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ARCHÆOLOGICAL HISTORY OF OHIO

THE MOUND BUILDERS AND LATER INDIANS

By GERARD FOWKE

PUBLISHED BY THE OHIO STATE ARCHÆOLOGICAL AND HISTORICAL SOCIETY

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PREFATORY NOTE

THE ARCHÆOLOGICAL HISTORY OF OHIO, which is herewith given to the public, is the consummation of a desire long entertained by the Ohio State Archæological and Historical Society. The Society is enabled to put forth this publication by means of the appreciative and generous assistance of the General Assembly, which made sufficient appropriations for the purpose in the years 1900 and 1902. Probably no work of equal character and completeness has been produced by any state in the Union. Certainly no other state affords such rich material for similar work. While the Archæological History of Ohio is published by the Society under the auspices of the state, it is to be regarded in no sense as a public document for gratuitous distribution.

For the preparation of this work the Society was fortunate in obtaining the services of Mr. Gerard Fowke, who has had extensive and varied experience as an Archæologist. He has conducted explorations for the National American Bureau of Ethnology; in 1884, at Flint Ridge in Licking county (Ohio); in 1885, in northern Mississippi, southern Ohio and northern Kentucky; in 1886, in western Pennsylvania, southern Illinois and western Kentucky; in 1887, in conjunction with James D. Middleton made surveys of aboriginal works in Licking, Ross and Pike counties; collected data for archæological map from Detroit to Duluth, principally along the lake shores, and to some extent in the interior of Michigan (northern and southern peninsulas), Wisconsin and Minnesota; then among the effigy mounds of Wisconsin and Iowa; thence down the Mississippi to Cairo and across western and central Kentucky. In 1891-2-3, examined the valleys of the James, Potomac, Shenandoah and South Branch, in Virginia, West Virginia, and Maryland, opening large numbers of mounds; made a partial map of the mounds and shell heaps along the Atlantic coast of Georgia and Florida. In 1892 visited Columbia, South America, and studied aboriginal remains. In 1893, studied the archæological localities in Virginia, West Virginia, Kentucky, Indiana and Ohio. In 1894 and 1896, studied the remains of the Norsemen on Charles river near Boston. In 1898, opened various cairns on Vancouver's Island (British Columbia), and explored the lower Amoor river in Siberia, for the American Museum of Natural History of New York.

Mr. Fowke has written extensively for publications, particularly the reports of the Smithsonian Institution and of the Bureau of Ethnology; in the American Anthropologist; Science; the American Naturalist; Folk Lore Journal; Ohio Archæological and Historical Quarterly; Ohio Geological Survey Reports; Denison University Bulletins; Ohio Academy of Science (special papers); the American Archæologist; Popular Science; Reports of Philadelphia Academy of Natural Science and numerous magazines and newspapers.

E. O. RANDALL,
Secretary Ohio State Archaeological and Historical Society.

Columbus, Ohio, April, 1902.

PREFACE

"There is more ado to interpret interpretations than to interpret the things, and more books upon books than upon all other subjects; we do nothing but comment upon one another."

* * * * *

This volume is not written for scientists or specialists.

Many persons interested in archæology are desirous of extending their knowledge, but have not the time, opportunity, or perhaps courage to wade through the vast amount of literature that has accumulated on this subject in the past fifty years. To lighten this labor, an attempt is made in the following pages to compile so much of it as relates to Ohio antiquities, and present it in convenient form. As certain features of Ohio archæology can not be understood when considered alone, there must be brought into the work a number of descriptions of remains outside her borders. This is the more necessary owing to the general impression that traces of the Mound Builders, wherever found or of whatever nature, belong to one race existing within one definite period of time.

To the writer has been assigned the task of preparing the manuscript and selecting the illustrations; the reproduction of the latter and the publication of the entire work has been assumed by the Ohio Archæological and Historical Society. Most of the figures, except those in the chapter on relics, have been borrowed from the sources indicated in the text. The explanation of abbreviated references will be found in the appendix.

GERARD FOWKE.

Chillicothe, Ohio, July, 1901.

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CHAPTER I

INTRODUCTORY

FROM the first knowledge of our prehistoric earthworks they have aroused a steadily increasing interest, with a corresponding desire to learn something definite in regard to their builders. This hunger for information has, for the most part, been fed on husks. Most publications relating to the subject, whether newspaper articles or bulky volumes, are the work of relic hunters, or persons whose curiosity is excited by something they have seen or heard, or visionaries seeking proof of a pet hypothesis — and generally finding it; careless, unskilled, and superficial observers, whose acquaintance with the science is derived mainly or in some cases entirely at second-hand, and whose statements are unsafe to rely upon no matter how honest their intentions. Many such have felt impelled to set forth explanations and theories in regard to recognized facts, the meaning of which was to them as a sealed book. Almost invariably something is taken for granted; partial examination of a limited field becomes the basis of arbitrary deductions respecting a wide range of country; hasty surmises appear in the form of definite assertions; indications and possibilities patched together with wild guesses, are recorded as established facts. Some works which have attained a wide circulation, so far from being accurate expositors of facts and trustworthy records of scientific knowledge, as they purport, are nothing more than expressions of opinion by one whose knowledge is only partial, generally incorrect, and interpreted in the light of very limited personal investigation. A few, unfortunately, bear the signatures of distinguished men whose successful work in some other profession or branch of science gives to their words the weight of authority when they decide, usually as a matter of recreation, to dabble in archæology. They too often consider it unnecessary to verify borrowed statements, or to do such field work as would enable them to determine the correctness of evidence upon which they proceed to build conclusions; they are satisfied

to cull from those who have preceded them, put their collections together in an attractive form, add a few pages of comments and deductions, mostly mere conjecture, and send forth a volume which, being accepted without question because of the authors' reputation, adds to the general confusion.

The erroneous and exaggerated statements and deductions contained in such writings have been deemed sufficient proof of a social organization such as would be possible only to a people possessing a far higher degree of culture than that of any tribe of American Indians of which there is record or tradition; so that in the end, there has been evolved a "lost civilization" for whose assumed existence writers largely ignorant of facts have deemed it necessary to account by inventing a great nation dominating all the country from the Atlantic Ocean to the Rocky Mountains, from Canada to the Gulf. There has been pictured out a dense population of busy people living in unity under fixed laws, despotic or indulgent, hierarchy, monarchy, oligarchy, aristocracy, anything but democracy, as may seem to the author best adapted to bringing about the conditions of which he considered himself the discoverer or sponsor, but always with the underlying principle of force and fear; tilling the soil, paying tribute, assembling periodically for adoration to a Great Spirit or homage to rulers, national games or religious festivals; digging mica in the east, mining copper in the north, diving for shells and pearls in the south, working flint quarries in various parts of the Mississippi Valley; practicing unknown and unknowable rites in the Scioto and Kanawha Valleys, animal fetichism in the far west, sun worship on the Mississippi. For these people, who are supposed to have preceded the known Indians, and to have differed from them in almost every respect, the expression "Mound Builders" has been appropriated as a distinctive title; and has been made elastic enough to embrace the authors of not only the remains in the Ohio Valley, but all the cognate works in the United States. Owing to the vague and discursive meaning usually attached to it, however, the term, so far from serving to assist the general reader in arriving at a correct understanding of prehistoric conditions, is really an obstacle in his way. At once his mind is sent drifting over the whole country, striving to comprehend in a single thought all manner of incongruous peoples and occupations. To popu-

lar conception, the Mound Builder is an illusory, mythological personage, who, in fairy-book fashion, roves through the sunny south, floats over northern lakes, traverses western prairies, wanders up and down great rivers. Reason or judgment can lay no firm hold on him in either time or space. The name appeals to imagination like a haunting strain from a forgotten song. It conjures up the shadowy outline of a being unlike any that ever existed on earth; who combines in harmonious relation qualities found only in the highest of educated races with those which never survive a state of savagery. Ignorant of metals, he was a skillful engineer; without a single animal that could be used as a beast of burden, he was a sucessful farmer; with no means of communication except canoes and messengers on foot, a central power, somewhere, was kept fully informed of all that occurred within a radius of a thousand miles. Moreover, almost his entire time was spent in conducting some sort of religious exercises or in defending himself against the attacks of enemies. There passes before us a panorama of priests, warriors, nobles, despots, slaves, a supreme ruler, a national religion, bloody wars, endless sacrifices, and all the characteristics of an empire like that of ancient Persia or Egypt; with the turning of a page we are in the midst of weapons, fortresses, look-out stations, ambuscades, sieges, battles, massacres, and "refuges of last resort."

It is remarkable that persons able to distinguish between the reasonable and the ridiculous will let their intellectual powers become so blurred by thrilling rhetoric or airy flights of fancy, as not to perceive the self-evident contradictions in a large majority of popular archæological writings.

The erroneous prevalent notions concerning native races of North America, whether of the past or present, created and confirmed by gross mistakes and manifest perversions of truth so widely circulated, are discouraging to those who have studied the subject and are desirous of presenting it in the proper light; and they have, as a general rule, withstood the attempts of experienced investigators to substitute for them more correct ideas of native life. Sensible and conservative statements of men who have classified the knowledge brought out by spade and trowel, and compared it with that recovered by diligent research from ancient records, make a feebler impres-

sion than the utterances of platform lecturers or contributors to popular periodicals, who find pecuniary returns directly proportional to the glamor in which they contrive to envelop their emanations.

But there have always been some who refused to accept the prevailing superstitions. They have preferred to examine the material from which the ideas are derived. For nearly a century a few delvers into the dust-heaps of vanished races have dug in a methodical instead of a desultory manner; have reported what they observed instead of what unfinished excavations may have led them to infer. Their enthusiasm, necessary for the prosecution of such work, has been subordinate to common sense; their deductions are based upon reason and reasons, and not upon imagination. The wide-spread mistakes and fallacies regarding the aboriginal inhabitants of the United States, need never have come into existence, had due regard been paid to the published material of men who were not content to accept superficial indications as final proof. But, unfortunately, such publications were few in number, concise in style, limited in extent, and worse than all, buried in "Proceedings," and "Transactions," and "Reports," of institutions, societies, and associations, and consequently as inaccessible to the public at large as if they had never been issued.

There is always room for difference of opinion on questions which must be solved by comparative or analytic study. But in matters where exact conclusions can be reached by any one who will be at the trouble to investigate properly, there is but one side. Systematic investigation has broken up this mythical "nation" into separate tribes whose relationship to one another, if indeed there be any, is very obscure. The variations in size, design, outward appearance, interior arrangements and contents, of enclosures, mounds, earthworks and stone structures, in different sections of the country, compel a belief that their inception and construction is due to several disconnected tribes. The remains of the upper half of the Ohio Valley are quite unlike those toward its mouth; the same is true of the Tennessee. The regions about the lower lakes, the upper Mississippi, the Gulf States, differ from one another, each having its own peculiar class. Central Kentucky has some features in common with southern Ohio and with the region south of Tennessee, while in other re-

spects it finds no counterpart elsewhere. In short, the whole Mississippi Valley may be divided into tolerably well defined districts not much larger than the state of Ohio, each possessing a class of remains which in some respects is distinctively marked off from all the others. It would very much simplify matters if, to each area which properly constitutes an archæological division, a name or title could be given which should belong to it alone. This would at once bring the science down to a geographical basis; and the soaring mind of the novice instead of ambitiously striving to attain a height whence it might survey with sweeping glance a vast prehistoric empire, could fold its wings and return to earth with the hope of finding something definite to work on. So far as the evidence now at hand tends to show, it would soon learn that all this wondrous, complex "civilization" rests upon no better foundation than earthen enclosures demanding only ordinary sighting and easily contrived apparatus to originate, patience and brute strength to execute; and the excavation from tumuli of articles not surpassing in any respect similar things made by modern Indian tribes in various parts of the country, but ecstatically proclaimed to be equal in design and finish to the finest productions of the most skillful potters, sculptors, and lapidaries in modern art centers.

In recent years archæological investigation has attracted a large force of careful, intelligent field-workers whose reports are models of scientific accuracy; and men fully competent to the task have reviewed these records, condensing and comparing them, formulating working theories, making broad generalizations, bringing order out of chaos.

With all that has been accomplished, however, archæology, as a science, is yet in its formative period. There are many unsettled questions concerning which very different or even opposite opinions are held by students equally qualified to decide, so far as thought and observation can prepare them; and these disputed points must await further discoveries for definite settlement.

CHAPTER II

PALEOLITHIC MAN

Paleolithic Man. The Evidence of His Existence. Objections to the Evidence. Necessity for Careful Examination.

A—IN EUROPE

UNTIL practical methods of utilizing metals were devised, weapons and implements for which a greater degree of hardness or a keener edge was required than was possible with wood or bone, had to be made of stone. The period during which these conditions prevailed is called the Stone Age. This had two distinct divisions; one in which a fragment or pebble was brought to the desired shape by comparatively rough flaking or chipping; and the other when much finer chipping came into practice, and rubbing or grinding was also resorted to. The first era is known as the Paleolithic ("ancient stone"); the second as the Neolithic ("recent stone"). It is not to be inferred that the later method superseded the earlier; it simply marked an advance in the knowledge and method of working in stone. The rudest patterns have been retained in use in nearly all parts of the world within recent times, and the terms really pertain to the form of the implement and to the process by which it is made, rather than to its age. The name "paleolith" or "paleolithic implement" is now restricted in the main to specimens mostly leaf-shaped or almond-shaped, not regular in outline, thick at the middle portion, rudely finished, and usually made of flint, quartzite, or argillite; though other rocks may be used when these are not to be procured. Most collectors are familiar with them under the name of "turtle-backs."

In England and France a large number and variety of articles made by human hands have been discovered in undisturbed gravel beds of the glacial period, and in caves partially or wholly filled with sediments of the glacial floods. At first these attracted

little attention; but when it was realized they meant for the human race an age far exceeding what any one had ever imagined, they naturally excited very great interest. Men of highest scientific standing carefully studied the relics and the deposits in which they occurred; and as a result of their investigations it is now generally considered an established fact that man, physically the same being that he is today, lived in Europe when a large part of that continent was covered with ice. Moreover, the character of his handiwork proves him to have been no mean artisan. His chipped flint implements, his carvings and etchings on bone, were fashioned and executed with a delicacy and precision beyond the reach of many primitive tribes of the present day. Such skill does not belong to the earliest stages of savagery or to a life allied with that of the brute creation. It indicates a long period of evolution toward an artistic sense; and after this was developed many centuries more would be required for the growth of such accuracy of perception and proficiency in the use of tools as these objects denote. Consequently the first appearance of man in Europe must date many thousands of years in the past.

B—IN AMERICA

THE "TRENTON GRAVELS"

When their presence with the earliest known human remains in Europe was well established, search was made for them in America. The first investigator, or at least the first to bring them to public notice, was Dr. C. C. Abbott, of Trenton, New Jersey, whose account of the discovery of paleolithic implements in the Trenton Gravels was practically the earliest record of them in this country. (Abbott, Chap. XXXII.) It started a controversy that has raged unceasingly, and is apparently no nearer a settlement than at the beginning.

The results of Dr. Abbott's explorations will not be described here, further than to reproduce a single extract which may be taken as a fair example of the discoveries on which his theories are based. He figures a specimen

> "Taken from the bluff facing the river, but two miles farther south than the exposure near Trenton, from which most of the specimens have been gathered. It was discovered in a *perpendicular*

exposure of the bluff, immediately after the detachment of a large mass of material, and in a surface that had but the day before been exposed and had not yet begun to crumble. The specimen was twenty-one feet from the surface of the ground, and within a foot of the triassic clays that are here exposed. Directly over it, and in contact, was a boulder of large size, probably weighing one hundred pounds; while at a distance of five feet above was a second much larger boulder. The character of the mass, which was that of the bluff on the bank of the river near Trenton, was such as to render it impossible that this specimen could have reached this position subsequently to the deposition of the containing bed." — Abbott, 506.

Various archæologists and others visited this locality at different times after Dr. Abbott has announced his conclusions; several of whom found specimens similar to those described, at a depth which emphatically dispelled any lingering suspicion that they could, in any manner, have made their way from the surface to the level at which they were found. No one questioned the correctness of this view, though some may have doubted it, until Mr. W. H. Holmes published the result of his investigations. His position is well shown in the following citation:

"The evidence employed to prove the presence of a race of men in the Delaware valley in glacial times is confined almost wholly to the alleged discovery of rude implements in the glacial gravels. Many visitors, men of high repute in archæology and geology, have visited the site, but the observations made on such occasions appear not to have been of a nature to be of great value in evidence, being doubtful works of art or not having properly established relationships with the gravels in place. I have elsewhere shown that they are not demonstrably implements in any case, that they are identical in every respect with the quarry-shop rejects of the American Indian, that they do not closely resemble any one of the well-established types of European paleolithic implements, and that they are not a sufficient index of a particular stage of culture.

"The gravels at Trenton were exposed in a steep, nearly straight bank, several hundred yards in length, the base of which was washed by the river. There can be no question that Dr. Abbott and others have found shaped objects of various classes upon the face of this river bluff. Dr. Abbott explicitly states that he has obtained certain of these specimens from the great outcrops, and that they were not in talus formations, but in undisturbed deposits. How, then, is it possible to do otherwise than accept these statements as satisfactory and final?

"It happened last summer that the city authorities decided to open a great sewer through this very bluff to get a lower outlet to the river. A trench twelve feet wide and some thirty feet deep, the full depth of the exposed gravels, was carried along the bluff just inside

of its margin. At no point for the entire length of the bluff did the excavation depart more than forty feet from the length of the terrace face—from the upper margin of the slope upon which such plentiful evidence of a supposed gravel man had been obtained. The opportunity for studying the gravels in all their phases of bedding, composition and contents, was really excellent, and no one could watch the constantly renewed exposures hour after hour for a month without forming a most decided notion as to the implement bearing qualities of the formation. Not the trace of a flaked stone, or of a flake or artificial fragment of any kind was found, and we closed the work with the firm convictions that the gravels exposed by this trench were absolutely barren of art. But Dr. Abbott claims to have found numerous implements in the bluff face a few feet away and in the same gravels. If this is true, the conditions of glacial occupation of this site must have been indeed remarkable. It is implied that during the whole period occupied by the melting of the ice-sheet within the drainage of the Delaware valley the hypothetical rude race lived on a particular line or zone afterwards exposed by the river to the depth of thirty feet, leaving his strange tools there by the hundreds, while another line or zone, not more than forty feet away at most, exposed to the same depth by an artificial trench, was so avoided by him that it does not furnish the least memento of his presence. One vertical slice of the gravel twelve feet thick does not yield even a broken stone, while another slice not probably one-half as thick, cut obliquely through the gravels near by, has furnished abundant material. That no natural line of demarkation between the two section lines is possible is shown by the fact that the formations are continuous, and that the deposits indicate a constant shifting of lines and areas of accumulation of the glacial deposits; thus it was impossible for any race to dwell continuously upon any spot, line or plane. The gravels were laid down entirely irrespective of subsequent cutting, natural or artificial; yet we are expected to believe that a so-called gravel man could have resorted for a thousand years to the space *a*, leaving his half-shaped or incipient tools at all stages of the gravel building from base to top, failing entirely to visit a neighboring space *b* only a few yards away, or to leave there a single flake to reward the most faithful search. The easier explanation of the whole matter is that the objects found by Dr. Abbott were not really in the gravels, but that they are Indian shop-refuse settled into the old talus deposits of the bluff.

"But this case does not stand alone. The first discoveries of supposed gravel implements, are said to have been made when the Pennsylvania Railway opened a road bed through the creek terrace on the site of the present station. At first numerous specimens of rudely flaked stones were reported and the locality became widely known to archæologists, but the implement-bearing portion of the gravels—and this is a most significant fact—were limited in extent, and the deposit was soon completely removed, the horizontal extension containing nothing. At present there are excellent exposures of the full thickness of the gravels at this point, but the most diligent search is vain, the only result

of days of examination being a deep conviction that these grades are and always were wholly barren of art. It thus appears that here as well as upon the river front, the works of art were confined to local deposits, limited horizontally, but not vertically, and a strong presumption is created that the finds were confined to redistributed gravels settled upon the terrace face in the form of talus.

"That the art remains of the Trenton region are essentially a unit, having no natural separation into time, culture or stock groups, is easily susceptible of demonstration. I have already presented strong reasons for concluding that all the finds upon the Trenton sites are from the surface or from recent deposits, and that all may reasonably be assigned to the Indian. A find has recently been made which furnishes full and decisive evidence upon this point. At Point Pleasant, on the Delaware, some twenty-five miles above Trenton, there are outcrops of argillite, and here have been discovered recently the shop sites upon which this stone was worked.

"There are two features of these shops to which the closest attention must be given. The first is that they are manifestly modern; they are situated on the present flood plain of the Delaware, and but a few feet above average water level, the glacial terrace here being some forty or fifty feet in height. These shops, therefore, represent the most modern phase of aboriginal industry. The second point is that every type of flaked argillite found in the Trenton region, associated with the gravels or otherwise, is found on this site. Here are found great numbers of the rude failures, duplicating every feature of the mysterious 'paleolith' with which our museums are stocked, and exhibiting the same masterly quitting just at the point 'where no further flaking was possible.' The evidence relating to paleolithic art in the eastern United States, so imposing in books and museums, shrinks away surprisingly as it is approached. The evidence furnished by the bluff face and by the railway cutting, the two leading sites, is fatally weakened by the practical demonstration of the fact that the gravels proper are at these points barren of art remains. The articles themselves, the so-called gravel finds, when closely studied, are found to tell their own story much more fully and accurately than it has heretofore been read by students of archæology. This story is that the art of the Delaware valley is to all intents and purposes a unit, that there is nothing unique or especially primitive or ancient and nothing un-Indian in it at all. All forms are found on demonstrably recent sites of manufacture. The rude forms assigned by some to glacial times are all apparently 'wasters' of Indian manufacture. The large blades of 'Eskimo' type are only the larger blades, knives and spear points of the Indian separated arbitrarily from the body of the art-remains to subserve the ends of a theory. The question asked in the beginning, 'Are there traces of man in the Trenton gravels?' if not answered decisively in the negative, stands little chance, considering present evidence, of being answered in the affirmative." — Holmes, Trenton, 17, *et seq.*

On the other hand, Professor G. F. Wright, an ardent advocate of Dr. Abbott's views, in reply to this and other articles of Mr. Holmes, says : —

"The sum of Mr. Holmes's effort amounts, however, to little more than the statement that, with a limited amount of time and labor, neither he nor his assistants had been able to find any implements in undisturbed gravel in any of these places; and the suggestion of various ways in which he thinks it possible that the observers mentioned may have been deceived as to the original position of the implements found. But, as had been amply and repeatedly published, Professor J. D. Whitney, Professor Lucian Carr, Professor N. S. Shaler, Professor F. W. Putnam, of Harvard University, besides Dr. C. C. Abbott, all expressly and with minute detail describe finding implements in the undisturbed gravel at Trenton, which no one denies to be of glacial origin. In the face of such testimony, which had been before the public and freely discussed for several years, it is an arduous undertaking for Mr. Holmes to claim that none of the implements have been found in place, because he and his assistants (whose opportunities for observation had scarcely been one-twentieth part as great as those of the others) had failed to find any." — Wright, 2nd., xii.

And again : —

"Mr. Holmes has made a general attack upon all the evidence of glacial man in America; but the most which he proves is that he himself has not found any direct evidence, while the various hypotheses to which he resorts to discredit other witnesses are far more improbable than the existence of glacial man is. It is necessary to state also that his drawings of the supposed condition of the gravel banks when the implements were found are grossly misleading, and some of them absolutely impossible; while one of the theories to which both he and Professor Chamberlin * * * continually resort to account for the possible burial of implements at a depth of from ten to fifteen feet in the gravel is abundantly disproved by facts. The theory is that the implements may have worked down through the holes made by the decay of the tap-roots of trees; but, besides the fact that no instance of that sort has ever been observed, there is superabundant evidence at Trenton, N. J., that, while flint and jasper implements are very abundant in the upper foot of surface soil, below that level only argillite implements are found. Over a considerable area, however, Mr. Ernest Volk assures me that there is not a square yard of the Trenton terrace that will not yield some argillite chippings below the depth of two feet. To credit the tap-roots of trees with the intelligence required to sort out argillite fragments from flint, and permit them alone to settle in the gravel, is more than even a well-supported theory could endure. In short, Mr. Volk's extensive and careful excavations at Trenton, under the direction of Professor Putnam, are establishing beyond all controversy the correctness of the early inferences both of Dr. Abbott and Professor Putnam,

that there were three well-marked periods of occupation of the Delaware Valley by the human race, namely, 'the Palæolithic or the oldest, the flaked argillite or middle, and the Jasper or Indian.'" — Wright, 4th, xiv.

The reader may, if he chooses, peruse several volumes and many articles in scientific and other journals, upon this subject, only to find that he has the gist of them in the above quotations. While Professor Wright is one of a large company, Mr. Holmes also has many adherents ; and neither side shows any inclination to recede from the advanced position it has taken. There was sufficient evidence of this at the American Association meeting for 1897, where the question of artificial objects in the Trenton gravels was thoroughly discussed. A brief resume of each speaker's statement is appended :

F. W. Putnam.—"I, for one, am perfectly satisfied that the objects are of the same age as the deposit in which they are found. That the region of the Delaware valley was inhabited by man in very early times is beyond doubt. He must, moreover, have been somewhere on the continent, while these early deposits were forming, to have reached this spot at the close of the glacial period when the region became habitable. It is for the geologists to tell us the age of these deposits."

H. B. Kummel.—"The deposit in which the implements occur is, in my opinion, dune-sand, accumulated after the river had partly or completely excavated its trench below the level of the Trenton terrace."

J. G. Knapp.—"It is my opinion, based on a recent visit to the spot, that the implement-bearing sand deposits were of wind origin, accumulated since the river had cut its trench below the level of the upper Trenton terrace."

R. D. Salisbury.—"The relic-bearing sand may be of aqueous origin, dating from the close of the last glacial epoch; it may be of aqueous origin of later age; and it may be æolian. Whatever its origin, it may safely be said that the surface material down to the lowest depth at which the relics have been found has been so disarranged that no affirmation can be made concerning the origin of the relics it contains."

G. F. Wright.—"The evidence that the implements found forty-one inches below the present surface, and only five inches above the action of acknowledged glacial floods, belong to the deposits of the glacial floods, is sufficient, I believe, to convince any one who comprehends all the facts."

W. H. Holmes.—"In 1892 a great sewer trench, 33 feet deep, was cut, parallel with the river bank, at the very point where so many shaped stones had formerly been found. Though we kept up the search in this trench for five weeks as the work of excavation went on—not a chip was found, not a trace of man. The conclusion reached is that there must have been an error in the observations that could produce hundreds of flaked stones from obscure or partial outcrops at a given spot in a

crumbling bank when not a trace can be found at the same point when the beds are fully exposed. It may be regarded as substantially proved that the glacial gravels proper contain no relics of art."

H. C. Mercer.—"I was forced to conclude that a significant number of artificial chips rested in situ in the sand, and hence were of an age antedating its deposition. The age of the sand remains to be settled."

Arthur Hollick.—"There seems to be no doubt that this sand is a water deposit, and is of glacial age. There is apparently no break in the sequence of deposition from the coarse gravel below, through the fine sand containing clay seams, up to the surface soil,—the entire series representing successive periods of flood and sedimentation."

Thomas Wilson.—"The entire examination on which all these conclusions are founded, except that of Holmes based on the trench, had no bearing upon the paleolithic period, nor upon the existence of paleolithic man, nor on any of the objects of his industry. The stratum of glacial gravels, to which the paleolithic objects are claimed to belong and wherein they have been found, was not examined nor considered. If the sand is glacial, man is glacial; if it is not, the question is just where it was at the beginning."

T. C. Chamberlin.—"It seems to me in so far as this question is typical of the problem of glacial man, it should put all of us in an attitude of firm conviction that at present there is no positive evidence, and in that negative attitude we can rest. As to the existence of man in America in the glacial period, I know of no evidence today that is of scientific value bearing on that point."

R. D. Salisbury.—"As to whether we would not regard the implement found underneath the boulder as having been in place in the gravel, I would say, most emphatically no. The river undercuts the bluff. Most emphatically anything found behind a boulder on the slope would be open to great suspicion."

E. W. Claypole.—"The evidence that we have been discussing this afternoon is, as you know, entirely in regard to Trenton, and has no bearing on other localities."

W J McGee.—"Fifteen years ago there was hardly an archæologist who did not regard the Trenton region as affording conclusive evidence of glacial man; today the manner in which the evidence has been torn to shreds is apparent to every one."—A. A. A. S., 1897, 347-390.

Years before this, however, Lewis had said :

"The geological investigations along the Delaware Valley, * * * throw quite a new light upon this subject. They show that the implement-bearing gravel is of post-glacial age, and is a river deposit of comparatively recent formation; and that neither in the gravels of the Champlain epoch, nor in deposits of any previous age have any traces of man been discovered. The evidence appears to indicate the appearance of man at a time which, geologically considered at least, is recent." "It was very interesting to find that it was only within the limits of the

Trenton gravel * * * that Dr. Abbott found implements below the surface."

"The conclusions to which the facts seem to point may briefly be summarized as follows:—

"1. That the Trenton gravel, the only gravel in which implements occur, is a true river deposit of post-glacial age, and the most recent of all the gravels of the Delaware Valley.

"2. That the paleoliths found in it really belong to and are a part of the gravel, and that they indicate the existence of man in a rude state at the time when the flooded river flowed on top of this gravel.

"3. That the data obtained do not necessarily prove, geologically considered, an extreme antiquity of man in Eastern America." — Lewis, Gravel, 306-9.

In another place, Lewis says :

"The Trenton gravel is truly a post-glacial deposit, but still a phenomenon of essentially glacial times — times more nearly related to the Great Ice Age than to the present. No implements could have come into this gravel except at a time when the river flowed upon it, and when they might have sunk through the loose and shifting material. At the time of the Trenton gravel flood man lost his stone implements in the shifting sands and gravel of the bed of that stream." — Lewis: Gravel, 339, condensed.

"It may be that, as investigations are carried further, it will result not so much in proving man of very great antiquity as in showing how much more recent than is usually supposed was the final disappearance of the glacier." — Lewis: Gravel, 340.

In substance, then, we are told, in regard to the geological formation : —

That the gravels and sands were deposited by floods from the glacier in the period when this was at its greatest development.

That they were, if glacial at all, due to a glacier of more recent origin than the one which carried down material found a short distance away.

That they were not laid down until the glacier had much receded, and were then washed down and spread out by the river.

That the upper portion of the deposit was blown in from the surrounding country and spread out by the winds.

As to the specimens in dispute: —

The lower ones are genuine paleoliths, similar in every respect except material, to those of undoubted glacial age found in Europe.

They are broken, imperfect, and rejected specimens of modern Indian manufacture.

They are found promiscuously in the entire area, at all depths.

They are confined to the surface, or to the talus formed by crumbling banks, or to other situations whither they have come from a higher level.

Different materials and types are stratified in regular order.

All sorts are found at the same level.

The whole series denotes three distinct periods of occupation and of culture, reaching back to an immeasurable antiquity.

They are all of one general class, and belong to one era, which there is no necessity for believing to cover more than a few centuries.

When men of such ability, who have devoted much time to a close investigation of the region, are unable to come to an agreement on any one of the important points at issue, a person less informed has no right even to hold an opinion, much less to express one, upon any phase of the matter.

GLACIAL MAN IN OHIO

The discovery of these implements at Trenton, led archæologists to believe that similar vestiges of man's presence could be found in the valley of the Ohio and its principal tributaries. The series of gravel beds in the two regions are practically of the same age, belonging to the period immediately following the recession of the ice-sheet after it had reached its southernmost limit ; and were deposited by the great floods resulting from the melting ice. Consequently, Ohio archæologists have a direct interest in Trenton gravels and in the evidence they contain of human life. The final decision, whatever it may be, as to the existence of man at that time and place, will apply equally to our own state. What is true of one locality, in this respect, is true of the other. Should the scientific world agree that the specimens over which the warfare is waged are undoubtedly the work of "glacial man," no reason can be urged, so far as is now to be seen, for assigning a different origin to Ohio relics found under the same conditions. If, on the other hand, it is decided that the American Indian, using that term in its ordinary accepted meaning, is the author of the so-called "paleoliths" of the Delaware valley, similar implements found in Ohio, regardless of the conditions under which they occur, must take their place in the same classification. The future may, however, disclose something which will modify, or even reverse this assertion.

Thus far, objects which seem to indicate the presence of man in Ohio prior to the final disappearance of the ice-sheet, have been found in four different sections of the state. The first was recorded by Dr. C. L. Metz, who in 1885, "discovered a flint implement of paleolithic type in undisturbed strata of the glacial terrace of the Little Miami," at Madisonville. It was eight feet below the surface. (Wright, 250.) The formation in which it was found is gravel and coarse sand, of a grayish color; on this is about eight feet of fine grained sand-and-clay soil, having the yellowish color characteristic of alluvial deposits in this region. The implement is formed from a small pebble of basanite. One end had not been worked, but retains the natural surface; this has the rounded, water-worn appearance common to stones from streams or gravel beds. On the chipped portion the small facets produced by removal of the flakes are smooth and glossy; the angles where they meet are sharp as if recently made. The dirt has been thoroughly cleaned from its surface; but in minute crevices the microscope shows a fine-grained, yellowish deposit, closely resembling the surface soil and totally different from the coarse gray sand in which it was imbedded.

This specimen was found in a partially completed cistern; one of the diggers noticed it sticking in the wall, and pointed it out to Dr. Metz, who first noted its position and then removed it with his own hands. There can be not the slightest doubt that Dr. Metz found it in exactly the place and condition he describes. How it got there is another question. Mr. Holmes says in regard to it: —

> "I have examined the specimen * * * and find it to be identical in every essential feature with typical rejects of the modern blademaker, lacking the least indication of specialization. It is not safe to call it an implement, no matter what its age, and to present it as evidence of paleolithic culture is little short of folly." — Holmes, Traces, 154.

In 1887 Dr. Metz found another implement on the opposite side of the river from Loveland, a few miles from Madisonville. This was thirty feet beneath the surface. (Wright, 250.) It is coarsely chipped and has evidently been through a rather rough experience, as the facets and edges are blunt and rounded in just such manner as would result from attrition against other stones in a strong current.

"On carefully examining the Loveland specimen, I found it partly covered with dark, well-compacted earth, resembling the soil of the surface of the terrace, rather than the light-colored, fine-grained calcareous powder characterizing the matrix, such as there is, of the gravel deposits." — Holmes, Ohio, 163.

The next discovery was at Newcomerstown, Tuscarawas county, where in 1889, W. C. Mills found

"A finely shaped flint implement sixteen feet below the surface of the terrace of glacial gravel. Except for the difference in the material from which it is made, it would be impossible to distinguish it from [a certain type of paleolithic implement found in France]. The similarity of pattern is too minute to have originated except from imitation." — Wright, 250-1.

The last sentence is a little obscure. If there was any way in which glacial man at Newcomerstown could have found the opportunity to exercise his powers of "imitation" at such long range as to the region of Central France, the method should be fully explained and not left to conjecture.

Later it was explained explicitly that

"Mr. Mills found this specimen projecting from a fresh exposure of the perpendicular bank, fifteen feet below the surface. He thrust his cane into the coarser gravel which is seen to overlie the finer deposits. This resulted in detaching a large mass about six feet long and two feet wide, which fell down at his feet. It was in the face of the bank behind this mass that Mr. Mills discovered the implement. There is no possibility of mistake concerning the undisturbed character of the gravel from which he took the implement. All the strata were clearly exposed and observed by him." — Wright, 1893.

When Mr. Holmes visited this place, the gravel bank had been so altered by the removal of material for railway ballast that he was compelled to study parts several feet from where the implement was obtained; but the general character of the whole mass was so uniform that he felt justified in certain inferences concerning the manner in which it may have reached the spot where found. The publication of his report brought the following criticism from Professor Wright.

"In the case of the discovery at Newcomerstown, Mr. Holmes is peculiarly unfortunate in his efforts to present the facts, since, in endeavoring to represent the conditions under which the implement was found by Mr. Mills, he has relied upon an imaginary drawing of his own, in which an utterly impossible state of things is pictured. The claim of

Mr. Holmes in this case, as in the other, is that possibly the gravel in which the implements were found had been disturbed. In some cases, as in Little Falls and at Madisonville, he thinks the implements may have worked down to a depth of several feet by the overturning of trees or by the decay of the tap-root of trees. A sufficient answer to these suggestions is, that Mr. Holmes is able to find no instance in which the overturning of trees has disturbed the soil to a depth of more than three or four feet, while some of the implements in these places had been found buried from eight to sixteen feet. Even if, as Mr. Chamberlin suggests, fifty generations of trees have decayed on the spot since the retreat of the ice, it is difficult to see how that would help the matter, since the effect could not be cumulative, and fifty upturnings of three or four feet would not produce the results of one upturning of eight feet. Moreover, at Trenton, where the upturning of trees and the decaying of tap-roots would have been as likely as anywhere to bury implements, none of those of flint or jasper (which occur upon the surface by tens of thousands) are buried more than a foot in depth; while the argillite implements occur as low down as fifteen or twenty feet.

"To discredit the discoveries at Trenton and Newcomerstown, Mr. Holmes relies largely upon the theory that portions of gravel from the surface had slid down to the bottom of the terrace, carrying implements with them, and forming a talus, which, he thinks, Mr. Mills, Dr. Abbott, and the others have mistaken for undisturbed strata of gravel. In his drawings Mr. Holmes has even represented the gravel at Newcomerstown as caving down into a talus without disturbing the strata to any great extent, and at the same time he speaks slightingly of the promise which I had made to publish a photograph of the bank as it really was. In answer, it is sufficient to [refer], first, [to] the drawing made at the time by Mr. Mills, to show the general situation of the gravel bank at Newcomerstown, in which the implement * * * was found; and, secondly, [to] an engraving from a photograph of the bank, taken by Mr. Mills after the discovery of the implement, but before the talus had obscured its face. The implement was found by Mr. Mills with its point projecting from a fresh exposure of the terrace, just after a mass, loosened by his own efforts, had fallen away. The gravel is of such consistency that every sign of stratification disappears when it falls down, and there could be no occasion for a mistake even by an ordinary observer, while Mr. Mills was a well-trained geologist and collector, making his notes upon the spot." — Wright, 2nd., XIII.

Part of Mr. Holmes' conclusions were based upon certain observations which are thus stated : —

"At Warsaw, in Coshocton County, fifty miles west of Newcomerstown, I visited an exposure of gravels in a railway cutting, the conditions being almost identical with those at Newcomerstown. The terrace, as in the other case, has been occupied by Indian flint workers, and being in the proximity of extensive flint quarries, there is much

refuse of manufacture. * * * The redistributed deposits along the base of the steep slope were well reset, and from these I obtained a number of flaked flints; several of which were firmly imbedded, and two of them were removed from the gravel with some difficulty and with the aid of a pick, one twenty-five and the other twenty-seven feet beneath the surface of the terrace. * * * In a case like this even the experienced scientific observer, whose attention had not been definitely called to the nature and far-reaching significance of such finds, might from a casual observation have recorded the discovery of one or more of these objects from the gravel. * * * These specimens were in the gravels, firmly imbedded, and to all appearances this particular portion of the deposit was in a normal condition." — Holmes, Ohio, 167.

In summing up the evidence for and against the claim of great antiquity for these three specimens, Mr. Holmes concludes: —

"The finds are not demonstrably implements but have the characteristics rather of rejects of manufacture." — Holmes, Ohio, 170.

The next discovery of this character is reported as follows. It seems convincing; but there has been no discussion of it.

"Below Brilliant, Jefferson County, Ohio, a very fine remnant of high-level river terrace ranges from sixty-five to eighty feet above low water. Excavations in this terrace to a depth of forty-three feet show it to consist of interstratified sand, fine gravel, and clay in small quantities, all with rare exceptions cross-bedded. Coarse gravel is found at the top of the terrace; but, except for two or three feet on top, only rare pieces of gravel occur of more than one-half cubic inch in size. At the southern end of this terrace I found a plainly-marked but rude flint implement imbedded in the freshly exposed face of the stratified sand and gravel, under about eight feet of undisturbed cross-bedded stratification, only the point of the implement showing on the perpendicular face of the excavation. The condition of the stratification in all of the superincumbent eight feet, which was closely examined by me, was such as to convince me that the implement was not intrusive, but had been deposited with the remainder of the material from the terrace.—*Sam Huston.*" — Wright, 1895, condensed.

Finally New London, Huron county, yields several specimens found under circumstances which are difficult to explain on any hypothesis that does not assign to them an extreme age. Chief in interest is one bearing no resemblance whatever to anything ordinarily classed as paleolithic, but presenting, nevertheless, stronger proof of the existence of man in Ohio before the

close of the glacial period, than does any of the other implements recorded. An abstract of the evidence is given.

"Mr. E. E. Masterman, of New London, Ohio, found a grooved stone axe two miles from that town, at a depth of twenty-two feet. The upper eight feet, from the surface, was a very firm clay, yellow above and blue below, with small stones; under this were thirteen feet of silty material, very tough toward the bottom and requiring the use of a pickaxe for its removal. Interbedded in this were streaks of sand one or two inches thick. Last was about one foot of coarse gravel, yielding water, and containing some small subangular stones. Beneath all this was a very tough, blue clay impervious to water. Imbedded to about one-half its thickness in this last clay, lay the implement. It is a grooved stone axe four inches long, two inches wide, and one inch and a half thick. It is made of the hard, banded, green slate so common in the drift of some parts of Ohio. It is deeply weathered and pitted, so that on the surface it looks like a piece of ordinary 'rotten stone'; this weathering extends to the very middle, there remaining only a trace of the original stone retaining the green color and hardness. Concentric limonite stains furnish conclusive proof that the whole process has taken place since the stone received its present form. It would be utterly impossible to produce such an implement fraudulently. It was deposited when the thin gravel bed in which it lay was formed, as it lay directly upon the boulder clay. The natural surface is a plain, with no quarry-face or water-course within a long distance. The thin streaks of sand in the clay absolutely preclude any supposition that the ground had been previously disturbed, while the great depth (twenty-two feet) and the nature of the soil passed through exclude all other theories that have been advanced in similar cases to account for the presence of implements in glacial gravels, such as falling into cracks, rotten root holes, etc. If there is no other origin or date for the fine clay and streaks of sand that overlie it than that which assigns them to late glacial time then the tool must be set down to the same epoch and must be considered the work of glacial man." — Claypole, 304, *et seq.*, condensed.

"The geological situation at New London, Ohio, is this: The watershed between the Great Lakes and the Ohio is but a few miles to the south, and drains to the north through the main valley of Vermillion River. The land about New London is level for several miles, and is about two hundred feet below the summit of the watershed. There is no opportunity for any disturbances to have occurred subsequent to the glacial period; but in the retreat of the ice from the watershed a temporary glacial lake doubtless occupied the upper part of the valley of Vermillion River, emptying its waters into a tributary of the Mohican, and thence into the Muskingum and the Ohio. But this lake evidently did not exist for a great length of time.

"Heretofore numerous flying reports of the discovery of implements in the glacial till have been made, but this is the first instance

where the evidence has seemed in itself altogether convincing and satisfactory." — Amer. Nat., October, 1896, 784.

Such is the evidence offered so far, of paleolithic man in Ohio ; five specimens from four localities. The New London ax is neolithic in form, material and finish ; no relic of the sort has ever been exhibited or reported as occurring with the paleolithic objects of Europe, and it differs from modern axes in no other respect than its extreme alteration from weathering. Even if the latter condition is due to greater energy of chemical elements in the earth surrounding it, the great depth at which it was found and the apparent integrity of overlying strata, afford better evidence of its antiquity that can be claimed for the chipped objects. The unbroken layers above the latter, though very strong testimony in their favor, do not constitute positive proof. When a bank or face is formed by excavation, erosion, or otherwise, in a glacial deposit, it is quite possible for a mass of sand, clay and gravel to fall or slide from a higher to a lower level without in the least disturbing the regular arrangement of the strata. A good example of this was shown some years ago in a gravel pit at Weaver's Station in Darke county. The workmen came to a thick layer of fine sand, about fifteen feet below the surface, which they dug out as far as they could reach with their shovels leaving a cave or recess beneath the undisturbed strata above. With the next period of wet weather this mass slipped down so gradually that although the bottom was pushed out far enough to cover the track at its base, there was not the slightest crack in the upper part along a distance of more than thirty feet. Both ends of the dislodged mass, however, were so broken as to resemble ordinary talus. If by any chance a worked stone found its way into the cavity left by the workmen, it may some day come to light and furnish *prima facie* evidence of glacial man in a new locality.

During his explorations in a mound 27 feet high, in Florida, Mr. Moore found trouble because

"So great was the height of the mound that frequent slides of masses of sand were unavoidable, and thus exact depths of objects found were often unobtainable, though at times close estimates were to be had since sections of the mound, sliding down a few feet as a whole, retained their integrity, holding undisturbed human remains and associated objects." — Moore, Duval, 33.

An object found in the vicinity of a stream, at a depth less than the bottom of its bed, is not to be accepted, no matter what its form or its situation, as unquestionably the handiwork of paleolithic man. A hole cut in a bank by one flood will often be filled by the next one; and in a short time this place can hardly be distinguished from the natural deposits around it. A layer of compact material may be left standing as a shelf on which caving banks above will pile material that will soon become equally solid. Either process may be repeated in the same spot; and surface specimens can easily be carried into such places and buried from sight. Furthermore, the streams in the glaciated districts of Ohio have worn their beds from the level of the highest terraces bordering them, to that at which they are now found; this erosion was much more rapid in former times than at present. The shifting of such streams from side to side of the alluvial lands through which they flow is also quite rapid in some cases; it being not unusual for a river or creek to change its course scores of yards in a single generation, cutting away the earth on one side and filling it in at a lower level on the other. With a rapid current to carry away the detritus, a stream will in this manner often produce a nearly vertical bank to the top of any terrace against which it may impinge ; and when it again makes its way toward the opposite side of the valley, denudation will give to this bank a slope whose inclination will depend upon the character of the material and the length of time given to atmospheric agencies for their action. These alterations have been continually in progress since drainage was established along its present lines. The terraces with a thickness of fifty feet or more along our rivers and creeks owe their formation to precisely the same causes that are daily creating the minor bars along the shores of these streams ; the difference is merely in the diminished forces now at work. The most skilled glacialist is liable to be deceived by the arrangement of secondary terraces. It will be apparent therefore, that great caution is to be exercised by those who are seeking for paleolithic implements; many things, as indicated above, are to be taken into consideration. There are various ways in which a stone implement that was once on top of the ground, or in the soil near the top, may now be found in clean gravel much below the present surface, some distance from

the nearest stream or at a considerable elevation above it; or may be covered by a mass of earth nearly equal in thickness to the highest gravel bank whose foot is reached by the water. The discovery of an implement, no matter how rudely finished, under such circumstances, is by no means to be accepted as indubitable evidence that man existed in that locality during glacial floods. To establish beyond controversy the fact of human existence during, or at the close of, the glacial period, it must be shown that these implements are scattered promiscuously throughout gravel which has remained as it was originally deposited ; and it is necessary to prove incontestably that the gravel or sand in which the specimen occurs still retains the exact position and condition in which it was laid down at the beginning. The latter fact can be determined only by geologists who have made a close and careful study of such deposits in every phase of their complicated structure.

The question must remain an open one until the claims of those who advocate and those who deny that man lived in Ohio, or in America for that matter, while the ice-sheet held dominion, are less open to dispute than they are at present. Even should every assertion yet made of discoveries in the drift be substantiated, the age of man would not be carried to such a remote time as many assume.

"Not a few cases have been brought forward in which human relics have been found in such association with glacial deposits as to point strongly to the conclusion that both were of the same age. But in all these cases the deposits in question belong to the very latest stages of the Glacial era and were the work of the retreating ice or even of the torrents that flowed from it after the area in which the remains were found had been left bare. Consequently, if every one of these cases was logically unassailable, and its evidence positively conclusive, the only inference would be that man was a denizen of North America during the final withdrawal of the ice, that he hung Esquimaux-like on its borders and followed it as it withdrew to the northward. Of any earlier date than this, therefore, for man in North America we have no evidence whatever." — Claypole, 302.

It is probable that reports of discoveries of this character will multiply with the increase of excavations of glacial deposits ; there are many persons who are given to such "practical jokes" as making false statements regarding circumstances under which specimens are found, or deftly concealing desirable objects in

places where they are being sought. Nor is it at all difficult to find a laboring man who will embrace the opportunity of adding a dollar to his day's wages when he can get it by sticking into the sand at the bottom of a cellar or cistern a rude specimen which he has picked up on the surface, and calling the attention of a collector to it. All the greater need, then, for one to whom may not have been afforded the opportunity for a large field of study, to be chary of hasty deductions. Such practices are by no means uncommon or of recent origin; early in the century the same warning was uttered.

"That some persons have *purposely* lost coins, medals, etc., etc., in caves which they knew were about to be explored; or deposited them in tumuli, which they knew were about to be opened, is a well-known fact which has occurred at several places in the western country."—Atwater, 120.

There is one question which has never been answered in a satisfactory manner; namely, how did these relics get to the places where they are found? The sharp angles, unworn facets, and general "new" appearance of such specimens as that from Madisonville, prove them never to have been subjected to the abrasion which rounded the quartz and diorite pebbles associated with them. If it be claimed that they were lost at or near the spots where we find them, how are we to account for the losers being on the icy waters? Certainly no people able to manufacture boats of any kind would have failed to make tools with which the boats could be constructed. Aquatic animals could not be reached from the shore; and while some land animals may have fled to the water when wounded, and their bodies been carried out of reach, some trace of their bones must survive along with the weapon to which their death was due. None have been reported. Neither has any trace of a habitation been found. In warm countries naked savages may rove at will, subsisting on natural products of the soil and such animals as they can knock over with clubs; but living at the foot of a glacier they would require shelter and clothing more substantial than could be prepared with these rudely chipped flints. If they had better tools, we should find them; if they had not, we can not understand how they lived in their frigid climate. On the other hand, if these be surface specimens that have in some mysterious way

made their way into the earth, why do we not find more of them ; and why do we not find finished articles as well?

There are continual reports in newspapers and other publications regarding the occurrence of some object or other at a very great depth or under circumstances which, if true, would set it back to a very remote date. Many of them are as well authenticated as stories of finding aboriginal relics in the drift. As examples, a few quotations follow, whose authors were tolerably accurate observers and who would indorse no statement of whose truth there seemed, to them, to be any reasonable doubt. It is safe to assert that in every case such as these some significant fact has been overlooked, which would explain in a rational manner the seemingly marvelous discovery. If, however, the reports be correct, some of them are far more remarkable than the discovery of paleoliths or any other implements under any depth of gravel.

Schoolcraft refers to "the discovery [before 1818] of a small antique-shaped iron horse-shoe, found twenty-five feet below the surface in grading one of the streets [presumably at Marietta], and the blunt end, or stump of a tree, at another locality, at the depth of ninety-four feet, together with marks of the cut of an axe, and an iron wedge." — Schoolcraft, 17.

"At Portsmouth, Ohio, six or seven [large sea-shells] were found buried in the soil, beneath the parallels of the great work. They were at a depth of twenty-five feet in river alluvium." — Whittlesey, Works, 19.

Schoolcraft reports that at Shawneetown salt-works a pot of 8 or 10 gallons capacity was found at a depth of 80 feet.— Drake: Ab. Races, 62.

Short quotes a statement of Dr. Furness: —

" Near Waynesville, Ohio about the year 1824, on top of the hill on the east side of the Little Miami River forty or fifty feet above the level of the stream," a well-digger "at the depth of thirteen or fourteen feet came to a dark mould about two feet deep, on the top of which was a *thimble and a piece of coarse cloth.*" "The removal above after passing through the soil consisted of solid clay of a yellowish-brown color." — Short, 126.

It is stated that Dr. Edward Orton believed the find authentic ; though no explanation is forthcoming as to the manner in which these articles may have reached the place where found.

" Dr. McMurtrie relates in his 'Sketches of Louisville' that an iron hatchet was found beneath the roots of a tree at Shippingport, upwards

of 200 years old." He mentions "that walls of bricks and hewn stones have been discovered in the western country" — presumably prehistoric. These were "about 18 feet below the surface of the ground;" while the discoverers "who came upon them in digging" were examining their find "water broke in upon them and they were obliged to make a hasty retreat." — Drake: Ab. Races, 62.

In the excavation of the Louisville canal "the workmen came, at the depth of fourteen feet below the surface of the *calcareous rock* to a brick hearth, covered with what appeared to be the remains of charcoal and ashes." — Schoolcraft, 20.

"Col. C. C. Jones, of Augusta, Georgia, recorded the finding of some rudely-chipped, triangular-shaped implements in Nacoochee valley, which in material, manner of construction, and in general appearance, so nearly resemble some of the rough, so-called flint hatchets belonging to the drift type that they might very readily be mistaken the one for the other. A cutting had been made through the soil and the underlying sands, gravels, and boulders down to the bed-rock. Resting upon this, at a depth of some nine feet from the surface, were the three implements described. But the great terminal moraine lies more than four hundred miles away to the north, and consequently these objects do not fall within our definition of true paleolithic implements. The same thing may be said in a less degree of the implements discovered in the gravels and clays of the valleys of the James River." — Winsor: History, I, 344, condensed.

"C. T. Wiltheiss incloses testimony of A. J. Templeton and Joseph Defrees with reference to finding two tablets in a gravel bank within the corporate limits of Piqua, Ohio, on the land of Wilson Morrow. One of these tablets was 15 feet from the surface, which was covered with four feet of loam. On the surface of the object were 'characters' and in the center lead was inserted. The second was found the next day in the loose gravel which had caved down." — Sm. Rep., 1881, Editor's abstract.

Wiltheiss was a man of more than ordinary intelligence, a close observer, and was firmly convinced that these tablets were found in undisturbed earth at the depth mentioned. The lead, however, is sufficient proof that they were not prehistoric.

"In the State of Ohio, near Chillicothe, was found a stump, with the marks of an axe upon it, 90 feet below the surface."

"In the summer of 1819, not far from Franklinton, on the Scioto, in digging a well, after the workman had descended sixty feet, he found a piece of brass, the remains of a boiler, and a part of a tree, which had been partly burnt." — Haywood, 302.

This may be one of the stumps referred to in the next extract; although the author says they "were found at the depth of sixty feet, in digging a well."

"One writer has said, that they had evidently been cut by a metallic instrument—that the marks of an axe were visible, and that chips, in a state of perfect preservation, were found on and near them. Another has stated that the rust of iron was seen on them; and a third has affirmed that an axe was found near them. Neither of these statements is true." — Burnet, Letters, 36.

This story is like that of "the three black crows." Dr. Edward Orton stated that the chips were not made by any instrument, but resulted from the gnawing of the (extinct) giant beaver.

"I have seen at Portsmouth, Ohio, on the banks of the Ohio River, fire hearths more ancient than the earthworks at that place." — Whittlesey, Relics, 125.

The correctness of this statement is very doubtful. Fireplaces and ash-beds are not at all uncommon along the banks of the Ohio, at varying depths beneath the surface, but they are invariably in ground that is subject to overflow and gradually increasing in elevation. They are never observed in the higher terraces when these are encroached upon by the river. The fact that human remains of any sort are found at a lower level than the earth-works, does not mean for them a greater age, unless they are in the same terrace on which the earth-works stand; and this is not the case with the fire places.

* * * * *

This chapter will be closed with an abstract of the most remarkable report upon discoveries of this nature that has ever been published.

"At Blue Banks, about one and a half miles above Portsmouth, Ohio, there are many old fireplaces. * * * They occur at various levels, from near the top of the bank to about thirty feet beneath. At one point there are seventeen different levels on which they are visible. There are three different classes of these fireplaces. Those on the lower levels show only a burned streak of clay from five to eight feet in diameter, with but a slight concavity, on which are found ashes, charcoal, burned stones and bones, with an occasional fragment of pottery, composed of broken stone and clay. At about twenty feet down they are most numerous, and many of them are from one to three feet deep, and are lined with flat stones. The clay, outside the stone, bears evidence of intense heat. In some instances they are nearly filled with ashes and charcoal. The pottery from within them is composed of shell and clay. Above the latter level, while not so numerous, they are more interesting, from the fact that more or

less fine relics are obtained from them. They are only slightly concave, and mixed with the ashes are stones broken by the action of fire, bones of various kinds—some calcined, arrow-heads, drills, stone and hematite celts, stone pipes, perforated stones called shuttles, and much broken pottery—many pieces being nicely ornamented with lines, etc. These old fireplaces * * * extend along up the river at intervals for twenty-eight miles. * * * About two miles below the mouth of the Scioto, there are also a few of them exposed, at a depth of from fifteen to twenty feet. They are generally called 'ovens'; this probably arises from the fact that the clay around the basin-shaped beds is burned so hard that the water often washes them out in large pieces, and when a half section of one of them is exposed it looks like a large clay kettle. * * * The first occupants used stone in the manufacture of their pottery. They were succeeded by others who used shell, who in turn gave way to people using stone. The latter seem to have occupied the ground for only a brief period when they were displaced by those using shell. In the adjoining fields, however, both kinds of pottery are found intermingled." — Lewis.

The foregoing statement impresses one as being a record of actual conditions, carefully studied. Yet there is not the slightest evidence of any such fire-places as those described. More than that, the character of the formation in which they are said to occur, is such as to refute the idea that they ever existed. "Blue Banks" is a mass of clay which successive floods have deposited, a little at a time, in a shallow gulley or a little bay cut out at some former time by swirls and eddies. Such deposits are found by the hundred along the Ohio. They also fill abandoned portions of beds of small streams which have made new channels for themselves in the alluvial earth. Generally, but not always, these clay cores are covered with more or less soil. They almost invariably extend below water level, so that even at the river's lowest stages no other material than clay is to be seen ; while at either side of the intrusive deposit a stratum of gravel and sand underlies the silt.

Careful examination of the "Blue Banks" formation over every foot of its exposed surface, fails to reveal a trace of the features claimed by Lewis. The clay is laminated or thinly stratified, and checkered by extremely fine crevices, many of them requiring close scrutiny to detect. Percolating water, charged with iron leached from the clay, has partially followed these crevices, partly spread itself out on more compact layers. Where the included mineral has been re-deposited, it stains the earth yellow, brown, or red, exactly simulating the effect pro-

duced by burning. In many cases concretionary action has given curved outlines to the discolored earth ; and when the deposit is very heavy it may form a clay-ironstone, which, as it dries, breaks into angular plates. These features could be mistaken for fire-pits and stone linings.

The whole deposit is penetrated here and there by roots of ancient sycamores and cotton-woods, which are quite black, as is usual in such circumstances; while piles of leaves, accumulated on the bottom and afterwards covered by mud, are macerated and carbonized until they closely resemble powdered charcoal.

There are no ashes ; but there is a grayish silt, fine as flour, which is so like them as to deceive any one not familiar with it. In fact, many mounds which are reported as consisting largely of "ashes" are composed of this clayey silt.

The works of art come from the surface of the terrace. When the upper portion of the bank caves down the relics go with it ; and the current washing away the loose fine loam, leaves them in, or on, the more solid earth settling on the shore. Into this they are forced by the weight of compact masses, containing at times several hundred cubic feet, which slide down bodily at every flood. Or they may, by the same means, be covered to a considerable depth and long afterward revealed by erosion.

A vertical distance of thirty feet from the terrace surface at "Blue Banks" can be seen only when the Ohio is very low. At a good boating stage, that is for seven or eight months in the year, at least one-half of the face of the clay bank is covered by water. Much more of it must have been submerged, then, in past times when the bed of the stream had not scoured out to its present depth.

Whatever may be the basis of the statements quoted, it is absolutely certain that no sign is now visible of fire-places in these clays ; nor of any worked objects except such as may have fallen from above and become imbedded in the manner here described.

If the asserted conditions were true of any part of the "Blue Banks" deposit that has been destroyed by the river, then we must concede that men familiar with all phases of a life out of doors would make camps on clay which, when wet, is as

slippery as soap; that they would establish them where, at first, a very slight rise in the river would cover the site; that they would continue to utilize the same spot year after year, possibly for centuries, in periods of low water, and that intervening freshets would deposit a thin layer of clay over each successive level of occupancy without displacing even the ashes and charcoal left on it; that through all this unknown length of time there was an absolute sameness of pottery, and toward the upper part, of manufactured articles identical with surface finds belonging to modern Indians; and, finally, that they would camp in such a place when gravel beaches and firm, dry, level terraces offered ideal camping facilities within a few rods in either direction.

There seems to be an error of observation, such as is liable to befall any one who is not familiar with the Ohio at all seasons and in all its stages.

CHAPTER III

THEORIES OF THE ORIGIN AND MIGRATIONS OF THE NORTH AMERICAN INDIANS

Natives of North America. Conjectures as to their Origin. Ways in which the New World might have been Peopled from the Old. Possibly a Distinct Variety. Apparently of Great Antiquity. Mounds in the Eastern Hemisphere. Of Various Ages. Widely Distributed. Probable Initial Seat of American Aborigines. Lines of Migration. Suggestions as to Lineage of Mound Builders.

IT scarcely falls within the province of this volume to discuss the original settlement of America; yet it may not be amiss to touch on the subject. Among the numerous unsolved problems, concerning which the field archæologist is expected to enlighten the public, there is no other upon which information seems more desired. The questions "Where did the Indians come from?" and "Who were the Mound Builders?" are more frequently asked than any others. It is unfortunate that we are not yet in position to make more than a guess — and only a plausible guess — at an answer; but such is the case. Pages could be filled with a list of authors who have advocated theories based on resemblances, most of which possess no especial significance. Too often their productions are incoherent collections of irrelevant facts, ingeniously woven together with uncertain traditions, and colored by vague descriptions borrowed from imaginative travelers. A sample of this style of literature is furnished by one writer who is

"Astonished and gratified on discovering a striking similarity between the fac-simile of the ancient Briton's style of writing and that found in the mound at Grave Creek. Although there are but few characters on the flat stone found in the mound at Grave Creek, yet several of that few exactly resemble some of those in the Stick Book [alphabet] of the ancient Britons. Perhaps the former was composed at a time when the emigrant Britons in this country had partially lost the mode of writing previously prevalent in Britain. There are other striking facts which

seem to prove that the ancient Britons first peopled this country. Ancient mounds, walls, embankments, and parallels, such as are found in this country, exist throughout England, Scotland, Ireland and Wales. The Picts painted themselves in different colors, *like the aborigines of this continent.* The ancient British Druids were buried in mounds. Among the ornaments worn by the British Druid was one like the ordinary plummet-stone of the Indians. In our mounds, grates or fireplaces are discovered containing charcoal and partially burnt human bones. The British Druids burnt human beings in the performance of their rites." — Levering, 407, condensed.

The author then goes on to describe Welsh, Scandinavian, and Roman remains found in various parts of North and South America, even stating that *"many fragments of Roman armour have been found here."*

One author is satisfied that the inscriptions accompanying the "Cremation Scene" on the Davenport tablets are Hittite; but naively adds

"It may be some time yet before our knowledge of the Hittite language will enable us to arrive at perfectly accurate translations of the inscriptions." — Campbell.

Another has discovered that

"The *Mohawk* Indians had a tradition among them, respecting the *Welsh*, and of their having been cut off by the Indians at the falls of the Ohio. Col. Joseph Hamilton Daviess * * * mentions this *fact* and of the Welshmen's bones being found on *Corn Island.*" "Some hunter, many years ago, informed me of a tombstone being found in the southern part of Indiana, with initials of a name, and 1186 engraved on it." — Hinde, 374.

This tradition and tombstone he explains as follows:—

"It is a *fact* that the *Welsh* under Owen ap Zuinch, in the twelfth century, found their way to the Mississippi, and as far up the Ohio as the falls of that river at Louisville, where they were cut off by the Indians; others ascended the Missouri, were either captured, or settled with and sunk into Indian habits. *Proof;* In 1799, six soldiers' skeletons were dug up near Jeffersonville; each skeleton had a breast plate of brass, cast, with the Welsh *coat of arms*, the MERMAID and HARP, with a Latin inscription, *in substance*, 'virtuous deeds meet their own reward.'" — Hinde, 373.

Conflicting theories as to northern and southern origin are happily reconciled in the next extract, by the ingenious expedient of setting up another migration or two.

"While Baron Humboldt, whose researches entitle his conclusions to great weight, regards the Toltecs, and other more ancient tribes whose names are preserved in Central American tradition, as northern invaders of the vale of Anahuac, Mr. Squier, whose opportunities were perhaps equally good, believes they emanated from regions still further south. Both may be right; and if we conceive of a race and civilization existing at some more remote period than Humboldt takes into account, extending their settlements through Texas and up the Mississippi and to its tributaries, and afterwards dispossessed and driven out by a great wave of invasion from the north, of which the Toltecs, Olmecs, and other tribes, led the van, many of the difficulties attending the inquiry are removed. We are then remanded to Mexico and Central America * * * as the fountain-head of the Mound-Builders' civilization."—Hosea, Mounds, 71.

This is quite simple; and "if we conceive" a few more things and apply them where they are needed, all the other "difficulties attending the inquiry" can be very easily "removed."

Dr. Crookshanks "once saw a paddle which had been brought from the Pacific, probably from the Feegee isles, which was almost covered with hieroglyphic characters [similar] to those on the clubs of the Caribs, * * the ruins of Palenque, * * and the Peruvian jars. All these indicate to me something of Egyptian character, and the Mexican idols and other sculpture, * * as well as others, * * partake of the same." He then shows how voyagers to the Cape de Verde Islands would drift to the Caribbean Sea. He sees not only Egyptian and Phenician art; but finds in Chili "evidence of both Greek and Latin origin." After giving various good reasons for the decay of cities, he says,

"The Toltecs, after inhabiting their country for over four centuries, were dispersed about eight hundred years ago in consequence of death and pestilence. Now, it would be a most extravagant supposition that the whole nation were cut off by these causes. A goodly number of them would still have remained, and had it not been for their cowardly *fatalism* —the fear of like disaster in the unfortunate place—they might and would have returned to their ancient dwellings. All nations in a savage state are fatalists to such a degree that if they have bad luck in any way at any town or habitation, they abandon it, and can never be persuaded to return and reinhabit it. This may afford a probable reason * * * for the desertion of the forts and embankments in Ohio and the adjacent states. The stone structures and sculptures identify the southrons with the Egyptians, and the mounds and earthen embankments the northerners with the Tartars and other northern Asiatics. It is not less probable that these abandoned their intrenchments in consequence of conquest, death or pestilence, than that the Toltecs should; and possibly some of

them in succession, made several forts, and successively abandoned them for like causes, and became wandering hordes until the country became covered with timber; then every tree became an Indian's fort. [He does not concern himself] whether this great and civilized people migrated to Mexico, or whether the Mexicans extended their conquests and colonizations here. I believe, they, on this continent, formed two distinct races; the one from Egypt and the Mediterranean generally, partly by way of the Pacific Ocean, and principally by that of the straits of Gibraltar; the other from Asia by Behring's straits. These may have amalgamated. Some idols and other remains give some reason to suspect this; but the [Cincinnati tablet] is not among these indications; the figures on it are not hieroglyphics; there is too much of sameness to indicate ideas." — Crookshanks, 412.

In book I, of his "Aboriginal Races of North America", Dr. Samuel G. Drake gives an excellent summary of literature up to about 1860 concerning the primitive inhabitants of America. We find that as far back as 1637 Thomas Morton attempted to demonstrate the Indians could not be descended from the Tartars of Asia; because "it is not like that a people well enough at ease, will, of their own accord, undertake to travel over a sea of ice." But he thinks they may have come from the scattered Trojans, though he does not explain why the Trojans would be any more "like" to come than would the Tartars. He also finds great similarity between the Indian languages and the Greek and Latin—which only proves that he knew very little about the former. Dr. Williamson in his history of North Carolina (no date given) has no doubt the Indians of South America are descended from the Hindoos. They could not have come from the north, he thinks, because the South American Indians are unlike those of the north. Father Venegas (1758) after many years residence among California Indians fails to find any knowledge among them as to the particular country from which they may have come, nor can he discover any evidence connecting them with Asians. William Wood, in 1633, says the language of the New England tribes is peculiar to themselves, having no connection with the refined tongues; he disputes the idea, even then prevalent, that they are descended from the Jews merely because some of their words resemble Hebrew. By the same rule, he says, they could be proven descended from various other peoples. Mr. Josselyn, in 1638, finds the Indians speaking the language of the Tartars, whom they also resemble in complexion, shape, habit, and manners. Rev.

Thomas Thorowgood, in 1652, "proves" the Indians are descended from the Jews. Roger Williams believed the same. Cotton Mather, in 1702, is satisfied that the Indians are Scythians whom the Devil decoyed to this country to keep them away from religious teaching. Adair, who lived among the Southern Indians for forty years prior to 1775, published a voluminous work to prove the Indian languages and customs are the same as those of the Jews; and Dr. Boudinot, in his "Star in the West" identifies to his entire satisfaction the Indians with the Ten Lost Tribes of Israel. This theory was ridiculed as far back as 1680, by Hubbard in his History of New England; he finds only fortuitous resemblances. Voltaire can see no reason why the Indians should be derived from anywhere; they are native to the soil as are the buffalo or the beaver. Dr. S. L. Mitchell of New York, traces their descent from the northeastern nations of Asia, because they are of the same color. A contributor to Dr. Rees's Encyclopedia thinks "it would be surprising indeed that one-half of our planet should have remained without inhabitants during thousands of years, while the other half was peopled." Dr. McCulloh, in his Aboriginal History of America (1829), apparently takes all sides of the question, and ends where he began. Lord Kaimes, in Sketches of the History of Man (1774), not only finds several arguments that Indians are not descended from any people in northern Asia or Europe, but believes that America has not been peopled from any part of the old world. Dr. Swinton, in the Ancient Universal History, thinks Phenicia and Egypt too far away to have furnished colonists to America; consequently it was peopled from northeastern Asia. Dr. Cabrera, of New Guatemala, in his history of the Americans (1822) is very confident that Phenicians built the city of Palenque in Central America. De Witt Clinton (1818), thinks the ancient works in this country are similar to remains in Wales, attributed to the Romans; also, that the Danes as well as the nations erecting our fortifications were of Scythian origin—Scythian, according to Pliny, meaning all nations in the north of Asia and Europe. There is a very full account of various stories concerning red-haired white Indians who speak Welsh; supposed descendants of Madoc or Medoc who sailed west from Wales about 1170 and was never afterwards heard of. "Printed books," in Welsh, were carefully preserved by these Indians; unfortunately for this part

of the story, printing was not invented until long after Madoc's time. Persons competent to decide have investigated this subject thoroughly, and found nothing whatever to substantiate any theory of Welsh colonization.

A summary and discussion of the various theories concerning the manner in which America received its earliest inhabitants is also given in "Native Races of the Pacific Coast" (H. H. Bancroft, I, chap. I.) and a condensed resume in "North Americans of Antiquity" (Short, chap. III.). A few facts will be stated which show the possibility of foreign people reaching America without intending it; but it must be borne in mind that beyond a shadow of doubt the settlement of America took place long before any vessels were made of a size that would encourage voluntary ocean voyages; and such wanderers as might be cast ashore would soon be absorbed by the native population and leave little if any trace of their presence.

The Gulf Stream and the trade winds carried Columbus and Cabral to Brazil; and it is only 1,539 miles from Cape Frio to Africa. (Short, 506.) In forty-one instances between 1782 and 1875, Japanese junks were cast upon our coast. There is "a record of over one hundred similar disasters." (H. H. Bancroft V, 51–4.) At least one Japanese wreck, after drifting ten months, reached the Sandwich Islands. — Whymper.

"There are two strange and solitary beings [on Fiji Island] who have come from an unknown country and speak an unknown language. They were picked up by a passing vessel many hundreds of miles from any known land, floating in the same tiny canoe in which they had been blown out to sea. They had lived on shell-fish and a few cocoanuts as best they could, and when found were but skin and bone. No one could understand what they said, and they have never named their country; or if they have, the name does not correspond with that of any island on any chart." — Forbes, 77.

"At the present day, natives of the South Pacific Islands undertake, without a compass, and successfully, long voyages which astonish even a regular Jack-tar, who is not often astonished at anything." — Leland, 71-2.

"In the winter of 1833 I saw two Japanese who had been wrecked in a junk near the entrance of the Straits of de Fuca; and if they had been dressed in the same manner, and placed with the Chinook slaves whose heads are not flattened, I could not have discovered the difference." — Schoolcraft, History, I, 217.

In 1832 a Japanese junk, with nine of the crew still alive, reached the Sandwich Islands after drifting eleven months. About the same time a similar boat landed near Cape Flattery. Chinese boats, also, have

been driven to the northwest coast; and articles have been floated from this coast to Kauai. (Sittig.) In 1843, a Chinese junk was lost on the coast of Oregon. Three young men were saved, taken to England, educated, and sent back to their country. Previous to that date Chinese vessels had been wrecked upon this coast. — Gray, 40.

After showing the resemblance of certain forms of art in Queen Charlotte's Island to those in Mexico and Central America; the striking similarity of various manufactured objects in present use among the Haidas and the Maoris; and the total difference in language and ceremonial objects belonging to the Pacific Coast tribes and those east of the Rocky Mountains;—Thomas gives his endorsement to the theory that the same races or peoples who in early prehistoric times extended their migrations over the Polynesian Islands from some unknown source, may have worked their way directly across the Pacific to the shores of America.—Thomas, Origin.

Wickersham admits the truth of all the evidence adduced by Thomas; shows that there is very much more than the latter has presented; then describes the trend of the Pacific currents, and contends that exactly the contrary of Thomas's argument is probably the truth—that is, that the Northwest Pacific Coast of America was peopled from Asia, mainly from Japan, by means of the Japan Current, and that, missing the coast, derelict barks or craft were carried onward to the Sandwich Islands, and thence to Polynesia. He cites various authorities and occurrences in proof.—Wickersham.

Catlin draws attention to the fact that with all their improvements in boats and other facilities for navigation, and with some idea of the trade that is to be carried on, Asians do not at this day cross to Alaska. (Catlin, Rambles, 314.) But he fails to give any reason why they should do so; there is plenty of room for them in their own country which is in no wise inferior to Alaska; and the traders come to them with all they need.

It is asserted, also, that America may have been settled by Europeans who made their way to Iceland, thence to Greenland, and so to Labrador and the St. Lawrence. This was accomplished in the tenth century by Lief Ericson. Until the time of the Norsemen there was no vessel capable of making headway against the Gulf Stream and weathering north Atlantic storms. As to the Welsh, this is

"A tale, which the knowledge we have acquired of the various Indian nations and of their dialects has set at rest." — Gallatin, 125.

For most writers, Behring's Strait has from remotest times been a ferry-way for Asian emigrants to America.

"It is impossible to approximate the period of the world's history in which the migration must have taken place [across Behring's Strait]. No doubt it was in a remote age, before the old world peoples had developed their present or even historic peculiarities and types of civilization." — Short. 511.

"The Scyths of Herodotus have disappeared from the face of Europe, and many have supposed that they found a refuge in America. They certainly had many of the habits and customs of the Indians of the plains. * * * They were always in condition to emigrate, the only motive being the improvement of their condition. But would they voluntarily move through the vast and desolate region of Siberia to Behring's Strait, abandoning their flocks and herds * * * and horses?" — Foster, 334.

It is true that Eskimo and other natives pass safely, at certain seasons, from one continent to the other; but this affords no evidence that people unaccustomed to boats would risk the passage. It is incredible that pastoral or agricultural barbarians would suddenly abandon those pursuits for a life devoted to fishing and hunting. Yet, in the case of any people of central or southern Asia, we must either suppose this to have happened, or admit a very slow movement toward the north and east, beginning far back of the Scythians or any other historic race.

"Concerning the Aleutian Islands, we know by the evidence of language and archæology, that they were first peopled from America and not from Asia. [And further] we know that Siberia was not peopled till late in Neolithic times, and what is more, that the vicinity of [Behring] Strait and the whole coast of Alaska were, till a very modern geologic period, covered by enormous glaciers which have prevented any communication between the two continents." — Brinton, Race, 20 and 21.

The Serpent Mound has given rise to two widely different views concerning the migrations of its builders.

"All through Mexico the favorite subject for the Toltec or Aztec sculptor was the serpent, generally the rattlesnake. * * * We have already observed the same disposition to sculpture the rattlesnake among the Mound-builders. In the great serpent [in] Adams County, Ohio, we find a striking analogy to the tendency of Mexican art. * * * The part which the serpent symbol plays in the south and east Asiatic sculpture and mythology is well known; * * * it occupied a place equally im-

portant among Nahuas and Hindoos. The great serpent in Ohio may be a connecting link between the art of both Mexicans and Asiatics." — Short, 418.

"The facts [that an effigy somewhat similar to the Serpent Mound had been discovered in Scotland] would indicate that serpent worship in Ohio had come from Great Britain and had been first introduced by the mound builders. Possibly the serpent worship in Mexico may have been introduced from the other side by way of Polynesia." —Peet, Amer., I, 84.

It is a demonstrated fact, however, that trees and serpents were once worshipped or at least held in high veneration, in nearly all parts of the world.

"If it should turn out that these [the serpent mounds and figures] are really representations of the great serpent, and that this worship is indigenous in the New World, we are thrown back on the doctrine that human nature is alike everywhere, and that man in like circumstances and with a like degree of civilization does always the same things, and elaborates the same beliefs." — Fergusson, 38.

"Reduced to a similar situation, their wants, their desires, their enjoyments, still continue the same; and the influence of food or climate, which, in a more improved state of society, is suspended or subdued, by so many moral causes, most powerfully contributes to form and to maintain the national character of Barbarians." — Gibbon.

It has been suggested that the Scythians and other Asiatics may have reached America along a route which offered more genial climatic conditions than that by way of Behring's Strait. Because skull-flattening is (or was) practised on the east border of Europe, in western America, and in Polynesia, Short concludes that

"It originated among the wild hordes of the northern steppes of Asia. * * * This fact is suggestive of a remote intercourse between people separated by seas and mountains, if it does not serve as an argument for the unity and common origin of the human family." — Short, 183.

But we are still confronted, under this supposition, with the difficulty of understanding how or why "wild hordes" would make their way from frigid plains through a populated region, to tropical islands. Neither do we find any assistance in his suggestion that the numerous remains of Polynesia may indicate that at one time there was a much larger area of land above the water than is now apparent. If such were the case since the buildings were erected, whose ruins are now to be found, it would seem that

similar remains must exist below the present sea-level. These have not been reported.

Mason shows how a primitive colony could travel from the Indian Ocean to America, under present geological and climatic conditions, and along the present coastal lines. They would find in their favor: An abundant food supply, in the water and on the land. It is the shortest possible route, being on a great circle of the earth. The present natives, all along this route, make sea journeys greater in length than the distance separating any one island from the next in the line of migration. The ocean currents and the winds favor the east-bound navigator, and equalize the temperature. Such migrations may have continued for thousands of years, bringing every people of eastern and southern Asia and of Polynesia to America. "Every one of the industrial and esthetic arts here can be matched by one from Asia or Oceanica." "All intelligent travelers are struck with the similarity existing between our west coast Indians and existing eastern Asiatics." The author "desires to lay aside * * * any arguments relying upon continents that have disappeared, upon voyages across the profound sea without food or motive, upon the accidental stranding of junks, or upon the aimless wandering of lost tribes. These may all have entered into the problem of the aboriginal life of America." Finally, he believes that America was settled by people who were being dispersed slowly by natural causes, and who were led in this direction because it offered few obstacles and many advantages. — Mason; Migration.

Indeed, if the subject be followed, we will find

"There is not a race of eastern Asia — Siberian, Tartar, Chinese, Japanese, Malay, with the Polynesians — which has not been claimed as discoverers, intending or accidental, of American shores, or as progenitors, more or less perfect or remote, of American peoples; and there is no good reason why any one of them may not have done all that is claimed." — Winsor, History, I, 59.

The same claim has been made for the Norse, Danes, Irish, Basques, Welsh, Jews, Romans, Greeks, Phenicians, Carthaginians, Egyptians, Guanches of the Canary Islands, and even Ethiopians; storm-driven, on voyages of exploration, hunting for gold, or impelled by some other motives to cross unknown seas. Not content with existing lands to provide settlers, some writers have evoked continents now buried beneath the sea; as Atlantis, and a great continent in the Pacific represented by various archipelagoes. Any sea-faring race, in any part of the world, may have reached America from either direction, under three conditions—namely, favorable winds, of sufficient duration; vessels strong enough to resist any storm they were destined to en-

counter; and a food supply adequate to support the crews until they could reach land. It remains to be proven whether there was ever such a concurrence of conditions prior to the tenth century.

On the other hand there are not wanting assertions that the American Indians are indigenous to the soil, as Voltaire says, "like the buffalo or the beaver." It is rather singular that two authors, who have labored faithfully to connect them with the Old-World races, should end by saying:—

"If this continent was peopled by migration from the Old World, it must have been at a period far remote, and at a time when mankind was unacquainted with the use of iron. * * * The entire absence of all the domesticated animals in North America, when first known to the white man, and of the domestic cereals of the Old World, would lead to the inference that if this continent was peopled from Asia, it must have been at a period far more remote than is embraced in the received chronology, and when society was in a purely hunter state." — Foster, 333 and 335.

"The most persistent investigation has failed to disclose any marked resemblance between the architecture, art, religion, and customs of the North Americans considered as a whole and of any old world people." — Short, 519.

J. W. Powell says

"On this subject [the study of physical characteristics of different races] there has been much research; * * * but, the more thorough the investigation, the firmer is the conclusion that the aboriginal peoples of America cannot be allied preferentially to any one branch of the human race in the Old World." "The American Indian did not derive his forms of government, his industrial and decorative arts, his languages, or his mythological opinions from the Old World, but developed them in the New. Man thus seems to have inhabited the New World through all the lost centuries of prehistoric time." "There is no evidence that the tribes of the Occident have ever commingled with the tribes of the Orient. * * * The occupancy of America by mankind was anterior to the development of arts, industries, institutions, languages and opinions; the primordial occupancy of the continent antedates present geographical conditions, and points to a remote time, which can be discovered only by geological and biological investigation." "Throughout North and South America * * * a vast system of distinct languages was found, usually so unlike each other that they did not furnish a method of communication between different peoples. Of such languages some hundreds are well known. * * * We are therefore forced to conclude * * * that the tribes inhabited this hemisphere anterior to the development of articular or grammatic speech." — Forum, 682-4, 679-686.

In regard to the statement contained in the last paragraph,

"Those learned in comparative philology say, that all the multitudinous languages and dialects spoken in America, from the Esquimaux to Patagonia, constitute one family, have a common root and origin; and that all the natives and tribes speaking these languages constitute one race. While these several hundred languages are the same in organism and structure, they differ so in vocabulary that many of them have not a single word in common. Now, the growth of a language is a slow process. * * * How long must it require for a barbarous people to develop and complete near four hundred distinct languages? The period must, at all events, be so great, that one thousand years ago is, in comparison, freshly recent, almost of the present day." — Force, 61.

In spite of the vast amount of study that men have given to the matter, we do not know, and at present it appears doubtful whether we shall ever know, when, how, whence, or by whom, America was settled, or whether it was ever "settled" at all, in the ordinary meaning of the word. Ethnologically, the areas east and west of the Rocky Mountains are essentially different. There is manifest, too, a wide variation in character among the races inhabiting the three grand divisions of the continent; greater than would probably be produced by climate alone. These facts indicate more than one line of migration, leading back to different starting points; yet, given time enough, all these stages of culture may gradually evolve in various branches of one tribe developing under radically dissimilar circumstances.

With the present distribution of land and water and the trend of ocean currents, immigration would be more feasible, to a primitive people, from south-eastern Asia and the adjacent islands than from any other direction. We have no means of knowing how long existing conditions in these respects have prevailed. Relatively slight elevations and depressions of various portions of the earth's surface, like those which have frequently occurred in all ages of the world, might produce such alteration in land areas, winds, and ocean currents as to carry savages or barbarians to places now impossible for them to reach, or to render practicable lines of travel which they cannot now attempt.

"Man in his wanderings has always been guided by the course of rivers, the trend of mountain chains, the direction of ocean currents, the position of deserts, passes and swamps. * * * Perhaps [at a future date], the post-tertiary geology of our continent will have been so clearly defined that the geography of its different epochs will be known suffi-

ciently to trace these lines of migration at the various epochs of man's residence in the western world from his first arrival." — Essays, 45.

If the existence of a "glacial" or "paleolithic" man in this country can be proven, or if it can be shown, as Powell contends, that America was inhabited while man was still but little beyond the stage of a wild beast, his presence can be accounted for in only three ways: — He gradually developed here from a lower stage into a human being; there was a land connection between the eastern and western hemispheres which no longer exists; or there were islands, or possibly continents, now destroyed, so distributed that he could be accidentally carried from one to another. At that early period of his existence he could not have prepared himself for travel by sea.

MOUND-BUILDING PEOPLES

Included in the general search for the starting-point of America's pristine population has been the quest for the original home of the Mound Builder. Fortuitous resemblances in physical characteristics, manner of living, personal habits, and mental traits, have furnished arguments in favor of the Red Man's descent from nearly every barbarous tribe of Asia, and some portions of Europe; similarly, the remains of the Mound Builders are considered tokens of their identity or kinship with people as fundamentally different from each other as the Egyptians and early Britons. The analogy is no more convincing in one case than in the other.

Mounds are among the earliest and most widely distributed memorials of the dead. Savages could pile up earth or stones before they could carve a rock or hew a piece of wood. Barbarians would feel that they were showing greater honor to the memory of a leader whose loss bore upon all alike, by the erection of a monument to which every individual might contribute a share of time and labor. Nothing is more enduring; when settled into compactness and covered with sod, a heap of earth will remain unchanged through vicissitudes that reduce to ruins any other product of human industry.

It is to be expected, then, that such tumuli would be of world-wide occurrence; and belong not only to primitive ages when men were debarred by limited resources from constructing

more elaborate tombs, but continue to be built as tokens of general esteem or affection long after architectural skill had made magnificent structures possible

A few citations taken at random from hundreds that might be given show the prevalence of mound burial in various parts of the globe.

In the British Isles "the smaller tumuli may be seen on almost every down; in the Orkneys alone it is estimated that more than two thousand still remain; and in Denmark they are even more abundant; they are found all over Europe, from the shores of the Atlantic to the Ural mountains; in Asia they are scattered over the great steppes, from the borders of Russia to the Pacific Ocean, and from the plains of Siberia to those of Hindostan; the entire plain of Jelalabad, says Masson, 'is literally covered with tumuli and mounds.' * * * Nor are they wanting in Africa. * * * Indeed, the whole world is studded with the burial places of the dead. Many of them, indeed, are small, but some are very large." "Within a radius of three miles [about Stonehenge, England,] there are about three hundred burial mounds." "Tumuli [were erected over] Queen Thyra and King Gorm, who died about A. D. 950, in Denmark. It appears that in England the habit of burying under tumuli was finally abandoned during the tenth century." — Lubbock, 110 to 123.

The mound of the King at Cogstad, Norway, was about 160 feet in diameter; its height is not given. It covered a Viking war-vessel and was erected in the ninth or tenth century. (Vessels, 80.) In A. D. 363, the Roman Emperor, Julian, fleeing before the Persians, died at Samarah on the Tigris. His body was burned and a "huge tumulus" was erected as a monument. — Myers, 143 and 164.

"Far more interesting than any of the [other] tumuli explored by me in the Troad, is the mound attributed by the tradition of all antiquity to the hero Protesilaus. * * * This sepulchre * * * is not less than 126 meters in diameter. It is now only 10 meters high, but as it is under cultivation, and has probably been tilled for thousands of years, it must have been originally much higher." — Schliemann.

Near Aleppo is "an immense artificial mound, nearly half a mile in circumference, and about one hundred and fifty feet high, surrounded in part by a cyclopean wall, twelve or fifteen feet in height, constructed of huge basaltic boulders. * * * One is astonished at the vast number of these mounds occurring throughout Northern Syria and Mesopotamia. Upon the plains of the latter we have counted twenty within range of the vision. * * * Advantage seems to have been taken, in some cases, of a natural eminence; but generally the entire enormous pile is unmistakably of artificial construction. * * * That they date back to the very earliest time there is no doubt." — Myers, 71.

"The largest mound near Nineveh covered one hundred acres. Its surface is somewhat irregular, the mound varying in height from seventy

to ninety feet. Not more than twenty to thirty feet is composed of the material of the destroyed buildings; the remaining elevation marking the height of the artificial platform upon which the palaces stood." — Myers, 114–5, condensed.

"Semiramis, the widow of Ninus, raised over him a great mound of earth. Two Trojan heroes were buried under earthen barrows. Hector's barrow was of earth and stone. Achilles erected a tumulus upwards of an hundred feet in diameter, over Patroclus. The mound over the Father of Crœsus, King of Lydia, was of stone and earth and more than a quarter of a league [?] in circumference. Alexander the Great heaped a tumulus over Hephæstion at a cost of much more than a million dollars. Deucennus, King of Latium, was buried under an earthen mound. Mound burial was practiced in ancient times by the Scythians, Greeks, Etruscans, Germans and many other nations. — Lubbock, 116, condensed.

"About ten miles from the city of Kalgan [China] there is a cluster of over forty mounds, one of them being thirty feet high, and four hundred and twenty feet in circumference at the base, and an oval mound forty-eight feet in length on the summit." — Can. Savage, 32.

The Chimus of the Peruvian coast, a different people from those of the Incas, had sepulchral mounds, and "great mounds or artificial hills," whose purpose is not stated. (Winsor: History I, 275.) The burial mound of Oberea, in Otaheite, was 267 feet long, 87 feet wide, and 44 feet in height. It was a pyramid made of round pebbles, faced with squared coral stone.—Lubbock, 483.

* * * * *

Not all such structures are sepulchral in character; many owe their origin to a religious instinct.

In Wiltshire, England, are prehistoric remains of great extent supposed to be the work of the Druids. The so-called

"Temple of Abury consisted originally of a grand circumvallation of earth 1,400 feet in diameter, enclosing an area of upwards of twenty-two acres. (1) It has an inner ditch, and the height of the embankment, measuring from the bottom of the ditch, is seventeen feet. It is quite regular, though not an exact circle in form, and has four entrances placed at unequal distances apart, though nearly at right angles to each other. Within this grand circle were originally two double or concentric circles, composed of massive upright stones; a row of large stones, one hundred in number, was placed upon the inner brow of the ditch. Extending upon either hand from this grand central structure, were parallel lines of huge upright stones, constituting upon each side, avenues upwards of a mile in length. These formed the body of the serpent. Each avenue consisted of two hundred stones. The head of the serpent was

(1)—A circle of this diameter would enclose nearly 35 acres.

represented by an oval structure, consisting of two concentric lines of upright stones; the outer line containing forty, the inner eighteen stones. This head rests on an eminence * * * from which is commanded a view of the entire structure, winding back for more than two miles to the point of the tail. * * * About midway, in a right line between the extremities of the avenues, is placed a huge mound of earth, known as Silsbury Hill, [which] is supposed by some, Dr. Stukely among the number, to be a monumental structure erected over the bones of a King or Arch-Druid." — Squier, 234.

"The circumference of the [above] hill, as near the base as possible, measured two thousand and twenty-seven feet, the diameter at top one hundred and twenty feet, the sloping height three hundred and sixteen feet, and the perpendicular height one hundred and seventy feet." It contains over 13,500,000 cubic feet. — Hoare, 82.

"But the most wonderful structure of the kind yet discovered is the gigantic temple of KARNAC in Brittany. The serpentine character of this great work is now well established. It consists of seven parallel rows of huge upright stones, which, following the sinuous course of the structure, can yet be traced for upwards of eleven miles, and it is believed it formerly extended thirteen miles in length. The stones are placed from twelve to fifteen feet apart laterally, and from thirty to thirty-three feet apart longitudinally. Some of these are of vast size measuring from twenty to twenty-five feet in length above the ground, by twelve feet in breadth and six in thickness; and are estimated to weigh from one hundred to one hundred and fifty tons each. The number of stones originally comprised in the work is estimated by Mr. Deane, who made a careful survey of the ruins, at upwards of *ten thousand.* The line of this vast parallelithon is designedly crooked-or serpentine, although maintaining a general direction from east to west; and the height of the stones is so graduated as to convey (in the opinion of Mr. Deane) the idea of *undulation,* thereby rendering the resemblance to a vast serpent more complete and obvious. In connection with this structure is an eminence, partly natural and in part artificial (corresponding to Silbury Hill at Abury) called Mount St. Michael, from which a general view of the great serpentine temple is commanded." (Squier, Serpent, 238.) This hill "is no less than 380 feet in length, and 190 feet broad, with an average height of 33 feet." — Lubbock, 163.

Although these "temples" find no counterpart in North America, the description of them, as of the mounds referred to, is inserted partly to furnish a basis of comparison in regard to the amount of labor performed in this country and in other parts of the world; partly to show the futility of attempting to establish any theory of descent or relationship upon a practice so nearly universal.

* * * * *

Omitting from consideration all reference to our aborigines other than the Mound Builders and their possible ancestors, there is as little certainty and as much guesswork in regard to their movements in America as there is in theories regarding their indefinite ancestors. The original home of the American native is generally conceded to have been on the far Northwest coast. Morgan has offered cogent reasons for such belief. He says:—

"Barbarians ignorant of agriculture and depending upon fish and game for subsistence, spread over large areas with great rapidity. The American aborigines undoubtedly commenced their career as fishermen and hunters, but chiefly as fishermen. The hunt is a precarious source of human subsistence. Without the horse to follow the larger animals of the chase upon the plains, it was entirely impossible for nations of men to maintain themselves from this source exclusively or even principally. Nations would rapidly perish if dependent upon so uncertain a source of maintenance. *Fish was the basis of subsistence* of the Indian tribes, to which their increase in numbers and diffusion over North America is to be ascribed. It was by the abundance of this article of food that certain centers of population were created, which first supplied, and afterward replenished, the continent with inhabitants.

"The country within a radius of five hundred miles from the head of Puget sound, was singularly well supplied at the time of its discovery with the requisites for the subsistence of Indian tribes. A mild and genial climate was added to its other attractions. In the amount and variety of the means of subsistence spontaneously furnished, it had no parallel in any part of the earth.

"The facts are sufficient to raise a presumption that the valley of the Columbia was the region from which both North and South America were peopled in the first instance, and afterward resupplied with inhabitants.

"The Algonkin, the Dakotan, the Pawnee, and the Shoshonee—seem to proceed from the valley of the Columbia as their original source. In point of time the Algonkins apparently held the advance in the eastern movement, and were thus able to follow the isothermal line, by way of the Saskatchewan, to the great lake region, and thence to the valley of the St. Lawrence; while the Dakotas, striving to move in the same general direction, took a more southern route, by way of the Platte; and the Pawnees and Shoshonees, moving still later, followed a route still farther south.

"It is reasonably certain, first, that the distribution of the aborigines over North America began on the Pacific side of the continent; second, that the several stock languages east of the Rocky Mountains and north of New Mexico had become distinct before these stocks migrated eastward; third, that the nations of Mexico and Central America were emigrants from the north; and last, that the initial point of all these migrations was in the valley of the Columbia.

"It is highly probable that the shores of Lake Superior were the central seats of the Algonkin stock, from its earliest appearance on the eastern side of the continent, and that emigrants went forth from this secondary center of population to the southward and eastward.

"Two important facts are made apparent; first, that the Algonkin stock still inhabit the slopes of the Rocky Mountains, over against the valley of the Columbia, thus pointing to that valley as the initial point from which they emigrated to the great lake region, and thence to the Atlantic coasts; and secondly, that they were climatically a northern people. — Morgan, Migrations, 159–253, condensed.

After discussing at some length the movements of the various tribes, their connection with one another, their amalgamations and separations, he states his belief that

"Among those nations who are without recognized descendants are the mound-builders who lived east of the Mississippi. It is evident that they were agricultural and village Indians, from their artificial embankments, their implements and utensils, and from their selection of the areas most poorly provided with fish and game. From the absence of all traditionary knowledge of their existence, amongst the nations found in possession of their territories, it is also to be inferred that the period of their occupation was ancient. Their disappearance was probably gradual, and completed before the advent of the present stocks, or simultaneously with their arrival. The small number of sites of ancient villages, and the scanty population assignable to Indian villages even of the largest class, particularly in cold climates, are good reasons for supposing they were never very numerous. It is a reasonable conjecture, as elsewhere stated, that they were village Indians from New Mexico. In fact, there is no other region from which they could have been derived; unless it be assumed that, originally roving Indians, they had become after their establishment east of the Mississippi, Village Indians of the highest type—of which there is not the slightest probability. It seems more likely that their retirement from the country was voluntary, than that they were expelled by an influx of roving nations. If their overthrow had been the result of a protracted warfare, all remembrance of so remarkable an event would scarcely have been lost among the natives by whom they were displaced. * * * It is, therefore, not improbable that the attempt to transfer the type of village life of New Mexico to the Ohio valley proved a failure; and that after great efforts, continued for more centuries than one, it was finally abandoned, and they gradually withdrew, first into the gulf states, and lastly from the country altogether.

"But there is not a fact to show that the village Indians of Central America or Mexico ever spread northward, or competed with the Northern Indians for the possession of any part of the continent north of the immediate valley of Mexico; whilst several reasons may be assigned against the supposition of a movement in that direction." (Morgan,

Migrations, 243-5.) "Every presumption is in favor of their derivation from New Mexico as their immediate anterior home, where they were accustomed to snow and to a moderate degree of cold." — Morgan, 202.

Other investigators have come to a somewhat different conclusion.

"Bishop Madison, of Virginia, having with much labor investigated the subject, declares his conviction that these Astecks are one and the same people with those who once inhabited the valley of Ohio. The probabilities are certainly in favor of this opinion." — Harrison, 224.

"In undertaking to trace the migrations of the Mound Builder, I would direct attention to the warm climate of Central America, rather than to the hyperborean regions of Siberia and Behring's Strait as marking the line of his departure. The primitive lines of migration, so far as they relate to North America, were probably from the south to the north." — Foster, 339.

Gillman is not content with an origin so near home, as he speaks of

"Mound Builders * * * the mysterious people * * * a race whose craniological development and evidently advanced civilization apparently separate it from the North American Indian and ally it to the ancient Brazilian type." — Gillman, M. B., 304.

Payn advocates the Carib origin of the mounds. He bases his argument on the well-known fact that the Caribs made canoe voyages to Yucatan and to Florida. Consequently he thinks there is no reason why they should not have sailed up the Mississippi and its tributaries, and spread over all the interior region. But maritime nations are not given to living away from water; besides which, the connection between canoe voyages and mounds is not apparent.

Starr says of an engraved shell very similar to those figured by Holmes, which was found "near Morelia, in the state of Michoacan, Mexico:"—

"Form, function, character of this Michoacan specimen are plainly the same as those from Tennessee, Georgia and Missouri. It can no longer be said that the type is essentially northern nor that it belongs exclusively to the Mound Builders of the United States. * * * In fact there are greater differences between the Tennessee specimens themselves, or between the Missouri specimens alone, than there are between the United States specimens as a class, and this Mexican gorget." — Starr, 173.

"One of the specimens from the Hopewell mounds was a remarkably fine piece of incised work on the polished surface of a piece of human

femur. The carving comprises human and animal faces, ovals, circles and other symbolic designs, and resolves itself into several distinct masks and head-dresses together with the serpent and sun symbols. The designs on this carving are repeated in the forms of objects found in the same mound. The most striking resemblance was found in one of the masks which, in the carving, is surmounted with a head-dress in the form of a deer's antlers, while in the mound was found a skeleton having over the skull a head-dress of copper and wood made in this same form with the branching antlers. One carving on the arm bone of a man represents several animal heads interwoven in a curious manner, and over each head are the symbolic designs, ovals and circles, common to nearly all the carvings. These lines are arranged in such a fashion that portions of each head form part of another above and below, and the reverse of the carving shows still different heads. Other specimens represent artistic conventionalized forms of birds and animals. Professor Putnam said the Cincinnati Tablet is undoubtedly genuine, since 'several of the strange figures carved on the stone are of the conventionalized serpent form common in the mounds of Ohio and also agreeing essentially with the serpent head symbol on the old stone sculptures of Central America, which resemblances were not before known.' This stone was also found to have lines identical with those on a piece of copper found in the Hopewell group. Professor Putnam also called attention to the fact that the elaborate and intricate designs and delicate workmanship of the carvings he had illustrated necessitated a high degree of skill, ingenuity and patience for their conception and execution, combined with a certain religious cult expressed by the symbols in the carvings, and he claimed that no such work had ever been done by the dolichocephalic tribes of the northern and eastern portions of the United States, nor had any such specimens ever been found in the mounds of later date. His convictions, after more than twenty-five years of exploration and study, are that the builders of the old mounds and earthworks of the Ohio Valley, 'were probably a branch of the great southwestern people represented by ancient Mexicans, the builders of the old cities of Yucatan and Central America, and some of the Pueblo tribes' of the south-west." — A. A. A. S., in Bul. Am. Geo. Soc., condensed.

"The marked development of conventionalism and symbolism in the art of the people who built the old earthworks in the Ohio Valley and southward, indicates their connection with certain peoples of the southwest and of Mexico and Central America. It also furnishes one more point of evidence that the Ohio earthwork builders were more closely allied with the early stock, of which the ancient Mexicans were a branch, than with the tribes of the eastern part of the continent. The art of the eastern tribes,— with the exception here and there of slight resemblances which can easily be accounted for by survival from ancient contact,— is of an entirely different character with different motives and different symbols; whereas this old art of Ohio is closely related to that of Mexico and Central America, and many of the symbols are identical." — Symbolism, 302.

Some writers have turned the tide of emigration in the other direction; they argue that the peoples of the southwest are derived from those of the Ohio valley. For example:—

"In the light of modern discovery and scientific investigation we are able to follow the Mound Builders. We first found them in Ohio engaged in tilling the soil and developing a civilization peculiar to themselves. Driven from their homes they sought an asylum in the South, and from there they wandered into Mexico, where we begin to learn something more definite concerning them." — McLean, 148.

"So we can track the Mound Builders by their structures from the shores of the Great Lakes to the milder region of Mexico and Central America. The truncated pyramid is among the strongest links in the chain which connects the ancient inhabitants of the Mississippi Valley with those of Mexico and Central America. In the rude earthworks we see the germ of the idea which was subsequently wrought out in proportions of beauty and harmony, giving origin to a unique style of architecture. The flat-topped mounds are traced, with increasing size and diversity of form, from Aztalan, Wisconsin to the Teocallis of Central America." — Foster, 98, 188 and 186.

In order to show how some writers are simply guessing, compare the preceding statement with the following by the same author:—

"The Aztecs moved into the valley of Anahuac only about three hundred years before the Spanish Conquest, and had failed to consolidate the Mexican Empire. It is quite probable that these astronomical problems, which indicate a high range of intellect, were not wrought out by their own ingenuity, but were derived from the subjugated race. As to the conquered race, de Bourborg maintains that they were Toltecs or Nahuas — a people identical with the Mound Builders of the Ohio and Mississippi Valleys. — Foster, 340, condensed.

The pioneers, Squier and Davis, while believing in a relationship between the races, express no opinion as to which was the earlier. Their final deduction, on this phase of the problem, is very conservative.

"We may venture to suggest that the facts thus far collected point to a connection more or less intimate between the race of the mounds and the semi-civilized nations which formerly had their seats among the sierras of Mexico, upon the plains of Central America and Peru, and who erected the imposing structures which from their number, vastness, and mysterious significance invest the central portions of the continent with an [absorbing] interest." — S. & D., 301.

Short has no difficulty in getting at the kernel of the whole question. He covers a very wide field in a very few sentences,

and displays remarkable analytic powers in determining lines and dates of migrations.

"It is not improbable that while few in numbers the Nahuas arrived on our north-western coast, where they found a home until they had become a tribe of considerable proportions. Crossing the watershed between the sources of the Columbia and Missouri Rivers, a large portion of the tribe probably found its way to the Mississippi Valleys, where it laid the foundations of a wide-spread empire, and developed a civilization which reached a respectable degree of advancement. The remainder of the Nahuas, we think, migrated southward into Utah." [So he continues, scattering various tribes of Nahuas all over the south and west, and finally landing them all in Mexico.]

"The 52 years in the Aztec cycle, multiplied by the 24 marks on the calender stone, gives us 1248 years. There is a sign accompanied by the number 13, which corresponds to the year 1479, the date at which the calendar stone was finished. If we subtract 1248 years from the known date 1479 A. D., we have the year 231 A. D.; * * * we believe this to be the date of the migration from Hue hue Tlalapan, the country of the Mound Builders of the Mississippi Valley, and we further think we are sustained in this view both by the early writers and by the condition of the mounds and shellheaps of the United States."—Short, 517 and 458.

The principal objection to all these paradoxical surmises concerning wandering Nahuas, Aztecs, Mound Builders, etc., is, that no satisfactory evidence is forthcoming in regard to them. Some very high authorities dismiss the subject as being, at present, entirely beyond any means of certainty or knowledge.

So far as the arguments of advocates of Toltec migration from the north and from the south are concerned, "We can turn from one to the other of these theorists and agree with both, as they cite their evidences. It is one thing to lose one's way in this labyrinth of belief, and another to lose one's head."—Winsor: History, I, 136.

"The traditions of the migrations of the Chichimecs, Colhuas, and Nahuas are no better than the Greek traditions about Pelasgians, Æolians and Ionians, and it would be a mere waste of time to construct out of such elements a systematic history."—Müller.

There is another fact opposed to these theories of kinship. Both peoples were apparently, inveterate smokers; yet while thousands of pipes have been exhumed from mounds, the name and the use of the calumet was unknown to the Aztecs.—Biart, 103.

It will be observed in the above citations that no tangible objects of any character are offered in support of their various assertions, except the shell described by Starr and the Hopewell

specimens mentioned by Putnam. These may doubtless be explained in the same manner as other articles from mounds, figured on subsequent pages.

In all the territory between New Mexico and the middle Ohio valley, there are no adobe structures like those of the former locality, or great enclosures such as are typical of the latter. The so-called adobes and bricks reported in the mounds and village-sites of the southern states are only masses of burned earth (see page 461.) It is difficult to believe that either custom, after being in vogue for several, perhaps many, generations, would be at once and completely abandoned. Then, no attempt is made to explain how migrating parties may have reached their destination. Two routes were open to either the Pueblo Indians or the natives of Mexico. The first lay over barren, burning deserts, beneath a scorching sun, where for many days in succession neither water nor food is to be obtained. These must be carried in addition to other necessary articles. The second route led to the Gulf coast, and along that to any point where they chose to diverge from it. Either would at last bring them to the fertile lands of the lower Mississippi valley, where they would find everything needed by a savage or a barbarian for rendering life pleasant or even luxurious. It may be that population so increased under these favorable surroundings, as to make it necessary for colonies to branch off and seek a home elsewhere; but it is improbable they would at once have begun a journey of hundreds of miles toward the north, or that, if they had advanced by slow degrees as is most likely, they would have erected in the country over which they traveled structures which, so far as we can tell from the meager ruins, were markedly different from those in both the region which they left and that where they settled. The same difficulties attend the reverse of the proposition; namely, that the peoples of the southwest are descended from the Mound Builders.

A further discussion of this question will form a part of the matter in the next chapter.

CHAPTER IV

THE MOUND BUILDERS

Ohio Mound Builders. Early Writers. Little Known Until the Report of Squier and Davis. Great Increase in Number of Authors Since Their Day. Conflicting Opinions Regarding this People. Theories as to Their Affiliation with Historic Tribes. No Definite Knowledge Concerning Their Origin or End.

FOR over half a century after the settlement of Ohio, there was more or less speculation about Mound Builders' work, most of it based on casual observations and incorrect reports. It was generally known the primeval forests concealed earthen remains of various forms, and in some cases of considerable extent; but definite information concerning them was lacking, and while much diversity of opinion existed as to their origin, no theories advanced in regard to their builders or the purpose of their construction met either with zealous advocacy except, in some cases, from the author; or with forcible opposition. Occasionally an article would appear in a periodical or in a volume devoted mainly to some other subject, describing a particular group, or the remains within a limited area. Some of these articles were accompanied by a few crude illustrations. They were generally based upon cursory examinations, and the data which they presented did not afford sufficient grounds upon which to establish a logical argument. Nevertheless, some courageous writers, assuming the absolute correctness of these accounts, had no hesitation not only in deducing from them unwarranted theories but also in applying these theories to works of quite different character in remote localities. As a natural consequence, the known facts were soon invested with a magnitude and importance out of all proportion to their real value; and thus arose a belief in a single race or nation antedating the Indian and occupying the entire Mississippi valley. Critical readers may not have found the evidence of a nature to justify this presumption; but an attempt at

contradiction was merely setting the ideas of one person against those of another. An assertion that the earthworks are evidence of a high civilization or an autocratic central government, could be met only by a general denial; while a statement that the labor and skill involved were not beyond the power of known tribes was successfully met by the challenge to cite a single instance in which Indians were known to engage in any such task.

Thus matters stood when, fifty years ago, Squier and Davis gave to the world their great work on the "Ancient Monuments of the Mississippi Valley." It came as a revelation, bringing definitely to public notice the existence in Ohio, and to a less extent in adjoining states, of a class of prehistoric remains differing in character from those belonging to any other part of the country. All doubts as to the high culture of the Mound Builders seemed dispelled. Abundant proof, apparently, was presented in this volume that a people, of whom no known trace remained but who were certainly far superior to the Red Men, had once dwelt in this region. A firm foundation was laid for the misconceptions and erroneous beliefs which have become so firmly implanted in the minds of nearly all persons who are interested in the science, but are not in position to investigate carefully the statements upon which their beliefs are based.

The authors in question give numerous measurements, along with many plates and figures, purporting to be the results of actual personal observations, in addition to perhaps an equal number of others from friends who placed their surveys and descriptions at the disposal of the two associates. They claim that regular geometric figures are the rule; that there are perfect circles, squares, and octagons, and evidences of considerable astronomical knowledge in the manner of laying these out relative to the cardinal points. According to the figures, all lines are a certain number of feet in length; enclosures contain exact acres; angles are turned off only in degrees. This would be impossible unless the builders of the works had the same system of mensuration that is in use among ourselves. We find such paragraphs as these:—

"Another fact, bearing directly upon the degree of knowledge possessed by the builders, is, that many, if not most, of the circular works are *perfect circles,* and that many of the rectangular works are *accurate squares.* This fact has been demonstrated, in numerous instances, by careful admeasurements; and has been remarked in cases where the works

embrace an area of many acres, and where the embankments, or circumvallations, are a mile and upwards in extent." — S. & D., 8.

"The square and rectangular works [in] certain groups are marked by great uniformity of size. Five or six of these * * * are *exact* squares, each measuring one thousand and eighty feet side,—a coincidence which could not possibly be accidental, and which must possess some significance. It certainly establishes the existence of some standard of measurement among the ancient people, if not the possession of some means of determining angles." — S. & D., 48.

An octagon "of large size, in the vicinity of Chillicothe, has its alternate angles coincident with each other, and its sides equal." — S. & D., 49.

Such assertions are not true in a single instance. Their correctness has been successfully impeached wherever surveys have been carefully made with accurate instruments. It is obvious that several degrees in angles, scores of feet in lines, rods or even acres in area, have occasionally been added to or subtracted from correct measurements either through a disposition to "take it for granted," or because they were so saturated with a conviction of resemblance or coincidence between works which in reality differ widely, as to distrust their own judgment or observation when it contradicted their deep-rooted belief.

Instead of the absolute symmetry, or identity in form or size, claimed in numerous cases, there has not been found one true circle, square, octagon, or ellipse, among these works, nor any two that exactly correspond in dimensions. There are some with a striking approach to regularity; but none that can not be laid off with sight-stakes and a line equal to the radius of a circle or somewhat longer than half one side of a square.

In view of these facts, which are easily to be verified by any one who will take the trouble to make a correct survey, we are at a loss to understand the animus of the explanatory foot-note, in which they say:—

"To put, at once, all skepticism at rest, which might otherwise arise as to the regularity of these works, it should be stated that they were all carefully surveyed by the authors in person. Of course no difficulty existed in determining the perfect regularity of the squares. The method of procedure, in respect to the circles was as follows. Flags were raised at regular and convenient intervals, upon the embankments, representing stations. The compass was then placed alternately at these stations, and the bearing of the flag next beyond ascertained. If the angles thus determined proved to be coincident, the regularity of the work was placed beyond doubt. The supplementary plan *A* [see figure 25] indicates the method of survey, the 'Field Book' of which, the circle being thirty-six

hundred feet in circumference, and the stations three hundred feet apart, is as follows:

1	N.	75	E.	300 feet.
2	N.	45	E.	300 feet.
3	N.	15	E.	300 feet.
4	N.	15	W.	300 feet.
5	N.	45	W.	300 feet.
6	N.	75	W.	300 feet.
7	S.	75	W.	300 feet.
8	S.	45	W.	300 feet.
9	S.	15	W.	300 feet.
10	S.	15	E.	300 feet.
11	S.	45	E.	300 feet.
12	S.	75	E.	300 feet.

(S. & D., 56.)

There can be no doubt of the regularity of a circle meeting these conditions, provided the curve be uniform between all the stations; the trouble with the symmetrical figure thereby created is that there is no such circle in the State. That at Newark comes nearest meeting the measurements given; but even it varies considerably from them. The fact that the hypothetical figure is put with the Harness works has led to the supposition that the smaller circle of that group is the one thus taken as an illustration (see page 184). It is clear, however, that a circumference of 3,600 feet and a diameter of 800 feet, which is the measurement given on the map, cannot belong to the same figure. If we suppose the lines to be laid off on the chords instead of the arcs of the circle, as their plan indicates, the matter is even worse; for we then have a dodecagon with a perimeter of 3,600 feet inscribed in a circle whose radius is only 400 feet. Besides, with a chain of the old standard length—66 feet—used by them in these surveys, no little ingenuity would be required in laying out a perfectly straight line exactly three hundred feet long, from one fixed point to another fixed point whose position on a constantly curving line must remain unknown until the measurement is completed. It is not probable they ever made any such survey as that set forth in their note. Nor is the accuracy of their compass readings free from doubt; they used an old instrument, borrowed from a surveyor of Chillicothe, who had thrown it aside as unreliable, and who taught them how to manipulate it. Neither of them had any previous knowledge of the methods of surveying. This was told to the present writer by Mr. Kendrick who had

a distinct recollection of the occurrence—his father being the surveyor mentioned.

It may seem uncalled for thus to comment upon work done so long ago; and it certainly would be unfair to criticise the men who did it, were it not for the fact that errors they committed are made the foundation of a science. Under the circumstances it is well to present the mistakes in their proper light simply as a matter of justice to students.

Nothing said here is to be construed as imputing any wrong motive to the authors; they made no attempt at deception, they had no previously formed theory to sustain, there was nothing for them to gain by the slightest perversion of truth, or by any false construction which could be placed on their words. It is evident that any misleading statements are due entirely to errors of judgment. In the entire report there is a manifest desire to represent matters as they appeared to the investigators; there is no striving for effect, no bid for notoriety. They plainly did not realize the importance of the work they had undertaken, nor did they dream of the value which would be attached to their report in after years. They justly deserve the credit and honor accorded them for the arduous labors which never brought them an adequate return, and for having given to the world knowledge that would otherwise, perhaps, never have come to light; but none the less their faulty interpretations have been responsible for many wrong impressions and opinions with which the working archæologist finds himself obliged to contend.

* * * * *

And yet Squier and Davis are less at fault than are many succeeding authors who carry to a ridiculous extent the fanciful conceptions which seem to them the logical outcome of alleged measurements and resemblances among aboriginal remains. The exactness with which square and circular enclosures are said to be laid off, gave fresh impetus to extravagant suggestions made before their day, until now no height of absurdity is beyond attainment by enthusiastic sciolist or venal charlatan—not to mention some who mean well but should know better.

* * * * *

On the other hand, the magnificent collection made by Squier and Davis stimulated various scientific societies and museums to undertake explorations on their own account. In this

work men trained to observe have gone into the field and reported what they saw. Careful surveys and excavations have produced some definite results; not enough to clear away all the mystery enveloping the ancient people, but enough to destroy the effect of unwarranted opinions and assumptions which would greatly astonish the Mound Builders if they could know what has been said about them.

But as before intimated, there were two sides to the question long before the publication of "Ancient Monuments." In the preface to that volume is given a list of early writers on western antiquities. The first in the Ohio valley are Bishop Madison of Virginia, in 1803 (Transactions of the American Philosophical Society, vol. VI.); Harris (Tour into the territory northwest of the Ohio), 1805; Brackenridge (Views of Louisiana), 1814; Dr. Drake (Natural and Statistical View of Cincinnati and the Miami Country), 1815; President Harrison (Address before the Historical Society of Ohio), 1832. Major Long; Dr. Hildreth; Henry Howe; Col. Charles Whittlesey; and Caleb Atwater;—also contributed much to the science prior to the time of Squier and Davis. Atwater in particular, deserves credit as making the earliest careful and systematic examinations of the aboriginal tumuli and earthworks. His report was published in the first volume of the *Archaeologia Americana* in 1819. Most of his drawings are crude, some only rough outlines, and his descriptions are erroneous in many respects; but when we consider that absolutely nothing in the way of excavation, for the purpose of gaining knowledge, had been attempted before his time, and that in his interpretation of what he found he could derive no assistance from any source, even more serious inexactness could be condoned.

Since that time the register of archæological literature has indefinitely—one is tempted to say infinitely—extended; but whichever side the writers may take, they find themselves confined to an endorsement or denial of beliefs now almost a century old. Even so long ago the line was drawn between those who attributed the earthworks to Indians, and those who would accept nothing less than an extinct nation.

The most complete and convenient catalogue of writers on aboriginal remains, accessible to the public, is that contained in the American Antiquarian, volume IX, July, 1887, under the head of "Early Books Which Treat of Mounds"; and in the same

journal, volume XV, March, 1893, with the title of "Private Services under Public Patronage." Here may be found the names of nearly, if not quite, all those writers whose published works contain descriptions of mounds and earthworks. The articles are especially good in their references to authors of the first half of the century, who wrote before so much discussion had arisen, and who consequently simply told what they saw or believed, without any thought of controversy. An abstract or abridgment of these papers could not do them justice, and the reader who wishes to gain a full view of the progress in this science will do well to consult the authorities whose names are given in Peet's lists. All that will be attempted here is to give extracts from a few of these writings, showing how the subject has been considered. They are selected with the intention of showing the whole range of thought in as brief a space as possible. A hundred volumes could be filled with other quotations without adding materially to the enlightenment of the reader.

Perhaps it will be well to begin with the following from Foster. According to his belief it is

"A summary with regard to the origin, customs, and ultimate fate of the Mound-builders."

"As a race their origin extends back to a remote antiquity. They possessed a conformation of skull which would link them to the autochthones of this hemisphere,—a conformation which was subsequently represented in the people who developed the ancient civilization of Mexico and Central America. They developed traits which distinguished them by a well-marked line of division from the Indians [of Columbus's time]. Unlike the Indians, who were ignorant of the curative powers of salt, they collected the brine of the salines into earthen vessels molded in baskets, which they evaporated into a form which admitted of transportation; they erected an elaborate line of defense, stretching for many hundred miles, to guard against the sudden irruption of enemies; they had a national religion, in which the elements were the objects of supreme adoration; temples were erected upon platform mounds, and watchfires lighted upon the highest summits; and in the celebration of the mysteries of their faith, human sacrifices were offered up. The magnitude of their structures, involving an infinity of labor, such only as could be expended in a community where cheap food prevailed, and the great extent of their commercial relations, reaching to widely separated portions of the continent, imply the existence of a stable and efficient government, based on the subordination of the masses. We see the crude conception in the truncated pyramid, as first displayed in Wisconsin, Ohio and Illinois, and the accomplished result in the stone-faced foundations of the temples of Central America. And finally the indications

are this people were expelled from the Mississippi Valley by a fierce and barbarous race, and found refuge in Central America, where they developed those germs of civilization, originally planted in their northern homes, into a perfection which has elicited the admiration of every modern explorer." — Foster, 349, condensed.

A. — CIVILIZATION.

Upon the question of the degree of culture to which they had attained—or the grade of their "civilization" as most writers term it—we find Atwater saying prior to 1820,

"What surprized me, on measuring those forts [at Circleville], was the exact manner in which they had laid down their circle and square; so that after every effort, by the most careful survey, to detect some error in their measurement, we found that it was impossible, and that the measurement was much more correct, than it would have been, in all probability, had the present inhabitants undertaken to construct such a work." — Atwater, 144.

Squier and Davis express the same idea in summing up their observations in regard to various other enclosures which they examined.

"Such are the predominant features of this remarkable series of works. As already remarked, the coincidences observable between them could not have been the result of accident, and it is very manifest that they were erected for common purposes. * * * We may content ourselves with the simple expression of opinion, that they were in some manner connected with the superstitions of the builders. There is one deduction to be drawn from the fact, that the figures entering into these works are of uniform dimensions, which is of considerable importance in its bearing upon the state of knowledge among the people who erected them. It is that *the builders possessed a standard of measurement and had some means of determining angles.* The most skillful engineer of the day would find it difficult, without the aid of instruments, to lay down an accurate square of the great dimensions of those above represented, measuring as they do more than *four fifths* of a mile in circumference. It would not, it is true, be impossible to construct circles of considerable size, without instruments; the difficulty of doing so, when we come to the construction of works five thousand four hundred feet, or *over a mile* in circumference, is nevertheless apparent. But we not only find accurate squares and perfect circles, but also, as we have seen, octagons of great dimensions." — S. & D., 61.

Later, they cautiously add somewhat to the above conclusion, but are still far from claiming for the builders any particular degree of advancement.

"The vast amount of labor expended upon these works, and the regularity and design which they exhibit, taken in connection with the

circumstances under which they are found, denote a people advanced from the nomadic or radically savage state,—in short, a numerous agricultural people, spread at one time, or slowly migrating, over a vast extent of country, and having established habits, customs, and modes of life. How far this conclusion, for the present hypothetically advanced, is sustained by the character of the minor vestiges of art, of which we shall now speak, remains to be seen." — S. & D., 186.

"The earthworks, and the mounds and their contents, certainly indicate that, prior to the occupation of the Mississippi valley by the more recent tribes of Indians, there existed here a numerous population, agricultural in their habits, much superior to their successors. There is, however, no reason to believe that their condition was anything more than an approximation towards that attained by the semi-civilized nations of the central portions of the continent,—who themselves had not arrived at the construction of an alphabet. Whether the latter had progressed further than to a refinement upon the rude picture-writing of the savage tribes, is a question open to discussion. It would be unwarrantable, therefore, to assign to the race of the mounds a superiority in this respect over a nation palpably so much in advance of them in all others." — S. & D., 273.

An eminent English author is not satisfied with this guarded statement. He insists that

"The ancient geometrician must have had instruments, and minute means of measuring arcs; for it seems impossible to conceive of the accurate construction of figures on such a scale otherwise than by finding the angle by its arc, from station to station, through the whole course of their delineation. It is no less obvious from the correspondence in area and relative proportions of so many of the regular enclosures, that the Mound-Builders possessed a recognized standard of measurement, and that some peculiar significance, possibly of an astronomical origin, was attached to figures of certain forms and dimensions." — Wilson, D., I., 342.

Short goes still further:—

"The two principal figures of [the Hopetown] works are a square and a circle—each containing exactly twenty acres. The discovery of these geometrical combinations—executed with such precision—in many parts of the country, leads to the belief that the Mound-builders were one people spread over a large territory, possessed of the same institutions, religion and perhaps one government. These facts are highly important as shedding light upon the degree of their civilization. The evidence is ample that they were possessed of regular scales of measurement, of the means of determining angles and of computing the area, to be enclosed by a square and circle, so that the space enclosed by these figures standing side by side might exactly correspond. In a word their scientific and mathematical knowledge was of a very respectable order." — Short, 49.

He also thinks the Cincinnati tablet

"in all probability served the double purpose of a record of the calendar and a scale for measurement." — Short, 45.

No one has ever been able to fathom the thought that led to this singular surmise. There is no reason to believe the Mound Builders had any idea of a calendar such as is attributed to the Aztecs. As to a lineal scale, the evidence is equally negative, in spite of the fact that "a large number of measurements of mounds and earthworks in Iowa" were made by W J McGee, with the result of "ascertaining a common standard of 25.716 inches." — Essays, 447.

When we consider that it is not possible to tell within several inches at the best, and in some cases within several feet, of the terminal point of any earthwork, the decimal proves more in regard to the calculating power of the computer than it does concerning the "mathematical ability" of the builder. Another surveyor comes to a very different conclusion:—

"In 1883, Col. Chas. Whittlesey, of Cleveland ("The Metrical System of the Mound-builders"), analyzed eighty-seven measurements of Ohio earthworks by the method of even divisors and concluded that thirty inches was about the length, or was one of the multiples, of their metrical standard. Moreover, fifty-seven per cent. of all the lines were divisible without remainder by ten feet." — Essays, 447.

These figures are valuable, in that they show how the measurements were made upon which his calculations are based. If there are any indications of such "units" as "thirty inches" and "ten feet", they exist only in the minds, or diagrams, of white surveyors and explorers. The tendency is almost universal to run indeterminate numbers into tens, dozens, scores, or hundreds. By accepting as correct the figures of surveys made as these have been, one can plainly show any sort of "unit" or "system" he wishes to; for there will be coincidences without end. The most striking feature of this kind, however, is to be found in a group in Missouri, whose location, unfortunately, appears to be known only to its discoverer. According to his statement

"the chief mound measures twelve feet in height by thirty-six in diameter. * * * The ridges forming the three sides of the triangle [enclosing it] are of equal length—144 feet; their diameter is twelve feet, and their height three, four and five feet respectively. It is remarkable that these heights taken together equal the height of the central mound,

and that when they are multiplied together the length of the side of the triangle is obtained." — Conant; quoted by Nadaillac, 87.

Of course these alleged measurements are asserted to be intentional, and to have some "mysterious significance". The fact is overlooked that the present dimensions cannot be the same as those which held before the works had undergone centuries of denudation.

* * * * *

Naturally, such knowledge implies skill in smaller matters; in comparing remains in northern and southern Ohio, Atwater claims for the latter "glazed or polished" pottery, and a "great number" of wells "dug through as hard rock as any in the country." (Atwater, 220.) Of course he never found anything of the sort. Neither is it true, as will be seen in the chapter on stone objects, that

"the holes [in gorgets, etc.] are sunk with perfect accuracy, showing that the implement was turned by an apparatus which was far more efficient and precise than the human hand." — Foster, 207.

So far as ability to work in stone is concerned, we are not confined to a study of such small articles as gorgets and the like; some stone chambers which exist, or formerly existed, about two miles from Louisiana, Pike county, Missouri, have often been mentioned as examples of the skill of the Mound Builders in this respect. It is probable these opinions are based on a cut published in the early part of the century in which these structures are represented as symmetrical and well-made as would be possible by a skilled stone mason with the best tools of the trade. But the accompanying description says "All the walls consist of rough unhewn stone"; and that "although they are at present considerably decayed, their form is still distinct". — Beck, 306.

Broadhead says of a "walled burial place", "The walls were constructed of rough limestone taken from the subjacent strata of the hill". In the peculiar works in Pike county, mentioned above, "All the walls were of rough stone". Nevertheless the illustrations which he gives of them represent straight lines, sharp angles, smooth curves, and accuracy of fitting, such as would be possible only with slabs dressed by a skilled artisan. (Broadhead, 351-2). The cuts instead of the text, of these descriptions, seemed to have furnished inspiration to various persons for the assertion that large buildings constructed with great regularity, of stone accurately cut and fitted, are still to be found in this

portion of Missouri. The stones are now so scattered that nothing can be ascertained as to their original position.

The worst publication of this character which has ever appeared in a scientific disguise, is that of a former State Geologist of Indiana, who furnishes a report and figure of a most remarkable "Stone Fort" at the mouth of Fourteen Mile Creek, in Clark county, near Charleston. Across the neck of a peninsula formed by the creek and the Ohio River, he says, a wall is piled up "mason fashion, without mortar". It has "an elevation of about 75 feet above its base, the upper ten feet being vertical". The plate which accompanies the report shows a regular revetment of large stones, apparently dressed, or at least squared. A wall along the creek is said to be similarly built, but is not more than ten feet high.— Ind., 1873, 125.

Both the plan and description of this so-called fort are entirely imaginary. The creek, half a mile above its mouth, approaches the river quite closely, being separated from it by a solid rock ledge only eight or ten feet wide on top at the narrowest part, with a vertical cliff on either side. The creek then recedes in a curve, forming a peninsula whose surface contains a few acres of nearly level space. At the lower end of this is a small triangular tract of bottom land enclosed by the river, hill, and creek. The river side of the peninsula stands out in a bold precipice, extending from this low land to a considerable distance above the isthmus; on the side next the creek are similar but smaller cliffs, with some crevices or broken places, where it is possible to pass through or over them. Beginning at the termination of the cliff next to the river, a ditch and embankment sweep round the end of the hill facing the bottom land, and terminate at one of the cliffs above the creek. Accessible places along the latter side were strengthened either by filling narrow crevices with stones or, where necessary, by building short stretches of wall with stones irregularly piled up. When near the isthmus, a wall of mingled earth and stone, taken from an interior ditch, as in the case of the principal embankment, leaves the cliff and is carried diagonally along the hillside to a point near the narrowest point of the summit, where it ends in a stone mound which extends entirely across the space between the river bluff and the slope toward the creek. A person approaching this end

of the fort must follow the narrow neck of rock, in full view for more than a hundred feet and without any shelter or protection from the missiles of those within.

The wall at the west end of the hill was made by first gathering rocks and earth from the surface and throwing them promiscuously together. Then a considerable ditch was dug, fully twenty feet wide in places, and the earth heaped on the wall, which contains sufficient material to make on level ground a bank five or six feet high. Loose rocks were deposited on the outer side, apparently more as a protection for the wall from effects of erosion than as a feature of additional strength. Many of these have been hauled away; but it is reported by residents, and enough remains to show that the statement is correct, that in places flat rocks were laid up in a sloping wall against the face of the bank. There was not a wall of this character built up and earth thrown behind it; but the earthen embankment was made first and the stones laid one on another along its face to prevent washing; the outer edge of each being somewhat within the edge of the one next below. The reported "walls" of ten and seventy-five feet in height are only the natural outcrop of the heavy, evenly-bedded limestones. It seems incredible that a person connected in any capacity with a geological survey, even as cook or mule-driver, could ever have made such a ridiculous blunder as to suppose them artificial.

* * * * *

The utmost confusion of speech and thought results from attempts to probe the depths of this alleged civilization. One writer believes that because in building mounds and enclosures —

> "All of the material must have been laboriously carried to its place in baskets, it will be obvious that the real labor expended upon some of them was not much, if any, less than that expended upon the largest pyramid of Egypt. Such works could be constructed only by a people who had a compact, civil organization, with a central authority which could control the labor of the masses, and with dominant civil or religious ideas which would induce the masses to submit to long-continued labor." — Read, Arch., 79.

While no one can deny that such *may* have been the case, the query naturally arises, Why do we not find some better or at least some additional evidence of a government of this character? Certainly a separation of society into rulers and slaves presupposes a degree of advancement in knowledge that would

develop some of its members into artisans who could at least cut stone or make bricks. The mind can not realize a "compact civil organization" among people whose limit of constructive ability was reached in the manufacture of pottery; the carving of stone pipes and ornaments, and carrying dirt in baskets.

Other writers lose themselves in a tangle of ideas and utter strangely contradictory sentiments. One of them tells us on one page,

"For their time and surroundings they had made great strides towards a permanent civilization, and must be ranked as one of the great people of ancient times." — McLean, 89.

And on the next, paraphrasing Squier and Davis,

"We have no evidence that they attained to the same condition as that possessed by the semi-civilized nations of Europe, who themselves had not arrived at the construction of an alphabet." — McLean, 90.

Then he says:

"That they were remarkable people of an original civilization there is no room for doubt." — McLean, 129.

And finally,

"There is one thing that impresses itself upon the mind of the investigator. There could not have been a central government, but there must have been separate, although cognate nations. There is a belt of country running through central Ohio from east to west, entirely devoid of ancient earthworks. There were in the state two distinct nations, having different sympathies, and on account of the disparity existing between them they placed themselves wide apart, being separated by the belt of neutral territory." — McLean, 140, condensed.

Whittlesey, while advocating a somewhat advanced stage for these people, really marshals evidence against it. He undertakes to prove they had high military skill and knowledge, while showing they were not at all prepared for war.

"The tools found in the Ohio mounds were almost without exception, intended for peaceful purposes, indicating a people whose habits were not warlike. The earthworks must have been occupied by a people prepared for defence without being called upon to resist; weapons of war have not been found within these fortifications. The race of the Mounds has left us as much in doubt in regard to their fighting implements as to their history. If they had used stones for this purpose to be thrown from slings, or as battering rams, they should now remain upon the soil in the neighborhood of their forts; there must have been magazines of them collected within the works. Perhaps their forts were not erected until after a long residence here, when they were threatened by

warlike neighbors. The period during which they were compelled to turn their attention to military affairs was probably short; and, when their preparations were made, they may have withdrawn further south without a vigorous defence. They constructed a large number of strong and permanent forts. We find no proof that these works were called into requisition for defense, but the fact of their existence shows that they were prepared for war. If so, they must have had weapons of offense and defence, but what they were we cannot affirm. Their stone axes may have served the double purpose of battle axes and cutting instruments, but a people thus highly advanced in mechanics must have had something better. It is singular that so few weapons of a warlike character are found in the mounds, while so many forts exist in the country. If the tumuli were erected in honor of martial heroes, there should have been in their tombs the warlike implements which they used in battle. Instead of this, most of the relics which have been discovered are mere ornaments and symbols, the latter of a religious cast.

"All the contrivances of the race of the Mounds intended for practical purposes, display skill of a high order." — Whittlesey, Weapons, 473-9, condensed.

On the other hand, there have not been wanting persons whose conclusions have led in the opposite direction. The advanced stage of culture claimed by so many, is vigorously disputed by others. As far back as 1815 Moses Fiske, of Hilham, Tennessee, anticipated and logically refuted very many of the arguments propounded since that time and still adhered to in regard to the origin, social condition, time of occupation, and degree of culture, of the Mound Builders whom he calls "the ancient people" and whom he holds to be distinct from the modern Indian. He speaks particularly in regard to his own State; but much that he says applies equally to Ohio. The small conical or dome-shaped mounds, he says,

"are pertinently called barrows or bone heaps. But the truncated ones may have been castles or to give eminence to temples or town houses. If some of them contain bones, so do some cathedrals. It was probably an honor to be buried there. Nor must we mistake the ramparts or fortifications for farming enclosures. What people, savage or civilized, ever fenced their grounds so preposterously? But what settles the question conclusively, is, that the areas encompassed by these ramparts, were chiefly occupied by houses and mounds. The tokens are indisputable. * * * Those who can manufacture iron will not cut wood with a flint. * * * Not a chimney is seen, nor an oven; nor the remains of any bridge or dam, or well, or cellar, or wall of rocks; no masonry, however rude, either of stone or of brick. * * * They must have been ignorant of letters. Otherwise, in a country of slate, they who fabricated utensils of the hardest flint, would have left some inscription to

be deciphered by posterity. It is absurd to suppose that they were Welsh. If they were conquered, where are the victors? And to imagine that the whole people became extinct by pestilence or some other awful catastrophe, is an extravagant hypothesis, not supported by any precedent in the annals of mankind. The conjecture that they emigrated to Mexico seems quite plausible. But to suppose them refugees from Mexico, is a supposition altogether inadmissible." — Amer., I, 300-7, condensed.

One of America's most thorough students, speaking in reference to the earthworks, believes

"There is nothing in their construction or in the remnants which they contain, indicative of a more advanced state of civilization than that of the present inhabitants. But it may be inferred from their number and size, that they were the work of a more populous nation than any now existing." — Gallatin, 147.

An eminent geographer said early in the century:—

"The mounds show no more art, though infinitely more labor, than might be expected from the present Indians. They are mere erections of earth, exhibiting no other traces of skill, than that most of them are of regular forms, contained under circular or right lines. Iron tools were not used in the formation of them. Stones make no part of them. Yet many of the squares and parallelograms make a much more conspicuous figure, after the lapse of unknown ages, than the defences of earth, thrown up on the Atlantic shore, during the Revolutionary War.

"The only circumstance, which strongly discredits their having been formed by the progenitors of the present Indians is the immensity of the size of some of them, beyond what could be expected from the sparse population and the indolence of the present race. We know of no monuments, which they now raise for their dead, that might not be the work of a few people in a few days." — Flint, I, 194.

Another thus records his opinion:—

"Of one thing the writer is satisfied, that very imperfect and incorrect data have been relied upon and very erroneous conclusions drawn, upon western antiquities. Whoever has time and patience, and is in other respects qualified to explore this field of science, and will use his spade and eyes together and restrain his imagination from running riot amongst mounds, fortifications, horse-shoes, medals, and whole cabinets of relics of the 'olden time,' will find very little more than the indications of rude savages, the ancestors of the present race of Indians.

"Of ancient military works, I have long been convinced that not half a dozen structures ever existed in the west before the visits of Europeans. Enclosures of various sizes, and perhaps for different purposes, with an embankment of earth three or four feet high, and a trifling ditch out of which the earth was dug, undoubtedly were formed. In all probability some of these embankments enclosed their villages; others the residence of their chiefs or head men. But what people, savage, bar-

barous, civilized or enlightened, ever constructed a fortification around five or six hundred acres, *with a ditch on the inside!* Or what military people made twenty or thirty such forts, within two or three miles." — Peck, 35.

If the author just cited had restrained his impatience to the extent of modifying the exaggerations in his second paragraph, and especially in regard to the last two sentences, his opinions would have borne more weight—as they deserve to do.

Morgan, who has done more than any one else to arouse critical investigation of fanciful theories, goes to the root of the matter in a few words.

"A people unable to dig a well or build a dry stone wall must have been unable to establish political society, which was necessary to the existence of a state." — Morgan, 219.

Thruston, who has thoroughly worked out the archæology of middle Tennessee, presents the following strong argument, which applies with the same force to Ohio. The correctness of his conclusions is beyond controversy.

"The results may be briefly summarized as follows:

First. The mounds and earthworks of Tennessee and Southern Kentucky are simply the remains of ancient fortified towns, villages and settlements once inhabited by tribes of Indians, some of whom were more devoted to agriculture, more stationary in their habits, and more advanced in culture than the nomadic tribes generally known to the whites.

Second. Nothing has been found among the prehistoric monuments and remains in Tennessee, or, indeed, elsewhere in the Mississippi valley, indicating an ancient civilization or semi-civilization. There are many indications, however, of a state of native society, primitive and rude, yet, in some respects, more progressive and advanced than that found existing among the historic red Indians at the date of the European settlement.

Third. The remains of the arts and industries and the cranial remains evidently connect the ancient tribes that occupied the Cumberland and Tennessee valleys with the native tribes of the West or Southwest, of the sedentary or village Indian type. They place them in the ethnic scale in the same class as to culture as the village Indians of New Mexico and Arizona, and as the village tribes of old Mexico. The cranial remains and the remains of the arts, homogeneous among the mound tribes, also appear to separate the advanced tribes of mound builders from the more barbarous tribes of northern and northeastern Indians. * * *

Fifth. The remains of art and industry in Tennessee * * * indicate that the ancient inhabitants of Tennessee probably reached as

high a state of development as any of the native races within the present territory of the United States.

Sixth. The accumulation of a dense population in favored localities, and the progress made toward civilization, were probably the results of periods of repose and peace, that enabled certain tribes to collect in more permanent habitations, and to pursue for a time more peaceful modes of life than some of their neighbors and successors."

"The flint implements and the pottery from the stone graves of Tennessee evince a much higher order of workmanship and degree of skill than similar articles from the Ohio mounds or village sites."—Thruston, Tenn.: 16, *et seq.*

Contrast this conservative statement of a dispassionate student with the turgid emanations presented in the next few pages. It seems almost necessary to apologize for offering them to the reader; but it is just this sort of stuff that has helped to form the opinions of many who believe such vagaries entitled to respectful consideration as being the warrantable judgment of well-informed men.

"With reference to the civilization of the Mound Builders: * * * they came into the country in comparatively small numbers at first * * * and during their residence in the territory occupied by the United States they became extremely populous. Their settlements were widespread, as the extent of their remains indicate. The magnitude of their works, some of which approximate the proportions of Egyptian pyramids testify to the architectural talent of the people and the fact that they had developed a system of government which controlled the labor of multitudes, whether of subjects or slaves. They were an agricultural people, as the extensive ancient garden-beds found in Wisconsin and Missouri indicate. Their manufactures afford proof that they had attained a respectable degree of advancement, and show that they understood the advantages of the division of labor. Their domestic utensils, the cloth of which they made their clothing, and the artistic vessels met with everywhere in the mounds, point to the development of home culture and domestic industry. There is no reason for believing that the people who wrought stone and clay into perfect effigies of animals have not left us sculptures of their own faces in the images exhumed from the mounds."

"Their defences were numerous and constructed with reference to strategic principles, while their system of signals placed on lofty summits, visible from their settlements and communicating with the great water-courses at immense distances, rival the signal systems in use at the beginning of the present century. Their religion seems to have been attended with the same ceremonies in all parts of their domain. That its rites were celebrated with great demonstrations is certain. The sun and moon probably were the all-important deities, to whom sacrifices (probably human) were offered. We have already alluded to the development in architecture and art which marked the probable transition of

this people from north to south. Here we see but the rude beginnings of a civilization which no doubt subsequently unfolded in its fuller glory in the valley of Anahuac, and spreading southward engrafted a new life upon the wreck of Xibalba." — Short, 96 and 100.

Fort Ancient has furnished a prolific ground for wonder-mongers. At the foot of the hill on which the three terraces are situated, the current of the Little Miami has worn a deep hole in passing from a bed of stone and hard clay to one of finer, looser material. Washouts of this character are quite common; but no such explanation of its origin meets the approval of at least one visitor to the place. He accounts for it in the following manner. But we are left in ignorance as to the method by which men or animals could find their way into or through a tunnel whose entrance was at the bottom of a pool "over thirty feet deep", and its exit in a mudhole more than 250 feet above.

"The river here suddenly expands into a large oval basin, of such extraordinary depth and regular cincture as to seem an artificial formation. It is said, that when the railroad was under construction around the base of the bluff, the declivity being such as to require a foundation for the road-bed partially built up from the river bottom, the great depth of the basin was a serious obstacle, and a vast amount of material was required to make the railway embankment of the requisite width. This portion of the river has for years been designated by residents in the locality as the 'deep hole,' and twenty years ago, after being partially filled by the debris of the railway bed, was over thirty feet deep. It is now nearly twenty feet in depth, with a bottom of soft mud, washed in by freshets. The shores exhibit no such conditions as would create a whirlpool or other excavating agency during high water; and in the apparent absence of any natural cause, we might be justified in assuming that it was excavated by the builders in connection with a subterranean communication between the fort and the river, in which case the terraces before mentioned would appear to have been designed as stations for guards, to protect the mouth of such passage from hostile attempts during a siege. An unusually large depression within the fort, nearly opposite to this point, now filled with soft mud, washed into it from the surrounding surfaces, gives some color to this supposition; especially, in connection with a tradition of the existence of some subterranean passage within the fort, founded upon the disappearance and reappearance of game when pursued, which is held by residents who have been accustomed to hunt in the vicinity." — Hosea, Ft. A., 298.

This may be the place to which Nadaillac refers when he says that Mound Builders' works

"are connected with each other by deep trenches and secret passages, some of them hewn out beneath the beds of rivers.' — Preh, Peo., 296.

Early in the century it was recorded that

"a mound in Belmont county, in the State of Ohio, opposite the mouth of Little Grave creek, and nearly half a mile from the Ohio river, was about 15 or 16 feet high. At or near the bottom were several layers of human bones, laid transversely, in a great mass of decayed matter five or six feet thick. The toe and finger nails were nearly entire; the hair, long, fine, and of a dark brown color; it would bear to be combed and straightened out. Along with flint spear heads there were also found four or five iron swords, the silver ferules on the handles engraved with animal and geometrical figures." — Haywood, 327.

From Utah, Kansas, Indiana, Illinois, Texas, and perhaps other places, come reports of corn dug from the bottom of a mound, which, being planted, produces a bountiful crop. As a rule, the grain of this corn is quite different from any other ever seen. An Arkansas man caps the climax of such discoveries, and his report affords a fitting end to these absurdities.

"Near the great mound not far from Osceola there is a threshing floor, paved with adobe, having an area of quite ten acres. The wheat of wide districts must have been threshed on this spot, and stood in bins made of the same material, the remains of which are quite visible. This threshing floor is buried quite two and a half feet beneath the country's surface by a black loam." — Du Pre, 347.

Du Pre's article then goes on hysterically about "countless myriads of people"; "skulls and thigh-bones of giants" (it seems that in all such cases the remaining bones entirely disappear); in the swamps "remains of brick structures"; "old military road, the product of ancient skill and toil"; "countless canals by which floods were rendered impossible"; "many mounds constructed to record the height of floods"; "broad farms of hundreds and even thousands of acres, absolutely created by piling up the earth"; "mightier tasks than those achieved by modern engineers"; "magnificent cities"; "bronze idol"; "crucible, suspended by brass wire"; "an earthen box with a sliding lid, half full of pills," whose potency had "caused the bones of the mound-building patient to become an impalpable powder." Strangely enough, he makes no mention of the tall man with heavy whiskers and an unusually large jaw, who is generally so conveniently present to afford a scale of measurements, but introduces a novelty in the way of a "burly weather-beaten sailor," who happens along just in time to pronounce an exhumed pot "the water-cooler of a Malay Islander." He "has before him" wheat raised in Arkansas from

"grains taken from an ancient Egyptian sarcophagus." "Strange but true it is, this very wheat still grows among the weeds and grass that cover mounds" near Memphis [Tennessee]; which is sufficient proof that the Mound Builders are descended from the Egyptians. But because King David "visited Araunah to buy his threshing-floor," and the threshing-floor near Osceola contains "ten acres, and the same peculiar grain grew beside both peculiar threshing-floors," the deduction necessarily arises that the same race of people "cultivated the same crops and garnered them in the same peculiar manner." He mentions two mounds sixteen miles east of Little Rock; "the loftier mound is about two hundred and fifty feet in height, * * the smaller is quite one hundred feet; its summit is flat and an acre in area."

There are no such mounds in Arkansas; and perhaps the whole article is merely a burlesque. But statements equally ridiculous are frequently published in all seriousness.

The greatest mistake that has ever been printed in regard to American antiquities, comes from no less a personage than America's most eminent historian. It is quite opposite in its nature to the general tenor of those which have just been concluded. It is only fair to say, however, that the following quotation does not appear in the later editions of Bancroft's great work:

"The country east of the Mississippi has no monuments. The numerous mounds which have been discovered in the alluvial valleys of the west, have by some been regarded as the works of an earlier and more cultivated race of men; but the study of the structure of the earth strips this imposing theory of its marvels. Where imagination fashions relics of artificial walls, geology sees but crumbs of decaying sandstone; in parallel intrenchments, a trough that subsiding waters have plowed through the center of a ridge; the tesselated pavement a layer of pebbles aptly joined by water; the mounds composed of different strata of earth, arranged horizontally to their very edge, it ascribes to the Power that shaped the globe into vales and hillocks." — Bancroft, condensed.

In many of the above citations it will be observed that writers make liberal use of the term "civilization," apparently without any definite idea as to its meaning. In fact, the word is somewhat loosely employed by modern writers on all social subjects. It is vaguely considered to be synonymous with intellectual capacity, with a gentle disposition, with refinement of manner, or, in recent years, with the ability to sell great quantities of manu-

factured goods. Which, if any, of all these qualities entitles the Mound Builders to be called "civilized" is not to be learned from the volumes in which this particular standard is claimed for them. We must be content with the information that such was the case without seeking for reasons.

It is a relief to turn from such rhapsodies to the cool, logical formula of a man who devoted a lifetime to ethnological study. Probably no better scheme for indicating the relative standing of American aborigines can be devised than that of Morgan, who makes the following classification of culture stages:

1. *Status of Savagery.*— From the infancy of the human race to the invention of pottery.

2. *Lower Status of Barbarism.*— From the use of pottery to the domestication of animals in the eastern hemisphere; and in the western to the cultivation of maize and plants by irrigation, with the use of adobe and dressed stone in houses.

3. *Middle Status of Barbarism.*— From the domestication of animals, etc., to the manufacture and use of iron.

4. *Upper Status of Barbarism.*— From the use of iron to the invention of a phonetic alphabet, with the use of writing in literary composition.

5. *Status of Civilization.*— From the use of alphabetic writing in the production of literary records to the present time. —Morgan, Periods, 271.

According to this plan, it is clear that the Mound Builders had attained only the second step of five which they must surmount before reaching a plane where they could demand admittance to the ranks of civilized peoples. In spite of all assertions to the contrary, the proposition is easily demonstrated.

They had no alphabet. They knew nothing of the economic use of iron or any other metal. Copper, galena, hematite, they had in plenty; meteoric iron, gold, silver, in small amounts; all were treated as so many stones, to be rubbed, chipped or beaten into desired forms. They had no domestic animals or beasts of burden, for not one bone of such has ever been found. Cement or mortar was unknown. There is no evidence that they could build with flat stones an unsupported wall that would stand upright. They could not dig a well. They never walled up a spring. They had no hand mills, not even so rude an implement

as a Mexican metate, though corn must have been a staple article of food.

They did, however, manufacture serviceable pottery, often of elegant design, though they knew nothing of the potter's wheel. Consequently, their place is in the "Lower status of barbarism"; below the Pueblo Indian, and far below the Peruvian.

B.— RELIGION.

Connected with the culture of any race, indeed forming no unimportant part of it, is a belief in the controlling influence exerted by invisible beings or unknown forces. It is sometimes affirmed by travelers that they find savages who have no conception of a deity. This is no doubt true in so far as it relates to the kind of deity the traveler has in mind. Neither party has any idea of what the other is thinking about, consequently no understanding can be reached.

Every person capable of forming a definite thought must of necessity believe in a power of some sort, let him call it what he will, which he can neither see nor understand. This is the germ of religion. Its growth and development follow advance in knowledge and power.

What particular form the religion of the Mound Builders may have assumed, we do not know. The most we can say is that it must have been of the same general character as that of sedentary barbarians now in existence and unaffected by the influence of traders or missionaries. This lack of knowledge has not prevented abundant theorizing; in fact, it has rather encouraged it, for where nothing is known anything may be guessed at. A very few extracts will be given, to show the tendency toward the marvelous. No comment is necessary further than to say that no reason whatever is known why we should believe a word of it, while much that is asserted is contradicted by the reports of all explorers.

"The mound-builders worshiped the elements—the sun, the moon, and particularly fire. They erected their fire-altars for sacrifice, on the highest summits. Like the Persian sun-worshippers, they, undoubtedly, had their Magi, without whose presence the sacrifice could not go on. No gifts were too costly to be offered up."—Foster, 182.

"The simple mound so common in the northern and central region of the United States, represents probably the first attempts at the imitation of Nature in providing a place of worship."—Short, 80.

"Every indication shows that it was largely a government of the priesthood. * * * Such a government is only content with the complete subjection of the masses, which results in personal servitude, and an abnegation of all political and personal rights. It can not be said that the Mound Builders were entirely ruled by priests, but undoubtedly to a very great extent. There were probably very powerful rulers, or chieftains, who had a voice with the priesthood and who together controlled the masses, and had supervision over their labor. The numerous works of the people, and the useless but gigantic tumuli, give evidence that they were not free men, but in a condition of servitude. These men, by stupendous labor, with rude implements, would not have erected of their own accord, the Grave Creek and other mounds simply to gratify a ruler who wished to perpetuate his name. This government apportioned the work among the masses and selected the avocation for each and every one. * * * While a portion were engaged in toiling on the earthworks, others provided for them the necessaries of life. * * * While they had a very strong centralized and despotic government,. it is extremely doubtful if the race constituted one nation or empire." — McLean, 125.

"The impossibility of assigning any other purpose to which the greater number, and many of the largest of these remains could be applied, together with other appearances scarcely to be misunderstood, confirm the fact that they possessed a national religion; in the celebration of which, all that was pompous, gorgeous, and imposing, that a semi-barbarous nation could devise, was brought into occasional display. That there were a numerous priesthood, and altars often smoking with hecatombs of victims. These same circumstances, also indicate, that they had made no inconsiderable progress in the art of building, and that their habitations had been ample and convenient, if not neat or splendid. * * * Thus much do these ancient remains furnish us, as to the condition and character of the people who erected them.

"The temples of Circleville, Grave Creek and Newark, no doubt annually streamed with the blood (if not of thousands like those of Cholula and Mexico,) of hundreds of human beings * * * The necessity of a double draft upon their population, to supply the losses of the battle field, and the demands of their own priesthood, * * * will serve to strengthen my conjecture, that the fate of the [Mound Builders] was hastened by their laboring under the double curse of an arbitrary government, and a cruel, bigoted, and bloody religion." — Harrison, 223 and 265.

At the smaller flat-topped mound at Marietta (which he calls eighty feet high instead of eight feet),

"On the south side is a peculiar kind of terrace, or platform, which extends out from the body of the mound about fifty feet. This platform is supposed to have been occupied by orators who stood in that elevated position and descanted upon matters connected with their political jurisprudence, and their governments and cares; or perhaps it was occu-

pied by priests, clothed in their sacred robes, teaching their dying fellow men the road that leads to the abode of the gods, whose throne is the sun, and whose eyes are twinkling stars which glisten in the heavens." —Larkin, 156.

"It is probable that upon this platform [on the top of Cahokia mound] was reared a capacious temple, within whose walls the high priests, gathered from different quarters at stated seasons, celebrated their mystic rites, while the swarming multitude below looked up in mute adoration." — Foster, 106.

"The evidences are abundant that some mysterious rites were performed at the altar mounds; cremation only may have been practiced, but we fear that even more awful and heart-sickening ceremonies took place upon these altars as well as upon the high temple sites in which human victims may have been offered to appease the elements or the sun or moon by their death agonies. What splendid ceremonial, what mystic rites administered by a national priesthood in the presence of a devout multitude may have accompanied these horrible sacrifices are beyond even the limits of conjecture." — Short, 85.

"Next, the uses to which the mound and roadway at Fort Ancient were devoted, of course, rests largely in conjecture; but it seems not improbable that upon this mound were conducted the religious ceremonies peculiar to the worship of the sun. The imagination was not slow to conjure up the scene which was doubtless once familiar to the dwellers of Fort Ancient. A train of worshipers, led by priests clad in their sacred robes, and bearing aloft holy utensils, pass in the early morning, ere yet the mists have risen from the valley below, along the gentle swelling ridge on which the ancient roadway lies; they near the mound; and a solemn stillness succeeds the chanting songs; the priests ascend the hill of sacrifice and prepare the sacred fire; now the first beams of the rising sun shoot up athwart the ruddy sky, gilding the topmost boughs of the trees; the holy flame is kindled—a curling wreath of smoke arises to greet the coming god; the tremulous hush which was upon all nature breaks into vocal joy, and songs of gladness burst forth from the throats of the waiting multitude as the glorious luminary arises in majesty and beams upon his adoring people—a promise of renewed life and happiness." — Hosea, Ft. A., 294, *et seq.* condensed.

By the "hill of sacrifice" he means the little mound a few hundred yards east of the fort. This was never more than three or four feet in height.

C.—NUMBERS.

The theory of a high "civilization" and a complicated "religion" involves the necessity of a great number of people. Accordingly we find such expressions as these:

"The conclusion that the ancient population was exceedingly dense, follows not less from the capability which they possessed to erect, than from the circumstances that they required, works of the magnitude we

have seen, to protect them in danger, or to indicate in a sufficiently imposing form their superstitious zeal, and their respect for the dead." — S. & D., 302.

"These facts, I think, clearly indicate that this region must formerly have sustained a dense population, who derived their support mainly from agriculture." — Foster, 124.

"In some places * * * they cover square miles of surface, and it is hardly to be doubted that they are the work of a people or peoples not less numerous than the present population." — Newberry, P. S. M., 189.

"During the period of occupancy by the Mound Builders, there were certainly districts densely populated, as indicated by the remains, which do away with the idea of dependence upon the chase, and prove that they subsisted upon the products of the soil. * * * It has been estimated that in the hunter state it requires fifty thousand acres for the support of one hunter; * * * we could then have, upon the above estimate, but five hundred and nine able-bodied men, supported alone by the flesh of wild beasts in Ohio. * * * Their system of agriculture must have been very complete in order to sustain so large a population. These monuments arose slowly, and untold multitudes toiled constantly upon them. In order to have supported the laborers there must have been plenty of cheap food, which in a well populated district could only be produced by skilled labor. Their chief subsistence was probably maize, * * * the product of a single acre [of which] is sufficient to sustain, for an entire year, about two hundred able-bodied men." — McLean, 123-24.

"The vast amount of labor expended upon the earthworks implies that the condition of society among the Mound Builders was not that of free men; * * * the state possessed absolute power over the lives and fortunes of its subjects. This condition of affairs implies considerable advance in society, and a complex system of government; and to maintain [this] there must have been cheap food. * * * Maize undoubtedly constituted the great staple of existence. * * * The product of a single acre furnishes rations to sustain, for an entire year, all the way from one hundred and twenty, to two hundred and forty able-bodied men. The area of the forest-belt abundantly stocked with game, required to support an equally numerous population, would vary from nearly eight hundred thousand acres to more than a million and a half acres. That the Mound Builders cultivated the soil in a methodical manner * * * is evident from the vestiges of ancient garden-beds." — Foster, 346.

But the garden-beds appear only in a limited area, as noticed elsewhere; and no indications exist that they were ever made use of outside of that section. Certainly none were ever constructed in the Scioto valley.

The silliness of the proposition that an acre of maize would support "from 120 to 240 men" is evident at a glance. Suppose

we take the smaller figure. If we allow a yield of sixty bushels of corn to the acre, which is equal to the average production on fertile ground with modern farming utensils, each person would receive two pecks, on which he must subsist for an entire year. Twenty times that amount would not keep a man from starvation. The ration issued to each grown slave on southern plantations was a peck of corn meal, four pounds of bacon, and a quart of molasses every week. In some places the family was also allowed a small garden, with the privilege of raising a few chickens and a pig or two. But the ration was considered sufficient to keep them in good working order.

On such a basis, a village whose population would require as much food as one hundred adult Indians—or Mound Builders—would need for a year's supply 1,300 bushels of corn and 20,000 pounds of cured meat. With their crude methods of cultivation this means a corn-field of at least 30 acres; and as freshly killed game must, of course, have a weight much in excess of 20,000 pounds, a large area of hunting ground was required. Fish and nuts were also important articles of food, and their use may have reduced to some extent the amount of land needed for farming and hunting. On the other hand, however, the aborigine probably ate much more than the Negro—when he had it to eat. He used in addition quantities of berries and some sorts of wild fruits which grew in abundance in these fertile lands, and which added a welcome variety to his somewhat monotonous dietary.

* * * * *

The considerations that governed the Mound Builder in his selection of a place of residence, are supposed to be the same as those which influence his white successor.

"And it is worthy of remark, that the sites selected for settlements, towns, and cities, by the invading Europeans, are often those which were the especial favorites of the Mound Builders and the seats of their heaviest populations. Marietta, Newark, Portsmouth, Chillicothe, Circleville, and Cincinnati, in Ohio, Frankfort in Kentucky; and St. Louis in Missouri, may be mentioned in confirmation of this remark. The centers of population are now, where they were at the period when the mysterious race of the mounds flourished." Quotes from Brackenridge: "The most numerous as well as the most considerable of these remains are found precisely in any part of the country where the traces of a numerous population might be looked for." — S. & D., 6.

"The most dense ancient population existed precisely in the places, where the most crowded future population will exist in the generations.

to come. The appearance of a series of mounds generally indicates the contiguity of rich and level lands, easy communications, fish, game, and most favorable adjacent positions." — Flint, I, 193.

With the exception of Cincinnati and St. Louis, an examination of the census returns will show that none of the places mentioned are entitled to be called large cities; and the same is true regarding various other towns to which the argument has been applied. In the last sentence quoted may be found a very simple explanation of the coincidence, as far as there is a coincidence. It is easier to carry goods in a boat, than on pack-horses or men's backs; rivers furnish water and wood with only the trouble of securing them; fertile land, easily tilled, lies along the banks; fish was an essential item; while different sorts of game frequented the water-courses. These are the necessities of life in a new country; and they are the only necessities. There is, then, nothing remarkable or significant in the fact that the pioneer chose spots that had been occupied by his predecessor. As soon as the construction of roads opened up communication with the "back country," and especially with the building of railroads, the largest cities began to spring up where the Mound Builders never lived in considerable numbers.

* * * * *

As will appear presently, there is no need for supposing a great number of inhabitants to account for the creation of even the largest earthworks. Besides,

"Dense populations, an expression sometimes applied to the Mound Builders, have never existed without either flocks or herds, or field agriculture with the use of the plow. * * * The difficulties in the way of production set a limit to their numbers. These also explain the small number of their settlements in the large areas over which they spread. [A stone chisel, a wooden spade, a flint knife] were as perfect implements as they were able to command." — Morgan, 218.

The most exaggerated views prevail as to the amount of labor that must enter into the erection of mounds and earthworks. For instance:—

"No one, I think, can view the complicated system of works here displayed [at Newark], and stretching away for miles, without arriving at the conclusion that they are the result of an infinite amount of toil, expended under the direction of a governing mind, and having in view a definite aim. At this day, with our iron implements, with our labor-saving machines and the aid of horse-power — to accomplish such a task

would require the labor of many thousand men continued for many months." — Foster, 128.

"The importance of some of their works, which, according to the judgment of competent engineers, it would have taken several thousand of our workmen, provided with all the resources of our grand modern industries, months to execute, bears witness to an organized community and a powerful hierarchy." — Nadaillac, 85.

"We have seen mounds that would require the labor of a thousand men employed upon our canals, with all their mechanical aids, and the improved implements of their labor for months." — Flint, 131.

"One thousand men could not have performed the great labor" of erecting all the Cahokia group in a generation. "If one thousand men were employed upon these great works for forty or fifty years it would surely have taken nearly twice that number to have supplied them with food, clothing, fuel and other necessaries during that long period of time, and then again, we must suppose a numerous train composed of women and children and feeble persons * * * which had to be fed, clothed and maintained." — Larkin, 143.

The author last cited has found an easy solution; he says:—

"My theory that the prehistoric races used, to some extent, the great American elephant or mastodon, I believe is new. * * * Finding the form of an elephant engraved upon a copper relic some six inches long and four wide, in a mound on the Red House Creek, in the year 1854, and represented in harness with a sort of breast-collar with tugs reaching past the hips, first led me to adopt that theory. That the great beast was contemporary with the Mound Builders is conceded by all, and also that his bones and those of his master are crumbling together in the ground."

"It is a wonder, and has been since the great mounds have been discovered, how such immense works could have been built by human hands. To me it is not difficult to believe that those people tamed that monster of the forest and made him a willing slave to their superior intellectual power. If such was the case, we can imagine that tremendous teams have been driven to and fro in the vicinity of their great works, tearing up trees by the roots, or marching with their armies into the field of battle amidst showers of poisoned arrows." — Larkin (preface), and 3.

Another common delusion is that in many mounds,—

"The singular circumstance is said to exist, and by people, who live near them, and ought to know that, of which they affirm, that the earth, of which they are composed, is entirely distinct from that in the vicinity. It is of no avail to inquire, why the builders should have encountered the immense toil, to bring these hills of earth from another place?"

"It is the most inexplicable of all the mysterious circumstances, connected with these mounds, that the material of these immense structures, some of which would require the labor of a thousand men for some time in the erection, should have been brought from a distance. There

is no conceivable motive to us, why the earth, on which the mounds rest, should not have subserved all purposes, that we can imagine the builders to have had in view, as well as that from a distance." — Flint, I, 195 and II, 314.

"At numerous places [at Fort Ancient] are found large quantities of water-worn stone which, after an incredible amount of labor, have been carried from the river below." — McLean, 20.

Such statements are not true. Neither earth nor stone is ever carried more than a few hundred feet, unless in very small quantities, for a particular purpose; as making an "altar," for example.

Let us bring figures to bear upon this question of labor. The largest mound in Butler county, is in Madison township.

"Its altitude is forty-three feet with a circular base of five hundred and eleven feet. The hypothenuse is eighty-eight feet, the contents being eight hundred and twenty-four thousand four hundred and eighty cubic feet. At twenty-two cubic feet per load, this would give thirty-seven thousand four hundred and seventy-six wagon loads, which allowing ten loads per day, would take one man twelve years (not including Sundays) to remove the mound, say a distance of one mile.— (Dr. J. B. Owsley.)" —McLean, 224.

If the altitude and base are correctly given, the hypothenuse is almost exactly 92 feet; if the base and hypothenuse are as stated, the height must be about 34 feet. This is on the assumption that the slope of the mound is uniform and in a straight line from summit to base; if the surface of the mound be curved, as must naturally be the case, then with the assumed height the hypothenuse, if measured on the ground, must be greater than 92 feet; or if the measurement of 88 feet be correct, the elevation is less than 34 feet. Accepting, however, the figures as to the altitude and circumference, we find the solid content of a cone having these dimensions is in round numbers 297,800 cubic feet; and the content of the segment of a sphere of these measurements, which is larger than a mound exposed to the elements could possibly be, is about 488,000 cubic feet. Thus we see that the mound is certainly less than three-fifths of the asserted size. On the other hand, a cubic foot of perfectly dry common loam, which is the material composing most of the mounds, weighs about eighty pounds; the weight varies somewhat according to the moisture and to the way it is packed, but the above will fall very close to the average when it is allowed to settle naturally. If we admit, for argument, the preposterous intimation that the average dis-

tance which this earth is carried is one mile—though why an Indian or any one else would carry dirt a mile when he could get it within a few rods, is past human understanding—then if we suppose a man to walk, with a load, three miles per hour he must in a day of ten hours travel thirty miles and must carry for half that distance a load of 117 pounds, in order to deposit upon the mound as much as *one* "wagon load" of twenty-two cubic feet in a day. In order to complete his allotment of *ten* wagon loads per day, which our author has assigned him, he would, if we change only one of the factors in the problem, have to walk thirty miles an hour; or carry over 1,170 pounds at a load; or work one hundred hours in a day. No evidence has as yet been discovered to justify the supposition that any of the Mound Builders possessed such a degree of speed, strength, or endurance!

Observations in a number of mounds indicate that the average load as carried in during the construction, was not far from half a cubic foot; if any difference the amount is a little more. Assuming this amount as approximately the load, the weight will be about forty pounds for loam and about fifty pounds for sand; which is as much as a man will want to carry for any considerable distance. By carrying thirty loads a day of this size—a reasonable estimate, for such an amount—a laborer would add fifteen cubic feet to the pile every day. If we allow 450,000 cubic feet for the solidity of the mound in question—which is certainly beyond the actual amount—one hundred men will complete it in 300 working days; that is, within one year. Not a yard of this earth need be carried more than 600 feet; for if a circle be laid off with this radius and the earth removed to a uniform depth of a small fraction less than five inches (excluding that portion of the area on which the mound stands) the amount so obtained will be ample for the construction of the tumulus.

Suppose we put the calculation in a different form. A regular cone twenty feet high and one hundred feet in diameter at the base, will contain 1940 cubic yards. For one mound that will exceed this size there are a hundred that will fall below it. Taking it as the average, and accepting the usual estimate of 10,000 as correct, the entire amount of earth—and stone—in the mounds of the State will be about 19,400,000 cubic yards.

A regular enclosure 1,000 feet square or 1,275 feet in diameter, measuring twenty feet in breadth at the top, forty feet at the base, and six feet high, with four gateways each twenty-five feet

wide, will contain 26,000 cubic yards. It is doubtful whether any one, except two or three hill-top forts, is so large. The equivalent of four hundred such will fully equal the contents of all enclosures, making in all about 30,000,000 cubic yards for the entire solid contents of aboriginal remains in Ohio. No one familiar with them will dispute the liberality of these figures.

The lenticular masses noticed in so many mounds, each of which represents the amount carried in at a load, vary in volume from a peck to two pecks; if the average load be taken at one-half a cubic foot, it will represent almost the mean between these figures. It would require 104,760 such loads to complete the mound. Twenty of these loads would be an easy task for one day; with fifty persons continually at work, 1,000 loads would be piled up each day. Consequently one hundred and five working days would see the mound completed.

With the same force working in the same way, an embankment of the size above given could be finished in 1404 days.

But a village which would require an enclosure of such magnitude could furnish a much larger force of workmen; if 200 were steadily engaged, the wall could be easily finished within a year; while, with the same number, less than a month would be needed for the mound.

On the estimate of 30,000,000 cubic yards for the prehistoric works of the State, one thousand men, each working three hundred days in a year, and carrying one wagon load of earth or stone in a day, could construct all the works in Ohio within a century.

To show that a load of the size indicated is not excessive, it may be stated that in various parts of the world, where goods must be conveyed by porters and carriers, the long distance load for a man (or woman) varies from 80 to 180 pounds. The average seems to be not far from 100 pounds. In Martinique, according to Hearn, "women can walk all day long up and down hill in the hot sun, with shoes, carrying loads of from 100 to 150 pounds on their heads." "The slaves are almost the only carriers of burdens in Rio Janeiro. * * * The usual load is about 200 pounds."— Mason, Travel, 480-483.

Forty deck-hands on a western steamboat, working steadily, will transfer 10,000 bushels of corn from the bank to the vessel in one day. An equal weight of dry earth will make a mound forty feet in diameter and ten feet high.

D.—EXTENT.

The idea of a vast empire possesses a fascination for nearly all who become interested in American antiquities. The real significance of important facts has been so obscured by this delusion that many careful workers whose opportunities for observation were, and are, of the best, have been led to a faulty interpretation of their discoveries. Frequently they seem on the point of apprehending the truth in regard to differences which can scarcely be overlooked; but the pathway in the other direction is too attractive to be deserted.

Squier and Davis say, in the introduction to their great volume,

"It yet remains to be seen whether all the ancient monuments of the Mississippi Valley were constructed upon similar principles; whether they denote a common origin, and whether they were contemporaneous or otherwise in their erection. It remains to be settled whether the similar and anomalous structures of Wisconsin and the Northwest are part of the same grand system of defensive, religious, and sepulchral monuments found in the valley of the Ohio, and the more imposing, if not more singular remains which abound in the Southern States." — S. & D., Introduction, xxxviii.

If they could have followed their investigations into the regions mentioned, as Squier alone afterward did in New York, they would never have countenanced the theory of a single race occupying all this territory. They appear, indeed, to have reached this belief by degrees; for later we find them saying:—

"There seems to have existed a *System of Defences* extending from the sources of the Susquehanna and Alleghany in New York, diagonally across the country, through central and northern Ohio, to the Wabash. Within this range the works which are regarded as defensive are largest and most numerous. If an inference may be drawn from this fact, it is that the pressure of hostilities was from the north-east; or that, if the tide of migration flowed from the south, it received its final check upon this line. On the other hypothesis, that in the region originated a semi-civilization which subsequently * * attained its height in Mexico, we may suppose that from this direction came the hostile savage hordes, before whose incessant attacks the less warlike Mound Builders gradually receded, or * * entirely disappeared. Upon either assumption, it is clear that the contest was a protracted one, and that the race of the mounds was for a long period constantly exposed to attack. * * In the vicinity of those localities, where, from the amount of remains, it appears that the ancient population was most dense, we almost invariably find one or more works of a defensive character."

"It may be suggested that there existed among the Mound Builders a state of society something like that which prevailed among the Indians; that each tribe had its separate seat, maintaining, with its own independence, an almost constant warfare against its neighbors, and, as a consequence, possessing its own 'castle,' as a place of final resort when invaded by a powerful foe. Apart from the fact, however, that the Indians were hunters averse to labor, and not known to have constructed any works approaching in skillfulness of design or in magnitude those under notice, there is almost positive evidence that the Mound Builders were an agricultural people considerably advanced in the arts, possessing a great uniformity throughout the whole region which they occupied, in manners, habits, and religion, — a uniformity sufficiently well marked to identify them as a single people, having a common origin, a common mode of life, and, as an almost necessary consequence, common sympathies, if not a common and consolidated government." — S. & D., 44.

These opinions were based upon reports made to them by other parties, and are not the result of personal examinations by the authors. They seem to have no doubt of the correctness of the position thus assumed; for toward the close of their work they practically repeat their language in these sentences: —

That the ancient population of the Mississippi valley "was numerous and widely spread, is evident from the number and magnitude of the ancient monuments, and the extensive range of their occurrence. That it was essentially homogeneous, in customs, habits, religion, and government, seems very well sustained by the great uniformity which the ancient remains display, not only as regards position and form, but in respect also to those minor particulars, which not less than the more obvious and imposing features, assist us in arriving at correct conclusions. This opinion can be in no way affected, whether we assume that the ancient race was at one time diffused over the entire valley, or that it migrated slowly from one portion of it to the other, under the pressure of hostile neighbors or the attractions of a more genial climate. The differences * * * between the monuments of the several portions of the valley, of the northern, southern, and central divisions, are not sufficiently marked to authorize the belief that they were the works of separate nations. The features common to all are elementary, and identify them as appertaining to a single grand system, owing its origin to a family of men, moving in the same general direction, acting under common impulses, and influenced by similar causes." — S. & D., 301, *et. seq.*

Following the line indicated by Squier and Davis, a host of lesser writers have advocated the theory of a great nation, often carrying their language into the ridiculous. It would be tiresome merely to give a list of names of such authors; but extracts from the works of a few may not be out of place, as they will serve to show the prevalence of the error.

"The remains of this mysterious people known as the Mound Builders are spread over thousands of square miles of the United States. * * * The entire valley region of the Missouri, Mississippi and Ohio rivers with that of their affluents was occupied by this remarkable people—presenting us with a parallel to the ancient civilization which flourished in the earliest times on the watercourses of the old world."

"All the way up through the Yellowstone region and on the upper tributaries of the Missouri mounds are found in profusion. (*Note.*) — The proof is conclusive that the head-waters of the Missouri was one of their ancient seats." — Short, 27 and 31.

"In choosing this vast region lying between the great lakes and the gulf of Mexico, and extending from the Alleghenies to the Rocky Mountains and consisting of a great system of plains, the Mound Builders exercised great foresight and wisdom." — McLean, 14.

The last quotation is about as sensible as to say that a man displayed great literary inclinations by electing to be born in Boston. Did the Mound Builders examine the entire country before deciding to settle in it?

"If, as is generally conceded, the Mound Builders were of the same race that wrought in Lake Superior copper mines, built the pyramids of Mitla and Coahuila, monoliths at Copan, the temples in Arizona, and in Yucatan, Mexico, and Peru,—" etc., etc., for quantity. — Du Pre, 347.

The next one is a gem: —

"A people, the sun of whose empire once arose beyond the northern lakes and extended south to where great rivers send down their turbid waters to meet the ocean's tide; and further still, to a land of wealth and flowers, where the golden fruits hang in tempting clusters, unborn of human toil, and thence o'er ocean isles, ere it is lost in the western wave." — Larkin, 21.

Foster thinks

"There are evidences which would lead us to believe that the junction of the Ohio and Mississippi rivers was the seat of the Mound Builders' empire; not that the mounds are the most conspicuous, or the investing lines are more intricate — for the latter are almost entirely absent — but it formed a radiating point between widely separated regions. The navigable streams were the great highways, and when we glance at a map, and trace the courses of the various tributaries of the Great River, we see how vast a region could be traversed by an easy and expeditious communication, without resort to artificial constructions." — Foster, 109.

It seems he has no other reason for this opinion than the junction here of two large rivers, which he learned by "glancing at a map." Not only are there no mounds within a long distance of Cairo, but there is no spot within many miles which is not

subject to frequent overflow. The bottom lands are swamps a part of the year while the uplands, the nearest of them miles away, are infertile, rough, and poorly adapted for cultivation.

Perhaps the most ingenious, though of course unintentional, perversion of "evidence" is that of Schoolcraft, in his statement that

> "There is strong evidence * * * that the teocalli type of Indian civilization, so to call it, developed itself from the banks of the Ohio * * * west and northwestwardly * * * toward Lake Michigan and the borders of Wisconsin territory. The chief evidences of it, in Michigan and Indiana, consist of a remarkable series of curious garden beds, or accurately furrowed fields. * * * It is worthy of remark, too, that no large tumuli or teocalli exist in this particular region of the west, the ancient population of which may therefore be supposed to have been borderers, or frontier bands, who resorted to the Ohio Valley as their capital or place of annual visitation. All the mounds scattered through Northern Ohio, Indiana and Michigan are mere barrows or repositories of the dead. — Schoolcraft, 317.

Not only are there no garden-beds "on the banks of the Ohio," but there is nothing at all resembling them anywhere within the borders of the State. Their utter lack of resemblance to any remains in the Scioto Valley is one of the strongest proofs that they are due to entirely different people. As described by Schoolcraft himself

> "They extend, so far as observed, over the level and fertile prairie-lands for about one hundred and fifty miles, ranging from the source of the Wabash, and of the west branch of the Miami of the Lakes [Maumee] to the valleys of the St. Joseph's, the Kalamazoo, and the Grand River of Michigan. The Indians represent them to extend from the latter point, up the peninsula north to the vicinity of Michillimacinac. They are of various sizes, covering, generally, from twenty to one hundred acres. Some of them are reported to embrace even three hundred acres. As a general fact, they exist in the richest soil, as it is found in the prairie and burr oak plains." — Schoolcraft, History, I, 55.

A better description is furnished by Hubbard, who gives their area and extent along with figures of eight different classes of these remains; all in narrow raised ridges, and all forming rectangular plats, except one, which is circular. They are all "in the valleys of the St. Joseph and Grand Rivers, where they occupy the most fertile of the prairie land and burr-oak plains; principally in the counties of St. Joseph, Cass, and Kalamazoo." Some of the gardens contained 100 acres or more, in small plats; and there were several thousand acres in all.— Hubbard, Gardens.

It is probable these were erected, like the mounds in low lands of Arkansas and Missouri, for the purpose of raising the cultivated soil above the general level in order that crops would not be drowned by heavy rains.

The next quotation, from Foster, shows that Colonel Whittlesey recognized the distinction between the different classes of remains and was disposed to assign each to a different tribe. Foster, however, refuses to see the way when it is thus pointed out to him, and dismisses as unworthy of consideration the very features which go to prove the different origin of works in different sections.

"The region adjacent to Lake Erie contains ancient earthworks which differ somewhat from those of the Ohio valley. Squier was disposed to regard these works as much more recent than those of the true Mound-builders, in fact, as belonging to the Iroquois. Colonel Whittlesey, however, claims for them as high an antiquity, but belonging to a different nation. He thinks there were three distinct nations; first, in the Ohio valley, the Agricultural Nation; secondly, the Fort builders on the Lakes, the Military Nation; third, between the Mississippi and Lake Michigan, the Effigy Nation. I hardly see the necessity for this assignment. Recognizing these minor distinctions, it might be claimed that the earthworks of the Upper Mississippi were constructed by a different people, for the reason that all the mounds are destitute of enclosures; and that those of the Lower Mississippi were the work of still another people, because the truncated pyramidal form predominates, and are rarely enclosed. In what may be called the frontier of the Mound-builders' empire it became necessary to fortify against sudden irruptions of the enemy, and hence the enclosures; but as we penetrate the heart of the empire, these structures disappear." — Foster, 144, condensed.

The few flat-topped mounds in Ohio are sometimes adduced as evidence of the relationship of their builders to tribes of the southern states where this form is common. Only those within the larger enclosure at Marietta are of a size to render them worthy of comparison with similar structures at St. Louis and farther south; and the height even of these is relatively insignificant. As no others of the class are found in the state (except very small ones), and as the enclosure surrounding them is not duplicated outside of the Ohio region, it is more than probable the Marietta mounds are merely a coincidence, or due to the suggestion or influence of visitors in either direction.

The Serpent, the Opossum, and a few nondescript elevations in other parts of the state which are supposed to resemble

some animal or other, have induced a belief that their builders were in some manner related to or connected with the people to whom are due the effigy mounds of the upper Mississippi. The latter works have now been very thoroughly examined; and in the light of this knowledge we can affirm with certainty what was said fifty years ago, namely, that

"From the information which we possess concerning the animal effigies of Wisconsin, it does not appear probable that they were constructed for a common purpose with those of Ohio. They occur usually in considerable numbers, in ranges, upon the level prairies; while the few which are found in Ohio occupy elevated and commanding positions,— 'high places,' as if designed to be set apart for sacred purposes. An 'altar,' if we may so term it, is distinctly to be observed in the oval enclosure connected with the 'Great Serpent;' one is equally distinct near the Granville work, and another in connection with the lesser but equally interesting work near Tarlton. If we were to deduce a conclusion from these premises, it would certainly be, that these several effigies possessed a symbolical meaning, and were the objects of superstitious regard." — S. & D., 101.

The conclusion would be as easily arrived at, were there no "altars" about these works; whether it be the correct one or not, is another question. Any one "has a right" to form a conclusion in regard to those things which transcend his knowledge or understanding; and, equally, he "has a right" to deny the conclusion of any one else. Where nothing can be proven, much may be asserted without fear of successful contradiction. The comparison with the works of Wisconsin is a little unfortunate in one respect. Many of the effigies in that state are on hills much higher than any on which an effigy occurs in Ohio. The only similarity in the two systems is that some figures in each have a tolerably close resemblance to an animal; though it is difficult and often impossible to discover what animal it is that is intended to be thus commemorated. For one thing, we are told

"The human figure is not uncommon among the effigies, and is always characterized by the extraordinary and unnatural length of the arms." — S. & D., 126.

The persons who have identified the various animal forms of Wisconsin are not experts in zoological knowledge; even if they were, they would have considerable difficulty in naming the remains. For example the same group is called "buffaloes" by one writer, and "bears" by another; and there is contro-

versy among some authors as to whether a certain figure is a fox, or a panther, while there has been much discussion in attempting to determine whether another figure is a cross or a bird. Many, if not all, the so-called human effigies are probably efforts at imitating the shape of some bird with extended wings and a forked tail. This is the easiest way in which to account for the disproportionate length of the "arms."

Peet says "There were, to be sure, many mistakes made by Dr. Lapham, especially in his identifications, as he seemed to lack the faculty of imagination, or some other quality, which should have enabled him to trace the resemblances in the right direction." — Amer. Antiq., May, 1884.

As an example of this "imagination," there is one mound which has been called a mastodon by some and a raccoon by others. The trouble arises from the fact that the two parties are not able to agree on the question of which end of the animal has the head. The trunk of the mastodon to one, is the tail of the "'coon" to the other.

Peet gave a figure of the effigy; the reader may decide.— Amer. Antiq., XI, May, 1889.

* * * * *

Many unreasonable inferences are drawn from aboriginal workings in the copper region. No greater skill was required in mining copper than in quarrying flint; it had to be dug out of the ground in a similar manner. Nevertheless, the following quotation from McLean fairly conveys the idea held by a large number of writers, that a high degree of knowledge and unusual enterprise was necessary for such operations.

"When we remember the extreme extent of the country traced to obtain mica and copper, added to the earthworks of Ohio, and other States, and when we remember how extensively these operations were carried on, the Mound Builders must appear to us to have been a great and mighty nation." — McLean, 88.

Foster and Whittlesey seem to think the entire journey from the Scioto to the mines had to be made in canoes, and all provisions carried from the starting point.

"To penetrate that distant region from the Ohio Valley, involved on the part of the Mound Builders, a voyage of a thousand miles. The passage to and fro was made in the Summer season, for there is no evidence, such as mounds, village plots, or house foundations, to indicate permanent occupancy. The climate is too hyperborean to admit of the maturing

of maize, and hence they must have had a well organized commissariat, with no interruption in their lines of communication." — Foster, 269.

"As yet no remains of cities, graves, domicils, or highways have been found in the copper regions. [The miners] probably had better means of transportation than the bark canoe. They might thus carry provisions a great distance by water, [and] could readily bring with them in the spring supplies for three months, and before these were exhausted the same craft might return for additional supplies." — Whittlesey, Copper, 179.

As to the question of food, the later Indians find no serious difficulty in living upon the natural products of the country, and there is no reason why the ancient miner may not have done as well.

Except those on Isle Royale, all the copper deposits worked by the aborigines could be reached without crossing any large body of water. It is doubtful whether the Mound Builders of southern Ohio ever did any mining work whatever in that country. The small amount of copper exhumed from mounds does not justify the supposition that the raw material was dug out by people living where the finished articles are found. If they had made such a tedious journey, they would have procured a greater supply. It is more probable that what they used was obtained by exchange.

"Near Racine, there have been at least one hundred mounds either opened or entirely removed concerning fifty of which I have personal knowledge, and not one single specimen of copper has been discovered in these mounds and as this group is of the oldest type, and as they are situated in the region of abundance of copper, the fact leads to the inference that they were built before copper became of common use among the Indians. This is the more likely as the later mounds have not infrequently articles manufactured from native copper. The conclusion follows that the Indians living at no great distance from the copper regions of Lake Superior did mine copper and make various ornaments and implements, not only for their own use, but extensively for the purpose of barter with distant tribes and nations of Indians." — Hoy, 13.

A person unfamiliar with the facts would infer from statements like that in the next citation, that copper is found in the mounds in vast quantities. Such is not the case. It seems to have held the same rank in the estimation of the Mound Builder that gold holds with us. It can not be far out of the way to say that for one copper article found in our mounds, fifty are found in Wisconsin or Michigan.

Notwithstanding all these facts we are assured that

"One of the best evidences which we have of the systematic government and habits of the Mound Builders, together with the comparatively advanced state of the practical arts among them, is found in the ancient copper mines of the Lake Superior region. * * The labor involved in a journey of a thousand miles from the Ohio Valley to the copper regions, the toil of the summer's mining, and the tedious transportation of the metal to their homes upon their backs, and by means of an imperfect system of navigation, indicates either industry and resolution such as no savage Indian ever possessed, or a condition of servitude in which thousands occupied a condition of abject slavery. No permanent abodes were erected by the miners in this region, no mounds were constructed, but the indications all point to a summer's residence only and a return to the south with the accumulation of their toil when the severities of winter approached." — Short, 89 and 93.

Further reference to copper mining and working will be found in the concluding pages.

* * * * *

The association in mounds of manufactured articles made of material from foreign localities, has caused much perplexity, and is responsible for some very erroneous conclusions. It will be sufficient to repeat here the remarks of Squier and Davis, which embody the substance of all that has been said upon this phase of the matter since their time.

"It cannot, however, have escaped notice, that the relics found in the mounds,— composed of materials peculiar to places separated as widely as the ranges of the Alleghanies on the east, and the Sierras of Mexico on the west, the waters of the great lakes on the north, and those of the Gulf of Mexico on the south,— denote the contemporaneous existence of communication between these extremes. For we find side by side in the same mounds, native copper from Lake Superior, mica from the Alleghanies, shells from the Gulf, and obsidian (perhaps porphyry) from Mexico. This fact seems seriously to conflict with the hypothesis of a migration, either northward or southward." — S. & D., 306.

The final sentence means, at least it is generally understood to mean, that in the opinion of these authors the Mound Builders held control of all the area included within the limits of the localities mentioned, and performed the labor necessary for securing the material which they afterward wrought into the various forms in which it is now to be found. But the facts noted do not warrant this assumption. With the exception of a few localized types, artificial objects of nearly every sort are found in greatest abundance in the immediate vicinity of natural

deposits of raw material, gradually diminishing in numbers toward distant points. If persons who were at the necessity of making long journeys to reach the source of supply, carried on for themselves the mining or quarrying operations, they would have transported most, if not all, of the product which could be utilized, to their homes, where it could be worked into shape at the leisure or convenience of the owners. They certainly would not have been at the trouble to complete, and then abandon, the great number of implenments found remote from their habitations.

Indian traders traveled extensively in the exchange of wares. Articles of barter were passed from hand to hand, from tribe to tribe, over large areas and through long periods of time. The Atlantic coast Indians

"did more or less barter, especially in pipes, the material for which, a red marble, is rare, and found only on the Mississippi. A more common sort is made of a kind of ruddle dug up by the Indians living to the west of the Mississippi, on the Marble River, who sometimes bring it to these countries for sale." — Carr, Mounds, 522; from Loskiel's "Missions."

"It has been found that articles from the shores of the Caspian may reach the mouth of the Mackenzie * * in about three years by barter." — Nadaillac, 173.

"At the beginning of this century, the southwestern Indians had great numbers of horses which they acquired from the Spaniards or nations immediately bordering on New Mexico. These animals are chiefly transferred to the nations northeast of the [Missouri] River * * in exchange for articles procured from the British traders." The Crows made annual exchanges of goods with the Minnatarees and others to the eastward, obtaining European goods which they used, in part, in trading with Snakes to the west. "Iridescent shells from the Gulf of California found their way to Zuni through Sonora and the Colorado people. An Indian in the employ of the first President of Mexico had made two trips to Zuni." Many other instances are given of individual traders making long journeys, or of tribes acting as middlemen between other tribes remote from each other, everywhere east of the Mississippi. — Mason, Travel, 587, *et. seq.*

Hunting and war parties wandered great distances from home.

"The Delawares [at Fort Leavenworth, in 1846] make war upon remote tribes * * * sending out their war-parties as far as the Rocky Mountains, and into the Mexican territories." — Oregon Trail, 19.

"In my travels in the Upper Missouri, and in the Rocky Mountains, I learned to my utter astonishment, that little parties of these adven-

turous myrmidons [Delawares], of only six or eight in numbers, had visited these remote tribes, at 2,000 miles distance; and in several instances, after having cajoled a whole tribe * * * may have brought away six or eight scalps with them; and nevertheless * * * retreated with safety out of their enemies' country, and through the regions of other hostile tribes, where they managed to * * * come off with similar trophies." — Catlin, Indians, II, 102.

"Charlevoix, in his history of Canada, has stated what Father Grillon often informed him of, namely, that after having labored some time in the missions of Canada, he returned to France and went to China. As he was traveling through Tartary, he met a Huron woman whom he had formerly known in Canada. She told him, that having been taken in war, she had been conducted from nation to nation, until she arrived at the place where she then was. There was another missionary, said Charlevoix, passing by the way of Nantz, on his return from China, who related the like story, of a woman he had seen from Florida in America. She informed him that she had been taken and given to those of a distant country, and by them again to another nation, till she had been thus successively passed from country to country, had traveled regions excessively cold, and at length found herself in Tartary, and had there married a Tartar, who had passed with the conquerors into China, and had there settled." — Haywood, 271.

The history and traditions of nearly all tribes show them continually migrating. In all these ways small objects could wander hundreds or thousands of miles from their starting point. By the middle of the sixteenth century European goods had been carried hundreds of miles from the coasts, along different lines from any pursued by the earlier explorers; undoubtedly a similar traffic prevailed in prehistoric times. Thus may be explained the occurrence of one or two specimens far from a locality where that particular type prevails; as, to take a single case, the discovery in eastern Massachusetts of some "monitor pipes" which are almost entirely confined to the Ohio district.

On the other hand, there are certain permanent remains which indicate that colonies or clans separated from the main body of their people and established themselves in a new country. The huge pyramids opposite St. Louis are distinctly southern in type; and no others of this size and form are found north of the Ohio except at one point.

"On Angel's farm, situated six miles southeast of Evansville, I found six mounds, four distinct cemeteries, three lines of earthworks, one large stone cist, and one altar. The first and most western mound is 15 feet high, 585 feet in circumference, truncated and 100 feet across the top. The second mound is 8 feet high and 150 feet in circumference.

The cist was 8 feet long, 4 feet wide, 4 feet deep, walled with slate [shale]. In this were found several skeletons. A third mound is twenty feet high, 402 feet in circumference, truncated, and 60 feet across the top. The altar was a pit with a floor and a roof of sand rock, the sides and ends lined with slate slabs. Inside it was three feet long, two feet wide, and fourteen inches deep. It contained the remains of a cremated body or skeleton. The fourth mound is 150 feet in circumference, and 5 feet high. The fifth mound is square, 100 yards on every side, and 45 feet high to a plateau, the width of which is 185 feet. On top of this there is an additional mound, 15 feet high. Then at the west end there was an elevated platform 4 feet high, 150 yards long, 55 feet wide. The last mound is 10 feet high, 30 yards in circumference. Around these six mounds is a line of earthwork, resting at either end on the river bank, and inside of this are two other short ones. The outer line is about one mile in length, and about every forty yards there are mound-like widenings on the outer edges. One-half mile northeast of these mounds is a mound 50 feet high and 164 yards in circumference. All of the graves in this section are walled with slate." — Stinson, 591, *et seq.*, condensed.

If the above description is correct — and we have no reason to doubt it — the Evansville group, in its situation and construction bears a remarkable resemblance to the one on the Etowah River near Cartersville, Georgia. The "mound-like widenings on the outer edges" of the wall do not appear in the latter works; and so far as known are not to be observed at any other point except in Wisconsin. This is at the so-called "Aztalan," where the mounds associated with the walls are quite small. Because of its fanciful name, and of the marvelous stories which have gone the rounds of newspapers about "brick walls," "stone arches" and other unusual features, many persons suppose "Aztalan" was once the abode of a tribe or colony from Mexico. In order to show its true character, a tolerably full description is appended.

"It is the only ancient enclosure, properly so called in Wisconsin; and although it is usually termed a fort or citadel, it will be shown hereafter that it falls more properly into the class denominated 'sacred inclosures.' Without this we might be led to suppose that the ancient Mound Builders of Wisconsin were a distinct people from those of Ohio, so different is the general character of their monuments.

"The 'ancient city of Aztalan' has long been known, and often referred to, as one of the wonders of the western world. Many exaggerated statements respecting the 'brick walls' supported by buttresses, the 'stone arch', etc., have been made; for all of which there is little foundation in truth."

"The name Aztalan was given to the place by Mr. Hyer [the discoverer of the ruins], because, according to Humboldt, the Aztecs, or ancient inhabitants of Mexico, had a tradition that their ancestors came from a country at the north, which they called Aztalan; and the possibility that these may have been the remains of their occupancy, suggested the idea of restoring the name.

"The main feature of these remains is the enclosure or ridge of *earth* (not *brick*, as has been erroneously stated), extending around three sides of an irregular parallelogram; the west branch of Rock River forming the fourth side on the east. The space thus enclosed is seventeen acres and two-thirds. The corners are not rectangular; and the embankment or ridge is not straight. The earth of which the ridge is made was evidently taken from the nearest ground, where there are numerous excavations of very irregular form and depth. If we allow for difference of exposure of earth thrown up into a ridge and that lying on the original flat surface, we can perceive no difference between the soil composing the ridge and that found along its sides. Both consist of a light yellowish sandy loam.

"The ridge forming the enclosure is 631 feet long at the north end, 1,419 feet long on the west side, and 700 feet on the south side, making a total length of wall of 2,750 feet. The ridge or wall is about 22 feet wide, and from one foot to five in height.

"The wall of earth is enlarged on the outside, at nearly equal distances, by mounds of the same material. They are called buttresses or bastions; but it is quite clear that they were never designed for either of the purposes designated by these names. The distance from one to another varies from sixty-one to ninety-five feet, scarcely any two of them being alike. Their mean distance apart is eighty-two feet. They are about forty feet in diameter, and from two to five feet high. On the north wall, and on most of the west wall, they have the same height as the connecting ridge; but on the south wall, and the southern portion of the west wall, they are higher than the ridge, and at a little distance resemble a simple row of mounds. On the inner side of the wall, opposite many of these mounds, is a slight depression or sinus, possibly the remains of a sloping way by which the wall was ascended from within the enclosures. The two outworks, near the southwest angle of the great enclosure [these are short walls, one straight, the other having an angle, and both set diagonally to the lines of the main structure], are constructed in the same manner; but both these mounds and the connecting ridge are of smaller dimensions. When viewed from the road, a short distance west, these outworks would be supposed to be nothing more than a few circular mounds.

"On opening the walls near the top, it is occasionally found that the earth has been burned. Irregular masses of hard, reddish clay, full of cavities, bear distinct impressions of straw, or rather wild hay, with which they have been mixed before burning. These places are of no very considerable extent, nor are they more than six inches in depth. Fragments of the same kind are found scattered about; and they have been

observed in other localities at a great distance from these ancient ruins. This is the only foundation for calling these '*brick* walls'. The '*bricks*' were never made into any regular form, and it is even doubtful whether the burning did not take place in the wall after it was built. The impression of the grass is sometimes so distinct as to show its minute structure, and also that it was of the angular stems and leaves of the species of carex, still growing abundantly along the margin of the river. As indicating the probable origin of this burned clay, it is important to state, that it is usually mixed with pieces of charcoal, partially burned bones, etc. Fragments of pottery are also found in the same connection. The walls and mounds are of a light colored clay, which becomes red on being slightly burned. From all the facts observed, it is likely that clay was mixed with the straw, and made into some coarse kind of envelope or covering, for sacrifices about to be consumed. The whole was then probably placed on the wall of earth, mixed with the requisite fuel and burned. The promiscuous mixture of charcoal, burned clay, charred bones, blackened pottery, etc., can only in this way be satisfactorily accounted for.

"A shaft was sunk to the bottom of one of the large mounds projecting from the wall. No burned clay was on this mound, and we soon discovered that it is only in a few places that this substance exists. The earth was here a yellowish sandy loam, entirely free from spots of black mould; thus showing that it was built exclusively from the subsoil of the adjacent grounds. The builders had carefully removed the black soil before they commenced the erection of this mound.

"The mound at the northwest angle was also excavated. At some distance below the top, was a cavity which was nearly filled with *loose* earth, in which were indications of bones very much decayed and charcoal. This was divided below into two other cylindrical cavities, extending beneath the original surface of the ground, and filled with the same loose materials. This indicates that when the mound was partially completed, two bodies had been inhumed in a sitting posture, close together; another body was placed above these two; and the mound carried above all.

"At the western angle of the main enclosure are two truncated pyramidal mounds, one measuring about 53 feet square at the top, the other about 60 by 65 feet. From the summit of one, on the highest ground inside the wall, the whole works, and quite an extent of the surrounding country can be seen; while the other rises but little, if any, above the top of the adjacent wall."

"A few stones left along the sides and bottom of a small ravine cut into the bank by the passage of water to the river [said stones being in their natural, undisturbed, position] is all the evidence that could be found of an ancient sewer 'arched with stone.' It is quite clear that no such arch ever existed.

"It is not possible that this enclosure could have been a work of defence; for it is entirely commanded from the summit of a ridge extending along the west side, nearly parallel with, and much higher than

the west walls themselves, and within a fair arrow-shot; so that an enemy posted on it would have a decided advantage over those within the defences. This ridge would also constitute an excellent breastwork to protect an enemy from the arrows or other weapons shot from the supposed fort. From the summit of this ridge the ground descends towards the river; so that the enclosure is on a declivity, and is thus commanded from the opposite side of the river, whence arrows or other weapons could be thrown directly into the fort by persons lying in perfect security. There is no guarded opening, or gateway, into the enclosure. It can only be entered by water, or by climbing over the walls.

"We may suppose it to have been a place of worship; the pyramidal mounds being the places of sacrifice like the teocalli of Mexico. From its isolated situation — there being no other similar structure for a great distance in any direction — we may conjecture that this was a kind of Mecca, to which a periodical pilgrimage was prescribed by their religion. Here may have been the great annual feasts and sacrifices of a whole nation. Thousands of persons from remote locations may have engaged in midnight ceremonies conducted by the priests. The temple, lighted by great fires kindled on the great pyramids and at every projection on the walls, on such occasions would have presented an imposing spectacle, well calculated to impress the minds of the people with awe and solemnity." — Lapham, 41–49 condensed.

The concluding paragraph of Lapham's description is pure fancy. Such pilgrimages and devotions as he suggests were unknown to any race of the United States. The place seems to have been an ordinary Indian village, whose inhabitants were in no great danger from enemies. The masses of burned clay mixed with reeds and grasses are very common in some parts of the south. So far from being remains of sacrifices or intentionally burned for any other purpose, they are simply the walls and roofs of mud-plastered huts which have been destroyed by fire. Catlin describes similar huts constructed by Mandans. The object of the vegetable substance is to hold the clay in place—as hair is mixed with mortar by modern plasterers. (See, also, pages 460-1).

It would not be safe to affirm or deny a connection between the builders of the Evansville works and the southern Indians merely because of the resemblance of the works in the two sections; nor between the former and the ancient inhabitants of "Aztalan" by reason of the projections on the embankments. But it is easier to believe them related in in some way or at least having some knowledge of each other, than to suppose the striking similarities are entirely accidental.

The same difficulty confronts us in the case of certain mounds near Naples, upon the Illinois River, explored by Henderson. His description of their situation, construction and contents would apply equally to many of the tumuli in southern Ohio. He even found "effigy pipes" as perfect in design and execution as any figured in "Ancient Monuments."— Henderson.

A group of nine small mounds, a mile below Davenport, also yielded a large quantity of relics quite similar to those found in the Ohio mounds. Among them were nine pipes, all of the so-called mound pipe patterns, and three of them carved with effigies. Those illustrated are of a similar style to the Ohio mound pipes, but much less finely finished. In one of these mounds the remains were at least six feet below the present surface which is now only from eight to twelve feet above high water; the bodies apparently having been placed in a pit.— Farquharson, 297.

The specimens in the latter group may have been obtained in trade. But it is quite probable that a number of Ohio Mound Builders wandered into the region of the Mississippi and remained there. With the migratory habits of native Americans, it is not to be supposed that a single stock or tribe held possession of any section for an unlimited time, or that fertile districts would remain unoccupied for a long period.

GEOGRAPHICAL LIMITATIONS OF TYPES.

A classification by types and localities shows that distinctive classes of remains are restricted to well-defined areas; that is, the great enclosures commonly called "sacred" are found between central Ohio and central Kentucky, from the panhandle of West Virginia to the lower Wabash; the garden beds are confined to Michigan and northern Indiana; the effigy mounds principally in the adjoining portions of Iowa, northern Illinois, Wisconsin and Minnesota; the great hilltop fortifications in Ohio; the pyramidal flat-topped mounds in the southern States and as far up the two principal rivers as St. Louis and Evansville. Very few of these are to be found in localities distant from where they are most common. On the other hand there is abundant evidence that any of the localities named have been occupied by two or perhaps more different races; nearly everywhere appear aboriginal remains so diverse from one another as to make it almost certain

that they belong to a different period of construction or to an unrelated people. Particularly in southern Ohio the dissimilarity to be observed in various remains which were at first thrown into a single classification denotes that several waves of population swept over this region. There is sufficient diversity between the symmetrical enclosures of the bottom lands, the massive hill forts, and the smaller or irregular embankments found in the same sections, to justify a supposition of separate builders. So of the large mounds, whether of earth or stone, when compared with some of the smaller mounds of either material alone or of both combined; while the stone graves or cairns fall in a class to themselves.

A "Catalogue of Prehistoric Works East of the Rocky Mountains", was issued some years ago by the Bureau of Ethnology, as Bulletin No. 12 of their publications. It gives a map of each state, and attempts to show by means of "symbols" the number and character of the various remains within its borders. At the best, such a work must be very incomplete; but in addition, these maps are sadly misleading, and no comparison based on them should be attempted between the remains of different states or even between different parts of the same state. Owing to the small size of the page, the method of "symbolizing" renders it impossible to represent more than one mound or enclosure within an area of several square miles, and some are placed ten miles or more from their proper position. A mound which would scarcely be noticed while walking over it, is given the same prominence as one fifty feet high; and a group like that at Hopewell's or "Mound City" is not differentiated from three or four sand dunes in Michigan utilized by modern Indians as burial places.

Although it has nothing whatever to do with Ohio archæology, it will not be out of place to introduce here an abstract of Lewis and Clark's description of an earthwork on the upper Missouri, a few miles above the mouth of the Yankton, both as a matter of general interest and for purposes of comparison.

"This interesting object is on the south side of the Missouri, opposite the upper extremity of Bonhomme Island, and in a low level plain, the hills being three miles from the river. It begins by a low wall composed of earth, rising immediately from the bank of the river and running in a direct course S. 76° W. ninety-six yards; the base of this wall or mound is seventy-five feet, and its height about eight. It then diverges in a course S. 84° W. and continues at the same height and depth to the

distance of fifty-three yards, the angle being formed by the sloping descent; at the junction of these two is an appearance of a hornwork of the same height with the first angle; the same wall then pursues a course N. 69° W. for three hundred yards; near its western extremity is an opening or gateway at right angles to the wall, and projecting inwards; this gateway is defended by two nearly semi-circular walls placed before it, lower than the large walls; and from the gateway there seems to have been a covered way communicating with the interval between these two walls; westward of the gate, the wall becomes much larger, being about one hundred and five feet at its base, and twelve feet high; at the end of this high ground the wall extends for fifty-six yards on a course N. 32° W.; it then turns N. 23° W. for seventy-three yards; these two walls seem to have had a double or covered way; they are from ten to fifteen feet eight inches in height, and from seventy-five to one hundred and five feet in width at the base; the descent inwards being steep, whilst outwards it forms a sort of glacis. At the distance of seventy-three yards, the wall ends abruptly at a large hollow place much lower than the general level of the plain, and from which is some indication of a covered way to the water. The space between them is occupied by several mounds scattered promiscuously through the gorge, in the center of which is a deep round hole. From the extremity of the last wall, in a course N. 32° W. is a distance of seventy-six yards over the low ground, where the wall recommences and crosses the plain in a course N. 84° W. for eighteen hundred and thirty yards to the bank of the Missouri. In this course its height is about eight feet, till it enters, at the distance of five hundred and thirty-three yards, a deep circular pond of seventy-three yards' diameter; after which it is gradually lower, towards the river; it touches the river at a muddy bar, which bears every mark of being an encroachment of the water, for a considerable distance; and a little above the junction is a small circular redoubt. Along the bank of the river, and at eleven hundred yards distance, in a straight line [down the stream] from this wall, is a second, about six feet high, and of considerable width; it rises abruptly from the bank of the Missouri, at a point where the river bends, and goes straight forward, forming an acute angle with the last wall [it is, in fact, nearly parallel with it] till it enters the river again, not far from the mound just described, towards which it is obviously tending."

"Where the river passes between this fort and Bonhomme Island, all the distance from the bend, it is constantly washing the banks into the stream, a large sandbank being already taken from the shore near the wall. During the whole course of this wall, or glacis, it is covered with trees, among which are many large cotton trees, two or three feet in diameter. Immediately opposite the citadel, or the part most strongly fortified, on Bonhomme Island, is a small work in a circular form, with a wall surrounding it, about six feet in height. * * * The citadel contains about twenty acres, but the parts between the long walls must embrace nearly five hundred acres." — L. & C., I., 63, *et seq.*

As this description may not be perfectly clear in the absence of any illustrations, it may here be added that the work in question cuts off a short bend in the Missouri. The curving or irregular wall first mentioned, starts out below the bend almost at a right angle with the river bank, and at its termination is again approaching the river. The long straight wall, beginning here, reaches the river at a considerable distance above the turn; while the second straight wall described, begins almost at the angle of the bend and follows the direction of the current, close to the bank, and terminates just where the channel begins to take a straight course to the eastward. It is possible that, as originally constructed, it was carried onward until it joined the curved wall below; and it is also possible that a third straight wall connected these two at the upper portion of the area surrounded, these portions having been carried away by encroachments of the stream. It is at least evident that the walls have been shortened to some extent, for they are broken off abruptly, presenting the same general slope at the ends as that of the banks where they terminate.

There is no mention in the text, and no indication in the figure, of a ditch either within or without the embankments; so the heights given must be from the ordinary surface level.

There is nothing in Ohio approaching these remains in magnitude, except, perhaps, the works at Newark; and if the supposition be correct that connecting walls have been undermined and carried away by floods, the entire structure must have considerably surpassed any group in our State, in the amount of material handled during its construction. If defensive in character, a platform of wood must have extended around the interior to afford a standing-place for the garrison, whence they could command the slope in front.

E.— AGE.

One problem which has withstood the most persistent efforts toward its solution, is that of the period at which the mounds were constructed. It has been approached from every side, but so far the answer is as uncertain as at the beginning. There is no lack of guesses, many of them quite irrational; and all sorts of data, some of which can have no possible bearing on the question, are used as bases for calculation. Trees, geological for-

mations, mastodons, astronomy, are among the things which have served to promote discussion and befuddle readers. Centuries or milleniums are called into requisition with a fluency and freedom worthy of philosophers discussing the age of the earth.

"They [Mound Builders] occupied all the forest-covered region of the Mississippi Valley * * * for many hundreds and perhaps thousands of years. This is indicated by the general occupation of this widespread area, the magnitude and number of such of their works as have resisted the ravages of time [intimating that some are destroyed by the elements] and the great abundance of the stone implements of their manufacture found scattered over the surface; also by the extent of their mining operations." — Newberry, P. S. M., 193.

"The ancient population must have numbered half a million, with a probability of a million. The period of their occupation exceeded one thousand and probably reached three thousand years." — Cent. Rep., 107.

"There are no traces of Mound Builders' works below Baton Rouge. [Hence] we may conclude that the Gulf of Mexico in the age of the Mound Builders laved the base of the heights on which Natchez stands. * * * Thus the conclusion is deduced that quite three thousand years have elapsed since the people known as the Mound Builders utterly disappeared." — Du Pre, 348.

It would have been quite as logical to suppose the Gulf at Memphis or Cairo, so far as it relates to the condition of the country below Baton Rouge. There are mounds along the coast near Mobile on land formed since that below the mound limits on the Mississippi, but as these do not fit in with the idea of great antiquity they are not mentioned.

McLean insists that mounds in different portions of the country were built at widely separated intervals.

"It is pretty well established that since the time of the Mound Builders, and prior to the advent of the Indian, a race known as the 'Villagers' occupied certain districts of this country and made the 'garden-beds' found in northern Indiana, lower Missouri, and in Michigan. Time must be allotted for them to take possession of the country; then growth and decadence would have required ages, so that an almost incredible period must have elapsed from the time they took possession of the country until they retired. If the animal mounds were made since the structures in Ohio, then another people lived between the time of the Villagers and the Mound Builders. Since the period of the Villagers and before the advent of the Indians, still another race may have existed." — McLean, 131-2, condensed.

In the first place there are no "garden beds in the lower part of Missouri." Immense numbers of small mounds, probably for agricultural uses, extend from Pilot Knob in that State into and

probably beyond Louisiana; but they are entirely different from the Garden Beds of the north in their situation and appearance. By McLean's style of reasoning, we could carry any nation back to the beginning of time. He assumes that only a restricted area could be occupied at one period; that these inhabitants must become extinct and ages elapse ere another people can settle a place a thousand miles away; and that all the races which have thus in turn flourished and died out are of different stocks.

Harrison based his ideas of successive populations upon a more valid belief; but he was mistaken in his interpretation of the "embankments" to which he refers. Some of them were artificial; but most were the ordinary irregularities to be observed in all river bottom lands, being due to natural causes operating at the time the terraces were forming.

"I think there are indubitable marks of the bank of the Ohio being thickly inhabited by a race of men, inferior to the authors of the great works we have been considering, after the departure of the latter. Upon many places, remains of pottery, pipes, stone hatchets and other articles are found in great abundance, which are evidently of inferior workmanship to those of the former people. I have one other fact to offer which furnishes still better evidence of my opinion. When I first saw the upper plain upon which Cincinnati stands, it was literally covered with low lines of embankments. The number and variety of figures in which these lines were drawn was almost endless. Many so faint, indeed, as scarcely to be followed, and often for a considerable distance entirely obliterated. Now, if these lines were ever the height of the others, (and they must have been to have answered any valuable purpose), or unless their erection was many years anterior to the others, there must have been some other cause than the attrition of the rain (for it is a dead level) to bring them down to their then state. That cause I take to have been continued cultivation. And as the people who erected them, would not themselves destroy works which had cost them so much labor, the solution of the question can only be found in the long occupancy, and cultivation of another people, and the probability is, that that people were the conquerors of the original possessors." — Harrison, 226–7, condensed.

This "conquering race" was not the American Indian found here by the whites, but had in turn abandoned the vicinity before the latter appeared upon the scene. This would, in his opinion, set the Mound Builders back to a remote age.

All these estimates, however, are moderate compared with some others.

"One of the exterior mounds at Fort Ancient is situated one or two degrees north of east of the main gateway. A similar variation from the true points of the compass exists, it is believed, in some of the similar works in the Scioto and Miami valleys, and also in Florida and Mexico. It would be difficult to account for this variation, if upon investigation it should be found uniform, unless in some way connected with the obliquity of the ecliptic to the earth's axis of rotation; and it might furnish a clue to the age of the works, in view of the measurable tendency of the ecliptic, in the course of ages, to coincide with the plane of the equator. It would require, in round numbers, nearly eight thousand years to account for a variation of one degree; but we need not be staggered by the results to which such a theory would lead us." — Hosea, Ft. A., 293, condensed.

As the present angle of inclination is not far from twenty-three and a half degrees, this theory would give Fort Ancient an age of about 150,000 years; which is enough to "stagger" almost any one. By a similar calculation, some writer whose name is not recalled, proves that the Newark works were built at the same time as one of the Egyptian pyramids, and consequently by the same people.

In describing the "sculptured winged monster" which is *painted* on the bluffs near Alton, Illinois, Larkin says, "Persons who visited the Centennial at Philadelphia, in the year 1876, will recollect the skeleton of a gigantic bird, whose bony frame and neck towered to the height of nearly fifteen feet. * * * Now, it is not unreasonable to believe that such a bird lived with the Mound Builders, and went down with them, perhaps when the whole solar system was plunged into an icy wave." — Larkin, 137.

THE MASTODON OR MAMMOTH.

Several accounts have appeared of discoveries tending to prove that primitive man in the United States was contemporaneous with the mastodon or mammoth. Three of these have attained wide circulation. First in time as well as importance is that of Dr. Koch, of St. Louis.

"In the year 1839, I discovered and disinterred in Gasconade County, Missouri, the bones of a *Mastodon giganteus*. The greater portion of the bones had been more or less burned by fire. The fire had extended but a few feet beyond the space occupied by the animal and had been kindled by human agency with the design of killing the huge creature which had been found mired in the mud. The fore and hind legs of the animal were in perpendicular position in the clay with the toes attached to the feet. All the bones which had not been burned by the fire had kept their original position, standing upright, and apparently quite undisturbed in the clay, whereas those portions which had extended above the sur-

face had been partially consumed. Mingled with the ashes and bones were many broken pieces of rock carried from the river to be hurled at the animal. I found also among the ashes, bones, and rocks, several arrow-heads, a stone spear-head, and some stone axes. The layer of ashes, etc., was covered by a strata of alluvial deposits from eight to nine feet thick. [Koch afterward] found in Benton County several stone arrow-heads, mingled with the bones of a nearly entire skeleton, mentioned above as the *Missourium*. Two arrow-heads found with the bones were in a layer of vegetable mould, which was covered twenty feet in thickness with alternate layers of sand, clay and gravel. One of the arrow-heads lay under the thigh bone of the skeleton, the bone actually resting in contact upon it. The layer of vegetable mould was some five or six feet thick, and the arrow-head and bones were found buried in it. Above this layer there were six undisturbed layers of clay, sand and gravel." — From Foster, 63, condensed.

Koch's statement has been vigorously attacked by Dana, who proceeds to point out discrepancies in his different reports; demonstrates his lack of training in observation, his ignorance of geology, and his desire to make a good story; doubts whether the Indians would have waited for the bones to char through the skin and flesh before they would begin eating; and says "the charring might have been done very long after the miring and death of the animal, and the facts be all as they are reported."—(Dana). But the truth of these strictures upon Koch himself might be admitted without in the least invalidating his assertions in regard to what he saw. The only question at issue is " Did Koch find the mastodon bones and the weapons in the position which he claims?" His report is very circumstantial, has an air of truthfulness, and has not been disproven.

Dana fails to explain what motive would have induced the Indians, or whoever they were, to char the bare bones and leave them undisturbed; or to account for the arrow-heads and stones lying around them.

The dubious feature of Koch's communication, is the *charring* of such a large proportion of the bones; the flesh covering them would thereby have been rendered unfit for use, and so great a degree of heat was certainly not necessary to compass the death of the animal. At the same time it is true that in a beast of such size there would have been a great amount of flesh uninjured by the flames. It is now too late to learn anything more definite about the matter.

The next discovery was in a salt-pit at Petit Anse Island, off the coast of Louisiana. Here a

"fragment of matting was found near the surface of the salt, and about two feet above it were remains of tusks and bones of a fossil elephant, * * * thus showing the existence of man on the island prior to the deposit in soil of the fossil elephant." "At the depth of twelve feet below the surface and immediately overlying the salt-rocks incredible quantities of pottery were thrown out of the pits by miners, mingled with fragments of the bones of the elephant and other huge extinct quadrupeds." — Foster, 56-8.

Fortunately the opportunity was afforded for an examination of this locality by a careful observer, whose report is thus summarized:—

"Up to the time of Dr. Goessman's visit, all the borings and pits which had reached the salt, had been sunk in detrital material washed down from the surrounding hills, and frequently enclosing the vestiges of both animal and human visits to the spot. Mastodon, buffalo, deer, and other bones; Indian hatchets, arrow-heads, and rush baskets, but above all an incredible quantity of pottery fragments have been extracted from the pits. The pottery fragments form at some points veritable strata, three to six inches thick; this is especially the case where [there] appeared to have been a furnace for baking the ware (a process very imperfectly performed), and near it three pots of successive sizes, inside of each other. The pots must be presumed to have subserved the purpose of salt-boiling; for although human handiwork has been found so close to the surface of the salt as to render it probable that its existence in mass was once known, yet the boiling process alone has been resorted to, within even traditional times, until the discovery, at the bottom of a salt well, of solid rock salt. * * * It is very positively stated, that mastodon bones were found considerably *above* some of the human relics. In a detrital mass, however, this can not be considered a crucial test." — Hilgard, 14.

As the pits, after being abandoned by the Indians were filled with material washed in from the surrounding soil, the human remains which lay on the outer surface would be carried in first; and the mastodon or other bones, coming from a lower level, would be deposited on top of the artificial objects.

Finally we have the following report of discoveries in Nebraska.

"About two and a half miles southeast of Omaha, in a railroad cut, I found a large coarse arrow or spear head. It was found twenty feet below the top of the Loess, and at least six inches from the edge of the cut, so that it could not have slid into that place. * * * Thirteen inches above the point where the last named arrow was found [he had

previously found another near Sioux City, Iowa, at a depth of "fifteen feet below the top of the deposit"], and within three inches of being on a line with it, in undisturbed Loess, there was a lumbar vertebra of an elephant. * * * It appears clear from this conjunction of a human relic and proboscidian remains that man here as well as in Europe was the contemporary of the elephant in at least a portion of the Missouri Valley." — Aughey, 254.

This find means nothing more than that the arrow-head and the vertebra were *deposited* together, and has no bearing upon the age of either. There is no mention of any other bone; and the arrow (which is really a spear head) is quite modern in appearance, such as are common on the surface anywhere.

It seems to be taken for granted, even by geologists, that because the mastodon is now extinct, the last one of the species must have died a very long time ago. Therefore, if it can be shown that men were familiar with the animal, the inference follows, of necessity, that man also has been upon the continent for many thousand of years. Newberry says, in speaking of the effigy mounds of Wisconsin,

"Among the animals thus represented is what seems to be the elephant or mastodon. Small figures of an elephantine animal also appear in the archæological collections of the Northwest and are claimed to be authentic. These relics go far to prove the acquaintance of the Mound Builders with either the mastodon or mammoth, and may be accepted as presumptive evidence of the synchronism of man here, as in Europe, with one or both of these great pachyderms — and hence of his great antiquity." — Newberry, P. S. M., 195.

Figure 1 gives the outline of the "Elephant Mound," from a careful survey made by Middleton with the assistance of a civil engineer. It will be seen that the so-called effigy has very little resemblance to any animal. Jacob Warner's sketch, published many years previously in one of the Smithsonian Reports, is reproduced in the Bureau report for comparison. It differs from Middleton's somewhat, but to no greater extent than would naturally result from farming operations in the time between the two observations, except that there is a prolongation of the muzzle in Warner's drawing that does not appear in Middleton's. Norris made a sketch different from Warner's in that the supposed "trunk" is curved inward; he also mentions an extension at the back of the head which seems to have escaped the attention of everyone else, although he says it is "from 2 to 3 feet high." When there are such

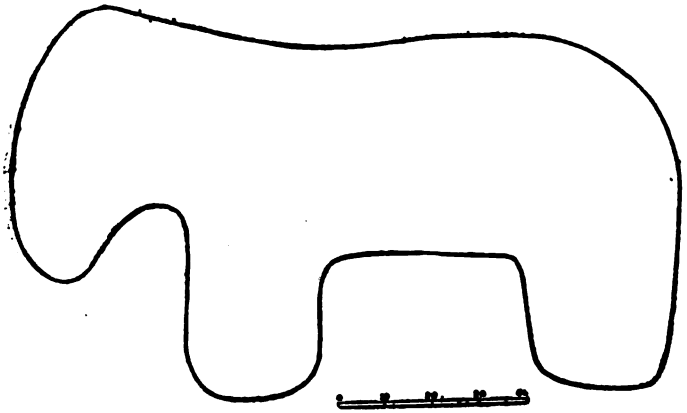


Figure 1 — The " Elephant Mound " of Wisconsin.



Figure 2.



Figure 3.
The " Elephant Pipes " from Iowa.

discrepancies in statement, and the most accurate measurements fail to show any "proboscis" at all, Thomas would have probably been nearer the truth to deny its existence altogether than to say it "was evidently a shifting line of sand."— B. E. 12, 92.

The "small figures of an elephantine animal" to which Newberry refers, are two pipes found near Davenport, Iowa. All the evidence for and against their genuineness is collected by Henshaw, in the Second Annual Report of the Bureau of Ethnology. Both cuts are reproduced here as figures 2 and 3. The officers of the Davenport Academy of Science, who secured the specimens, are positive of their authenticity; Henshaw is equally certain they are frauds; and so the matter stands.

Another author makes use of a most singular argument in this connection. He attempts to show that the Mound Builders are a very ancient race, not because they were acquainted with the form of the Mastodon but because it was impossible they could know anything about the animal. The funny twist in his logic may not be apparent at a glance, but it is worth finding.

> "No bones of any of the elephant family have been found in the ancient monuments of the Mississippi Valley. The striking form of this family is not delineated on their pottery. In all the Mound Builders' relics from the valley of the Ohio, no trace of the elephant family has been found. * * * These animals must have ceased to exist in the United States long before the Mound Builders began to flourish. * * * As they became extinct a great many centuries ago (several thousand years, perhaps), we have it definitely settled then that a great antiquity must be assigned to the Mound Builders." — McLean, 136.

Perhaps the trend of speculation upon this subject has all along been in the wrong direction and should be reversed. If the elephant family passed out of existence prior to the advent of the Mound Builder, it may be that the arrival, or development, of the latter in the Ohio Valley is much more recent than commonly believed. Bones, teeth, even entire skeletons of mastodons or mammoths are frequently found in situations where it would seem impossible they could retain their form and solidity for a great length of time. Big Bone Lick, in Boone county, Kentucky, about twenty miles south of Cincinnati, received its name from the vast quantity of bones of these animals, formerly scattered about on the ground. The spot was discovered in 1773 by a party of hunters who used

the ribs for tent poles and the vertebræ for seats. Only small fragments, turned up by the plow, are now to be observed, numerous visitors having carried away everything they could find ; but people living in the vicinity a few years ago could remember when the surface was strewn with well-preserved vertebræ, tusks, and other portions of the frame-work. The springs are in a deep basin whose nearly level bottom contains a considerable area of farming land. The only outlet is a narrow depression through which flows a little creek. Where the remains were most abundant the ground is saturated with strong sulphur water, which will explain the preservation of those beneath the soil ; but there are no indications of denudation of such character as would remove all the earth to a certain depth and then cease to act.

Scarcely a month passes in which the public prints do not herald the discovery of mastodon remains. They usually occur in swamps or other low grounds, especially where shallow lakes formerly existed. When aquatic vegetation once gains a foothold in such places the depression is rapidly filled with peat or muck, and animals resorting to them for food or water may mire and perish. In Ohio, and particularly in the northern portion of the state, these lakes post-date the retreat of the glacier, and many of them are still far from being filled; so their age, measured even in years, can not be extreme. When we find the bones of any animal in a swamp of this nature, much closer to the roots of the sod than to the solid earth below, it is evident that the time of their inhumation will not embrace many centuries. Consequently, if the animal became extinct before man appeared the latter may be a very recent immigrant.

THE BUFFALO.

The buffalo, as well as the mammoth, has served as a time-measurer.

> "None of the bones of extinct animals have been found in the mounds; nor has the buffalo, long a ranger of the Mississippi Valley, been identified in the shapes of the mounds." — Winsor, History, I, 403.

The latter statement is contradicted by Henderson who says it is represented in the animal mounds of Wisconsin.

He also claims that the spinous processes of a buffalo have been found in a mound in Dakota.— Henderson, 713.

Its asserted presence or absence in the effigy mounds is immaterial; for among the latter, persons gifted with a sufficient degree of "imagination" can see anything they are looking for, or fail to detect a resemblance to anything they do not expect to find.

There is proof, however, that the buffalo was known to builders of mounds from Dakota, as cited above, to the Blue Ridge. From a mound in the river bottom-land near Corning in the northwest corner of Missouri, at a depth of five or six feet, I dug some teeth which were pronounced to be those of a buffalo by anatomists at the Cincinnati Society of Natural History.

"In a very large mound, square in shape, three hundred feet on each side and thirty feet high [opposite St. Louis], there were found, in contact with a number of copper implements and ornaments, a number of the teeth of the buffalo. * * * They had most probably been worn as ornaments." — McAdams, 35.

Putnam found a "pendant made of buffalo horn" on an altar at the Turner mounds (see page 386).

"The entire skeleton of a bison was found by Professor Appey in a large tumulus [near Granville, Ohio,] associated with human remains." — Moorehead, 19.

Lying on the natural surface, in a mound near Luray, Virginia, I found the bones of a young buffalo, identified as such at the Army Medical Museum in Washington. Only a portion of the skeleton was present, there being no trace of the leg or shoulder bones. The vertebræ were in their proper position, and the ribs, some of them still firm and strong enough to be taken out intact, extended into the earth of the mound above them. It was evident that the animal had been dissected on the spot, a part of the carcass carried away, and the remainder intentionally covered by the tumulus. It lay within a few feet of a number of graves under the central part of the mound, and the flesh may have been consumed by workmen engaged in the labor of constructing the tumulus.

These are the only instances recorded; but it is not surprising that remains of this animal should occur so rarely in mounds. The entire carcass of a buffalo is too heavy and unwieldy for a party of hunters to carry. The flesh would

be cut off where the animal was killed and the bones left where they lay. The latter were not converted into implements or utensils because, being of coarser texture, they were less strong and hard than the bones of smaller or more active beasts. Or, if some of them were utilized, from these same causes they would decay more rapidly when thrown aside or buried.

But a scientist of wide reputation, who holds an important professorship in one of our great universities, assures us that the beast effectively, though perhaps unconsciously, wreaked dire vengeance for this unmerited neglect and contumely.

Geese saved Rome; buffaloes overthrew the Mound Builders' empire.

Were the following quotation the composition ot an unknown or ignorant individual, we could dismiss it as twaddle; coming as it does from one holding so eminent a position, our attitude must be that expressed in Goldsmith's line. "And still they gazed and still the wonder grew."

"About a thousand years or so ago, perhaps less, the buffalo, a creature of the plain lands, began to appear in this part of the country. * * * The coming of this creature coincided with the change of these peoples to a more barbarous condition. This plentitude of meat appears to have had a debasing effect on all the peoples of the Ohio Valley. They no longer tilled as much; their settlements, with their mounds and forts, were abandoned as far as this epoch-making beast extended his march. The Indians of the south, where the dense forests and the swamp-margined streams presented a barrier to the migration of the buffalo, remained principally soil-tillers, as did the Indians of New York, while other western tribes became nomadic." — Shaler, 46.

HUMAN BONES.

Among other bones which have been called upon to offer testimony as to the period at which the Mound Builders inhabited this region, are those of the Mound Builders themselves.

"Considering that the earth around these skeletons is wonderfully compact and dry, and that the conditions for their preservation are exceedingly favorable, while they are in fact so much decayed, we may form some approximate estimate of their remote antiquity. In the barrows of the ancient Britons, entire well-preserved skeletons are found, although possessing an undoubted antiquity of at least eighteen hundred years." — S. & D., 168.

On Long Island, in the Holston River, East Tennessee, "the skeletons on low bottom lands were in better condition than those found in

the red clay mounds of the uplands. It is inferred from this * * * that the mounds on the higher portion are much older than those on the lower point." — B. E. 12, 363.

The condition of a skeleton bears no relation to the length of time that has passed since the period of its interment. The preservation of bones is dependent almost entirely upon the protection afforded them. If kept perfectly dry they will last indefinitely; if exposed to dampness, especially to the percolation of rain water, they will disappear in a very short time. In sandy ground they will last much longer than in clay; which is the real explanation of the difference of condition in the Tennessee graves. Water fully charged with lime seems to effect them but little. The physical condition of the individual also has a decided influence. Frequently, in the same mound, at the same level, in the same kind of earth, in short under identical conditions so far as could be determined by careful inspection, I have found bones so fragile that they would fall to fragments when their removal was attempted, while others within a few feet were hard enough to withstand a sharp blow with a trowel. This feature has also been observed in the mounds of Florida and perhaps elsewhere.

"At times, in various portions of the mound, the skeleton was represented by remains with hardly greater consistency than putty, while again, often at no great distance from the base, the bones were fairly well preserved. Such remains lay near oyster shells from which, doubtless, the infiltration of lime was a potent factor." — Moore, Duval, 32.

"In the west of France bones in mounds, cairns, and graves, known to be not less than 2,000 years old, are quite sound and solid; while in the east of France, in tumuli of the same age, and under practically identical conditions, the bones have in all cases mouldered into the consistency of ashes, and in many cases have entirely disappeared." — Thomas Wilson; communicated.

In 1803 a party of Indians left Piqua, Ohio, for Michigan. They had gone but a little distance when smallpox broke out among them. Some of them died and were buried in stout oaken puncheons. Excavations in these graves in 1879 revealed fragments of the wood as light as cork though still strong enough to be taken out in pieces as large as a man's hand; but not a trace of bone was discoverable.

In Ross county, in 1900, two bodies were removed from an old cemetery. All the bones of one, buried in 1804, were in

good condition except a few of the phalanges, which had entirely disappeared. The other skeleton, buried in 1824, was intact except for one arm, which had crumbled away.

The essential preliminaries to research in this direction were pointed out two generations ago.

"As a starting point to investigation, it ought to be first settled how long human bones will retain their form and solidity without decomposition, when exposed to the air, earth, water, and other causes of decay, interred two or three feet deep in the earth. Will they preserve their form and soundness over two, or at the most three hundred years? Are not the relics of the early pilgrims of New England, and the first settlers of Jamestown mouldered entirely to dust? Will any one say that human skeletons, entombed as those are in the mounds of Illinois, but two or three feet below the surface, remain in a state of preservation five or six hundred years? A sober investigation of these questions would result in an entire overthrow of the hypothesis of existing races of men prior to the Indians, founded upon such remains." — Peck, 36.

TREES.

The extent of forests and the size of trees growing over mound areas, have been held conclusive evidence that the abandonment of these works took place many centuries ago. Nearly every publication on the subject of archæology contains some such assertion. The tenor of all is fairly exhibited by quotations from four authors.

"The high antiquity of this mining is inferred from these facts: That the trenches and pits are filled even with the surrounding surface; that over the pits were trees of the same size and character as those in the adjacent forests; that the nature of the material with which the pits were filled indicated the slow accumulation of years. There were counted three hundred and ninety-five annular rings on a hemlock growing on a pile of debris. One trench was filled nearly flush with the wash of the surrounding surface." — Foster, 264–7, condensed.

"This habitation must have been very ancient, for the present inhabitants of the country remember to have seen the mound covered with venerable trees, which have now disappeared." — Nadaillac, 485.

"Actual examination showed the existence of not far from *two hundred* annual rings or layers to the foot, in the large chestnut tree already mentioned, now standing upon the entrenchments. * * * We are irresistibly led to the conclusion that [Fort Hill] has an antiquity of at least one thousand years." — S. & D., 16.

"As to the time which has elapsed since the mines and structures of the Mound Builders were abandoned [they] were found by the incoming whites covered with dense forests in which the trees had attained

their maximum size. Beneath this present generation of trees, and overgrown by their roots, were lying the prostrate and decaying trunks of a preceding generation. We thus have evidence that at least a thousand years have elapsed since the country was abandoned by its former inhabitants, and their fields and villages were overgrown by the forests." — Newberry, P. S. M., 194.

The count of "200 rings to the foot" in the chestnut tree, means that each ring is a little less than one-sixteenth of an inch. While this may be true of the outer few inches of a very large tree whose growth has practically ceased, any one who will count all the rings in a chestnut tree, from the center to the bark will see that the average thickness is at least twice as great as the measure quoted.

Newberry's statement means, if it means anything, that all trees, regardless of species, live and grow for 500 years; that trees standing on mounds are 500 years old; that they have been preceded by one generation — or more — of other trees which promptly fell down at the allotted time to make room for the new growth; and, finally, that these older trees have lain on the ground, exposed to the elements, for 500 years and preserved their forms all that time. Absurdity can not go further.

"Gericke, the great German forester, writes that the greatest ages to which trees are positively known to have lived are from 500 to 570 years. For instance, the pine in Bohemia and the pine in Norway and Sweden have lived to the latter age. Next comes the silver fir which in the Bohemian forests has stood and thrived for upwards of 400 years. * * * Of foliage trees, the oak appears to have survived the longest. [One] reached the age of 410 years. Other oaks in Germany have lived to be from 315 to 320 years old." Other known ages are given of various trees: Red beech, 225 to 245 years; ash, 170; birch, 160 to 200; aspen, 220; mountain maple, 225; elm, 130; and red alder, 145 years.— Sci. Am.

It is uncertain whether the last sentence denotes the life limit of species mentioned, or the known age of specimens still growing; elm certainly lives longer than 130 years.

"An elm at Cambridge, just as it had reached its hundredth anniversary, was fourteen feet in circumference. The 'Aspinwall elm,' at Brookline, was known to be one-hundred and eighty-one years old in 1837, when it measured sixteen feet eight inches at five feet from the ground. A cypress-trunk, which grew near Wilmington, North Carolina, with a diameter of fifty-four inches, exhibits six hundred and seventy annual layers. The trunk was thirteen inches in diameter at the expira-

tion of its first century; and twenty-seven inches, about the close of the second; it added seven inches to its diameter during the third century, and a nearly equal amount during the fourth; and for the remaining three hundred and seventy years, it grew at a still slower, but, on the whole, nearly equal rate." — N. A. Rev., 204 and 236, condensed.

There must be some mistake about the number of rings in this cypress ; for one planted in Philadelphia in 1808, had in 1892 a height of 120 feet and a girth of 28 feet. Cypress is a soft wood and grows rapidly. An elm in Chicago, known to be just fifty years old, measured eight feet and two inches in circumference, three feet from the ground.

In Racine, Wisconsin, "in 1847-48, an organization was formed for the purpose of planting trees, some of which, at this time [he was writing in 1882 — 35 years afterward], have attained to a somewhat remarkable size. I have recently measured some of the largest. The white elms are from six to eight feet in circumference two feet from the ground. Maples from four to five feet; black and golden willows, eight feet; poplars, eight and one-half to nine feet. Not long since I had an opportunity of counting the rings and accurately measuring one of these street elms, the diameter, two feet from the ground, inside the bark, twenty-four inches, rings forty-eight — an average of just one-fourth of an inch to a ring, giving an increase in diameter each year of one-half an inch." [It will be observed that he records forty-eight rings in a tree whose age is known to be not more than thirty-five years.] "Near Racine, in September, 1850, there was a pin oak sapling growing. * * * That sapling now [in 32 years] is fifty-six inches in circumference." — Hoy, 15.

Dr. Hoy says, also, that in most forest trees the breadth of the annual ring diminishes almost uniformly from the center to the bark, with the annual growth.

At the old fort in Desha county, Arkansas, supposed to be of French origin, "thirty-six years ago the trees now growing on the new-made lands along the river some of which are three feet in diameter were small saplings." — B. E. 12, 238.

Old Fort Chartres, Illinois, was abandoned in 1772. We learn that in 1820 " in the hall of one of the houses, there is an oak tree about eighteen inches in diameter."— Beck, 109.

The acorn from which this oak grew, could not have sprouted until the building had fallen into such decay as to allow the ground beneath to be come wet.

" In 1856 I transplanted an elm and a red maple; each measured, at four feet from the ground, eight inches diameter. In 1876 the elm measured two feet, the maple two feet eight inches in diameter. A dozen

or more trees increased in eighteen years from about three inches diameter to an average of seventeen or eighteen inches. All were excelled in rapidity of growth by a black walnut; a mere whip-stock when planted, but twenty years afterward a lofty tree, with a trunk four feet in circumference." In 1886 this tree had attained a circumference of six feet. — Hubbard, 409.

A fort was constructed on Jamestown Island, below Richmond, Virginia, some time in the civil war — certainly not earlier than 1861. In the bottom of the encircling ditch, is a pine tree which I measured in 1891 and found it to be seventeen inches in diameter at four feet from the ground. This measure included the bark.

Some years since a hill-side field at Youngsville, Pennsylvania, was cleared off and the large timber hauled to a saw mill. Many of the trees had upward of a hundred growth-rings, the greatest number being observed in a hickory in which one hundred and forty rings were counted. A resident of the town, Mr. Davis, then in his eighty-fifth year, said he had helped to plant corn on that field when a small boy, and that it was then entirely free of any growth that could interfere with cultivation.

This is only one instance, of many which have been noted, that no reliance can be placed upon the number of rings in estimating the age of a tree. It is probably true as a general rule that one definite ring forms each year; but the alternations of heat and cold, drought and moisture, prevent the law from being invariable. Not that a tree ever fails to make a certain growth throughout a season; but the rate may be irregular through interruptions of the vital processes from the causes mentioned. From a check in the flow of sap, there may result a hardening of cellular structure that will separate one year's growth into two or more apparent parts, each of which may be mistaken for an annual layer. In this manner the number of growth-rings formed within a series of years, as well as the rate of growth, may be affected. Trees in tropical regions seem especially subject to these influences. In his description of the ruins at Palenque, Charnay says

"The size of the trees growing between and over these structures has been adduced as a conclusive proof of the age of these monuments. * * * Mr. Lorainzar computed that these monuments must be 1700 years old, because he found a mahogany table made of one single piece from a tree in these ruins. His reasoning is based on the erroneous notion that a concentric circle represents one year, whereas I ascertained

that in a tropical country nature never rests; for chancing to cut a twig some eighteen months old, I counted no less than eighteen concentric circles. To assure myself that this was not an isolated fact, I cut branches and trees of every size and description, when the same phenomenon occurred in exactly the same proportion. * * * In my first expedition to Palenque in 1859, I had the eastern side of the palace cleared of its dense vegetation to secure a good photograph. Consequently the trees that have grown since can not be more than twenty-two years old; now one of the cuttings measuring some two feet in diameter, had upwards of 230 concentric circles, that is at the rate of one a month or even less; it follows that the seventeen centuries of Mr. Lorainzar must be reduced to 150 or at most 200 years." — Charnay, 259.

On the whole, it is probable that there are few, if any, trees in Ohio four hundred years old; with an annual growth of one-eighth of an inch of new fiber, a tree will in that time reach a circumference of twenty-six feet. Few varieties of timber will fail to exceed this rate of increase in the fertile ground where most aboriginal remains occur; in fact they should grow more rapidly on the works than elsewhere, as these are usually made of the surface earth and therefore furnish more nutriment to the roots.

In any old forest the ground is dotted with little depressions where trees have been uprooted by the wind. The absence of similar depressions upon mounds or embankments may, as maintained by some, refute the idea that successive generations of trees have stood on the works. But on a sloping surface such an excavation would probably soon be filled up by the wash from above, or form the starting-point of a gulley that would destroy its outline. A more satisfactory contradiction of the theory may be found within the structure. The roots of trees reach many feet into the interior of mounds. In exploring a tumulus at Waverly it was found that a root from a sassafras tree which grew on the top, followed a tortuous course through the structure and passed into the original soil beneath at a distance of thirteen feet vertically and thirty-two feet horizontally from the point whence it started. Where it disappeared it was nearly two inches in diameter; so that it probably extended much farther. When these roots decay, the casts may easily be recognized by the mould in them, either from the roots themselves or from matter that has worked its way in from the surface. If successive generations of trees had flourished in such situations, it would seem that mounds must contain a great number

of these casts; but they are comparatively few. This gives reason for supposing that the mounds do not reach back many centuries. To avoid such conclusion, recourse is had to the groundless assumption that until relatively recent times the Ohio valley was devoid of forests, and that consequently the country was a prairie in the age of the Mound Builders.

Mr. Read, who first put this idea into tangible form, made no attempt to prove that the earthworks are either ancient or modern, as measured in years. Others have put this construction on his words. He wished only to call attention to possible conditions.

"But was this ground ever occupied by forests until the abandonment of these works? Their erection with Mound builders' tools, if it involved the clearing of a forest as a preliminary work, is so nearly impossible that we can not imagine it would be ever undertaken. It involved not only the clearing of these lands of the forest, but also the neighboring lands which were to be subjected to tillage. It is with the utmost difficulty, in moist and tropical climates, that men armed with steel tools make successful battle with the forests. It is much more reasonable to suppose that these works were located in a treeless region, and the works evidently of the same age scattered over the country indicate that this treeless region was of large extent, covering probably most of the alluvial valley. The inference would follow that the abandonment of the region marked the time when the slow intrusion of the forests reduced the amount of tillable land below the necessities of the community; the time since their abandonment marks the whole period of forest growth on the alluvial bottoms." — Read, Arch., 84.

The abundance of charred or decayed timber in mounds, some of it coming from large trees, effectually disposes of this hypothesis. There was not only timber, but it existed in great variety, as much so, perhaps, as at the present day. We know also that modern Indians had no difficulty in clearing up as much land as they needed, by deadening and burning. To admit Read's theory, and Harrison's, next presented, we would be compelled to carry the Mound Builder back almost to the Ice Age.

"The process by which nature restores the forest to its original state, after being once cleared, is extremely slow. In our rich lands, it is, indeed, soon covered again with timber, but the character of the growth is entirely different, and continues so through many generations of men. In several places on the Ohio, particularly upon the farm which I occupy, clearings were made in the first settlement, abandoned, and suffered to grow up. Some of them, now to be seen, of nearly fifty years growth, have made so little progress toward attaining the appearance of the im-

mediately contiguous forest, as to induce any man of reflection, to determine, that at least ten times fifty years would be necessary before its complete assimilation could be effected. The sites of the ancient works on the Ohio, present precisely the same appearance as the circumjacent forest. You find on them, all that beautiful variety of trees, which gives such unrivaled richness to our forests. This is particularly the case, on the fifteen acres included within the walls of the work, at the mouth of the Great Miami, and the relative proportions of the different kinds of timber, are about the same. The first growth on the same kind of land, once cleared, and then abandoned to nature, on the contrary, is more homogeneous — often stinted to one, or two, or at most three kinds of timber. If the ground had been cultivated, yellow locust, in many places, will spring up as thick as garden peas. If it has not been cultivated, the black and white walnut will be the prevailing growth. The rapidity with which these trees grow for a time, smothers the attempt of other kinds to vegetate and grow in their shade. * * * This state of things will not, however, always continue. * * * The preference of the soil for the first growth, ceases with its maturity, * * * and whenever this is the case, one of the oft-rejected of another family, will find between its decaying roots, shelter and appropriate food. * * * It will easily be conceived what a length of time it will require for a denuded tract of land, by a process so slow again to clothe itself with the amazing variety of foliage which is the characteristic of the forests of this region. Of what immense age, then, must be those works, so often referred to, covered, as has been supposed by those who have the best opportunity of examining them, with the second growth *after the ancient forest state had been regained?*" — Harrison, 248.

Some error of observation or reasoning is involved in these conclusions. It is true that when a field is abandoned in some parts of the United States, growth will spring up of one timber to the exclusion of other kinds. It is true, also, that in certain portions of Ohio some varieties usurp lands which have been denuded. The sort of timber thus asserting itself seems dependent to a considerable extent upon the geological formation of the soil. But no one variety can monopolize the area for more than a few years. Others will crowd in to do their part in restoring the original estate. Trees have sprung up on what was prairie land when Ohio was settled; hill-sides once in cultivation are covered with a dense growth of timber. In either of these situations, a large number of species occurs. These facts are patent to any one who uses his eyes.

TERRACES.

By overlooking an obvious explanation of a very simple matter which has no bearing upon the subject anyway, low lands along streams are offered as proof of the great age of earthworks.

"No work of any kind has been found occupying the first, or latest-formed terrace. This terrace alone, except at periods of extraordinary freshets, is subject to overflow. * * * The fact that none of the ancient works occur upon it, while they occur indiscriminately upon all the others, bears directly upon the question of their antiquity." — S. & D., 10.

"There is no good reason why builders should have avoided erecting these structures on the lower terraces, unless the terrace was formed since or was being formed about the time the Mound Builders took their departure." "The streams generally show four successive terraces, which mark four distinct areas of their subsidence. The last, upon which the works do not occur, must have been the longest in forming. * * * This geological change proves, for the mounds, a very great antiquity." — McLean, 135.

Few mounds are on these terraces, precisely because they are "subject to overflow"; still, some are found in such places. The lowest terraces were not the "longest in forming". Some of them are of very recent origin. There are few farm houses on the low terraces; does this prove "a very great antiquity" for those at a higher elevation?

Harrison offers an explanation, true in its premises, but not necessarily so in its conclusion.

"To the question of the cause of no recent vestige of settlements being found on the Ohio, I can offer only a conjecture. Under certain very possible conditions, a flood might produce a height of water equal to that described by an Indian chief, (to which he said he was an eye witness,) to General Wilkinson, at Cincinnati, in the fall of 1792. And which, if true, must have been several feet, (eight or ten,) at least, higher than that of 1832. The occurrence of such a flood, when the banks of the Ohio were occupied by numerous Indian towns and villages, nearly all of which must have been swept off, was well calculated to determine them to a removal, not only from actual suffering, but from the suggestions of superstition; an occurrence so unusual being construed into a warning from heaven, to seek a residence upon the smaller streams. Before the remembrance of these events had been obliterated by time, the abandoned region would become an unusual resort for game, and a common hunting ground for the hostile tribes of the north and south, and, of course, an arena for battle. Thus it remained when it was first visited by the whites." — Harrison, 227, condensed.

"In the year 1772, 'the June fresh,' was not less than *five feet* higher than the flood of 1832. In the spring of 1778 Wheeling Island was over-

flowed, and the top of the mound only in sight. This fresh was less by seven feet than that of 1772." — Hildreth, Floods, 51-2, condensed.

It appears from this that not only is the Wheeling Island mound on overflow ground, but that the mound itself must have been almost, or entirely, covered in 1772.

Valuable evidence on this point is furnished by Squier.

"Mr. [De Witt] Clinton was unable to learn of the occurrence of any remains upon the first terrace back from the lakes, and, upon the basis of the assumed fact of their non-existence, advanced the opinion that the subsidence of the lakes and the formation of the terrace had taken place since these works were erected — a chronological period which I shall not attempt to measure by years. This deduction has been received, I believe, by every succeeding writer upon the subject of our antiquities, without any attempt to verify the assumption upon which it rests. I have, however, found that the works occur indiscriminately upon the first and upon the superior terraces, as also upon the islands of the lakes and rivers." — Squier, N. Y., 10.

The erosion of their banks by streams is cited as another "proof of age".

"There are several instances of streams encroaching upon the works and carrying portions away. In order to get an approximate length of time for these encroachments, it must first be observed how many inches the stream advanced per year, and even then it would be impossible to tell how far the works were originally placed from the stream." — McLean, 134.

In the enclosure just east of Chillicothe "the large circle had been encroached upon, and the terrace near which, at one time, was the bed of Paint Creek was broken down, leaving the wall of the enclosure; but the creek now runs more than a mile away." — Peet, Amer., I, 63.

What he calls the bed of Paint Creek is a "cut-off" of the Scioto, which could have been torn out in a few years (see page 191). Near here, the river has moved its entire channel, in low ground, several hundred yards since the town was settled.

"At Piketon the stream had withdrawn from the terrace and had left an old channel, with ponds full of water, near the foot of the covered way. The graded way which ended with the terrace may, at one time, have been used as a canoe landing or levee, for the village was on the summit of the terrace. At Hopeton the walls of the covered way terminate at the edge of the terrace, at the foot of which it is evident the river once had its course, but between which and the present bed of the stream a broad and fertile bottom now intervenes. The graded way at Marietta ends with the terrace, but there is now an interval of 700 feet between the end of the way and the river bank. These changes indicate great antiquity in the works of Southern Ohio." — Peet, Amer. I, 54.

The facts are as stated; but the implication that any connection ever existed between the streams and the artificial works, other than exists at present, is wholly incorrect. The river at Piketon is several hundred yards from the foot of the graded way (which is a natural formation) and fully fifty feet lower. At Hopetown the "broad and fertile bottom" is frequently flooded. At Marietta the river is as close to the graded way as it ever was.

"These streams have not only encroached upon the works, but afterward receded, in one instance [the High Bank works], to a distance of three-fourths of a mile." — McLean, 134.

When the High Bank works were constructed, the river flowed at the foot of a steep bluff bounding the terrace upon the north and west sides. On the north, the channel held its ancient way until within the past few years; but it has now shifted more than two hundred yards and soil is rapidly accumulating in its former course. On the west the river is more than half a mile away. Some effort has been made to estimate the length of time necessary for this change. Such estimates are pure guesses; one century is ample for the work; twenty may have passed since it began. It is significant that no large timber grows on the made ground.

As the amount of water passing down our rivers is practically uniform from year to year, it follows that as a stream encroaches upon one side it must build up the shore on the other; and the rate of filling is dependent upon so many factors that nothing short of actual observation is of any value in determining the time that is required for a given deviation. There are places along the Scioto and Great Miami where new channels have been cut through cultivated fields, or where crops are raised on soil deposited in what was the bed of the river, within a generation.

Larger streams make equally rapid changes. In 1756 Fort Chartres, Illinois, was half a mile from the Mississippi. Before 1762 the river was deflected and built up a large island in front of the fort. In that year the island could be reached by fording the cut-off; in 1770 the channel between was forty feet deep. About 1772 one side of the fort was undermined by the river. In 1820 there was a sand bar in front of the ruins, nearly half a mile in width.— Beck, 107, condensed.

THE FORMATION OF TERRACES.

As there has been some misapprehension in regard to the terraces or "bottom lands" of the Ohio river and its tributaries, it may be well to explain here how they are formed.

Prior to the glacial period, the Ohio was not in existence. Its waters as far down as the mouth of the Kentucky, which now find their way to the Mississippi through the present channel, flowed northward across Ohio. When the ancient drainage systems were blocked by the advancing ice-sheet, a lake was formed which filled all the old valleys and rose to the level of a slight depression at Madison, Indiana, through which it found an outlet. Into this lake, torrential streams from the melting ice poured a vast amount of drift. Finally the glacier was a thing of the past; but it had left all the former channels so choked with the sands and gravels from northern regions as to prevent the streams from resuming their old course, and they have ever since made their escape in the other direction. Meantime, the material carried by the swollen waters was being distributed with tolerable regularity wherever the varying currents could deposit it, and in the end, when the new drainage lines were fairly established, the spaces between the hills were filled with a long, narrow plain at the level or somewhat above the level, of the highest terrace or bottom now remaining. Through this plain, the streams as we now see them, began to make their way.

Minor inequalities of surface would, at first, determine the course of the new river. For a certain length of time it would follow this way, and there would be formed a bed bounded by steep banks, while the land on either side extended with a practically uniform surface to the bordering hills. The natural tendency of running water to deviate from a direct course would soon create a sinuous channel, impinging against opposite banks at irregular intervals ; and in this way bends and curves would be established. On the outer or convex side of each curve the current, having greater velocity, undermines the bank and carries away the material composing it ; while on the inner side is deposited the sediment resulting from similar erosion farther up the stream. With successive additions these deposits are built up into sand and gravel bars,

over which the water rises only in time of freshets; with increasing deflection of the river they gradually widen until portions in the rear are so far from the main channel that no coarse detritus reaches them. Finer matter left by the quiet water furnishes a foothold for vegetation which still further impedes the flow, thus continually increasing the depth of soil. Then there are two terraces on one side and one terrace on the other side. In time, the river begins in the same manner to eat away the bottom which it has formed, and to build another on the opposite side at a still lower grade. This process is repeated until there is no longer sufficient fall for the stream to scour out its channel deeper; when this stage is reached the banks on both sides may cave in and be carried away, but terrace-making is at an end.

A river may continue its erosion in one direction until it reaches the rocky border of its valley; or it may stop at any point and begin to work its way back. It may leave a portion of the original deposits undisturbed, with a bluff face the entire height. It may carry away the entire mass and afterward fill its place with similar material whose surface is a few feet, or many feet, lower than that of the part removed. It may leave the bottom land on either side at one level or at several levels between the hill and the bank of the stream. It may leave deposits at successive levels on opposite sides of the stream at the same point, or there may be one bank on one side and more than one bank on the other side. But, unless the action of the main current is modified by that of a tributary, there will not be two terraces in the same order at the same height above the water. That is to say, the third terrace, for instance, on one side will not measure the same number of feet above the water as the third terrace on the opposite side. This does not agree with the generally accepted theory that the terraces are cut out in orderly succession, from level bottoms, by intermittent lowering of the stream, either through sudden slight elevations of land surface or equally spasmodic subsidence of some portion of the river bed; but it does agree with the observed facts. Consequently, any calculations as to the age of the first (lowest or latest formed) terrace, based upon geological considerations, are apt to be misleading. The period of its formation depends entirely upon the fluctuations

of the stream and the degree of slope. Places exist upon the Ohio where the last work of this sort was completed many centuries ago; some terraces on its tributaries are still in the process of formation; and there are terraces on the Scioto, Miami, and other streams, which in the course of ages will be carried to the Gulf and replaced by others at a considerably lower level.

But whatever be the age of the lowest terrace, whether a century or a score of centuries, it has no connection with the age of mounds which are not built upon it. Indians — or Mound Builders — may have encamped for months at a time on the banks of a creek or river; at a desirable fishing station they may even have piled up a small amount of earth on which to raise a hut or a wigwam sufficiently high to avoid the mud resulting from a heavy rainfall; but they were not so stupid as to erect permanent structures of either wood or earth in situations from which they would be driven at every flood and which would be untenable for a considerable portion of every year.

There are apparent exceptions to this statement. Some mounds stand in bottoms subject to occasional overflow; and village-sites are common on river banks even lower than those over which the water sometimes rises. But in the former case it will usually be found that no higher land is near, unless on the hills where the people did not wish to go; and again, the location may be above all but the greatest floods which come only at long intervals, so that, like many of the whites who have succeeded them, the aborigines would believe such an exceptional condition of affairs would probably never occur. In seeking a location for a village, the great desiderata are wood and water; the river produced both, for the driftwood along the shores was always abundant, accessible, thoroughly seasoned, and needed very little labor to prepare it for use. The soil was fertile and easily tilled, while fish were to be caught in plenty almost at the door. In view of such advantages, the natives could well afford to be routed out once or twice in a generation, when the alternative involved more labor and less convenience.

SURFACE ACCUMULATION AND EROSION.

Two other standards of measurement would be valuable aids in determining the age of prehistoric earthworks, if we could ensure their fixity; both are subject to so many disturbing influences whose effects can not be calculated, that it is unsafe to place much reliance on them. One of these is the rate at which soil will accumulate on level ground, where there is neither wash nor overflow. According to some geologists this amounts to about three inches in a century. Could we be sure of this figure, the depth of village-sites beneath the present surface would afford a clue to the number of years that have elapsed since their abandonment. But the growth of vegetation and the action of earthworms are uncertain, the amount of detritus carried in by winds may either exceed or fall short of the amount removed by the same agency, and no balance can be struck.

The other factor is the rate of erosion in embankments or other works, on a sloping surface. We have to consider here the amount of rainfall, the degree of slope, the drainage area, the size of the outlet, the amount and kind of vegetation, and the character of the soil. It is like attempting to solve an equation when some of the letters are missing. It may be said, however, that in all cases where breaks due to atmospheric influences occur in earthworks, the volume of material thus removed is remarkably small. At the largest ravine cutting through the northern wall of the Hopewell enclosure in Ross county, not more than a dozen wagon loads of earth would be required to fill the broken space to the height and breadth of the wall on either slope.

At Fort Ancient "the embankment may be traced to within three to eight feet of the stream" in the minor ravines. "Hence it appears that not more than three feet of that excavation has been done since the construction of the earthworks." This statement, which is a little obscure, seems to imply a belief on the part of the authors that the embankment was carried continuously across the little ravines, and that the figures given are a measure of the amount of the erosion since it was made. But the wall may have stopped at first just where the ends are now seen; for if it were made without a break the portion

in the ravine would go out with the first heavy rain unless stayed with timbers ; and if sufficiently heavy timbers were used no further defensive work would be necessary. Nor is there any authority for assuming that all the erosion indicated at the bottom of the ravine has taken place since the wall was built; the gulley may have been there before. It would not take a great while for a ditch to increase three feet in depth on a hill-side; yet on the same page they estimate the age of the work at "thousands of years."— S. & D., 19.

To prevent an assumption of certainty concerning such calculations, Fort Miami offers two ravines. One of these on the north side of the fort receives the drainage of a comparatively limited area ; the cut here is deep and wide. On the south side there is a much smaller break in the wall, through which passes the drainage from a considerably larger area.

F. — PHYSICAL STRUCTURE.

CRANIA.

A vast amount of time and labor has been devoted to measurements of skeletons with the hope that some relation of parts may be discovered which will serve as a basis for classification into types and a guide to tribal connections. Such investigations are especially directed to the skull; various tables are formulated, differing in minor particulars, but all having in view the idea that development of the human cranium is somewhat like the crystallization of minerals—each class possessing a type of its own from which there may be slight deviations but which, on the whole, is sufficiently marked and distinct to dissociate it from all others.

The first, and principal, measurement of the skull is the "cephalic index"; this is obtained by dividing the breadth of the skull by its length and multiplying the quotient by 100. When the result is below a certain number, the cranium is called "dolichocephalic", meaning "long-head"; when above a certain other number, it is termed "brachycephalic" or "short-head"; while one falling between these two is classed as mesaticephalic, or "middle-head". These are the three grand divisions; within them fall sub-divisions governed by other proportions. Each is assumed to belong to a distinct type of humanity; so that when a skull is properly indexed something can at once be inferred as to the racial affinity of the individual of whom it once formed a part.

It is a beautiful scheme; the only trouble with it is that no one has ever been able to reduce it to a system from which it is possible to obtain any certain or definite results. When this difficulty is overcome — no special progress appears yet to have been made in that direction — we may look for the announcement of some interesting discoveries. As the matter now stands, very little dependence can be placed in conclusions drawn from the use of such tables; there is a general resemblance among skulls of races who are somewhat homogeneous, so that we may with some assurance of correctness say one belongs to the Caucasian, or Indian, or Negro, or some other race, or even, in a few instances to some particular branch of a race; but it does not seem safe, now, to go much further. Even this comprehensive statement must be based, not upon a few linear measurements, but upon the general appearance of the entire cranium. When we proceed to details, we are only applying the principals of phrenology.

If a single tribe should have the sole occupancy of a country for centuries, under conditions of life remaining practically unchanged during that time, the monotonous uniformity of their method of living might result in the evolution of a well defined type of cranium by which they could readily be distinguished from all other races. But with a roving people, like most American Indians, who must adapt themselves to continual changes of topography and climate, who form confederations and adopt captives, the intermingling of different strains will be attended with a diversity of physical structure affecting not the head alone but the entire frame as well. At any rate skulls of almost every normal shape and size have been taken from a single mound, or from the same cemetery, mingled in a way to indicate that those who interred the bodies had no thought of making any distinction of caste. In such cases, any attempt at classification by drawing a hard and fast line between the "long-heads" and the "short-heads"labeling one division "ruling class" and the other "slaves and captives" is, to say the least, very unsatisfactory. And it does not help the matter to establish a third division between these, and call it "progeny of the two races."

Professor Putnam clearly presents his ideas in regard to the distribution of the two principal divisions in North America, the intermingling of types through migrations, and the resultant formation of intermediate varieties.

"We find that the prevailing form of the skulls from the older burial places across the northern portions of the continent, from the Pacific to the Atlantic is of the long, narrow type (dolichocephalic), while the skulls of the old peoples of Central America, Mexico, and the southwestern and southern portions of the United States are principally of the short, broad type (brachycephalic). Following the distribution of long and short skulls as they are now found in burial places, it is evident that the two forms have spread in certain directions over North America; the short or broad-headed race of the south spreading out toward the east and northeast, while the long or narrow-headed race of the north has sent its branches southward down both coasts, and toward the interior by many lines from the north as well as from the east and west. The two races have passed each other here and there. In other places they have met; and probably nowhere is there more marked evidence of this meeting than in the Ohio valley, where have been found burial places and sepulchral mounds of different kinds and of different times. This variation in the character of the burial-places agrees with the skulls found in them. Some contained the brachycephalic type alone; in others, both brachycephalic and dolichocephalic forms were found with many of the mesaticephalic or intermediate form; indicating a mixture of the two principal types, which seem to be of different races or subraces." — Putnam, Ohio.

His interesting conclusions in regard to the aboriginal population, are presented here in a much condensed form:

"We seem compelled to admit the following groups of North Americans. The Preglacial or Interglacial race, or Paleolithic man. The "Eskimo." The Dolichocephali. The Brachycephali. These groups, call them by what name we will, are the principal ones in North America. From them are composed the North Americans, or, as they are called, the Indians, with all their resemblances and differences." — Putnam, Ohio.

Whittlesey's view is of the same general nature as that of Putnam, though he differs from the latter somewhat as to the method in which the association of the last two races was brought about.

"Colonel Whittlesey's sagacious generalizations concerning the advance of a more civilized race from the south as far as southern Ohio, and their final expulsion by more warlike tribes from the lake region, are fully confirmed by recent investigations. The Indians of Mexico and South America belong to what is called a 'short-headed' race, i. e., the width of their skulls being more than three-fourths of their length, whereas the northern Indians are all 'long-headed'. Now out of about 1,400 skulls found in the vicinity of Madisonville near Cincinnati, more than 1,200 belonged to a short-headed race, thus connecting them with southern tribes. Going further back it seems probable that the southern tribes reached America across the Pacific from southern Asia, while the northern tribes came *via* Alaska from northern Asia." — Howe, I, 234.

Moorehead remarks of some skulls which he exhumed: —

"In some of the large mounds, especially those of Hopewell's earthwork in the Scioto valley, and mounds of the Little Miami valley, the crania are remarkable for their great thickness and low, retreating, narrow foreheads, with heavy superciliary ridges." — Moorehead, 240.

On page 217 he gives a figure of a skull; it shows a common mistake in drawing or photographing whereby an apparent "low forehead" is created when in reality the cranium is well formed and has a full forehead. The error consists in resting the skull on the lower jaw, thus allowing its base to drop to the level of the chin; the specimen is thereby tilted backward until the vertex is considerably to the rear of where it properly belongs. On page 222 another cut illustrates the manner in which the same erroneous impression may be given with a fragmentary cranium. Instead of so placing the fragment that it would hold the position belonging to it in life, the fractured edges, front and rear, are on a practically horizontal line; in this way the "flat head" observed is determined by the relative loss of the bone from the occiput. Most works on anthropology contain such misleading illustrations; and some very elaborate discussions are based on an artist's oversight instead of, as the writers suppose, on the conformation of a prehistoric skull.

"The strong mixture of the two races, brachycephalic and dolichocephalic, as exhibited in several of the mounds on Mr. Hopewell's farm, was to us at first inexplicable. But as excavations brought to light new finds we could come to but one conclusion, both from an inspection of the crania and the implements. The short-headed race, predominating to such an extent in the river valleys of Tennessee, also controlled the Scioto and Miami settlements. The few long-heads present were undoubtedly subservient to the short-heads." He pronounces "the osteological affinities of the people" (the aborigines of southern Ohio) as "resembling those of the stone-grave people of Tennessee so closely that there is little doubt that the builders of Hopewell's earthwork are but an advanced offshoot to the north of these people." — Moorehead, 195 and 198.

This is followed by two pages of fanciful theorizing by the author. In other portions of his "Primitive Man" there is a large amount of pure, unfounded guess-work in regard to "long-heads" and "short-heads," who roamed about at random, making settlements here, forays there, conquering and enslaving or stoically resisting elsewhere; all of which has no other foundation than the discovery of skulls differing somewhat from each

other in form, and concerning which variations no scientific or satisfactory basis has as yet been established.

No one at all competent to render a decision in this matter has yet made an examination of the cranial remains exhumed from the mounds in Ohio; until this is done, and until anatomists can agree among themselves as to the meaning of the various measurements, it will be as well not to attempt any race distinctions based on such sciolistic observation.

Even now, however, there is no excuse for so silly a statement as that of Larkin.

"The head of the Indian * * * indicates the cruel savage that he is. The Mound Builder has a head that will compare favorably with that of the most intellectual people now living." — Larkin, 2.

But this is no worse than a diagram by Nadaillac. In trying to show "the degraded type" of a skull of ordinary Indian form, by means of comparison with a "European skull", he represents the latter as having the form of an arc of a circle terminating at each end in radii of a somewhat larger circle — a shape unlike that of any skull which ever existed.— Nadaillac, 483.

The skull figured by Squier and Davis has passed under the inspection of various anatomists and archæologists, who have given it careful study. Foster says of it: —

"Squier and Davis profess to have collected but one skull which they regarded as authentic of the Mound Builders, but any comparative anatomist, on referring to their plate, will instantly recognize it as of the Indian type. Dr. Morton justly describes it as 'perhaps the most admirably formed head of the American race hitherto discovered.' Comparing this skull with those which I have figured, it will be seen that the Scioto skull differs widely from the true Mound Builder's skull in its most characteristic features." — Foster, 291.

The importance of this cranium justifies a detailed statement of the conditions under which it was found. The report of the explorers is, in substance, as follows: —

"The only skull incontestably belonging to an individual of that race [the Mound Builders] which has been recovered entire, or sufficiently well preserved to be of value for purposes of comparison, was taken from the hill-mound * * * situated upon the summit of a high hill, overlooking the valley of the Scioto about four miles below the city of Chillicothe. * * * It is about eight feet high by forty-five or fifty feet base. The superstructure is a tough yellow clay, which at the depth of three feet is intermixed with large, rough stones. * * *

These stones rest upon a dry carbonaceous deposit of burned earth and small stones, of a dark black color, and much compacted. This deposit is about two feet in thickness at the centre, and rests upon the original soil. In excavating the mound, a large plate of mica was discovered placed upon the stones, at the point indicated by the letter *a* in the section. Immediately underneath this plate of mica and in the centre of the burned deposit, was found the skull * * * resting upon its face. The lower jaw, as indeed the entire skeleton, excepting the clavicle, a few cervical vertebrae, and some of the bones of the feet, all of which were huddled around the skull, were wanting. No relics were found with the bones, except a few shells of the fresh-water mollusks from the neighboring river.

"From the entire singularity of the burial it might be inferred that the deposit was a comparatively recent one; but the fact that the various layers of carbonaceous earth, stones, and clay were entirely undisturbed, and in no degree intermixed, settles the question beyond doubt, that the skull was placed where it was found at the time of the construction of the mound. Either, therefore, we must admit that the skull is a genuine relic of the Mound Builders proper, or assume the improbable alternative that the mound in question does not belong to the grand system of earthworks of which we have been treating.

"The skull is wonderfully well preserved, unaccountably so, unless the circumstances under which it was found may be regarded as most favorable to such a result. The imperviousness of the mound to water from the nature of the material composing it, and its position on the summit of an eminence subsiding in every direction from its base, are circumstances which, joined to the antiseptic qualities of the carbonaceous deposit enveloping the skull, may satisfactorily account for its excellent preservation. * * *

"The vertical occiput, the prominent vertex, and the great interparietal diameter, are, according to Dr. Morton, features characteristic of the American race, but more particularly of the family which he denominates the Toltecan, and of which the Peruvian head may be taken as the type. [It] exhibits in a marked degree, the cranial characteristics of the American race, of which it may be regarded as a perfect type." — S. & D., 289.

The mound in question is number 8 of figure 23. It is shown in figure 4. A section shown in figure 5 is reproduced from (S. & D., fig. 199). The skull is represented in figures 6 and 7 (S. & D., Plates XLVII and XLVIII).

If this is an "Indian" skull, then it is plain that one "Indian", at least, was buried by Mound Builders in their customary fashion.

Foster evidently deems himself competent to decide spontaneously what skull is to be called "Mound Builder" and what



Figure 4 — Mound 8 of Squier and Davis.



Figure 5 — Section of Mound 8.



Figure 6 — Profile of Skull from Mound 8.

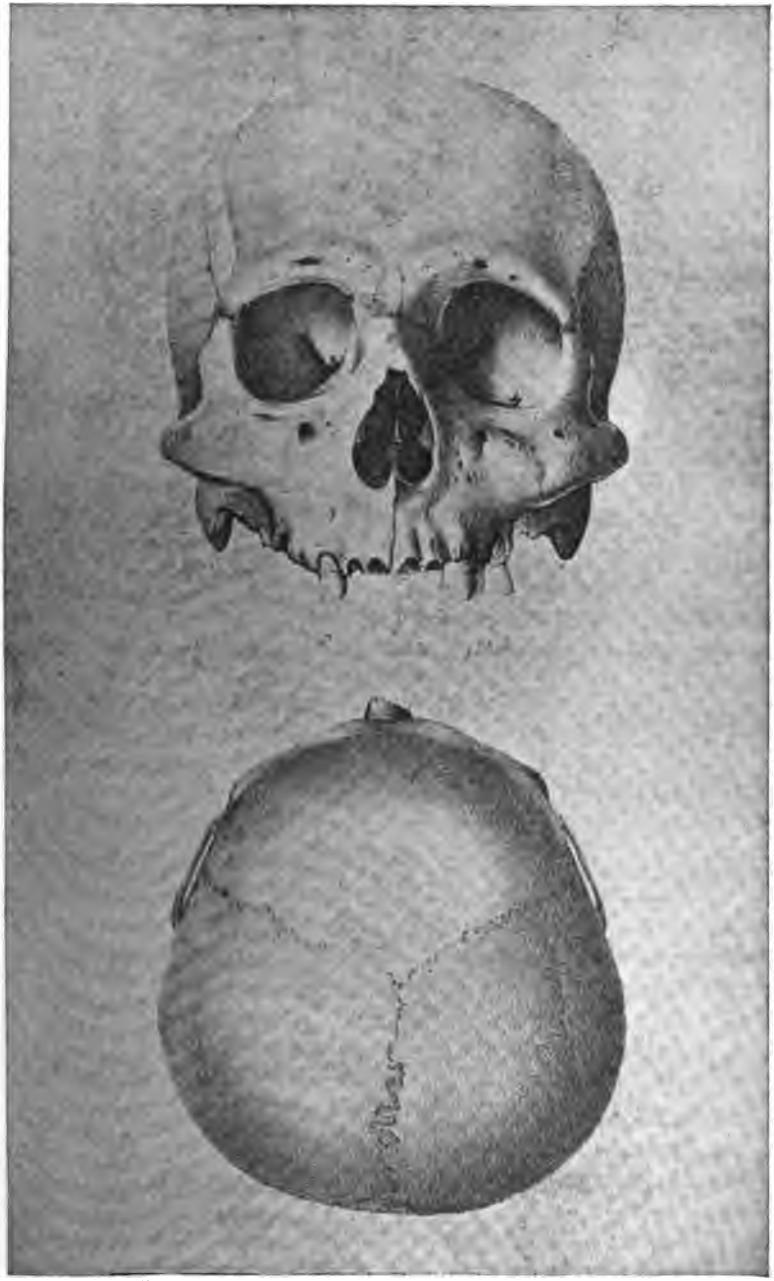


Figure 7 — Front and Top Views of Skull from Mound 8.

"Indian". He describes skulls from Chicago, Merom, and Dubuque, of which he says: —

"Without doubt they are the authentic skulls of the Mound Builders." The first are from mounds only two and a half feet high and the last from mounds which "are by no means conspicuous in size and are destitute of the long lines of circumvallation which so often invest those of the Ohio Valley." One "was exhumed from a mound about twelve feet high at Dunleith [opposite Dubuque]. The corpse was buried about two feet below the surface, and was covered with wood and stone; * * * this skull is one of the most anomalous ever found. * * * It has a marked resemblance in its contour to that from * * * near Chicago."

It is evident these are modern Indians, not connected in any way with the Ohio Mound Builders. Yet, because the three skulls from near Merom, Indiana, have a cephalic index of 73, 73, and 74, respectively, Foster says,

"I think we are justified in drawing the conclusion that the Mound Builders were not the ancestors of the North American Indian." From them he also deduces "the former existence on this continent of an anomalous race, characterized by a remarkably depressed forehead, * * * and subsequent discoveries which have been made but confirm me in the views originally entertained as to the low type of the Mound Builders' skulls." "Thus far but few authentic Mound Builders' skulls have been exhumed, and they indicate that that race must have ranked intellectually below the lowest types of Australia and New Caledonia." "All the specimens indicate a low intellectual organization, little removed from that of the idiot."

The shape of these Merom skulls furnishes him grounds for asserting that "with a single exception, in the figures heretofore given of the Mound-builders' skulls, I fail to recognize the typical characters." He even goes so far as to claim, in effect, that the largest mound in the Ohio Valley is of Indian origin; for he says "The skull from the Grave Creek mound, West Virginia, figured by Morton and reproduced in Schoolcraft's works, is of the Indian type." Recognizing his inconsistent attitude in attributing mounds to Indians, and calling the Mound Builders Indians, while still maintaining the idea of a broad gulf between the two, he defends his position by a quotation from Dr. Lapham: —

"It seems quite probable that men with skulls of this low grade were the most ancient upon this continent; that they were the first to heap up those curiously-shaped mounds of earth which now so much puzzle the antiquary; that they were gradually superseded and crowded out by a su-

perior race, who adopting many of their customs continued to build mounds and to bury their dead in mounds already built. Hence we find Mound Builders with skulls of the ancient form, associated with others of more modern type. The discovery of these skulls with characteristics so much like those of the most ancient of prehistoric types of Europe, would seem to indicate that if America was peopled by emigration from the old world, that event must have taken place at a very early time—far back of any of which we have record." — Foster, between 275 and 306.

Force neatly disposes of Foster's entire discussion in a single sentence:

"Efforts have been made recently to find some peculiarity in the crania of the Mound Builders. The late Dr. Foster declared in his 'Prehistoric Races of the United States,' that he had discovered the type of the Mound Builders' skull, and that it was a degraded type. Dr. Foster's argument is very good except that he failed in the first step; he failed to get crania of the Mound Builders." — Force, 62.

Through a study of Dr. Wilson's measurements, it is revealed to Short that no warrant is found for the division into "long-heads" and "short-heads". He perceives that

"the type of skull among the American aborigines, ancient or modern, was in no sense constant, since among the same tribes long and short skulls occur in almost equal numbers. This fact is especially true among the savage Indians. — Short, 164.

But in attempting to present an epitome of the various theories, he loses his way and leaves the whole question in a muddle.— Short, chapter IV.

Nadaillac accurately sums up the situation, though without any comment as to its bearing or meaning.

"Though most of the skulls which can be attributed with any certainty to the so-called Mound Builders are short or Brachycephalic, there are numerous exceptions; and often beneath the same mound have been found skulls which appear to date from the same period, yet which present different forms; numerous excavations have established similar facts in the Old World." — Nadaillac, 487.

The unsatisfactory nature of such classifications, and the dubious quality of any deductions based upon cranial measurements, have impressed themselves on more than one careful investigator; whose conclusions, fairly represented in the next quotations, give very little support to any theory based upon such data.

"In skulls, however, the main measures are the length, which is compounded of a half dozen elements of growth, and the breadth and

height, each the resultant of at least three elements. Two skulls may differ altogether in their proportions and forms, and yet yield identical measures in length, breadth and height. How can any but empirical results be evolved from such a system of measurement alone?"

"The length of growth of each plate from its center in different directions regulates the entire form of the skull."— Petrie, 592.

"In the examination of 38 skulls of men, the cephalic index ranged from 69 to 86; the capacity from 1220 to 1920. In 29 skulls of women the index varied from 68 to 82; the capacity from 1182 to 1580. I am led to treat this entire series of crania as having belonged to one race. From such figures as these, craniologists seek to establish an average which shall be taken as the type; and yet after all it must be admitted that in point of fact, so far as this collection is concerned, the typical cranium, as adduced from the measurements, has no real existence. In the crania from the stone graves of Tennessee, or those from Greenland there runs through each series a certain prevailing form which is at once recognized. Here, however, no such uniformity exists. The crania differ among themselves in every possible way."— Carr, Crania, condensed.

"The classification into long and short skulls is open to the objection that it forces into opposite classes crania closely related to each other. In proportion as arbitrary divisions are increased these difficulties are multiplied, and this simple, two-fold classification presents the fewest." — Dr. Meigs, from Short, 160, condensed.

"From an old and well-filled European graveyard may be selected specimens of klimocephalic (slope or saddle skull), conocephalic (cone-skull), brachycephalic (short skull), dolichocephalic (long skull), platycephalic (flat skull), leptocephalic (slim skull), and other forms of crania equally worthy of penta- or hexa-syllabic Greek epithets."— Owen, quoted by Short, 160.

JAWS, TEETH, AND LIMBS.

Various other portions of the frame-work are studied, with conflicting results. It is a very common newspaper statement that a Mound Builder has been dug up somewhere "whose jawbone will slip over that of a large man." Sometimes the man elevates the marvelous into the miraculous by having a growth of "remarkably heavy whiskers."

It is not necessary to procure a Mound Builder in order to perform this feat; the phenomenon is equally apparent with any other full grown human jaw. It may be observed, also, in curved or open-angle objects generally, having approximately the same form and thickness; as spoons, saucers, miter-joints, gutter-spouts, or slices of melon rinds. The significance is as great in one case as in the others. The experimenter has failed

to perceive a considerable interval between the end, or angle, of the jaw which he held in his hand and the one with which it was being compared. He should invert the former and apply it to the lower part of the latter, when he would find much less difference than he expected. Even should the Mound Builder's jaw exceed in size that of the modern white man, it does not follow that his entire skeleton was on a corresponding scale. Mastication of tough or coarse food promotes growth of the necessary organs; if muscles are strong and large the bones to which they are attached must be heavy enough to meet the strain upon them. For this reason both maxillaries may attain proportions much in excess of other parts of the skull.

Frequently this development affects the teeth as well; the prominent chin brings the upper and lower incisors to the same vertical line, allowing the edges to impinge instead of overlapping, so that the crowns of all the teeth alike wear off flat in practically the same plane. Many persons who have noticed the fact, without reflecting upon its cause, that "the front teeth are flat instead of sharp," deem it ample evidence that the "Mound Builders had double teeth all around, a peculiarity which distinguishes them from all other known races." Others, better informed, suppose the amount of wear thus manifest must indicate the attainment of an extreme age. As a rule, this would be true; but nothing has been found to show that the Mound Builders had any methods of preparing food which were superior to those in vogue among later Indians, and it must be conceded that a diet of parched corn, bread made from grains and nuts crushed on a stone mortar or with a stone pestle and baked in ashes, meat cooked on coals with a liberal admixture of sand and silt or boiled in water heated by dropping red-hot stones into it — would not require more than an ordinary life time to wear out the hardest teeth that can develop as long as lime is the chief component in them.

"Dr. Sozinsky says: 'The dental profession was unknown to the Mound Builders, and they had no need for it; for toothache and all such diseases were troubles with which they were but very little acquainted.' Dr. Farquharson mentions the invariable soundnesss of teeth in the remains found in the Davenport mounds. Dr. Patrick says: 'It is the exception to find a sound set of teeth. * * * The marks of alveolar abscess are common; loss of molars and bicuspids is frequent, with complete absorption of the sockets.' The writer's observations, which

have been limited, accord exactly with those of Dr. Patrick." — Henderson, 710.

After an examination of several hundred skeletons from mounds, cemeteries, and village-site burial places, I can add my testimony, also, to Dr. Patrick's. It is very rare indeed to find a full set of sound teeth, even in the skull of a young person. Often all the teeth are present, but some, perhaps most, are diseased. Sometimes the teeth remaining are sound, but the number is deficient. A skeleton under the center of a mound originally over twenty feet high, near Waverly, had only twenty-two teeth left, and thirteen of these showed marks of decay. None of them were much worn.

Of the other bones, the humerus and tibia have been seized upon most frequently in the effort to advertise the Mound Builder as not like other men. In the former there is sometimes a perforation just above the elbow. The size varies in different arms, but it is seldom as much as half an inch in diameter. It is usually considered a peculiarity confined to the Mound Builders, a sort of racial birth-mark; but it is found in only a small per cent. of their skeletons, and occurs in other races as well. It is sometimes spoken of as an indication of inferiority; though for what reason, and what sort of short-coming is meant, does not appear.

Dr. Matthews says in regard to this anomaly,

"We believe that the perforation is not congenital but acquired; and that it has no connection with the rank a people may hold in the scale of races, but is the result of some mechanical cause connected with their occupations. We believe, furthermore, that it results from repeated and forcible extension of the forearm, in which the summit of the olecranon process of the ulna impinges against that long, thin bony partition which ordinarily separates the coronoid from the olecranon fosse of the humerus. The absorption of this partition naturally follows." — Matthews, 218.

There is often observed in the tibia a flattening as if it had been pressed from each side. This is sometimes so pronounced that the thickness from side to side is less than half the measure from front to back.

"That flattening of the leg-bone or tibia, peculiar to prehistoric man in Europe, and perhaps the result of rugged exertion in climbing mountains and traversing the country with that rapidity which the chase required where the horse is wanting, is more noticeable in the remains of some of the Mound Builders than in any other people. * * * its

prominence among the people of the mounds indicates the possession of great pedestrian powers." — Short, 185.

It may indicate various other things also:—

"Flattened or platycnemic tibias * * * may be produced in any race by the prolonged use of certain muscles, either in constant trotting, in prolonged squatting, in carrying burdens, or in the use of peculiar foot gear." — Mason, Travel, 261.

"It is a recognized fact that the flattened tibia does not occur in childhood, but that the peculiarity is acquired as years advance. * * * The flattening is entirely due to [the] inverse action of the *tibialis posticus* [as] exerted when the foot is fixed and the tibia raised, as in the act of rising from a kneeling position. This action * * * is produced in the upright position; more still in walking, above all up inclined planes both in mounting and descending them, and infinitely more in running and jumping. Lifting and carrying heavy loads [is also an important cause.]" — Matthews, 223.

* * * * *

The confusion prevailing in regard to these minor features extends to the entire skeleton. For nearly a century there has been a continual reiteration of the sentiment that Mound Builders were a gigantic race. Almost invariably a skeleton from an aboriginal burial-place is that of a "very tall" person. If figures are given, it is usually "fully seven feet." One early author, indeed, claimed just the opposite.

"The skeletons found in our mounds never belonged to a people like our Indians. The latter are a tall, rather slender, straight limbed people; the former were short and thick. They were rarely over five feet high, and few indeed were six. Their foreheads were low, cheek bones rather high; their faces were rather short and broad; their eyes were very large; and they had broad chins." — Atwater, 209.

But the common belief satisfies more people.

The skeletons of Mound Builders show that, as a race, there was no practical difference between them and any other people living an outdoor life, with plenty of coarse but nutritious food. Physically, they differed very little from our pioneers. The shortest skeleton of a male I have ever found in a mound was about five feet in length; the longest was six feet four inches. Owing to the displacement of bones exact measurements are seldom possible; but there need be no error of more than an inch in most cases. The bones sometimes show the effects of rheumatism, tubercular trouble, or fractures.

There were, of course, many abnormal features of physical structure among them; it would be strange if they were the only people on earth free from such visitations. But owing to the hardships and exposure incident at times to their manner of living, not many of the weak, sickly or deformed would survive childhood.

SUMMARY.

The foregoing epitome of arguments and theories shows that a search for the origin of the Mound Builders is included within and forms a part of the larger inquiry as to the starting-point of the American Indians.

If any race had its beginning on the Western Continent, it has been more or less modified in physical appearance, mental traits, character and disposition by accessions from the Old World.

All known facts are at variance with the belief that large additions to population may have come from either Europe or Africa, unless in times so remote that little trace now survives of influence from this source.

The western coast may have been accessible to primitive Asian peoples by way of Behring Strait; along ocean currents; or by means of islands in the Pacific, now submerged.

Under present conditions of climate no extensive travel is practicable across the Strait except for Eskimo; though small parties from farther south may sometimes use this route.

The Japan current makes it possible, now, for any race of Southeastern Asia, to and including the Malays, to reach the Alaskan coast.

The hypothesis of former islands in the equatorial portion of the Pacific, in a position to afford any assistance to a movement in this direction, involves geological changes within recent times, of which we have no evidence. It also involves a reversal of winds and ocean currents whose trend is now away from the American coast instead of toward it.

It seems probable that the center of distribution for the first Americans was that part of the Pacific Coast containing the Gulf of Georgia and the mouth of the Columbia River. From here they spread southward along the coast and eastward over the Rocky Mountains.

This dispersion dates from so far in the past that different tribes of Indians now vary as greatly from each other in psychological attributes as do different nations of Asia or Europe.

When one part of the American race started eastward and the other southward from their pristine home, the separation was final. There is no good reason for believing a general migration ever took place in either direction across the territory intervening between those who reached the Ohio valley and those who established themselves in New Mexico and southward; though traders and roving bands probably created and maintained a communication along this line.

In many particulars the Aztec differed from the Indian of the Pueblo; the Mound Builder, apparently, was in most respects unlike either; while the hunting Indian of North America resembled none of the three. This refers to their manner of living and their social customs. It is more probable that the culture status of each particular group developed where it was found, than that any one should be transformed into another with no intermediate stages. In what some writers designate as the "architectural" features of domestic life, the inventive power or mechanical ingenuity of the "wild Indian" in the northern states seemed to find its limit in the use of skins or bark. The agricultural Indian of the southern states, the Iroquois, and the Mandan, went a step further and utilized wood in the construction of buildings. The last also plastered, banked, and covered his house with clay. The Mound Builder seems not to have entirely outgrown this stage, although making use of earth for various purposes besides defense or burial. The Pueblo Indian advanced to the knowledge and use of adobe. The ancient Mexican, mentally the foremost of North American people, had learned to dress stone. None of them had reached the stage of metal working, except in its simplest form with raw material. Even casting was an unknown art.

Mounds are to be found in every part of Europe and Asia; some of them are older than the dawn of history, others were constructed well within the Christian era. Consequently, no theory of descent or relationship can be based upon them. The custom of building mounds no doubt slowly developed among people who settled in districts where we find these remains.

Nothing yet discovered proves for any of the Mound Builders a higher intellectual capacity than is, or was, possessed by more than one well-known tribe of American Indians.

There were several mound-building tribes within the limits of the United States, who may, or may not, have been related or contemporaneous. The period within which they occupied this territory can not be definitely ascertained by any of the means usually employed for that purpose.

Nothing is to be learned of the origin of the American Indians, or, as a corollary, of the Mound Builders, by a comparison of their customs or implements with those of foreign peoples. Under analogous circumstances races or tribes of a like degree of culture, though unrelated, and ignorant of each other's existence, will attain similar ends by practically the same methods. A resemblance in certain typical forms of mounds, earthworks or utensils, does not prove that people to whom they belong are related or even that communication existed between them, but may mean only that the social conditions were essentially alike.

The habits of primitive people are determined by their environment. Barbarians are at the mercy of forces with which Nature is equipped, and the means by which they must protect themselves are about the same everywhere. The ability to modify materially external physical conditions must precede the beginning of the lowest forms of civilization. The divergent customs which so sharply mark off one nation from another, are due simply to evolution along the different lines on which they started out.

There is no probability that any manuscript, inscriptions, or other records, will ever be disclosed, which will aid in solving the unanswered questions concerning Mound Builders. Additional information is to be gained, if at all, only by investigation of their tumuli, cemeteries, and village-sites.

The discouraging feature presents itself, that we seem unable to find anything new, or essentially different from what we already have. Our museums are filling up with material from all these sources; and yet, for years, the accumulation has added nothing in the way of real information to what we already knew.

CHAPTER V

ENCLOSURES.

The Enclosures of Ohio. Classification. Theories as to Use. Methods of Designing and Building. Description.

IN OHIO, enclosures fall into three different classes — the heavy embankments of earth peculiar to the level or low lands of the southern half of the State; the larger hill-top fortifications composed of earth and stone in varying proportions, confined mainly to the same localities as the first; and the far greater number resembling in some respects both the above, but usually smaller, seldom symmetrical, evincing less care in design or construction, and placed on high or low ground indifferently, sometimes with little regard to topographical features.

The fertile valleys of the Muskingum, Scioto, and Little Miami, seem to have been the favorite home of the builders of the first series. With the exception of one group on the Kanawha River, and two others in Greenup county, Kentucky, which are really a part of the Portsmouth works, all the principal low land enclosures are confined to the vicinity of these streams.

Every theory yet advanced to explain the purpose for which such works may have been constructed, is largely conjectural and in some respect or other inconsistent with facts which soon become apparent to the careful observer. At an early day all were called "forts" alike; but when closer inspection made it apparent that many, especially the larger ones, were not adapted to the requirements of warfare, it was assumed that they were intended to cloak the performance of religious ceremonies. This view is clearly set forth by Squier and Davis: —

> "Reflection, however, has tended to strengthen the opinion, that those works not manifestly defensive were connected with the superstitions of the builders, and that all the enclosures of the West (except perhaps some of the petty circles), were either military or religious in their origin. [It is not] improbable that a few were designed to answer a double purpose."

"If we are right in the assumption that [the enclosures] are of sacred origin, and were the temples and consecrated grounds of the ancient people, we can, from their number and extent, form some estimate of the devotional fervor or superstitious zeal which induced their erection, and the predominance of the religious sentiment among their builders. Their magnitude is, perhaps, the strongest objection that can be urged against the purpose here assigned them. It is difficult to comprehend the existence of religious works, extending, with their attendant avenues, like those near Newark, over an area of little less than *four square miles*! We can find their parallels only in the great temples of Abury and Stonehenge in England, and Carnac in Brittany, and must associate them with sun worship and its kindred superstitions." — S. & D., 49.

"The structure not less than the form and position of a large number of the earthworks of the West, and especially of the Scioto Valley, render it clear that they were erected for other than defensive purposes. * * * When we find an enclosure containing a number of mounds, all of which it is capable of demonstration were religious in their purposes, or in some way connected with the superstitions of the people who built them, the conclusion is irresistible that the enclosure itself was also deemed sacred, and thus set apart as '*tabooed*' or consecrated ground, especially where it is obvious, at the first glance, that it possesses none of the requisites of a military work. * * * We have reason to believe that the religious system of the Mound Builders, like that of the Aztecs, exercised among them a great, if not controlling influence. Their government may have been, for aught we know, a government of the priesthood; one in which the priestly and civil functions were jointly exercised, and one sufficiently powerful to have secured in the Mississippi Valley, as it did in Mexico, the erection of many of those vast monuments, which for ages will continue to challenge the wonder of men. There may have been certain superstitious ceremonies, having no connection with the purposes of the mounds, carried on in inclosures specially dedicated to them. * * * It is a conclusion which every day's investigation and observation has tended to confirm that most, perhaps all, of the earthworks not manifestly defensive in their character, were in some way connected with the superstitious rites of the builders—though in what precise manner, it is, and perhaps ever will be, impossible satisfactorily to determine." — S. & D., 46.

"The great size of most of the foregoing structures precludes the idea that they were *temples* in the general acceptation of the term. As has already been intimated, they were probably, like the great circles of England, and the squares of India, Peru, and Mexico, the sacred enclosures, within which were erected the shrines of the gods of the ancient worship and the altars of the ancient religion. They may have embraced consecrated groves, and also, as they did in Mexico, the residences of the ancient priesthood. * * * Analogy would therefore seem to indicate that the structures under consideration, or at least a large portion of them, were nothing more than sacred enclosures. We find * * * the altars upon which the ancient people performed their sacrifices. We find also pyramidal structures * * * which correspond

entirely with those of Mexico and Central America, except that, instead of being composed of stone, they were constructed of earth, and instead of broad flights of steps, have graded avenues and spiral pathways leading to their summits." — S. & D., 102.

Since the day of these authors much has been written to the same effect; but nothing has been added to their argument, nor a scrap of evidence adduced in its favor beyond what they offered, namely, that such must have been the object in view, because we know of no other motive which would have led to the construction of these works.

But no explanation has ever been offered as to the character of ceremonies requiring for their performance areas of twenty or thirty acres, or even more, with passage-ways over a mile in length, all concealed from prying eyes by massive walls of earth or high palisades. The most primitive races practice some sort of rites and make sacrifices of personal comfort, through a sense of duty or under the influence of spiritual fear; while some of the greatest architectural achievements of our race owe their existence to the same feelings. But people whose constructive power reaches its limit in piles of earth, whether symmetrical or not, could scarcely possess so comprehensive and connected a system of religious ideas as would lead to the creation of immense and elaborate works for their observance, to the exclusion of similar or equal structures for the requirements of social or military needs.

It is impossible to imagine any condition of life that would lead people to enclose areas so great for no other purpose than to conceal the operations of one part of the populace from the remaining portion; or to conceive of what use the walls would be if all should take part in the exercises. There is nothing in our knowledge of barbarous races, of any age or country, to justify such a supposition. True, the priests of most religious systems in ancient times concealed parts of their rites from the multitude; but it is absurd to cite records of the use of caves or groves for this purpose in support of a theory that the same end could be attained or even attempted by means of a low wall around a twenty acre field.

Recognizing this difficulty, some authors have abandoned the idea of a religious origin, and assigned to these enclosures an office similar to the Roman circus, considering them places where persons who wished, or were compelled, to entertain the

populace with games or feats of strength and valor, would have abundant room for the display of their skill and prowess; the spectators meanwhile viewing the performance from seats provided for them along the top of the wall. This is giving the Mound Builder credit for more enterprise and public spirit than seems warranted. If boundaries were needed, they could be marked off by lines; and the hills or terrace-banks in the immediate vicinity of any of these works overlook level tracts as well adapted for such purposes as those within the walls.

It is suggested, also, that they were "game preserves," into which wild animals suitable for food could be driven and confined until needed. Even admitting the people to have been so enervated as to enjoy this form of sport, they would have found more difficulty in providing food for their captives than in chasing them down as they were needed or in driving them into some ravine and slaughtering them as they came across the pass at the top. The native wild animals of the region would pay scant respect to any walls that could be made of earth; besides, the numerous openings or gateways preclude any such service for the works. The same objections are fatal to the theory that the enclosed space was used for farming purposes by inhabitants of villages situated outside the walls, who took this method of protecting their crops. It is true that palisades may have been set along the top; but palisades strong enough to be of any service in such position would have been equally effectual in the absence of walls, thereby obviating the necessity of erecting the latter.

The reader will bear in mind that all such theories are based solely upon the idea that the manners, customs, and condition of life among the Mound Builders, were such as to harmonize with the conception which has found lodgment in the mind of the theorizer. In other words, through a study of the earthworks an author has been led—or has led himself—to believe that they denote for the builders a certain social organization; the particular kind or degree of this being whatever he chooses to imagine it. Having thus formulated a system of government, he proceeds to show what motives would lead people in such stage of culture to construct the enclosures. Then, from the enclosures and allied works, he infers the performance of sundry ceremonies and observances which shall have to find their expression by such means, and shall at the same time correspond with the stage of culture

in which the actors are supposed to be living. This is not reasoning in a circle, but along three straight lines which, if we may set aside a mathematical axiom, begin and end at the same point.

In a few sentences, Foster summarizes the various opinions, except as to the stock-yard notion.

"The large [enclosures] may have been walls, surrounding their towns and cultivated fields, and even used to protect their fields from predatory animals. The smaller ones may have been designed to guard their temples and sepulchral mounds from profane intrusion. Every nation has its games, and the ruder the nation is, the greater the attempt at barbaric pomp and magnificence. There can be little doubt that the Mound Builders had their national games which were celebrated within these enclosures. They had, too, their religious observances, their funeral ceremonies, and their grand councils; but no clear line, I think, can be drawn in reference to the different purposes of these structures." —Foster, 176.

So far as the "sepulchral mounds" are concerned, nearly all of them are outside of the enclosures.

Perhaps the most plausible hypothesis is that villages were located within the walls; though it does not follow, as seems to be generally held, that the latter are intended as a defense against invaders.

"A few of these enclosures may possibly owe their origin to a religious sentiment, but of a large majority of them it may be safely said, in view of recent investigations, that they were simply fortified villages. Self-protection was the primary object of the people who lived behind these walls." — Carr, Mounds, 555.

The numerous gate-ways show that ready entrance and exit was desired, and they are almost invariably so wide that speedy closure would be impossible, since this could be accomplished only by means of palisades or breastworks of logs. These would take time to erect and must be removed again to make the openings available. Further, a wall higher than a man's head, especially one with an interior ditch, would give the defender no advantage over his assailant; for unless a platform were constructed entirely around the inner side, he could see over the top only by climbing up a slope on which he would find it difficult to secure a foothold. The embankments at Hopetown and at the Hopewell group, in Ross county, are certainly not constructed with a view to defense; the circle in the former runs for a part of its course along the slope of a terrace whose top commands the interior; while in the latter the wall closely

follows the top of a terrace on which an enemy could have ample space of level ground for his approach and maneuvers, while the inmates would have barely room to stand. It would seem that if either had been intended for a protective purpose, the walls would have extended far enough back on these upper levels to afford sufficient room for defensive movements.

In most of these works, the garrison could be easily cut off from their water supply by an investing force of large numbers. Should the besiegers once gain possession of the top of the wall, the defenders would be in a death trap from which there was no escape.

Again, there are no surface indications of occupation within them, such as have led to the discovery of so many village-sites; but it is quite possible that all such refuse has been covered by natural accumulations to a greater depth than farming operations can reach. They have not been disclosed by any excavations for cellars, foundations, etc.

Morgan thinks the larger circle at High Banks may have been a garden enclosure; the smaller ones "suggest the circular estufas found in connection with the New Mexican pueblos. * * The circles were adapted to open-air councils after the fashion of the American Indian tribes."— Morgan, 215.

After assuming that the Mound Builders were of the same stock as the Pueblo Indians, he says that when they

> "reached the Scioto valley, in Ohio, they would find it impossible to construct houses of adobe brick able to resist the rains and frosts of that climate, even if they found the adobe soil. * * * They might have used stone. Or they might have fallen back upon a house of inferior grade, located upon the level ground. * * * Or, *they might have raised these embankments of earth, including rectangles or squares, and constructed long houses upon them*, which, it is submitted, is precisely what they did." — Morgan, 206.

> "The embankments enclosing the squares were probably the sites of their houses; since, as the highest, and because they were straight, they were best adapted to the purpose. If these embankments [referring to those at High Banks] were reformed, with the materials washed down they would form new embankments thirty-seven feet wide at base, ten feet high, and with a summit platform twenty-two feet wide. If a surface coating of clay were used, the sides could be made steeper and the summit platforms broader. On embankments thus formed out of their original materials respectable as well as sufficient sites would be provided for long joint-tenement houses, comparted into chambers like stalls opening upon a

central passage-way through the structure from end to end, as in the long houses of the Iroquois. These embankments answered as a substitute for the first story of the house constructed of adobe bricks. The gateways were protected, it may be supposed, with palisades. The pueblo, externally, would thus present continuous ramparts of earth ten feet high, around an enclosed area, surmounted with timber-framed houses with walls sloping like the embankments, and coated with earth mixed with clay and gravel, rising ten or twelve feet above their summits; the two forming a sloping wall of earth twenty feet high. Figure 47 [Morgan, 210, reproduced here as figure 8] shows not only the feasibility of occupying these embankments with long houses, but also that each pueblo was designed by the Mound-Builders to be a fortress able to resist assault with the appliances of Indian warfare. Occupying to the edge of the embankments, they could not be successfully assailed from without either by Indian weapons or by fire. The inclosed court, which is of unusual size, is one of the remarkable features of the plan. It afforded a protected place for the villagers, room for their drying-scaffolds, and for gardens, as well as for fuel for winter use." — Morgan, 207, *et seq*, condensed.

Figure 8 [N. A. Cont., IV, 210, fig. 47] presents a "Restoration of High Bank Pueblo," according to the ideas set forth by Morgan; while figure 9 [same, fig. 48] gives a ground plan and section of the house which he thinks may have been erected on the walls.

But the theory takes as its basis that the walls are composed of, or at least coated with, tough clay which will stand with a very steep slope from top to bottom. None of the embankments are thus constructed, being made of the loam and gravel constituting the soil about them, which will not maintain a greater angle than an ordinary fill made of similar material for a road or railway. To erect on the walls at their present height a dwelling, except of very contracted width, would require a breadth at top greater than can be given to any of them with the amount of material used, unless means be taken, as by a palisade or retaining wall of some description, to keep them from crumbling down; there is no evidence that this was ever done.

We have now come back to the starting-point; namely, that every theory which has been devised to explain the larger enclosures has a valid objection. Yet some one of them must certainly be applicable to any given enclosure; because every conceivable reason for their existence—except, perchance, the right one—seems to have been advanced. If careful examinations should be made by experienced investigators, of the embankments, ditches,

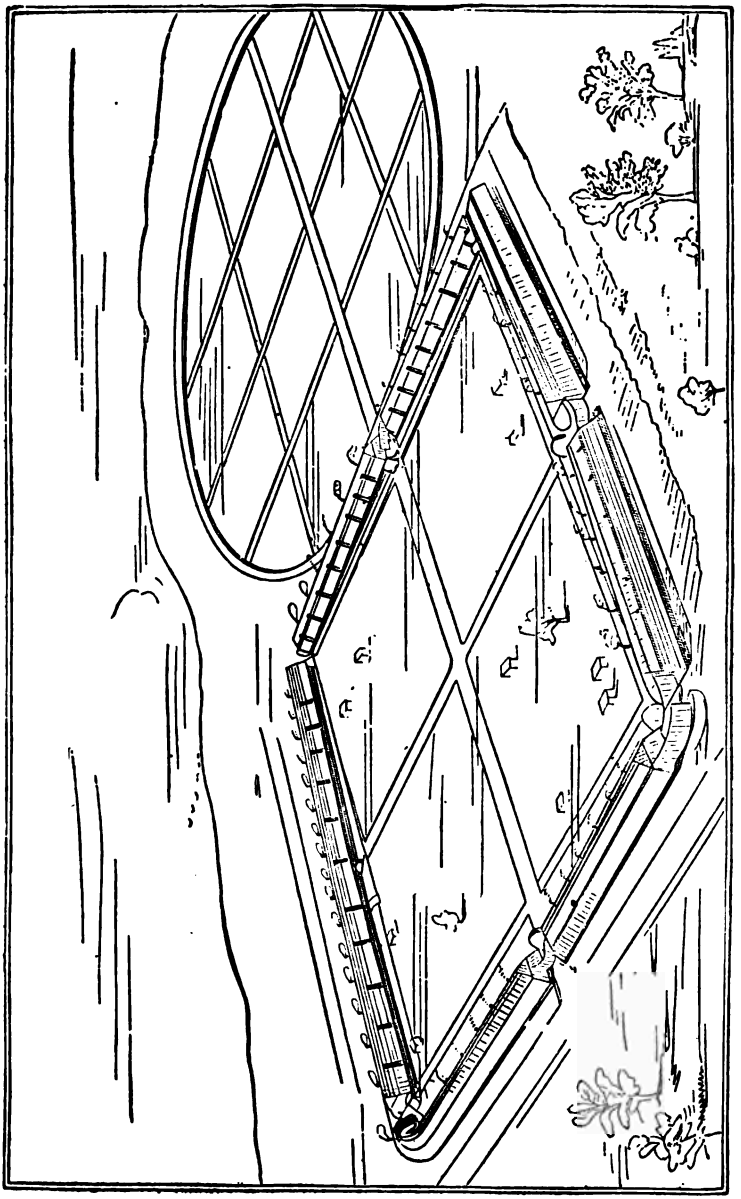


Figure 8 — Morgan's "Restoration of High Bank Pueblo."

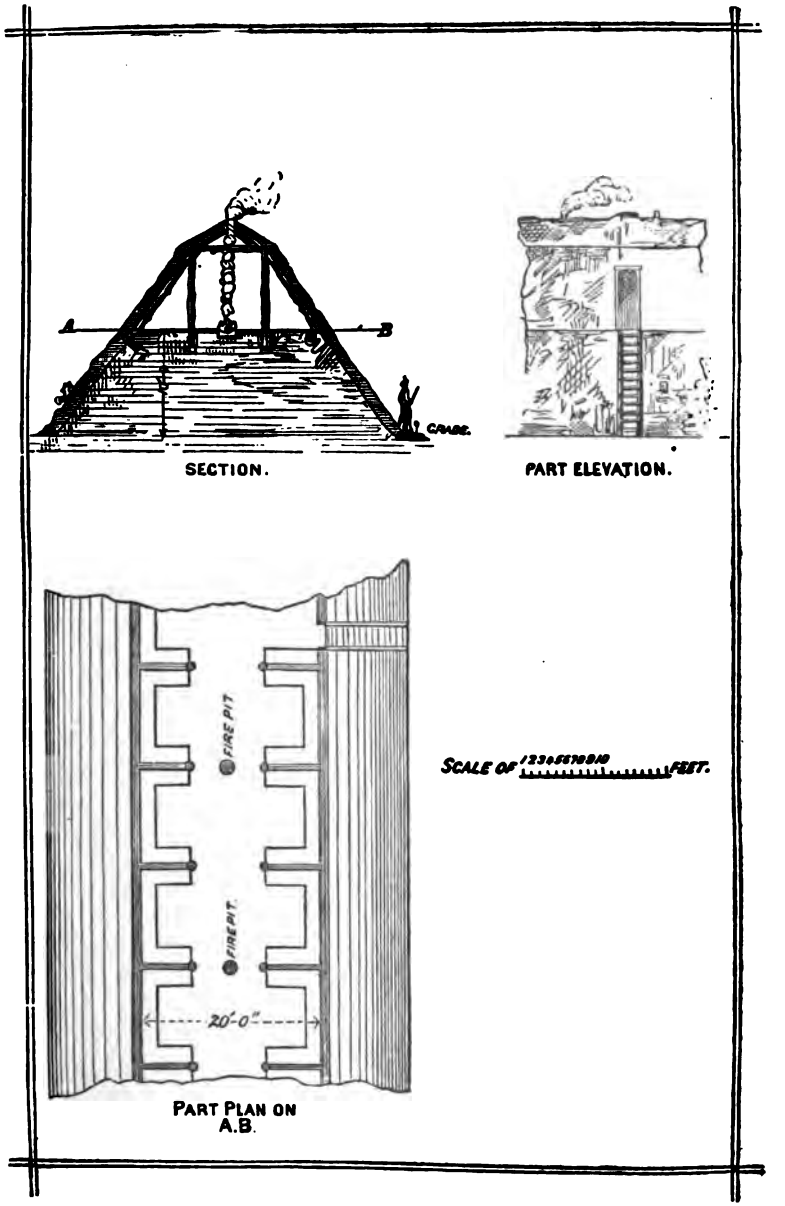


Figure 9 — Morgan's Plan of "High Bank Pueblo."

and included areas, to a depth at or below any level which was disturbed by the Mound Builders, we might be able to arrive at definite and defensible conclusions. Until this is done, any explanation must remain open to question. It is quite possible that such explorations would leave us still in the dark; for there is no assurance that the desired information would be forthcoming.

Perhaps we may obtain a hint from the far-away Fiji Islands. In one community there is

> "A town fortified with an earthen rampart, about six feet thick, faced with large stones, surmounted by a reed fence or cocoanut trunks, and surrounded by a muddy moat." Battles are conducted among them exactly as among Indians. — Fiji, 37.

Any interpretation of the enclosures must apply to the long walls or parallels connected with them. The solution of the problem, if it is ever achieved, will be something different from Peet's explanation of features which do not exist.

> "Let us ask what works there are and what uses we may discover in them. We have first the village defenses. This we see was always protected by a circumvallation. This circumvallation was generally in the form of a square and a circle, but the circle was always protected by a high wall and sometimes by two such walls, and the openings in the wall of the square were always protected by a watch tower or additional platform guard on the inside. Second, there were near the villages many fortified hill tops, places to which the villagers could resort in times of attack. These fortified hills were generally located in the midst of several villages, so that they could be easily reached by all. Third, the sacrificial places and the places of religious assembly, were always provided with circumvallations or long covered ways. Nothing of a religious nature was ever undertaken unless the people could be protected by a wall. Fourth, we find that the sweat-houses, so-called, were always close by the village enclosure, but if by any means it was remote, there was always a covered way provided, so that it could be reached in safety from the village enclosure. Fifth, the same is true of the dance circles and places of amusement. These were sometimes remote from the village, but in all such cases there was a covered way between the village and the dance ground. Sixth, the fields were cultivated, but the fields were reached by passing through the parallels or covered ways, and lookout mounds or observatories were always provided to protect those at work and to sound the alarm to them. Seventh, there were landing places for canoes and places at which the villagers could reach the water's edge. These, however, were always protected by covered ways. Every village had its landing place, but nearly every landing place was furnished with a graded and a protected or covered way, the canoes being kept from the water and

from the enemy by the same contrivance. Eighth, we find a few isolated enclosures. These are parallels, supposed to have been used for races and other games. They, too, present the peculiarity of having a wall to protect them. The sacrificial or burial places were also isolated, but even the burial grounds were furnished with heavy earth walls or circumvallations. The lookouts were also at times isolated from the villages, but even the lookout mounds were surrounded with circles to protect them, and some of them were connected with the village sites by covered ways. It would seem as if the people were not willing even to trust their sentinels or watchmen to the open fields or to risk the chance of his reaching an enclosure by rapid flight, but even he must be protected by a wall or covered way.

"This presents a new view of the earthworks of the region. It shows that the people realized their danger; that while they were peaceable themselves and were given to agriculture and to a peculiar religious cult, yet they were in the midst of a savage foe which was always lurking near. * * * The Mound Builders of Ohio, then, and the Indians of later times were plainly very different from one another." — Peet, I, 93, *et seq.*

What his "sweat-houses" or "dance circles" are, no one knows. Many of the village-sites are remote from streams large enough to float canoes; of those closer, not one now presents a "graded way" to the water, nor a "covered way" directly to a canoe landing. According to Major Long there was such a protected grade at Piqua; but nothing remains to show the accuracy of the statement. Neither is there any evidence of most of the "protective walls" which Peet thinks he sees.

* * * * *

One conclusion seems warrantable. Earthworks of every description, whether low-land enclosures for social requirements of any character; or hill-top forts for protection; or mounds intended as a mark of respect for the dead; or anomalous structures at whose meaning we can not guess; — of whatever kind and for whatever purpose, they were probably public in their nature and erected by the joint efforts of the whole community. This is a less pleasing view of the matter than the picture of great multitudes of workmen, drafted from a dense population, and toiling day after day under the direction of task-masters; but it is more in accordance with the testimony of the works themselves.

It may be added that invariably the great bulk of the structures is of earth from the immediate vicinity, despite the gen-

eral impression that it is "brought from a distance." This is a patent fact to all who are familiar with soils.

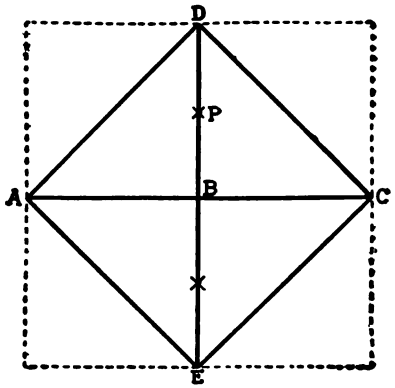
"The walls are usually composed of earth taken up evenly from the surface, or from large pits in the neighborhood. Evident care appears in all cases to have been exercised, in procuring the material, to preserve the surface of the adjacent plain, smooth, and as far as possible, unbroken." — S. & D., 48.

No instruments beyond stakes and lines are required in marking out any of the enclosures, large or small. A circle may be accurately laid off with a line of sufficient length, which is firmly secured at one end and kept tightly stretched while the other end is being carried around. A deer-hide may be cut, as a shoemaker cuts a string from a small piece of leather, into a thong with a length greater than the radius of any prehistoric circle in the State, and of sufficient strength to withstand the strain of such use; or several thongs may be tied together if necessary. Should there be obstructions interfering with the free sweep of the line, points on the circumference may be marked at any desired intervals by drawing the cord taut and setting stakes at the outer end. If these are close together they may be connected by straight lines of embankment whose very small angles of divergence will in time disappear under the influence of wind and weather; and the wall will finally assume the form of a curve, practically continuous and requiring careful measurement to distinguish from a true circle.

Not only can we say that the circles may have been outlined in this manner; we have evidence that such was the method employed.

"That their work was marked out before commencing the same we have every reason for believing. Of the three, or rather four, sacred enclosures at Alexanderville, not one is complete. These incomplete remains prove that all of these works were commenced at the same time, all abandoned before being finished, and all show what method was pursued in their construction. The three mounds of the smaller circle, we found not to be mounds at all, but intended to form component parts of the intended circle, and were not placed in a straight line to the circle, but located on the line of the curve. The whole line was established before the work was begun, and work was performed on different parts of the line at the same time. This fact is also true of the square a short distance removed from the circle. We must not rely on the plan of these works as given in the "Ancient Monuments," which is faulty in more than one particular.

"A circular work eighty feet in diameter, in Butler county, is incomplete, being composed of four mounds three feet in height, corresponding with the cardinal points of the compass. Between the mounds the walls gradually taper until they meet midway. These mounds may represent the original height of the proposed wall. In another part of the same county, are eleven hillocks (small mounds) which made a complete circle two hundred and thirty feet in diameter. All of the eleven hillocks, except one to the southwest, had their corresponding depressions facing the center. The exception was due to a tree falling. It was plain that a plan for a work had been laid out here, the mounds or stakes had been set, and then for some cause the work was abandoned." — McLean, 84, 172, and 220, condensed.



The construction of a square figure without instruments is somewhat more difficult, but can be compassed with a little care and patience. Lay off a straight line, AC, and mark its middle point, B. Procure two cords of exactly the same length, somewhat longer than the distance AB. Stretch these cords from A and C until their ends touch at the point P; draw a line equal to AB from B, through P, to D. From D draw lines to A and C. In the same manner find a point, E, on the opposite side of the line AC, and draw AE and CE. The points A, D, C, and E, will mark the corners of a square. Or, if lines equal to AB be extended from each of these points their intersections will fall at the corners of a new square having twice the area of the first. By repeating this process, an enclosure of any size may be marked off. If all measurements are accurate, each figure successively formed will be regular; but a mistake at any stage of the work is multiplied in each following step. Consequently, the larger

the initial square is made, the closer will be the approximation to exactness in the completed work. In fact there is no necessity for making more than a single series of measurements; for with one cord of 525 feet for the line AB and two others somewhat longer but not to exceed 742 feet, for AP and PC — measures quite within the reach of any hunter of large game — a square can be at once laid off which will enclose an area of a little over 25 acres.

The easiest method of constructing a square, when exact dimensions are not required, is to lay off a circle, divide the circumference into four equal arcs, and draw chords to these.

To construct an octagon, lay off a square; prolong the diameters as far beyond the sides as desired; connect their ends with the corners of the square. The angles of the octagon will vary with the extent to which the diameters are carried; but this extension must not exceed two-tenths of the original length, at each end of the diameter. A slight increase beyond this limit will produce a square whose diameters are the diagonals of the one on which it was built; a greater increase will form a four-pointed star.

It may be objected that such calculations as the last surpass the abilities of barbarians. We have the evidence of the works themselves that calculations or measurements of some description were made; those indicated are the simplest possible for tolerably accurate work. Anything less intricate must be mere guess-work or "rule of thumb." At any rate, people who would find these simple methods beyond their reach, would certainly be unable to devise means for ensuring the "mathematical accuracy" of which we hear so much.

GEOMETRIC ENCLOSURES.

It would be equally impracticable and unnecessary to attempt an illustration or even a description of all the enclosures in the State. But all of those usually termed "geometrical" may be presented in order that the reader may perceive for himself upon what a slender basis this so-called "civilization" is laid.

THE NEWARK WORKS.

In Licking county there are probably 500 earthworks of all descriptions without including in the estimate the excavations at Flint Ridge. In the vicinity of Newark, mile after mile of

embankments, circles and other geometric figures, parallels, lodge-sites, and mounds, covering an area of more than four square miles, amaze the archæologist and curiosity seeker alike as they spend hours and days in traversing the ground in every direction, constantly finding something worthy of investigation and description.

Part of these are shown in Figure 10 (S. & D., 98, Plate XXXVI, No. 4), which is a map of six miles of the Raccoon

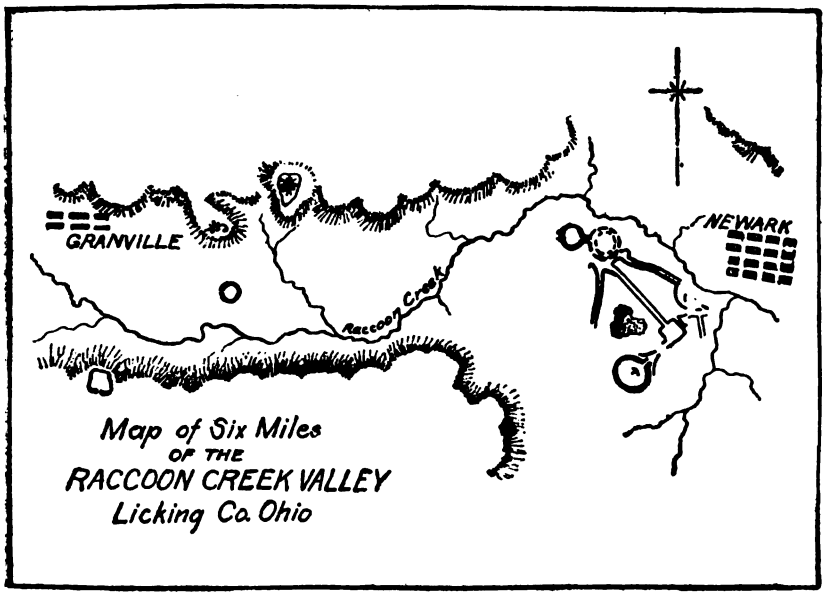


Figure 10.

creek valley. There are numerous mounds and many other works within this area which are not represented.

The principal groups, commonly known as the Newark works, are shown in Figure 11 (B. E., 12, 458, Plate XXX), from a survey made by Whittlesey for Squier and Davis. The plan is erroneous in several particulars, although it furnishes an excellent idea of the system in its entirety. Owing to the growth of the city many of the remains are now obliterated.

Atwater's map shows only the large enclosures and parallel walls. On the brink of the terrace are represented embankments extending from the small circles containing mounds, which lie

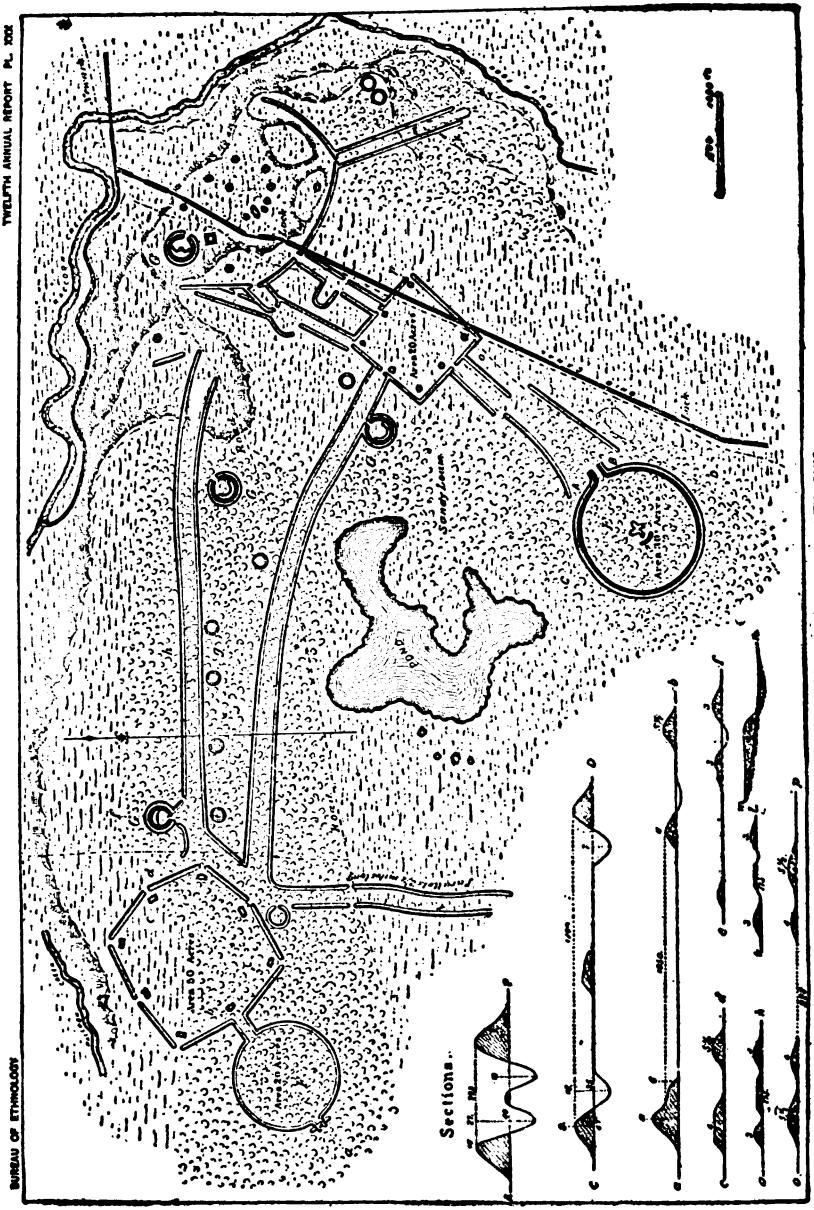

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Sections.
NEWARK WORKS, LICKING COUNTY, OHIO.

Figure 11.

to the south and the north of the parallels; all these walls stop at the top of the terraces, but "graded ways" are indicated in the lower bottoms, in line with them. His drawing of the eastern portion of these works is quite different from Whittlesey's. He claims that the streams were at the foot of the high terraces when the works were constructed, and says "passages down to the water have been made of easy ascent and descent."— Atwater, 126-8.

According to the description which accompanies Whittlesey's plan,

"The greatest elevation of the embankment of the great circle E, is sixteen feet; the greatest depth of the ditch, thirteen feet; the wall will average twelve feet high by fifty feet base, and the ditch seven feet in depth by thirty-five in breadth. It is not, as has been generally represented, a true circle; its form is that of an ellipse, its diameters being twelve hundred and fifty and eleven hundred and fifty feet respectively. There are two or three slight irregularities in the outline, too trifling, however, to be indicated in the plan.

"The wall of the circle is six feet high and of the octagon and square about five and a half. At each of the angles of the octagon is a gateway, which is covered upon the interior by a small, truncated pyramidal elevation, five feet in height, and measuring eighty by one hundred feet at the base. These are not of the same class as the 'Temple Mounds,' and were made for a different purpose, apparently, though it is somewhat uncertain what may have been the intention of either. It is probable that most, if not all, of them were in some manner connected with the defense of the enclosure to which they belong.

"The enclosure F *is a true circle* two thousand eight hundred and eighty feet in circumference. At a point immediately opposite the entrance it would almost seem that the builders had originally determined to carry out parallel lines; but after proceeding one hundred feet, had suddenly changed their minds and finished the enclosure, by throwing an immense mound across the uncompleted parts. It has been pretty thoroughly excavated, but the excavations seem to have disclosed nothing, except an abundance of rough stones, which must have been brought from the creek or some other remote locality, as none are scattered over the remarkable plain upon which these works are situated.

"It would be unprofitable to indulge in speculations as to the probable origin and purpose of this group of works."— S. & D., 68-71, condensed.

The rough stones noted in the circle F are angular fragments of sandstone, not at all waterworn, which could be procured only on some of the hills in the vicinity. They constitute a large part, perhaps half, of the wall about this closed entrance. The

remainder is of the soil covering the adjacent ground. Nevertheless McLean says of this part of the wall:

"It was discovered that [it] was constructed entirely of clay. From this it has been concluded that originally it was built of sun-dried bricks, but during the lapse of ages, the external or exposed surfaces have crumbled away. It may be that all the larger works of this series together with the heavier walls were either composed of or else faced with sun-dried bricks." — McLean, 33.

No trace of "sun-dried bricks" or any other sort of bricks has ever been found in connection with prehistoric works in Ohio — unless of intrusive character.

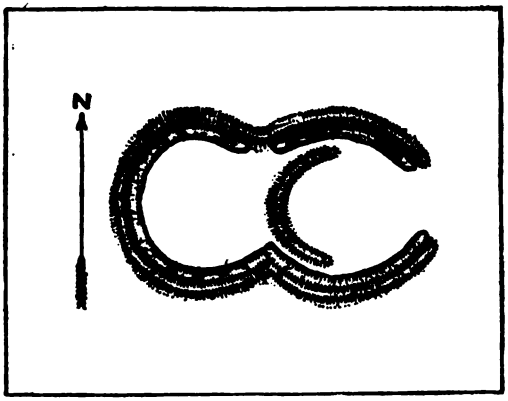


Figure 12.

Some errors in the plan and description may be pointed out. The northern parallels, gh, reach only to the brink of the upper terrace. There is no reason for supposing they ever reached down its slope as indicated, for not only is there no inequality of its surface apparent, but the owner of the land, who was familiar with them before this survey was made, says they terminated at the top of the bank. Atwater correctly represents this feature. Neither is there the slightest evidence of an elevated way across the low ground beyond, as represented in some drawings. Its surface is irregular, with numerous slight elevations and depressions, none of which are artificial.

The small circle G is placed too far to the north; between it and the parallels is the singular structure shown in Figure 12 (B. E. 12, 460, Fig. 315).

There are two large deep excavations immediately north of the octagon, and also slight depressions along the walls as well as at some little distance away, both within and without the enclosure, whence the earth for the embankment was taken. The terrace on which the octagon stands is about fifty feet above the creek-bed. Had clay been desired for the walls, it could have been obtained in any amount in the low ground along the stream. There is a strong spring of very cold water under the bank at the point nearest the work.

All the low terraces bordering that upon which these remains are situated, are liable to overflow. The streams have flowed immediately under precipitous banks of the upper terrace at a period quite recent — in some parts, undoubtedly since the works were built. Yet, notwithstanding assertions of various writers, from the time of Atwater down to the present, there is no indication of a roadway or even of an easy grade having been constructed to make access to water more convenient. North of the octagon is a gulley or depression, apparently not due to surface drainage, which might be the result of a path worn in the face of the bank; but it extends only five or six feet back from the terrace margin. Between the two parallels, gh, and also between those at the southeast part of the group, is a re-entrant curve, which may be artificial, although similar indentations are quite common along streams anywhere, in loose material. The slope of these concavities is as great, at their upper part, as that of the unaltered terrace on either side; so that, if dug at all, it was not for the purpose of facilitating passage in either direction. The walls of the southeast parallels stop at the top of the bank; indeed, one of them does not quite reach the edge, though this may be due to the plow. The re-entrant space here may result from digging out gravel to make a causeway across the old channel that marks a former course of the creek along the foot of the terrace; but it is possible that this raised space is due to an ox-bow loop at this spot. In the figure a section across the end of this level shows a roadway built up, with a wall along each side of it. This section is imaginary, as no trace of an artificial wall now exists there, though numerous hummocks and little ridges diversify the surface. Besides, there is no reason for the "way" ending where shown, as the same general level holds for a considerable distance. There is a natural break across a

sharp angle of the terrace a few rods from this "artificial grade;" it is very plainly natural. From its position the Mound Builders could not utilize it. The other break may have been made by water in the same way and at the same time, and the walls carried to it because it was in a convenient position.

The three mounds in a line west of the pond (which is only a swamp much of the year) are close to the bank; the fourth can not be found, and could not exist as shown, because there is not room for it between the pond and the other mounds. The line of their trend should be to the northwest instead of to the northeast.

The ditch within the large circle, E, is considerably deeper at the entrance than elsewhere; the bottom presents the appearance customary to old depressions, being of a grayish clay color when dry but resembling the loam around when wet. There is nothing looking at all like the compact clay bottom, intentionally made, reported by some late investigators who are apparently not familiar with the different aspects of the various soils and subsoils. It has also been asserted by some writers that an "underground tunnel" connects the ditch with a pond on the outside, by which means the "moat" may be flooded at will. Aside from the question of what possible benefit could be derived from such flooding, is the fact that the surface of the pond is lower than any part of the ditch.

An inspection of figure 13, (plate XXXI, B. E. 12, 460), the "Fair Ground Circle," E, and of figure 14, (plate XXXIV, B. E. 12, 466), the "Square," will show that these enclosures approach much nearer to true geometrical symmetry than is shown in the preceding plate, from Squier and Davis. The wall of the circle varies in width from 35 to 55 feet, and in height from 5 to 14 feet. The ditch is from 28 to 41 feet wide, and from 8 to 13 feet deep. It will be seen that the amount of earth taken from the ditch is not equal to that in the bank. Measuring on top of the wall, the longest diameter (from east to west) is 1,189 feet; the shortest, 1,163 feet. A true circle will fall within the zone or ring covered by the wall, frequently coinciding with its middle line for some yards. This is different from Whittlesey's "ellipse."

The southern corner of the square is destroyed; by assuming to be at the point (8) where the adjacent lines intersect when produced, we find the angles to be:—At station 2, 90° 51′; at sta-

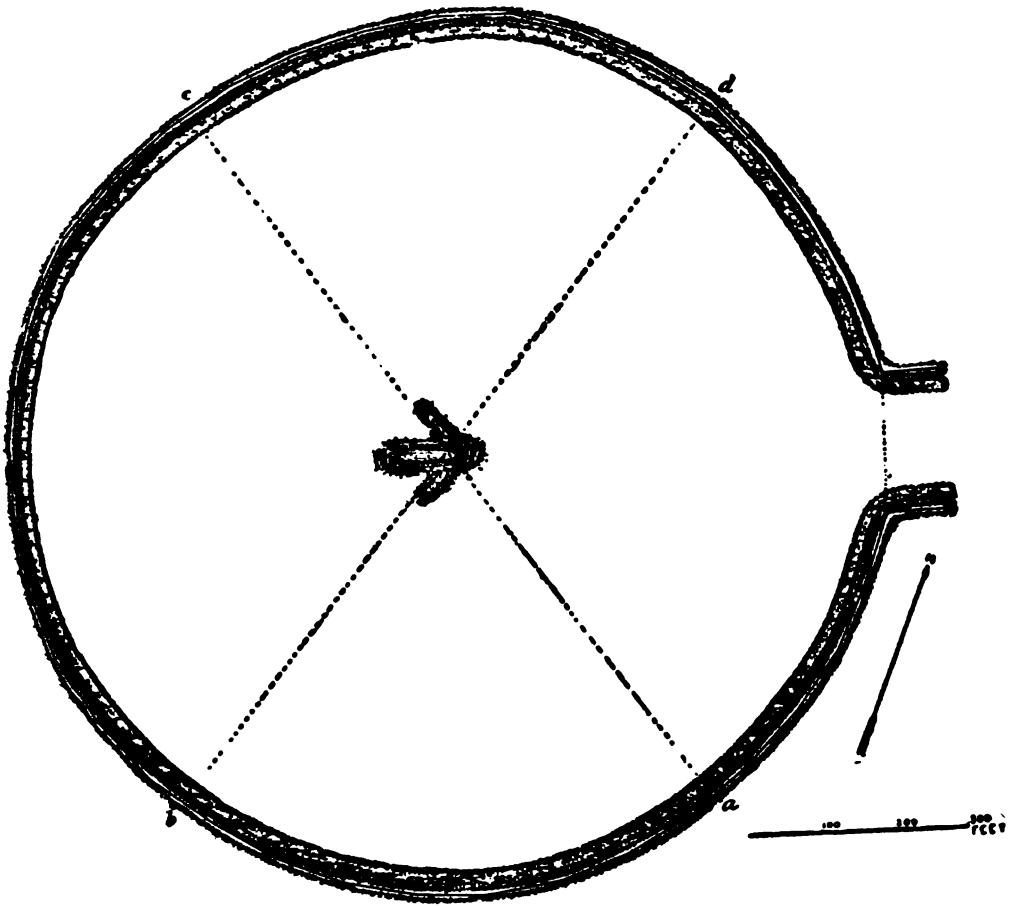


Figure 18.— The "Fair Ground Circle" at Newark.

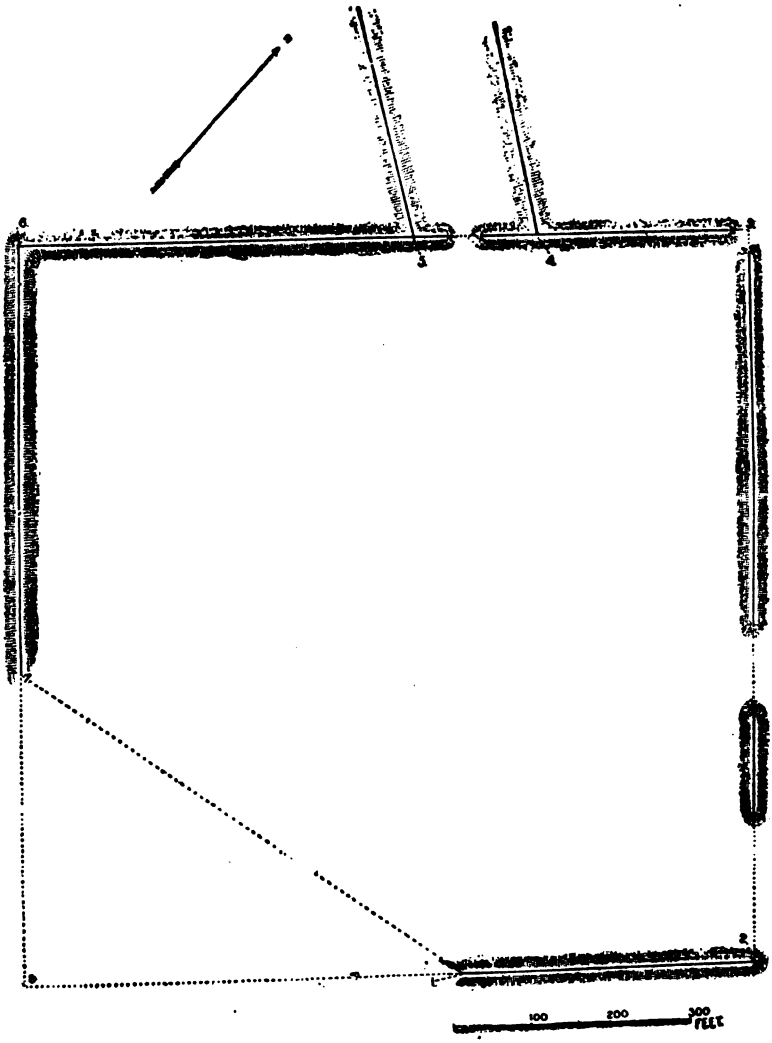


Figure 14 — The "Square" at Newark.

tion 3, 89° 40′; at station 6, 90° 26′; and at station 8, 89° 3′. The sides, measured in the same direction, are 928 feet; 926 feet; 939 feet; and 951 feet.

The maximum diameter of the "observatory circle" (F) is 1,059 feet; the minimum, 1,050 feet; the mean, 1,054.5. The nearest exact circle has a diameter of 1,054 feet, and the widest divergence between this and the line of actual survey is four feet. The "circumference of 2,880 feet" must have been measured entirely inside the embankment.

In the Octagon, the angles at center, of the diagonals, are only 10′ from right angles; of the diameters, only 2′.

In these plates, as in all that are copied from the report of the Bureau of Ethnology's reports on the mounds of the Central States, the solid black line represents the chords or distances which were laid off before any bearings were taken; the angles, when not on the wall, are at the intersection of adjacent straight lines. All stakes were set as near the middle as was possible by measure and judgment. Greater care was taken in gettings bearings and distances than is usually employed in railway or canal surveys. Middleton and I, who did the work, stand by our figures, and with all the more reason, too, that in some cases they completely upset our antecedent ideas and opinions.

These magnificent works bid fair to remain for the instruction of future ages. The Licking County Fair Association holds the title to the circle E, while the State has acquired the circle F and the octagon. It is probable that none of these will ever suffer any diminution in size. In fact, the State authorities have a little overdone the matter of restoration. Unless there is considerable reduction, from weathering, of that portion which has lately been built up, visitors in generations to come will infer that some parts were originally heavier than others, when such was not the case. As the earth become more compact, the difference will be less apparent than at present.

THE MARIETTA WORKS.

In figure 15, (S. & D., 73, plate XXVI), is a reproduction, from the survey of Whittlesey, of the works at Marietta. The plain on which these works stand is from 80 to 100 feet above the river level, and about three-fourths of a mile long by half a mile broad.

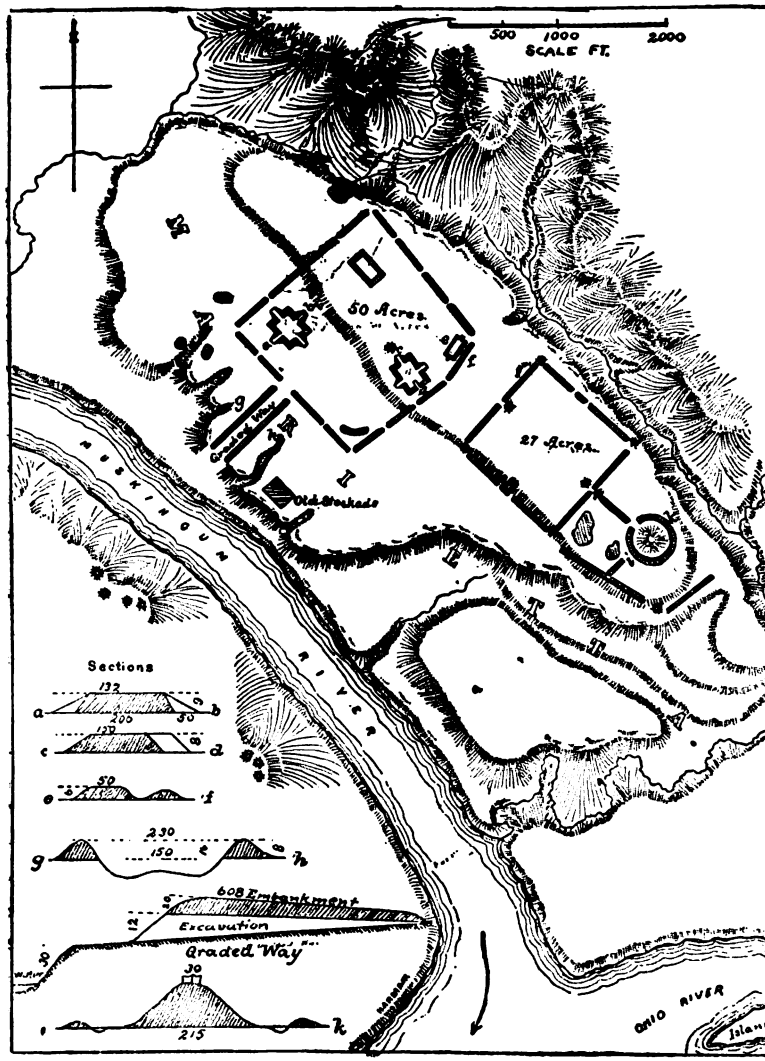


Figure 15 — The Marietta Works.

"The walls of the principal square, where they remain undisturbed, are now [the survey was made in 1837] between five and six feet high by twenty or thirty base; those of the smaller enclosure are somewhat less." — S. & D., 73.

Priest's and other old maps show parallel walls extending outwardly toward the river, from the middle and northwest gate-

ways of the larger enclosure. These do not appear upon later charts, nor is any mention made of them. It is doubtful whether they ever existed.

The large conical mound, with its encircling ditch and embankment is now included within the cemetery grounds, and is secure from injury. The flat-topped mounds are reserved as parks; with commendable care, the town authorities have, from the first, taken measures for their preservation. The "Via Sacra" or graded way, to be described later, is also public property. All of these are subject only to such damage as may result from persons walking on them; a small matter, easily remedied. Everything else relating to this group has been obliterated by the town, which now covers the entire terrace.

In the early days of Marietta, in an effort to determine the age of the works,

"Dr. Cutler, Gov. St. Clair, and many other gentlemen, ascertained that one tree somewhat decayed at the center, was found to contain, at least, four hundred and sixty-three circles. In one of the angles of a square, a decayed stump measured eight feet in diameter at the surface of the ground; and though the body of the tree was so mouldered as scarcely to be perceived above the surface of the earth, we were able to trace the decayed wood, under the leaves and rubbish, nearly one hundred feet." — Harris, 154, condensed.

WORKS AT CHARLESTON, WEST VIRGINIA.

A group of mounds and enclosures extending for two miles along the Kanawha river, just below Charleston, plainly marks the seat of a colony of Ohio Mound Builders. Norris opened a number of them, which in construction and contents are identical with the Ohio mounds; and one of the largest was so similar in every respect to the mound at Grave Creek, West Virginia, that it might have been due to the same workmen.— Burial Mounds, 53, *et seq.*

THE PORTSMOUTH WORKS.

Figure 16 (S. & D., 77, plate XXVII), represents the Portsmouth Works. consisting of three groups, two of which are on the Kentucky side and one in Ohio.

"A reference to the accompanying map, exhibiting a section of eight miles of the Ohio Valley, will show the relative positions and general plan, though not the exact proportions of the series." The lines of these embankments "are not far from one hundred and sixty feet

apart," each "measuring about four feet in height, by twenty feet base." "The total length of the parallels now traceable may be estimated at

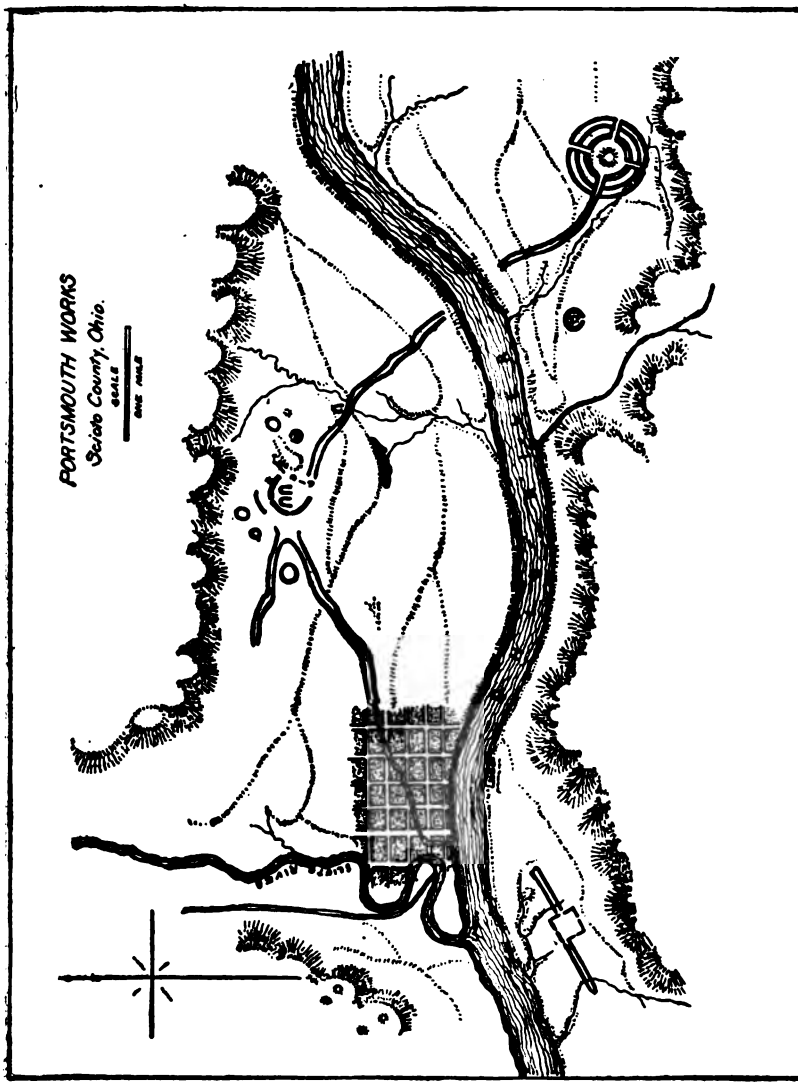


Figure 16.

eight miles, giving *sixteen miles* of embankment to the parallels alone. If we include the walls of the entire series, we have a grand total of upwards of twenty miles." — S. & D., 77.

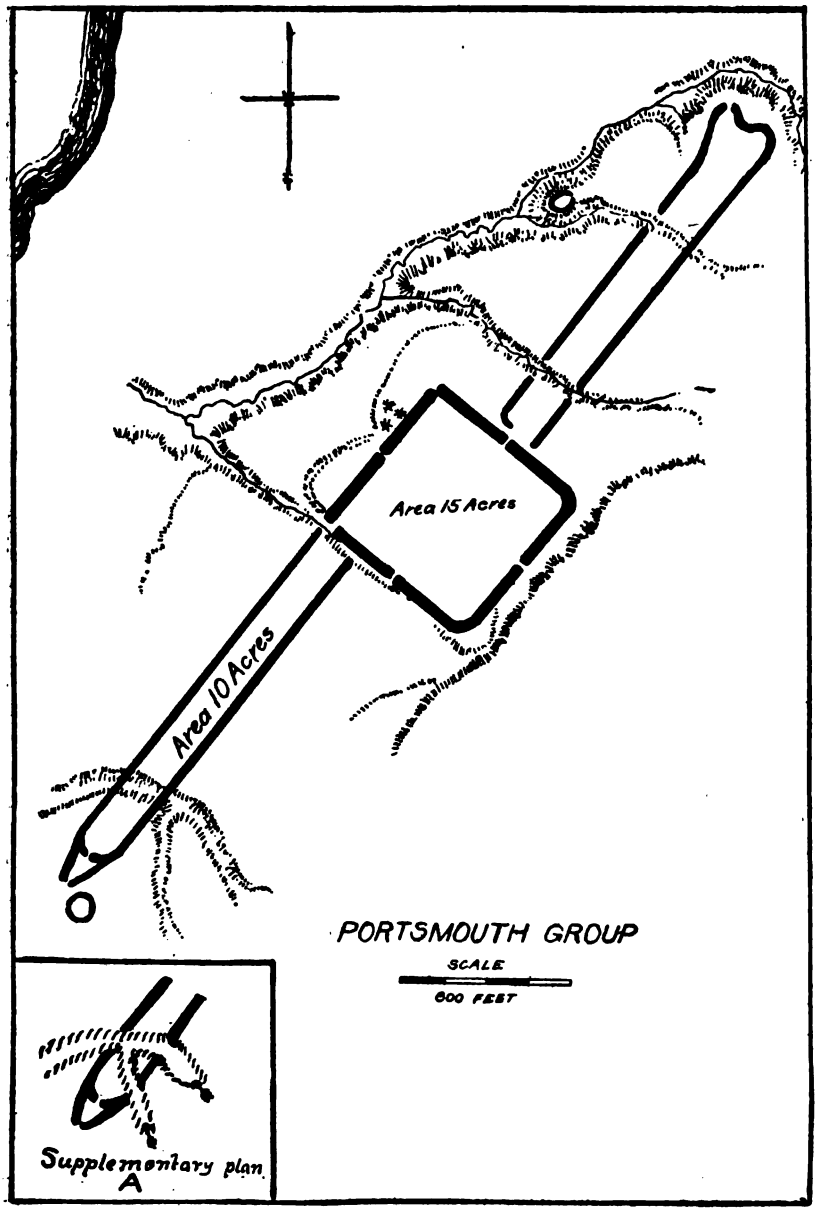


Figure 17 — Work opposite old mouth of the Scioto.

It is almost certain that some portions of these works had been destroyed by natural influences prior to the settlement of the country by the whites.

Figure 17 (S. & D., 78, plate XXVIII), shows that portion of the Portsmouth Group which is in Kentucky,

"Opposite the old mouth of the Scioto, about two miles below the town of Portsmouth. The terrace on which it is situated * * * is much cut up by ravines and is quite uneven. * * * The principal work is an exact rectangle, eight hundred feet square. The walls are about twelve feet high, by thirty-five or forty feet base, except on the east, where advantage is taken of the rise of ground, so as to elevate them about fifty feet above the centre of the area." The long lines to either side "are exactly parallel to the sides of the main work, and are each two thousand one hundred feet long. Some measurements make them of unequal length; but after a careful calculation of the space occupied by the interrupting ravines, they are found to be very nearly, not exactly, of the same length." A singular work is shown at N. "It is on a very narrow point between two deep ravines with nearly vertical banks. The embankment of this work is heavy, and the ditch deep and wide and interior to the wall. From the bottom of the ditch to the top of the wall, is perhaps twelve or fifteen feet. The enclosed oval area is only sixty feet wide by one hundred and ten long." Other details of the group are well shown in the figure. — S. & D., 78.

There is a slight error in the course of the east parallel extending southward; it extends down the terrace bank to the ravine; beyond this, it is built over the point between the two ravines. Apparently it once extended across the entire distance unbroken. This is shown in A, figure 17.

The group within the present limits of Portsmouth, now completely destroyed, is shown on a larger scale in figure 18.

"The most reasonable conjecture respecting it is, that it was in some way connected with the superstitions of its builders; in what manner, of course, it is impossible to determine."

The third group of this series is in Kentucky, near the mouth of Tygart river. "It consists of four concentric circles, placed at irregular intervals in respect to each other, and cut at right angles by four broad avenues, which conform in bearing very nearly to the cardinal points. A large mound is placed in the center; it is truncated and terraced, and has a graded way leading to its summit. * * * On the supposition that this work was in some way connected with the religious rites and ceremonies of the builders, this mound must have afforded a most conspicuous place for their observance and celebration. And it is easy, while standing on its summit, to people it with the strange priesthood of ancient superstition, and to fill its avenues and line its walls with the thronging devotees of a mysterious worship. Whatever may have been the divinity

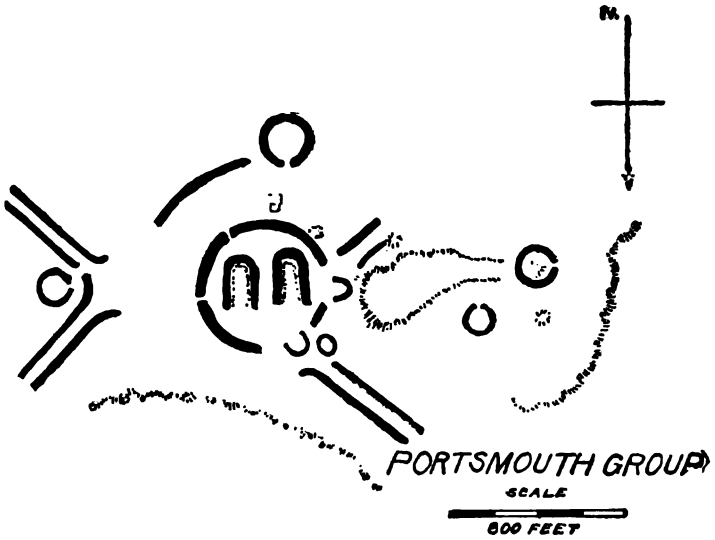


Figure 18 — Works on the Site of Portsmouth.

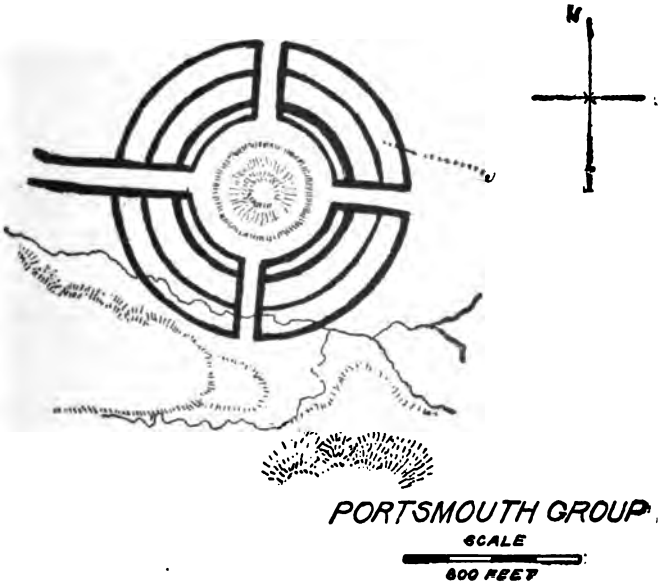


Figure 19 — Large mound and concentric circles near Tygart River.

of their belief, order, symmetry, and design were among his attributes; if, as appears most likely, the works that most strongly exhibit these features were dedicated to religious purposes, and were symbolical in their design." — S. & D., 78.

A better understanding of this unique structure may be had from the enlarged plan in figure 19.

On the Kentucky side of the river, between the most western of the Portsmouth Group and that above the mouth of Tygart River (which by an odd error is marked " Tiger Creek " on the map) are several mounds which are omitted from the general plan. One of these is represented in figure 20 [S. & D., fig. 19, p. 82.]

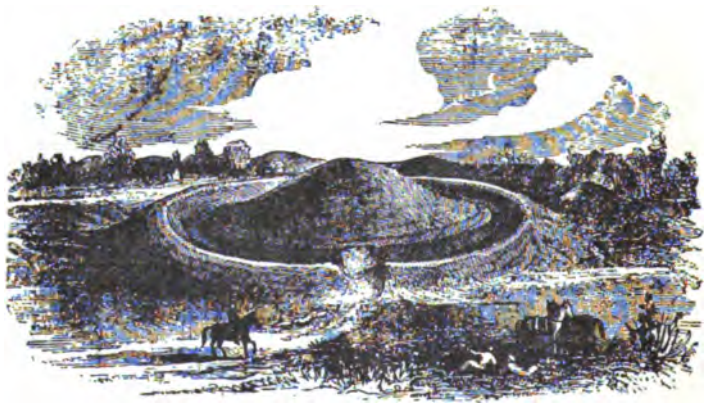


Figure 20.—Mound with encircling ditch and embankment, Greenup County, Ky.

" It consists of an embankment of earth five feet high by thirty feet base, with an interior ditch twenty-five feet across by six feet deep, enclosing an area ninety feet in diameter, in the center of which rises a mound eight feet high by forty feet base." It serves as a type of hundreds of similar structures in the mound-building area; the opening in this is to the south, but it is usually toward the east. The wall and ditch are terminated on each side of the gateway, so that entrance is on the natural surface. — S. & D., 82.

The best and most accurate account of the lower group of the Portsmouth Works which has yet been printed, is that by Lewis. A map accompanies the account. He finds the total area actually covered by artificial work in this group to be about nine acres and the cubic contents approximately 42,000 cubic yards. He corrects certain errors of Squier and Davis in calling *artificial* some ravines and eminences of natural formation.— Lewis, Fort, 375.

The walls of this enclosure, taken as a whole, are heavier than those of any other of work in a similar situation. It is plainly not a defensive structure, because the south corner runs over a natural knoll in such a manner as to make its inner slope continuous with the slope of the terrace. There is an easy approach from the outside, while on the inside the wall is steep as earth will lie, and more than twenty feet in vertical height.

WORKS IN PIKE COUNTY.

The work on the Barnes farm, in Seal (now Scioto) township, five miles below Piketon, is shown in figure 21 [S. & D., 66, plate XXIV.]

"It consists principally of * * * the square and the circle; the former measuring in this instance a little upwards of eight hundred feet upon each side, the latter ten hundred and fifty feet in diameter. They are connected by parallel walls, four hundred and seventy-five feet long, placed one hundred feet apart. These are intersected by a runway, which has here cut a passage in the terrace one hundred and twenty-five feet wide by fifteen deep. * * * We have here the square, the circle, and the ellipse, separate and in combination,—all of them constructed with geometric accuracy. * * * Nothing can surpass the symmetry of the small work A. * * * The work D consists of a small circle, from which leads off a wall, extending along the brow of the terrace bank, until the latter turns, nearly at right angles, towards the north." — S. & D., 66.

There are several errors in this description. *A* is a circular embankment around a square level area; but the ditch, so far from being narrow and touching the circle only at the corners (see figure 22, which is reproduced from the cut in their text), reaches the outer embankment all around. In other words, the outside line of the ditch is a circle, while the inside is a square.

In their Plate XXXIII, No. 1B, Squier and Davis show a work near Mount Sterling, Kentucky which is precisely like their figure of the circle *A*. Whether it is correctly represented in the cut, or whether the two are of the same nature there is no means of knowing. At any rate the former is associated with other works which are more closely allied in form with the works farther south than with anything in Ohio.

The section *e-f* in "Ancient Monuments" is wrong; there was never any wall here, although there is a ditch terminated at the east by an embankment, as shown. A narrow strip south of the ditch is of the same general level as the field north of it. East

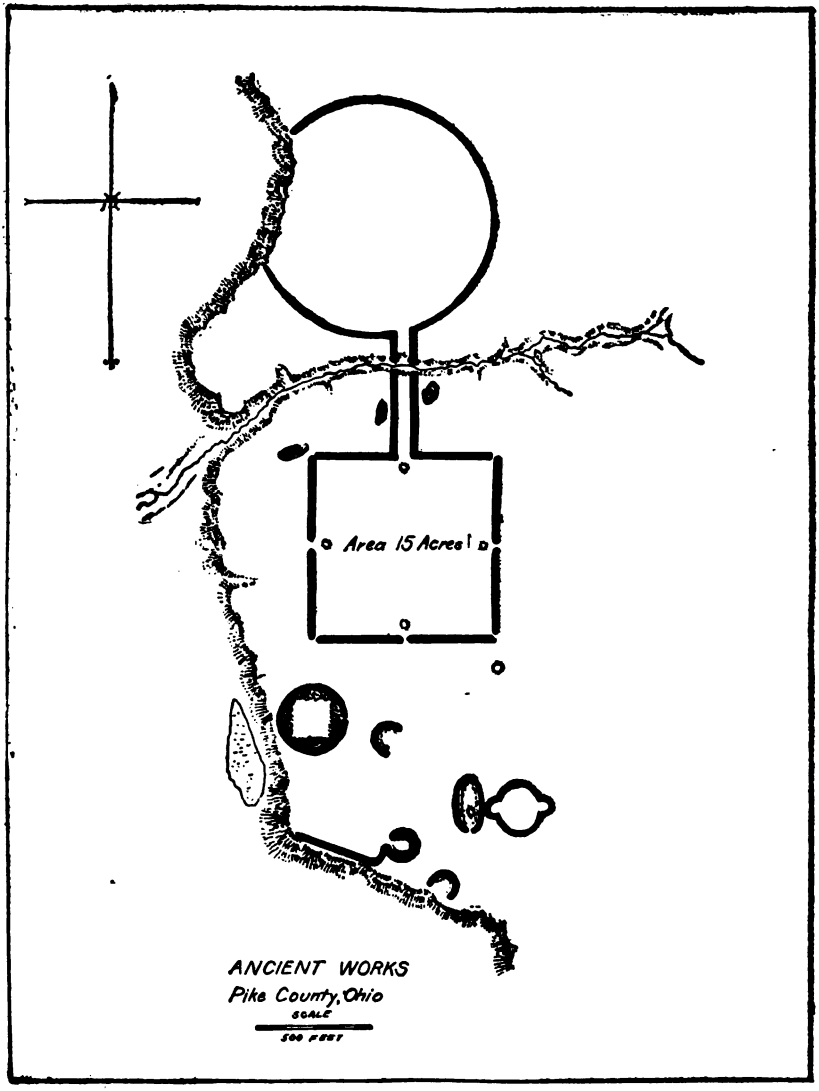


Figure 21.—Enclosures five miles below Piketon.

of the circle *D* is a small ravine resulting from the wash of a pathway established here for the purpose of ascending and descending the bank. The half circle beyond has been somewhat reduced from its original size, by the caving off of the gravel bank on which it stands.

The square measures 854 feet east and west by 852 feet north and south. The parallels are only 68 feet apart; the eastern one measures 647 feet, the western 621 feet, to the circle. From the square to the ravine is 427 feet for the eastern wall, and 400 for the western. The ravine is 110 feet wide. All these figures, which are correct, vary considerably from those of Squier

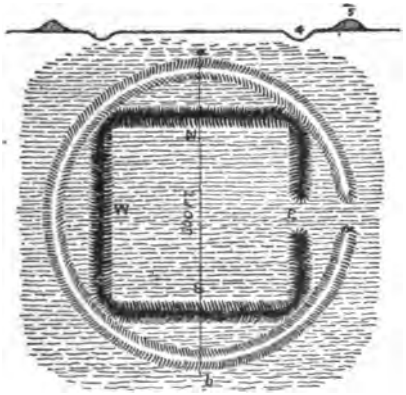


Figure 22.—Ditch and Embankment, incorrectly drawn. Pike County.

and Davis. The large circle is so nearly destroyed by cultivation, that it can no longer be traced with certainty.

WORKS IN ROSS COUNTY.

The most interesting archæological district in the State, is comprised in Ross county. There is no single group which equals the one at Newark; but if the combinations of square and circle occurring in several parts of the county were brought together, as are the two at Newark, they would cover a much larger area and present features of greater interest. Squier and Davis say

> "Not far from one hundred enclosures of various sizes, and five hundred mounds, are found in Ross county, Ohio. The number of tumuli in the state may be safely estimated at ten thousand and the number of enclosures at one thousand or fifteen hundred." — S. & D., 4.

They were too modest in their estimate of Ross. The entire number of such remains is probably not less than one thousand.

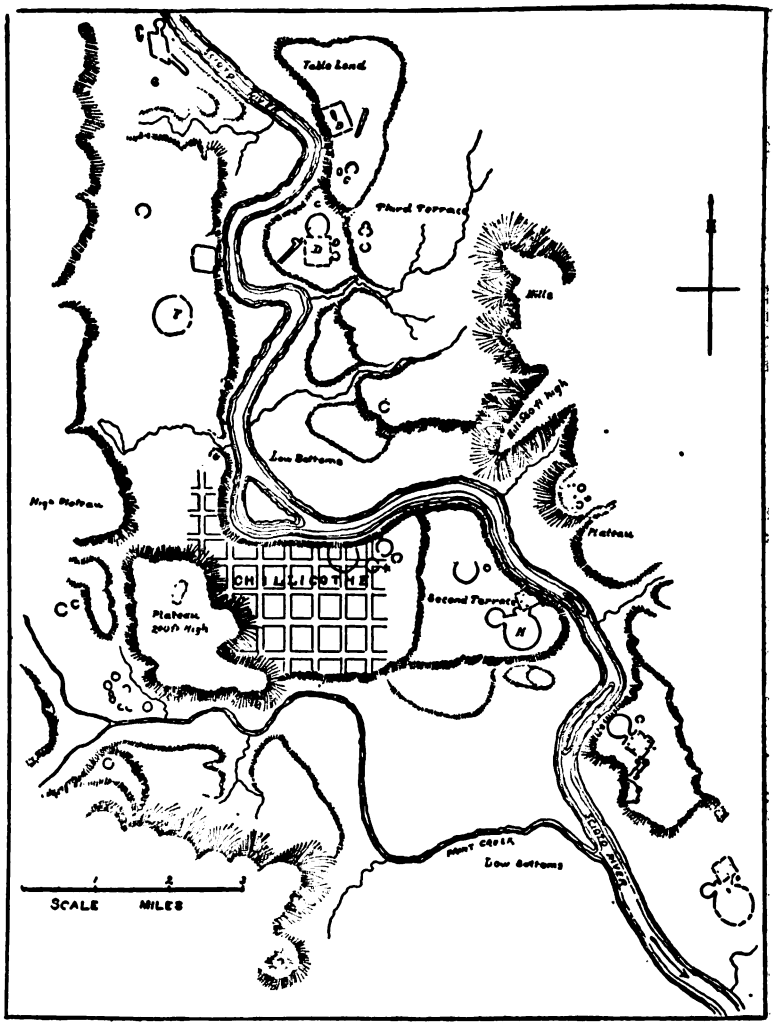


Figure 23 — Twelve Miles of the Scioto Valley.

This may seem extravagant. But let the reader examine figure 23 [S. & D., plate II] "Twelve miles of the Scioto Valley", and figure 24 [S. & D., plate III, pt. 1] "Six miles of Paint

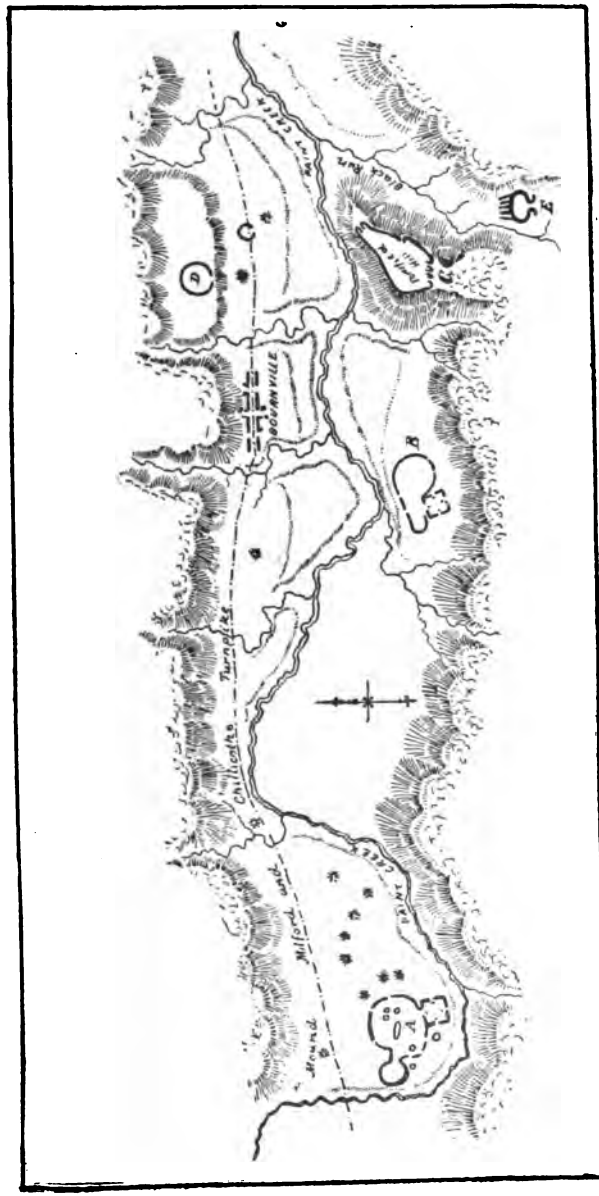


Figure 24 — Six Miles of the Paint Creek Valley.

Creek Valley"; let him remember that, owing to the small scale on which these are constructed, scores of mounds and other works had to be omitted; finally, let him bear in mind that these maps show only a small portion of the county and that much of the remainder is dotted with these remains;—and he will be willing to concede that one thousand is a moderate claim.

Only the principal groups will be here considered; first those near the river, then those in Paint Valley.

HARNESS WORKS.

Figure 25 [S. & D., 56, plate XX] is a reproduction of Squier and Davis's survey of the "Liberty Township Works" on the Harness farm eight miles south of Chillicothe. The pointer on their map should be turned 90 degrees to the left. As the drawing is given here, the top is toward the east. The authors say:—

"This work is a fair type of a singular series occurring in the Scioto valley,—all of which have the same figures in combination, although occupying different positions with respect to each other, viz., a square and two circles. These figures are not only accurate squares and perfect circles, but are in most cases of corresponding dimensions,—that is to say, the sides of each of the squares are each ten hundred and eighty feet in length; and the diameter of each of the large and small circles, a fraction over seventeen hundred and eight hundred feet respectively. * * * It will be observed, that while the wall of the larger circle is interrupted by numerous narrow gateways, that of the smaller one is entire throughout,—a feature for which it is, of course, impossible to assign a reason. * * * The whole work appears to have been partly finished, or constructed in great haste. * * * No one would be apt to ascribe a defensive origin to this work, yet it is difficult to conceive for what other purpose a structure of such dimensions, embracing nearly one hundred acres, could have been designed."—S. & D., 56.

In another place, after describing the many striking resemblances in area and other properties to be observed in the works at Newark, Hopetown, High Bank, and Marietta, they say

"It is not to be supposed that these numerous coincidences are the result of accident."—S. & D., 71.

It can not be too often or too strongly impressed on the reader that these "coincidences," so often given and referred to in their text, have no existence in the works themselves. The larger circle of this group is plowed level, and no measurements could be obtained. The square is nearly obliterated, making any estimate of its angles or dimensions unsafe; but it

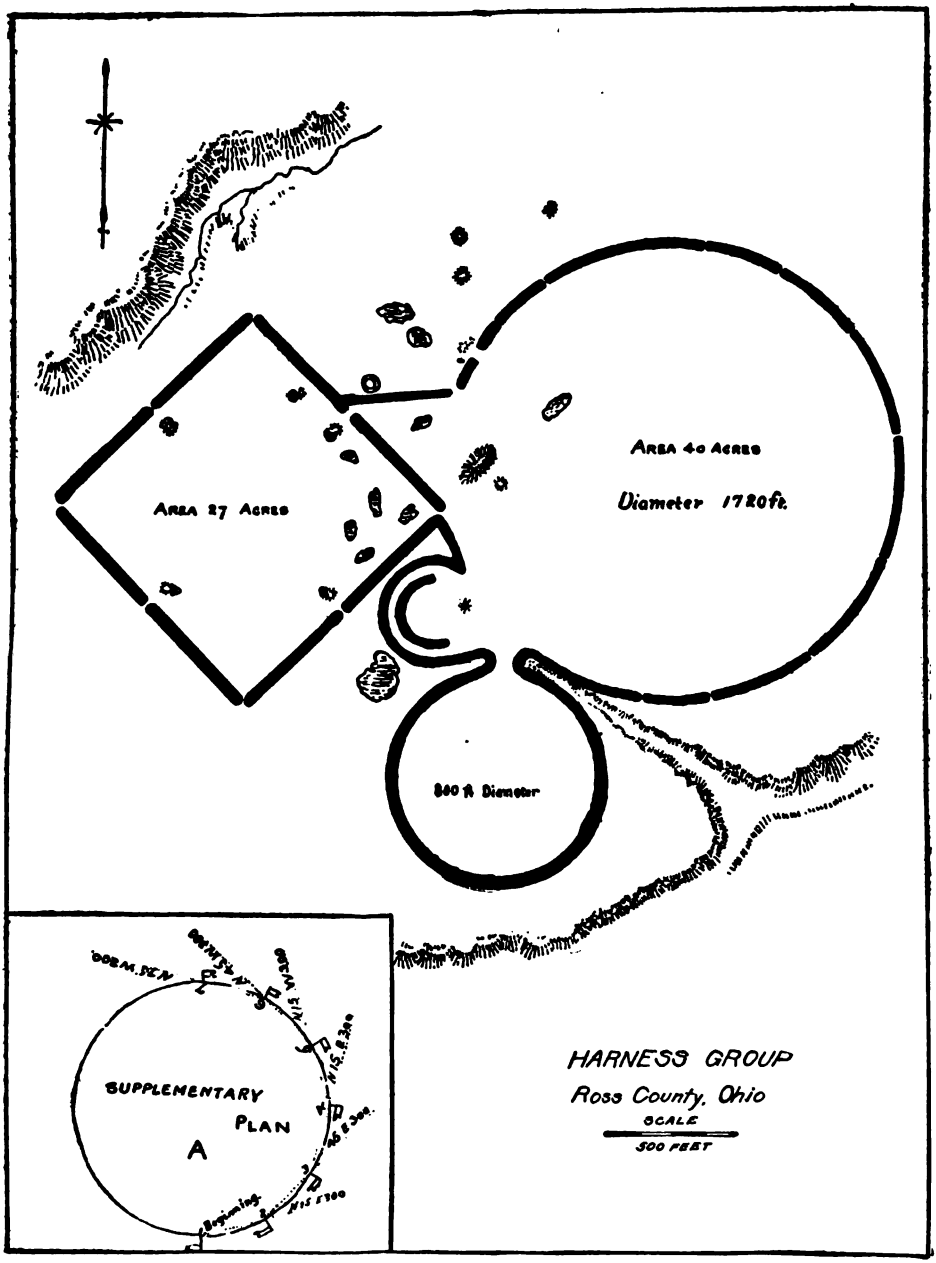


Figure 25 — The "Liberty Township Works" of Squier and Davis.

appears to vary considerably from "accuracy." The smaller circle, however, is all in woodland or pasture, and could be surveyed without difficulty. Under the impression that this was the hypothetical figure given by Squire and Davis (see page 56) as absolute proof of the uniformity of curve, especial care was taken in its measurements.

The diameter, it is true, is given in their plate as 800 feet, while the supposed "perfect circle" had, according to their text, a circumference of 3,600 feet; or, as it was platted, circumscribed a dodecagon of 3,600 feet perimeter. It was evident from this that an error existed somewhere, which we hoped to locate. The result of the survey is shown in figure 26.

Stakes were set 100 feet apart along the middle line of the embankment, beginning at the south side of the gateway. The bearing of each stake was then taken from the one next preceding. Had the curve been regular, as claimed by the authors, each angle of divergence, to the last one, would have been the same. Instead of that, they read as follows:

21° 35'; 3° 09'; 20° 31'; 4° 45'; 10° 44'; 17° 16'; 17° 37'; 11° 35'; 18° 35'; 14° 43'; 13° 54'; 19° 28'; 13° 13'; 17° 18'; 14° 29'; 7° 30'; 2° 36'; 5° 57', 25° 19'; 19° 01'; 12° 55'; 8° 48'.

There were twenty-two full chains, making 2200 feet. The last chord, from station 23 to station 24, at the end of the wall was thirty feet, making the angle of divergence much smaller than it would have been with a full chord. The wall terminated abruptly at station 1; as this portion is in land on which the original timber is standing, there can be no presumption that it ever extended farther, although in the original survey it is represented as reaching in an unbroken line to the gateway or opening and thence to the larger circle; as shown by the dotted lines in figure 26. From station 1 to station 24 the distance is 313 feet, making the entire circuit, by this system of short chords, 2,543 feet. Measured exactly on the circle, with allowance for curvature, this figure would have been slightly larger. It is only thirty feet in excess of the circumference of a true circle with a diameter of 800 feet; which goes to show that Squier and Davis merely ran a line around the embankment, called the work a "perfect circle," and made the diameter 800 feet for even figures. In a "perfect circle" of this size, each reading of the compass at

intervals of 100 feet would show a deviation of a little more than fourteen degrees.

Yet they say

"The greatest care has, in all cases, been taken to secure perfect fidelity in all essential particulars." — S. & D., 10.

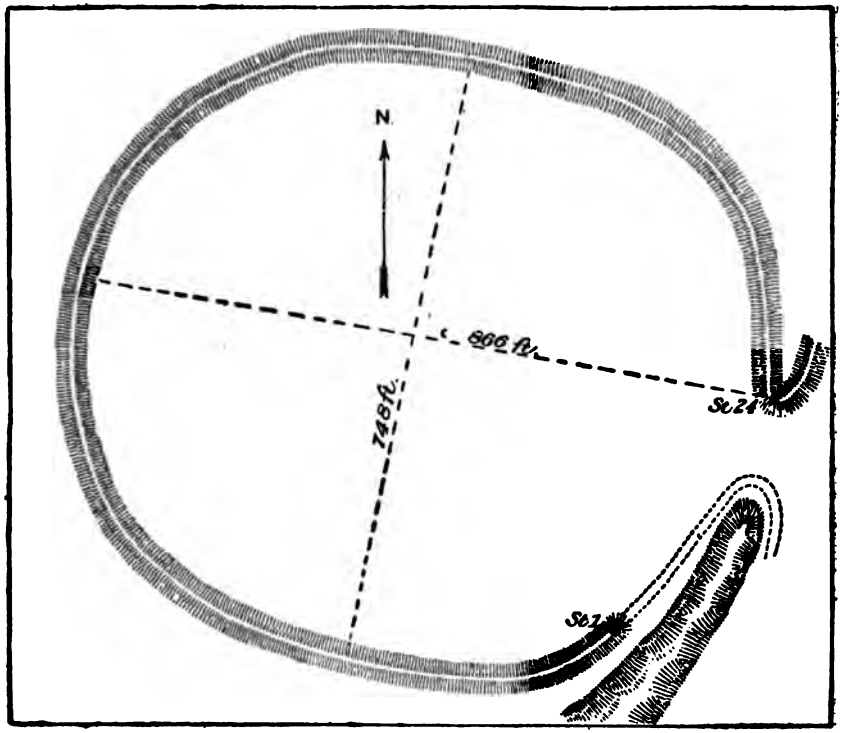


Figure 26.—Correct outline of smaller circle in figure 25.

HIGH BANKS WORKS.

The works at High Banks, four miles below Chillicothe, are shown in figure 27 (S. & D., 50, plate XVI).

The octagon measures 950 feet, the circle 1,050 feet in diameter; the former is not strictly regular, although its alternate angles are coincident and its sides equal, but the circle is a perfect one. "The walls of the octagon are very bold; and where they have been least subjected to cultivation, are now between eleven and twelve feet in height, by about fifty feet base. The wall of the circle is much less, nowhere measuring over four or five feet in altitude. * * * About half a mile to the southward, and connected with this work by lines of embankment, much reduced but

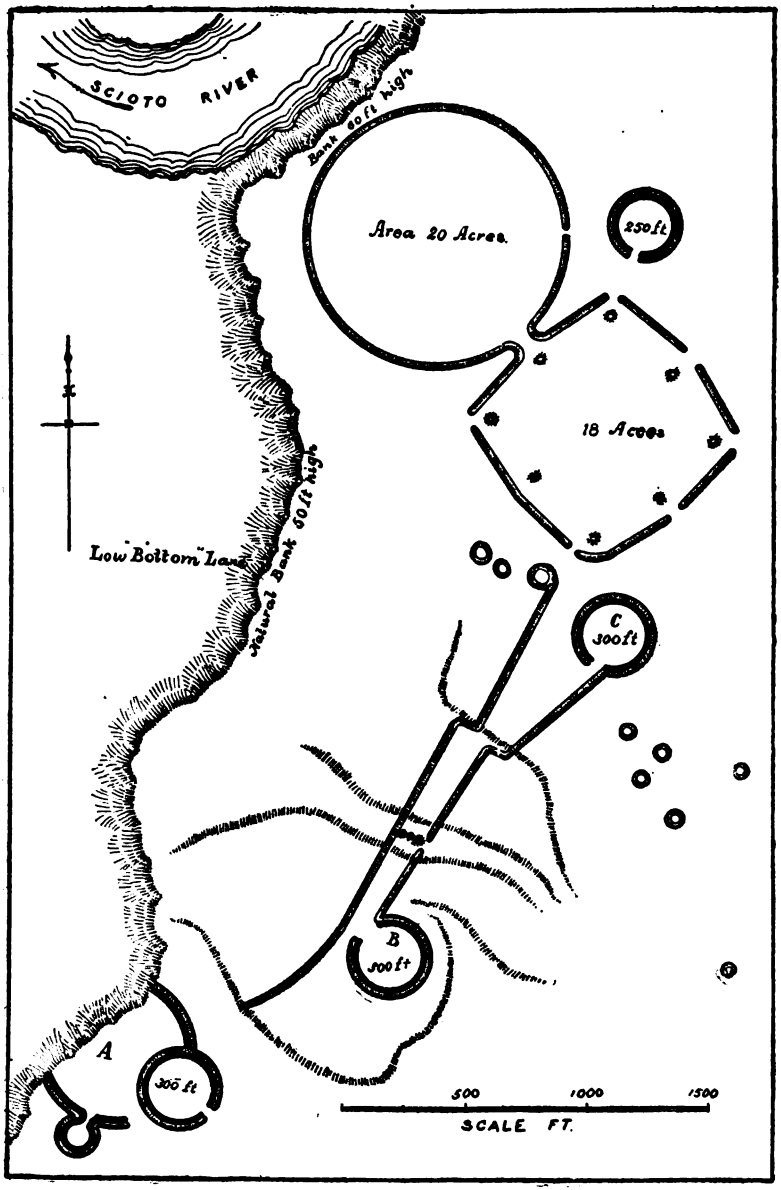


Figure 27 — Works at High Banks.

still traceable, is a small group of works, partially destroyed by the river. A fourth of a mile below this subordinate group, on the bank of the terrace, is a large truncated mound, thirty feet in height." — S. & D., 50.

The statement that a part of the lower group was "partially destroyed by the river" is a mistake. The line B, which appears

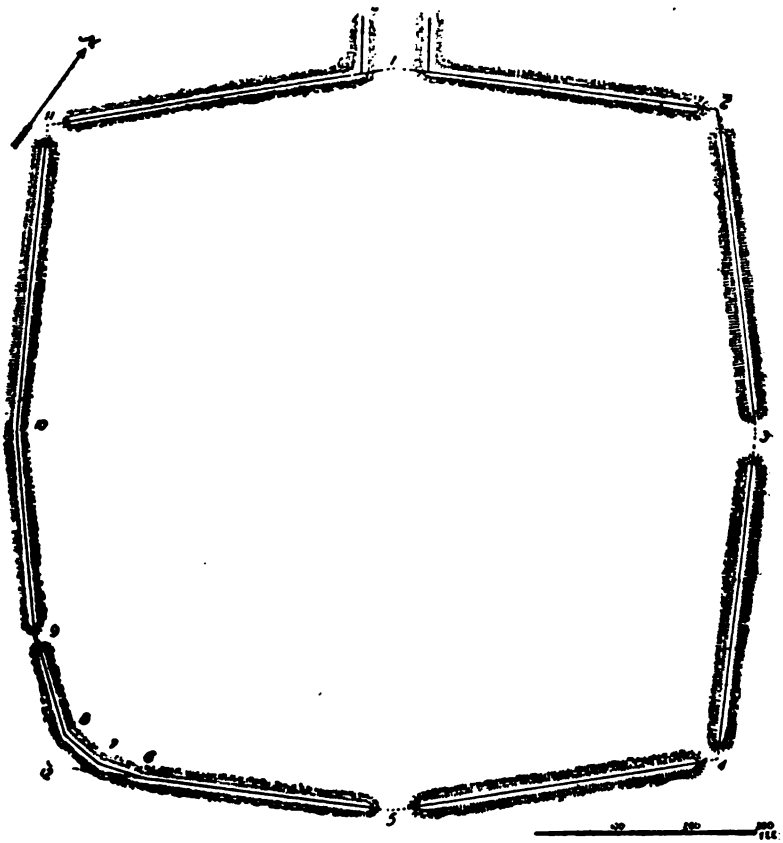


Figure 28 — Octagon at High Banks.

to be the residue of a complete circle originally extending over a portion of the terrace now washed away, was built thus to reach the bank, which was then about where it is now.

There is no mound, such as they describe, anywhere about these works. It is possible that what they call such is only one of the natural knolls occurring in that vicinity.

In figure 28 (B. E. 12, 478, plate XXXVIII) the octagon

is correctly shown. The irregularity at the southern corner is due to a depression which would interfere with easy approach. The opposite sides and angles are tolerably regular. One diameter is 1,008 feet, the other 1,005 feet; the included area is 20.6 acres. It is possible Squier and Davis measured entirely within the walls; but in the adjoining circle their figures plainly refer to the top of the embankment.

The circular enclosure is almost geometrical in its accuracy; a radius of 526 feet will describe a circle which will nowhere miss the middle line of the embankment more than six feet.

WORKS AT CHILLICOTHE.

Figure 29 (S. & D., 57, plate XXI, No. 3) shows a group which was located just east of the corporate limits of Chillicothe. Owing to the encroachments of the city, it has entirely disappeared. It is not likely that either the square or the circle was ever complete, as indicated, though such may have been the case. A few floods would suffice to throw down so much of the terrace as would have afforded room to extend the work on the dotted lines. Large sums are now expended annually in these valleys for levees, piling, etc., to prevent damage from freshets. In spite of such precautions the swollen streams sometimes work great destruction. The case must have been the same in early times.

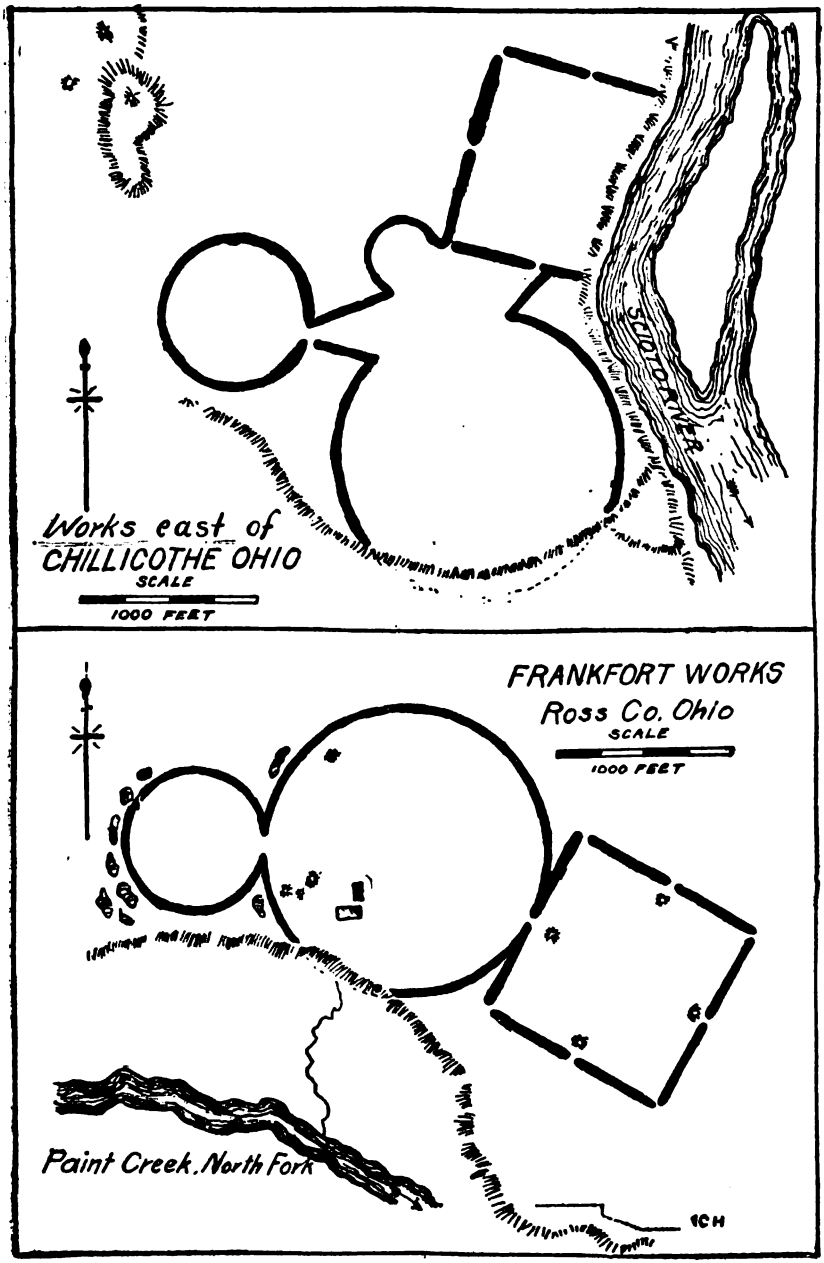
WORK AT FRANKFORT.

Figure 30 (S. & D., 57, plate XXI, No. 4) represents a work on the site of Frankfort. Very little of it is now to be found. The creek still washes against the slope above which the circle terminates, so it may once have been unbroken.

THE HOPETOWN WORKS.

The Hopetown works, as platted by Squier and Davis, are presented in figure 31 (S. & D., 51, plate XVII.)

"They consist of a rectangle, with an attached circle, the latter extending into the former, instead of being connected with it in the usual manner. The rectangle measures nine hundred and fifty by nine hundred feet, and the circle is ten hundred and fifty feet in diameter. * * * The chord of that part of the circle interior to the rectangle is five hundred and thirty feet. * * * The walls of the rectangular works are composed of a clayey loam, twelve feet high by fifty feet base. * * * The wall



Figures 29 and 30.

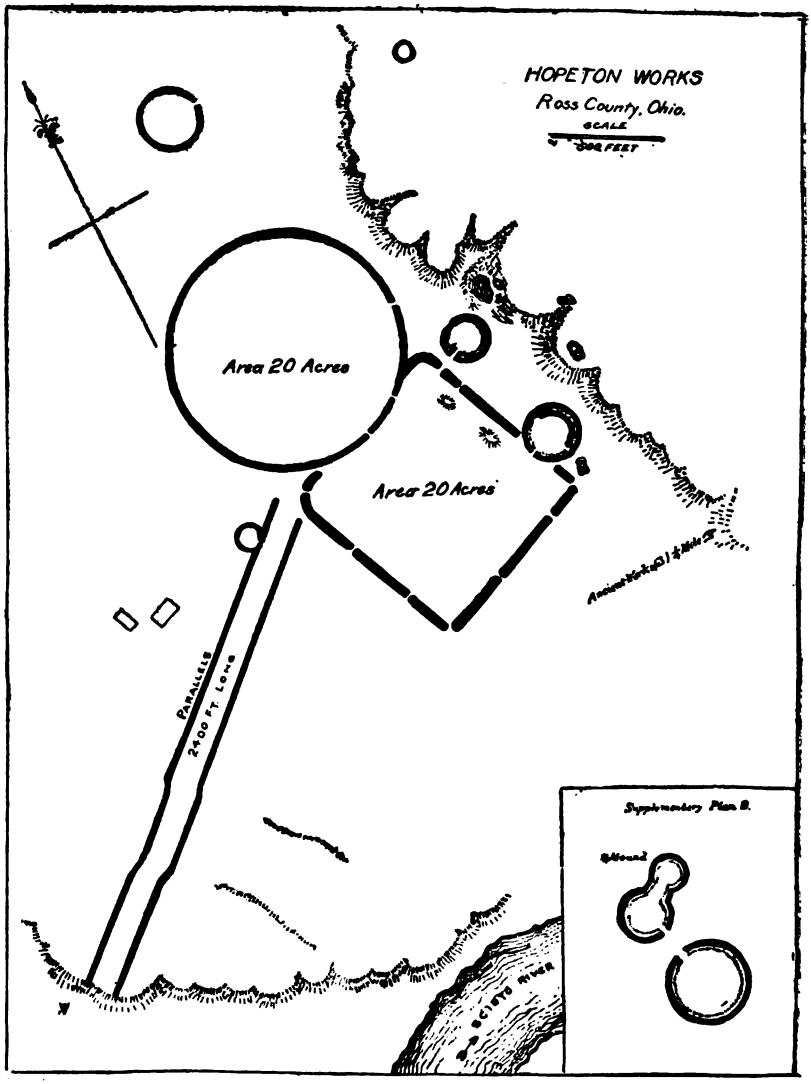

HOPETON WORKS
Ross County, Ohio.
SCALE
Area 20 Acres
Area 20 Acres
PARALLELS
2400 FT. LONG
Supplementary Plan B.
Mound
SCIOTO RIVER

Figure 31.

of the great circle * * * although much reduced of late years by the plough, is still about five feet in average height. * * * It is built of clay, which differs strikingly in respect of color from the surrounding soil. * * * In the bank of the table land * * * are several excavations, *d, d, d,* from which large quantities of the earth have been taken, though much less, apparently, than enters into the composition of the embankments. From the height and solidity of the walls, it might be inferred that this was a work of defence. But its position, in respect to the third terrace which commands it, strongly opposes that conclusion. Still, this objection would not be insuperable, could we suppose that the walls were palisaded." — S. & D., 51.

As usual, there are various errors in these measurements. Compare the plan and figures just given, with those of a careful survey made for the Bureau of Ethnology. The square is correctly shown in figure 32 (B. E., 12, 472, plate XXXV), and the circle in figure 33 (same, XXXVI). Instead of being connected by parallel lines as is usual in this class of enclosures, the two are coincident for a considerable distance, the circle forming most of the north side of the square. It will be observed that in the so-called "square" no side is straight. Among the thirteen angles, not including the broken part of the circle at the north, there is not one within three degrees of a right angle. Measuring in straight lines between the intersections forming the corners of the "square," the lengths of the sides are 957, 791, 962, and 825 feet.

The circle was surveyed by 100-foot chords on the middle line of the embankment; the angles varied from 159 degrees 20 minutes, to 178 degrees 4 minutes; only two were identical (172 degrees 12 minutes), and these were four stations apart. The polygon thus described had thirty sides of 100 feet each and one side of 98 feet. In a regular polygon having 31 sides each measuring 100 feet, or only two feet greater altogether than the one in question, each interior angle is very nearly 168 degrees 23 minutes 13 seconds. The east and west diameter is 1,018 feet; that north and south 960 feet. The included area is a little less than 18 acres, or about the same as that of a regular circle with the mean diameter of 989 feet. The circle, at least, could not be defensive, as it reaches slightly up on the slope of the upper terrace which is between 30 and 40 feet higher. Consequently an enemy could easily have thrown arrows or even

spears into the enclosure, for palisades could scarcely have been made so high as to afford protection. It would have been easier to build the wall farther out. All the walls are made of

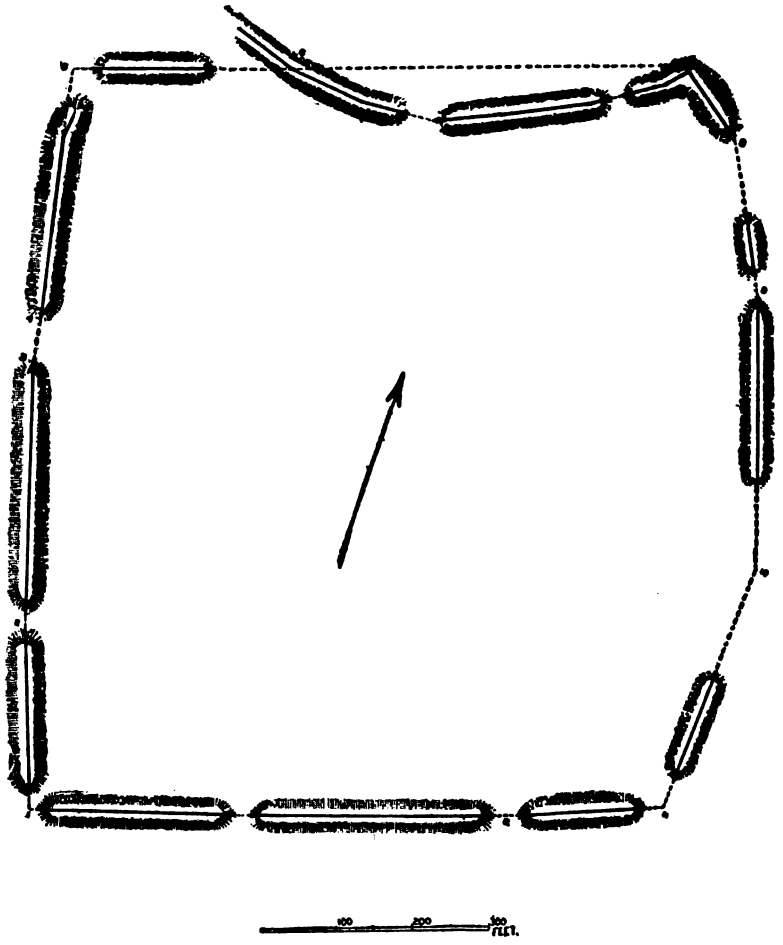


Figure 82 — The "Square" at Hopetown.

the material near by — sand, clay, loam, and gravel, mixed; probably much of it was taken from the terrace bluff just above. Had clay been wanted, it could have been procured in abundance at a short distance.

In the "Portfolio," Vol. II, No. 5, November, 1809, opposite page 419, there is a cut of the Hopetown works. The parallel walls are represented as being connected with the circle on each side of a gateway in a line with the west side of the square. At the other end, the walls are similarly connected with another circle, about the size of that at the southeast corner of the square. The smaller circle has no other opening than

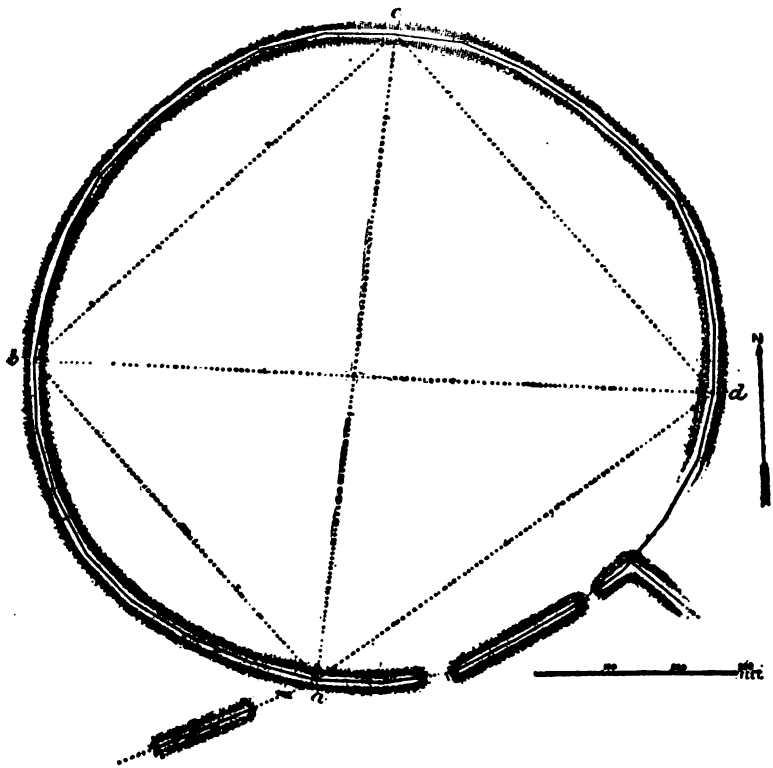


Figure 33 — The "Circle" at Hopetown.

that leading out between the parallels. This small circle had evidently been destroyed by the river between 1809 and 1845; for the survey of Squier and Davis, about the latter time, represents the walls as terminating at the brink of a low terrace-bank. This is another evidence that "encroachment" does not guarantee "antiquity."

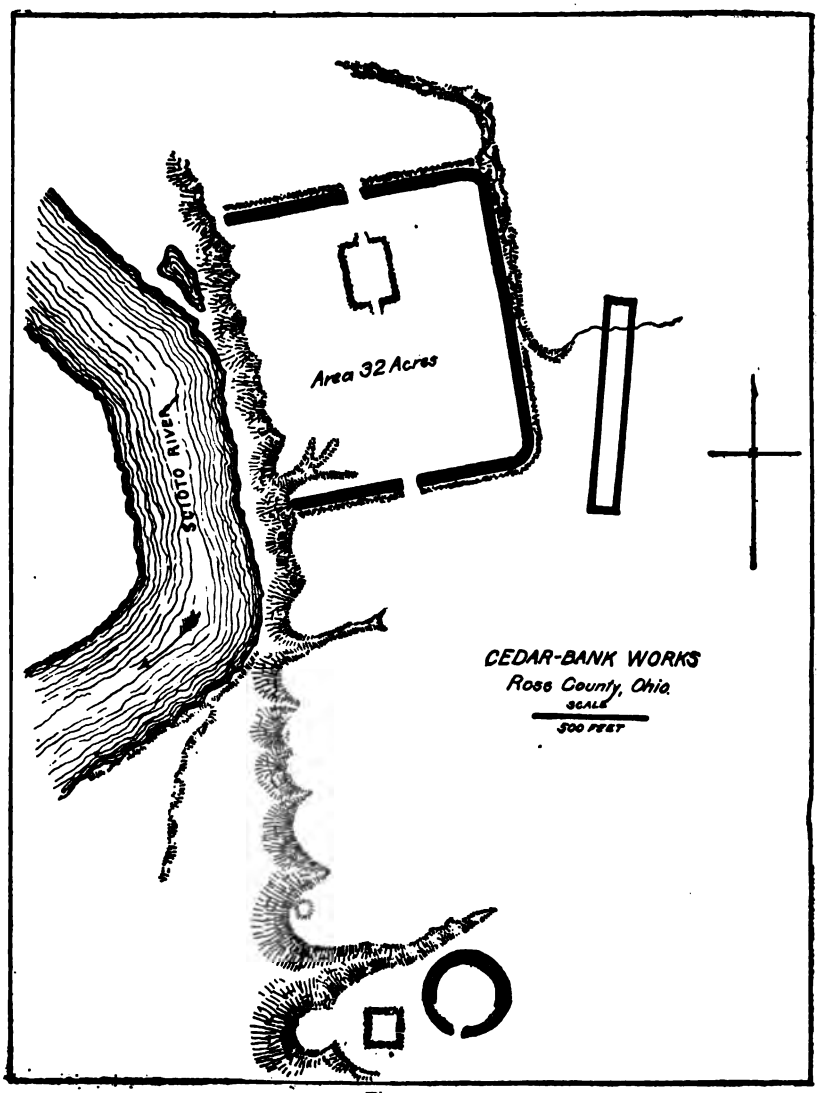


Figure 34.

WORK AT CEDAR BANKS.

The "Cedar Banks" work, four miles north of Chillicothe, is shown in figure 34 (S. & D., 52, plate XVIII).

"The walls of this work are about six feet high by forty feet base; the ditch five feet deep by forty wide. The ditch upon the longer or

eastern side is formed, for two-thirds of its length, by a 'runway' or water-course. It is here from eight to ten feet deep. The wall upon this side is fourteen hundred feet long. The northern and southern walls are each ten hundred and fifty feet in length, and placed at right angles to the first. * * * Covering the northern gate-way, and two hundred feet interior to it, is an elevated square, two hundred and fifty feet long by one hundred and fifty broad, and four feet high. It is ascended from the ends by graded ways, thirty feet broad, and in all respects resembles the truncated pyramids or 'elevated squares' of the Marietta works." — S. & D., 52.

"It has been suggested that the gully or 'wash' towards the river was originally a graded way to the water, and that its present irregularity has been occasioned by the rains and storms of centuries." — S. & D., 54.

It is apparent from the plate that when this work was constructed, the river flowed at the foot of the bluff on which it stands. At present there is a low, overflow bottom intervening, covered by quick-growing trees of no great size, whereas there lately stood on the embankment a white oak nearly five feet in diameter. The supposed "graded way" is only a natural ravine; it no doubt formed a passage-way when the enclosure was inhabited, but it is now more difficult to ascend than the steep bank to either side. When the river flowed at the foot of the bank, the face presented an exposure of clean gravel which was inaccessible. For this reason there was no necessity for a wall along the west side.

As no recent survey has been made, the angles at the corners and the length of the sides can not be stated. There is an interval of 25 or 30 feet between the end of the north wall and the brink of the terrace. The end of the south wall has been worn away, but to what extent it is impossible to determine. The river may have encroached on it, or the surface drainage through the ditch at its foot may have undermined it by washing away the soil and loose gravel on which it is built. The river is now much farther away than represented in Squier and Davis's cut. Along the eastern side the natural slope is toward the north; but the ravine called "Dry Run" is subsequent in its origin to the earthwork. The ditch on the north side having no outlet towards the river, its waters united with those of the east ditch and cut a passage through the low ground to Prairie Run a few rods to the north. More earth seems to have been taken from the east ditch than from the others—probably to construct the mound. The latter has been cultivated until its outline is no

longer traceable. The main walls were intact until within a few years; but they are now cultivated and their symmetry will soon be destroyed.

The rectangular enclosure east of the square is 870 feet long and 70 feet broad. It has been compared to the Cherokee "chung-kee yards", but it is not level; the northern end is several feet lower than the southern, and the slope of the space within is not uniform.

The topography about the square mound south of the enclosure is incorrectly represented in the plan of Squier and Davis.

They say

"The headland upon which [it] is situated seems to have been artificially smoothed and rounded." — S. & D., 53.

But the point on which it stands is of natural formation, no more smooth and rounded than many others along the terraces; neither does it extend so far outwardly as to reach the lower terrace, as they represent it, being terminated by ravines on either side.

"MOUND CITY".

The "Mound City" of Squier and Davis, within whose walls they made their famous find of pipes, is shown in figure 35 (S. & D., 54, plate XIX).

"In outline it is nearly a square, with rounded angles, and consists of a simple embankment, between three and four feet high unaccompanied by a ditch. * * * There are no less than *twenty-four* [mounds] within its walls. All of these * * * have been excavated, and the principal ones found to contain altars and other remains, which put it beyond question that they were places of *sacrifice* or of superstitious origin. * * * We are certainly well warranted in classing this as a sacred work." "To the south is another work of somewhat similar outline, but of larger size. * * Uulike the works obviously of sacred origin, which, if they possess a ditch at all, have it interior to the wall, this has an outer fosse; a circumstance which would seem to favor the suggestion of a defensive origin. On the other hand, it has a mound very nearly if not exactly in its centre, which was clearly a place of sacrifice." — S. & D., 54.

Although the text says there are 24 mounds, only 23 are shown in the engraving; while on page 144 the authors say there are 26. So far from being of "similar outline", a glance will show that the work to the south approaches more nearly to the outline of some works denominated by them "perfect circles", than it does to the shape of the "square".

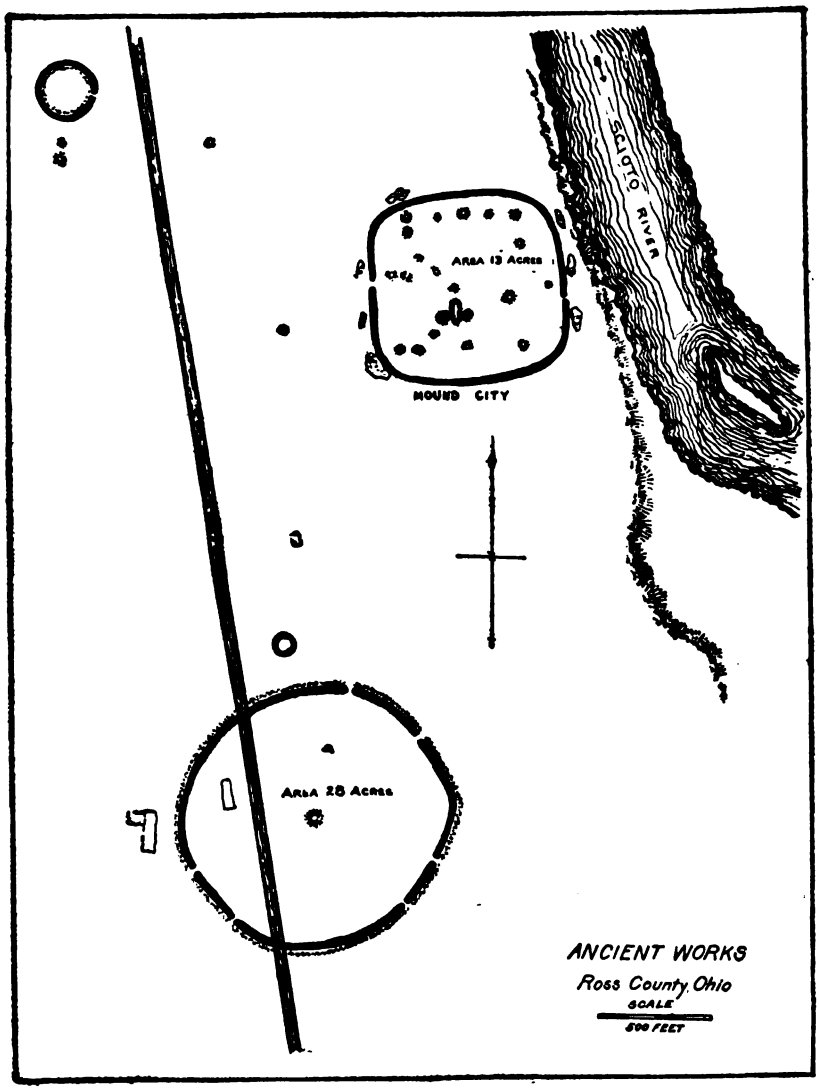


Figure 35 — "Mound City."

WORK AT DUNLAP'S.

The group shown in figure 36 (S. & D., 63, plate XXIII, No. 1), known as "Dunlap's Works" and

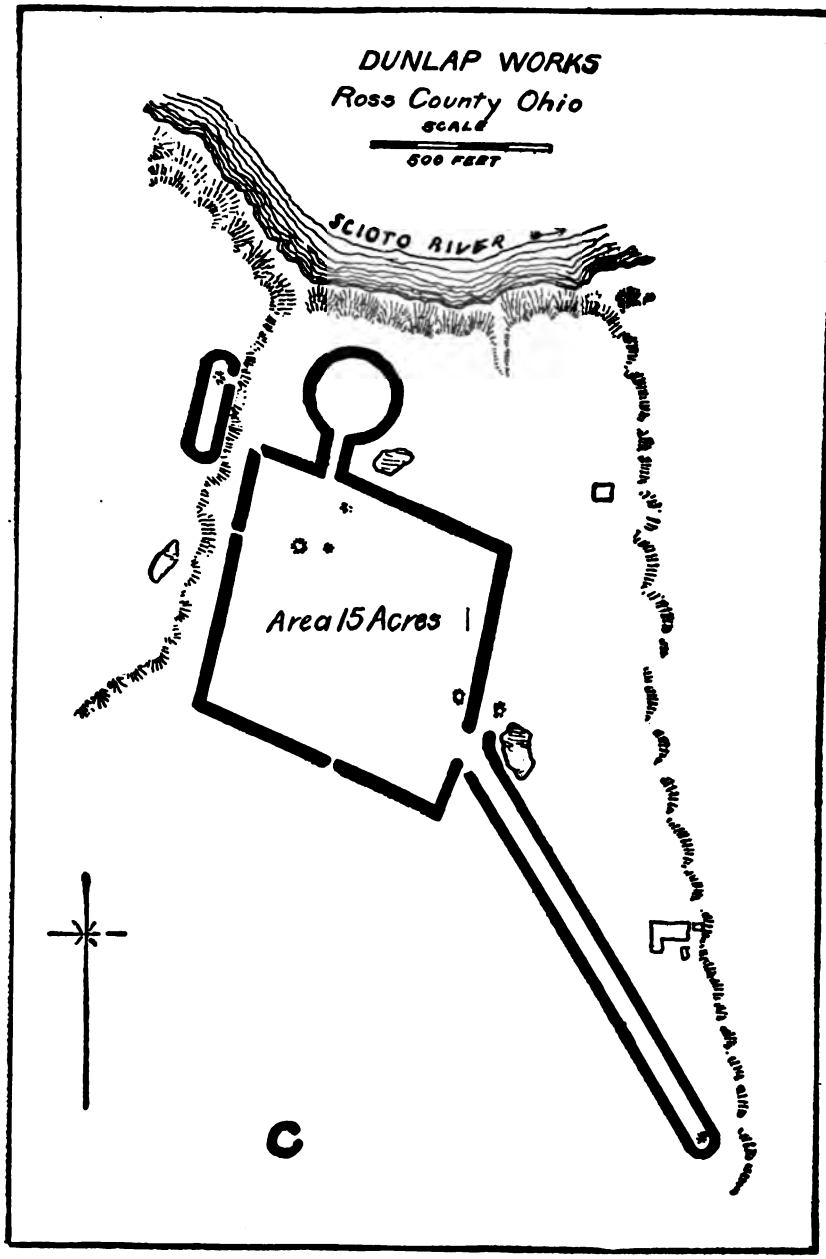

DUNLAP WORKS
Ross County Ohio
SCALE
600 FEET
SCIOTO RIVER
Area 15 Acres
C

Figure 36.

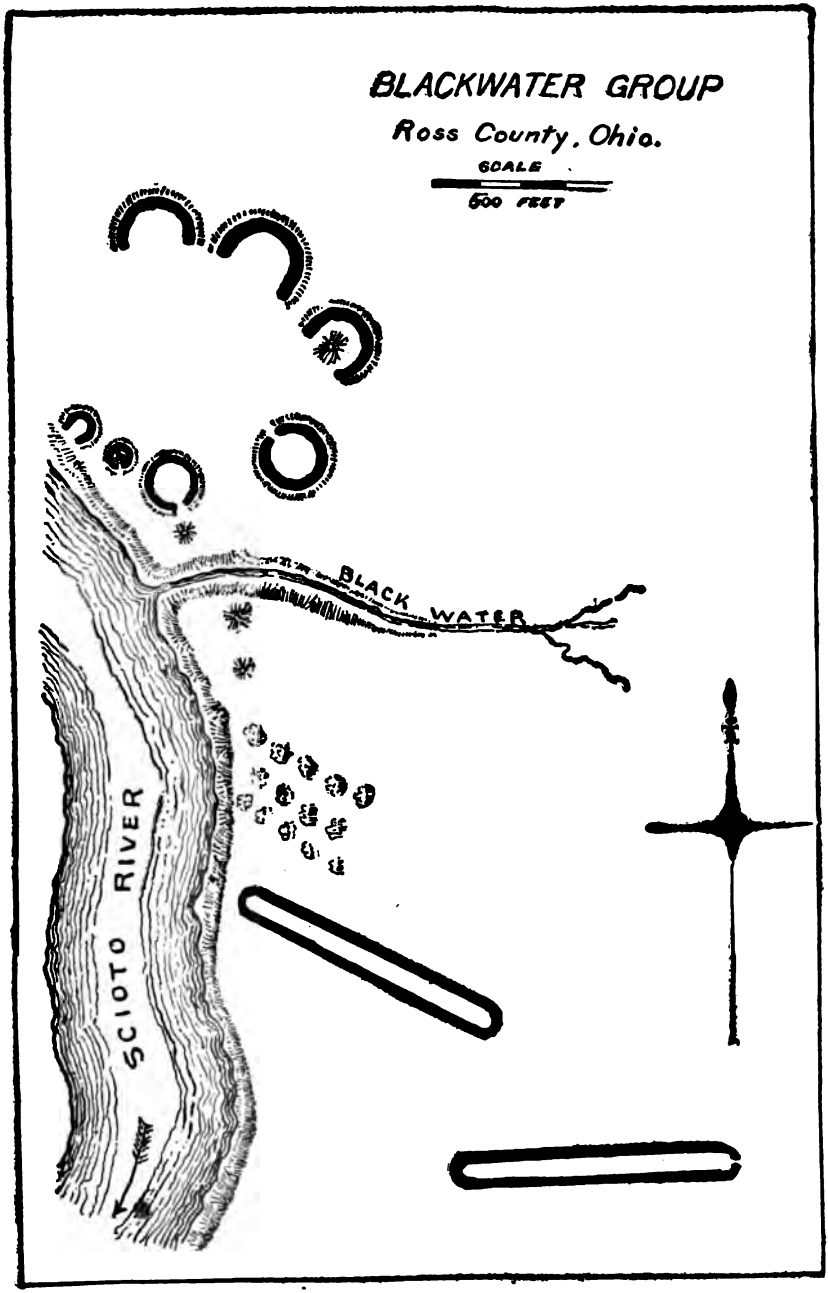

BLACKWATER GROUP
Ross County, Ohio.
SCALE
500 FEET
BLACK WATER
SCIOTO RIVER

Figure 87.

"situated on the right bank of the Scioto river, six miles above Chillicothe, * * is rhomboidal in figure, with an avenue eleven hundred and thirty feet long extending to the south-east, and also a short avenue, leading from a gateway to the north, connecting with a small circle." — S. & D., 63.

There are a number of mounds within a mile of this group. It is very clear that the builders of the work had no wish to construct either a "perfect circle" or an "accurate square"; for there is abundant room to make a figure of any form desired, on a much larger scale than the one found here.

THE BLACKWATER GROUP.

The "Blackwater Group" shown in figure 37 (S. & D., 61, No. 2)

"is situated on the right bank of the Scioto river, eight miles above Chillicothe. It is especially remarkable for its singular parallels, A and B of the plan. Each of these is seven hundred and fifty feet long by sixty broad, measuring from center to center of the embankments. * * The ground embraced in the semi-circular works C and D is reduced several feet below the level of the plain on which they are located." — S. & D., 63.

JUNCTION GROUP.

The system represented in figure 38 (S. & D., 61, Plate XXII, No. 1) is for some reason called "Junction Group" by Squier and Davis.

It is situated on Paint Creek, two miles south-west of Chillicothe. Each enclosure "consists of a wall three feet high, with an interior ditch." "That they were not designed for defensive purposes is obvious, and that they were devoted to religious rites is more than probable. They may have answered a double purpose, and may have been used for the celebration of games, of which we can have no definite conception. It has been suggested that the enclosure A, as also B and C, were occupied by structures, temples perhaps, which in the lapse of time have disappeared. Similar groups are frequent,— indeed, small circles, resembling those here represented, constitute, in the Scioto valley, by far the most numerous class of remains. They seldom occur singly, but generally in connection with several others of the same description, and accompanied by one or more mounds; sometimes they are connected with long parallel lines of embankments." — S. & D., 61.

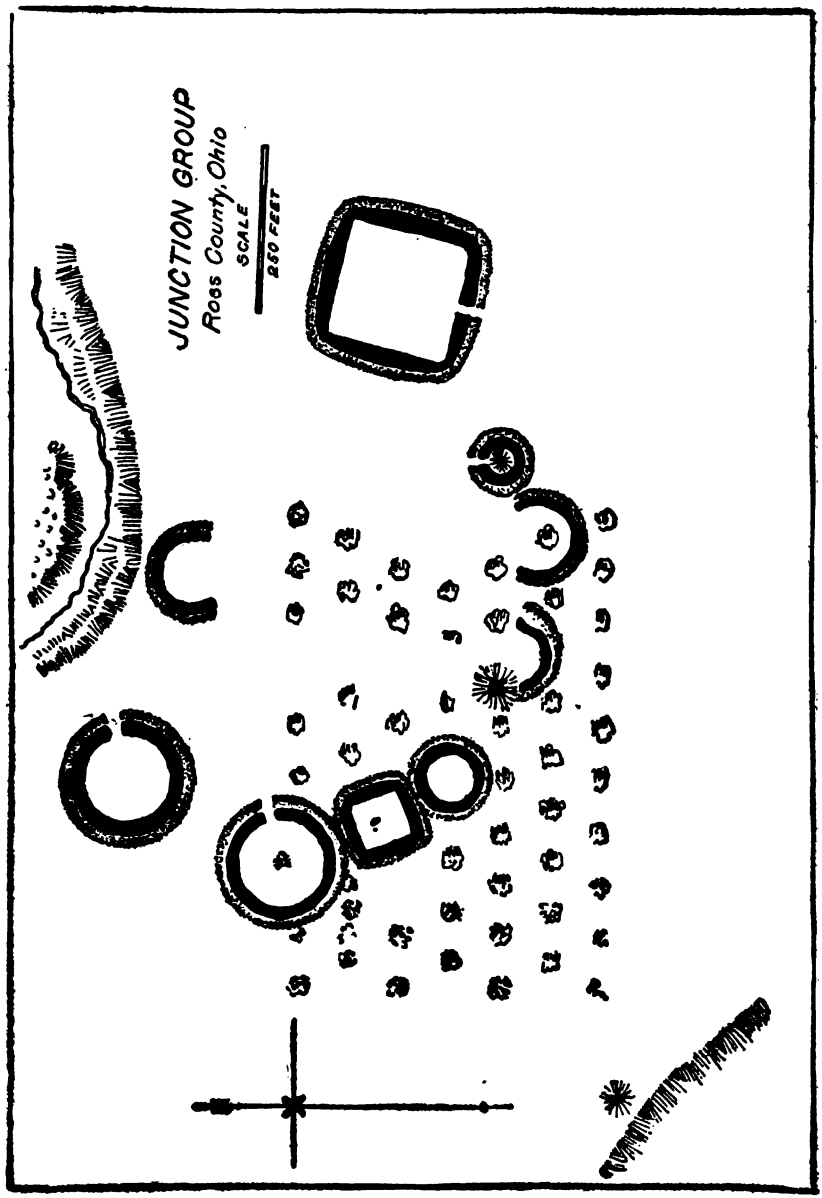


Figure 88.

CLARK'S WORKS, OR THE HOPEWELL GROUP.

Figure 39 (S. & D., 26, Plate X) is the "Clark's Work" of Squier and Davis, which is now better known as the "Hopewell Group," from the name of the present owner. An abridgment of the description by Squier and Davis follows:

"It has many of the characteristics of a work of defense, and is accordingly classified as such, although differing in position and some other respects from the entrenched hills. The minor works which it encloses, or which are in combination with it, are manifestly of a different character, probably religious in their design, and would seem to point to the conclusion, that this was a fortified town, rather than a defensive work of last resort. Its general form is that of a parallelogram, twenty-eight hundred feet by eighteen hundred, with one of its corners somewhat rounded. On the side next the creek, it is bounded by a wall four feet high, running along the very edge of the terrace bank, and conforming to its irregularities; these however are very slight. Its remaining sides are bounded by a wall and exterior ditch; the wall is six feet high by thirty-five feet base, and the ditch of corresponding dimensions. The lines ascend the declivity of the table land back of the terrace, and extend along its brow, dipping into the ravines and rising over the ridges into which it has been cut by the action of water. Wherever the ravines are of any considerable depth, the wall has been washed away; but in all cases leaving evidences that it once extended uninterruptedly through. The bank of the terrace is thirty, that of the table land fifty feet in height. The area thus enclosed is one hundred and eleven acres. To the right of the principal work, and connecting with it by a gateway at its center, is a smaller work of *sixteen acres area.* It is a perfect square; its sides measuring respectively eight hundred and fifty feet. The walls of the smaller work are much lighter than those of the large one, and have no attendant ditch. Within the area of the great work are two small ones; one of them is a perfect circle, three hundred and fifty feet in diameter, bounded by a single slight wall, with a gateway opening to the west; the other is a semi-circular enclosure, two thousand feet in circumference, bounded by a slight circumvallation and ditch. Within this are seven mounds; three of which are joined together, forming a continuous elevation thirty feet high by five hundred feet long, and one hundred and eighty feet broad at the base. Nearly all the mounds examined were places of sacrifice, containing altars. Where the defences descend from the table lands to the left, is a gully or torrent-bed, which was turned by the builders from its natural course (towards x) into the ditch. The slight wall along the terrace bank is composed chiefly of smooth, water-worn stones, taken from the creek and cemented together by tough, clayey earth. The wall of the square is wholly of clay, and its outlines may be easily traced by the eye, from a distance, from its color. It appears, as do the embankments of many other works, to have been slightly burned.

That they have in some cases been subjected to the action of fire, is too obvious to admit of doubt. At the point *s* in the lower wall of the square

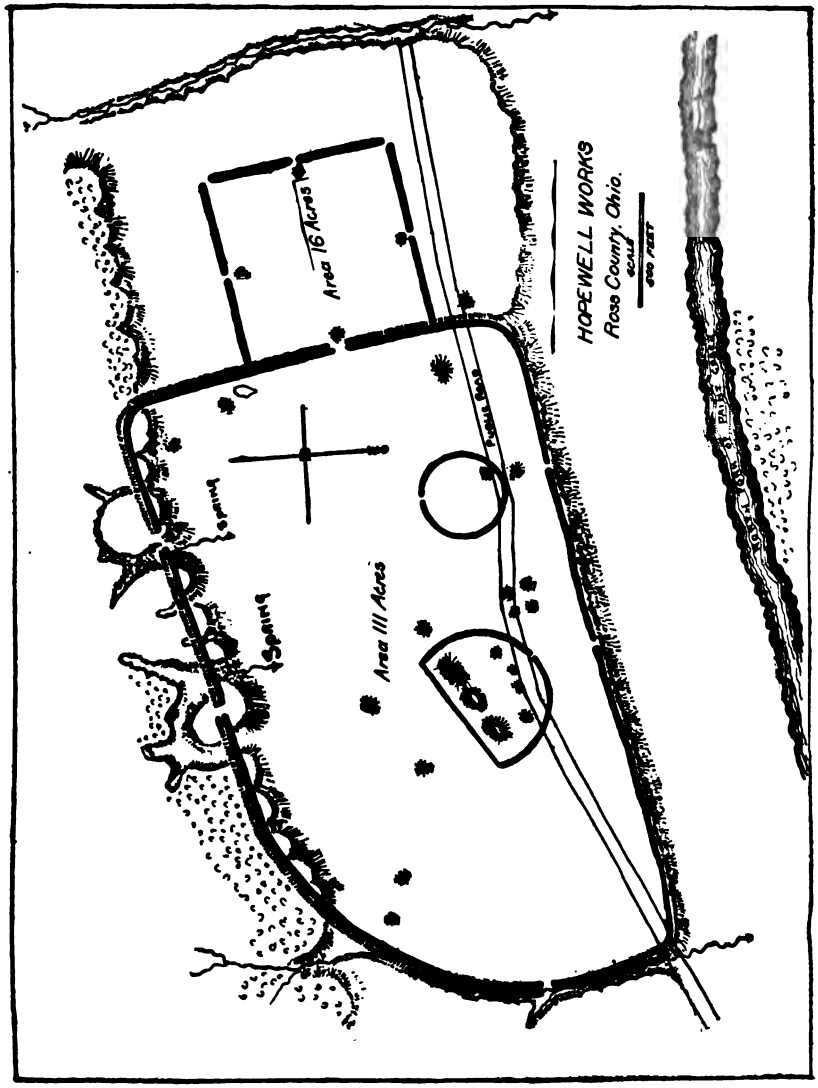


Figure 39.

stones and large masses of pebbles and earth, much burned, are turned up by the plow. The comparative slightness of the wall and the absence of a ditch, at the points possessing natural defences — the extension of the artificial defences upon the table lands overlooking and commanding

the terrace — the facilities afforded for an abundant supply of water, as well as the large area enclosed, with its mysterious circles and sacred mounds — *all* go to sustain the conclusion, that this was a fortified town or city of the ancient people. The embankments measure together nearly *three miles* in length; and a careful computation shows that, including mounds, not less than three millions cubic feet of earth were used in their composition." — S. & D., 26, *et seq.*

Very little is left of the wall along the edge of the terrace toward the creek; enough, however, to show that, like all the other walls, it is composed of material similar to that on which it rests. The stream is now fully a fourth of a mile away, and flows on shale. The terrace bank, at whose foot it probably flowed when this enclosure was inhabited, is composed of the glacial drift common on all streams; instead of being "thirty feet high," it is not more than fifteen. It would have been no great task to carry the material of the wall from its slope.

The "clay" of the other portions of the embankment is of the same nature as that in the fields around. The darker earth, due to decay of vegetation, washes off of the upper part of elevations, and accumulates around their base; the difference in color is sometimes quite pronounced, and so has led to the supposition that material for the earthworks came from some other locality.

It is impossible at this late day either to verify or contradict their calculation of the amount of earth heaped up.

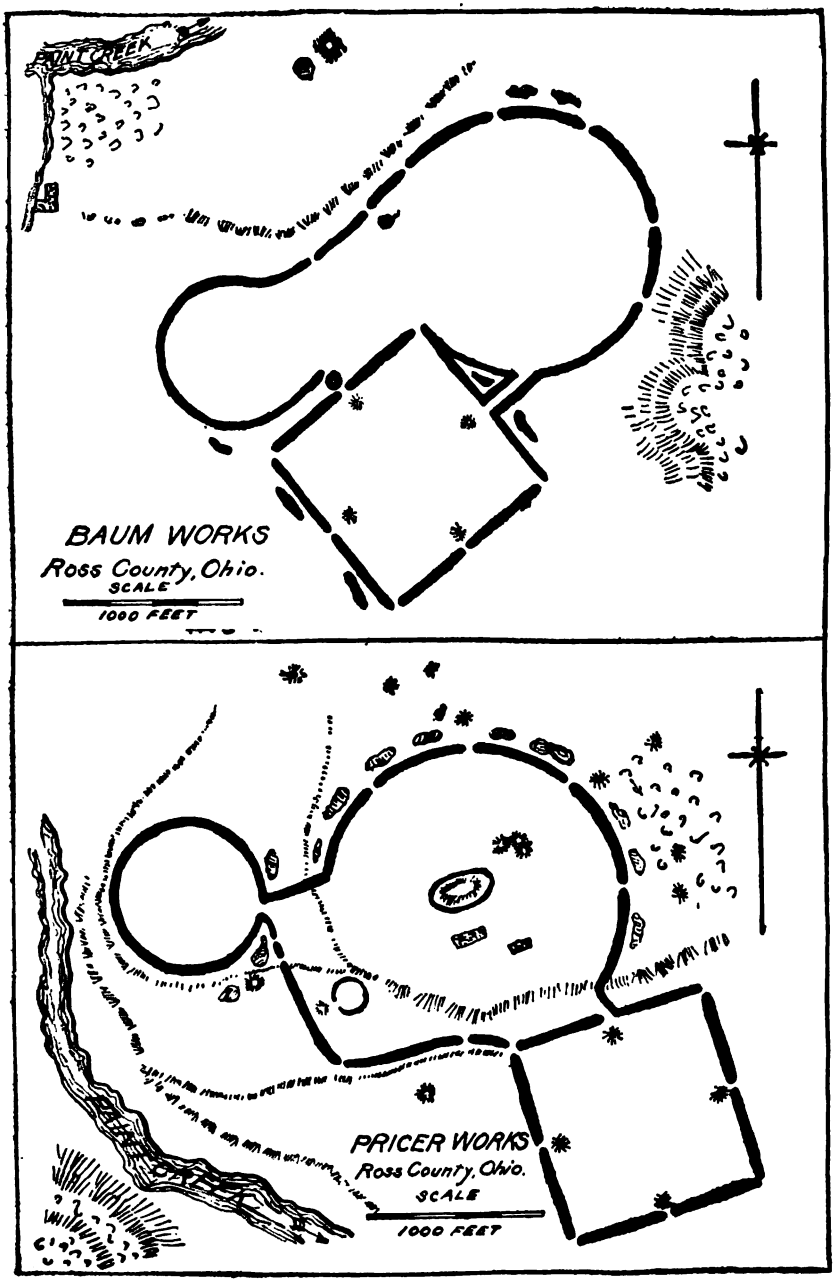
WORKS OPPOSITE BOURNEVILLE.

In Figure 40 (S. & D., 57, Plate XXI, No. 1) is seen the work on the Baum farm opposite Bourneville. The "hills" to the right are composed of gravel and sand of glacial origin probably marking the limit here of the ice-sheet. A bold spring rising in them sends a perennial stream toward the junction of the square and the larger circle. This and surface drainage have carried down sufficient of the loose material from above to obliterate all traces of the wall and excavated areas at this point.

The square in this group is nearly exact; the greatest variation, at any corner, from a right angle is only 47′; the difference between the longest and the shortest side is twelve feet.

WORKS NEAR BAINBRIDGE.

One of the largest works in the Scioto valley is that shown in Figure 41 (S. & D., 57, Plate XXI, No. 2). It is in Paint



Figures 40 and 41.

creek bottoms about three miles east of Bainbridge. Much of the line of embankment is very heavy. According to Squier and Davis, the elliptical mound is "two hundred and forty feet long by one hundred and sixty broad, and thirty feet in height." The last measure is greatly exaggerated; the mound is not more than twenty feet high, and being still covered with the original timber, it cannot have appreciably lowered since their time. They also say that "several very large and beautiful mounds, composed entirely of clay, occur about one-fourth of a mile distant." These mounds are of the ordinary earth around them; one, in fact, is mostly sand and is much worn by the weather. The usual measure of "ten hundred and eighty feet" is given as the length of each side of the square; the south wall of this is now destroyed, but a measure of 1,080 feet from the ends of the north wall, along the east and west sides, will terminate in the thoroughfare which, according to their illustration (Plate XXI, No. 2), cuts across the square.

WORKS AT CIRCLEVILLE.

One group of the larger enclosures was situated north of Ross county.

There was formerly a square connected by parallel lines with a circular enclosure, on the site of Circleville; the town takes its name from having made its beginning within the latter. This enclosure was peculiar in consisting of two concentric embankments, with a ditch between them; the only case of the kind in the Scioto valley. All these works are now entirely destroyed. Before they were defaced, two quite opposite views were held as to their purpose.

"The square has such a number of gateways, as seem intended to facilitate the entrance of those who would attack it. And both it and the circle were completely commanded by the mound, rendering it an easier matter to take, than defend it." — Harrison, 225.

"The round fort was picketed in, if we are to judge from the appearance of the ground on and about the walls. Half way up the outside of the inner wall, is a place distinctly to be seen, where a row of *pickets* once stood, and where it was placed when this work of defence was originally erected." — Atwater, 145.

A zealous advocate of the recent origin of mounds, has interpreted this statement to mean that Atwater saw the pickets in position. But it is clear that he refers only to a break, or step, in the slope.

On review, it will be seen that the larger square and circular works in combination, ordinarily termed "sacred enclosures," on which have been built up such thrilling stories of a "high culture," with all its attendant elements of "advanced knowledge," "central government," "ruling priesthood," "centers of modern population," etc., etc., in the Mississippi valley in prehistoric times, are just eleven in number; the Marietta group having no circle. Seven of these are on farming land, at least three miles from the nearest village of a thousand inhabitants. Two of them are at the little towns of Frankfort and Circleville. The remaining two are at Newark and Chillicothe, neither of which can claim to be much of a "city." The works which do occur at or near larger places are not of the same character as the enclosures in question. The identity of measurements, the uniformity of curves, the exactness of angles, do not exist. With this removal of the foundation upon which the imposing edifice is reared, the whole fabric of a "lost empire" comes to earth, and instead of a "civilization" we see only a stage of barbarism.

REMAINS IN THE VALLEYS OF THE MIAMIS.

Although the remains in the two Miami valleys are quite different in character from those characteristic of the Scioto, and are less numerous, they possess as great interest for the archæologist. The largest mound and the largest lowland enclosure in Ohio are below Dayton.

That some portions of this part of the State supported a considerable population is apparent from the number of remains shown in Figure 42 (S. & D., Plate III, Part 2), which gives a view of "Six miles of the Great Miami valley." There are other localities where as many earthworks can be found in the same space.

THE TURNER GROUP.

The most remarkable structure in this part of the State is that on the Little Miami river, between Milford and Newtown, now known as the "Turner Group." One portion of the work, unique so far as known, is thus described.

"On a detached ridge, composed of limestone gravel, covered with a clay loam, is a low wall nearly in the form of a circle. The average diameter of the circle is four hundred and seventy feet. Outside of the circular figure, there is a space from twenty to thirty feet wide, on the

natural surface of the ground. On the two opposite sides of the circle where it occupies the height of the ridge, is an external ditch, enclosing about half the figure. It is from seventy to eighty-five feet broad at the top, and from twelve to eighteen feet deep. On the east is an embankment or grade extending by a gradual slope, from the enclosure A to the plain. It is one hundred and sixty-eight feet wide where it joins A, and has, at the edges, raised side-walls like those made for pavements in

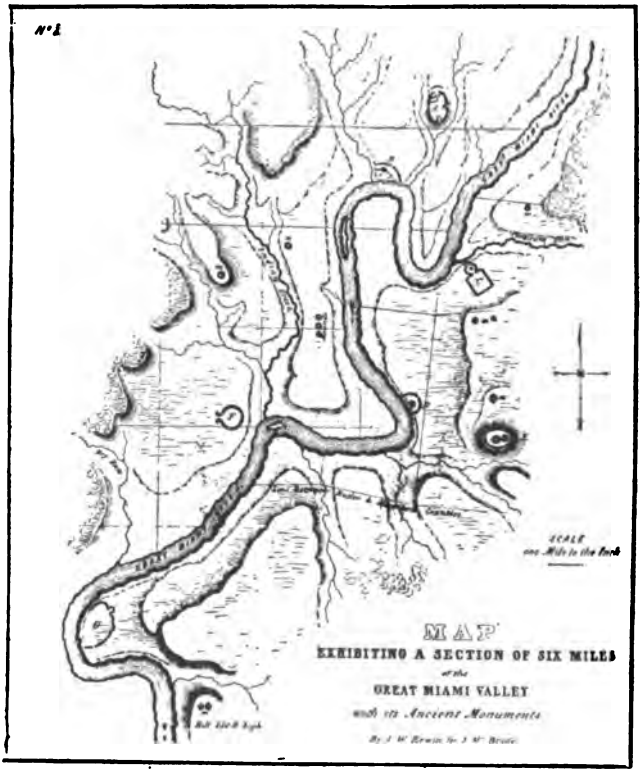


Figure 42.

cities with a drain or gutter inside. The space between the sideways is rounded like a turnpike, as represented in the section *de*. Its length is six hundred feet. It reaches to the next terrace, twenty-five feet lower. There are some examples of graded ways among the ancient works of Ohio, but none resembling this." — Whittlesey, Works, 9, condensed.

Putnam describes this as

"A hill through which two ditches, 30 feet deep had been cut, separating the hill into three parts. On the hill is a circle 550 feet in diameter, surrounding two mounds. The earth from the ditches was

used to make the graded way from the top of the hill to the level land below. This graded way connects with an embankment of earth 1500 feet in diameter. At the foot of the graded way is a small circle enclosing a burial mound. South of this was the great group of altar mounds, around each of which was a wall of stones, four feet high, built below the surrounding level of the field." — Putnam XX, 554.

Professor Putnam is at fault regarding the depth of the ditches. The knoll (or "hill" as he calls it) is less than thirty feet higher than the surrounding level, and the ditches nowhere reach more than half the depth, except near one end; some of the lowering here may be due to erosion.

In this region there are three distinct terraces. The uppermost is represented by a few scattered knolls, most of it having been removed while the Little Miami was scouring out a channel There is an isolated remnant near the river, having an elevation over the next lower terrace of nearly thirty feet; and it is from this that the graded way descends. The latter is composed of gravel and earth. The lower portion, as exposed by a railway cut, is plainly of natural origin; the upper part, however, is of soil of a different character from the material beneath. The slope along its top from one terrace to the other, is gradual but not uniform; while the natural slope of the banks to either side of it is quite abrupt, such as would be left by a stream flowing at its foot. There is only a thin deposit of soil on the highest terrace; the circle and included mounds are of much coarser material which, it is clear, came from the deep ditches at either side. There is a much greater thickness of soil on most of the lower terrace, a ravine near by showing several feet of silt free from gravel. If the graded way is built up from the lower plain, the material composing it must have been taken in part from the artificial ditches, and in part from the terrace on which it stands; for while much gravel is found on its surface, the finer earth exposed by the railway cut is of different color from that found in the works above it. Owing probably to long cultivation there is not now the slightest trace of sidewalls along the embankment as described by Whittlesey and shown by the model in the Cincinnati Art Museum; nor does it seem possible that the amount of earth now above the surface level could be so disposed as to give the form of the model. The great change which can be wrought in such loose material in a few years by farming operations and by heavy rains upon freshly plowed ground, render it

unsafe, however, to advance any definite opinion in regard to this.

The position and slope of the graded way or spur are such as to indicate that it is artificial; while its magnitude, so far beyond any imaginable utility, would lead to the belief that it must be natural. The probability is that a projecting point was left by a loop in the stream which once flowed under this bank; and that the Mound Builders seeing in this feature something which they could turn to advantage, modified its form in some measure by their own labor. What purpose or object they may have had in so doing is a matter of conjecture. The question of its origin can be settled only by a careful examination of trenches cut across it, to ascertain whether the interior shows any evidence of surface material at a level below that reached by the plow.

AT CINCINNATI.

Dr. Drake thus enumerates the ancient works in the vicinity of Cincinnati. He falls into the same error as Harrison, in considering the various "inequalities of surface" artificial when they are plainly natural.

"The remains on the site of Cincinnati, are an ellipse 800 by 600 feet, the bank not over three feet high; what seems to be the segment of a very large circle, though it can be traced only three blocks; a circle sixty feet in diameter; two low parallels connected at the ends; an excavation 12 feet deep and fifty feet across; two other shapeless and insulated elevations, more than six feet in height, which, it seems probable are artificial; and four mounds, the largest about 35 feet high before being disturbed. In addition, the site of our town exhibits many other inequalities of surface, which are no doubt artificial; but they are too much reduced, and their configuration is too obscure, to admit of their being described. The plains on the opposite side of the river have not a single vestige of this kind. The mound at Third and Main Streets was about eight feet high, one hundred and twenty long, and sixty broad. In it were found plummets of jasper, rock crystal, granite and other stones; pulley-like objects of cannel coal and argillaceous earth; incised bones; mica; galena; copper plates; large marine shells cut in such manner as to serve for domestic utensils; spool-shaped copper objects; and the remains of not more than 20 or 30 skeletons." — Dr. Drake, 199, condensed.

OTHER WORKS IN THE MIAMI VALLEYS.

The complicated structure shown in figure 43 (S. & D., 94 plate XXXIV, No. 1), is one mile east of Milford, in Clermont county; that in figure 44 (same, No. 2B), is about twenty miles farther east.— S. & D., 94.

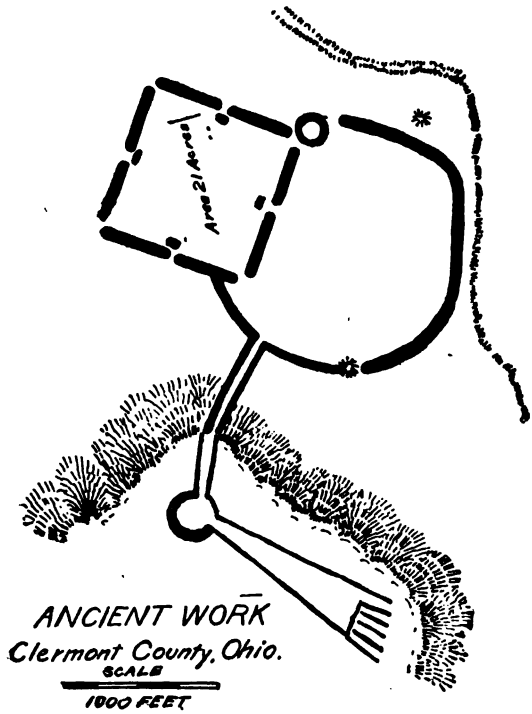


Figure 43.

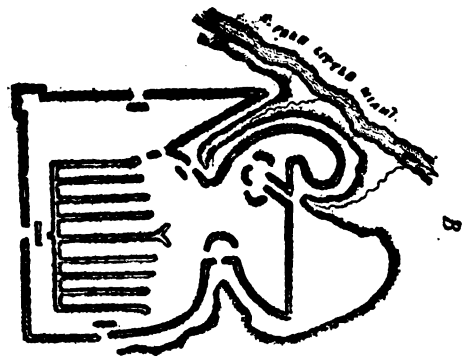


Figure 44.
The "Gridiron," Clermont County, Ohio.

The diverging lines of the first, on the hill, and the "grid-iron" interior arrangement of the other, induce some skepticism as to the accuracy of the drawings. Thomas makes the following comment on them:—

"Some of the singular works described and figured in Ancient Monuments and elsewhere are to a large extent imaginary. Of these we may name Nos. 1 and 2, Pl. XXXIV of that work. The wing to No. 1 is not only imaginary, but, according to the Bureau agent who visited the locality, was made impossible by the topography." — B. E. 12, 566.

On a level terrace five miles north of Hamilton a double wall encloses with the terrace bank, an irregular space of about 25 acres. The inner

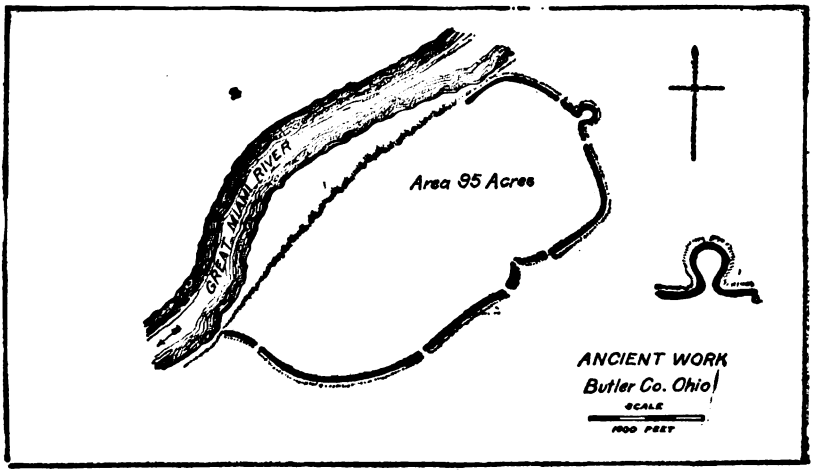


Figure 45.

wall is about three feet high, the outer four. They are parallel and only a few feet apart. An exterior ditch from five to six feet and 35 feet wide, probably furnished earth for both embankments.— S. & D., 29.

The work shown in figure 45 (S. & D., 35, plate XIII, No. 2),

"is situated near the village of Coleraine, Hamilton County, Ohio, on the right bank of the Great Miami river, and encloses an area of ninety-five acres. The walls have an average height of nine feet, and have an exterior ditch of proportionate dimensions. * * * The up-heaved gravel upon the exterior side of the wall, wherever it is under cultivation, supports dwarfed and sickly maize; while on the inner side the grain is luxuriant." — S. & D., 35.

The explanation given in regard to the great thickness of gravel on the outer side of the wall also accounts for the "clay embankments" sometimes found. Where there is a substratum of

clay, into which the ditch reaches, that material will form the top of the wall; and when the ditch becomes partially filled, so that the clay in it is no longer visible, there is straightway an argument that "these walls are composed of earth which must have been carried a long distance, as there is none like it to be seen in the vicinity." (Compare the concluding sentence of the next paragraph.)

Six miles below Dayton, on the east bank of the Miami, were a square and two circles, differing in plan from those of the Scioto valley in being placed at several hundred feet from each other. Not one of them was ever carried to completion, one side of the square being only half-finished, while a large arc was lacking in each circle. According to the surveyor's figures, the square would have enclosed thirty-one acres; the smaller circle had a diameter of 875 feet, the larger of 1950 feet. "The embankments are now between five and six feet high, and have a base fifty feet wide. They are composed of tough yellow clay, which is found to be superimposed on the loam of the original level. It must have been brought from a distance, as there are no excavations perceptible in the vicinity. — S. & D., 82.

This work is shown in figure 46 (S. & D., 82, plate XXIX). It is evident from the plan that, with the river where it now is, the larger figure could never have been made a "perfect circle." If the uncompleted portion had been carried on with the same curvature, it would have reached the river some distance below the point of beginning; in which case it would no doubt have been adduced as another example of a work "partially destroyed by the encroachment of a stream, which fact is a proof of its extreme antiquity." The "encroachment" could readily enough occur; but on the outside of a curve it may go on rapidly and be a matter of a quite recent period.

With a single exception no recent surveys have been made which can serve as a check to the areas of works along the Great Miami, as given in "Ancient Monuments." The exception, however, proves that the evil fate which led to such egregious mistakes in the Scioto valley pursued the early surveyors farther west. In the first volume issued by the present Ohio Archæological and Historical Society, on page 266, Professor McFarland presents

"a correct plan of the earthwork described by McBride in Squier and Davis, Plate XI, No. 2, and by McLean in his 'Mound Builders.'" McBride's plat "gives the area as '25 acres'; the text says '20 acres.' A careful survey made under my personal supervision,

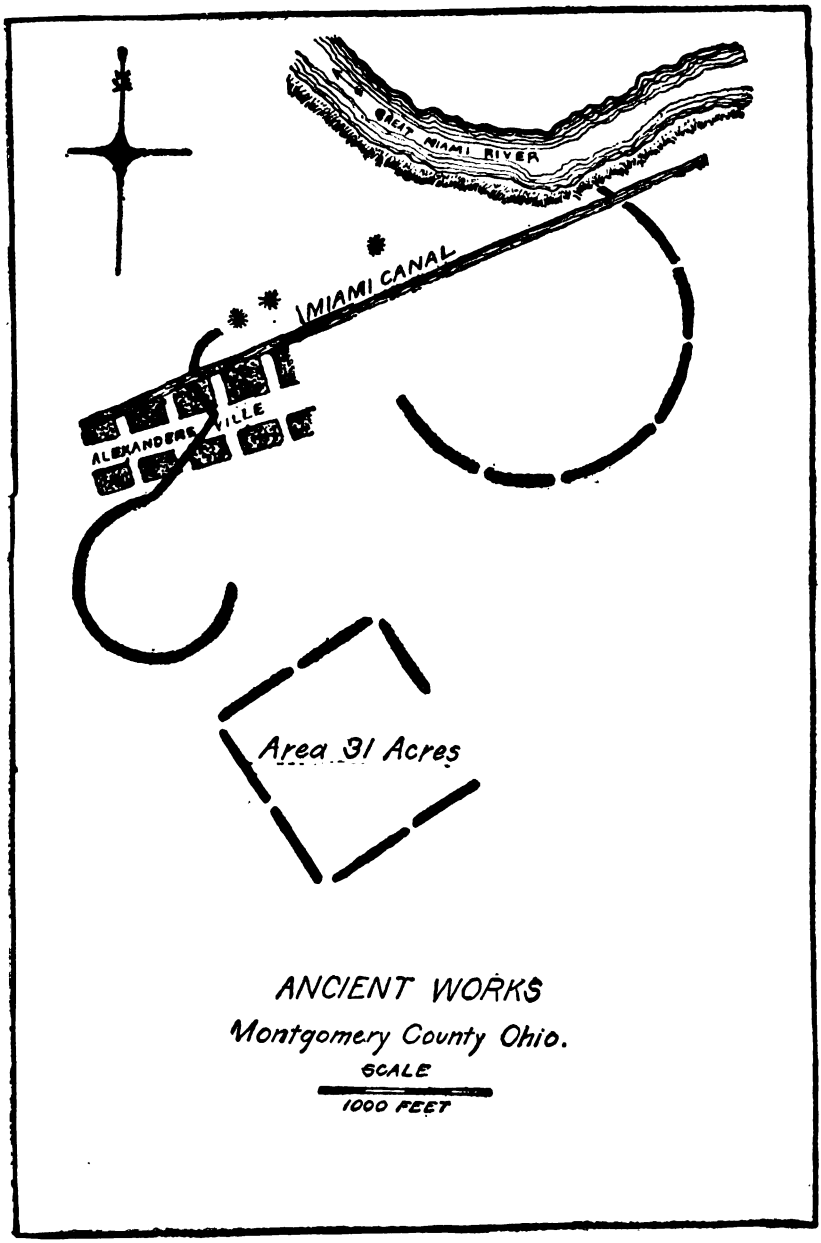

GREAT MIAMI RIVER
MIAMI CANAL
ALEXANDERS VILLE
Area 31 Acres
ANCIENT WORKS
Montgomery County Ohio.
SCALE
1000 FEET

Figure 46.

gives *eight* acres. * * * Only the wildest kind of guess work could have produced a plat so far out of the way in respect to size, shape and position." * * * Even so late as 1840, the stream flowed in that part marked 'old channel.' * * * The terrace mentioned by Mr. McBride is nothing but landslides." — McFarland, 265–7.

The same investigation that corrected the mistake as to area of this enclosure, revealed the purpose of its creation. This one, at least, was a stockaded village.

"A plowman said that when the field is fresh plowed the eye can easily trace out the center of the wall by a streak of dark earth. Acting on this hint we caused six or eight trenches to be cut directly across the wall, down to the general level of the earth. Looking into these cross-sections the most careless eye could not fail to detect immediately the position of the dark band. This was about one foot wide and was filled with earth of a darker hue. The spade cut through small pebbles of limestone which had been *changed to lime*, and thus the part of the cross-section occupied by the band was speckled with white spots. We also found pieces of charcoal too deep down to have been put there by accident."

"It is evident that a row of pickets, or palisade, had been destroyed by fire, as there is no other way to account for the burned pebbles, charcoal, and tolerably uniform width of the black streak wherever a cross-cut was made. The narrow trench or cavity left by such burning, being hardened on the exposed faces by the heat, would remain open till a considerable amount of leaves or trash would accumulate in it, before caving in from the top. Fresh earth, thus covering the marks of fire and decay, would protect such traces from alteration until it was removed by cultivation or denudation; so that if similar evidence is sought in other embankments, we must look for it at or near the natural surface of the ground." — McFarland, 268, condensed.

If such use of palisades was customary among the Mound Builders, it is probable that many works which seem incomplete, as along steep banks or the edges of streams, had the missing parts thus supplied.

* * *

A square enclosure in Franklin county, located near Worthington, is presented in figure 47 (S. & D., Pl. XXIX). The cut sufficiently explains its position relative to the streams and the general topography.

The circle next represented, figure 48 (S. & D., 85, plate XXX No. 3,) is a mile east of Bourneville, on a high terrace. The authors say of it: —

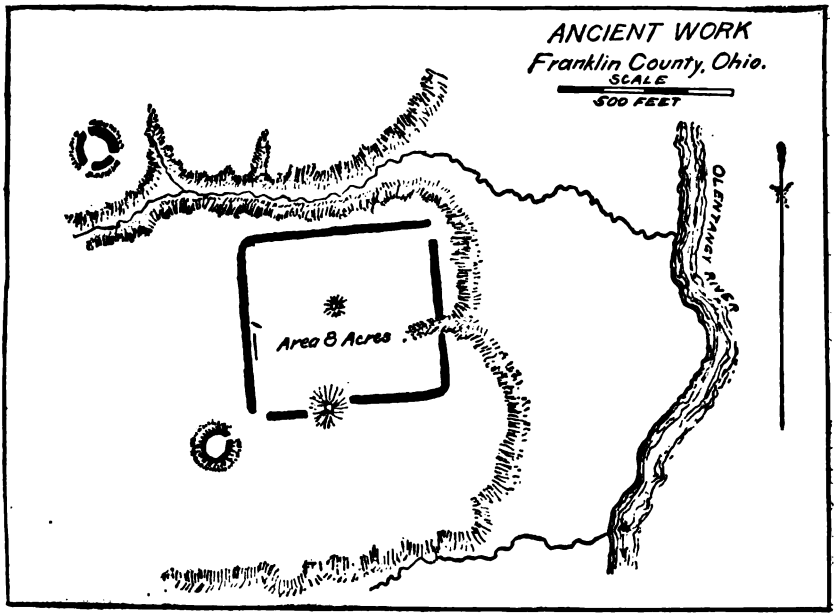


Figure 47 — Square near Worthington.

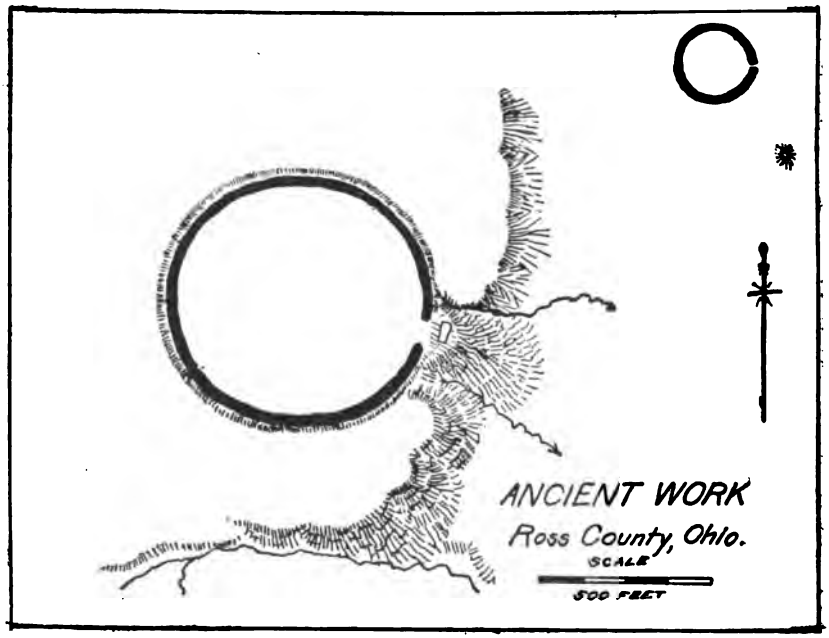


Figure 48 — Ellipse near Bourneville.

"The small work here figured, is one of the most beautiful in the State of Ohio. * * * It consists of a wall of earth, eight or ten feet in height, with a broad and shallow exterior ditch. In figure it is elliptical, with a transverse diameter of seven hundred and fifty, and a conjugate diameter of six hundred and seventy-five feet. It has a gateway one hundred and twenty feet wide, leading into it from the southwest. It opens upon a small spur of the terrace, which has been artificially rounded and graded, so as to make a regular and easy descent to the lower level. * * * The proprietor esteems the soil much richer within the enclosure than upon the adjacent plain. We are unprepared to ascribe any other than a religious origin to this structure." — S. & D., 85.

The "regular and easy descent" is entirely natural, due partly to the manner in which the material (glacial drift) was deposited, and partly to subsequent erosion. There is a bold spring midway of the slope on this descent. As in so many other cases where these works are concerned, the favorable contours determined the location of the village; the Mound Builders would not choose a place difficult of access and then waste a vast amount of labor in altering the topography of the neighborhood, when there were scores of places that offered every inducement for settlement without demanding any such exertion.

CHAPTER VI

SMALLER ENCLOSURES AND WORKS OF IRREGULAR CONSTRUCTION.

Minor Geometrical Enclosures. Confined Mainly to Southern Half of the State. Probably Walls of Villages. The Smallest, Possibly Foundations for Houses. Irregular Works, Mostly in Northern Part of the State and in Miami Valleys. Evidently for Defensive Purposes. Similar Works Common in Other States.

BESIDES the larger geometrical works above described, there may be found in nearly all parts of the southern half of the State small, tolerably regular, circular, square, or elliptical enclosures. They occur associated with all the great low land earthworks; in connection with groups of mounds; or standing singly, miles from any other aboriginal structure, sometimes on the highest summits. The interior usually measures from 150 to 250 feet across; the walls in some cases are scarcely traceable, in others from five to six feet high with a base of ten times the height. There is but one entrance way; on the east side in most, sometimes on the north or south, very seldom on the west. Only the heavier embankments are accompanied by ditches; and while in the larger enclosures "ditches, when they exist, are nearly always interior to circles or exterior to squares," (S. & D., 8), in the case of these the ditch, when there is one, is inside the wall, regardless of the outline. Occasionally a mound stands on the space enclosed, sometimes quite small, again taking up nearly the whole area within the ditch. A few of these mounds have been excavated, and skeletons found in them. Rarely, a circular bank surrounds a square interior, the ditch varying in width to accomodate itself to both, as at the large group in Pike county, shown in figures 21 and 22.

It is possible that some of them, as suggested by Morgan for the larger squares, served as the foundation for houses whose openings faced the inner court. If such was their purpose, the utility of the ditch is not apparent. The central mound would

certainly exclude a number from this category, unless it was erected after the building was intentionally abandoned or destroyed.

"Lest these comparatively little works [referring to those which are from 150 to 250 feet in diameter] should appear insignificant, from the small scale on which they are presented, it may be well enough to remark, that the circle formed by the stones composing the great temple of Stonehenge is but little more than one hundred feet in diameter, and that most of the circular earth and stone structures of tne British islands are considerably less in size than those here presented." — S. & D., 93.

* * * * *

In figure 49 (B. E. 12, 450, figure 309), is represented a fair example of the smaller enclosures of the State. This group is situated near Dublin in Franklin county. Each consists of a ditch within an embankment. The passage ways are at the natural level, both wall and fosse coming to an end at their margin. Measuring on the middle line of the embankment in each case, the diameter of number 1 is 120 feet; of number 3, 162 feet. The sides of number 2, to the points where they would intersect if produced, are 287, 212, 262 and 220 feet. The wall of number 1 is about ten feet broad and two feet high, the ditch fifteen feet wide and two feet deep. In number 2, the wall is from 25 to 35 feet wide and quite uniformly about three feet high; the ditch is 20 feet in width, except on the west side, where it is ten feet wider; its depth varies from two to four feet. The embankment of number 3 is 18 feet across and two feet high; the ditch 22 feet wide and three feet deep. All measures begin at the level of the natural surface. Besides the two mounds in number 2, there are many flat stones which are said to have formed graves containing very large skeletons.

The group in figure 50 (S. & D., 63, plate XXIII, No. 2) is four miles north of Athens, on a plain of about 1,000 acres, elevated sixty to seventy feet above the Hocking River, which flows from half a mile to a mile east of the works. The largest circle, A, encloses a level space 130 feet in diameter; the wall is seven feet high and the ditch six feet deep. Of course the authors ascribe a "religious origin" to the group. — S. & D., 63.

In figure 51 (Sm. Rep., 1884, p. 37), from a map prepared by C. T. Wiltheiss, the remains of Miami County are shown.

Major Long gives an extended description of the earthworks and other remains about Piqua.

"We observed one elliptic and five circular works, two of which are on the east bank of the river, the others on the west. The ground appears in all cases to have been taken from the inside, which forms a

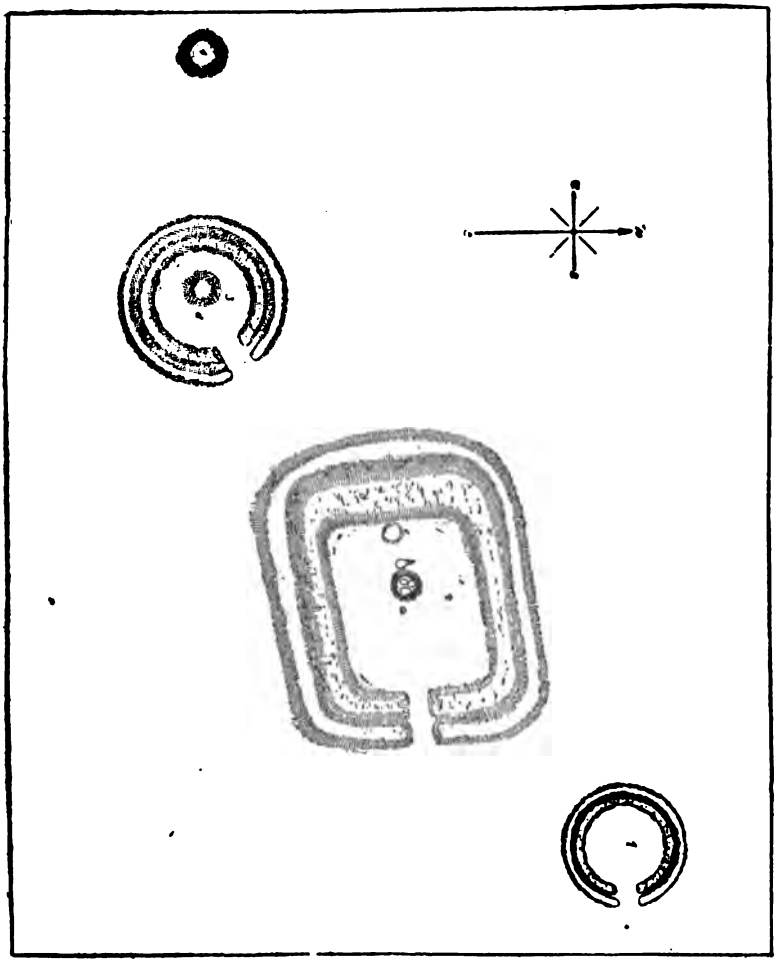


Figure 49 — Group of Enclosures near Dublin.

ditch in the interior." All these were small, the largest measuring 83 by 295 feet in its two diameters. "The elevation of [the different parapets] varies at present from three to five or six feet." He describes also the wall of stones north of the town, and while offering no definite suggestion as to its purpose unless "it must have been a religious monument," gives various objections to "the possibility of its being intended as a work of defense."

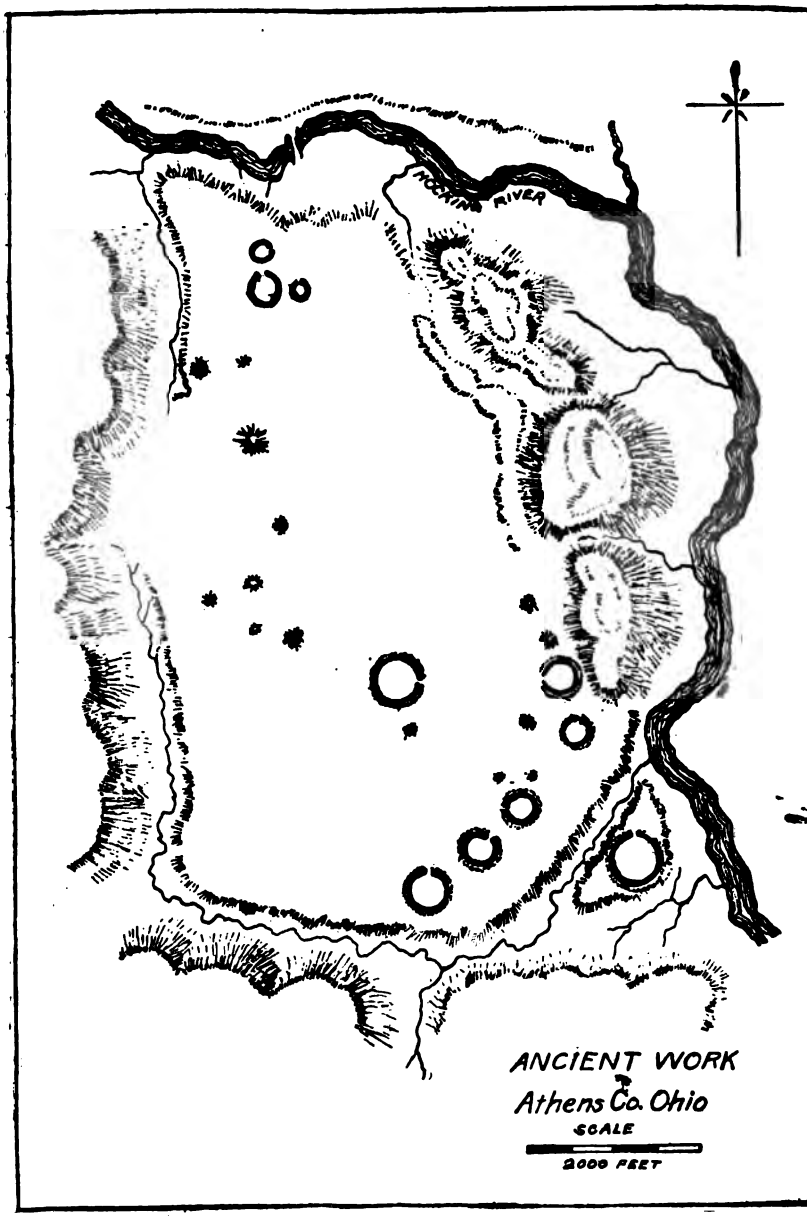


Figure 50.

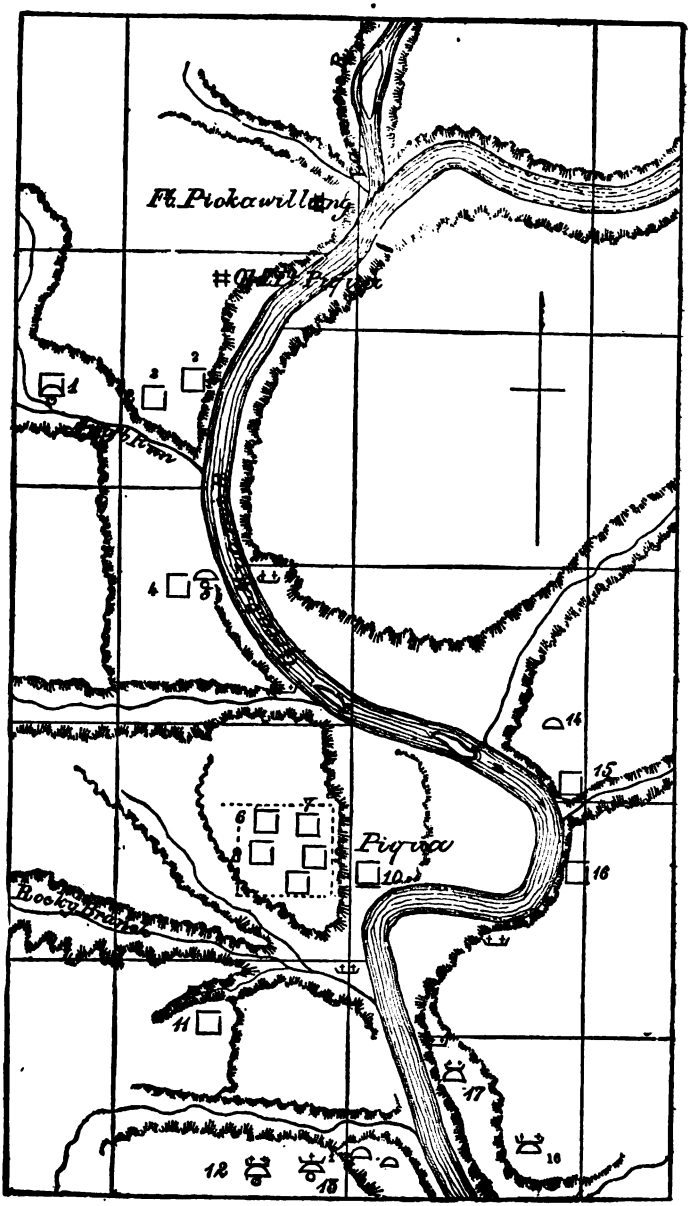


Figure 51 — Archæological Map of Miami County.

"About half a mile to the south of the town at Piqua, there is an old Indian cemetery; upon [the exposed strata of limestone] rocks it appears that the corpses were placed and that they were covered with slabs of stone." Even at that early day, "most of these mounds had been broken open." — Long, St. Peters, 50, *et seq.*

Circular embankments of still smaller size are numerous and wide-spread. For example, at the High Banks works,

"A number of small circles occur about a hundred rods distant from the octagon, in the forest land to the southeast. They measure nearly fifty feet in diameter, and the walls are about two feet in height. It has been suggested that they are the remains of structures of some kind, and also that they were the bases of unfinished mounds. There are no indications of entrances or passageways, a circumstance which favors the latter hypothesis. Similar small circles occur within or in the immediate vicinity of several other large works." — S. & D., 50.

It is probable, as pointed out by Morgan, that walls of this character mark the sites of council houses or communal dwellings. In periods of wet weather some measures must be adopted to prevent the surface water from finding its way to the interior; and in winter the base of the building would need additional protection against the ingress of cold air. Both these requirements could be met either by making a ridge of earth along the line of posts forming the frame of a wooden structure, and extending downward over it the bark or other material with which the walls were covered; or by piling earth against the base on the outside as is now done by many inhabitants of cold countries.

Such embankments as these would also result from the decay of walls plastered with mud.

WORKS OF IRREGULAR CONSTRUCTION.

The more elaborate earth-works, having been so often described and figured, are somewhat familiar to the public; equally deserving of study, though not so impressive, are others to which less attention has been paid.

These vary in design from a straight wall to a combination of rudely elliptical or nearly circular enclosures, with accompanying wing walls or supplementary structures covering many acres. Apparently their general purpose was for protection to settlements around them or to villages within them. In some

cases, the point of a high hill with precipitous sides, or a peninsula in a level bottom, is cut off from the adjacent country by an earthen or stone wall, straight, curved, or broken, as may be most suitable; again, as large a level area as may be desired is enclosed by a crooked embankment, whose ends abut upon a cliff or stream; or where these plans are not feasible, the entire space required is often artificially enclosed. All these methods may be combined in one series. Generally, but not always, a deep ditch accompanies the wall; it may be on either the inner or the outer side. It is probable that the earth in a majority of these structures supported palisades.

In Ohio, remains of this sort are most numerous in the valleys of the two Miamis and in two or three tiers of counties south of Lake Erie, though they are not uncommon in other parts of the State. Many of them closely resemble enclosures and defensive works in other states, known to have been built or occupied in the historic period. In a few, transverse cuttings have shown marks along the center line due, beyond question, to the decay or burning of posts that stood in them.

An excellent example of the form under consideration is situated in Greene county, a few miles from Xenia. At some former time Massie's creek, after eroding a deep, sinuous channel, abandoned its course and formed a cut-off. On the detached area thus separated from the level land the aborigines constructed the work shown in figure 52 (S. & D., plate XII, No. 3). The north, east, and south sides of the island, if it may be so called, terminate in abrupt cliffs which needed no protection. The sloping surface toward the west was guarded by a double line of ditch and embankment, carried entirely across, but interrupted by several gateways.

Typical of this class, also, are the works at Norwalk, presented in figure 53 (S. & D., plate XV, No. 1). The method of closing the entrance in the ellipse, the manner in which the end of the hill is guarded against forays, the dependence upon the stream and its banks for security in other directions, and the partially excavated ditch within the ellipse, show the principal features in all groups of this character. All the lines of embankment were low, none more than three feet high before being cleared.

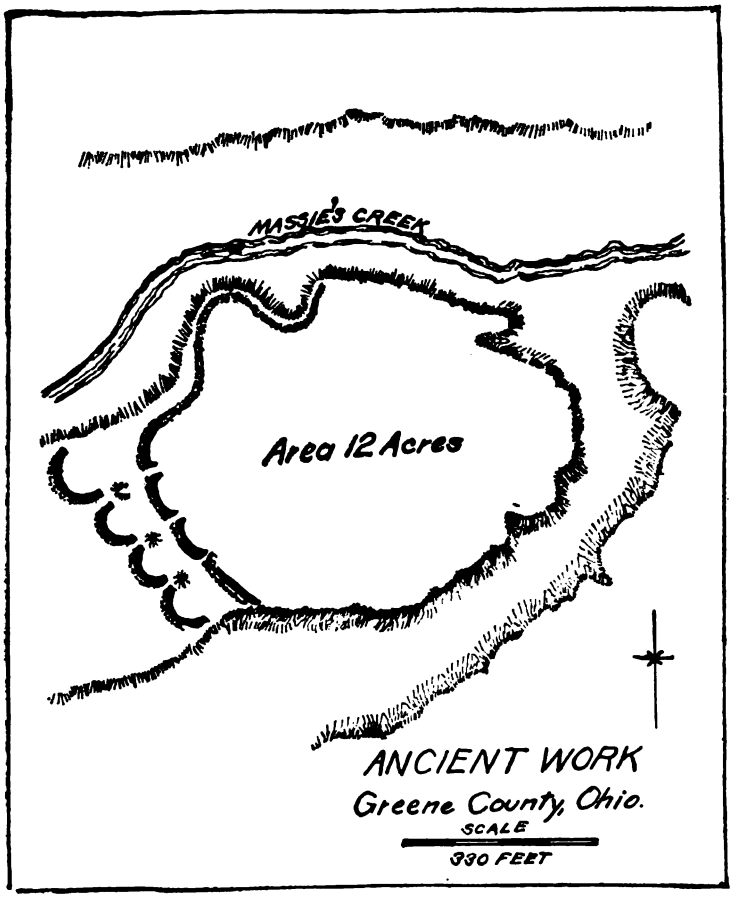


Figure 52.

Other enclosures of this class are given in figure 54 (same, Nos. 2 and 3), the first near Conneaut and the second three miles southeast of Cleveland; figure 55 (S. & D., 40, figs. 6 and 7), on the Cuyahoga River, respectively six and eight miles above Cleveland; and figure 56 (same, fig. 8), an apparently unfinished work, near Toledo. Two in Lorain county are illustrated in figures 57 and 58 (S. & D., 39, figs. 4 and 5).

The first consists of "double embankments, with an intermediate ditch. The embankments are very slight, not much exceeding a foot in height." In the second, which is near the first, there are two embankments, each with an outer ditch, but there is no gateway to the inner line.— S. & D., 39.

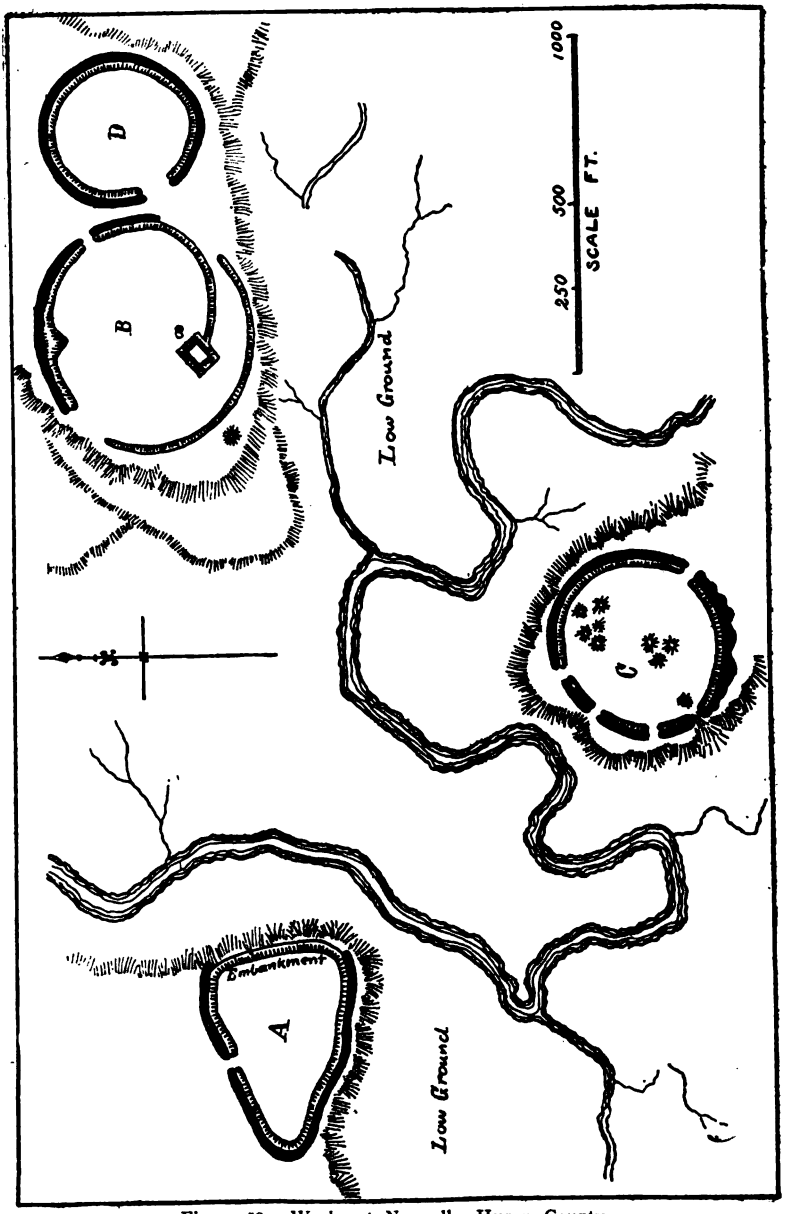


Figure 53 — Works at Norwalk, Huron County.

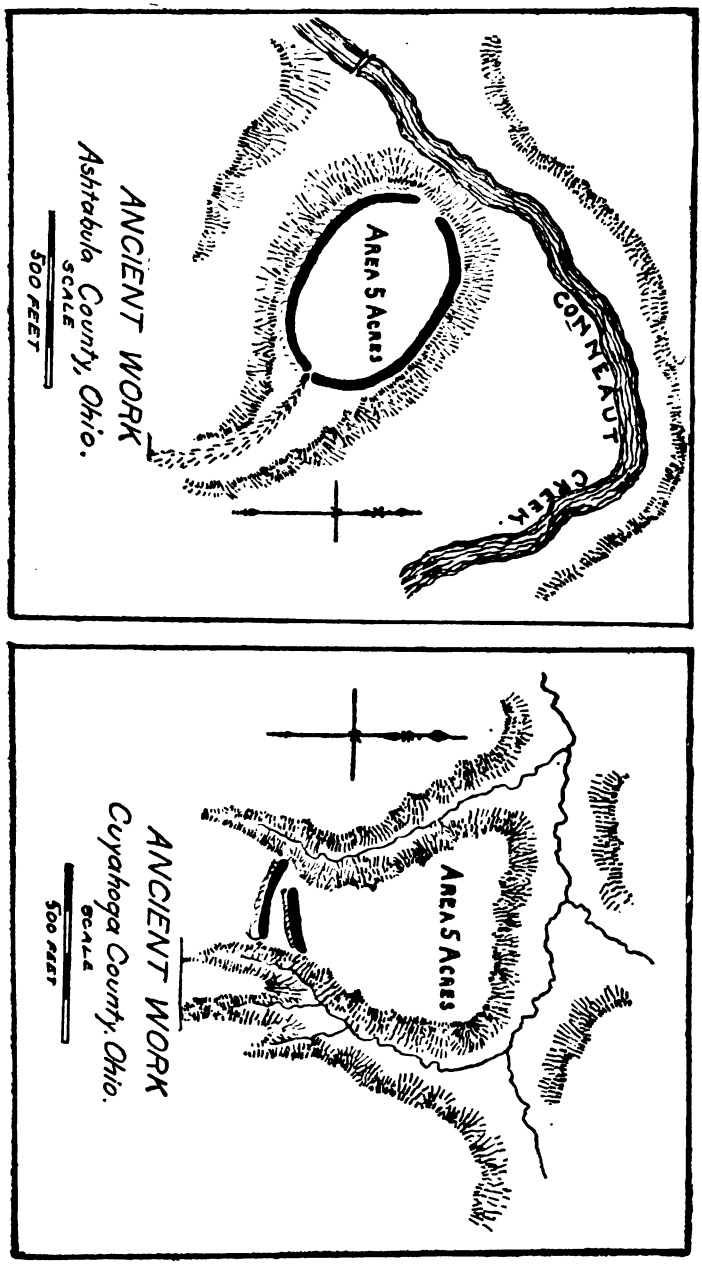

ANCIENT WORK
Ashtabula County, Ohio.
SCALE
500 FEET
AREA 5 ACRES
CONNEAUT CREEK.
ANCIENT WORK
Cuyahoga County, Ohio.
SCALE
500 FEET
AREA 5 ACRES

Figure 54.

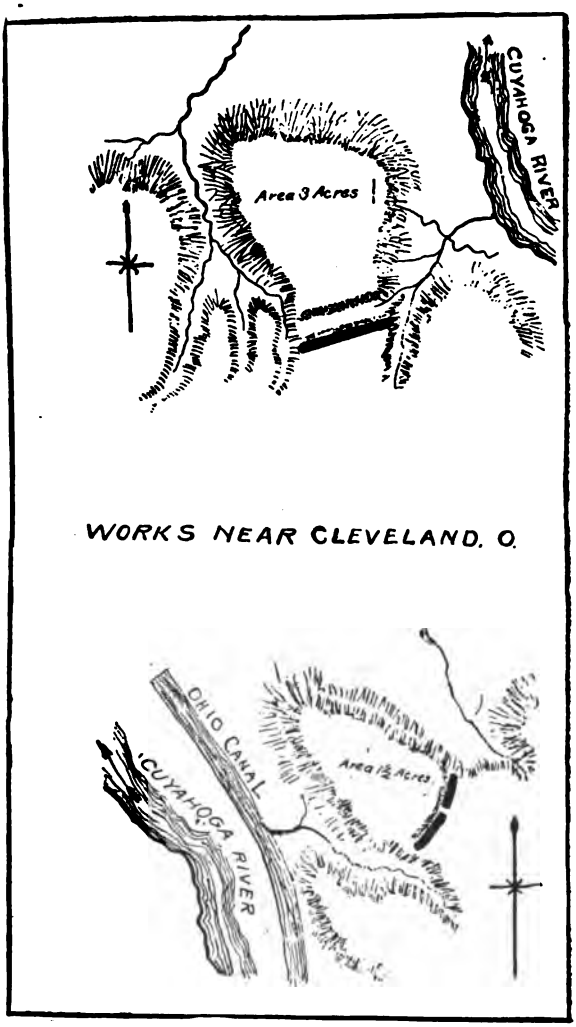


Figure 55.—Works near Cleveland, Ohio.

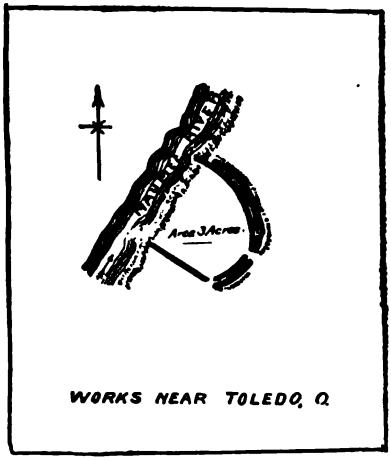


Figure 56.

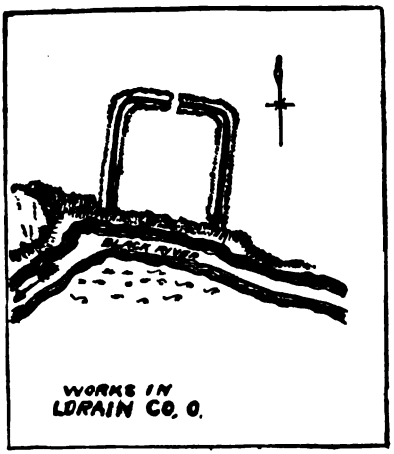


Figure 57.



Figure 58.

A very common form is thus described by Schoolcraft:—

"There are two enclosures on the south shore of Cunningham's [now known as Kelly's] Island, in Lake Erie. One is a crescent-shaped and irregular earth-work, which has the general appearance of an embankment, or circumvallation intended to enclose and defend a village. The gateways occupy the east side and the northwestern angle. The embankment is twelve hundred and forty-six feet around the crescent-shaped part, and about four hundred feet on the rock-brink of the island. A second enclosure, marked by circumvallation, also fronts on the rocky and precipitous margin of the lake. This front line is 614

feet. The embankment, which is wholly without gate or sally-port, is 1243 feet around. Near by is a rock one face of which, measuring 32 by 21 feet, is nearly covered by incised figures and characters. Another inscribed rock, much smaller, is on the north side of the island. Several small mounds or burial heaps are on the western and southern parts of the island." — Schoolcraft, History, II, 86 *et seq.* condensed.

"Within the old fort described [above] large numbers of human bones are turned up by the plow. Under the Indian occupancy this island must have been populous, for there are in many places partially obliterated works of prehistoric date. The islands and the shores of the west end of Lake Erie are the best of fishing grounds where both savage and civilized man can procure an excellent living with little labor." — Whittlesey, Kelly's, 36.

* * * * *

There has been much difference of opinion concerning the relation between these works and the larger enclosures. But there has been no discussion as to their purpose; it is agreed by all that they are defensive in their nature. At first Squier and Davis were inclined to attribute the two classes of work to the same people.

"The traces of ancient fortifications in the northern part of the State of New York, and upon the head waters of the Susquehanna in Pennsylvania, may, it is believed, be referred with entire safety to the same hands with those of the Mississippi valley. It will be seen that they have a close resemblance to those of northern Ohio, both in position and structure." — S. & D., 44.

Short adopted this view and attempted to explain the causes leading to so great a change in conformation.

"The Indian has no more knowledge of who constructed the fort-like enclosures of Western New York, and common upon the rivers discharging themselves in Lakes Erie and Ontario from the South, than of the builders of the mounds of the Ohio and Mississippi. * * * It is probable that these defences belong to the last period of the Mound-builders' residence on the lakes, and were erected when the more war-like peoples of the North who drove them from their cities first made their appearance." — Short, 28.

Foster unconsciously came near arriving at the probable truth of the matter while trying to prove something else.

"The Mound-builders, if their enemy were like the modern Indians, had only to guard against sudden attacks, and a row of pickets, without reference to whether the trench were inside or outside, would be effectual. * * * These [small] enclosures are the most conspicuous along what may be called the frontier of the Alleghenies, and disappear altogether as we enter the immediate valley of the Mississippi. * * * This

would seem to imply that there was another race, occupying the mountain region to the east, * * * — a race of Highlanders, essentially different in habits — * * * who from time to time, made predatory excursions into the Mound-builders' country, and succeeded at last in extirpating the inhabitants. On the west, it may be inferred, the country was secure against such irruptions." — Foster, 175.

In " Ancient Monuments " are figured many works in South Carolina, Mississippi, Tennessee, Kentucky, Indiana, Pennsylvania, and New York, which have a decided resemblance to the more irregular enclosures of Ohio. This fact, however, can have no other significance than that their builders working under analogous conditions and circumstances, with the same kind of material, constructed works essentially similar in character. It cannot be made to mean anything more than that they were the same kind of people—not that they were the same tribes, or even allied to one another.

" All primitive defences, being designed to resist common modes of attack, are essentially the same in their principles, and seldom differ much in their details." — Squier, N. Y., 84.

" In all the works of the northern part of the state described by Colonel Whittlesey, the walls are low and the ditches shallow; none of them having a total slope from embankment top to bottom of ditch of more than eight feet at any point, and most of them having a measure considerably less than this. In most of them the soil on the enclosed area is noticeably more fertile than that in the vicinity outside; indicating a village-site, probably in not very remote times. ' Nothing can be more plain, than that most of the remains in northern Ohio, particularly those on the Cuyahoga river, are military works. It is very safe to presume that palisades were planted on them. Of the works bordering on the shore of Lake Erie, through the State of Ohio, there are none but may have been intended for defense; although in some of them the design is not perfectly manifest. They form a line from Conneaut to Toledo, at a distance of from three to five miles from the lake; and all stand upon or near the principal rivers. They are so different from the large enclosures in the interior of the State that I am disposed to regard them, not only as designed for other purposes, but as the work of another and probably later people. By whatever people these works were built, they were much engaged in offensive or defensive wars. At the south, on the other hand, agriculture and religion seem to have chiefly occupied the attention of the ancient people. Upon the assumption that two distinct nations occupied the State,— that the northern were warlike, and the southern agricultural and peaceful in their habits,— may we not suppose that the latter were overcome by their northern neighbors, who built the military works to be observed upon the Ohio

and its tributaries, while the more regular structures are the remains of the conquered people?' " — S. & D., 41, condensed.

The authors, unwilling to relinquish their prejudice in favor of a single race, make this comment upon Whittlesey's contribution:—

" The differences between the northern and southern earthworks, pointed out by Mr. Whittlesey, are not greater than would naturally be exhibited between the structures of a sparse frontier population, and those erected by more central and dense communities. * * * The race by whom these works were erected, possessed [a] knowledge of the science of defense * * * much superior to that known to have been possessed by the hunter tribes of North America previous to the discovery by Columbus, or indeed subsequent to that event." — S. & D., 42.

The best general description of remains of this character is furnished by Read:

" The most of these works are confined to the valleys of the streams where there is land specially adapted to the cultivation of maize. * * * They are much more abundant in the northern and southern than in the central parts of the State, a fact which might be easily explained from the small extent of the alluvial valley on the table land. Still there is a marked difference in the character of those in the northern and southern regions. The former have more the appearance of defence works, both in their location and mode of construction. They ordinarily occupy elevated spurs, projecting from the table land into the valleys, overlooking extensive alluvial plains — often where erosion has left these spurs with a narrow connection with the table land, and a wider expanse of surface on the part projecting into the valley. In such cases the works consist of one, two, or three ditches and embankments across the neck, plainly intended to protect the spur against aggression from the table land. The enclosed surface often shows evidence of having been leveled off, the material removed so deposited as to increase the angle of the slope rising from the valley; and in some cases the location of an old footpath leading from the summit into the valley can be clearly traced. The enclosed surface is generally filled with pit-holes and shows evidence of long occupancy. * * * These protecting walls and ditches take different shapes, determined by the form of the surface to be protected. * * * The size of these enclosures seems to be related to the size of the arable land in the adjacent valley, and hence to the size of the village communities that could be supported by them. It seems a reasonable inference that these enclosures were strongholds, for protection and observation, and designed to meet the normal wants of small communities of agriculturalists, and that they were not erected to meet the exigencies of a campaign. The great number of them, and the small size of each, scattered along the bluffs of a single stream, like the Cuyahoga, would tend to confirm this conclusion. * * * In the valley, and at a distance from these protected enclosures, are some-

times single mounds, which seem not to have been burial mounds, raised to such an elevation merely as would give an extended view above the top of the growing corn. * * * In this whole northern region true burial mounds are rare, and those that have been observed are of small size." — Read, Arch., 80.

Near the north line of Pickaway county two parallel streams enter the Scioto some 300 feet apart. Across the peninsula thus formed extend *three* parallel lines of embankment, separated only by narrow ditches interior to each. — S. & D., 36.

This is the most southern point in central Ohio where a work of this particular kind has been recorded. It signifies that a party from the Lake district established themselves here for a time; though it may have been only a temporary village-site or a summer's camping-place.

After Squier had concluded his archæological work in southern Ohio, he extended his labors to western New York and the southern border of Lake Erie. He comes to the following conclusions:—

"It has long been known that many evidences of ancient labor and skill are to be found in the western parts of New York and Pennsylvania, upon the upper tributaries of the Ohio, and along the shores of Lake Erie and Ontario. Here we find a series of ancient earth-works, entrenched hills, and occasional mounds or tumuli. It has all along been represented [by various authors whom he names] that some of the enclosures were of regular outlines, true circles and ellipses and accurate squares — features which would imply a common origin with the vast system of ancient earth-works of the Mississippi valley. Submitted to the test of actual survey, I have found that the works which were esteemed entirely regular were the very reverse, and that the builders, instead of constructing them upon geometrical principles, regulated their form entirely by the nature of the ground upon which they were built. And I may here mention, that none of the ancient works of this State, of which traces remain displaying any considerable degree of regularity, can lay claim to high antiquity. All of them may be referred, with certainty, to the period succeeding the commencement of European intercourse."

"Were these works of the general large dimensions of those of the Western States, their numbers would be a just ground of astonishment. They are, however, for the most part, comparatively small, varying from one to four acres — the largest not exceeding sixteen acres in area. The embankments, too, are slight, and the ditches shallow; the former seldom more than four feet in height, and the latter of corresponding proportions. * * * Most occupy high and commanding sites near the bluff edges of the broad terraces by which the country rises from the level of the lakes. * * * When found upon lower grounds, it is

usually upon some dry knoll or little hill, or where banks of streams serve to lend security to the position. A few have been found upon slight elevations in the midst of swamps, where dense forests and almost impassable marshes protected from discovery and attack. In nearly all cases they are placed in close proximity to some unfailing supply of water, near copious springs or running streams. * * * These circumstances, in connection with others not less unequivocal, indicate, with great precision, the purpose for which these structures were created. * * * Few positions susceptible of defence, under the systems practiced by all rude people, are to be found upon [the first and second] terraces; the builders, consequently, availed themselves of the numerous headlands and other defensible positions which border the supposed ancient shores of the lake, simply because they afforded the most effectual protection with the least expenditure of labor."

"Misled by statements which no opportunity was afforded of verifying, I have elsewhere, though in a guarded manner, ventured the opinion that the ancient remains of western New York belonged to the same system with those of Ohio and the West generally."

"In full view of the facts before presented, I am driven to a conclusion little anticipated when I started on my trip of exploration, that the earth-works of Western New York were erected by the Iroquois or their western neighbors, and do not possess an antiquity going very far back of the discovery. Their general occurrence upon a line parallel to and not far distant from the lakes, favors the hypothesis that they were built by frontier tribes — a hypothesis entirely conformable to aboriginal traditions. Here, according to these traditions, every foot of ground was contested between the Iroquois and the Gah-kwas and other western tribes; and here, as a consequence, where most exposed to attack, were permanent defences most necessary." — Squier, N. Y., 2, 12, 11, and 83.

The contrary opinion to that expressed by Squier, would not have become so firmly fixed, perhaps, but for Gallatin. His standing as a student of Indian languages gave to his words undue influence in aboriginal affairs generally. Consequently, when he ridiculed the idea that earthen walls were made by Indians, few were inclined to doubt his correctness. Either through a lack of acquaintance with early records, or a lapse of memory in regard to their contents, he wrote,

"If considered only as fortifications, ramparts of earth in a forest country strike us as a singular mode of defense against savage enemies and Indian weapons. All of the defensive works, without exception, that were used by the Indians east of the Mississippi, from the time they were first known to us, were of a uniform character. They all consisted of wooden palisades strongly secured, [were] of a moderate size, and such

as could be defended by the population of an Indian village." — Gallatin, 148.

But Gallatin overlooked the fact that palisades cannot stand without support; and this support usually takes the form of a bank of earth heaped against the foot. Frequently, too, a ditch was dug alongside as an additional defense.

From Canada and New England to the Gulf and the upper Missouri, fortification by means of ditch, embankment and palisade, was common; and this was continued until within the present century, or until the final expulsion of the Indians, in war among themselves as well as with the whites. There can be no reasonable doubt that many of the large earth-works in the Southern States are the sites of villages or towns occupied in De Soto's time.— Carr, Mounds, 593, *et seq.*

"The fortified towns of the Hurons were all on the side exposed to Iroquois incursions. The fortifications of all this family of tribes were, like their dwellings, in essential points alike. A situation was chosen favorable to defence,— the bank of a lake, the crown of a difficult hill, or a high point of land in the fork of confluent rivers. A ditch, several feet deep, was dug around the village and the earth thrown up on the inside. [Palisades] were planted on the embankment, in one, two, three, or four concentric rows,— those of each row inclining towards those of the other rows until they intersected." — Jesuits, xxviii.

"The Iroquois resided in permanent villages. * * * Having run a trench several feet deep around five or ten acres of land and thrown up the ground on the inside, they set a continuous row of stakes or palisades in this bank of earth, fixing them at such an angle that they inclined over the trench. Sometimes a village was surrounded by a double or even a triple row of palisades. * * * Around it was the village field, consisting, oftentimes, of several hundred acres of cultivated land. * * * But * * * when their power had become consolidated and most of the adjacent nations had been brought under subjection, the necessity of stockading their villages ceased, and with it the practice." — Iroquois, 312.

"Indeed, now that the palisades that once enclosed the villages known to have been occupied by the Iroquois have rotted away, there is no structural difference to be seen between them and any of the earth-works of Western New York; and as these, in their turn, are identical in this respect with the hill-forts of the Ohio valley, it must follow, if the Iroquois or their western neighbors erected the New York series of these works, that there is no reason why these same western neighbors, or a people in the same stage of civilization, could not have built those in Ohio and still further to the west, due regard being had to their population and to the necessity for such defenses." — Carr, Mounds, 592.

CHAPTER VII

HILL-TOP ENCLOSURES.

Effective Defenses. Deficient Water Supply. Large Areas Included. Amount of Labor Involved in Construction. Possibly Not Work of the Mound Builders.

THE difficulties of accounting for large symmetrical embankments in bottom lands, do not exist in the case of walls of similar proportions upon, or around, the summits of hills To all who carefully examine their location it is evident they were made for defensive structures. Whether composed entirely of stone, or of earth, or of both combined; whether confined to a plateau or extending down a hillside; whether having a ditch either interior or exterior, or rising directly from a level surface; —in all, the method of construction and their position relative to the surrounding country, make it obvious they were intended as a place of refuge in time of danger from foes. So long as the defenders could muster in sufficient numbers to man the walls and had an ample store of provisions and munitions of war, these places would be impregnable except against overwhelming odds.

But provisions means also water; and the most perplexing question in the study of all these forts, one that has never been solved in a satisfactory manner, is that of water supply. No springs exist within them, as they are above drainage; shallow depressions in some have been called reservoirs, but these would be very precarious as they depend entirely upon rainfall and are dry much of the summer and autumn; it would be a tedious and arduous undertaking to carry an adequate supply up these long steep hills at any time, and with an active, alert enemy at hand would be impossible of performance. Even should the few ponds be cleared out to a depth that would ensure plenty of water the year round, the difficulty still presents itself that most of these enclosures have no depression within them where water would stand for a day.

FORT ANCIENT.

Easily first among prehistoric fortifications, is Fort Ancient in Warren county. The Little Miami at this point makes a sharp bend from south to east. Two ravines head near each other on the table land to the left of the stream; one of these trends west, the other south, into the river. The promontory thus formed has an elevation of about 270 feet. Around the tortuous margin of its summit a ditch has been excavated and the earth piled on the outer side in a wall which varies from three to twelve feet in height, above the natural surface. Across the narrow level neck between the two ravines the ditch is outside the wall, and the latter rises to an altitude of nineteen feet. East of the fort, a few rods from the walls, are two mounds, about ten feet high before being disturbed; an artificial ditch reached from each of these to the ravine bounding the fort on the corresponding side. Beginning at these mounds a double line of embankment extends eastward, curving around a small mound and coming together at a distance of 2760 feet from the starting-point.

At every opening where the wall is worn away, stone may be seen cropping out at the base; whether they underlie the entire embankment, or whether they are only placed at the depressions to prevent surface water from washing out the earth is as yet unknown. To the left of the pike, above the railway station, may be seen a few stones piled in the form of a leaning wall, near the outside margin of the embankment. They are now covered with earth, settled down over them from the wall.

The total length of the walls of the fort, not including any detached works, is 18712 feet; the longest straight line that can be drawn within them is a little less than 5000 feet.

Many thousands of "Indian relics" have been gathered up within a radius of two miles about the fort. They include every variety of form and material that can withstand exposure to air and moisture. At several places within the fort walls and in the immediate vicinity, flint implements were made in great quantities.

A feature of much interest in connection with Fort Ancient, is the stone pavement about two hundred yards outside of the eastern wall.

"An excavation four feet in width and ten feet long was made, and one portion of the pavement was actually laid bare. We found at a depth of twelve inches a considerable quantity of fine gravel, which had been filled in between the stones, and which seems to have been intended to secure evenness of surface. The pavement is laid with limestones, which were probably brought from the ravines and creek-beds in the neighborhood. Some of them are two to two and a half inches in thickness, others not more than an inch and a half. The pavement rests on the original surface, the clay being fourteen to fifteen inches below it. It is supposed to have been on the surface, of course, and the earth above is due to vegetable decay and the accumulation of debris. Some of the stones give evidence of having been subjected to the action of fire, but most of them show no trace of heat. The use of this pavement is wholly conjectural. * * * Its area, approximately, is 130 by 500 feet. * * * The plow has greatly disturbed in a number of places a few of these stones, but most of them are as they were placed at first. They seem to have been slightly worn on the upper side, as if they had been used for many years as an assembly-ground." — Ft. A., 54.

For additional information concerning this remarkable product of prehistoric skill and industry the reader is referred to a volume entitled "Fort Ancient," by W. K. Moorehead. It embodies the results of months of labor spent in making surveys and excavations.

The land upon which the fort is located, with the exception of a small portion at the northern end, is now the property of the State, and in charge of the Ohio Archæological and Historical Society; so its preservation is ensured for centuries to come.

A correct plan of the enclosure and surrounding area is shown in Figure 59, reduced and slightly altered from Moorehead's map.

The plan by Squier and Davis, which has been extensively copied, conveys an incorrect idea of the course of the walls. Many of the sections represented as regular curves or tolerably straight lines have numerous sharp bends and angles. The lines of contour and the course of ravines are quite misleading, as they give a very erroneous impression of the height and steepness of the hill-sides. None of the streams are shown in their proper places, especially that which is represented as flowing westward along the southern side, apparently about half way up the hill; in reality this flows directly south across a narrow strip of bottom land into the river. The "mounds" marked on the line of enclosure are only heavier sections of embankment.

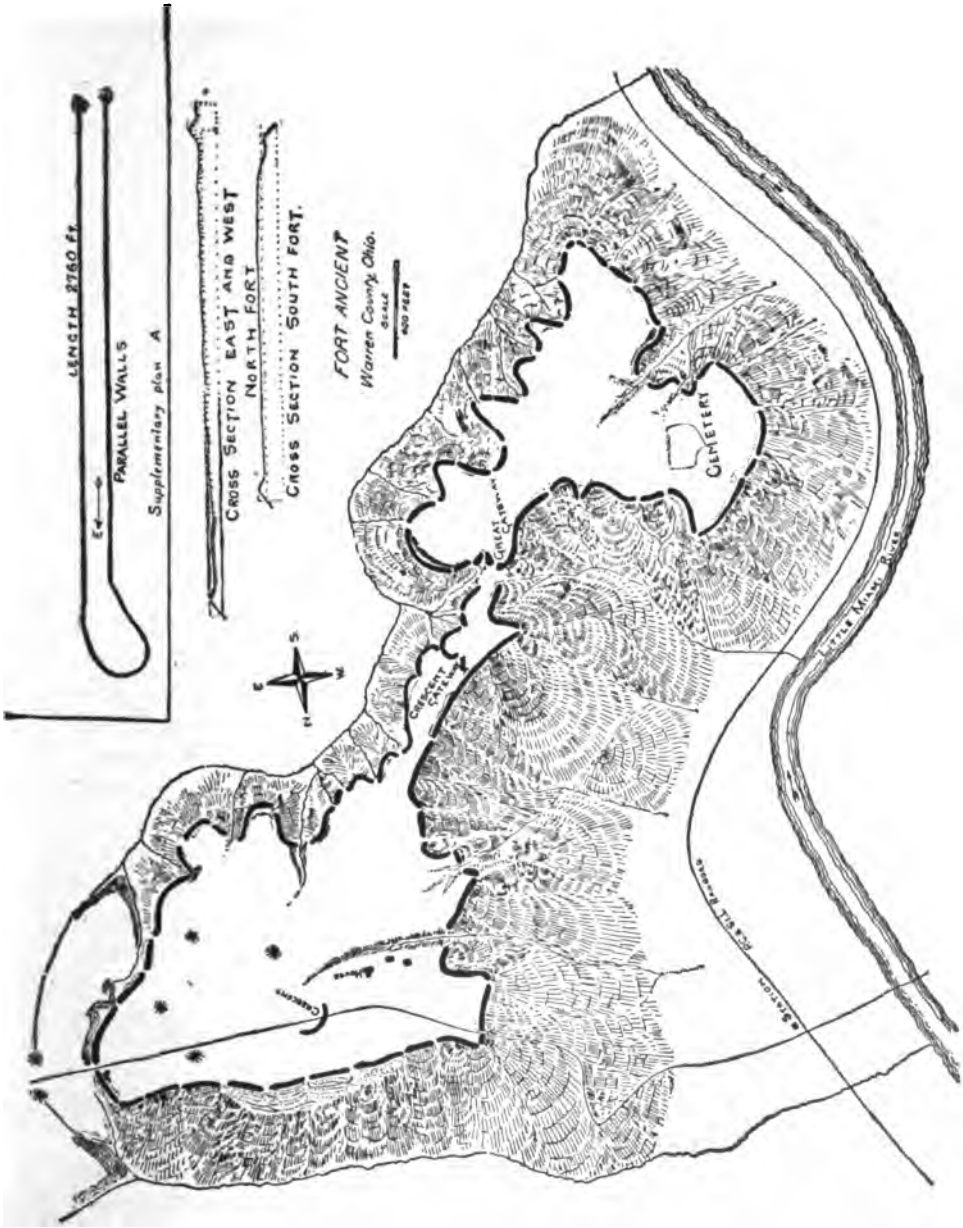


Figure 59 — Fort Ancient, Warren County.

These authors also state that the parallel walls "continue for about thirteen hundred and fifty feet;" which is less than half their real length.

In order that he may find an excuse for ascribing a "religious significance" to the work, Peet congratulates himself upon his good fortune

"in apprehending the significance of these walls and mounds of the lower enclosure" at Fort Ancient. "They bear a resemblance to the form of two massive serpents, which are apparently contending with one another." — Peet, I, 1.

There is more to the same effect.

SPRUCE HILL.

Figure 60 (S. & D., 11, Plate IV), is a copy of the Squier and Davis survey of the fort at Spruce Hill, opposite Bourneville in Ross county.

This work overlooks the entire region from the hills east of the Scioto to the high land about Hillsboro, as well as the country for many miles north and south. The hill on which it stands is a long, narrow spur projecting from the table land toward the south, with steep, in some cases almost precipitous, sides. The wall, composed entirely of bowlders and cobble-stones resulting from the disintegration of the sandstone strata at and near the surface, closely follows the margin of the level summit, a little below the top of the slope at every point except where the lines connecting the ends are carried across. It was only from this direction that danger need be apprehended by the inmates, as no other portion of the enclosure could be reached save by a tedious ascent of the steep hill, over loose rocks in many places, and constantly exposed to missiles of the besieged. Although nowhere more than two feet in height now, the amount of material scattered along the line where it has stood is abundant for the construction of a barrier sufficient to check the advance of an unorganized or undisciplined foe. The few breaks or openings easily accessible are all in the part crossing the neck of the spur, and are quite narrow, with the wall curving inward at each. Thus, every entrance could be speedily closed to form a *cul-de-sac* where an enemy, when he once got in, would find himself exposed to attack on three sides.

At the time of the original survey,

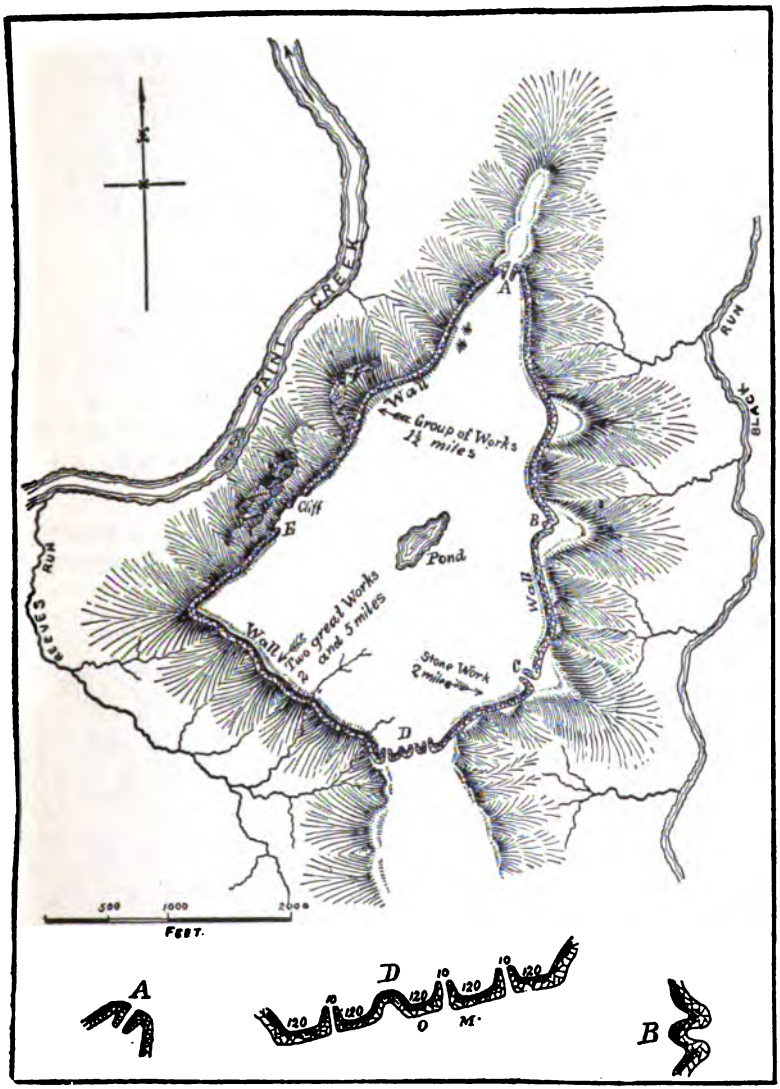


Figure 60 — Spruce Hill Fort, near Bourneville.

"where the wall is best preserved, there is little evidence that the stones were laid one upon the other so as to present vertical faces, much less that they were cemented in place." — S. & D. 11.

Since that date the owner of the land, in building a fence, carried it for a few rods along the old line. In order to save rails, he gathered up all the loose stones and built them into a wall. This was told to me by the man who built the fence. This short stretch of modern stone wall has several times been cited as proof that the Mound Builders could erect a stone wall that would remain upright for an indefinite time. It has now fallen.

The interior of the fort has been long in cultivation; but the clearing, except in a few spots, reaches only to the top of the slope, so that the wall is still mostly in the original forest. It is evident that Squier and Davis followed the margin of the cleared land in making their survey, at least for the greater part of the way, and made the course of the wall correspond. Many curves and angles which exist in the structure do not appear in the drawing.

"On the inside of the wall, at line *D*, there appears to have been a row of furnaces or smith's shops, where the cinders now lie many feet in depth." — Atwater, 149.

These masses of burned earth and stone also occur at some other points, notably on the western side. No examination has ever been made of them, so no explanation can be offered.

There is a large depression within the fort which is generally supposed to be artificial, intended to form a reservoir or permanent lake. Its shape and situation are such that it must be due to natural causes. It is now nearly filled up.

In the shale forming the bed of Paint creek, at the foot of Spruce Hill, are many concretions, some of them two or three feet in diameter. Floods and freezing split and break these in various shapes, thereby giving rise to stories of "wells," "fish traps," "hiding places for treasure," etc. Such concretions are common in many places, and the diverse forms they assume, though often peculiar, are altogether natural.

This fort is probably the largest area in the world surrounded by an artificial wall made entirely of stone.

FORT HILL.

Fort Hill, three miles north of Sinking Springs in Highland county, is located on one of the western peaks of the Sunfish Hills, entirely detached by Brush creek and deep ravines from

any other elevated area. The hill-sides present a succession of minor cliffs, shale banks, washouts, and loose broken rock; in only two or three places can a continuous grade be found to the summit. At the top, a sandstone ledge crops out, and the weathered fragments of this are piled up into a rude wall around the hill, conforming in some measure to its irregular outline. The height of the wall was increased by throwing on it a large quantity of earth, excavated along its inner side, leaving a considerable ditch.

"It is worthy of note that this work is in a broken country, with no other remains, except perhaps a few small, scattered mounds, in its vicinity. The nearest monuments of magnitude are in the Paint Creek valley, sixteen miles distant, from which it is separated by elevated ridges. Lower down, on Brush Creek, towards its junction with the Ohio, are some works; but none of importance occur within twelve miles in that direction." "In 1845, a standing chestnut was 21 feet in circumference, and a fallen oak 23 feet. The length of the wall is 8,224 feet; its height usually from 6 to 10, though in some places, 15 feet; the base is 35 to 40 feet." "The ditch has an average width of not far from fifty feet; and in many places is dug through the sandstone layer upon which the soil of the terrace rests. At the point *A* the rock is quarried out, leaving a mural front twenty feet high." — S. & D., 14 and 16.

The use of the term "quarried" by the authors has led to a belief that work was carried on here similar to that employed in getting out large blocks for building. Such was not the case. The rock at this point is not in heavy layers but in angular, flattened slabs, thinning out to an edge on every side, and most of them small enough to be handled by one man. It is but little more difficult to take them from a bluff, at least to as great a depth as roots and frost penetrate, than it is to pick them up in the bed of a creek. No other tools than handspikes would be needed.

The accompanying map, figure 61, is reconstructed from those of Squier and Davis, and H. W. Overman of Waverly. Overman's map of the immediate vicinity is also given in Figure 62 (O. A. H., I, 262). An abstract of his report is appended.

"Fort Hill is three miles north of Sinking Springs, in Highland county, Ohio. Its elevation is about five hundred feet above the bed of Brush Creek. It was constructed by an excavation of earth and stone around the brink of the hill, thus raising a wall, which, at the present time, has a base averaging twenty-five feet and a height averaging from six to ten feet. Its entire length is 8,582 feet. It contains

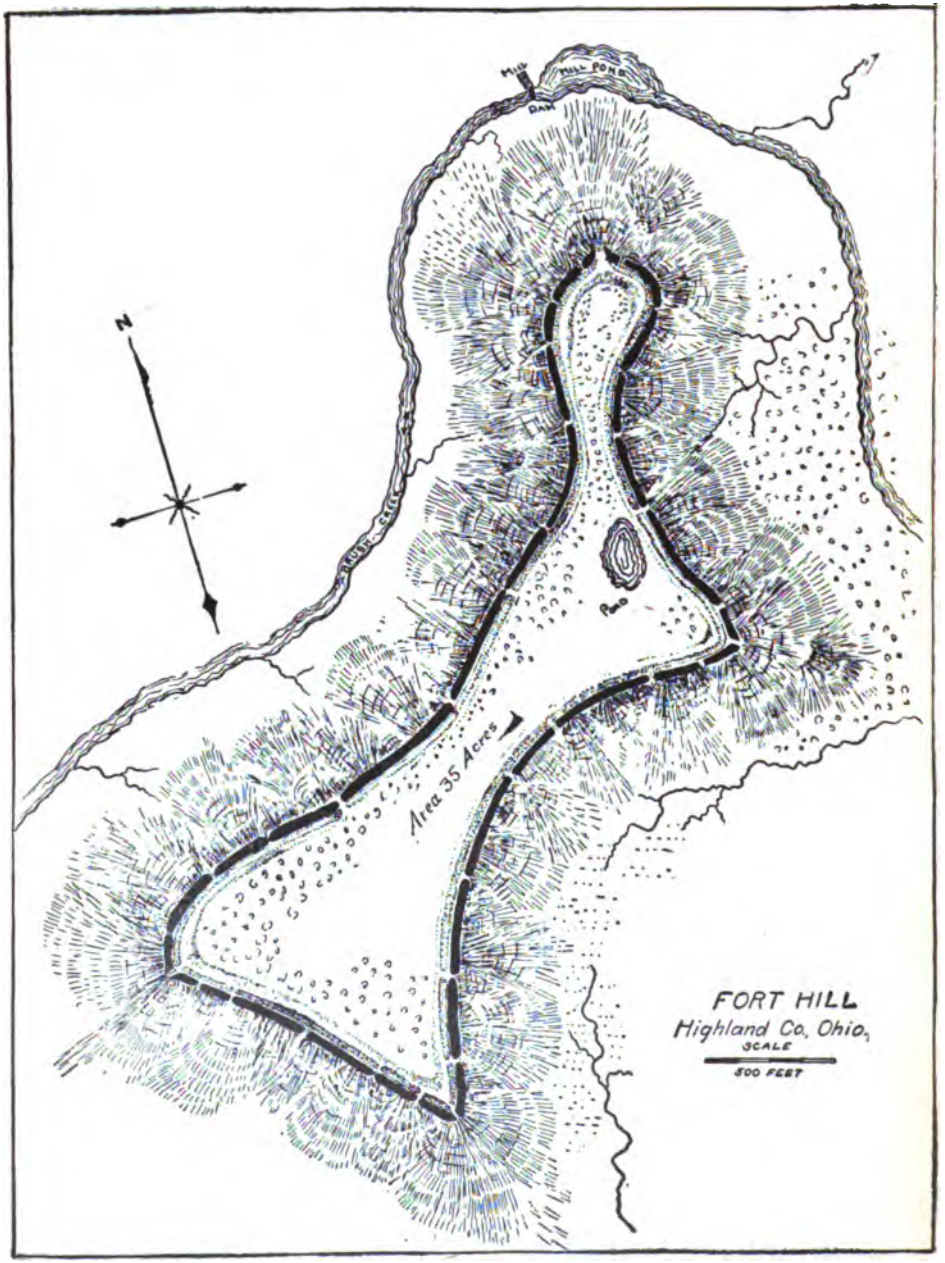

MILL POND
MILL DAM
N
Area 35 Acres
FORT HILL
Highland Co, Ohio.
SCALE
500 FEET

Figure 61.

50,856 cubic yards of material. The area enclosed is thirty-five acres. The gateways or entrances are thirty-three in number and are spaces from ten to fifteen feet in width, arranged without apparent order or regularity except that an average number is found on either side,—the eastern half containing the same number as the western. The

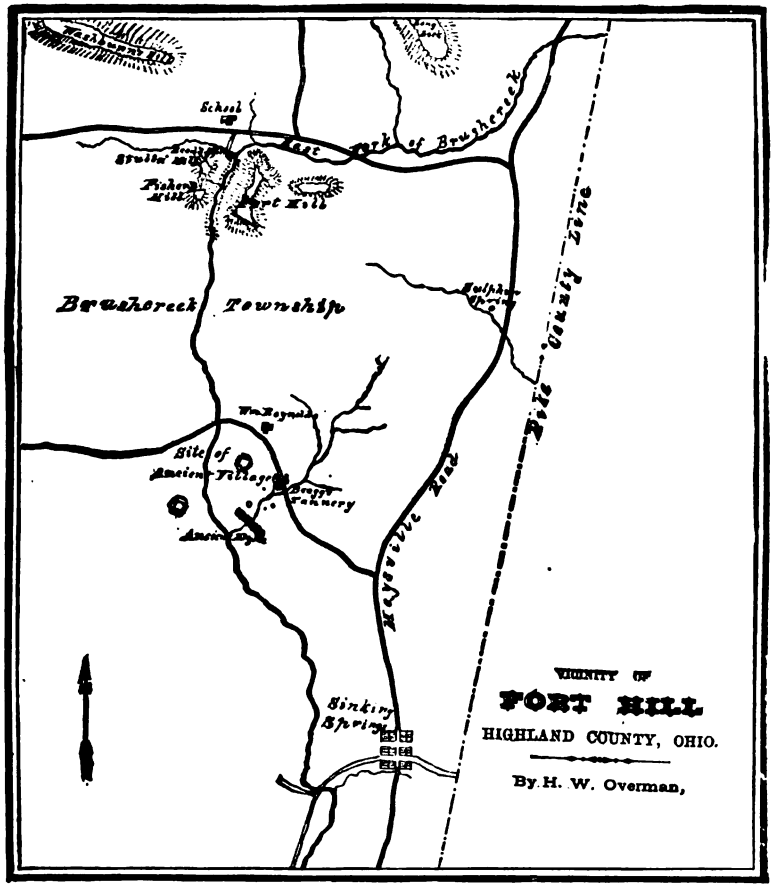


Figure 62 — Map of the Vicinity of Fort Hill.

same may be said as to the northern and southern divisions. The space enclosed is level. There are two small ponds, one located near the northern extremity, the other in the north-central part of the Fort. In winter and during rainy weather these ponds contain water and could be made to hold and retain almost any desired quantity. The entire circumference of the wall for at least one hundred feet from the summit is very steep and precipitous, so that the inmates would certainly be able to repel a much superior force from the outside.

"There are evidences of the former existence of a considerable village or settlement about one mile south of the summit of the hill. Three

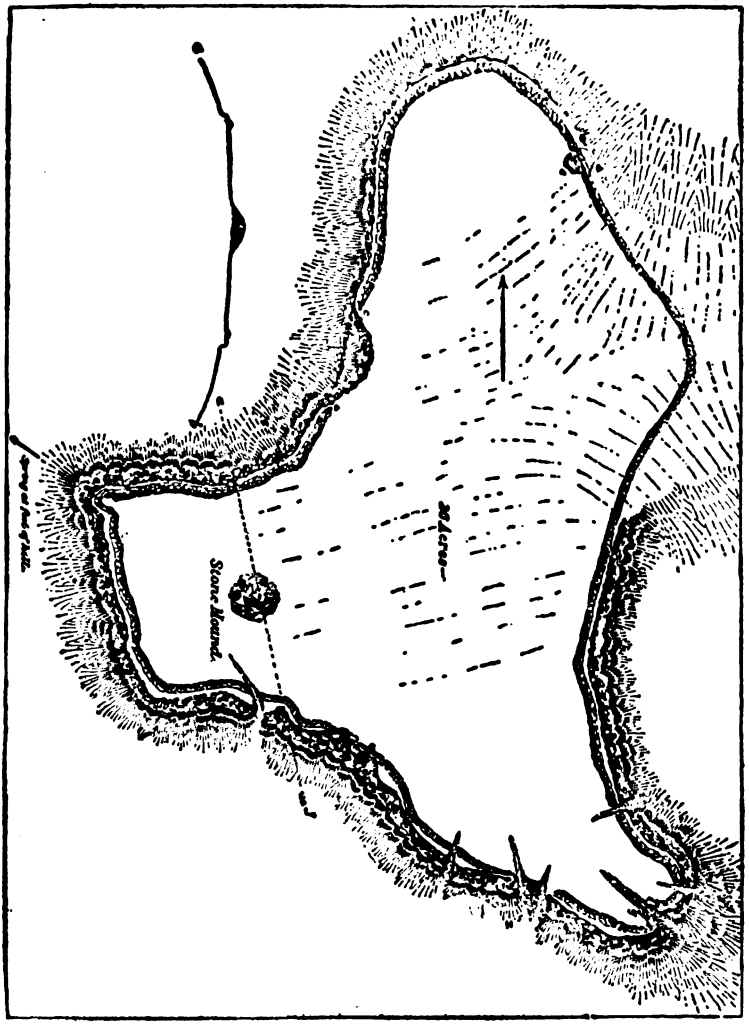


Figure 65 — The Stone Fort at Glenford, Perry County.

circular enclosures and other artificial structures are visible." — Overman, 260-1.

GLENFORD FORT.

One of the most interesting works in the State is the large stone fort in Perry county, near Glenford. A sketch is given in

Fig. 63 (B. E. 12, No. 470, Fig. 319). It stands upon a hill which is entirely isolated from the surrounding high land except for a very narrow ridge which gently declines for some distance toward the southeast, and then rises to the general level. The spur thus cut off is elevated about 300 feet above the creek at the foot of the western slope; its practically level summit is terminated in nearly every direction by a vertical ledge of sandstone from six to ten feet in height, the outcrop of the cap-rock. On the eastern side this bluff is absent for a few hundred feet and the slope is tolerably uniform from the top half way to the bottom. The wall of the fort follows closely around the margin, except at the line c—d where, for some unexplainable reason, it is carried along the steep hillside below. It varies from six feet high at the southeast and northwest sides, to a foot or even less along the gentle eastern slope where one would naturally suppose it would be heaviest, as no other part is so easily approached.

It may be, however, that for this reason palisades were erected, and only a retaining wall of stones made. Several small breaks eroded in the solid rock foundation intercept the course of the line. It is carried across some, around others, and terminates at each side of the deepest; the sides being vertical, no protection was needed in the last, as it would be easy to drop a boulder on the head of an intruder. At the southeast corner is a natural passage-way, formed by a long crevice opening out directly on the isthmus. The wall is re-entrant along both sides of this and much strengthened at its outlet. There is a confused heap of stones on each side here, which may have formed a sort of bastion, breastwork, or other defensive structure. The entire length of the wall, which is much more tortuous than can be shown on the small scale of the accompanying map, is 6,610 feet, and the enclosed area about 26 acres. Very few stones are to be seen on the surface within the enclosure; all which were accessible at the time seem to have been gathered up to form the walls, and the mound shown in the cut. The latter is now about 12 feet high and 100 feet in diameter; but a great amount of stone has been hauled away from it.

At several points are minor openings, most of them convenient to good springs at the foot of the hill.

Views of this structure are shown in figures 64, 65, 66 and 67.

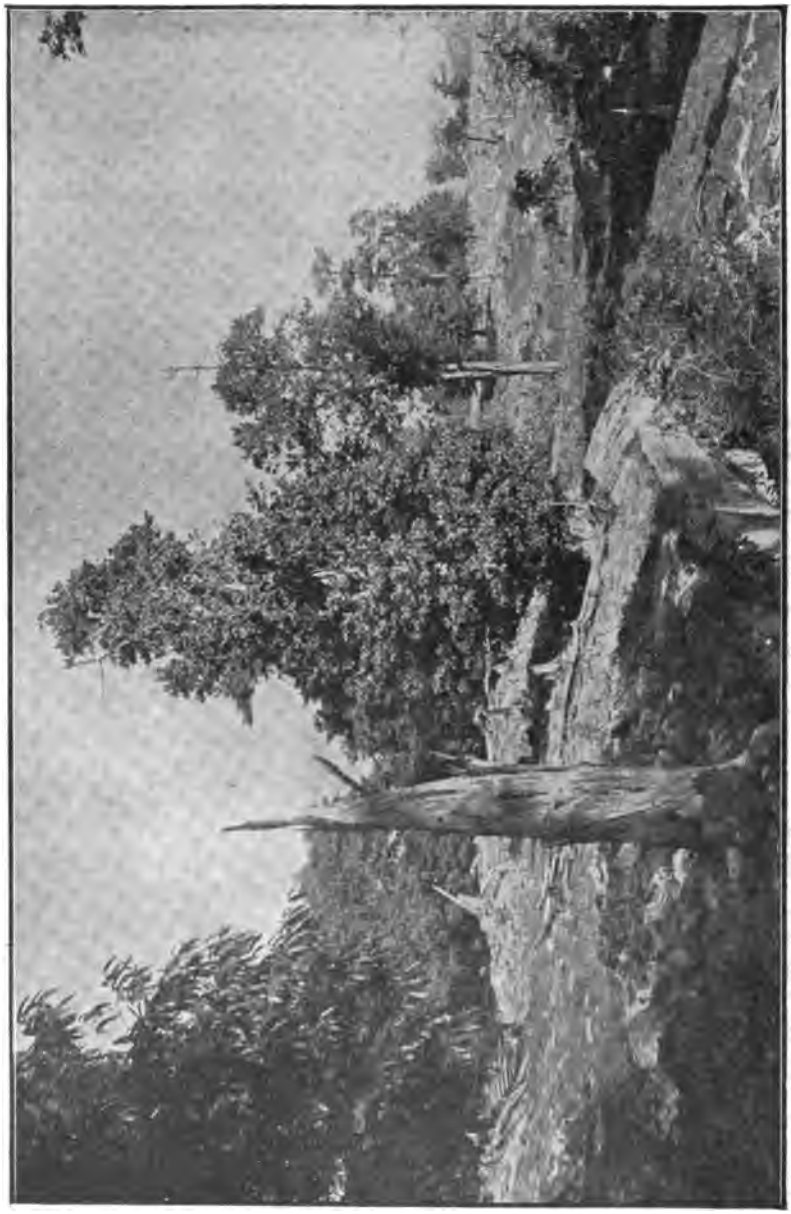


Figure 64 — Looking north along the east side of Glenford Fort.



Figure 65 — View on the east wall of Glenford Fort.



Figure 66 — Present appearance of the east wall of Glenford Fort.

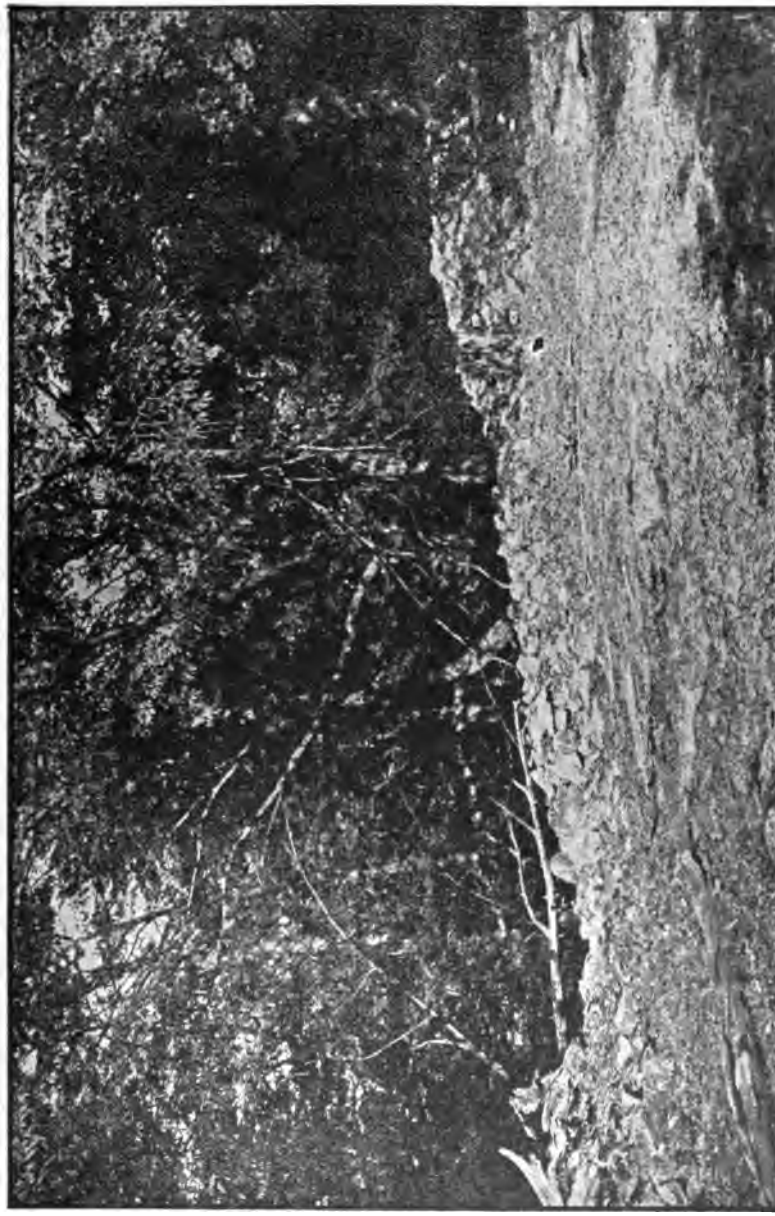


Figure 67 — View from the interior of Glenford Fort, near the stone mound.

FORT MIAMI.

The defensive earthwork in the extreme southwest angle of the State is commonly known as Fort Hill; but as that title is due by pre-emption to the work in Highland county, this should be called Fort Miami from its location on a high hill overlooking all the territory about the mouth of the Great Miami river.

There is very little stone in the wall, it being composed almost entirely of earth obtained from a ditch along the bottom, on the inner side. The gateways are comparatively narrow and few in number; from the situation of some of them it would seem they were but little used; others are toward the easiest approaches. The average cross-section of the wall is considerably in excess of that of any other enclosure in the State, similarly situated, but the area enclosed is only a few acres. holding no comparison in this respect with several other structures whose walls are much lighter.

The gullies draining the interior through the walls are but little worn down; the deepest is not more than three feet below the base of the wall on either side although it drains an acre or more. No estimate of time can be made from such measurement, because the wall itself may have been cut off to a considerable extent by the same water that lowered the bottom of the ravine; and the erosion of the former may have been greater than that of the latter.

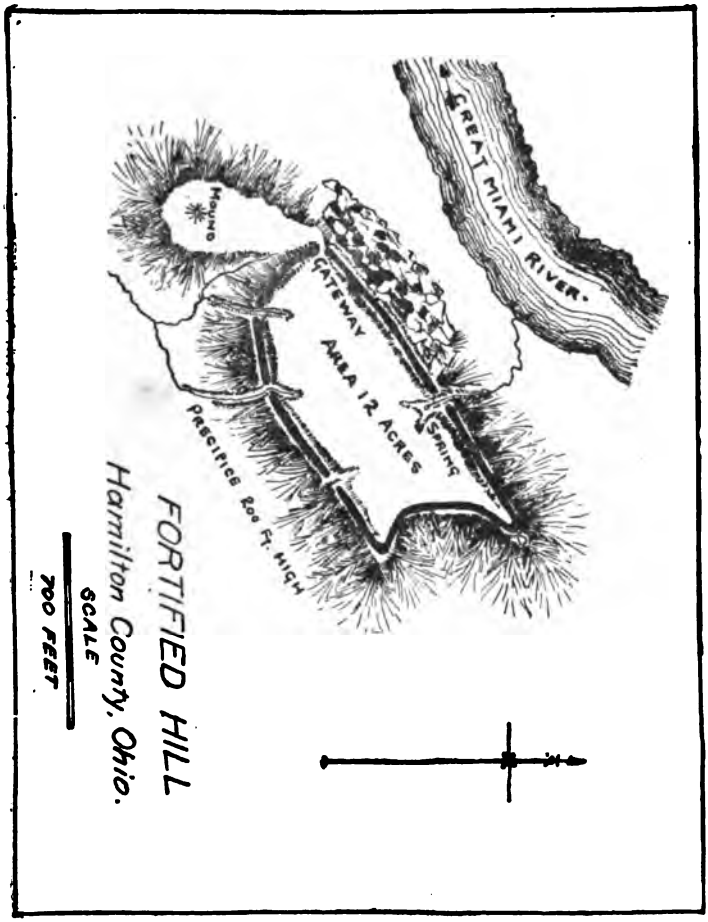
At one place in the north wall, at the largest ravine, there are some stones which seem to have been piled on one another into a rough wall, as a revetment. The ends of the wall at this break show marks of burning, but this may be due to brush fires in clearing the land.

The structure is excellently adapted to defensive purposes, but there must have been, particularly on the north side, some additional protective work, as the wall there though very steep on the outer side, has its top almost on a level with the interior surface, exposing its inmates to easy assault by any one who could reach the summit.

Two mounds on a ridge a few hundred yards to the eastward of the fortification are about eight and eleven feet high.

An approximately correct sketch is given in figure 68 (S. & D., plate IX, No. 2); the annual report of the Indiana Geological Survey for 1878 gives a map of the region about the mouth of the Great Miami, showing the former course of the river, Fort Miami,

and works on the hills north of Lawrenceburg. The river has made extensive changes of channel.



Figur. 68. Fort Miami.

In the early settlement of this region,

"A large space of the lower ground was enclosed by walls, uniting it with the Ohio. The foundation of that, (being of stone as well as those of the citadel), that forms the western defence, is still very visible where it crosses the Miami, which, at the period of its erection, must have discharged itself into the Ohio much lower down than it does now. I have never been able to discern the eastern wall of this enclosure, but if its direction from the citadel to the Ohio, was such as it should have been, to embrace the largest space, with the least labor, there could not have been less than three hundred acres enclosed." — Harrison, 263.

"The engineers who directed the execution of the Miami works, appear to have known the importance of flank defenses. And if their bastions are not as perfect, as to form, as those which are in use in modern engineering, their position as well as that of the long lines of curtains, are precisely as they should be. I have another conjecture as to this Miami fortress. If the Mound Builders were really the Astecks, the direct course of their journey to Mexico, and the facilities which that mode of retreat would afford, seems to point out the descent of the Ohio, as the line of that retreat. It was here that a feeble band was collected to make a last effort for the country of their birth, the ashes of their ancestors, and the altars of their gods" — Harrison, 225, condensed.

FORT AT FOSTER'S CROSSING.

"A singular structure, locally known as the 'The Fort,' is on the hill top opposite the station of Foster's, in Warren county. It is a circumvallation over half a mile in extent, made up of a carefully laid wall of flat stones along the outer side several feet in height; behind these are loose stones, both large and small, making nearly half the structure; and behind and over these stones a mass of clay burnt to all degrees of hardness, in places forming a vitreous surface over the slag, which resembles that from a blast furnace. At every part of the work through which a trench was dug the same story was told, — burnt stones and clay, ashes and charcoal, and the mass of stones, faced on the outer side by a good stone wall." — Putnam, Foster's, 126, condensed.

This is an uncompleted defensive work. Only a portion of the wall was ever built. From a corner at the top of the hill nearest the river, a short line bears eastward, running somewhat below the brow of the declivity; another, much heavier, line follows the brink of a ravine which leads in a southerly course directly away from the river and into a small creek. Both these walls terminate abruptly at points where there is no reason apparent why they should not continue. Except for a narrow isthmus at the corner mentioned, the hill is entirely isolated by steep slopes of deep ravines; and except for a few hundred feet at the southeast, there may be traced an unbroken artificial terrace around the margin, in a position corresponding to such portion of the wall as exists. This tends to prove that the ground was leveled to afford a base upon which to begin structures of this character. On the side next the river, beyond the point where the embankment ceases, there are a few places where burned earth, similar to that in the walls, may be found. The embankment is nowhere more than four or five feet high on the inside; on the outer side, owing to the necessity for a steeper slope than

is afforded by the natural surface, it measures in some places fully thirty feet vertically from bottom to top—not that the wall was made so high, but its base overlaps the hill-slope to that extent. There is no visible evidence of a regular stone wall; though many stones lie in confusion on the slope and at the foot of the wall, on the outer side, just as at Fort Ancient. In fact, except for its smaller area and the immense amount of burned earth, this work was apparently intended to be very similar to the great fortification a few miles farther up the stream. It is very probable that the builders made low retaining walls of stones; and these may still be standing where the earth holds them in position. But there is no reason to believe that a solid wall, such as has never been found elsewhere, was built here.

There is a low irregular mound of earth on the narrow isthmus, just without the fort.

Owing to a lack of definite knowledge of any but the superficial aspects of this work, no attempt will be made to explain its object, the cause of so much burned earth, or the possible method of construction.

FORT NEAR HAMILTON.

The " Fortified Hill " in Butler county, shown in figure 69 (S. & D., 16, plate VI) is

"on the west side of the Great Miami River, three miles below the town of Hamilton. * * * The hill, the summit of which it occupies, is about half a mile distant from the present bed of the river, and is not far from two hundred and fifty feet high, being considerably more elevated than any other in the vicinity. It is surrounded at all points, except a narrow space at the north, by deep ravines, presenting steep and almost inaccessible declivities. The descent toward the north is gradual; and from that direction the hill is easy of access. * * * Skirting the brow of the hill, and generally conforming to its outline, is a wall of mingled earth and stone, having an average height of five feet by thirty-five feet base. It has no accompanying ditch; the earth composing it, which is a stiff clay, having been for the most part taken up from the surface, without leaving any marked excavation. There are a number of 'dug holes,' however, at various points, from which it is evident a portion of the material was obtained. The wall is interrupted by four gateways or passages, each twenty feet wide; one opening to the north, one on the approach above mentioned, and the others occurring where the spurs of the hill are cut off by the parapet, and where the declivity is least abrupt. They are all, with one exception, protected by inner lines of embankment, of a most singular and intricate description. The

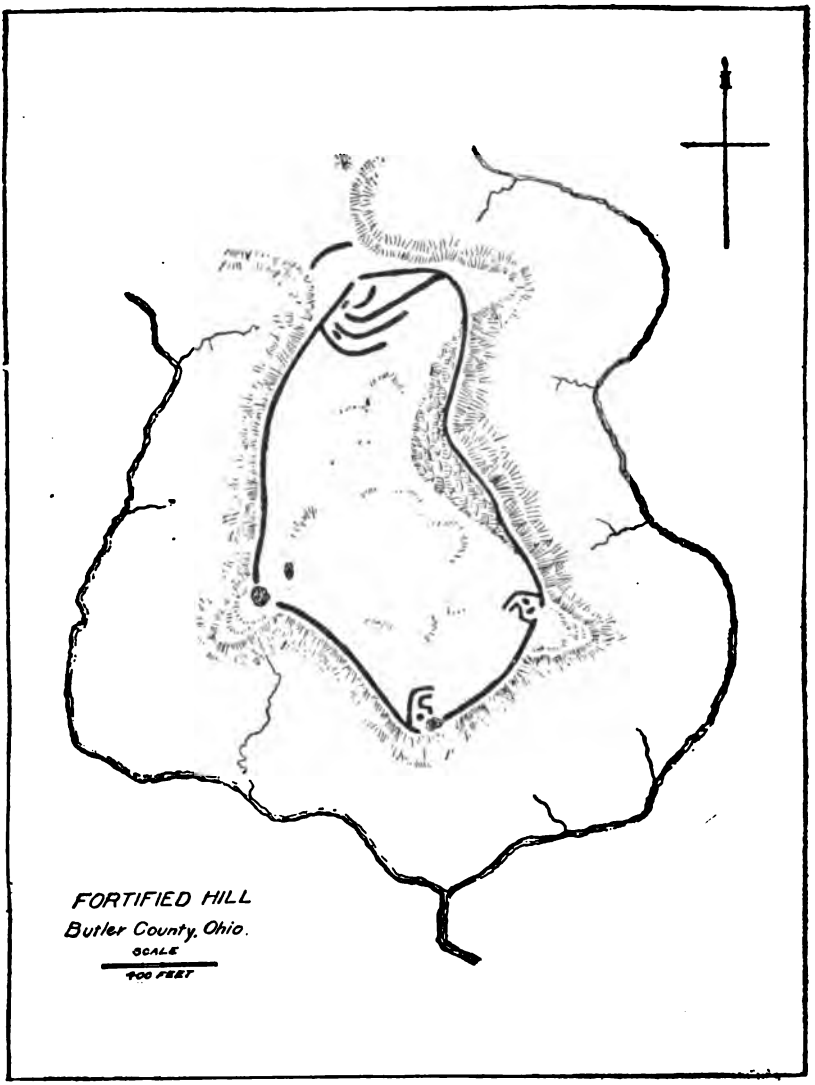


Figure 69.

excavations are uniformly near the gateways, or within the lines covering them. None of them are more than sixty feet over, nor have they any considerable depth. Nevertheless, they all, with the exception of the one nearest the gateway S, contain water for the greater portion, if not the whole of the year. A pole may be thrust eight or ten feet into the soft mud at the bottom of those at E." — S. & D., 16.

The stone mounds, S. and W., are each about eight feet high. The mound at the north contained a quantity of stone which seemed to have been burned.

"The ground in the interior of this work gradually rises, as indicated in the section, to the height of twenty-six feet above the base of the wall, and overlooks the entire adjacent country." — S. & D., 16.

Owing to long cultivation, the complicated system of walls at the northern end, peculiar to this work, cannot now be definitely followed. Admitting, however, that they are correctly represented in the sketch, it is difficult to see how they could be of any particular service as a means of defense. There is a narrow ridge connecting the part of the hill on which the enclosure stands with the higher table-land beyond; but the secondary walls extend some distance to each side of this and are either opposite to slopes less easy of ascent than at other points not so strongly defended, or else are so placed that an intruder could not be seen from them until he had surmounted the outer wall. In case a determined rush should admit an enemy, the defenders would be in a trap. The same amount of earth piled upon the exterior wall and carried a little farther out on the isthmus, would make a better protection.

The so-called "Tlascalan gateways" at the other end of the enclosure are so overgrown with trees and bushes, that it is impossible to ascertain whether they are correctly figured or not; but it can be seen that they are quite unusual in their conformation.

The wall on the western side was never heavy, and in some places can not now be found, even in the uncleared land; while on the eastern side its course is along the hill-side, some distance below the summit. The original drawing has been altered to show this feature.

FORT NEAR GRANVILLE.

Figure 70 (S. & D., plate IX, No. 1) is known as "Fortified Hill," two miles east of Granville. It must not be confused with the "Fortified Hill" in Butler county.

"The embankment is for the most part carried around the hill considerably below the summit and is completely overlooked from every portion of the enclosed area. The ditch is exterior, the earth taken out being thrown on the upper side. In some places the ditch is partially filled by earth washed in and the space behind the bank leveled up, giving the effect of a terrace. The elevation varies, but at no place is the top of the wall more than ten feet above the bottom of the excavation. On

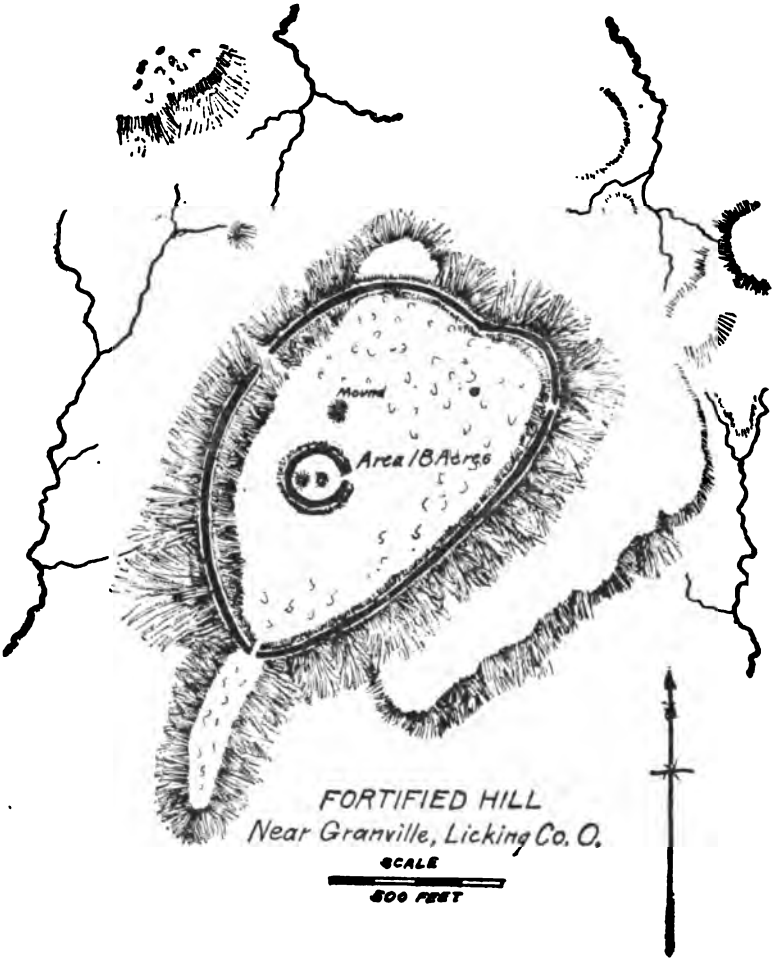


Figure 70.

top of the hill are two small mounds surrounded by a circular ditch and embankment a hundred feet in diameter. North of these is a truncated mound. All these contain altars, thus connecting them with the mounds of the large low-land enclosures. Nothing was found on these altars except ashes and fragments of pottery. "This is the only hill-work which has been observed to embrace a minor work of the description of

the work here presented. * * The principal enclosure is palpably a defensive work although deficient in a supply of water, and it is probable that this work, together with one of like character upon the opposite side of the valley, three miles distant, constituted the place of last resort of the ancient inhabitants.' " — S. & D., 24.

FORT BELOW NEWARK.

The work just described differs from the ordinary hill-top enclosures in having the embankment within the ditch instead of outside. Another of the same kind may be seen 6½ miles south-east of Newark. It stands on a hill which is cut off on every side by deep ravines with steep slopes. Surrounding the summit is a wall 2,176 feet in length, winding in and out to preserve a constant level. One end of the hill forms a ridge somewhat lower than the other portion; and here is located a gateway 89 feet in width opening on a small area nearly level. Several earth and stone mounds in various directions are visible from this point. This work, locally known as " the race track," is shown in figure 71 (B. E. 12, 468, fig. 317.)

FORT ON FLINT RIDGE.

Near the western extremity of Flint Ridge is a fortification made principally of flint blocks gathered up on the surface or from the outcrops close at hand on three sides. A small portion of the eastern side is composed of earth. Figure 72 (B. E. 12, 469, fig. 318) shows the shape. Most of it has been removed, as interfering with cultivation, so that the original height is uncertain; but it was probably not great, as the base is narrow at every point. The area enclosed is about seven acres. Within stands an earth mound 100 feet in diameter and fifteen feet high; and the debris of a small stone mound which is now from one to three feet high and scattered over an area thirty feet across.

OTHER HILL FORTS.

In figures 73 and 74 (S & D., 21., plate VIII), four works are shown. Number 1 is four miles above Hamilton. On three sides are high, steep banks, along the top of which are embankments; the fourth side, leading out on a table-land, is protected by a wall and ditch. A peculiar feature in this work is the entrance. The walls curve inwardly around a circle of about a hundred feet diameter; outside of this is a mound about five feet high and forty feet across. The passageway between these and the embankment is only six feet wide.

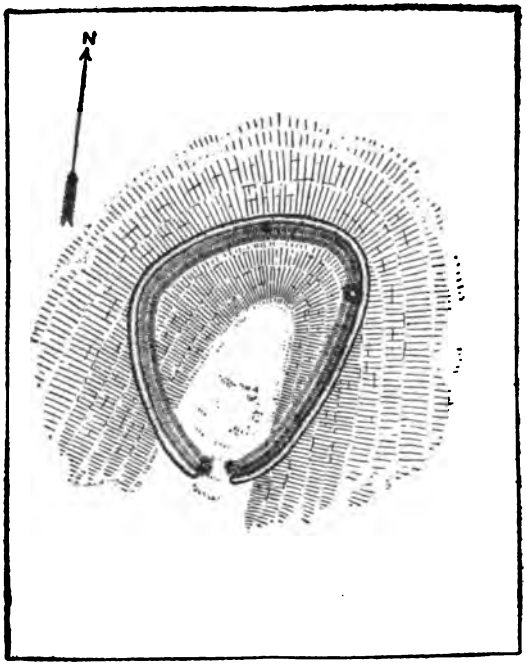


Figure 71 — Fort south-east of Newark.

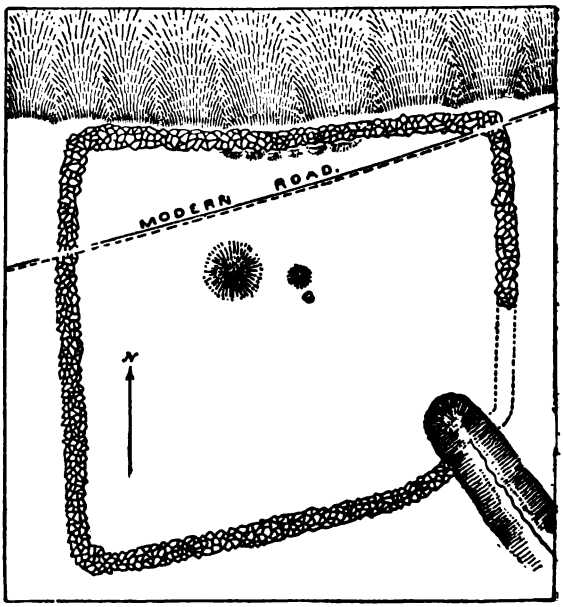


Figure 72 — Fort on Flint Ridge.

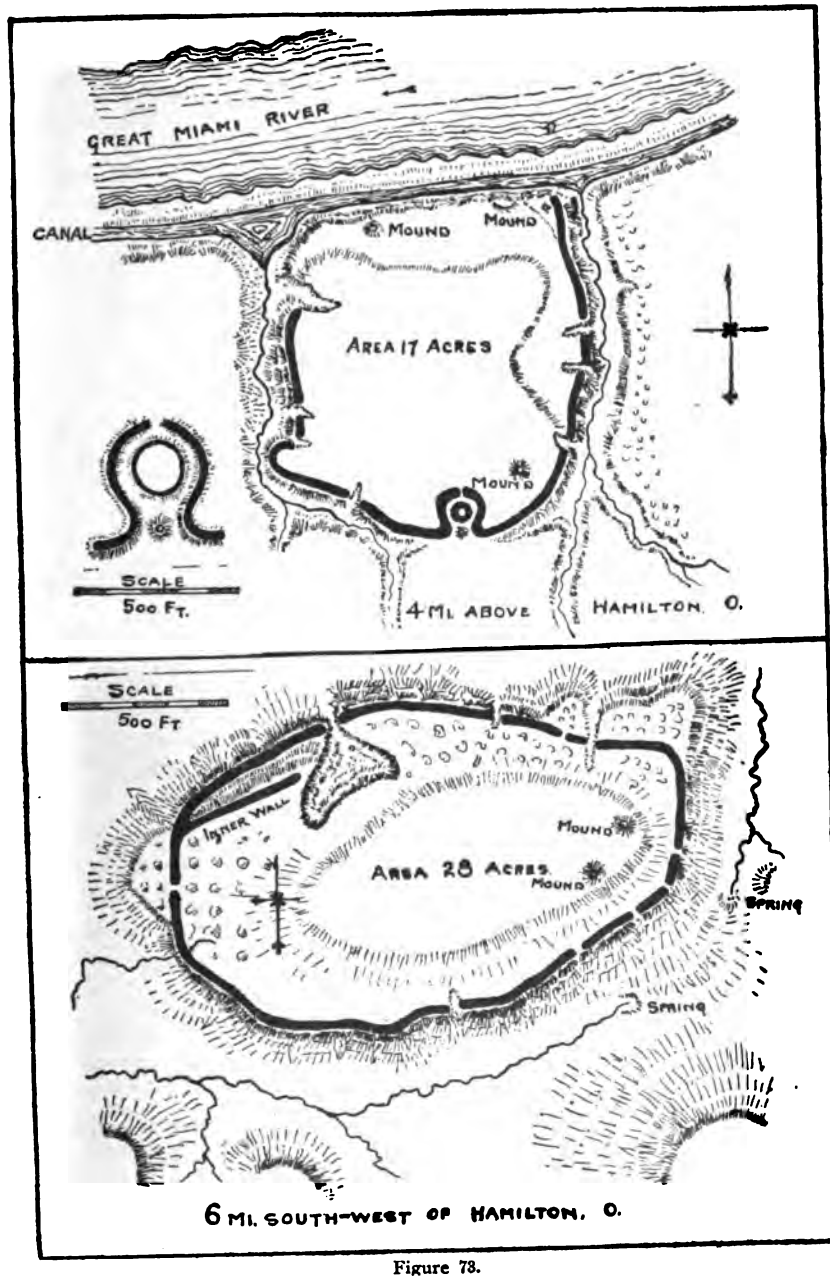

GREAT MIAMI RIVER
CANAL
MOUND
MOUND
AREA 17 ACRES
MOUND
SCALE
500 FT.
4 MI. ABOVE HAMILTON, O.
SCALE
500 FT
INNER WALL
MOUND
AREA 28 ACRES
MOUND
SPRING
SPRING
6 MI. SOUTH-WEST OF HAMILTON, O.

Figure 73.

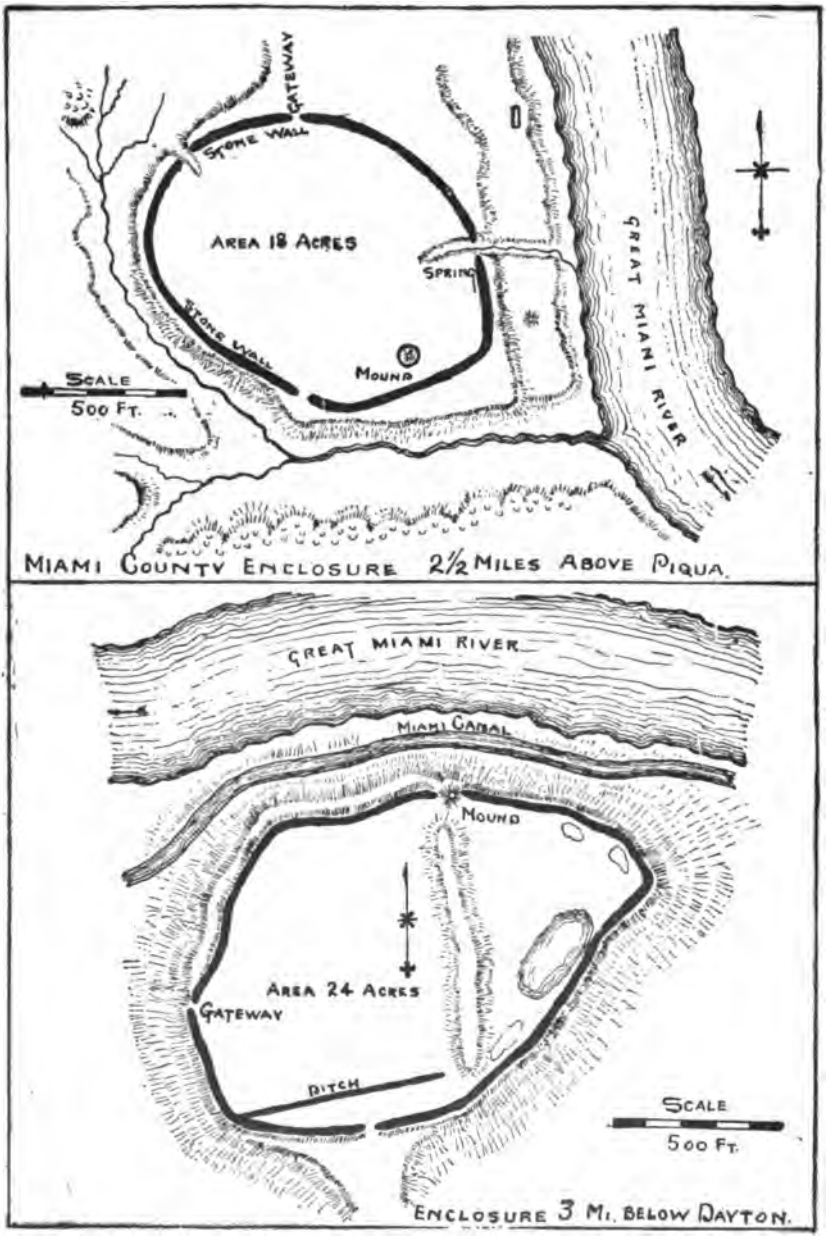

GATEWAY
STONE WALL
AREA 18 ACRES
SPRING
STONE WALL
MOUND
SCALE
500 FT.
GREAT MIAMI RIVER
MIAMI COUNTY ENCLOSURE 2½ MILES ABOVE PIQUA.
GREAT MIAMI RIVER
MIAMI CANAL
MOUND
AREA 24 ACRES
GATEWAY
DITCH
SCALE
500 FT.
ENCLOSURE 3 MI. BELOW DAYTON.

Figure 74.

Number 2 consists of an earthen embankment carried around a high, detached hill, six miles south-west of Hamilton.

Number 3 is of earth and stone, on a high terrace two and a half miles above Piqua. Steep bluffs from fifty to seventy-five feet high almost surround it. [In accordance with the usual assertion in regard to works of this character, it is stated that "the stones * * of this rampart are water-worn, and must have been brought from the bed of the river"; though it is never explained why the builders should have been at this trouble when plenty of similar stone was close at hand; the "water-worn" appearance being due to ordinary weathering or to glacial action]. Within the work is a mound five feet high with an encircling moat.

Number 4 is three miles below Dayton; it is a rampart of earth surrounding an isolated hill, with steep slopes on every side except toward the south; on this side is a gateway within which is a ditch twenty feet wide and seven hundred feet long. An elevated ridge, and a depression at *b* forty feet deep, within the wall, are natural formations. Along the north-west side is a terrace, apparently artificial, about thirty feet below the embankment. — S. & D., 21.

These works are not figured as possessing any striking or novel features, but on account of their close resemblance in form to the fortifications of the Iroquois. Works of the same kind are not uncommon in various parts of Kentucky and Indiana.

TO WHAT PEOPLE MAY WE ATTRIBUTE THE "FORTS"?

With aboriginal methods, the construction of any one of the large hill-top enclosures necessarily required a considerable time. There must have been a threat, or at least a prospect, of serious danger before they would be undertaken. Yet, if constructed as places of refuge by the race which built the earthworks of the valleys, as is the universal belief, they would have to be completed before an enemy was able to take permanent possession of the region.

By the expression "a considerable time", is not meant a period of years. If the builders of the forts were endowed with the foresight to prepare for a remote contingency; to provide a resort from enemies who might come upon them at some unknown future time; to anticipate trouble of which there were no present indications;—then they might go on with the construction at their leisure. But if menaced while still unprepared for defense; if compelled to take measures at short notice for the preservation of their lives or liberties; especially if coerced to build with one hand while fighting off an assailant with the other;—then each

day becomes of vital importance. "Time", in such event, is only a comparative term.

The actual number of days required to build one of these forts could be readily determined if we knew the number of yards of material in it, and the amount of work a man could—or would—perform in a day with a basket and a wooden shovel. The first factor it is possible to calculate; the second can only be guessed at.

Overman gives the contents of the Fort Hill embankment as 50856 cubic yards. If intended for temporary quarters only, as it must have been on the assumption under which we are calculating, one thousand persons would not be an excessive number to house within an area of thirty-three acres, especially if we suppose them to dwell in several separate villages during intervals of peace. Set aside one-half of these as too young, too old, or otherwise unfitted to take part in ordinary labor. Deduct one-half the moiety to engage in occupations necessary for subsistence and comfort. This will leave 250 persons who may put in full time on the proposed fortress. Each will have to deposit 204 yards of earth and stone, none of which need be moved more than one hundred feet; the average distance will be less than sixty feet, even if the ditch from which it is obtained be made three times as broad as the embankment. Half a cubic foot of this, tightly packed, will weigh about 65 pounds, which is a moderate load. Ten minutes will be ample time to fill and empty a basket. At this rate, each man would deposit one cubic yard in a day of nine hours; so that, even if idle more than one-third of the time, the number of men indicated could construct this fort in less than a year. Under the stress of fear they would work faster and more steadily; the task could easily be finished inside of six months, if necessary.

In the case of a structure entirely of stone the question may be solved in another manner. Glenford Fort contains 26 acres; with the above number of men, each must clear up a little more than one-tenth of an acre. How many weeks would a willing worker demand to pick up all the stones on a lot measuring fifty by one hundred feet, and carry them about one hundred yards?

The hill-top forts also afford almost positive proof that the territory occupied by their authors was quite restricted. It is not credible that any community would erect impregnable

fortifications in the heart of their country, leaving all the outlying region unprotected, especially in those directions from which it is almost certain an attack was to be expected.

But there is another consideration. In form, situation, and apparent purpose of construction, these forts are so unlike the geometrical earthworks of the plains as to create a doubt whether the two classes of works are to be attributed to one race. Except for their greater size, they bear a decided resemblance to those along the lakes, and eastward. This similarity between works in the northern and southern parts of the State suggests the idea of racial connection between their builders, closer at least than that between either of them and the designers of the squares and circles. Even though those writers who make a distinction between the authors of the works north and those south of the middle of the State have not questioned the statements that all enclosures in any particular locality, no matter what their form and position, are due to one race, yet in view of the migratory instincts and habits of all native American peoples of whom we have any knowledge, it is unreasonable to suppose that a single tribe or race has held for unnumbered centuries continuous and undisputed possession of a territory with a definite boundary. Such stability is impossible among savages or barbarians—at least such as have lived in this country. Consequently, we are not justified in the supposition that no race or tribe other than the Mound Builders has ever lived in southern Ohio; or that no other people have ever found it necessary to fortify themselves against attack.

All writers on our antiquities have agreed that these strong fortresses are intended as defensive enclosures to which the Mound Builders would retire at the approach of a foe numerically superior. But most of them are many miles from the fertile lands where the Mound Builders had their permanent homes. They are in regions not easily accessible, without an adequate water supply inside the walls, and there is but little cultivable land in the immediate vicinity of several of them. That a people with any judgment should make a long journey to reach a place so unsuited for their manner of life—or at least amid surroundings so totally unlike those to which they were accustomed—carrying with them their property and a large supply of food—seems incredible. Their towns could readily be defended against

assault or attacks such as would be made by predatory bands; and a foe of sufficient strength to conquer them in their homes could easily pen them up in these forts until starvation exterminated them. Again, even if we admit for the moment that all mounds on hills are intended as "signal stations" from which warning could be given of the advance of an enemy, such messages could not reach the settlements in time to allow an entire community to migrate with the proper supplies and safely ensconce themselves before the foe would be upon them. The latter had no roads to build, no wagon trains to drag through the forests; every warrior was his own commissary department and lost no time in waiting for rations to overtake him. A war party, unincumbered with impedimenta of any sort, could travel many more miles in a day than a party containing women, children, and feeble persons; and we are not to suppose these would be left behind to fall victims to the first onslaught. If villages and crops were left without protection, what would remain of them when the owners returned? The amount of labor expended upon Fort Ancient, or any other of these immense works, would be ample to render impregnable the scattered homes of all the people who could find shelter within its massive walls.

These structures, however, are unmistakably defensive in their nature; and their size indicates warfare of no small proportions. They prove that the Mound Builders or some other people in Ohio engaged in desperate conflicts involving large forces. If we accept the customary solution of the fate of the Mound Builders, namely, that they were driven from the country, then it is plain these forts were a prominent factor in the struggle.

It is with some hesitancy that an opinion is here advanced very different from what has hitherto been admitted without question; but as it does not seem that the Mound Builders could, or would, have made them, we must attribute the isolated forts to the invading party.

There is no improbability in the suggestion that at least some of the hill-top and other irregular enclosures of Ohio and the adjacent States may owe their existence to a race in the same stage of advancement as several tribes that lived in the Northwest Territory in the middle of the eighteenth century; while the complicated earthworks such as those at Newark and Portsmouth, and in Ross county, may have their origin in the

necessities of some tribe in the social condition of the sedentary Indians of the southern States. An exception, it is true, exists in structures like Fort Miami or Spruce Hill. These might be permanently occupied by a farming community, for they are upon hills which rise directly from level, productive bottoms. But wild, rugged country, like that in which Fort Hill and Glenford Fort are located, is suitable only for hunters and warriors. If the latter attempted to occupy portions of southern Ohio at the time it was in possession of the Mound Builders, they would need a base of operations, and a safe retreat when repulsed or when not actively engaged. Such a place must be difficult to assault, easy to defend, and at some distance from towns against which the operations of its garrisons were directed—all which conditions are complied with in the sites of the insulated forts. To the natural inquiry "What were the inhabitants doing, all the time this fortifying was going on?" it may be replied "What could they do?" If their dread of marauders would lead all the inhabitants over thousands of square miles, to abandon enclosures in the bottoms and crowd into those on the hills, as we are told they did, it would prevent them from molesting the invaders when the latter chose to settle in one spot.

Let us examine the conditions as they are set forth by all writers who have studied the subject:—There is an agricultural people, living in the midst of fertile, easily tilled lands; there is a broken country all about them abounding in game; there is a wild, roving, hunting race, at some place to the northward or eastward. The latter people are more accustomed to warfare than the former; they want game, they also have no objection to plundering villages; when resting from war or the hunt, and not wishing to return to their homes, they must be prepared for reprisals. This naturally leads to the selection of a position where they may easily defend themselves, and to the construction at the site chosen of a protective work of some sort—timber, earth, or stone, according to their numbers, the relative convenience or abundance of material, and the anticipated length of occupation.

The large area and massive walls of some of these structures are, it is true, presumptive evidence against such a hypothesis. Hunting or war parties were never known to fortify on so large a scale.

But if a tribe or clan, influenced by the abundance of game or the opportunities for plunder, should decide to settle in a country already in possession of a people opposed to the intrusion of strangers, it would be compelled to take such measures as were necessary. If a defensive work for the protection of a village of a thousand persons, must have ten times the size or strength of one that is sufficient for a village of a hundred inhabitants, by the same conditions there are at once ten times as many laborers to take part in the work.

With the advent of different bodies of aliens, the original inhabitants may have found themselves compelled to adopt the same kind of tactics; to abandon their more exposed settlements and congregate in defensible positions which they would fortify after the manner learned from their adversaries.

There is another view of the matter. Unless the Mound Builders were the first inhabitants of Ohio, they must, of course, have come from some other region and they must have found the territory already occupied. Either war or amalgamation would follow. If the former—which is the more likely, for such is "the natural condition of man" in a savage state—either the invaders or the earlier inhabitants may have built some of the forts.

So we have our choice among four possible sources, any or all of which may have to be taken into consideration in seeking the origin of the strictly defensive enclosures:—The Mound Builders, on their arrival; the tribe, or tribes, whom they found here; invaders, toward the close of the Mound Builders' occupation; and Mound Builders in resisting the last.

CHAPTER VIII

GRADED WAYS, TERRACES, EFFIGIES, AND ANOMALOUS STRUCTURES.

A. — GRADED WAYS.

ON page 209 is a description of the possibly artificial grade at the Turner Group. So far as known, no other passageway is formed by making a fill to connect plains of different levels.

But at several places in Ohio gentle inclines through a depression, from a higher terrace to a lower, or to a stream, are attributed to the Mound Builders, who are supposed to have cut them out for roadways, throwing the earth to either side.

Squier and Davis have the following reference to them.

"There is a singular class of earthworks, occurring at various points at the West, * * the purposes of which to the popular mind, if not to that of the antiquarian, seem very clear. These are the *graded ways*, ascending sometimes from one terrace to another, and ocasionally descending towards the banks of rivers or water-courses. The one at Marietta, is of the latter description; as is also that at Piqua, Ohio. One of the former character occurs near Richmonddale, Ross county, Ohio; and another, and the most remarkable one, about one mile below Piketon, Pike county, in the same State. A plan and view of the latter is herewith presented. [See figure 75 (S. & D., 88, plate XXXI, No. 1)]. It consists of a graded way from the second to the third terrace, the level of which is here seventeen feet above that of the former. The way is ten hundred and eighty feet long by two hundred and fifteen feet wide at one extremity, and two hundred and three feet wide at the other, measured between the bases of the banks. The earth is thrown outward on either hand, forming embankments varying upon the outer sides from five to eleven feet in height; yet it appears that much more earth has been excavated than enters into these walls. At the lower extremity of the grade, the walls upon the interior sides measure no less than twenty-two feet in perpendicular height."

"It is, of course, useless to speculate upon the probable purpose of this work. At first glance, it seems obvious; namely that it was constructed simply to facilitate the ascent from one terrace to another. But the long line of embankment extending from it, and the manifest con-

nection which exists between it and the mounds upon the plain unsettle this conclusion." — S. & D., 88-9.

A. — AT MARIETTA.

Of the four mentioned by them, that at Marietta has been most often described; but only because more people have seen it. Among the earlier notices, these may be found:—

"A causeway forty yards wide, and from ten to twelve feet high, rounded like a turnpike road, leads from it to the river." — Cuming, 106.

In a numbered sketch, made in 1785, of the Marietta works, is given:—

"No. 6, Covered away from the town to the then locality of the river, which is supposed at that time to have run along the edge of the second bottom. These walls are now twenty feet high, and the graded road between them was one hundred feet wide, and beautifully rounded like a modern turn-pike." — Stebbins, 329.

"The entrances at the middle are the largest, particularly that on the side next the Muskingum. From this outlet is a *covert way*, formed of two parallel walls of earth, 231 feet distant from each other, measuring from centre to centre. The walls at the most elevated part on the inside are 21 feet in height and 42 feet in breath at the base, but on the outside average only five feet high. This forms a passage about 360 feet in length, leading by a gradual descent to the low grounds, where it probably at the time of its construction reached the margin of the river. Its walls commence at sixty feet from the ramparts of the fort, and increase in elevation as the way descends towards the river; and the bottom is crowned in the centre in the manner of a well-formed turnpike road." — Harris, 149.

The account by Squier and Davis is more complete.

The "Via Sacra," or graded way, at Marietta "is six hundred and eighty feet long by one hundred and fifty wide between the banks, and consists of an excavated passage descending regularly from the plain, upon which the works just described are situated, to the alluvions of the river. The earth, in part at least, is thrown outward upon either side forming embankments from eight to ten feet in height. The centre of the excavated way is slightly raised and rounded, after the manner of the paved streets of modern cities. The cross-section *gh* [see figure 15] exhibits this feature. Measured between the summits of the banks, the width of the way is two hundred and thirty feet. At the base of the grade, the walls upon the interior are twenty feet high. From this point there is a slight descent, for the distance of several hundred feet to the bank of the river, which is here thirty-five or forty feet in height. [There is an] entire absence of remains of antiquity upon the beautiful terraces to which this graded passage leads. They may nevertheless have been once as thickly populated as they are now; and this passage may have been the

grand avenue leading to the sacred plain above, through which assemblies and processions passed, in the solemn observances of a mysterious worship." — S. & D., 74.

The plan given does not represent the squares as "exact".

Whittlesey is less romantic in his explanation of its probable use:—

"'The grade at Marietta leads from a strong work down to the Muskingum River, and had an evident purpose, that of access to water. It is principally an excavation and not an embankment." — Whittlesey, Works, 9.

There is no doubt that this work is artificial; but it was never made for the sole purpose of being used as a roadway or means of passage between the two terraces. It is wide enough for a hundred men to walk abreast in it, and leads out on a strip of bottom land but little if any wider than itself and which could never have been much wider. It is more than likely that earth was obtained here for making mounds and embankments in the vicinity. Very probably it originated in a pathway to the river, which was gradually widened by removal of earth for the works. If this was the case, another path led from the lower terrace to the water. The stream may have been reached, however, through the ravine which discharges almost in a line with the upper side of the "Via Sacra".

It is to be observed that the earliest recorded measurement gives the height of the walls on each side of the cut, as only five feet. The scale of "twenty feet" for the inside, includes the undisturbed earth of the side-slopes. These walls, which long ago disappeared, were probably built of earth taken up from the surface of the upper terrace, as was the case at Piketon.

The water of the Muskingum is now at a much higher level than it was formerly, owing to the dam near the mouth; but if ever as low as denoted by Squier and Davis, it is very clear that the graded way was made without any reference to the stream.

B.— AT RICHMONDDALE.

No such work exists in the vicinity of this village; nor is there any visible evidence of aboriginal occupation about there, except a few mounds scattered over the high terrace to the north. None of the latter are within a mile of Richmonddale;

and there is no conceivable reason why a "graded way" should be made, when there is no place for it either to begin or end. Probably the authors allude to some one of the numerous ravines in which no water now flows on account of changes of slope carrying drainage in other directions.

C.— AT PIQUA.

The reference to this is based upon Major Long's observations early in the century. It is evident we have here to deal only with a natural ravine or gulley, on one side of which an embankment has been made.

At Piqua, "near the bank of the river, there are remains of a waterway; these remains consist of a ditch dug down to the edge of the river, the earth from the same having been thrown up principally on the south side or that which fronts the river; the breadth between the two parapets is much wider near the water than at a distance from it, so that it may have been used either for the purpose of offering a safe passage down to the river, or as a sort of harbor in which canoes might be drawn up; or perhaps, as is most probable, it was intended to serve both purposes. This waterway resembles, in some respects, that found near Marietta, but its dimensions are smaller. The remains of this work are at present very inconsiderable, and are fast washing away, as the road which runs along the bank of the river intersects it, and, in the making of it, the parapet has been leveled and the ditch filled up." — Long, St. Peter's, 52.

D.— AT PIKETON.

The work at Piketon has long been cited as the most remarkable instance of this form of aboriginal industry. Figure 76 from the original drawing by Squier and Davis, and reproduced in a hundred publications since their time, has always been given as a correct representation. The actual work is shown in figure 77, in plan and section, from a recent careful survey. It will be seen that there is no "crown" to the roadway, as their cross-section shows, except that which is due to the construction of a turnpike passing through it; and the error and exaggeration, in various other respects, of their "plan and view" will be apparent at a glance. In itself the work is of no special interest or importance, and the details are trivial; but they show a negligent, slip-shod manner which casts doubt on more important work, and should be gone into with some minuteness, because these perverted accounts have done much toward

impressing readers with erroneous ideas of the people who are credited with its formation. Compare the "view" with the sections.

The depression is not in any degree artificial but is due entirely to natural causes. Formerly, when Beaver creek was at a much higher level than its present bed, at least a part of its waters found their outlet through this cut-off or thoroughfare. Its length, following the curve from the creek bank to the lower terrace at the other end, is 2225 feet; at the narrowest part it measures 120 feet across. The elevation of the upper terrace above the lower is 22 feet—not 17. The greatest base measure of either wall is 69 feet; one of them is 636 feet, the other 761 feet, in length along the top. The east wall has been cultivated until not more than three feet high; the west wall is untouched, and only a few rods of it have an elevation of more than six feet. Instead of tapering to a point at the south end, the west wall is higher there than anywhere else, having the appearance of a mound with an elevation of nine feet. No earth was carried up out of the depression; that composing the walls was gathered on the surface and piled along the brink of each bank, a part of it being allowed to spread down the sides in order to produce a steeper slope. Both walls change direction at more than one point; and so far from extending its entire length on the upper terrace, the east wall descends the slope and terminates near the bottom. The measure of "1080 feet" so frequently found in other parts of Squier and Davis's descriptions, as well as here, will not apply to any part of the "graded way" unless the line be carried out into the open fields. If the walls were leveled and all the earth in them spread out evenly, it would not make a difference of more than two feet in the elevation of the space between them.

The early mistakes in regard to this work are repeated and exaggerated by McLean.

Whittlesey says:—

"The great excavated road at Piketon also descended to water."—Whittlesey, Works, 9.

While, as we have seen, it is not "excavated" by human labor, it undoubtedly once "descended to water," though not in the sense he means to convey. It is cut through the fourth or highest terrace, and terminates on the third, at the end toward

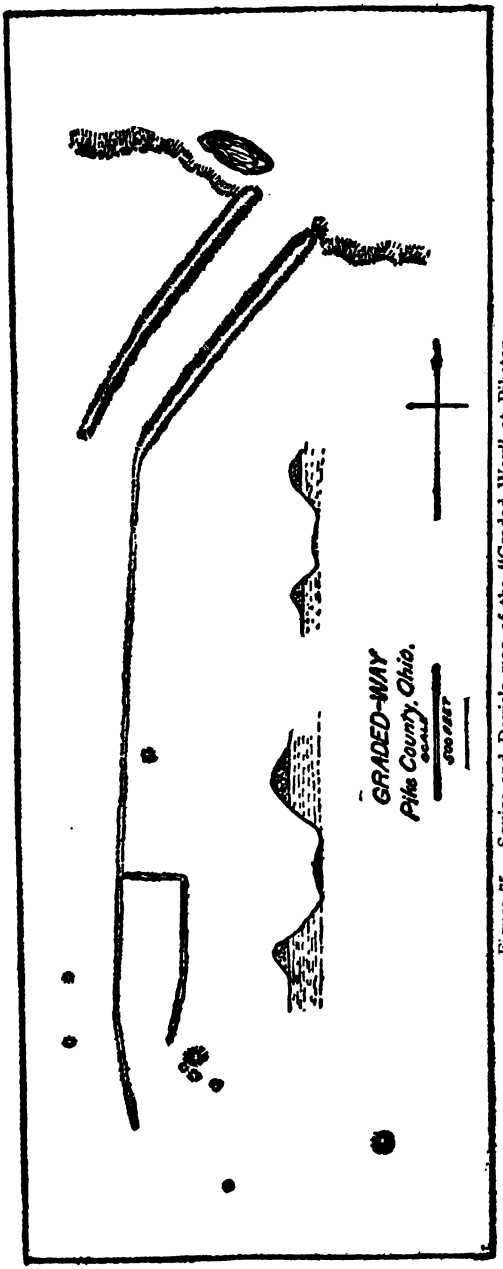


Figure 75 — Squire and Davis's map of the "Graded Way" at Piketon.

Figure 75.



Figure 76 — Squier and Davis's "view" of the Graded Way.

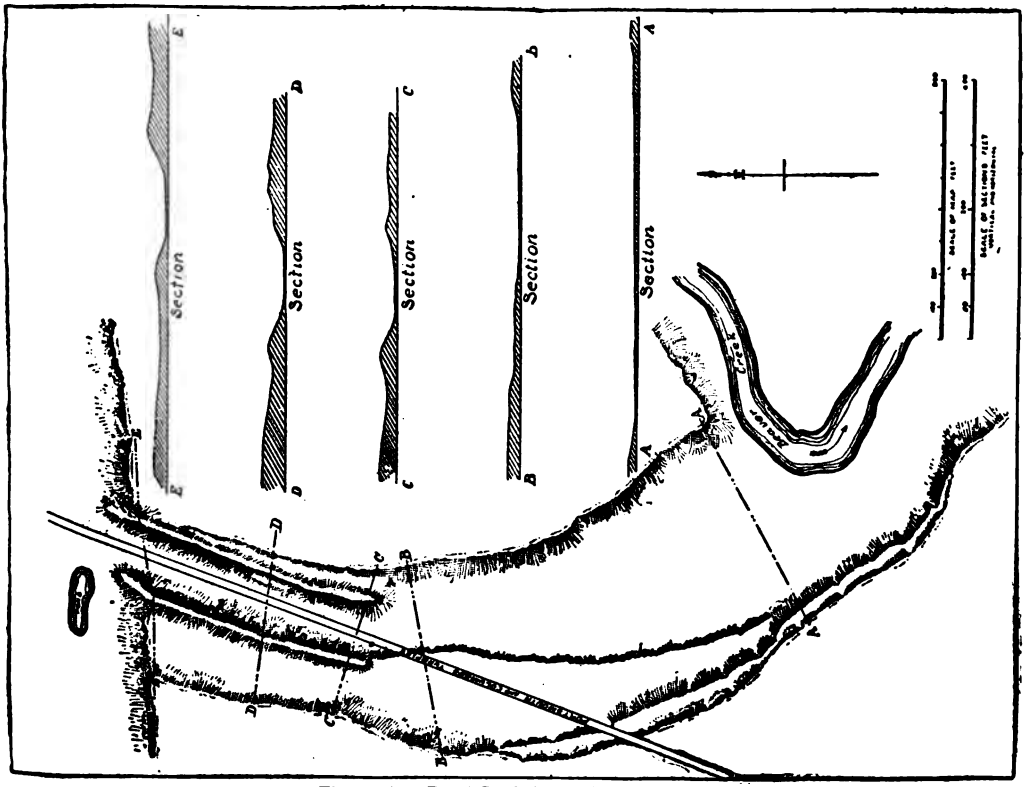


Figure 77 — The "Graded Way" at Piketon.

the river, which then flowed at that level. When Beaver creek carved out its present channel, the old thoroughfare remained practically unchanged for an unknown number of centuries, until the Mound Builders came along and built their little walls on either side, all unconscious of the trouble they were making for future archæologists.

E.— ABOVE WAVERLY.

Colonel Whittlesey falls into a worse error concerning another old "cut-off". This was made by the Scioto, after the third terrace was formed. It would be difficult indeed to "discover the spot to which the earth was transported", as it has gone toward making low bottoms farther down the river. He describes it as

> an excavation in Big Bottom, "near the line between Pike and Ross counties. The design appears to have been to form a cut or passage from the bottom land above Switzer's Point to the bottom land below. Only a very small portion of the earth removed is now to be seen; having been transported to some spot which I did not discover. At the north-east end of the east bank is a mound. A little to the west and north-west is a natural ridge which appears to have been trimmed by art, and to have been used in connection with the lower portion of the western line of the embankment. The mass of earth removed here is greater than at Piketon." — Whittlesey, Works, 7.

F.— NEWARK.

> "There is also a grade, partly in excavation and partly in bank, from a portion of the Newark works in Licking county, leading to a branch of Licking or Pataskala river." — Whittlesey, Works, 9.

This has been described under the Newark enclosures.

G.— NEAR BOURNEVILLE.

Atwater alludes to the "graded way to the spring" at the ellipse described on page 217.— Atwater, 149.

It never appears to occur to these writers that the existence of springs, and of an easy approach to them, may have determined the location of earthworks. They seem to proceed upon the assumption that the builders made their enclosures at random, and then set to work to make the locality habitable.

H.— AT MADISONVILLE.

> "The ancient roadway near Madisonville, is cut along the face of a steep hill extending from the creek to the top of the hill. It is upward

of 1,600 feet in length, having an average width of twenty-five feet." — Howe, II, 23, condensed.

The only "ancient roadway" at this place is an old wagon road, now overgrown with trees and partially destroyed. It is not at all like any prehistoric work, either in its position or its construction. It begins in a ravine and ends at the top of the hill near a pioneer farmhouse; and there are no aboriginal remains anywhere near it.

I.— NEAR CARLISLE.

McLean describes with much minuteness a "graded way," about two miles west of Carlisle in Butler County. This is raised instead of sunken. He traces it from the top of a hill, down the slope, across a bottom or "upper terrace" to the bank of Twin creek, giving numerous measurements. Here it stops; but he imagines it as formerly extending across the "second terrace," which was probably a "swamp" at one time and needed this "causeway" in order to enable the Mound Builder to reach the fort from which the "graded way" proceeds. He attempts to establish a chronology, by supposing all this "swamp" to have been carried away by erosion, to the level of the "second terrace," which he places thirty-one feet below the "upper terrace." No definite number of years is given, because there is no measure of erosion, and so

"The question is, 'how long has it taken Twin Creek to cut the thirty-one feet?'" — McLean, 134.

The site of this professed artificial roadway is on a hillside overlooking the valley of Twin creek, and on the bottom land at its foot. Two nearly parallel deep ravines, a few hundred feet apart, form a headland with steep, almost precipitous, sides. Around the margin of this and across the rear end of it an embankment is carried. On the side toward the creek it curves inward to surround the head of a small ravine which affords an easy approach from the bottom land below; consequently there is no need for a "graded way," and none was ever made. The ridge described as such is entirely a natural formation, due to erosion. The upper portion preserves the ordinary slope of the ground, as may be understood from his measurement which gives an incline of more than twenty degrees. This does not sound large, but makes a pretty stiff

climb, nevertheless. That part of the "way" along the foot of the hill is due to the approach of the ravine on one side toward a shallow washout on the other. What McLean calls the continuation of this "graded way" across the bottom, or "upper terrace," is nothing but the ridge formed by an old fence row and by the earth thrown up in making a turn with a plow at the end of the field; it is visible only in some places, as he says, and never had any existence where it is not now to be seen. His "second terrace" is nothing but the shore of the creek, and is subject to overflow with every hard rain — unless, indeed, he means the low bottom beyond the creek. This may once have been a "swamp," as he suggests; but if so it existed before the stream was formed, and extended to the hills several hundred yards away. If the Mound Builder was here at that time, he saw the retreat of the ice-sheet; for it was very shortly after that time that Twin creek began its task of "cutting down the thirty-one feet."

In a word, it may be said that with the single exception at Marietta, the alleged "excavated graded ways" are natural depressions, possibly slightly modified, which happened to be where they were needed; or the place was taken possession of because the grade was there.

The few pathways which are actually artificial have escaped notice by reason of their insignificance. Where a group of works or a village-site is located on a terrace immediately above a very steep slope, steps were no doubt cut in the bank, or perhaps a narrow passage way dug, to facilitate ascent. The depression thus begun would deepen and widen with every storm, until finally a trough with considerable width and easy slope would be eroded, which can be distinguished from one entirely natural only by the fact that no water from the upper plain drains into it. Such gullies may be observed at the present day along the banks of any stream whose banks are of soft, loose earth, up and down which persons are accustomed to pass frequently. They are not uncommon where prehistoric village-sites were located on a bank with a tolerably steep slope; but, as stated, their origin is overlooked.

The nearest approach to a "graded way" that is to be found in the Scioto Valley, is a ravine of this kind just north of the circle at High Banks. The river bluff, about sixty feet high at

this point, is so steep as to be very difficult of ascent. A pathway was made by the inmates or builders of the circle, in order to reach the water. This is now a large gully. In the loose sand and gravel forming the bluff, rains would rapidly erode the sides and bottom of such a path, and in a comparatively short time cut it down to an easy slope.

Passageways similar to this could be cited, but no other is so large.

B. — TERRACES.

AT FORT ANCIENT AND WAYNESVILLE.

Three terraces are represented on some maps, as existing on the steep hill-side where the fort makes its nearest approach to the river. Two are undoubtedly artificial. On the opposite side of the river is another, extending fully a mile. Still another is to be seen across the deep ravine north of the fort.

"These terraces are from 20 to 25 feet wide; they run along the hill-sides with surprising regularity of level. * * * The terrace across the river is 137.7 feet above low-water level. * * * The second north of the fort is 136.6 feet; [that] along the Fort hill is 135.2 feet, there being thus an extreme difference of about 30 inches. There can be no question that these terraces are artificial. They terminate abruptly at either end without any change in natural surface conditions, which would not be the case if they were due to water action in the glacial period. Pottery fragments and flint flakes a foot below the level surface prove that the earth was dug from the upper surface and thrown to the lower. * * * At Waynesville, 10 miles up the river, there are a number of clearly defined terraces of undoubted artificial origin along the hill-sides bordering on Caesar's Creek." — Ft. A., 98-9.

AT RED BANK.

"The hill at Red Bank [Hamilton county], just north from the railway station, * * * is terraced on its eastern and southern slopes. The terraces are five in number." — Howe, II, 23.

These terraces are plainly artificial and of an age antedating the settlement of the country by whites. They are about equidistant, from the top to the bottom of the hill.

No suggestion can be made as to the purpose of such remains. None yet offered seems to have any bearing on the question. They are not for "defense," because there is nothing to be defended; nor for "molesting enemies in canoes," because they are too far from the water; nor for gardens, because the soil on them

is infertile as compared with that close by; nor for "dwelling places," because they are not easy of access, are flooded from the hillside above at every rain, and any house built on them could be destroyed by rolling rocks down on it.

C. — EFFIGIES.

In several states are mounds presenting the rude outline of some animal or other. They are almost invariably of earth, though occasionally one is found of stone. By far the greater number is found in the Northwest, especially in Wisconsin and Iowa, where they exist by thousands. While an expert zoologist would probably hesitate at identifying and classifying the various forms, other persons, with greater courage and a more delicate appreciation of similitudes, have had no difficulty in discovering the human figure as well as that of many quadrupeds and birds. Some can even name the particular varieties represented, although the resemblances are, as a rule, no more striking than may be observed in the clouds of a summer sunset. They are frequently, and it may be correctly, called emblematic or symbolic; perhaps "effigy" is a safer term.

Ohio possesses several of these effigies, only two of which really resemble anything.

A.—THE SERPENT.

First, and above all others for its size and striking appearance, is the Serpent Mound of Adams county.

In figure 78 is reproduced the engraving of the survey of this work, made by Squier and Davis. They claim that

> "the accompanying plate [is] laid down from an accurate survey." "The entire length, if extended, would be not less than one thousand feet. * * * The neck of the serpent is stretched out and slightly curved, and its mouth is opened wide, as if in the act of swallowing or ejecting an oval figure, which rests partially within the distended jaws. * * * The point of the hill, within which this egg-shaped figure rests, seems to have been artificially cut to conform to its outline, leaving a smoooth platform ten feet wide, and somewhat inclining inwards all around it. The section *ab* will illustrate this feature." — S. & D., 96.

But an inspection of the section *ab* will show at once that it does not illustrate anything of the kind; and, further, the section *ab* is quite incorrect in so far as it purports to present a section of the extreme point of the ridge. This, like any other

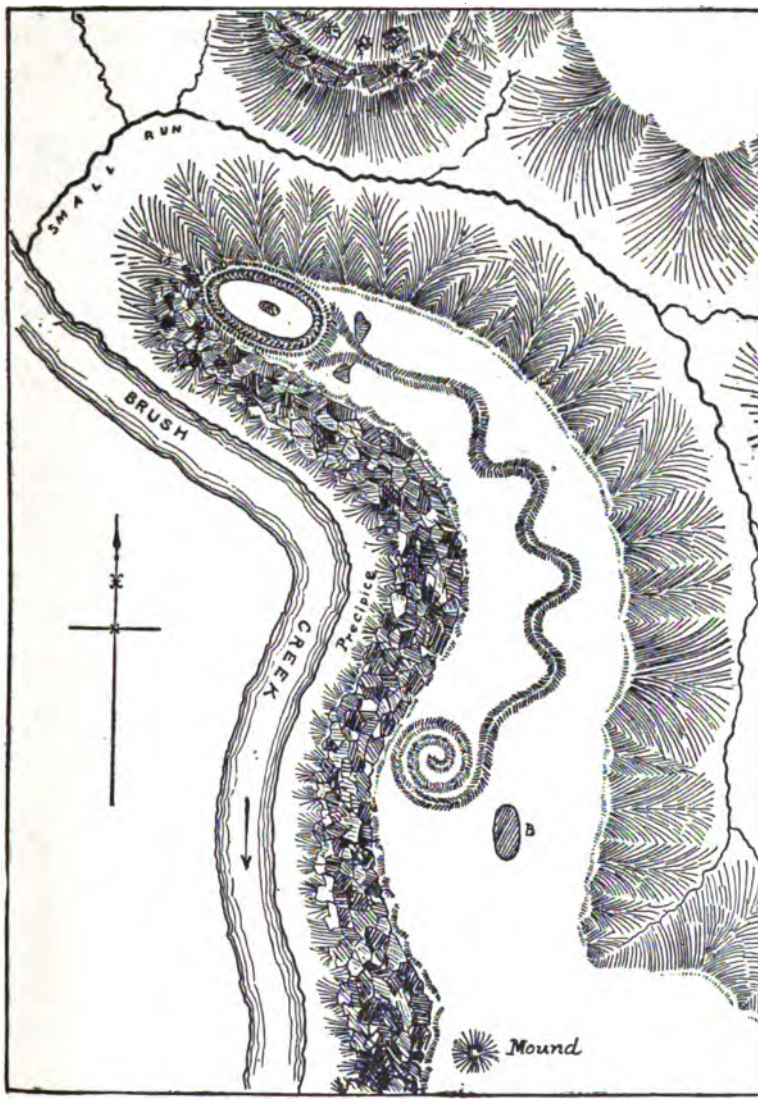


Figure 78.
Squier and Davis's Figure of the Serpent Mound.

narrow ridge, is highest along the middle line, or very near it, and slopes in both directions. Ground with a contour such as that represented would soon have a trench washed through the center.

While the statement in regard to the length is true enough, "an accurate survey" should present a closer guess than one that is fully one-fourth less than the correct number; for the effigy is somewhat more than 1,300 feet long from end to end.

In the Century Magazine for April, 1890, Professor Putnam gives an excellent description of the Serpent Mound, with a full account of his explorations there. A sketch which accompanies the article is reproduced as figure 79.

Professor Putnam says, in part:—

"The graceful curves throughout the whole length of this singular effigy give it a strange, life-like appearance; as if a huge serpent, slowly uncoiling itself and creeping silently and stealthily along the crest of the hill, was about to seize the oval in its extended jaws. * * * Will it be forcing the fact to argue * * * that in the oval embankment, with its central pile of burnt stones in combination with the serpent, we have the three symbols everywhere regarded in the old world as emblems of those primitive faiths? Here we find the linga-in-yoni of India, or the reciprocal principles of nature guarded by the serpent; or life, power, knowledge, and eternity. Moreover, its position, east and west, indicates the nourishing source of fertility—the great sun-god, whose first rays fall upon the altar of stones in the center of the oval. So that here we have associated the several symbols which in Asia would be accepted without question as showing the place to be a phallo-solar shrine combined with the serpent faith."

It is not east and west; and if it were the middle of the body is considerably higher than the oval enclosure so that the latter could not receive "the first rays."

"Its very position on the high cliff terminating in the rough overhanging rocks, washed by the spring torrents and near the three forks of the river, is to be considered when comparisons are made."

"Spring torrents" will wash anything they can reach; there are not three forks unless small ravines are so designated, in which case a score might as well be cited as three; and it is a stretch of the imagination to apply the name "river" to a little creek whose bed is dry with every drought.

"This combination of natural features probably could not be found again in any part of the great route along which the people must have journeyed from the Mexican Gulf."

Except as to the "head" formed by the projecting point of the cliff, to which Professor Putnam makes no allusion, all the topographic features about the Serpent can be practically dupli-

cated at various places within a few miles. If it is intended to say that *exact* duplications of all its features are to be looked for, it is a safe proposition to assert that such can not be found. No two places in a broken country can have precisely the same

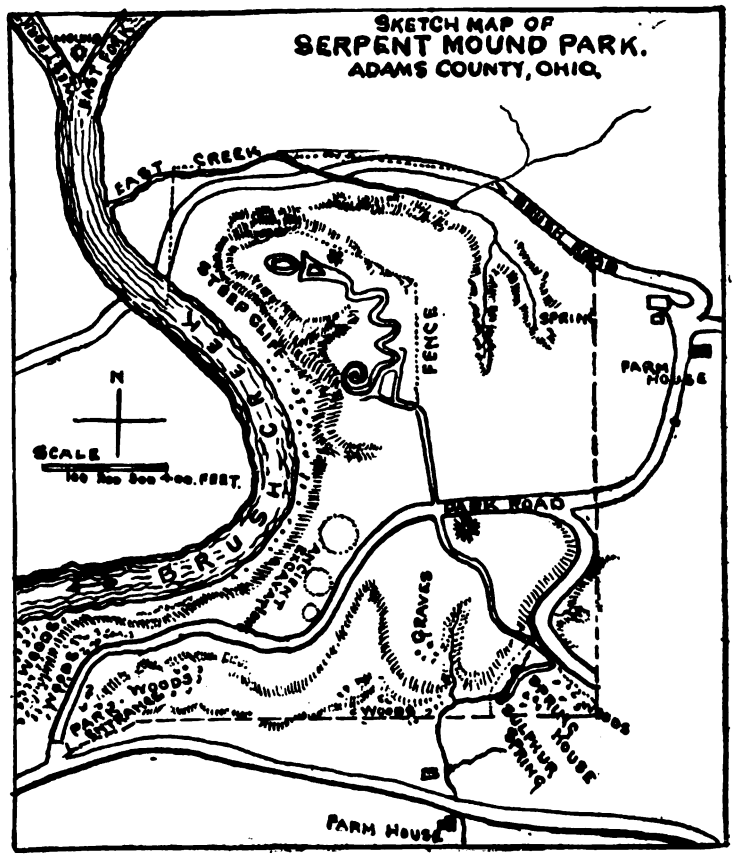


Figure 79.
Vicinity of the Serpent Mound.

appearance. Besides, are such remains as this to be found in Mexico? None are reported. Even if they should exist in Mexico, why are none of the kind to be found in the vast intervening territory? Are we to suppose the builders, if accustomed to the manner of worship indicated, would travel for months in order to find in the peculiar topography of Brush Creek a proper site for giving tangible or visible expression of their symbolism?

"Is all this to be taken as mere coincidence in the development of faith in America and the old world? There seems to be too much here to admit of such a theory; and when other facts, in other lines, point in the same direction, it is playing false with our reason to be too skeptical."

He makes comparison with a mound somewhat similar in construction in Scotland, and says:—

"Is there not something more than mere coincidence in the resemblances between the Loch Nell and the Ohio serpent, to say nothing of the topography of their respective sections? Each has the head pointing

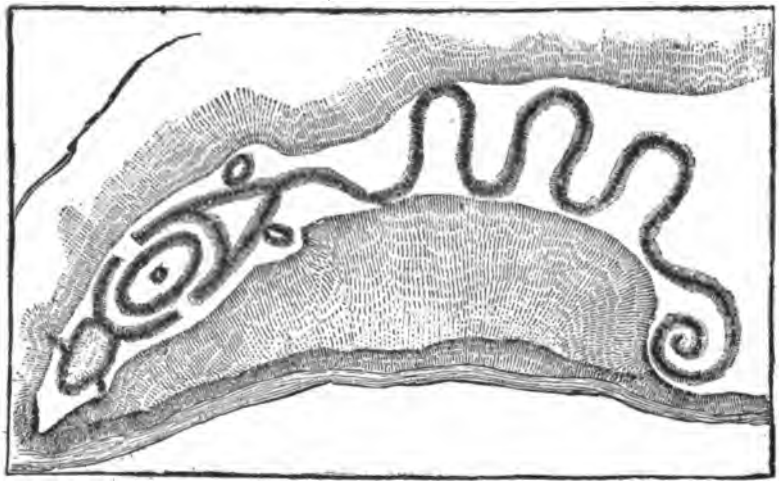


Figure 80.
McLean's Figure of the Serpent Mound.

west, and each terminates with a circular enclosure containing an altar, from which, looking along the most prominent portion of the serpent, the rising sun may be seen."

The Scotland work seems, from an illustration, to be on the shore of a mountain lake, and amid very different scenic surroundings.

For another view as to the significance of such similarities, see a citation from Fergusson, on page 39.

McLean made a thorough examination of the Great Serpent, and gives a drawing which is reproduced here as figure 80 (Amer. Antiq., Jan'y. 1885, p. 46). He has evolved a most singular theory.

"Thirty feet from the point of the rock is the end of the nose of the frog. The frog is in the act of leaping; the hind legs stretched

backward, the fore legs outward and forward, the body drawn up at the back, and the head depressed. * * * The apparent height is perhaps three and one-half feet. The head is fifteen feet long by twenty broad. It is considerably destroyed. The length of the body is forty-six feet. The right foreleg extends down the slope. For eleven feet it is bold. The left foreleg has been destroyed by denudation, except for a distance of five or six feet. The hind legs extend backwards fifty feet. Between the two hind legs, and removed a distance of seventeen feet, the egg-shaped wall is inserted. This wall is about two and a half feet high, with no outlet, and the bank seventeen feet across at the base. This wall or egg is oblong, the length one hundred and thirteen feet, and the greatest breadth from bank to bank fifty feet. The interior is hollow. In the center is a low mound fifteen feet in diameter at the base. It has been disturbed. A hole in the center reveals burnt stone. The opposite end from the frog extends into the mouth of the serpent effigy. From the top of the bank of the egg to the same forming the mouth of the serpent is twenty-four feet. Calculating from the extreme point of the jaws the egg extends into the serpent's mouth a distance of sixteen feet. * * * The entire length of the whole series, from the point of the frog's nose to the end of the serpent's tail, is thirteen hundred and thirty-one feet."

Various other measurements are given, not necessary to reproduce here.

"The whole series apparently represents the following: A serpent is on the mainland, resting in a coil, hid by a slight depression, and protected by declivities at two points of the compass. While in this position it beholds a frog sitting near the point of land beyond. The serpent unfolds itself, glides along the edge of the mainland until it reaches the tongue or spur, drops its head into the declivity, and just as it reaches the highest point beyond, strikes at the frog. But the wily batrachian becomes alarmed, leaps in time and emits an egg, which in turn is injected into the mouth of the serpent." — McLean, Serpent.

It is a physiological fact, of such common knowledge as to have become almost proverbial, that certain muscles respond with vigor and promptitude to the influence of sudden or extreme fright. There is also a property of matter, known in physics as inertia, owing to which a substance may fall directly downward when its support is precipitately removed. But it is difficult to picture in the mind any combination of circumstances which would constrain a frog (presumably of the gentler sex) to move with such electric celerity as to jump from around an egg nearly twice as long as itself and with a corresponding breadth. The imagination balks.

The man who had them tame the mastodon finds in the Serpent Mound evidence that the Mound Builders believed in immortality and eternal damnation.

"I have no confidence in the theory that a people so highly developed as the Mound Builders have shown themselves to be by their great works so artistically made, would worship one of the lowest and most depraved of reptiles. I am inclined to the opinion that the serpent with them was symbolical of a devil or infernal spirit, whose sparkling eyes would point to the slumbering fires within which would engulf them in everlasting pain and destruction, and that this great effigy was built with open mouth ready to devour its prey, to warn their fellow men to avoid the fatal snares of their hated enemy." — Larkin, 163.

According to the newspapers, a preacher in Adams county finds even a deeper significance in the "Serpent." He thinks the Garden of Eden was located in this vicinity, and that when Adam and Eve were banished (probably to the Sunfish Hills, as there is no other place in Ohio where a man would have to work so hard to make a living), the Almighty himself erected this semblance of Satan, carrying in his mouth the apple which caused all the trouble, as a memento of the occurrence.

The most scientific description and convincing explanation ever given in regard to this remarkable effigy, is that by Holmes.

"When almost to the brink of the cliff, we reach the tail of the serpent. Beginning with a small pit at the terminal point, we follow the unfolding coil for two full turns, and then advance along the body which increases gradually in height and width. Upon the crest of the ridge we find ourselves at the beginning of three great double folds. Following these we come to a point where the body straightens out along the ridge. Beyond this we reach the curious enlargement with its triangular and oval enclosures. Here the body embankment is divided into two parts, which respectively pass to the right and left of the enclosures. At the sides they descend slightly upon the slopes of the ridge, and at the widest part of the oval are somewhat obscure on account either of original conformation or of subsequent erosion. Beyond these breaks they continue, closing entirely around the oval embankment within. From the point of junction the body continues for a short distance, perhaps forty feet, and then terminates in a rounded and slightly widened point. This terminal elevation is entirely omitted by Squier and Davis, but is noticed by more recent writers. [The] auxiliary ridges, and the minor appended features recognized by Squier and Davis and by some recent visitors, are too obscure to be identified with absolute certainty, and I consider it unsafe to introduce them into my illustration; but the entire body of the serpent, and the peculiar features of the enlarged portion are all distinctly traceable, and leave no doubt in the mind as to their artificial character. The

topography of the outer end of the promontory is somewhat peculiar. The extreme point is about thirty feet beyond the end of the artificial embankment, and is slightly cleft in the middle. The right-hand portion has no exposure of rock, and descends in a narrow, rounded spur. The left-hand point is a naked shelf of rock a little to the left of the direct continuation of the earthwork, and some ten feet below its terminal point, It is rounded at the margin and perhaps twenty-five feet wide. The vertical outline is curved, and presents a number of encircling ledges marking the thickness of the firmer strata. The entire exposure of rock at the point is perhaps forty feet in height. Beneath this, talus extends to the creek bottom. From the point, the exposure of rock extends back along [down] the creek, descending slightly and soon disappearing. Most of the attempts to throw light upon the most extraordinary features of the work have been made through the medium of oriental philosophy; but it manifestly wrong to go thus out of our way to seek a symbolism for the oval enclosure, as do Squier and Davis, who liken it to the symbolic egg of old-world philosophy; nor need we make a serious effort to combat the idea that the terminal portion is a frog, as suggested by McLean. It would not seem unreasonable that the former feature should be simply the eye of the effigy; but we have another explanation more in accord, perhaps, with the analogies of native ceremonial art. The heart, which represents the life, is made a prominent feature in all superstitious delineations of living creatures, as shown by a multitude of examples. When we restore the head and neck of the reptile, omitted by Squier and Davis and misinterpreted by others, the strange oval takes the position of a heart, and in all probability marks the site of ceremonies that must have been connected with this work. This leads to a consideration of a proper identification of the head of the effigy, and the relalations of the natural to the artificial features of the site. From the bank of the creek we have a comprehensive view of the serpent ridge. Having the idea of a great serpent in mind, one is at once struck with the remarkable contour of the bluff, and especially of the exposure of rock, which readily assumes the appearance of the reptile lifting its front from the bed of the stream. The head is the point of rock, the dark lip-like edge is the muzzle, the light-colored under side is the white neck, the caves are the eyes, and the projecting masses to the right are the protruding coils of the body. The varying effects of light must greatly increase the vividness of the impressions, and nothing would be more natural than that the Sylvan prophet should at once regard the promotory as a great manito. His people would be led to regard it as such, and this would result in the elaboration of the form of the reptile, that it might be more real. The natural and the artificial features must all have been related to one and the same conception. The point of naked rock was probably at first and always recognized as the head of both the natural and the modified body. It was to the Indian the real head of the great serpent manito." — Holmes: Serpent, condensed.

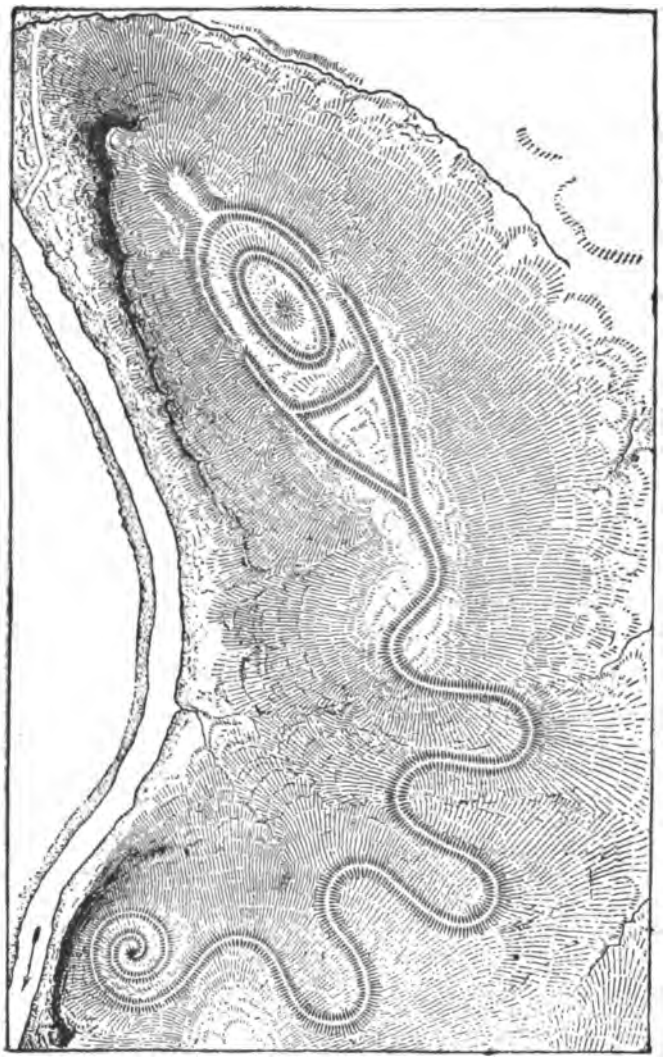


Figure 81.
Holmes's Figure of the Serpent Mound.

A sketch by Mr. Holmes is reproduced in figure 81 (*Science*, VIII, 204, Dec. 31, 1886, figure 1, page 626).

The vein of speculation seems worked out, so the reader must formulate a theory for himself if not satisfied with those presented.

The promontory upon which this effigy stands was purchased some years ago with money furnished by a number of generous ladies in Boston who had become interested in the work through the efforts of Professor Putnam. It was put in thorough repair, fences built, trees planted, and defaced portions of the artificial work restored and sodded over. The title deed was then transferred to the Peabody Museum, of Harvard College. Owing

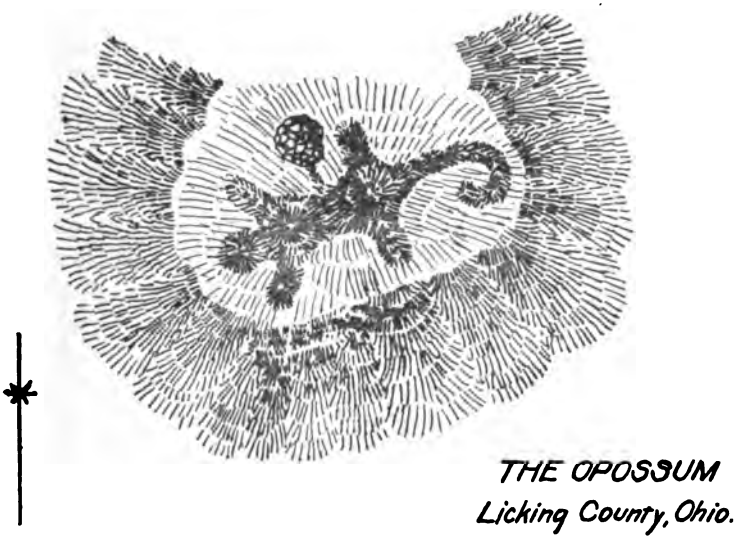


Figure 82.

to the difficulty of supervision from such a distance, the property became much impaired. Professor Putnam proposed that it be turned over to the State; and upon his advice and suggestion, the Trustees of Harvard, in 1900, deeded the entire property to the Ohio Archæological and Historical Society, in fee, with no other condition than the very reasonable one that the effigy be kept unimpaired and the adjacent grounds preserved as a park.

B.—THE OPOSSUM.

The effigy at Granville is shown in figure 82 (S. & D., 98, plate XXXVI. No. 2).

"It is known in the vicinity as 'the Alligator'; * * the figure bears as close a resemblance to a lizard as any other reptile." The total length, following the curve, is about 250 feet; breadth of body, 40 feet; length of each leg 36 feet; average height 4 feet; elevation at shoulders 6 feet. "It seems more than possible that this singular effigy, like that [of The Cross, near Tarlton], had its origin in the superstition of its makers. It was perhaps the high place where sacrifices were made on stated or extraordinary occasions, and where the ancient people gathered to celebrate the rites of their unknown worship. Its position, and all the circumstances attending it, certainly favor such a conclusion. The valley which it overlooks abounds in traces of the remote people, and seems to have been one of the centres of ancient population. * * Upon the inner side of the effigy is an elevated circular space, covered with stones which have been much burned. This has been denominated an altar. Leading from it to the top of the effigy is a graded way ten feet broad. — S. & D., 98.

The name "~~Alligator Mound~~," does not seem well chosen. The form, as may be seen in the figure, is that of an animal with short legs and a short neck; but the tail instead of tapering is of nearly uniform diameter and has a pronounced coil at the end, in both of which features it differs decidedly from any saurian. While individuals may have seen the alligator on some trip to the South, it is altogether improbable that the animal was familiar to the Mound Builders as a race. Their knowledge of the species would be of so limited a nature that they would scarcely desire to commemorate it in this manner. The figure resembles an opossum much more than it does an alligator. The propensity of uncivilized people to hold in awe or at least in superstitious regard anything unusual or mysterious, would lead them to consider the marsupium an organ worthy of religious recognition. Hence it is not improbable that this humble animal would be honored in their ceremonies.

The opinion sometimes advanced that it is a clan emblem or totem, is improbable. If the Mound Builders were divided into clans, it is not likely that only one—or two—would thus leave their mark.

C.—THE NEWARK FIGURE.

Concerning the mound in enclosure E, at Newark, shown in figure 83, Squier and Davis say:—

"In the center is a mound of singular shape. It much resembles some of the 'animal-shaped mounds' of Wisconsin, and was probably designed to represent a bird with expanded wings. It can hardly be called

a mound but is rather a group of four, so arranged and connected as to constitute an unbroken outline. Its greatest length is 155 feet." — S. & D., 68.

"It is common to find two or three, sometimes four or five sepulchral mounds in a group. In such cases it is always to be remarked that one of the group is much the largest, twice or three times the dimensions of any of the others; and that the smaller ones of various sizes, are arranged



Figure 83.

around the base, generally joining it, thus evincing a designed dependence and intimate relation between them." [This is shown in their plan, reproduced here as figure 84 (S. & D., 170, fig. 57)].

"No. 1 is situated six miles below Hamilton in Butler county. The largest is twenty-seven feet high.

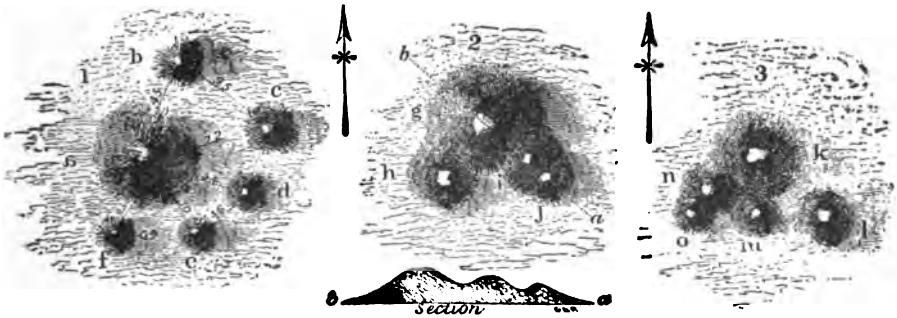


Figure 84.
Groups of Conjoined Mounds.

"No. 2 is a mile north of Chillicothe, and is numbered 4 in figure [23]. The small one indicated by the letter *j* was excavated, and was found to contain the skeleton of a girl enveloped in bark. The largest of the group is about thirty feet high.

"No. 3 is situated in Pike county, near the end of the embankment from the Graded Way." — S. & D., 170, condensed.

Group No. 2 is the one to which reference is made on page 354 to page 357.

It may have been the intention, never carried to completion, to construct a group of this kind at Newark. Four conjoined

mounds is all that can be made of the figure; and yet it has been compared to a flying eagle; a bird, without specifying what kind; a bird's foot; a bow with an arrow across it; a man on his back with outstretched arms; a honey bee; a man swimming without legs; a large temple with a tower in front and wings at each side; and possibly other things. The outline of the mounds is not so definite as the figure indicates.

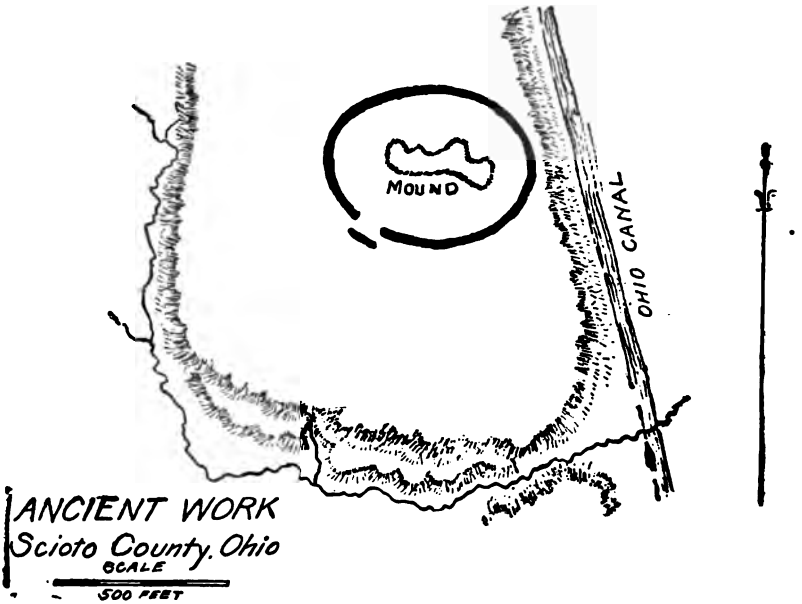


Figure 85.

D.— THE TAPIR.

Five miles north of Portsmouth, on the west side of the river, is the enclosure shown in figure 85 (S. & D., 82, plate XXIX).

It is 480 feet long, by 407 feet wide, but not a true ellipse. A mound within "is of the form and relative size indicated in the plan, and is composed of loose broken sandstone and earth, based upon dislocated and broken sand rock. It is from one to eight feet high, being lowest at the east end or head, and at the projecting points. It is probably of the same design as those of Wisconsin. * * * No explanation of the probable design of this work will be attempted here; it is impossible, however, to disconnect it from the superstitions of the ancient people. * * * Workmen engaged in excavating [for

the canal] found large quantities of mica, in sheets, in the immediate vicinity of this enclosure." — S. & D., 82.

Some writers have managed to find in the mound mentioned a resemblance to the South American tapir; proving thereby, of course, that the makers were familiar with that animal.

E.— THE BEAR.

On the opposite side of the ravine from the western termination of the parallels extending westward from the lower group of the Portsmouth Works, on the Kentucky side, is an effigy which apparently is intended to represent a bear. It is one hundred and five feet in length, and much resembles some of the Wisconsin figures.— Lewis, Fort, 375.

D. — ANOMALOUS STRUCTURES.

Among the works of the Mound Builders are some whose purpose not even a vivid imagination can fathom. No rational explanation is ever attempted by any one who describes them.

Three of these will be illustrated, merely to show that the psychological workings of an unknown people are not to be measured by our own standards. The builders of such figures probably knew what they were about; but we cannot even guess at their thoughts or intentions.

* * * * *

The structure known as "The Cross," shown in figure 86 (S. & D., 98, plate XXXVI, No. 1),

is near Tarlton, Pickaway county, on the point of a narrow ridge overlooking Salt Creek. It measures ninety feet across, each way, and is about three feet high. There is a slight ditch all around its margin, and a circular depression in the center twenty feet in diameter and twenty inches deep. Several small mounds, including one partly of stone, are close by; and some large ones on top of the hill, farther back. — S. & D., 98.

* * * * *

The singular structure shown in figure 87 (S. & D., 85, plate XXX, No. 4)

is on the little stream of Black Run, two miles south of the fort on Spruce Hill, opposite Bourneville. It is composed entirely of stones which are not laid up, but are rudely piled together. The main work

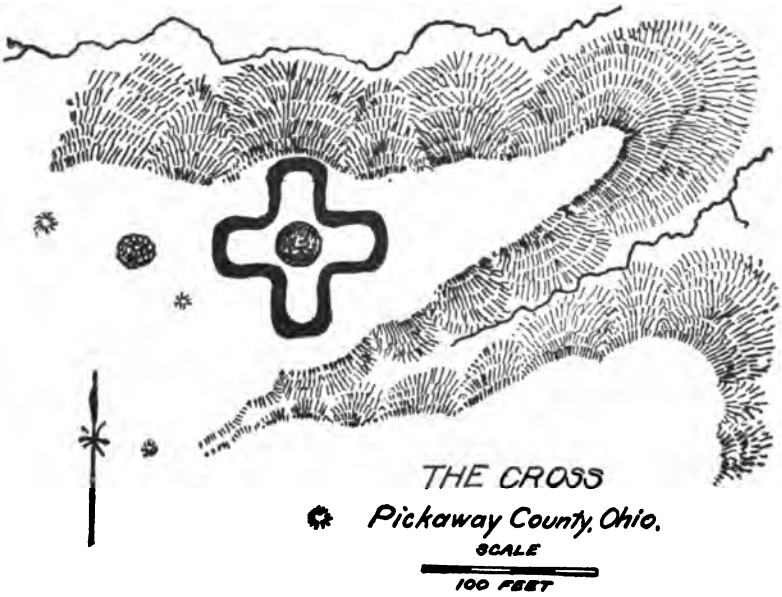


Figure 86.

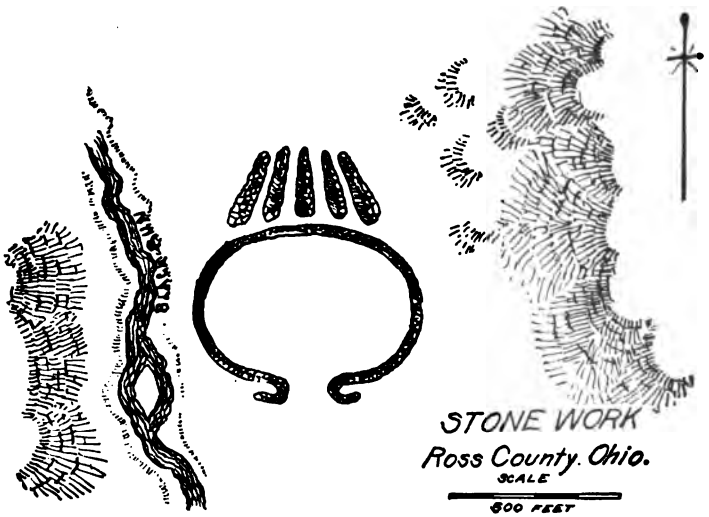


Figure 87.

is an ellipse 170 by 250 feet. There is an opening "fifty feet wide on the south, where the walls curve outwards and lap back upon themselves for the space of sixty feet." Five walls start "within ten feet of the unbroken line of the elliptical enclosure, and extend thence northward, slightly converging, for the distance of one hundred feet. The lines of the outer walls, if prolonged, would intersect each other at the distance of two hundred and fifty feet. These walls are twenty feet broad at the ends nearest the enclosure and ten feet apart. They diminish gradually as they recede, to ten feet at their outer extremities. * * * The stones [of the main work] cover a space fifteen or twenty feet broad, and are irregularly heaped together to the height of perhaps three feet. * * * The purposes of this strange work are entirely inexplicable; its small size precludes the idea of a defensive origin. It is the only structure of the kind which has yet been discovered in the valleys, and it is totally unlike those found on the hills." — S. & D., 87.

Peet finds in this work, two intertwined serpents, the five straight walls being the tails, and the curve at either side of the entrance the heads. Later, he concludes the walls are rattles. — Amer. Antiq., July, 1886, and July, 1890.

Peet possesses a peculiar faculty for seeing snakes. But he is justified in exploiting this discovery; in fact, he should give it more prominence than he has done, for there is probably not another work in the world where two snakes are represented as the proud possessors of five tails—or five sets of rattles, whichever it is.

* * * * *

The "Trefoil" near Bainbridge is presented in figure 88 (S. & D., 91, plate XXXII, No. 5).

"It can, of course, be regarded only as connected with the superstitions of the builders, for the reason that it could offer no good purpose for protection, nor subserve any of the useful purposes for which enclosures are required, such as the limits of fields and possessions, or the boundaries of villages." — S. & D., 91.

It serves as another example of the carelessness with which these men did their work. The pike in reality runs almost due west; the mounds are all north of the pike; there is no second terrace on that side where it is represented; and the Maysville pike turns off at some distance beyond the limit of the map. In addition to which there is not room on the terrace for a work of the size they figure. Still, they evidently found something out of the ordinary, of which no part has escaped the destructive influence of plow and harrow.

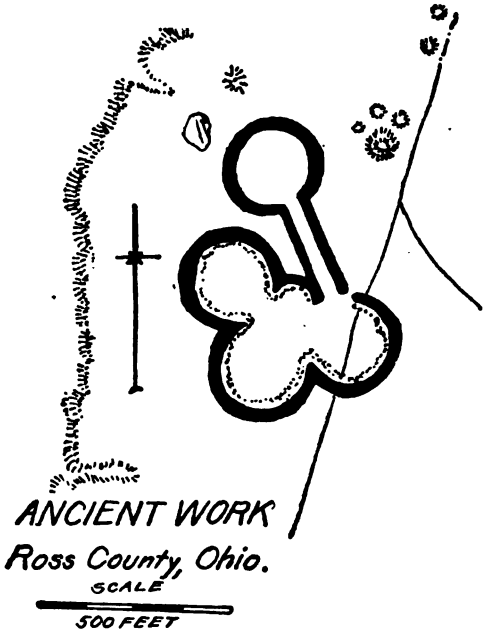


Figure 88.

* * * * *

From the illustrations and descriptions in the preceding pages, the reader may gain a clear idea of the appearance, situation, and construction of Ohio enclosures. All the so-called "sacred" or geometrical structures are figured, they being regarded as the most important. Of other classes only a few are selected from each for presentation; enough, however, to show the characteristics of all. To present fully the interesting archaeological details of every county in the State, would require many large volumes; a task beyond the power of an individual or the resources of a society or institution.

CHAPTER IX

THE MOUNDS OF OHIO.

Numbers. Size. Form. Classification. Stratification. Altars. Position of Skeletons. Property Buried with the Dead. Origin of the Custom. How Mounds Were Built.

THE total number of mounds in Ohio has been estimated at ten thousand. This is probably under rather than over the correct figure; for while they are almost unknown in the northwestern counties and are comparatively scarce in some parts of the rugged hill lands of the south and southeast and along the main water sheds, there is scarcely a township in any other part where they are not found. In the neighborhood of every stream in the southern half of the State, except some of those flowing through rough or swampy country, the surface is so dotted with them that signals could be transmitted from one to another for a hundred miles or more. There is scarcely a point along the Scioto below Circleville, or on either Miami in the lower half of its course, or in the valley of any tributary to these streams, where one may not be within a few minutes' ride of some permanent evidence of aboriginal habitation. The same is true of the Cuyahoga and some other rivers belonging to the Lake Erie basin. On the summits of steep hills; in bottom lands subject to overflow; on every terrace bordering a stream; on plateaus and uplands; wherever there is cultivable or naturally drained land, a good point of observation, an ample supply of water, a convenient topography for trails—the Mound Builder has left his mark. Even in places where it would seem a nomad would not care to go, except as led by the excitement or necessities of the chase, and then for as brief a time as possible, such evidence is not lacking of prehistoric residence, or, at least, sojourning.

In magnitude they vary from one reduced by farming operations until it is scarcely perceptible and probably never more than three feet in height or twenty feet across, to those fully thirty

feet in elevation with a base diameter of from one hundred and fifty to two hundred feet. Such mounds as that at Miamisburg, with an altitude of sixty-eight feet, or at Grave creek, West Virginia, two feet higher, are so far beyond the ordinary that they must be excluded in giving figures that shall fairly represent the usual dimensions.

The majority of them are composed entirely of earth, though there are many altogether of stone and occasionally one occurs in which both materials are used. As a rule the earth mounds resemble in shape a medium between a low cone, and a flat dome or segment of a sphere. Some have an elliptical outline; others are flat-topped. All these usually come under the designation of "conical mounds," which is, perhaps, as accurate as any single descriptive word could be, though none are or ever have been exactly conical; earth could not be built into that form, nor, if it could, would it retain its shape through the first storm.

The base diameter of a conical mound, undisturbed by cultivation, is very seldom less than four times and from that to ten times its vertical height. As this would not look impressive in a picture, they are almost invariably represented with the slope much exaggerated. The Marietta mound is especially unfortunate in this respect, as may be seen from the cut of it reproduced from Nadaillac (see figure 89). Some illustrations are even worse than this; the artist never feels it his duty to explain how one of the builders could climb up the sides with a load of earth. The actual slope is shown in figure 90, from a photograph. While inaccuracies are to be expected in a volume written for the "general public" by an author ignorant of his subject, it is somewhat depressing to find similar errors committed by men who have opportunities for personal examination of the objects which they portray. As an illustration, Plate XI, of the "Ohio Centennial Report," represents three "Ancient Mounds." It shows how little reliance is to be placed upon ordinary descriptions and observations. The first, reproduced as figure 91, outlines a mound as it really is, so far as proportions are concerned; the second, figure 92, is as it looks to a casual observer; while the third, figure 93, is an impossible "restoration," where stones less than a foot in diameter are made, according to the accompanying "scale," to appear as large as haycocks. Even books which profess to record only the careful observations of trained

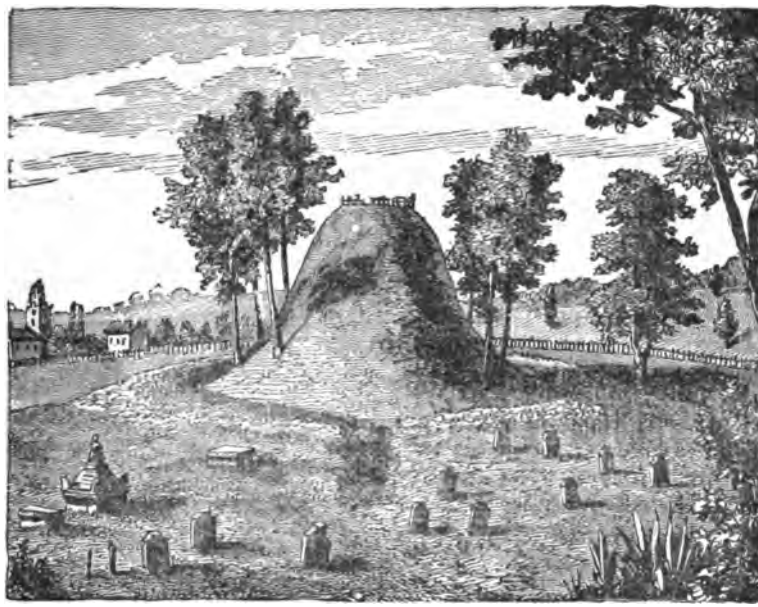
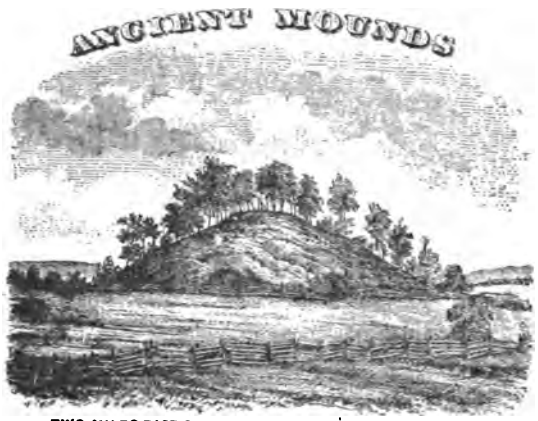


Figure 89 — Sketch of the Marietta Mound; from Nadaillac.



Figure 90 — The Marietta Mound; from a photograph.



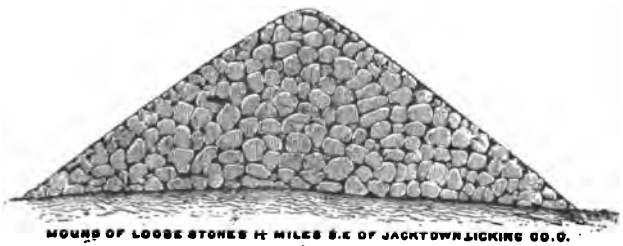
TWO MILES EAST OF MIAMISBURG MONTGOMERY CO. OHIO.
68 Feet High. Diameter of Base 263 Feet
Plate for the Western Reserve and Northern Ohio Historical Society by J. Slater. 1872.

Figure 91.



TIPPETS MOUND LICKING CO. OHIO.
Height 24 ft Diameter of Base 90 ft.
Sketch by D. Wyeth 1869.

Figure 92.



MOUND OF LOOSE STONES 1½ MILES S.E OF JACKTOWN LICKING CO. O.
Height About 40 ft Diameter of Base 170 ft.
Profile. Restored by Chas. Whittlesey 1838.

Figure 93.

scientists sometimes practically endorse errors which they are written to confute. In Plate IX, page 242, of the Twelfth Annual Report of the Bureau of Ethnology, the "Knapp Mounds" in Pulaski county, and the "De Soto Mounds" in Jefferson county, Arkansas, are represented as having slopes of sixty degrees; a pitch impossible to attain with loose earth. In this plate, the largest of the former group is represented as of the ordinary conical type. In the following plate, however, it is figured as elliptical, with a "platform" at the southern end; and the text, page 244, says it "is forty-eight feet high, 280 feet long from north to south, and 150 feet wide. The nearly level summit is about 50 feet wide by 90 long. The slopes are about 35 or 40 degrees." If these measurements are correct the slopes would have to be nearly 45 degrees on the longer sides and about 30 degrees at the ends. There are numerous minor errors of this character in that volume of the Reports, but none of them are serious. This is the more remarkable, in view of the fact that the former chief of the division of mound exploration made it a rule to engage only men without experience or knowledge in archæological work, and sent them into the field without instructions as to their duties, in order that they might render reports which should be, as he expressed it, "unprejudiced by preconceived opinions." Their reports were edited in Washington by this chief, who, himself, was without practical experience.

Various schemes have been proposed for the classification of mounds into definite groups and systems; nearly all of them being based upon method of construction, or upon certain details of internal structure, as well as upon outward form. All are open to the same objection, namely, lack of uniformity in those to which any particular name is applied, and their close resemblance in some respects to many which are arbitrarily placed in another division. There is so much similarity in the arrangement and contents of some amid totally different surroundings, and conversely such unlikeness in the structure of others which constitute a single group, that a definite name expressive of one certain purpose, applied to a mound on account of its location or outward appearance, is merely conjectural, may find as many exceptions as examples, and so is very apt to be misleading. It is natural to employ the term "burial mound" for one in which human remains are found; or to designate as "altar mound" one that

contains a number of articles, deposited apparently as a votive offering; or to use the name "sacrificial" when evidences of cremation are present. But, even if a mound was begun with a definite aim in view, plans may have altered as the work progressed. Additional interments are often made in a tumulus intended at first to cover only a single corpse; two mounds, of any character, may be gradually enlarged until the bases overlap; occasionally a number of small mounds, each of which would fall into a single "class," are built in a compact group and afterwards covered with one huge pile of earth. This last was especially noticeable at the Hopewell group.

Squier and Davis make the following classification of mounds:—

"1st. ALTAR MOUNDS, which occur either within, or in the immediate vicinity of enclosures; which are stratified, and contain altars of burned clay or stone; and which were places of sacrifice.

"2nd. MOUNDS OF SEPULTURE, which stand isolated or in groups more or less remote from the enclosures; which are not stratified; which contain human remains; and which were the burial places and monuments of the dead.

"3rd. TEMPLE MOUNDS, which occur most usually within, but sometimes without the walls of the enclosures; which possess great regularity of form; which contain neither altars nor human remains; and which were 'High Places' for the performance of religious rites and ceremonies, the sites of structures, or in some way connected with the superstitions of the builders.

"4th. ANOMALOUS MOUNDS, including mounds of observation and such as were applied to a double purpose, or of which the design and objects are not apparent. This division includes all which do not clearly fall within the preceding three classes." — S. & D., 142.

ALTAR MOUNDS.

In their descriptions of mounds containing altars, Squier and Davis state that

"The fact of stratification in [altar] mounds, is one of great interest and importance. * * * The stratification, so far as observed, is not horizontal, but always conforms to the convex outline of the mound."

"The circumstance of stratification, exhibiting as it does an extraordinary care and attention, can hardly be supposed to result from any but superstitious notions. It certainly has no exact analogy in any of the monuments of the globe, of which we possess a knowledge, and its significance is beyond rational conjecture."

"The characteristics of this class of mounds will be best explained by reference to the accompanying illustrations. It should be remarked,

however, that no two are alike in all their details." The mound in question (which is the first one they opened at "Mound City") was seven feet high with a base fifty-five feet in diameter. A shaft five feet square was sunk from its apex to the bottom. For a foot from the top there was "a layer of coarse gravel and pebbles, which appeared to have been taken from deep pits surrounding the enclosure, or from the bank of the river." The remainder of the mound was of earth, except for three layers of sand, each about an inch thick." — S. & D., 143, 160, and 144.

One of these illustrations is here given as figure 94 (S. & D., 144, figure 29). The lines of curvature as marked in the section are purely imaginary; in the narrow shaft sunk from the top only a limited portion of the deposits about the center of the

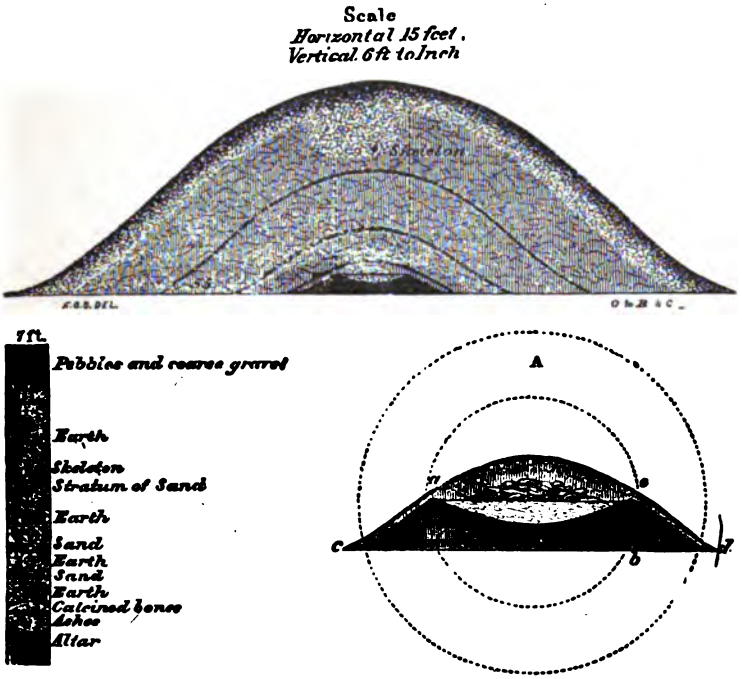


Figure 94.
Theoretical Section of a Mound.

mound could be seen, and it was taken for granted that these deposits were uniform in thickness and followed the curve of the top instead of the plane of the base. The same assumption is made in every mound where a section is represented.

There is often a rude stratification in the mounds of the Scioto valley, but it is not of the kind described by these authors; neither is it due to building in the manner which they supposed. The existing strata overlap; they are not continuous; they are as often horizontal as inclined; they are more generally sloping in a somewhat irregular plane than curved; and they are found, when they appear at all, indifferently in the various sorts of mounds which are introduced in the above misleading classification. In not a single case where they have been described or illustrated did these explorers cut a trench across the mound, which is the only manner of ascertaining the disposition of the different deposits. A succession of shafts such as they made would not be satisfactory in determining the matter, for while similar materials might be found at different levels, these could as well run out within a few feet on their own level as they could rise uniformly to the plane of the one above. The above remarks apply to those mounds, by far the most numerous, where the labor of construction was tolerably continuous from inception to completion. The entire space covered by the mound was worked over at one time by different parties, bringing earth from different places. Each would throw his load where it suited him. There was no such order and regularity as the authors indicate; one is led to infer from their cuts that a dome-shaped mass was intentionally and carefully carried to a certain height, covered with a thin layer of gravel and sand, then another stratum of earth built up, and so the work would continue until the tumulus was finished. Had they thought to trench the mounds, or to make their shaft much larger, they would have found that no one of these layers which they figure was of any great extent and that none of them had the regularity of curve which they represent. This statement is made with confidence of its correctness, for not only has the present writer carefully noted the arrangement of a large number of mounds in the Scioto valley and elsewhere; but has also trenched across a few of the identical mounds called "stratified" by these pioneer explorers; and in no instance has any such feature been discovered. The nearest approach to it was near Frankfort where

one mound was "distinctly stratified" though the strata were uneven. and another was what is usually classed as a "stratified mound," being composed of practically horizontal layers, though these varied consider-

ably in extent and thickness and none reached entirely across the structure. — Moorehead, 118 and 134.

In very few cases has even this rude accidental stratification been found; the entire mound, from base to summit seldom shows any lines of separation in the material composing it except the lens-shaped profile of each basket load as represented in figure 95 (S. & D., 144, figure 30).

There are some mounds in which a curved stratum extends without a break over the portions beneath. In such cases, it will be seen that different periods of construction are involved. A mound was built up, sometimes to a height of ten or twelve feet, though usually much less. The building was then discontinued for a time, occasionally a number of years as proven by the remains of timber which grew on its surface, until the earth deposited had settled into a compact mass. Then the structure was carried higher, with the same soil sometimes, but usually with earth of a different character from that used first. Such structures, however, are not what is understood by the term "stratified mounds."

ALTARS.

"The altars, or basins, found in these mounds are almost invariably of burned clay, though a few of stone have been discovered. They are symmetrical, but not of uniform size or shape. Some are round, others elliptical, and others square or parallelograms. Some are small, measuring barely two feet across, while others are fifty feet long by twelve or fifteen feet wide. The usual dimensions are from five to eight feet.



Figure 95.
Outlines of Separate Loads of Earth in a Mound.

All appear to have been modelled of fine clay brought to the spot from a distance, and they rest upon the original surface of the earth. In a few instances, a layer or small elevation of sand has been laid down, upon which the altar was formed. The height of the altars, nevertheless, seldom exceeds a foot or twenty inches above the adjacent level. The clay of which they are composed is usually burned hard, sometimes to the depth of ten, fifteen, or even twenty inches. This is hardly to be explained by any degree or continuance of heat, though it is manifest that in some cases the heat was intense. On the other hand, a number

of these altars have been noticed, which are very slightly burned; and such, it is a remarkable fact, are destitute of remains. — S. & D., 143, condensed.

It is a common belief that a fire kindled on the surface will not harden or discolor the earth for more than a few inches below; and this may be true of any ordinary degree of heat. Under old lime-kilns, and perhaps at other places where a great heat has been maintained for a long time, such evidences may be found at a depth of several feet. At Leavenworth, Indiana, some years since, a kiln was undermined by the river, leaving a vertical exposure across its center. The earth was red as a brick to the depth of six feet; it could not be seen lower on account of the mud piled against it by the current.

To the above description of the so-called altars it may be added that they seem to be found only in mounds connected with large enclosures. They are masses of clay from six to eight feet across—seldom larger—usually irregular in outline, and up to a foot in thickness. The first step in their construction was to clear off a sufficient space which was sometimes burned or pounded until quite hard. On this, the clay was spread out, kneaded or puddled to a uniform consistency, the upper surface made smooth and flat, and a basin excavated in it. The latter is always rectangular with rounded corners and a level bottom; it varies from three to five feet in length with a width one-half to three-fourths the length, and a depth of four to eight inches. Very few fall beyond these limits in either direction. The margin of the clay was either left as it was deposited, or cut away its entire thickness to form a rim of uniform width around the basin. A fire was then kept burning on it until all the clay remaining was as hard as brick. Sometimes all the ashes and charcoal resulting from this fire were carefully removed; in this event, the altar is usually filled with clean, white ashes, or with fine dark earth, possibly decayed organic substances. The name "altar" is derived from the relics of various descriptions, occasionally including burned human bones, gratuitously assumed to be sacrificial offerings, frequently found on them; though quite often they contain no objects of any kind.

The altars in three mounds at "Mound City," though much burned, had no remains in them; even the ashes had been removed. Some of the smallest mounds had no altars. "In place thereof, on the original level of the earth, was found a quantity, in no case exceeding the amount

of one skeleton, of burned human bones in small fragments. That they were not burned on the spot is evident from the absence of all traces of fire, beyond those furnished by the bones themselves. They appear to have been collected from the pyre, wherever it was erected, and carefully deposited in a small heap, and then covered over."

"That the stratified mounds are not burial places seems sufficiently well established by the fact that the greater number have no traces of human remains upon or around the altars. * * * The suggestion that the various relics found upon these altars were the personal effects of deceased chiefs or priests, thus deposited in accordance with the custom among rude people, of consigning the property of the dead to the tomb with them, is controverted by the facts that the deposits are homogeneous."

"Some of the altar or sacrificial mounds, on the other hand, have the deposits within them almost entirely made up of finished arrow and spear points, intermixed with masses of the unmanufactured material." — S. & D., 159 and 213.

Human remains are not uncommon on the altars; the authors themselves found them in various places, as they record in their volume. If, as they assert, the relics also found were not individual property, to whom could they belong? It is true that one altar may contain only pipes, on another nothing but spear-heads is found, in a third galena alone occurs, etc. Are we to suppose that each person in a village contributes his one or two specimens? Or does the whole lot belong to a trader or a manufacturer?

"Had the objects deposited upon the 'altars' in the Ohio mounds been of a sacrificial nature, there is no doubt that they would have been the best of their kind; imperfect and unfinished pipes would not have been worthy offerings to a divinity." — Stevens, 350.

Neither is it true that only one certain kind of article is found upon an altar. On the contrary, some of them have yielded an astonishing amount and variety of specimens; as will appear in the accounts of mound exploration.

"That all altars were not covered by mounds is certain. * * * Nothing is more likely than that * * * some were left exposed by the builders, and afterwards hidden by natural accumulations, to be again exposed" — by the plow and freshet in later time. — S. & D., 160.

Evidently they saw an "altar" in every spot of burned earth.

So far as the principle of "sacrifice" or "burnt offering" is concerned, the numerous wrought articles may have been

devoted to the flames with some such idea in view; but there has not as yet been discovered any real evidence that human sacrifice was practiced by the Mound Builders. Cremation; torture; indifference to the disposition of corpses;—will account for all the burned and charred human bones exhumed.

"The terms 'altars' and 'mounds of sacrifice' imply that human sacrifices were offered. Human sacrifices were unknown in New Mexico, and, without better evidence than these miscalled altars afford, they cannot be fastened upon the Mound-Builders. Moreover, these clay beds were not adapted to the barbarous work. Wherever human sacrifices are known to have occurred among the American aborigines, the place was an elevated mound platform and the raised altar or sacrificial stone stood before the idol in whose worship the rites were performed. There is neither a temple nor an idol; but a hollow bed of clay covered by a mound raised in honor over the ashes of a deceased chief, for assuredly such a mound would not have been raised over the ashes of a victim. Indians never exchanged prisoners of war. Adoption or burning at the stake was the alternative of capture; but no mound was ever raised over the burned remains. Another use suggests itself for this artificial basin more in accordance with Indian usages and customs, namely, that cremation of the body of a deceased chief was performed upon it, after which the mound was raised over his ashes." — Morgan, 217, condensed.

TEMPLE MOUNDS.

"These mounds are distinguished by their great regularity of form and general large dimensions. They occur usually within, but sometimes without, the walls of enclosures. They consist chiefly of pyramidal structures, truncated, and generally have graded avenues to the top. But whatever their form, * * * they have invariably flat or level tops, of greater or less area. * * * Mounds of this class are not numerous in Ohio, and it is believed are only found at Marietta, Newark, Portsmouth, and in the vicinity of Chillicothe. * * * They cover no remains, and seem obviously designed as the sites of temples or of other structures which have passed away, or as 'high places' for the performance of certain ceremonies. The likeness which they bear to the Teocallis of Mexico is striking and suggestive of their probable purpose." — S. &. D., 173.

One is shown at Newark, small and without a grade-way—it is doubtful whether this will fall within their classification; one above the mouth of Tygart, opposite Portsmouth, which may be only a natural knoll, dressed to its present form; two at Cedar Banks, only one of which is graded; and four at Marietta, three of them graded.

As none of them have been explored except in a very inadequate and perfunctory manner, the assertion that "they cover no remains" is not warranted by our present knowledge.

The rather common practice among Southern Indians of using such mounds as sites for buildings has suggested the idea that those found here were utilized in the same way. While this may have been the case with those standing on low or level ground, in connection with additional evidences of occupation, as at Marietta and in two or three other localities, there are some whose situation is contrary to such a supposition. For example, the mound a mile south of the Glenford Fort, which is about 18 feet high and covers nearly two acres, is on the top of a hill which slopes away in every direction. The soil in the vicinity is poor, the surface is a succession of hills and ravines, and it is not credible that an aboriginal settlement would have been located at this place; nor is it more probable that the people who occupied the fort would have established a temple or building of any other sort, of a size which is implied by the base of this mound, at such a distance from any suitable location for a town.

Even though a few of them were obviously intended to serve as sites for buildings of some description, it does not follow that all, or many, of these buildings were "temples." It is not to be denied that superstition was probably dominant in the mind of the Mound Builder; but to assume that everything which we do not understand among their remains must be owing to this trait, simply because we cannot account for it otherwise, is certainly illogical.

The sparseness of such mounds and their occurrence under the same conditions as commoner forms, are inconsistent with the theory which has been advanced more than once that they owe their origin to a different people or belong to a different age; their erection is undoubtedly due to the same motives which induced the building of mounds and other works amid which they stand, the entire group clearly constituting one general system.

Many conical mounds are also truncated; some of these have been opened, and their contents and methods of construction found to be practically of the same character as shown in

numerous mounds of the usual form, examined in the same localities.

LOOKOUT MOUNDS.

"The most commanding positions on the hills bordering the valleys of the West, are often crowned with mounds, suggesting at once the idea of signal or alarm posts. Between Chillicothe and Columbus, not far from twenty may be selected, so placed in respect to each other that signals of fire might be transmitted in a few minutes along the whole line. On the whole, however, the classification of any portion of the hill-mounds as places of observation, is not sufficiently well authorized. It seems that a large proportion contain human remains, undoubtedly those of the mound-builders. There can be no doubt that the ancient people selected prominent and elevated positions upon which to build large fires, which were kept burning for long periods, or renewed at frequent intervals. For what purpose they were built, whether to comunicate intelligence or to celebrate some religious rite, it is not undertaken to say. The traces of these fires are only observed upon the brows of the hills; they appear to have been built generally upon heaps of stones, which are broken up and sometimes partially vitrified over a large area and several feet thick. They are vulgarly supposed to be the remains of *'furnaces'*". — S. & D., 181-3, condensed.

This conservative and reasonable statement is too mild for some later authors. Short says:—

"On the Ohio and Mississippi, on all their tributaries, are mounds which served as lookouts. These were always placed in positions to command extensive views. * * The great mound at Miamisburg * * may have served the double purpose of a signal station and the base of a small edifice devoted to astronomical or religious purposes." — Short, 52.

This phrase "may have served" furnishes a convenient loop-hole when testimony is sought concerning the grounds for belief that leads to a statement which is apparently definite and is so regarded by readers. The author might, with equal propriety, have said it "may have served" as a toboggan slide, or in the nature of a corner-stone.

McLean does not palter thus; he boldly announces

"They were expelled from the territory by force. On the hills they erected mounds for posts of observation, and when a war party came down upon them, the fires were kindled, and the people thereby warned sought their shelters of refuge. The invaders came from the north. The belt of country between the northern and southern works of Ohio, probably remained a dense forest." — McLean, 144, condensed.

But the position of the so-called "Signal Mounds" or "Mounds of Observation" is opposed to their implied use

rather than confirmatory of it. When a point already overlooks the surrounding country for many miles, no possible advantage could be gained by raising a signal fire a few feet higher, or elevating a sentry to a slight extent when his horizon was already far beyond the limit at which he could discern any moving object. Head lands and high peaks have always been favorite burial spots with Indians, even till the present generation; and human remains are of such common occurrence in mounds thus situated as to warrant the assertion that all were intended as tumuli.

Ashes are found in as great quantities in many mounds on low ground as in those on hill-tops. A pile of damp leaves and trash which would make a column of dense smoke and leave few traces of their use, would serve better for signal purposes than any amount of wood which would leave quantities of ashes. The mound on Mount Logan, opposite Chillicothe, so often mentioned as composed nearly altogether of ashes from signal fires, was found on examination to contain only a relatively small amount, being mostly of earth, and containing human bones.

Mounds of earth, or stone, or both, are found on hilltops along every considerable stream in the southern half of the State, where these border any fertile bottoms, as well as less frequently farther north; on jutting points, back from the streams, either singly or in groups; and miles away from any stream larger than a small rivulet, on the higher hilltops overlooking extensive areas of broken table lands. There could easily be attributed to "signal purposes" not merely "twenty between Chillicothe and Columbus," but hundreds scattered over forty or fifty counties. In fact, one might start from almost any point and flash signals from one mound to another in almost any direction for an indefinite distance.

SEPULCHRAL MOUNDS.

"Mounds of this class are very numerous. They are generally of considerable size, varying from six to eighty feet in height, but having an average altitude of from fifteen to twenty or twenty-five feet. * * These mounds invariably cover a skeleton (in very rare instances more than one), which at the time of its interment was enveloped in bark or coarse matting, or enclosed in a rude sarcophagus of timber."—S. & D., 161.

Of the great number of mounds excavated with more or less care and exactness by farmers, collectors, scientists, and others, the results of such explorations as have been reported establish the fact that more than nine-tenths contained human skeletons; and it is a fair assumption that this proportion is true of all. Nor is the absence of such remains to be considered indicative, unless otherwise substantiated, that they were constructed for some other purpose than as burial-places; for conditions are frequent in which, although the character and disposition of relics found are such as invariably mark those deposited with a corpse, all traces of bone have disappeared.

As a rule, not many bodies were covered by a single mound; sometimes there is only one, very seldom more than twenty. From two to ten seems the usual number. There are some in which a great quantity of human bones is found, mingled in confusion; but these are plainly the remains of a communal burial in which the bodies, or bones, of all who had died within several years were collected and deposited at one time. This custom was common among Indians in various portions of the eastern United States, though few indications of it are found in Ohio mounds. The mistaken statement that "in very rare instances more than one" skeleton occurs in a mound is a consequence of the plan of sinking a shaft directly from the apex. It is not often that more than one skeleton would be found thus; but others may lie in different parts of the same tumulus. The size of the pile has no relation to the number of interments.

Ordinarily all the bodies were laid on the surface and the mound raised to its full height over them; but it is not unusual to find remains at various levels. The head may be toward any point of the compass; in many mounds no two skeletons are parallel or arranged in just the same manner.

"It should be remarked * * that the postion of the mound skeletons, in respect to the east or any other point of the compass, is never fixed. They are nearly always found disposed at length with the arms adjusted at the sides. None have ever been discovered in a sitting posture, except among the recent deposits; and, even among these, no uniformity exists." — S. & D., 172.

Their experience in this agrees with that of all later investigators; and yet there is a widespread belief that most bodies are buried "sitting up." This error is due in large part to the following allegation, which has been frequently quoted:—

"From Patagonia to Canada, and from ocean to ocean, and equally in the civilized and uncivilized tribes, a peculiar mode of placing the body in sepulture has been practiced from immemorial time. This peculiarity consists in the sitting posture." — Morton, 244.

Occasionally with the Mound Builders, and very often with the later Indians, in order to save labor, a grave was dug barely large enough to contain a body when it was laid in on the side, with knees drawn up to the chin. If the skull, in such cases, is intact when the grave is opened, it lies higher than the other bones and sometimes upon them; thus creating the impression that the body was placed in the grave-pit in a sitting or squatting attitude, and when decay ensued the bones fell to the bottom. At any rate, I have never found a skeleton which had been placed in a "sitting posture"; nor has any of my co-workers.

It is a prevalent notion that the occurrence in mounds or cemeteries of skeletons pertaining to persons of various ages "indicates a promiscuous massacre." Although marks of a violent death, such as a fractured skull, broken limb, or bone in which an arrow or spear-head is imbedded, are sometimes apparent in skeletons from mounds, there is no indication that any tumulus was ever erected to cover only the remains of those who were slain in battle. On the contrary, where the remains of several persons are present, all periods of life are often represented, from the infant of a few days to the man or woman of extreme age. Sometimes the arrangement of the skeletons denotes successive burials, all finally covered by one large tumulus; sometimes the bones of one or more skeletons are out of their proper place, as though carried from elsewhere and re-interred. Usually, however, the inhumation of all skeletons near each other appears to have taken place at one time.

Squier and Davis formulated their observations concerning the art products of the Mound Builders, as taken from the tumuli, in a few words.

"The mounds are the principal depositories of ancient art, and in them we must seek for the only authentic remains of the builders." — S. & D., 186.

"With the skeletons in these mounds are found various remains of art, comprising ornaments, utensils, and weapons." — S. & D., 161.

"It is a singular fact, however, that few weapons of stone or other materials are discovered in the sepulchral mounds; most of the remains

found with the skeletons are such evidently as were deemed ornamental, or recognized as badges of distinction." — S. & D., 213.

"As a general rule, to which there are few exceptions, the only authentic and undoubted remains of the mound-builders are found directly beneath the apex of the mound, on a level with the original surface of the earth." — S. & D., 146.

They are so convinced of the correctness of the last generalization, or so impressed with its importance, that they repeat it in practically the same words.

"As a general rule, * * whatever occurs in the mounds, whether they be sepulchral or sacrificial in their purposes, is deposited immediately beneath the apex and on a level with the circumjacent plain." — S. & D., 163.

Yet nothing can be further from fact. It is often the case that no worked specimens of any kind are at the center, even when a skeleton lies there; while at different places, sometimes almost at the original margin of the structure, valuable finds are made. The error here arises from the same cause as that regarding the "single skeleton," namely, that the authors very rarely looked anywhere except at the center. In the few instances where they did search elsewhere, their quest was not always unrewarded. It will be seen, in the subsequent pages, that about the least interesting portion of a mound is not infrequently "immediately beneath the apex."

Another very common error is thus expressed by Moorehead:—

"The aborigines always buried their dead with great ceremony, and they invariably deposited with the body objects of stone, bone, or clay, as tokens of respect, and from religious feelings." — Ft. A., 41.

What may have led him to make such an unwarranted statement, is a mystery; for in different parts of the same volume, as well as in other of his publications, he describes scores of burials made apparently with haste and carelessness; and many more in which no relics or remains of any character were associated with the skeletons.

The fact in regard to this matter is, that with a few skeletons of Mound Builders are found a great number and variety of articles which were presumably the personal property of the deceased; with some others, objects limited in number and of small value from the standpoint of a savage are associated. But

if it was customary in all cases to deposit with the dead his personal belongings, these must have been largely of a perishable nature; for a majority of the skeletons in mounds, and nearly all those in cemetery burials, are not accompanied by relics of any description. With the remainder, as a general rule, are only a few arrow-heads or beads, a pipe, ornament, or tomahawk. Very few are provided with a considerable number of articles. No particular system seems to have been observed in arranging them. Pipes are found near the skull, in either hand, on the breast, or at the feet; clay vessels are very rare, and have no fixed place; weapons of war or the chase, or articles of personal adornment, may be found in any part of the grave. True, a considerable degree of uniformity, which may signify tribal relationship, is often to be seen in different sections, in the position of skeletons and the arrangement of specimens with them; but this may be accidental. Such coincidences are less remarkable than a distinct method of burial would be for each of the many thousands whose remains have come to light in the past fifty years.

As to the reasons for placing food, ornaments, weapons, and other things in prehistoric graves, it is generally considered a satisfactory explanation to say that the custom implies belief in a future life where the spirit of the deceased will have need of them, or that, perhaps, he will need them on his journey thither. The survivors,

> "unable to imagine a future altogether different from the present, or a world quite unlike our own, showed their respect and affection for the dead, by burying with them those things which in life they had valued most." — Lubbock, 134.

But there may be other reasons as well. The savage knows the dead man may remain on earth an indefinite period prior to taking up his journey toward the Happy Hunting Grounds; because in his sleep he frequently sees and talks with him. There may be present need for food and weapons. He may also be able to take the "souls" of these articles with him when he finally departs.

> "The care with which the dead were interred, and the custom of burying implements with them, have been regarded by some archæologists as proving the existence of a belief in the immortality of the soul, and in a material existence after death. But it is far from being constantly the case, that the dead were so well supplied with what we call the neces-

saries of life; indeed, it is quite the exception and not the rule." — Lubbock, 139.

Or those who are left may fear that on account of some grievance or unfriendly feeling, the spirit will be disposed to work them an injury; and this method of propitiation is taken. There may be a feeling, too, that whatever property a person owns belongs to him, alive or dead, and no one else has any right to appropriate it. Or the personality of the deceased may attach to his belongings and resent their use by another. Again, if property is buried survivors can not quarrel over its possession. Finally there is the superstition that if anyone makes use of small personal possessions after the death of the original owner, some dire misfortune will result.

"We know that several savage tribes have a superstitious reluctance to use anything which has belonged to a dead person." — Lubbock, 133.

Such reluctance is by no means confined to savages. It may be found in civilized communities, and is quite strong in some localities, among our own people; and it is far from being restricted to the ignorant classes.

Any or all of these motives may have had their influence; and all of them are equally set at naught by the fact that much more than one-half of the bodies were deposited with absolutely nothing to accompany them.

Possibly we may gain further light on the subject by inquiring into the origin of a few of our own customs.

Why do so many people have a dread of ghosts? Why will they refuse to go into a cemetery alone after night-fall; or why do they whistle loudly when compelled to pass near one? Why will a man refuse to sit up with a corpse unless he can have company; or why will he break his neck falling down stairs if he should happen unexpectedly to find a dead man on the landing? Why do we bury letters, wedding rings and souvenirs with their possessors? Why do we carefully bathe and array in the best apparel obtainable, the corpse of a man whom we shunned in life for his uncleanliness? He is in no greater need of such attention now than he was before. Why do we write flattering epitaphs over the man whom we abused while he was living? Why do we erect monuments which outlast memory? Why do we decorate graves year after year? If it is

"ignorant superstition," fit only to provoke a smile of derision or pity from superior enlightenment, that induces an "Indian squaw" to place on her baby's grave the best food or toys possible to her poverty, what is the motive leading a white mother to plant flowers on the tomb of her little daughter? Are we doing all these things because we believe in the immortality of the soul? Or is it because we think that the beauty, amiability, intelligence, and spirituality we admired and loved, is an inseparable part of that which is fastened down beneath the coffin lid?

In the case of the savage, as of his civilized brother, dread of death and the things pertaining to it, has its foundation in the indefinite, unintelligible, but none the less potent, sense of mystery; of something beyond his comprehension; of a power greater than he can understand, which he is powerless to resist, and which may overwhelm him at any moment. He gives expression to his instinctive feeling in the way which he thinks will be best for himself and for his departed friend.

HOW MOUNDS WERE BUILT.

The manner of their construction was long a puzzling question; it was deemed impossible that such piles of earth could be made without the aid of machinery or beasts of burden. But there has never been found the slightest evidence of the use of any mechanical appliance, not even a hand-barrow; nor a bone of any animal susceptible of domestication, which had sufficient strength to be servicable in such work. On the other hand, scores of mounds of various sizes, in different localities, have furnished proof that human toil alone was employed. In some of them, almost the whole interior is made up of small lenticular masses, from a peck to two pecks in size, each of which marks the amount of a single load, carried to the spot in a basket or skin, and flattened out by the weight of the loads deposited above it. They are not apparent in all mounds for the reason that certain conditions must exist at the time the earth is deposited, in order that it may retain this form.

Sometimes the material of which a mound is composed is uniform in character; again several varieties of earth may appear in the space of a few cubic yards. Undue importance has been attached to this. It is urged that some motive or other led to a selection of different qualities and colors; that possibly a definite

meaning was intended, a hieroglyphic sign is concealed, which being deciphered would convey some kind of information concerning the builders. But various sorts of earth exist within a small area, in almost any locality, especially in glacial drift whereon so many of these tumuli and allied remains are standing. Any or all of it would serve their purpose, and the small quantity of any particular kind used at one spot shows that the laborers consulted their own convenience as to the places where they would procure it, or the amount that they could carry at one time. Occasionally the work was suspended so long that weeds, bushes, even small trees, sprung up; and occasionally the evidence of more than one such interruption has been observed. In cases of this kind it is easy to see that a number of years elapsed between the beginning of the structure and its completion; which scarcely comports with the idea of "toiling masses," or "severe task-masters."

Some very foolish theories have been advanced by persons not content with mere earth as the sole element in mound building; for instance:—

"It is not improbable that many of the dead were burned, and that their ashes were heaped together, constituting mounds." — S. & D., 172.

It probably never occurred to the authors to figure out how many Mound Builders would have to be burned to make a mound ten feet high; nor did they reflect that such ashes would not retain their consistency for very many years.

This conceit has no better foundation than the discovery of mounds whose interior, like that of the structure at Grave Creek, is largely made up of the material gathered on a village site, and containing all the debris of culinary and other domestic occupations. From shallow burials, from cremation, and from burning of prisoners, it is quite probable that fragments of human bone would also be collected; and a few of these observed among other substances is the only authority for their surmise. That such is the case is shown by the following quotation:—

Three miles below the large mound at Harness's on Walnut creek, a mound nine feet high and forty feet in diameter was composed of something resembling long exposed and highly compacted ashes, intermingled with specks of charcoal, small bits of burned bones, and fragments of sandstone much burned. Beneath this was a sort of core or nucleus of very pure white clay of somewhat regular outline. Two other mounds,

near Chillicothe, had the same appearance, but without the clay at the bottom. They were mainly composed of ashes, bits of charcoal, and small quantities of burned bones in small fragments. "In some instances, if not in all, the calcined bones were those of the human skeleton. It has been suggested that the mounds were composed of the ashes of the dead, burned elsewhere, and finally thus heaped together. It is not impossible that such was the case in a few instances." — S. & D., 180.

* * * * *

In the Twelfth Annual Report of the Bureau of Ethnology, are occasional references to the "mortar" which is found in various mounds. This does not mean what is usually known by that term, namely, a mixture of lime and sand. This was unknown to the aborigines. The material so designated is some form of earth, either puddled or burned, and perhaps mixed with ashes. Thus prepared, it becomes very hard and compact if kept dry.

* * * * *

The site upon which a mound was to be erected was generally made as clean as possible, though the sod was not always removed. Graves, most of them less than two feet deep, are sometimes found in the earth beneath tumuli; in some of these, the disposition of the bodies and the character of the associated specimens are much the same as in the mound above them; in others, there is a marked difference. In the latter case, the sod line usually extends unbroken over them, so that they must be of considerably earlier date than the mound, and it may be they owe their origin to a different people.

CHAPTER X

STRUCTURE AND CONTENTS OF MOUNDS.

NORTHERN OHIO.

VERY few records are at hand in regard to mound exploration in the northern part of Ohio. The tumuli are small, one of the largest reported, about three miles southeast of Cleveland, being "ten feet high by sixty feet in diameter at the base."— S. & D., 37.

Their contents, so far as may be judged from meagre accounts, are greatly inferior in amount and variety to those from mounds farther to the south, and are not usually of a nature to appeal so strongly to the fancy of a collector. At the same time, surface specimens seem to be abundant, with a larger proportion of symmetrical, well-finished, really artistic pieces among them. No doubt if a systematic examination were made, the results would be of considerable interest to archæologists, at least, if not to cabinet owners; it would be well worth while to learn something as to the social condition of the ancient inhabitants of this section from their remains, for comparison with the earliest records of the Indians found here by the whites. It might be determined, in this way, whether people in various stages of advancement occupied the region at different eras in prehistoric times. It is confidently asserted by many that such is the case; but convincing evidence of it is lacking. At Norwalk,

> "in the small mound outside of the enclosure B [see figure 53] were three pipes, one of marble and two of clay; two valves of a clam shell, each with three holes, as if for a handle; a 'stone hoe;' and a small, rude pot. All these articles were taken from the vicinity of coals and ashes, and burned human bones. These relics, as also the skeletons found with them, were probably those of the more recent Indians, and constituted a second and comparatively late deposit. The burned remains, doubtless, resulted from the original burial by fire."— S. & D., 37, condensed.

There is no reason for the assertion that two different peoples made use of this tumulus. Apparently the only motive

for so saying, is the desire to maintain a distinction between burials where cremation was used and those where it was not. The skeletons may have been, and probably were, those of "recent Indians;" but the burned bones may have as well belonged to the same tribe as to one more ancient.

A mound removed in Hardin county, to furnish material for railway ballast, is reported to cover an area of one and a half acres. The engineer in charge of the work says of it: —

"The mound was what I would call double; the larger and higher part to the west. About two-thirds of the mound was embraced in this part. The eastern part presented the appearance of a smaller hill having been pressed against the other, leaving a depression betwen them. The interior was composed of clean limestone gravel and sand. In the progress of removal, I found the eastern or small part of the mound to be literally filled with graves. The modes of burial had been various; the depth of remains varying from two to nine feet; while there was a difference of posture in nearly every skeleton. I found that not less that ten or twelve dogs had also been buried; the human and canine side by side. We came upon a grave that had been dug oblong almost six feet deep, three feet wide, and over seven feet long, which they had filled with human bones promiscuously, without regard to order, to the depth of four feet; on these, in regular order, were placed twenty-seven skulls, with the top of the skulls up. I found in this part of the mound the remains of at least fifty children, under the age of eight years. Nearly north of the center of the larger or western part, two skeletons, side by side, were found in a horizontal position, without their heads, there being no evidence of skulls. These graves were about four feet deep. There were two rows of graves leading direct from these two toward the center, each pair having been dug deeper as they approached the center of the mound, the last pair being eighteen feet below the surface. Various relics of stone and shell were found; the last one taken out had, I should think, nearly thirty yards of beads. His remains presented the appearance of being decorated all over. The whole number of skeletons exhumed by me was three hundred and eight. I could not ascertain how many had been previously taken out." — Matson, 126, *et seq.*, condensed.

It is clear this account has to do with what was in the beginning a natural knoll of glacial origin, utilized as a burial-place by the inhabitants of a village. Of course no Indians ever dug a grave eighteen feet deep. What they did here was to inter the bodies in the knoll, or possibly lay them on its surface, and then pile earth over them. This was continued until a mound was formed on its top. The lower portion, or smaller mound, may have been an extension of the larger, brought to

a rounded apex in the same manner; or it may be entirely artificial. The report is not sufficiently explicit for this to be ascertained. Probably the mound containing the first series of burials was carried to completion before the other was begun. The different levels of interments; the various ages represented, especially the large percentage of children; and the variations in the position or arrangement of skeletons, all go to prove that the burials extended over a long period. The grave with the twenty-seven detached skulls was, it is plain, made to contain bones gathered elsewhere and brought to this spot at one time. This practice was very common with the Hurons, as well as with other known tribes; the former dug a large pit every ten or twelve years in which to place the bones of those who had died since the last preceding "Feast of the Dead," as this ceremony was called. But there is no record that they ever erected a mound over the burial pit.

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CENTRAL AND SOUTHERN OHIO.

If poverty of detail is embarassing when a description is attempted of mounds in northern Ohio, quite the reverse is encountered in the southern portion. Amid the bewildering array of reports, it is difficult to make a selection which shall fairly present results without unduly swelling the number of pages. The largest share of space must, of course, be allotted to the Scioto Valley; but records of all sections will be chosen with a view to informing the reader, as far as possible, of the characteristic remains of each locality. All must be more or less abbreviated.

Although outside of our territory, the remains of that part of West Virginia lying near the border river bear such similarity to those of Ohio, that they can not be overlooked. Parts of Indiana and Kentucky, also, come within this range, but no trustworthy testimony is to be obtained of mound exploration in those parts near Ohio.

THE GRAVE CREEK MOUND, AT MOUNDSVILLE.

"The flats of Grave creek are a large scope of bottom land in Marshall county, [West] Virginia, and on the eastern shore of the Ohio

river, which here runs due south. They extend from north to south about four miles, and contain about three thousand acres. Big and Little Grave creeks both empty into the Ohio at these flats, from which they derive their names. The creeks themselves doubtless derived their names from various tumuli or mounds, commonly called Indian graves, which are found on these flats, and especially between the two creeks. These flats are composed of first and second bottoms. The first bottom is about two hundred yards wide and runs the whole length of the flats. The great flood of 1832 was about ten feet deep on the first, but lacked about ten to twenty feet of the height of the second bottom, on which all the ancient Indian works and mounds are situated; no signs of them being on the lower land. This (the largest) mound is surrounded by various other mounds and ancient works, and in respect to the surrounding localities, the situation, as respects defence, was well chosen, on the brow of the second bottom, and partially encompassed by steeps and ravines. The mammoth mound is sixty-nine feet high. Its circumference at the base is over three hundred yards. It is the frustum of a cone, and has a flat top of fifty feet in diameter. This flat on the top of the mound, until lately, was dish shaped. The depth of the depression in the centre was three feet, and its width forty feet. This depression was doubtless occasioned by the falling in of two vaults, which were originally constructed in the mound, but which afterwards fell in; the earth sinking over them, occasioned the depression on the top. On the 19th of March, 1838, we commenced an excavation in this mound. We commenced on the north side, and excavated towards the center. Our horizontal shaft was ten feet high and seven feet wide, and ran on the natural surface of the ground or floor of the mound.

"At the distance of one hundred and eleven feet we came to a vault that had been excavated in the natural earth before the mound was commenced. This vault was dug out eight by twelve feet square and seven feet deep. Along each side and the two ends upright timbers were placed, which supported timbers that were thrown across the vault, and formed for a time its ceiling. These timbers were covered over with loose unhewn stone, of the same quality as is common in the neighborhood. These timbers rotted and the stone tumbled into the vault; the earth of the mound following, quite filled it. The timbers were entirely deranged, but could be traced by the rotten wood, which was in such a condition as to be rubbed to pieces between the fingers. This vault was as dry as any tight room; its sides very nearly corresponded with the cardinal points of the compass, and it was lengthwise from north to south.

"In this vault were found two human skeletons, one of which had no ornaments or artificial work of any kind about it. The other was surrounded by about six hundred and fifty ivory beads, and an ivory ornament about six inches long, flat on one side and oval-shaped on the other. [This was a perforated tablet, with incurving sides. Like the beads, it was made of shell instead of "ivory."] The beads resemble button molds, and vary in diameter from three to five-eighths of an inch. In

thickness they vary from that of common pasteboard to one-fourth of an inch. Above I count only the whole ones left.

"After searching this vault, we commenced a shaft ten feet in diameter, at the center of the mound on top, and in the bottom of the depression before spoken of. At the depth of thirty-four or thirty-five feet above the vault at the bottom, we discovered another vault, which occupied the middle space between the bottom and top. It had been constructed in every respect like that at the base of the mound, except that its base lay east and west, or across that at the base, but perpendicularly over it. It was equally filled with earth, rotten wood, stones, etc., by the falling in of the ceiling. The floor of this vault was also sunken by the falling in of the lower one, with the exception of a portion of one end.

"In the upper vault was found one skeleton only, but many trinkets, as seventeen hundred ivory beads, five hundred sea shells of the involute species, that were worn as beads, and five copper bracelets that were about the wrist bones of the skeleton. There were also one hundred and fifty pieces of isinglass [mica], and the stone, a fac simile drawing of which I send you herewith [this is the famous "Grave Creek Tablet."] The beads found in this vault were like those found in the lower one, as to size, materials, decay, etc. The five bracelets weigh seventeen ounces. The pieces of isinglass are but little thicker than writing paper, and are generally from one and a half to two inches square; each piece had two or three holes through it about the size of a knitting needle, most likely for the purpose of sewing or in some way fastening them to the clothing.

"The beads were found about neck and breast bones of the skeletons. The sea shells were in like manner distributed over the neck and breast bones of the skeleton in the upper vault. The bracelets were around the wrist bones. The pieces of isinglass were strewn all over the body. The stone with the characters on it was found about two feet from the skeleton.

"The skeleton first found in the lower vault, was found lying on the back, parallel with and close to the west side of the vault. The feet were about the middle of the vault; its body was extended at full length. The left arm was lying along the left side; the right arm as if raised over the head, the bones lying near the right ear and crossed over the crown of the head. The head of this skeleton was toward the south. There were no ornaments found with it. The earth had fallen and covered it over before the ceiling fell, and thus protected, it was not much broken.

"The second skeleton found in this vault, and which had the trinkets about it, lay on the west side, with the head to the east, or in the same direction as that on the opposite side. The feet of this one were likewise near the center of the west side. The earth had not crumbled down over it before the ceiling fell, consequently it was much broken, (as was also that in the upper vault.) There is nothing in the remains of any of these skeletons which differs materially from those of common people.

"The skeleton in the upper vault lay with its feet against the south side of the vault, and the head towards the northeast. It is highly probable that the corpses were all placed in a standing position, and subsequently fell.

"The mound is composed of the same kind of earth as that around it, being a fine loamy sand, but differs very much in color from that of the natural ground. After penetrating about eight feet with the first or horizontal excavation, blue spots began to appear in the earth of which the mound is composed. On close examination, these spots were found to contain ashes and bits of burnt bones. These spots increased as we approached the center; at the distance of one hundred and eleven feet within, the spots were so numerous and condensed as to give the earth a clouded appearance. Every part of the mound presents the same appearance, except near the surface. I am convinced that the blue spots were occasioned by depositing the remains of bodies consumed by fire.— Tomlinson, 197, *et seq.*, condensed.

"The mode of its construction appears to have been by carrying earth in bags or vessels, from the plain, and emptying them out by hand. The earth is entirely made-earth, without the least appearance of stratification. * * * The removal of the earth appears to have been made in small portions, from several points, and at convenient intervals."— Schoolcraft, Grave Creek, 373.

Concerning the depression in the top, Cuming said in 1807,

"In the center of the flat top is a shallow hollow, like the filled up crater of an old volcano, which hollow or settle is said to have formed within the memory of the first neighboring settlers, and is supposed by them to be occasioned by the settling of the earth on the decayed bodies." — Cuming, 97.

If the statement of the pioneers be true — it is impossible now to verify or disprove it — the mound must be of comparatively recent origin. No matter how solid and strong the logs may have been when put in, they would at once begin to absorb moisture from the earth surrounding and in contact with them. This would lead to a gradual weakening. We have no data whatever on which to base an estimate of the length of time timber would be able to stand the strain upon it in this situation; but it must surely succumb within two or three centuries. Wood lasts indefinitely when kept perfectly dry or when saturated continuously; but when exposed to both air and moisture, no matter in how slight degree, decay ensues. Porous earth, like that of which the mound was built, permits sufficient circulation of both air and water to affect any substance susceptible to their influence. Under such circumstances wood must

yield to the pressure upon it, within a few generations at the most. If we could be certain that the early settlers were correct in their assertion, we would be justified in declaring that the Grave Creek mound does not antedate the days of Columbus; and as it is the largest in the Ohio Valley, many others are probably no older. But there may be some mistake made by Cuming or his informants.

The structure no doubt still conceals a great deal more than has been exhumed; for

"Another observer, Dr. Clemens, states * * * 'On reaching the lower vault from the top, it was determined to enlarge it for the accommodation of visitors, when ten more skeletons were discovered."—Foster, 191.

The burned bones and ashes mingled with earth and forming the "bluish spots," so far from denoting cremation of human corpses, are only masses of refuse taken up in the vicinity of dwellings. This would be easy to scoop up, light to carry, and with a thick coating of heavy earth to protect it from storms would answer the purpose as well as material more difficult to procure.

It is clear that the Grave Creek mound involved two periods of construction. First, a mound was built over the lower vault; afterward another vault or chamber was made on, or in, the top of this, and the second portion built over all.

CHARLESTON, WEST VIRGINIA.

Exactly the same method of formation, though with a somewhat different interior arrangement was observed in

"a mound near Charleston, West Virginia, conical in form, about 175 feet in diameter at the base and 35 feet high. It consists of two mounds, one built on the other, the lower or original one 20 feet, and the upper 15 feet high. Near the top was a stone vault 7 feet long and 4 feet deep, in the bottom of which was found a large and much decayed skeleton, but wanting the head, which the most careful examination failed to discover. At a depth of six feet was another skeleton, and at nine feet a third. Below this were the remains of a timber vault about 12 feet square and 7 or 8 feet high. Some of the walnut timbers of this vault were 12 inches in diameter. A skeleton found lying on the floor in the middle of this vault, 19 feet below the top of the mound, measured 7 feet 6 inches in length, and 19 inches between the shoulder sockets. There were four other skeletons in this vault, which, from the positions in which they were found, were supposed to have been placed standing in

the four corners. The relics found are entirely similar to those of Ohio mounds."— Buried Mounds, 51, condensed.

A mound in the same group with the last mentioned, also covered a wooden vault made on the surface of the ground; but none had been made above it. The structure.

"was examined by sinking a large central shaft to the bottom." For the first fifteen feet "the material passed through was an exceedingly hard, gray mixture, apparently of ashes and clay (1). At this depth the casts of poles and timbers of various sizes began to be seen, but all were less than a foot in diameter, extending into the western and southern sides of the shaft. These casts and rotten wood and bark continued to increase in amount nearly to the natural soil, which was reached at a depth of 25 feet. The debris being removed and the bottom of the shaft being enlarged until it was 14 feet in diameter, it was then found that these timbers had formed a circular or polygonal vault 12 feet across and some 8 or 10 feet high at the center. This had been built up in the form of a pen, the ends of the poles extending beyond the corners. The roof must have been sloping, as the ends of the poles used in making it extended downward beyond the walls on which they rested." — B. E., 12, 428.

* * * * *

Typical mounds in various parts of Ohio will now be considered, taking the Muskingum, Scioto, and two Miami valleys in their order. Those described may seem to be chosen somewhat at random. This is due to a desire to cover the field as far as practicable and to copy from investigators who observe closely and report accurately what they find. A list of such workers would include many times the number of names used here; but as only a few of them can be cited, it must be understood that no "odious comparison" is ventured. It is confidently believed that implicit reliance may be placed on all statements of facts; if any deductions from them seem unwarranted, a difference of opinion will be expressed.

KNOX COUNTY.

The plan of the large mound in the cemetery at Mount Vernon, Ohio, is shown in figure 96 (B. E. 12, page 444, fig. 306); and a section in figure 97 (B. E. 12, page 445, fig. 307).

"It was conical in form, unusually symmetrical, the base being almost a circle. Diameter 80 feet, and height 11. * * The mode of con-

(1). This was only the fine silt that is common in river bottom lands in this region. When packed, it is almost as hard as frozen earth.

struction is shown in the plan and in the vertical section from east to west. First, a 2-inch layer (a) of surface sod, then 4 feet of fine yellow clay (b) free of stones; below this, the central core (e) reaching to the original surface, of soil, apparently from the valley to the north. The

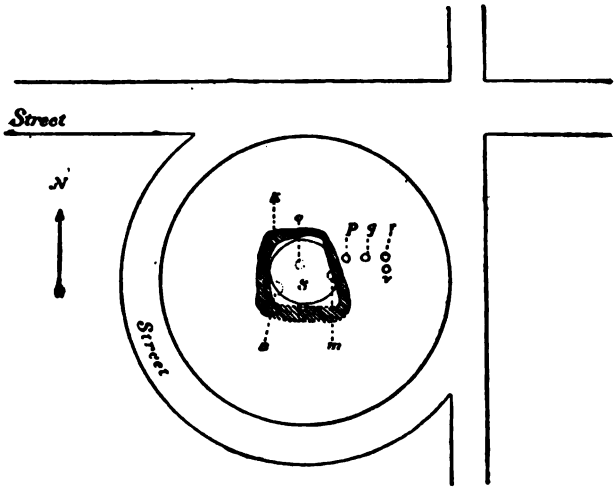


Figure 96 — Plan of Cemetery Mound.

small masses or leads in which it was deposited were very distinct. * * This central mass was interrupted by a few [three] thin seams of gray earth; [each about] two inches thick. * * In the central portion of the mound, resting on the original surface of the ground, was an irregularly quadrilateral stone enclosure (k). This was built up loosely of rough sur-

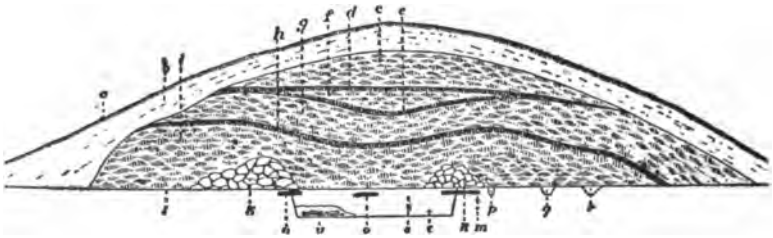


Figure 97 — Section of Cemetery Mound.

face sandstones, all with the weathered side up. The east and west diameter varied from 10 to 13 feet, the north and south from 13 to 15. The thickness of the wall at the base was from 5 to 10 feet, the height from 1½ to 3 feet. The stones were piled up without any attempt at regularity. * * * Within the space enclosed by the wall, and extending partly under it on the east side, was a basin-shaped, circular pit, 12 feet in diameter and 2½ feet deep. It was mostly filled with dark soil in small masses,

like that of the overlaying mass (i) with which it seems to be continuous, resting on a white substance (t) an inch thick, possibly the ashes of hickory bark, which covered most of the bottom of the pit and extended over a skeleton on the west side. The portion covering the skeleton was very hard, being difficult to penetrate with a pick. The remainder of it was quite loose. The skeleton (w) which was badly decayed, lay at full length with the head at the west margin of the pit and the feet toward the center. Around it was a quantity of decayed vegetable matter, possibly the remains of bark wrapping. On the under jaw was a crescent-shaped piece of copper, about the hips several shell beads, along the left arm a few bear's teeth, and about the head the remains of some textile fabric.

"The letters *m*, *n*, and *o*, mark the position of fire-beds; *m* and *n* were on the level of the original surface, extending slightly over the pit, *n* being mostly under the wall and *m* entirely so. Each was about six feet in diameter, and the clay soil beneath them for about a foot in depth was burned to a light brick red. The one at *o*, about the center of the pit, was comparatively small, and the clay beneath but slightly baked, indicating that but a single fire had been kindled on it. Just outside the eastern wall were four small pits or holes in the natural soil, each about a foot in depth and 9 inches in diameter, arranged as shown by *p*, *q*, *r* and *v*. Two of them, *q* and *r*, were filled with a dark-brown 'sticky substance' in which were a number of split animal bones." — B. E., 12, 444-5.

Holes such as those described are very common; there must be others under this mound. An inspection of the cuts, in connection with the description quoted, shows that the grave was dug, body deposited, ashes spread, wall built around, and no doubt the vault covered with wood. The sag in the sod-lines *g* and *h* show they fell in together; so the wood must have retained its strength until the sod *h* grew. Then the pit thus formed at the top was filled and left until the sod at *d* was well set; after which the mound was completed. The stones must have been intentionally placed with the weathered side up, for if left exposed until thus marked the ashes, etc., below them would have been displaced or even obliterated by the elements.

LICKING COUNTY.

On one of the highest hills in Licking County, about two miles southwest of Brownsville, is the group of mounds illustrated in figure 98 (B. E. 12, 458, fig. 314). It is interesting as combining in one group, in small area, four types of works. Number 1 is an earth mound 120 feet in diameter and, at present, 15 feet high; its former elevation was

about five feet greater, but relic hunters have removed the upper portion. The earth exposed by their excavations is burned to a deep red; pieces of sandstone and flint lying about are almost destroyed by heat. Quantities of charcoal were found; some of it was in the form of upright posts which were dug out to a depth as great as could be reached by a long-handled shovel. The whole interior must have been filled with charcoal, if the statement of the owner (corroborated by other testimony) is to be accepted. He says that some years ago boys set fire to it "at corn-cutting time"; it smouldered all winter, and the next spring "when plowing for oats," the earth of the mound was noticeably warmer than that around it.

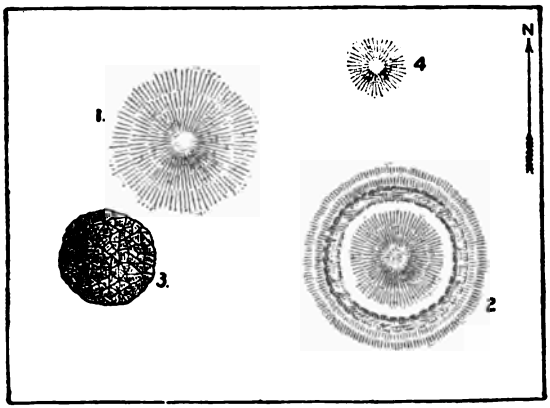


Figure 98 — Group of Mounds South of Brownsville.

Number 2 is an earth mound 100 feet in diameter and now five feet high. Surrounding it is a circular ditch a foot deep; and outside of this is a circular embankment two feet in elevation and 240 feet from crest to crest. Long cultivation has much lowered the mound and wall and correspondingly filled the ditch.

Number 3, which is shown in figure 99, is composed of stones, none of them larger than a man can easily handle. It is 80 feet in diameter. The summit has been lowered by relic hunters, who threw out the stones at the center to the bottom; should these be restored, the apex would be at least ten feet from the ground. An elevation around the margin indicates an encircling wall of earth; but it may be due to the plow.

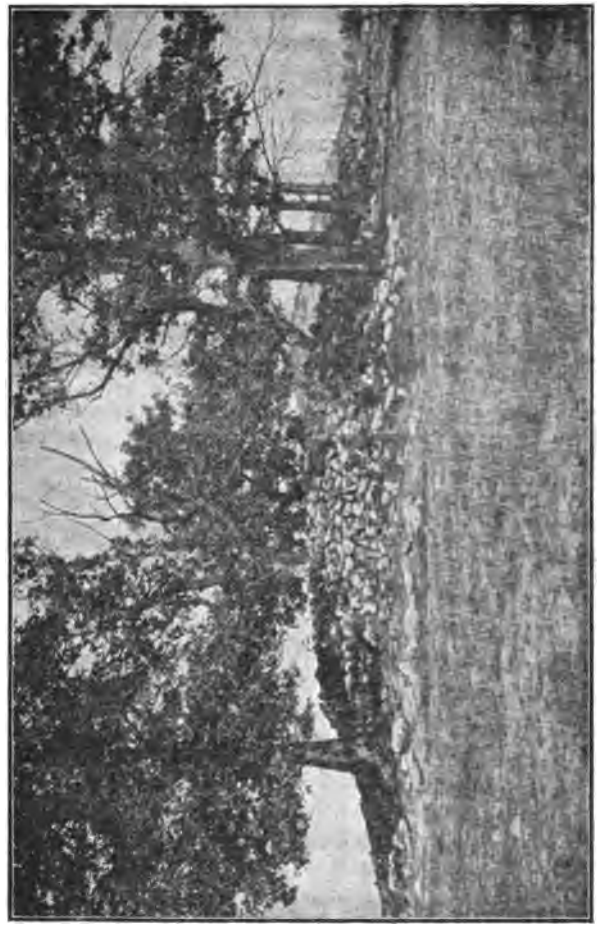


Figure 99 — Stone Mound in Group on Page 330.

Number 4 is an earth mound fifty feet in diameter and two feet high. It was formerly much higher, but is now plowed down.

* * * * *

"The Taylor mound is situated about two and a half miles south of Newark. It was about ten feet high and eighty feet in diameter. A shaft eight feet in diameter was sunk from the top. Next below the surface soil came a very compact layer of light loam, quite different from the soil of the ridge on which it stood; and its peculiar mottled appearance indi-

cated that it had been brought to the spot in small quantities. About seven feet from the top of the mound, a thin white layer was observed. Near the center of this space a string of more than one hundred beads of native copper was found and with it a few small bones of a child, about three years of age. A foot lower were two adult human skeletons, of opposite sexes, about middle age, lying one above the other, the woman uppermost, and remarkable well preserved. A white stratum similar to that above was here very distinct. The earth separated readily through this stratum which proved to be formed from two decayed layers of bark, on one of which the bodies had been placed, and the other covered over them. The smooth sides of the bark had thus come together, and the decomposition of the inner layers had produced the peculiar white substance. Directly above these skeletons was a layer of reddish earth, apparently a mixture of ashes and burned clay which covered a surface of about a square yard. Near the middle of this space was a small pile of charred human bones, the remains of a skeleton which had been burned there. The fire had evidently been continued some time and then allowed to go out; when the fragments of bone and cinders that remained were scraped together and covered with earth. About a foot lower, and somewhat more to the eastward, a second pile of charred human bones was found resting on a layer of ashes, charcoal and burned clay. Immediately beneath this deposit a third white layer was observed. In this layer was a male skeleton. A few inches deeper, near the surface of the natural earth, several skeletons of various ages were met with, which had evidently been buried in a hurried manner. All were nearly or quite horizontal, but no layer of bark had been spread for their reception, and no care taken in regard to arrangement of limbs. About four feet east of the center was an excavation, in an east and west direction, about six feet long, three wide, and nearly two deep. In this grave were found parts of at least eight skeletons, which had evidently been thrown in carelessly — most of them soon after death, but one or two not until the bones had become detached and weathered. Various ages, from infancy onward, were represented. Some of the loose human bones exhumed from the bottom of the grave, were evidently imperfect when thrown in. Among these was part of a large femur, which had been gnawed by some carnivorous animal, apparently a dog or a wolf. Quite a number of implements of various kinds were found with the human remains in this grave, among them a large number of bone implements, all exceedingly well preserved. The latter were with the skeleton of an aged woman of small stature, which was bent together and lay across the grave with its head toward the north. Two small vessels of coarse pottery were found, in fragments. Near the bottom of the mound, and especially in the grave, were various animal bones, most of them in an excellent state of preservation. All the skeletons in this mound, except one, appeared to have been buried in a horizontal position with the face upward. The exception was the skeleton of the aged female found in the grave, which lay on its side; those which had received a regular interment all had their heads turned toward the east. Parts of at least seventeen skeletons were exhumed; eleven of these, nearly all

of which were the remains of women and children, had been interred in a hasty and careless manner. The incremations had taken place directly over the tomb, and evidently before the regular interment was completed." — Marsh, condensed.

ATHENS COUNTY.

"On the 'Wolf Plains' near Athens, is a group of seventeen mounds. The largest of these is the Connett Mound. It is 40 feet high and about 170 feet in diameter of base. The cubic contents are 437,742 cubic feet. As the mounds here were built by the adding of small quantities — about a peck in the average — to the growing heap, it would require for this mound 1,405,152 such loads of earth. Since the earth was taken evenly from the surface of the plain, there being no depressions or excavations anywhere to be found, it will be seen that the average length of the journeys to and from the mound must have been considerable.

"The Beard mound, of this group, was about thirty feet high and with a diameter of base of one hundred and fourteen feet. Owing to the removal of part of the structure I was able to study, to very great advantage, the method of constructing the mound. The clean, vertical face presents a mottled appearance from the different colors of the material used. The dirt was thrown down in small quantities — averaging about a peck — as if from a basket, and the outline of each deposit is generally very distinctly discernible. These outlines of each pile or basketful, are somewhat oval, exactly what we should expect in a dump-heap made up this way, of earth of different shades of color. The materials are yellow clayey earth, light loam, gravelly earth and a black earth, which I call 'kitchen refuse,' the latter sometimes becoming lighter in color and composed of gray ashes. There is nowhere to be seen anything like stratification, from placing the materials in regular, concentric layers, as has been claimed in the structure of mounds. It is rather a vast pile of dirt thrown down without order or system, the sole object being to increase the magnitude of the heap. There was apparently no plan of working except to build up a conical mound in the most simple and convenient way possible. In the earlier stages of the Beard mound the surface was very uneven; at one time it was lowest in the middle. The dirt was scraped up from the surface of the plain, doubtless wherever it could be obtained most conveniently. On the southwest side I find large quantities of the dark earth which I have called 'kitchen refuse.' This is made up of blackened soil, ashes, charcoal, bits of bone (some burned and some not), fresh-water shells, land snails, bits of broken pottery and of broken flints, and small stones, generally burnt, such as might be in fires built on the ground. This refuse was gathered from near their dwellings, which were doubtless not far off. It was removed from the vicinity of the dwellings possibly because it was in the way there, but more probably because it was a convenient material to throw upon the growing heap. The quantity of this refuse would indicate a considerable population. But conceding this, I am nevertheless led to believe that the large Beard mound was a long time in building, for

we find at many different levels the proof that grasses and other vegetation grew rankly upon the earth heap and were buried by the dirt. This is more often noticed near the base of the mound where the area to be covered was so large. Whether in summer the grasses, etc., grew over a part of the area while work was going on elsewhere, or the work was intermitted altogether for longer or shorter periods of time, it may be difficult to determine. But I am confident that many years elapsed between the commencement and completion of this mound. It may have been the work of several generations of men.

"One of these mounds had, from long cultivation, been reduced in height to about six feet. About five feet below the top we came upon large quantities of charcoal, especially on the western side. Underneath the charcoal was found a skeleton with the head to the east. The body had evidently been enclosed in some wooden structure. First there was a platform of wood placed upon the ground, on the original level of the plain. On this wooden floor timbers or logs were placed on each side of the body, longitudinally, and over these timbers there were laid other pieces of wood forming an enclosed box or coffin. A part of this wood was only charred, the rest was burnt to ashes. The middle part of the body was in the hottest fire and many of the vertebræ, ribs and other bones were burnt to a black cinder and at this point the enclosing timbers were burnt to ashes. The timbers enclosing the lower extremities were only charred. I am led to think that before any fire was kindled, a layer of dirt was thrown over the wooden structure, making a sort of burial. On this dirt a fire was built, but by some misplacement of the dirt, the fire reached the timbers below, and at such points as the air could penetrate there was an active combustion, but at others where the dirt still remained there was only a smothered fire like that in a charcoal pit. On the same floor with the remains were placed about five hundred copper beads forming a line almost around the body. There was also evidence, in the amount of burned earth, that considerable fires had been maintained at various parts of the mound at different stages of its progress.

"Still another mound was from 16 to 18 feet high, with a diameter of base of about 85 feet. At the center, on the original surface of the ground, we found a small pile of ashes, burnt human bones, etc., its diameters being about 2 and 2½ feet, and its depth in the center from 3 to 4 inches. The ground below showed no trace of fire, and the earth immediately above was also in its natural or unburned state. so it was evident no burning of a body could have taken place there. About 15 inches above them was another small collection of burned human bones, a carefully prepared pocket of them enclosed in bark. This deposit was from 12 to 15 inches in length by 6 inches in width. The bones were free from ashes and had been picked up and carefully placed in the growing mound. No implements of any kind were found with the upper bones. In the lower pile of ashes and bones were found two

plates of copper and a stone tube. They had been burnt with the body and were buried with it. By this mound we prove that the Mound Builders practiced cremation. The lower pile of bones was brought there with the burnt ornaments, etc., and with more or less of the ashes of the fire. The bones were in the confusion to be expected from being gathered up and thrown into a small pile. The abundant ashes would imply that they were not brought far. On the other hand, the upper deposit of bones contained no ashes and these bones might have been brought from a distance where the cremation took place." — Andrews, Mounds, 56 to 59, and 71, condensed.

In building a mound, neither the size nor the number of loads has anything to do with the average distance they must be carried—provided, of course, the earth is obtained from points as near at hand as possible. The only factors to be dealt with are the size of the structure and the depth to which the surrounding earth must be excavated to procure the material.

The Connett mound, if spread out to a uniform thickness of one foot, would, according to the volume given, cover an area of 437,742 square feet. Suppose, however, that instead of a foot, the average thickness be called four inches; then the material would cover 1,313,226 square feet. A circle of this size will have a radius of about 647 feet; one-half of its area will be circumscribed with a radius of 406 feet, which is, consequently, the "average distance" the loads must be carried. If the earth be taken up to a greater depth than four inches, which can be as easily done, the "average distance" will be correspondingly reduced.

At the rate of three miles an hour a man will walk 800 feet in three minutes. Allowing five minutes for filling his basket, in eight hours he would carry sixty loads, and a hundred men could carry six thousand loads. At this rate the mound would be built in 234 days.

LOWER MUSKINGUM.

The level area on top of the "cemetery mound" at Marietta (figure 90) seems too contracted for any practical use; only a small building could be erected, or a few persons find room for the performance of any sort of ceremonies. It gives the impression that the builders simply concluded they had done as much as they wished, or as they had intended, in honor of the deceased. There may, however, have been some meaning in

the truncated top, applicable to the individual, or to the family or office of one thus interred—for there is no doubt the structure is a burial mound.

In figure 100 (S. & D., 74, fig. 17) is shown the "Temple Mound" of the Marietta group.

"Within the larger enclosure are four elevated squares or truncated pyramids of earth, which, from their resemblance to similar erections in Mexico and Central America, merit a particular notice. Three of these have graded passages or avenues of ascent to their tops. The principal one is marked A in the plan. * * * It is one hundred and eighty-eight feet long by one hundred and thirty-two wide and ten high. Midway upon each of its sides are graded ascents, rendering easy the

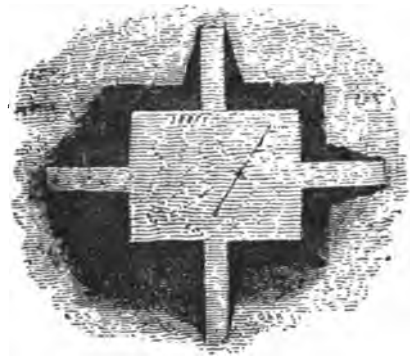


Figure 100 — "Temple Mound" at Marietta.

passage to its top. These grades are twenty-five feet wide and sixty feet long. The next in size is marked B in the plan, and is one hundred and fifty feet long by one hundred and twenty wide, and eight feet high. Those at the sides are placed somewhat to the north of the center of the elevation. Upon the south side there is a recess or hollow way, instead of a glacis, fifty feet long by twenty feet wide. * * * Near the eastern angle of the enclosure, is a smaller elevation one hundred and twenty feet long, fifty broad and six feet high. It has graded ascents at its ends, similar in all respects to those just described. * * * Near the northern angle of the work is another elevation, not distinctly marked." — S. & D., 74.

A figure of the "cemetery mound," and a list of works containing notices of it and of the group to which it belongs, is given by Winsor.— Winsor, History, I, 405.

* * * * *

"'Just above Cat's Creek, which empties into the Muskingum a mile above Lowell, * * * in a small mound occurred upon the base line

an altar four feet square, dipping toward the center, and six inches high" containing many fine ornaments. "Below [it] were found two logs ten to twelve inches in diameter resting upon a second larger altar, but in it there were no remains." — Moorehead, 26.

"Near Rainbow station Mr. Davis found the bones of a young woman in a kneeling position with a child's skeleton in her arms." — Moorehead, 27.

HOCKING COUNTY.

"Three and a half miles southeast of Logan, were two mounds. One, about ten feet high, covered a grave dug to a depth of five or six feet below the surface, into the underlying gravel. No traces of burnt earth, ashes or charcoal were found in the mound. The bones of the skeleton at the bottom of the grave had never been burned. It was exactly like a modern grave with an earth mound over it.

"In the center of the second mound, 9 or 10 feet high, perhaps 5 or 6 inches above the original level, with a layer of brown loam between, we found a large and mixed collection of bones, all burnt and in very small fragments. They were spread over a surface of perhaps 5 feet long and 2 feet wide. They evidently had been burned before burial in the mound. In the clay and dirt perhaps 3 inches above the layer of burnt bones, we found a part of the bones of a body which had evidently been buried without cremation. A few inches higher there were indications of pretty large timbers or logs forming a structure something like a 'cob-house' of children, or a rail corn-crib of the western farmers. These timbers were in places only charred, and the charred ends were preserved. The direction in which the charred wood lay was for the most part from north to south. The unburned body also lay in the same direction. Over the charred wood horizon was red burnt earth and clay, in some places nearly three feet thick." — Andrews, Mounds, 69, condensed.

* * * * *

Just across the line from Adelphi in Ross County, are two enclosures only a few yards apart. One is rudely circular, about 120 feet in diameter; the other, somewhat larger, is four-sided with rounded corners. Each consists of an embankment with an interior ditch. In the latter stood a mound 115 feet long, 96 wide, and 23 feet high. In the center of this, at the base, were the remains of a vault about ten feet square, made of logs about a foot in diameter. At each corner was a large upright post; the bottom seems to have been covered with poles. The lower tier of logs was a foot in the original soil, showing that a shallow grave had been dug. The pen or vault seemed to have had only two or three logs on a side. It was covered to a height of 18 feet with earth which must have been carried from the valley 200 feet below, as there is none of the same character nearer. In this could easily be traced the little loads or masses by which it had been built up. The remain-

ing five feet, to the top of the mound, was of clay such as forms the surface soil in the immediate vicinity.

A plan and sections of the above mound are shown in figure 101 (B. E. 12, p. 448).

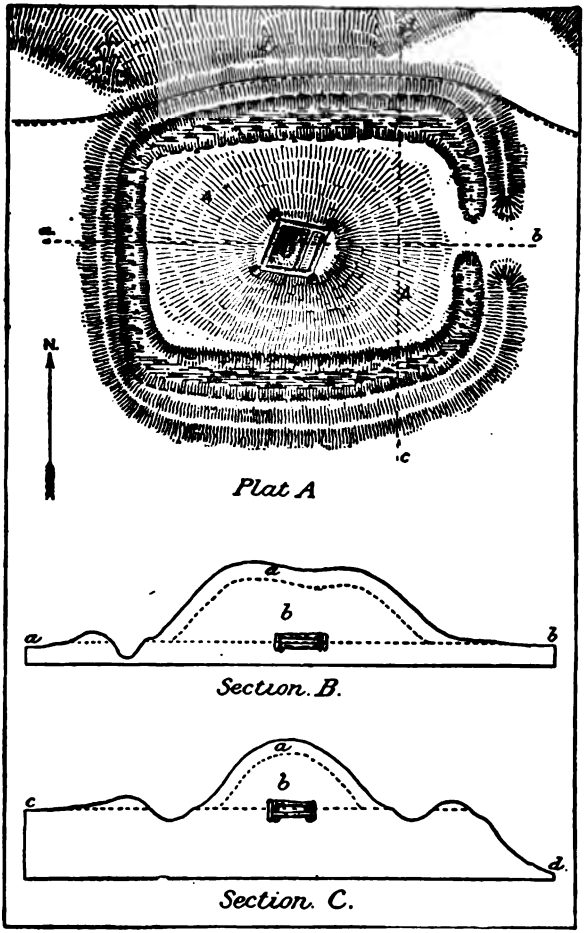


Figure 101 — Enclosure, with Interior Mound, in Hocking County.

In a mound near Adelphi, a circular basin 13 feet in diameter and 2 feet deep at the center, was excavated, and the entire bottom covered with a layer two inches thick of ashes and charcoal. On this were laid five skeletons folded into the smallest compass. The basin was then leveled up with a deposit of blue clay, over which there was heaped earth from the surface around, forming a mound which measured 32

feet in diameter and 2½ feet high. A small quantity of burned human bones occurred, apparently burned where they lay, about six inches above the bottom of the mound near the center.— B. E., 12, 471.

PICKAWAY COUNTY.

"Seven miles north of Circleville, on a hilltop, is a group of mounds and circular enclosures, six in all, known as the 'Snake Den Group.' One is an artificial clay platform about three feet in height, 110 feet east and west and 90 feet north and south. Upon this platform stands a stone mound 150 feet in diameter [this is evidently a misprint; circumference is meant]. About twelve feet from the top of the platform of earth and stone, on the outer edge of the south side, the workmen uncovered 55 concretions. These ranged from half an inch to a foot in diameter, the largest weighing about 75 pounds; they were all included in a space of three by four feet. Scattered among them were many fossils, odd-shaped stones, colored pebbles, and numerous stone implements. A most remarkable find was a small stone box three and one-half inches long, three inches deep, made of the halves of two concretions fitted together. Inside were five nuggets of silver about the size of small walnuts; three were coated with black paint and two with pink ochre. Just under the collection were found some large flat stones covering a grave two feet long, eighteen inches wide and eight inches deep. In the center of this stone vault we found about a cigar box full of cremated bones. There was no evidence that this skeleton had been burned in the mound, but it was cremated elsewhere and the fragments brought here for burial.— Field Work, VII, 111, *et seq.*, condensed.

* * * * *

"To the southwest of this tumulus [in the circle at Circleville], about forty yards from it, is another, more than ninety feet in height. It stands on a large hill which appears to be artificial. This must have been the common cemetery, as it contains an immense number of human skeletons, of all sizes and ages. The skeletons are laid horizontally, with their heads generally toward the center. On the south side of this tumulus, and not far from it, was a semi-circular fosse six feet deep. At the bottom was a great quantity of human bones which belonged to persons who had attained their full size." — Atwater, 179, condensed.

Of course, there never was an artificial mound "ninety feet in height" anywhere in the State. Either there is an error in the text, or else the writer has in mind one of the large gravel knolls left by the glacier. If the latter, the skeletons must have been near the top.

ROSS COUNTY.

AT FRANKFORT.

Among the numerous remains in the vicinity of Frankfort, were two mounds at the north edge of the village. One of these, was nine feet high and seventy-two feet across the base. The surface on which it stood had been carefully leveled off and burned. Contrary to what is usual, it had no remains, not even an ash-bed, at the center or within several feet of it. Yet it was one of the most productive of the smaller mounds which have been opened in the Scioto Valley. About twenty feet from the southern margin, three feet from the bottom, were three copper celts on which rested eight spool-shaped ornaments; portions of three human ribs were with them, but no other traces of bones could be found. All other remains discovered were upon the burned floor of the mound.

There were many skeletons of bodies interred soon after death; and numerous cremations had taken place. In one place was a mass of loose black dirt extending over a space of 9½x14 feet with a thickness of 1½ to 2½ feet. This covered the remains of seven cremated bodies, each lying in a little pile by itself, and occupying a space from 20 by 24 inches to 24 by 30 inches. A large amount of copper, in the form of celts, spool-shaped ornaments, and thin plates up to 12 inches in length; shell beads; and several hundred beautiful pearls;— were among the many objects deposited without any particular plan or arrangement. While relics much injured by heat were found with many of the cremated bones, some of the entire skeletons had nothing whatever with them.

Two altars were unearthed neither of which had anything in it or upon it. An excavation, rectangular with rounded corners like the cavities in the altars, measured 10x12 inches and 8 inches deep, and contained the remains of a young child, which had been laid on its side.

The second mound, whose altitude was greatly reduced by long cultivation, measured 110 feet in length by 50 feet in breadth. Near one end was an ash-bed seven by ten feet and two feet in thickness, its long axis at a right angle to that of the mound. Scattered about through the ashes with no regularity as to position, we found a number of flint flakes and 28 fine leaf-shaped flint implements; five plates of mica cut to perfect circles, somewhat larger than a silver dollar; a celt of symmetrical form, highly polished, together with great quantities of the calcined bones of various animals and birds. Nearly half a bushel of charred hickory nuts were also discovered, and hundreds of fragments of pottery. The most interesting find was that of fourteen earthenware pots, each of a capacity of about two quarts. They had been placed in the ash-bed, most of them with the mouth turned downward.

At the center was a space two by four feet, where the earth had been burned to a depth of three inches. On this was piled up at least six bushels of ashes in a dome-shaped mass. They were very fine, free from the slightest admixture of charcoal or other substance, and almost as

white as snow. They had been carried from some other place and carefully deposited here.

In a mass of fine, soft, black earth, were two thin copper plates, one placed above the other and about an inch apart. The lower plate measured seven by nine and a half inches, the upper six by eight inches. Spread out evenly upon the lower plate were 197 large shell beads, neatly drilled, finely polished, and perfect in every respect. Resting upon these, in contact with the upper plate, were 21 spool-shaped copper ornaments. Traces of wood fibre were discernible in several places on the outer side of both plates.

Several small holes, some as much as thirty inches deep, were found in the earth beneath one of the Porter mounds. All were filled with ashes, but only one contained anything else. This one was covered with a large sheet of mica; scattered through the ashes were 990 pearl beads.

In this mound was an altar made in the following manner:

A mass of clay had been worked or kneaded until of uniform consistency, and spread on the bottom in a layer about eight inches thick. It had been dressed off at the sides until the top was a rectangle 24 by 30 inches the corners being neatly rounded. A depression 12 by 18 inches, with a depth of four inches, the corners rounded, like those of the outer perimeter, was then excavated, leaving a rim or border with a uniform width of six inches. It will be understood, of course, that all these measures omit small fractions either way. After this, the entire altar had been subjected to an intense heat, for we found it burned hard and red throughout, the basin being filled with ashes and small fragments of human bones almost destroyed by the heat. There was no means of ascertaining whether the altar had been burned before the cremation had taken place, or whether it had been allowed to dry in the air and hardened by the same fire that had consumed the body.

One well preserved skeleton, measuring over six feet in length, lay extended, with head to the south. On the forehead were five bear tusks, each with several holes partially drilled through it. Probably all these perforations had formerly held smaller teeth, pearls, or some other objects. One of them still contains the tooth of a ground-hog neatly fitted into it. By the left side of the head lay four spool-shaped copper ornaments; at the top were two flat beads of mussel shell, each with two holes. Near the right elbow was a copper plate six by seven inches.—Moorehead, Chap. II.

AT HOPEWELL'S.

Far exceeding in beauty, variety and scientific value the contents of any other mound-group ever explored is the collection—or collections, for they are not all in one place—from the mounds within the Hopewell enclosure (figure 39). Squier and Davis made some remarkable finds in a few of the smaller mounds, only two of which will be noticed here. A third, con-

taining a greater quantity of hornstone disks, will be described in the chapter on flint instruments.

Mound No. 9 is illustrated in figure 102 (S. & D., 155, fig. 43).

"The altar, *a*, instead of occupying the center, is placed considerably towards one side, and a layer of charcoal, *e*, fills the corresponding opposite side. Over the altar curves a stratum of sand, and over the layer of charcoal still another, as exhibited in the section. This altar * * * was round, not measuring more than two feet across the top." It contained large thin blades of obsidian; perforated scrolls cut from thin sheets of mica; bone needles; pearl beads; a stone disk; and thin, narrow slips of copper.— S. & D., 155.

Mound No. 1 was "not over three feet in height. * * * In place of an altar, a level area ten or fifteen feet broad was found, much burned, on which the relics had been placed. These had been covered over with earth to perhaps the depth of a foot, followed by a stratum of small stones, and an outer layer of earth two feet in thickness. Hundreds of relics

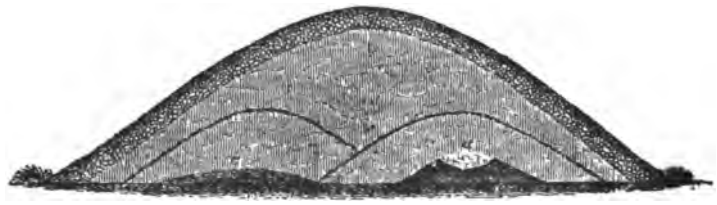


Figure 102 — Mound, with Altar, Hopewell Group.

* * * * were taken from this mound, among [them] several coiled serpents [one of which is shown in figure 279] carved in stone, and carefully enveloped in sheet mica and copper; pottery; carved fragments of ivory; a large number of fossil teeth; numerous fine sculptures in stone, etc." — S. & D., 157.

The supposed "ivory" in this instance was shell; probably from the thicker parts of large sea shells.

A very thorough exploration of this group was made in the winter of 1892, by W. K. Moorehead. A full account of the work has not yet been made public. Moorehead gives a sketch which is merely a brief abstract of field notes, with some drawings previously published. At the time of writing he had not access to the original report nor to the material exhumed. Only a few of his observations and conclusions will be presented here.

"We cannot, after explorations, consider the [largest mound] as being composed of three mounds, but that it is formed by the grouping together of a number of small mounds, and that over their irregular con-

tour was heaped a great mass of earth and gravel, giving it its present appearance." — W. K. M., 119.

Of two skeletons, indicated only by fragmentary bones, he says:—

"I think that these were in the original center of the mound, and were the first interments made. The small mound erected over them evidently permitted water to collect about the remains. One of the dome-shaped structures, such as have been described, surrounded them, the earth was very loose and the structure appeared to have been larger than that built around any other skeleton. Both skeletons lay with their heads to the west. The sheet copper had been found ten feet south of them. Right over the skeletons were sixty-six copper hatchets, ranging from four ounces to thirty-eight pounds in weight; twenty-three plates, several dozen broken plates, many thousand pearl and shell beads, perforated teeth and bear tusks, fragments of wood, fragments of meteoric iron, three or four meteoric iron celts, two eagle effigies (badly oxidized), fragments of carved bones, a stone celt, a broken shell and several copper figures of unknown form and use.— W. K. M., 241.

"It is no exaggeration to state that the entire person [whose skeleton is marked 248] glittered with mica, pearl, shell and copper. All that the ancients could give him were showered upon his remains. About the legs were numerous beads and fragments of copper plates. On the chest and under the back were several copper plates of large size. Perhaps a thousand beads, many of them pearl, were strewn everywhere about him. Bear teeth, cut and sawed into fantastic shapes, were also found with the remains. There were copper spool-shaped ornaments and panther teeth among the ribs. Upon the copper there was a perfect imprint of cloth, and many of the beads had been sewed to the cloth. As near as I could judge, a cloth or skirt had extended to the knees of the skeleton. At its right shoulder was a large platform pipe and an agate spear head. Over the cranium had been placed a cap or helmet of copper. This was corroded and could only be taken out in fragments. From the crown of the head there extended wooden antlers, covered with thin rolls of sheet copper. They were fifteen by twenty inches, with four prongs on each side. The imitation was admirable. These antlers were exceedingly frail. They could only be removed by taking out the entire mass of earth enclosing them." [These are shown in figure 298].

"List of sheet copper found in one place [in this mound]. A long mass of copper covered with wood on one side, squares and circles, patterns, etc., on the other. Eighteen copper rings and bracelets [some "double" rings]. Two sets of anklets joined together by oxidation, three in one and two in the other. Five saucer-shaped disks. Two swastika crosses, a saw pattern, a large grotesque arrow head and several unknown forms stuck together. One wheel or circular pattern with straight and curved lines and bars running across it. Small discs, wheels, etc. One whole fish (evidently a sucker), one fragmentary fish. Two diamond-

shaped stencils, four spool-shaped ornaments, four comb-shaped objects, one St. Andrew's cross, fifty-one various pieces resembling washers, etc. Ten small circles, and other fragments. No bones were near this singular copper find. It occupied a space three by four feet, and had somewhat discolored the surrounding earth. No burnt earth, ashes, charcoal, etc., accompanied the sheets. They seem to have been intentionally thrown down (as an offering), when the mound was partially complete." — W. K. M., 240.

"An enormous log was found," also, in this mound.

A great number of other interesting finds will be omitted; but one more is worthy of mention.

"Near the west end we found the largest or western altar. It was five by six feet and ten inches deep. [The base] must have covered twelve or fifteen feet in diameter. First came some charcoal and ashes. Then a layer of mica plates 18 by 20 inches in diameter. * * * Not only had the cavity been entirely filled with singular and valuable specimens, but several bushels had been heaped about the edges of the rim, and for some distance down its slopes. Fires built above and below the contents had melted much of the copper. I took out great chunks of conglomerate mass, composed of beautifully carved bone, pipes, effigies, etc., all of which were charred, cracked, or cemented together by half melted copper. Bear tusks, tortoise shell pendants, bone effigies (some human), terra cotta and graphite slate rings, lance and spear points of quartz srystal, thousands upon thousands of shell beads, * * * chalcedony knives in numbers, * * * claws, tablets, cylindrical pieces of copper containing charred reeds, etc. Several thousand fragments of large obsidian spears and knives were at the bottom. * * * A number of interesting and unique specimens were saved entire, though most of them were broken. Of the obsidian implements we secured many ten, twelve, or fifteen inches in length." — W. K. M., 255.

From one of the smaller mounds [17, in the northeast corner]

"as many as 3,000 sheets [of mica] varying in size and thickness were taken. * * * I remember shipping a barrel and a soap box from this structure, filled with nothing but mica. Many fine bone needles, mostly broken and damaged by heat, a rude altar full of bones and ashes, two or three hatchets and some spools of copper, ornaments, shark's teeth, and about 200 pounds of galena [showing no marks of heat] were taken from the structure." — W. K. M., 120.

In mound 23 [in the southeast corner] "thirty-nine skeletons lay upon the base line, most of which were accompanied by singular and unique specimens. The eastern portion of the mound was covered on the bottom with small stones. Several post holes were observed in different portions of the mound. These may have contained timbers 8 to 10 inches in diameter, which were the supports for a building of some description erected over the hard burnt floor of the mound where gravel

and clay intermixed seemed to have been subjected to a heat sufficiently intense to form a cement of equal toughness to that of an ordinary cellar floor. Among the finds were various forms of copper, including an axe weighing 17 pounds; large shells; pearls; human jaw-bones, both upper and lower, carved into ornaments; animal teeth, set with pearls and smaller teeth; pipes of different patterns, and a bowl, fourteen and a half inches in diameter, cut quite accurately from a piece of limestone." — W. K. M., 208.

It appears that around many of the skeletons in this mound, "little structures of wood, perhaps three or four feet in height and resembling small wooden tepees or conical lodges, were constructed. Although the

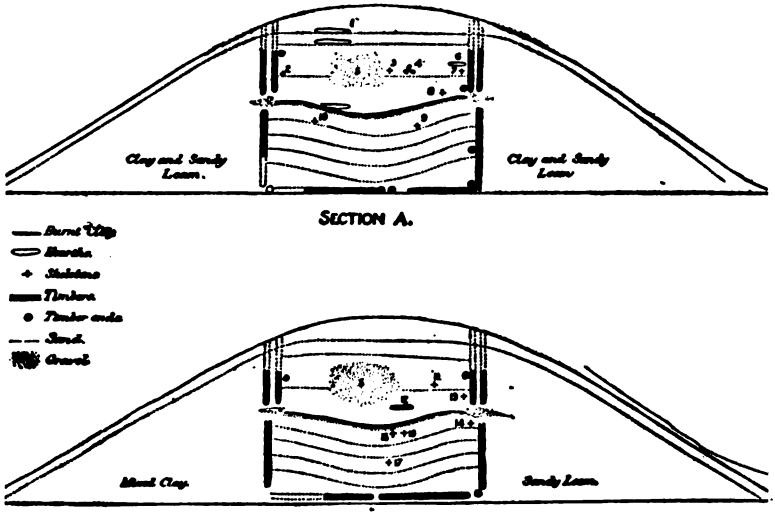


Figure 103 — Cross Sections of Mound at Baum's.

timbers or poles constituting the 'house' decayed, yet they remained in position long enough to form a hollow about the remains." Several times the horses broke through the harder earth above into these cavities.— W. K. M., 211.

AT BOURNEVILLE.

The mound at Baum's, near Bourneville, shown in figure 103 (B. E. 12, 485, figure 322), seems to have had two periods of construction, as shown by the two sets of upright posts, apparently the remains of houses. The lower row enclosed a circular space 36 feet in diameter; they measured, on an average, five inches in diameter and were set about ten inches apart. The sagging of the strata indicates a frame-work of some sort whose gradual yielding from decay or pressure allowed the superincum-

bent earth to settle slowly and evenly. The surface thus depressed seems to have been leveled up before the other frame was erected. Seventeen skeletons were found within the upright timbers above and below; some ordinary relics were unearthed, among them being a "hollow point of bone which appears to have been shaped with a steel knife" (B. E. 12, 483) — an entirely unnecessary supposition, for the marks on it could have been easily produced by the customary Indian methods, so far as may be judged from the engraving given. The object itself has been mislaid, unfortunately, so that a careful examination can not be made; but it seems to have been an arrow-head of deer-horn.

NEAR CHILLICOTHE.

In a small mound four miles west of Chillicothe "we found that a rude enclosure or pen, about twelve feet square, had been made with poles of various lengths, some of them only reaching to the corners, while others projected four or five feet beyond its sides. A floor had been formed within this pen by layers of bark or split wood, on which had been deposited five bodies. Over them had been placed other poles covered with a roof similar to the floor, on which had been cast the earth forming the mound. The entire mass of wood had an average thickness of twelve inches — what space may have existed between the floor and the roof at the time of its construction cannot be told; probably only sufficient to allow room for the bodies. The wood at the time of the exploration presented the appearance of ashes having about as much consistency as fine earth. * * * The skeletons were extended at full length and all were on the back except one. The first uncovered was that of a young person, with feet to the northwest. Among the bones of the head * * * were thirty small shell beads. The second body had been laid on its left side, with its feet almost at the exact center of the mound, and head toward the northwest. The bones of the feet were lying upon the left side of the child's head, the top of which was in contact with the tibiæ of the adult. No objects were found with this body. The third was an adult, whose feet rested against the hips of the second, its head being towards the northeast; under the back was a mass of burnt and broken bones in soft black earth, perhaps the remains of food. * * * A disk of yellow ochre * * * a broken arrow-head, a fine hematite cone, and a point of deer antler [were with the remains]. With the bones of the middle portion of this skeleton were intermingled those of an infant. On the forehead [of the latter] had been placed several pieces of mica, cut in the form of a half crescent, with smooth edges and rounded points. Each plate had several holes punched in it. [Copper and shell beads and a copper bracelet were also with this burial.] The fifth skeleton was that of a child, with its head near the waist of the last adult, and feet to the southwest. On its forehead was a crescentic plate of mica.

* * * About the neck were 196 beads of small sea shells.— Moorehead, Chap. XIII.

* * * * *

Mound *E*, of the "Junction Group" (see figure 38), as described by Squier and Davis, was seven feet high by forty-five feet base. At the bottom was about one-third of an altar on which lay "a number of relics clearly pertaining to the mound-builders." The remainder of the altar had been destroyed in the intrusive burial of three bodies which lay extended with heads east. Four feet from the bottom was a layer of charcoal, intact beyond the line of excavation for this interment. It is not clear from the statement of the authors whether the three feet of earth above this charcoal layer presented the same appearance of disturbance as that below. If it was thus displaced, the secondary grave was dug much deeper than Indians are accustomed to make them. If the contrary, then we have a case of intrusive burial in a mound by people who carried the mound considerably higher — in other words, by the Mound Builders themselves. But it is as difficult to believe that the latter would thus destroy one of their own altars, as that the later Indian would dig down seven feet into a compacted mound.

* * * * *

Next in interest to the group at Hopewell's farm, is that about three miles north of Chillicothe, called by Squier and Davis "Mound City." This is shown in figure 35. A section of the first mound opened by them at this place is given in figure 94.

"The altar was perfectly round. * * * The basin, which was five feet in diameter and nine inches deep, * * * was filled up evenly with fine dry ashes, intermixed with which were some fragments of pottery [and] a few convex copper disks. * * * Above the deposit of ashes, and covering the entire basin, was a layer of silvery or opaque mica, in sheets, overlapping each other; upon which, immediately over the center of the basin, was heaped a quantity of burned human bones, probably the amount of a single skeleton, in fragments. The position of these is indicated in the section. The layers of mica and calcined bones, it should be remarked, to prevent misapprehension, were peculiar to this individual mound, and were not found in any other of the class." — S. & D., 144.

"The thickness of the exterior layer of gravel, in mounds of this class, varies with the dimensions of the mound, from eight to twenty inches. * * * The number and position of the sand strata are vari-

able; in some of the larger mounds, there are as many as six of them, in no case less than one, most usually two or three."

The gravel covering "in mounds of this class" is due to two causes. First, the material of the mounds was taken from the immediate vicinity in a small area, so that pits were formed

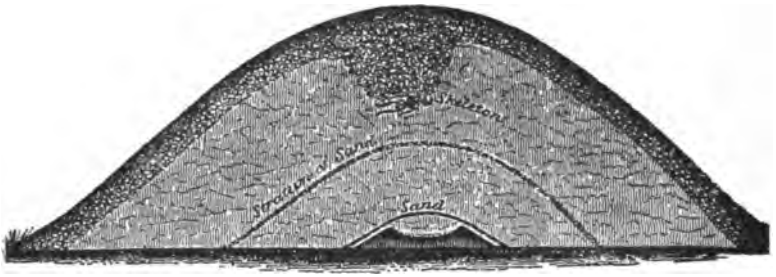


Figure 104 — Imaginary Section of Mound at "Mound City."

reaching below the soil and into the underlying gravel, which thus naturally came on top of the mound; and secondly, the sand and other loose material with which the pebbles were intermingled, was washed toward the bottom in course of time, leaving the gravel in much greater proportions than was the case at the beginning.

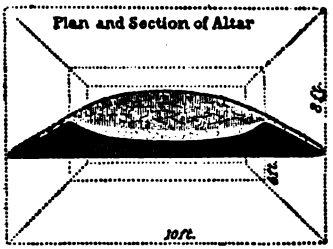


Figure 105 — Altar in Above Mound.

Mound No. 2 is shown in figure 104 (S. & D., 147, fig. 31).

"This mound is ninety feet in diameter at the base, by seven and a half feet high. * * * A shaft six feet square was sunk from the apex." — S. & D., 147.

Consequently this section of ninety feet was constructed from a view which comprises only *one-fifteenth* of its entire length.

The altar in mound 2 is shown in figure 105 (S. & D., 147, fig. 32.)

"This altar was a parallelogram of the utmost regularity as shown in the plan and section. At its base, it measures ten feet in length by eight in width; at the top six feet by four. Its height was eighteen inches,

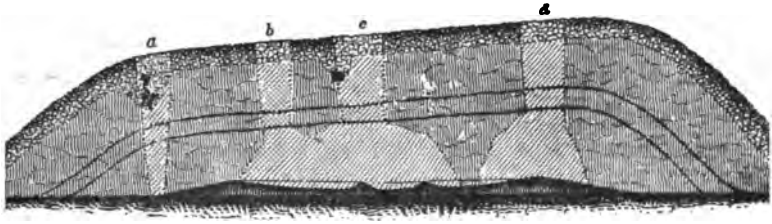


Figure 106 — Long Mound at "Mound City."

and the dip of the basin nine inches. Within the basin was a deposit of fine ashes, unmixed with charcoal, three inches thick, much compacted by the weight of the superincumbent earth. Among the ashes were some fragments of pottery, also a few shell and pearl beads." — S. & D., 147.

The most interesting of the group at "Mound City" and one which is entirely unique in the records of mound explora-

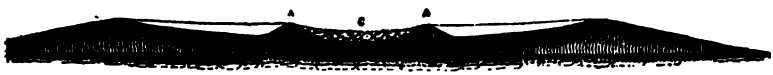


Figure 107 — Altar in Long Mound.

tion is the long mound, No. 3. A section is presented in figure 106 (S. & D., 149, fig. 34).

"It is egg-shaped in form, and measures one hundred and forty feet in length, by fifty and sixty respectively at its greater and smaller ends, and is eleven feet high. * * * Four shafts were sunk at as many different points; between three of which, for a distance of over

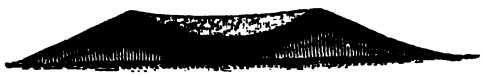


Figure 108.

forty feet, connecting drifts were carried as indicated in the plan. * * * Although the altar in this mound was not fully exposed, yet enough was uncovered to ascertain very nearly its character and extent. Forty-five feet of its length was exposed, and in one place its entire width, which was eight feet across the top by fifteen at the base." A longitudinal section of this altar is given in figure 107 (S. & D., 150, fig. 35), and a cross-section in figure 108 (same, fig. 36). "Near the center of the altar two partitions, A. A., are carried across it transversely, forming a minor

basin or compartment, C, eight feet square. Within this basin the relics deposited in the mound were placed. The outer compartments seem to have been filled with earth, previous to the final heaping over. * * * It was found to be burned to a depth of *twenty-two* inches." This depth of hardened earth is accounted for by the fact that "one altar had been built upon another. * * * This process, as shown in [the last figure] had been repeated three times. * * * The partitions A A were constructed subsequently to the erection of the altar, as is evidenced from the fact that they were scarcely burned through, while the altar immediately beneath them was burned to great hardness." There was much charcoal over the entire altar, from that formed by burning leaves or straw, to pieces of wood four or five feet long and six or eight inches thick. A quantity of pottery and many implements of copper and stone were deposited on the altar, intermixed with much coal and ashes. They had all been subjected to a strong heat, which had broken up most of "those which could be thus affected by its action. * * * A bushel or two of fragments" of spear-heads made of quartz and manganese garnet; a quantity of raw material, some of the garnet crystals three or four inches through; an arrow head of obsidian; many of limpid quartz, one of them four inches long; large thin pieces of quartz "shaped like the blade of a knife;" two celts and more than twenty small tubes of copper; a large quantity of pottery; two pipes, one resembling Potomac marble, the other "a bold figure of a bird, resembling the toucan, cut in white limestone" — were the principal finds. A partially burned human patella was also found on the altar.— S. & D., 149-150.

The "toucan" is the "crow" of Henshaw; see page 608.

In the altar of mound 4 was a mass of shells pulverized by heat; on that of mound 5 were about thirty pounds of galena in fragments from two ounces to three pounds. This bore slight marks of heat, although the altar was burned very hard.— S. & D., 148.

"Mound No. 7 had no altar in it. It was much the largest in the enclosure, measuring seventeen and a half feet in height by ninety feet base. A shaft nine feet square was sunk from the apex. At the depth of nineteen feet, at one side of the shaft, was noticed a layer of silvery mica. It was formed of round sheets, ten inches or a foot in diameter, overlapping each other like the scales of a fish. This was only partially uncovered, but enough to indicate that it formed a regular crescent whose entire length from horn to horn could not have been less than twenty feet and its greatest width five. Were we to yield to the temptation which the mica crescent holds out, we might conclude that the Mound Builders worshipped the moon, and that this mound was dedicated, with unknown rites and ceremonies to that luminary."— S. & D., 154, condensed.

Mound No. 8 was one of the smallest in "Mound City," but at the same time one of the most valuable as to its contents. The altar was six feet two inches in length by four feet in width, with a small, oval, secondary depression. "Intermixed with much ashes, were found not far from *two hundred* pipes, carved in stone, many pearl and shell beads,

numerous discs, tubes, etc., of copper, and a number of other ornaments of copper, covered with silver, etc., etc. The pipes were much broken up — some of them calcined by the heat, which had been sufficiently strong to melt copper, masses of which were found fused together in the center of the basin. * * * They are mostly composed of a red porphyritic stone, somewhat resembling the pipe-stone of the *Coteau des Prairies* excepting that it is of great hardness and interspersed with small variously colored granules. The fragments of this material which had been most exposed to the heat were changed to a brilliant black color, resembling Egyptian marble. Nearly all the articles carved in limestone, of which there had been a number, were calcined.

"The bowls of most of the pipes are carved in miniature figures of animals, birds, reptiles, etc. All of them are executed with strict fidelity to nature, and with exquisite skill. Not only are the features of the various objects represented faithfully, but their peculiarities and habits are in some degree exhibited. * * * The panther, the bear, the wolf, the beaver, the otter, the squirrel, the raccoon, the hawk, the heron, crow, swallow, buzzard, *paroquet*, *toucan* and other indigenous and southern birds — the turtle, the frog, toad, rattlesnake, etc., are recognized at first

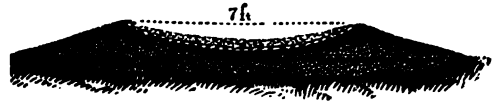


Figure 109 — Altar in Mound Near "Mound City."

glance. But the most interesting and valuable in the list, are a number of sculptured human heads, no doubt faithfully representing the predominant physical features of the ancient people by whom they were made. We have this assurance in the minute accuracy of the other sculptures of the same date." — S. & D., 152.

Under the mound within the large irregular enclosure just south of "Mound City," was an altar, a section of which is seen in figure 109 (S. & D., 156, fig. 45).

"It seems to have been formed at different intervals of time, as follows: First, a circular space, thirteen feet in diameter and eight inches in depth, was excavated in the original level of the plain; this was filled with fine sand, carefully leveled and compacted to the utmost degree. Upon the level thus formed, which was perfectly horizontal, offerings by fire were made; at any rate a continuous heat was kept up, and fatty matter of some sort burned, for the sand to the depth of two inches is discolored, and to the depth of one inch is burned hard and black and cemented together. The ashes, etc., resulting from this operation, were then removed, and another deposit of sand, of equal thickness with the former, was placed above it, and in like manner much compacted. This

was moulded into the form represented in the plan, which is identical with that of the circular clay altars already described; the basin, in this instance measuring seven feet in diameter by eight inches in depth. This basin was then carefully paved with small round stones, each a little larger than a hen's egg, which were laid in with the utmost precision, fully rivaling the pavior's finest work. They were firmly bedded in the sand beneath them, so as to present a regular and uniform surface. Upon the altar thus constructed was found a burnt deposit, carefully covered with a layer of sand, above which was heaped the superstructure of the mound. The deposit consisted of a thin layer of carbonaceous matter, intermingled with which were some burned human bones, but so much calcined as to render recognition extremely difficult. Ten well wrought copper bracelets were also found, placed in two heaps, five in each, and encircling some calcined bones — probably those of the arms upon which they were originally worn. Besides these, there were found a couple of thick plates of mica, placed upon the western slope of the altar.

"Assuming, what must be very obvious from its form and other circumstances, that this was an altar and not a tomb, we are almost irresistibly led to the conclusion, that human sacrifices were practiced by the race of the Mounds. This conclusion is sustained by other facts, which have already been presented." — S. & D., 156.

* * * * *

On the extensive level plain to the north and northwest of Chillicothe are ten mounds. The largest two are each twenty-six feet in height. Seven of them are now within the corporate limits of the city. Into one of these, having an elevation of twenty-six feet, a few tunnels were run by a man who had no clear idea of what he was trying to do, and could not decide whether he had found anything or not. Under another, located in the Fair Grounds, similar tunnels revealed a series of post holes arranged in a circle some 12 or 15 feet in diameter, beneath the apex of the structure. The posts which were placed close together, were cut off square at the bottom, and some of them extended as much as five feet below the natural surface.—Field Work, VII, 133.

A third, fifteen feet high, covered a skeleton placed between two layers of bark. With it were a tube six inches long, No. 2 in figure [189 (S. & D., 122)] and a gorget, both of limestone; and two bear's teeth. A small stick of timber lay at the head and another at the feet, presumably to hold the bark in place.— S. & D., 164.

The other four, which are crossed by the corporation line,

"form a connected group, being built in such a manner that the adjacent edges unite several feet above the level of the ground. All were

opened. The first, with a height of 13 feet, was 65 feet in diameter. At the base we found under the central portion of the mound a floor of bark or split wood on which had been built a rectangular enclosure of small logs with an inside measurement of seven by eleven feet. In it were the remains of single individual. The lower jaw and bones of the hands were covered with a coating of red ochre of uniform thickness, while the surrounding earth and the other bones showed no trace of the coloring matter. The pen was about 18 inches high, the logs forming it being 4 or 5 inches in diameter, and extending out for two or three feet at the corners. The floor and covering (it could not be determined whether the material was bark, or split wood like puncheons) were each about three inches thick. The logs were of some soft wood like poplar or willow. Nothing whatever had been buried with the skeleton. When the vault was completed the mound was built to a height of nine feet with a very fine dark sand which had become so compact as almost to equal mortar in hardness, and was impervious to water. The mound was completed with ordinary soil.

"The second mound was fifty feet in diameter and seven feet high. It had been opened by Squier and Davis and by them reported to contain 'the skeleton of a girl enveloped in bark.' The skeleton they exhumed was not 'enveloped in bark' but placed between two layers of split wood which extended several feet beyond their line of excavation on every side, and retained its texture to a degree that admitted of no doubt on the subject. Beech, sycamore, and black walnut were among the fragments. The feet and skull of the skeleton had not been touched by Squier and Davis, although they had disturbed all the other bones, even taking away the lower jaw. Neither did they reach another skeleton which lay parallel to the first and not more than a foot from it.

[Additional evidence of the manner in which these explorers conducted their operations is presented on page 360.]

The third mound resembled the first in construction — a core of very fine sand seven feet in height covered by six feet of soft muddy clay. In a little pocket at the bottom near the center of the mound. we found a small animal bone, four mussel shells, a few flakes of charcoal, and about a pint of ashes. There was nothing else in the entire mound."— Moorehead, Chap. XIII, condensed.

"The fourth and largest of this group was twenty feet high, and up to the time of our exploration had never been disturbed; so that it had retained its original dimensions. Nevertheless, Squier and Davis report its elevation as thirty feet.

"It contained a stratum or mass of charcoal at least fifty feet across and in some places fully three feet thick. In it were many logs and branches that had been cut off with stone axes, the marks being quite distinct. Some of them were nearly a foot across, while those with a diameter from four to eight inches were abundant. [Two of these are shown in figure 110]. There were also a great number of poles

or saplings, and a considerable amount of swamp grass and weeds. In this charcoal the grain of the wood was preserved to a remarkable degree; so much so that we could readily recognize among it black and white walnut, dogwood, elm, hickory, ash, maple, willow, red and white oak, redbud, honey-locust, cotton-wood, chestnut and basswood. This mound, also, had a core of the fine sand, so that no water penetrated to the charcoal where it had not been disturbed; and for this reason it was almost unchanged from its natural condition. Altogether we threw out not less than one hundred bushels of it. This amount refers only to the clean charcoal; there was a great deal more mixed

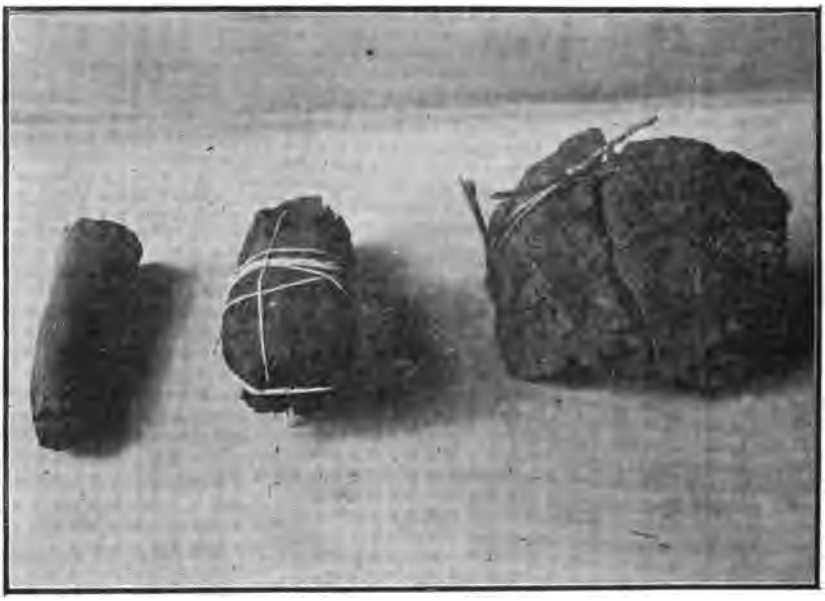


Figure 110 — Wooden Pick, and Cut Logs from Mound at Chillicothe.

with earth, besides which the layer extended to an unknown distance beyond our trench on two sides.

"Eight holes or pockets were found near the center from 12 to 16 inches across, and reaching well down into the sand, which is found under the soil at a depth of two to three feet. All were filled with loose earth, and the sand which had been taken from the bottom was spread out in a smooth, even layer above them. They contained no traces of wood or anything else to indicate the purpose for which they were dug.

"Just north of the center, on the original surface, the earth in a space of 4 to 6 feet was burned until to a depth of six inches it was hard as a brick. Over this lay a mass of white ashes. After the fire had died down a hut or pen had been constructed by setting logs or

posts into a narrow trench, like a stockade. [One of the wooden tools, preserved by charring, used in digging this trench, is shown at the left in figure 110.] These were set close together, so that no opening was left. The stumps of these posts, some charred, others decayed below the ground, were still in the trench. Above them a hut 10 by 12 feet had been made of logs 6 to 11 inches in diameter, crossed at the corners as in the ordinary mannner of building a log cabin. All were now converted into charcoal, and had settled down until each side of the pen formed a compact mass about three feet in breadth and thickness.

"A remarkable discovery was made in this mound. All the remains described had been covered with fine sand as above mentioned to a total height of about twelve feet. After the sand had been piled up, it was left undisturbed for several years, as is proved by the fact that we found on its top impressions left by the stumps of saplings, some of them four or five inches in diameter, the holes left by the roots being in some cases easily traceable by means of the darker color. As there was no trace of the trunks in the earth above, these must have been cut or broken off. This mound had then been opened from the top; the excavation reached a foot into the charcoal stratum. At the bottom of this excavation were laid several white oak logs, some of them more than a foot in diameter. Wood or bark was placed on them to form a floor, on which lay three skeletons side by side. More wood or bark had then been placed over them. To the west, at a little higher level, were three other skeletons. The hole had then been filled and the mound completed to its present height with soil, the excavated sand being left where it had been thrown, on the original slope. Immediately beneath these logs, on the charcoal, lay a skeleton. Whether this had been deposited at the same time as those above it, or placed here when the sand mound was first built, we cannot tell. A few inches lower than this skeleton was a very peculiar deposit—a mass five feet long, from 12 to 16 inches wide, having an elliptical section four inches thick at the middle, and composed almost entirely of small fragments of human bones. They had been burned until nearly destroyed, and were mingled in utter confusion as though hastily gathered up from the place of cremation. Some belonged to the frame of an adult, while others were from the remains of a child not more than half grown. All had been carried in from the outside. Thrown upon them after they were deposited, was about half of the top of a human skull, bearing no traces of fire. It had evidently been used as a cup or vessel before being broken. All the thicker portions of the bone had been cut away, and the edge thus left carefully trimmed, leaving a smooth rim entirely around it." — Moorehead, Chap. XIV, condensed.

Another such find has been recorded:

"A cup made from a human skull was exhumed * * * near Brookville, Indiana." — Fletcher, 6, *note*.

The second of the largest two mounds was entirely removed by Mr. W. C. Mills, curator of the Ohio Archæological and Historical Society. The structure and contents were of much interest, and will be fully described in a later report of the Society.

* * * * *

On the high terrace east of the Scioto at Chillicothe stood a mound eight feet in height. "For a space of twelve feet on every side of the center, the earth had been burned quite hard, and of a bright red color, forming a floor upon which rested the remains of fourteen adults and one child." Many specimens of aboriginal art were found among the bones "The bodies had been covered with a layer of charcoal fully a foot in thickness; in this were pieces of a size to show that logs at least six inches through had been burned. The charcoal was piled over the entire space included by the burnt earth, and had settled down until the bones were covered and surrounded with it." "At a point seven feet from the margin, on the bottom of the mound, was a small amount of black earth, containing over 290 pieces of pottery, the fragments of vessels which had been perfect when deposited, but had afterward been crushed by the weight of the earth resting upon them." — Moorehead, 148.

On the farm of Mr. Janes, two miles east of Chillicothe, on the opposite side of the river, was a mound measuring 50 by 95 feet at the base, and 13 feet high. A short distance away was a pond which was probably formed by obtaining here the earth for the mound. "At twenty feet from the margin, upon the bottom of the mound, we came to a stratum, three inches thick, of ashes and burnt bones, which extended eighteen feet [east and west] and more than twenty feet [which was the width of the trench] in length. Some squirrel and bird bones were found, but most of the mass was so broken and burned that the character of the remains could not be determined. * * * On the bottom, at the center, we found the skeleton of a child not more than ten years of age. By the neck were 119 beads, of small marine shells perforated at the apex. Six feet above these remains was found the partial skeleton of a man almost a giant in size. It was not an intrusive burial for the ground above it was undisturbed. Neither had the construction of the mound ceased at this height for any appreciable period, for there was no line of demarkation between the earth above it and that below, such as would result from the growth of grass or weeds had any considerable time elapsed. * * * The death of this individual had occurred a considerable time before the interment of the bones; for not only are many of them absent, but those present are not in their proper order. * * * The bones are unusually large and heavy. The breadth across the shoulders with the bones correctly placed, was nineteen inches. The only relics found with it were forty shells by the right wrist. * * * The skull of a wolf [or dog] * * * and almost the entire frame work of another were found ten feet apart, two feet higher than the adult's skeleton." — Moorehead, 151, *et seq.*

* * * * *

In Chillicothe, beneath a mound 25 feet high, was a deposit of ashes and charcoal six or eight feet square and from six inches to a foot thick.

In this were fragments of human bones almost destroyed by heat; a stone celt, the only object of this character found by them in a mound; copper ornaments; and a number of stones—sienite and other hard material. The mound was begun while the fire was active, as the earth above was burned.— S. & D., 165.

* * * * *

Six miles below Chillicothe under a mound twenty-two feet high and ninety feet in diameter, was a vault nine feet long, seven feet wide (outside measure) and twenty inches high, constructed of logs. The bottom was covered with bark or puncheons. Decayed fragments of a skeleton were on this floor, the head to the west. About the neck were several hundred shell and tusk beads. The vault had been covered with timber of some sort.— S. & D., 162.

In figure 111 (S. & D., fig. 50) is reproduced their drawing, which shows how they reached this vault. The mound is much smaller than the figures given in the text; in fact, the amount of earth composing it, if built up on a base of ninety feet in diameter, would not exceed ten feet in height.

AT HARNESS'S.

In figure 112 (S. &. D., 178, fig. 67.) is reproduced the illustration by Squier and Davis of the large mound at Harness's or "Liberty Township."

"The surface of the mound was covered with the layer of pebbles and coarse gravel already mentioned as characterizing the mounds of the first class [altar mounds] but the sand strata were absent. * * * It is irregular oval in form, and is one hundred and sixty feet long, ninety feet broad at its larger end, and twenty feet in height. Excavations were made at the points indicated in the section. The one toward the right or smaller end of the mound disclosed an enclosure of timber, eight feet square, and similar, in all respects, to those found in the sepulchral mounds, except that, in this instance, posts eight inches in diameter had been planted at the outer corners, as if to sustain the structure. These posts had been inserted eighteen inches into the original level or floor of the mound. * * * Within this chamber * * * a skeleton partly burned was found, and with it a thin copper plate * * * also a large pipe. [This is shown in figure 113 (S. & D., 179, fig. 68)]. * * * The second excavation, (B) was made at the larger end of the mound, somewhat to one side of the center, at a spot marked by a depression in the surface. At the depth of twenty feet was found an altar of clay of exceeding symmetry. This was * * * surrounded by an enclosure in all respects similar to the one above described, except that the timbers had been less in size. A fine carbonaceous deposit, resembling burned leaves, was found within the altar." Several large bone perforators were found around the altar. The floor, so far as exposed, was of clay, perfectly level, and burned hard.— S. & D., 178-80.

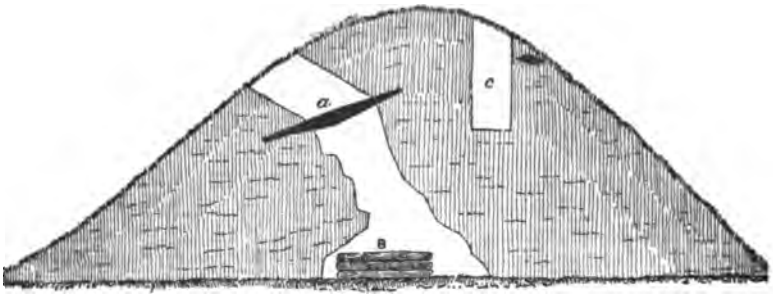


Figure 111 — Section of Mound Six Miles South of Chillicothe.

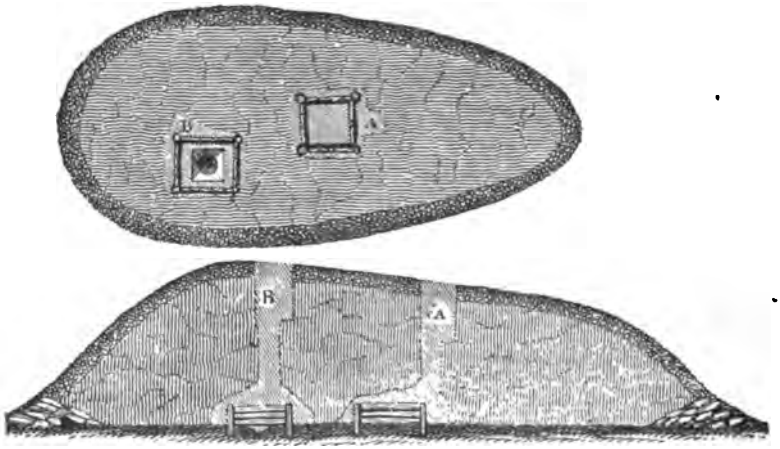


Figure 112 — Plan and Section of the Harness Mound (S. & D.).



Figure 113 — Pipe from Harness Mound.

Their work in this mound was either carelessly done or imperfectly reported, as it does not at all agree with reports of later explorers. There is no layer of gravel on top of the mound, except such as remains after most of the earth deposited there had washed off, leaving a residue. The cut, also, is incorrect.

According to Putnam,

"The Harness mound is 160 feet long, from 80 to 90 wide, and from 13 to 18 feet high. About forty feet from the center, at the northern portion, we discovered the first of the burial chambers, of which we afterward found a dozen in all. These chambers were made by placing logs, from five to six inches in diameter, on the clay which forms the lowest layer of the mound, in such a way as to make enclosures six to seven feet in length and from two to three in width and about a foot in height. In these the body was placed, evidently wrapped in garments, as indicated by the charred cloth found in several of the chambers. In two instances the skeletons were found extended at full length within the chambers. In the other chambers the bodies had been burnt on the spot. It was evident that these chambers were covered by little mounds of gravel and clay, and that in those where the burning had taken place, the covering of earth was made before the body was consumed [that is, before the incineration was completed]. The burials and cremations were not all made at the same time. After all these little mounds had been made, earth was brought from different places about and heaped over all. This was then covered with a thin layer of gravel and surrounded by stones, thus forming a large mound. Squier and Davis thought they had found an 'altar' and mention the burnt chamber, which they really found, as such. After we had abandoned this mound several school boys dug two pits in the mound, and took out more objects from one of their pits than we found in all the rest of the mound." — Putnam, Harness, 216, *et seq.*, condensed.

Later, Moorehead continued the explorations.

"We first cleared out the end of the trench abandoned by Professor Putnam, and measuring the mound thence to its end, ascertained the distance to be about eighty feet, at least sixty of which should be excavated. We started in with a trench some thirty feet in width, being a little wider than the excavation he had conducted. We soon ascertained that burials followed each other pretty much the same distance apart on either side of the mound, and that there were few burials in the main or central portion. Most of the burials in these rows occupied little domes or pits, varying from three to five feet in diameter and the same in height. In the end which we explored were a total of twenty-nine interments, but two of which were uncremated skeletons, a child and an adult. All the others were more or less burned. Nearly all the skeletons were on little raised platforms of burned earth, varying in height from four to ten inches. The platforms were usually about two

by three feet. Such relics as accompanied the remains were placed in no special order and many of them were partly burned up. The looseness of the earth above the skeletons, or the little domes to which we have referred, is probably due to small structures of poles having been built about the remains. The supports remained in position sufficiently long for the earth to become packed, and after their decay just enough earth fell upon the remains to cover them loosely. Frequently there was a space of about a foot between the top of the dome and the loose earth below." — Field Work, V., 222, condensed.

PIKE COUNTY.

About thirty mounds in this county have been carefully examined by the writer. On account of the diversity of structure observed within this limited area, a tolerably full account of them is here presented. Some were absolutely barren of contents, giving no clue that would aid in determining the purpose for which they were built; some others contained only fragmentary bones unaccompanied by any relics, and apparently pertaining to a rather hasty or careless burial. Such as these will receive no mention.

In every case the central point of the mound was ascertained as nearly as possible, and all horizontal measurements calculated from it; vertical measurements are from the level of the original surface earth. Frequently, however, the highest point of the structure was several feet to one side of what was clearly intended to be the principal feature of the tumulus. This is often due in some measure to erosion or cultivation, but more frequently to the fact that the builders, probably through ignorance or carelessness, made it so.

The most northern mound opened stood close to the north line of the corporation of Waverly, the county seat; this will be called No. 1, and the others will be numbered in the order of their position from here to the south line of the county. There are several mounds north of the one first described, but the owners of the land on which they stand would not allow them to be opened.

Mound No. 1.— This measured eighty feet in diameter at the base, and thirteen feet high above the surrounding surface. A trench ten feet in width was carried in from the south side. The structure was composed of very hard-packed, dry sand, with a slight mixture of clay, brought from a low ridge that lies a few rods to the north of the mound. All below the upper

two feet could be loosened only with a heavy pick wielded by stout muscles. This earth had been piled directly on the original surface level, whose characteristic grayish color, due to the decay of old sod and roots, extended from four to six inches downward and rested conformably upon the yellow sandy subsoil, just as in the field around.

About thirty feet from the center began a number of streaks of sand, darker and much harder than that of the mass in which they occurred; they were very tortuous, though the general direction was horizontal. They were nowhere over an inch in thickness, and as the center was approached become more and more lenticular in outline, running around or enclosing the lighter sand in small patches. Evidently they were due to segregation of certain components of the sand around the little masses or flattened piles where each laborer had cast his basket-load of earth. At twenty-four feet out it seemed that a trench or gutter had been dug to a depth of sixteen inches long before the mound was begun; for the dumped earth curved down into it, resuming the usual level on the other side. Immediately within this, or twenty feet from the center, were found five holes nearly in a straight line across the trench. Measuring from the western one, which was partially under the west wall, the distance to the center of the others was three and one-half, five, eight and nine and one-half feet. They were from twelve to sixteen inches deep and about eight inches across. A few fragments of bone were in the western one, some charcoal in the east and middle ones; nothing in the others except loose, dark earth. These holes are of frequent occurrence in the mounds of the Scioto valley; their object is problematical.

At eighteen feet out, ten feet from the bottom, was a hole with cavities branching out from it, the largest reaching toward the west or down the slope from the main hole. Plainly this was the remains of a stump and its roots and proves that the work was stopped at this point for several years, as the earth was solid above and the hole was such as would be left by a tree five or six inches in diameter, cut away when the work was resumed.

At sixteen feet out, ten feet from the bottom, were two extended skeletons, as close together as they would lie, with heads southwest. The earth about them was a deep black in places,

as if from decayed organic matter; but most of the larger bones, so far as they could be examined, were covered with a dull-red powder which took on a waxy appearance when worked up with a knife blade upon a hard surface. None of it was observed in the earth surrounding the bones. The skeletons were about six feet two inches and five feet ten inches in length, but the bones of the head and feet were so displaced that exact measurement was impossible.

At fifteen feet out, on the west side of the trench, began a streak resting on the undisturbed surface. It was somewhat darker than the earth immediately above or below it, and contained some small fragments of charcoal. Two feet from the edge of this, above it, began a layer of clean, yellow, sandy earth, evidently the subsoil of the field. Within a foot this increased to a thickness of five inches, gradually running across the face of the trench with a thickness of three to five inches to the east side, at which it ceased. At ten feet out, near the middle of the trench, and under this yellow sand, the earth was reddened over a space of eighteen inches to the depth of an inch, from a fire which was made here before the mound was commenced.

At twelve feet from the center a hole had been dug to a depth of five feet. It was almost uniform in diameter — about seven inches — to the bottom, and terminated in a blunt point as if due to a post that had been roughly burned or cut off. It was entirely filled with loose, dark earth, resembling garden mold. It required great patience on the part of the aboriginal excavator, with a pointed stick or piece of antler as his only tool, to dig such a hole in ground as compact as the surface of a traveled road.

On the west side of the trench, ten feet out, was a little pile of burned bones with some charcoal; this lay near the edge of a fire-bed, having a regular elliptical outline. The latter extended thirteen feet northwestward from the east margin of the trench, with a maximum breadth of five feet. Beneath this, at eight feet out and three feet from the east face, was a hole about eight by ten inches in its two diameters and twenty inches deep, filled with very loose, dark earth in which were two or three small fragments of charcoal. A foot nearer the center and three feet west from this hole was another ten inches in diameter and sixteen inches deep, the sides and bottom rough

as if it had been gouged out with a stick or horn. It was filled with clean, white ashes, mixed with some charcoal, and packed in so hard as to be difficult to remove with a trowel.

Five feet out appeared a loose, black earth, evidently the mucky soil from the creek bottom-land near by. It was piled as steep as such earth could be made to lie, to the height of five and a half feet, and the upper surface covered with a thin layer of charcoal. It proved to be the covering of a grave constructed in the following manner:—

A hole measuring ten feet east and west by nearly six feet north and south, rectangular in form, except that the corners were somewhat rounded, had been dug to a depth of about eighteen inches. The bottom was irregular, as though excavated with rude tools, and was a little deeper at the middle than toward the sides; the edges were not vertical, but slanted inward a little at the bottom. Lying close to the north side of this was a man's skeleton, five feet nine inches long, extended on the back, head west, left hand lying on the pelvis, right arm bent and lying across the stomach. The teeth were very little worn; five or six of them were slightly touched by decay, but otherwise they were solid, clean and white. At his right side and in the middle of the grave, was the skeleton, five feet four inches in length, of a woman lying extended on the back, with the left hand under the pelvis of the other. All the teeth were much worn, some of them entirely below the enamel. The two lower middle incisors were nearly cut in two at the neck; they looked as if some sort of fine cutting instrument had been forced between them and sawed back and forth horizontally until only a thin remnant of enamel at the outer margins held the crown and root together. The skulls were both in an excellent state of preservation, owing to the fact that they were completely imbedded in the above-mentioned bed of ashes, which extended across the upper portions of the skeletons to the northwest corner of the grave. A front and side view of each is given in figures 114 and 115, and 116 and 117. The lower jaws and most of the teeth were lost after they reached their last owner. Some fragments of bone and a piece of black flint knife were found in the ash-bed. A lining of wood had been placed around the margin of the grave; what remained of it looked more like ashes than like wood. The bottom of the grave was covered with a layer of

ashes; above this was a single thickness of bark on which the bodies were placed, without any covering or protection from the



Figure 114 — Front View of Skull from Waverly Mound.

black earth, which had been piled directly on them and extended a few inches beyond the grave on every side. The large mound had been built over and around this. There was no partic-

ular arrangement of material in the tumulus; it looked more as if various parties had worked as best suited their convenience, throwing the earth wherever they wished and gradually running the different masses into one another until the work was com-



Figure 115 — Side View of Skull in Figure 114.

pleted. If a shaft had been sunk from the top, there would have been an appearance of "stratification."

Two and a half feet from the bottom, at the center, was a decayed skull; a few fragments of bone were found at intervals to the east of it, as if the body had been interred there. No relics of any sort were found during the excavation, except a

copper bracelet, which had apparently been lost by one of the workers when the mound was about half finished.



Figure 116 — Front View of Skull from Waverly Mound.

No. 2.— This had been cultivated for many years, having now a diameter of ninety and a height of three feet. At various places below its bottom were holes filled with loose, dark earth,

some of them dug, others due to the decay of roots and stumps antedating the mound. Near the center were two skeletons of medium size, lying a foot apart, with heads toward the east. The left arm of the one to the south lay on a thin stratum of ashes



Figure 117 — Side View of Skull in Figure 116.

and bone, much burned and cemented together until almost as hard as stone; it covered a space of one by two feet. The feet of the skeleton lay on hard-burned, undisturbed earth, from which the ashes had been carefully removed. The lower jaw was narrow, with a prominent chin and the teeth much crowded; the

upper jaw was decidedly prognathous. The head of the second skeleton was two feet farther east than that of the first, and rested on a fire-bed; near its skull were found fragments of bones of a very young child. The fire-beds at the head and feet of these two were each about four feet across; another, north of them, was six feet across, and the earth beneath it was burned red to a depth of four inches; none of them was regular in shape. On these bodies and ash-beds, over a space of some fourteen feet in diameter, earth had been deposited to the thickness of a foot at the center, running to an edge all around; above this was a thin layer of charcoal with its margin resting on the original surface; and over this the mound had been built.

No. 3.— This was originally more than twenty feet high; but cultivation has reduced it to ten feet, with a diameter of about 100 feet. A trench six feet wide, increasing to ten feet towards the center, was run in from the southeast side. At nineteen feet out began a layer of ashes and burned earth, remains of a fire that had been made on the natural surface of the ground. It extended in every direction beyond the area excavated. Under the outer edge was a hole sixteen inches deep, filled with loose earth. Three feet northwest of this hole was another twenty-seven inches deep, the lower nine inches containing a mixture of ashes and loose earth, while the upper portion was empty. Two feet west of the second was a third, thirty inches deep, filled with loose earth and charcoal; near the bottom were two angular fragments of burnt rock. Three and a half feet north of the third hole was a fourth; a foot north of this was a fifth; southwest from the last was a sixth. Each of these was about thirty inches in depth, and all were filled with loose, black earth, containing small quantities of charcoal, ashes, and traces of rotten wood or bone. In one were two valves of muscle shells of different species, the larger broken as if in opening. All of these holes were about eight inches in diameter.

Ten feet out began a fire-bed, not over four feet across at any part; it lay partially under the south wall. The ashes were three and a half inches thick and the earth was burned a bright red to a depth of four inches. The fire had burned for a considerable period and the ashes were scraped away from time to time, reaching, on unburned earth, beyond the north side of the trench and three feet past the center of the mound. On the

top of the ashes, generally with a few inches of earth intervening, was a very thin layer of decayed wood or bark. The unconsumed end of a poplar or cottonwood log six inches through, extended a foot from the west edge of the fire-bed.

In the middle of the trench, two feet from center, was a hole eight inches in diameter and thirty inches deep; and three feet west of it one a foot across and thirty-two inches deep. The latter contained a number of fragments of bone, one of which, a broad, flat piece, had been dressed to a triangular shape with the wide end somewhat rounded. Lying on the ash-bed above these holes and reaching three or four feet beyond them to the west and north, was a mass of large poles which had been thrown in a pile, the ends of the longer ones projecting somewhat from the edge of the mass. It was composed of white walnut, poplar and cottonwood, and the debris was in some places more than a foot thick.

Two feet past the center, lying on the edge of the ash-bed, was the skeleton of a young adult, about six feet long, extended on the back with the head west, all the bones broken and crushed by the pressure of the superincumbent earth. Only twenty-two teeth remained, and of these thirteen were more or less decayed. Near the feet was the edge of an irregular fire-bed three or four feet across. The skeleton was covered with several layers of bark.

Under the right femur was the largest hole discovered. It was three feet deep and contained a number of pieces of ribs and other bones from animals; also fragments of charcoal as large as a hickory nut. The purpose for which these holes were intended is not known. There was nothing to indicate that they were post holes; nothing was concealed in them. The thin, superficial streak of ashes and charcoal passed over them without a break, so they evidently had no connection with the mound. It is possible they were caches in or near a wigwam which formerly stood at the site of the mound

No. 4.— This is now only three and one-half feet high and from eighty to one hundred feet in diameter, being much disturbed by farming. A trench eight feet wide, run in from the northwest side, showed it to be composed of sand, clay, soil and muck. About fourteen feet out were fragments of a skeleton, imbedded in black earth, filling an excavation that reached

through the natural soil to the underlying gravel. At five and one-half feet from center, with the skull in the edge of a bed of ashes which had been raked from a fire-bed near the center, and the rest of the body extended on a layer of muck that formed the bottom of the mound, was a skeleton of peculiar form. It was not over five feet long, but the bones were very thick and the processes for attachment of the muscles were extraordinary in their development. The skull was nearly half an inch thick and of unusual size, mostly back of the ears, though the forehead was full and high. The teeth were large, hard, and but little worn. One other skeleton was found at the center, two and a half feet above the bottom, extended, head toward the west.

No. 5.— This mound was sixteen feet high and sixty-five feet in diameter. It is the one marked "thirty feet high" in Squier and Davis's plan of the Graded Way. It was begun with a central core eight feet high, of black earth from the Beaver creek bottoms near by, and completed with the loam of the field in which it stands. A trench ten feet wide was carried in from the south side. Within two feet of the summit were traces of five intrusive burials, one of them of a child. One other skeleton was found ten feet out, six feet above the surface level, with the head toward the west. Four feet below this were part of the shaft of a femur, a bone of the hand or foot, and two small fragments of skull. Five feet from these, on the same level, was a large piece of skull. From the arrangement of a layer of ashes and wood below these fragments and a thin layer of wood above, which could be traced for three or four feet in every direction, it was evident that they were all parts of a single interment; but nothing else was found with or near them, although these fragments looked fresh and solid as though lately denuded of flesh. East of the center, on the original surface, was a mass of ashes about four inches thick on a bed of burned earth, six or seven feet across. It contained burnt bones and mussel shells, but no charcoal; and was continuous towards the west with a thin layer of ashes, over which was a layer of charcoal, both not exceeding half an inch in thickness. Above the latter was a layer of decayed wood in which were pieces of oak, walnut, and mulberry, running to the north and west of center. About six feet north of this ash-bed was a similar one; lying on the ground between the two, with its burnt ends in either, was an oak log ten inches

thick. Decayed wood and bark with a thickness of several inches, spread over an area of at least ten feet in diameter to the westward of the second ash-bed. In fact, all through the black core of the mound were masses of such wood and bark, apparently pertaining to mortuary exercises, but so confused that nothing could be determined in regard to their arrangement.

Five or six feet west of the center was a bed of ashes three inches thick and three to four feet across, on earth burned hard and red. In these ashes were many small fragments of bone, some burnt, others showing no trace of heat. Among them was part of a human femur, not over four inches long, one end of which was slightly burnt while the other end looked remarkably fresh, as if the flesh had only lately been removed from it. After the fire had died down three little packages of copper beads, fifty-four in all, were thrown into the ashes. The leather string was still in them, while the inner wrapping of cloth and the outer wrappings of buckskin around them were not even marked by smoke or heat. A fragment of the cloth is shown in figure 290. Over the ashes was a thin sprinkling of powdered hematite.

The next three in order have been much lowered by cultivation.

No. 6.—This is composed entirely of yellowish clay. Two feet west of center, two and a half feet above the bottom, was a mass of burned bone in small fragments; it was about six inches thick at the middle and less than two feet across at any part. In it were two copper rods about the size of half a slate pencil, a perforated gorget of striped slate, and another of black shale, unperforated. A similar bone-bed was about six feet east of the center, two feet above the bottom; it contained no relics of any sort. At about the same level, four feet west of the center, were traces of an adult skeleton, with the head to the east; only a few soft fragments of bone remained.

No. 7.—In the construction of this mound a hole had been dug through the three feet of soil into the underlying gravel. Extended on the back, on this gravel, head northeast, was a skeleton six feet four inches in length, the right hand on the neck, the left hand lying across the pelvis. At the right elbow was one valve of a mussel shell; on the breast were two bear's tusks with the root end ground off at a sharp angle. Among the lumbar vertebræ were four perforated pearls and several molar

teeth of a bear with the roots more or less ground, and two molars of some very small animal; west of his feet was a small mussel shell with both valves perforated. Lying at the left side of this skeleton were the remains of a child three or four years old; on its breast was a small slate gorget. Over the bodies was placed the clay removed in the excavation; on this was spread out the gravel removed from below the clay, thus reversing the natural order. Over the gravel the mound, of yellowish clay, was erected.

No. 8.—A trench thirteen feet wide was carried in from the south side. At eleven feet out was a hole five inches in diameter, containing a very little charcoal, dug into the underlying gravel. Five feet north of this was another, eight inches in diameter and a foot deep. Six feet east of center, three feet up, was part of the vertex of a skull with a small hole drilled through; at the same distance southeast of the center a complete skull of regular Indian type. If any other bones had ever been here, all traces of them had disappeared. Three feet south of the center was a very symmetrical hole, one foot in diameter and two feet deep, filled with soil. Five feet west of center was a hole three feet deep and a foot across, the lower two feet filled with ashes and charcoal, the upper foot with loose earth. This lay within and close to the edge of a fire-bed four or five feet in diameter. Upon the north and west portion of this burned earth was a considerable mass of ashes; the south side was covered with soil, which, near the center of the fire-bed, merged into the ashes. Over the whole mass was spread a layer of charcoal, which in turn was covered by the earth composing the mound. When these ashes were examined they were found to contain numerous fragments of bones, nearly destroyed by heat. A few of them seemed to be animal bones, but most of them were human. Among them were two fine flint knives, fragments of two pipes, and some smooth, rounded pebbles as large as a duck's egg — all much burned. There was here plain evidence that either a corpse was cremated or a living person burned at the stake. The hole showed marks of fire clear to the bottom, and there can be no doubt that a large post which stood here was thus consumed. The only thing in favor of the idea of cremation is the presence of the pipe fragments; the knives and the stones may have been used to add to the sufferings

of a victim, but would have no place if a corpse was to be destroyed. On the other hand, if the intention was to inflict torture, it would seem improbable that a mound would be erected to commemorate the event. Still, it is not safe to judge barbarian actions by civilized standards.

No. 9.—This is on the summit of one of the first, or lowest ranges of hills bordering on the Scioto, near the village of Jasper. It measured eighty feet in diameter and three feet high. A six-foot trench was run through it from north to south.

For twenty-five feet each way from the center—and presumably for the same distance to the east and west—the surface earth was burned red to a depth of two or three inches. On it rested a layer of ashes, and above this was a stratum of charcoal varying from half an inch to three inches in thickness. Rocks were piled on the charcoal, many of them burned and smoked as though thrown on while the fire was still briskly burning. The spaces between the stones were tightly filled with gray (surface) earth mixed with charcoal; it seemed to have been gathered up from a place where weeds and trash had been burned off. Like all the earth in the mound, it was as compact and solid as frozen ground. Some of the stones weighed more than 150 pounds. The central core of the mound, over an area of five feet every way from the center, was a tough mass about three feet in depth, of mingled yellow and white clay, surface earth, a little charcoal and ashes, and occasionally a rock. In three or four places holes which had been dug down into the clay subsoil were filled with this mixture. No bones or other remains were found, except a few pieces of charred cloth preserved between flat rocks, which kept the water from them.

No. 10.—This stood on the same hill as the last, but slightly below the top of the slope. It was connected with the hilltop by a level causeway thirty feet long, formed by filling the intervening depression with large rocks thrown in at random and leveling the upper surface with a pavement of small stones.

The mound was eighty feet in diameter at the base. A ten-foot trench was carried into the north side, past the center. The line of the original surface was easily followed along the gray earth formed by the decomposing sod growing here when the mound began. At twenty-five feet out large rocks appeared and increased in numbers until within eight feet of the center, where

they were piled to a height of four feet. Under this point, on the sod line, was the edge of a layer of rotten wood covered with ashes, which continued sixteen feet to the southward and under the walls of the trench on each side. On this, covering a space ten feet from north to south and from six to seven feet east and west, was a mass of broken and decayed human bones lying in the utmost confusion, as if they had been carelessly gathered up at some place or other, carried here, and thrown in promiscuously. In some places it was fully six inches thick. The only appearance of regularity anywhere was at the center of the mass, where an effort had been made, without much success, to arrange the bones of one skeleton in proper order; and at one edge, where a corpse was laid, crowded into the smallest compass possible. The earth in contact with it was much blacker than any other observed. Enough earth was thrown on the bones to cover them; over this was placed a layer of wood or bark, of which traces still remained. On this the rocks were thrown, reaching six feet past the south edge of the ashes, and over all the mound was built to a height of eight feet.

It is a matter of regret that these tumuli were not more thoroughly explored. The work was done in this manner because of a belief in the correctness of the assertion that everything of interest or value in a mound lies "directly under the apex," and the trench in each case was made mainly to study the method of construction, and only wide enough to give working room at the center.

The next three to be described were excavated by marking a circle forty feet in diameter, with the highest point of the mound as a center, and removing all the earth within this area to the undisturbed original soil.

Number 11.— On a high terrace near the mouth of Beaver creek stood two mounds whose bases overlapped, giving the appearance of a single mound with two summits. The smaller part contained nothing of interest except some cloth (see page 699).

The larger was about seventy-five feet in diameter. Twenty feet south of its center was a grave somewhat more than nine feet long and five feet wide, with a depth of five feet. On the bottom lay a few fragments of bones of a medium sized person, extended on the back, with head toward the east. The body had been covered with bark or wood which reached to the margin of

the grave on every side. The pit was filled with black, sticky earth which had evidently been carried from a swamp or low bottom and packed in while wet, thus causing the entire decay of the skeleton. Before this work was completed, however, another body was placed at a distance of three and one-half feet above it, or eighteen inches lower than the natural surface. Very little of this remained; on the bones of the wrist were five small rectangular pieces of copper.

Number 12.—Three and a half miles south of Piketon was the largest mound, with one exception, between Chillicothe and the Ohio river. It had an elliptical base 130 by 110 feet, the longer axis north and south, and its height before being disturbed was 18 feet. Its erection was practically continuous, for there was no line of demarkation anywhere observable such as would have resulted had the work been long interrupted. When the mound, or at least the northern portion of it, had reached a height of about three feet, a hole nearly eighteen inches deep was dug, 19 feet north of the center. This measured four by six feet and was lined with bark or wood which extended beyond it on every side. The bottom was uneven except in the northwest corner where a space had been leveled off barely large enough to afford a resting place for the body of a young child which lay straight, on its back, with head east. On the right wrist were two small copper bracelets; with the bones of the neck, 65 copper beads and some shell beads.

This burial had no connection with the original purpose of the mound, which was plainly intended to serve as a monument for two graves in the natural earth beneath it. The first of these had its longer diameter almost coincident with a radius extending northeast from the center of the tumulus. It measured ten feet in length, seven feet in width, and four feet deep. The sides were vertical for two feet above the bottom; from this line the margin had been cut away with a gentle slope until it reached the natural surface at a distance of eight feet to each side of the central line.

In the bottom of this pit had been placed two to three inches of the red subsoil, on which lay three to four inches of the deeper gravel, thus reversing their natural order; above this came a thin seam of decayed wood which also lined the sides of the pit, and extended outward on each side to the top of the

minor slopes mentioned; next in order was a thin layer of burned earth, ashes, and charcoal reaching from the shoulders to the knees and slightly beyond each side of a skeleton nearly six feet long. This lay at full length, with its feet directly toward the center of the mound, from which the skull was distant 21 feet. As near as could be determined from the confusion of earth and decayed wood, the body had been protected by a layer of wood supported upon chunks and upon poles whose ends were thrust into the sand on each side. Earth was then thrown on this covering to the original level of the soil; saplings or small poles were next laid around the margin of the grave to uphold a roof of wood or bark. Nothing further was done, apparently, until this had partially fallen into decay; it was then covered with a small heap of dark earth preliminary to beginning the mound.

The second grave was by far the largest that has been recorded in this region. The outline was tortuous, but could be easily traced by the decayed wood which had lined it, or by the difference in the consistency and color of the earth on either side. When fully exposed by removal of the surrounding top soil, it formed an irregular ellipse with a narrow prolongation toward the east. Perhaps its outline is best described by the word "pear-shaped". Its entire length was 27 feet on a line almost exactly east and west; its maximum breadth 19 feet. On the east, north, and south sides the dip was gradual to a depth of three feet; on the west side it was abrupt to the bottom. At the east end a graded slope was left to facilitate the passage of those engaged in the labor of excavating; on either side the walls were carried vertically downward four feet from the termination of the slope, or to a total depth of seven feet. The pit thus formed measured within the perpendicular walls, sixteen feet east and west by ten feet north and south. On the bottom lay a skeleton about six feet long, face upward, head east. A few beads were scattered around it, and on each forearm were three copper bracelets. One, at least, of these was made of a piece of rectangular sheet copper which had been doubled along the center, beaten flat, rolled into a cylinder as one would roll a piece of paper, and then bent until the ends were in contact, forming an elliptical ring large enough to slip over the hand.

Number 13.—On the line between Scioto and Pike counties stood a mound nine feet high and 75 feet in diameter. Human remains occurred at six places within the structure, at different levels; and it was evident from two strata of decayed vegetation that twice at least the labor of erecting the pile had been suspended long enough for a rank growth of weeds and grass to gain a foothold on its surface. For twenty feet east and south of the center—as far as explorations were carried in that direction—the earth upon which it was built contained numerous root-holes of a size to indicate that trees from three to six inches in diameter had been cut or burned off before the mound was begun. A space of more than thirty feet across in the middle portion of the mound was covered with a layer of ashes and charcoal containing many small fragments of burned animal bones but no art products of any character. It varied from a thin streak to a stratum of three or four inches; where it was heaviest, the earth below was considerably burned. At one place were a few fragments of bones of an adult burned until almost destroyed; at another point were the bones of a child similarly burned. Both these were lying directly on the ashes mentioned; but the latter were also covered with ashes to a depth of four inches. Many post holes were found, some of them five or six inches in diameter, others a foot in either dimension; it is possible they formed part of a house which stood on the site, but they were apparently set at random and not well arranged for such purpose. A trench eight to twelve inches wide at the top, somewhat narrower at the bottom, and about a foot deep, surrounded an irregular quadrilateral space about twenty feet across within the area covered by the ashes.

It is difficult to understand these facts. The posts were burned off prior to the depositing of the ashes, for the latter extended in an unbroken line over the holes in which they had stood, except in three or four places where they were not entirely consumed. Such as were left thus projecting had formed hollow molds in the body of the mound where it had packed around them before their decay; these molds were lined with charcoal from the partially burned wood. The trench also had been dug after the ashes were deposited. Moreover, all these changes had occupied a comparatively short time; for unless the posts had been quite solid when the mound was piled around them, they could

not have retained their shape long enough to leave a cavity in the earth on their final decay. It would seem that small trees and bushes, probably growth over a former open space, had been cleared away and a house erected. This was afterward destroyed by fire; at least two of the inmates meeting their death. Then a mound was erected by slow stages, and bodies of others who died while this work was in progress, interred in it.

A mound three miles southwest of Wilmington (Clinton county) "is presumed to be a house site, as posts extended into the structure to a depth of three feet and formed a square twelve feet on each side. The posts were burned and charred so that little remained of them.—Moorehead, 108.

ADAMS COUNTY.

In the Serpent Mound Park and immediate vicinity Professor Putnam found many graves, hut-sites, etc., and secured a large quantity of the remains pertaining to such. One grave

"Had been made about five feet deep in the clay, and was about nine feet long and five feet wide. A pavement of flat stones was placed over the bottom and on them * * * were fragments of a skeleton. * * * Over these remains were ninety-six large stones. * * * With all the burials about here there was no uniformity as to the position in which the bodies were placed." Under the largest mound was a thick layer of ashes, "covering a space thirty by thirty-five feet in diameter," partly burned in place and partly carried in. Two finely finished and polished stone axes with straight backs, and grooves around them were found at the bottom of the mound. In one grave were two skeletons extended at full length side by side. * * * Not a trace of the skulls could be found and it was evident that these two bodies had been decapitated before they were placed in the grave. [Yet] the largest number of objects I have ever seen in a single grave was found with these skeletons. [There was abundant evidence] that at the time when the two headless bodies were buried the body of another person was burnt near by, and that the ashes containing the burnt bones, and various objects burnt with the body, were placed over the two individuals in the grave." — Putnam, Serpent.

BROWN COUNTY.

"A small mound near Boston, Brown county, covered a burnt space, 11 feet east and west by 7 feet north and south. Over the burnt hard-pan of this portion was a compact bed of ashes, mixed with charcoal, from 2 to 3 inches in thickness, and over this a layer of clay, burnt to a red color, 6 to 8 inches thick. Over this was another layer of clay, about a foot thick, which had been burnt slightly, and covering this was from one to two feet of clay with the light soil above. The layers, with the exception of the outer one, were horizontal, and had been carefully superimposed

over this central bed of ashes. The fire by which this mass of ashes had been formed must have been long continued, as the quantity was too great to have been the result of any ordinary burning, such as the destruction by fire of a dwelling the size of a mound. That there had been some sort of a structure on the spot, however, was shown by the twelve post holes around the ash-bed and the three below it. These post holes are round soft places in the hard clay, from 1 to 2 feet in depth and from 8 to 14 inches in diameter. The soft material filling the holes is made up of particles of decomposed wood, earth which has sifted in, and, generally, more or less of a deposit of iron [this is from the soil]. Often these holes contain a little charcoal, the remains of a burnt post. We have also found potsherds, stones, animal bones, broken stone implements, and other things in the holes, as if they had been put there to aid in setting the post. These post holes must not be confounded with another class of holes, or 'soft spots,' which we have called pockets, or pits, according to their size and shape.

"Under another mound, a mile from the last, was an ash-bed 41 feet north and south and 31½ feet east and west, and from 8 to 10 inches in thickness. Under this ash-bed were about sixty post holes, some of which were close together as if small supporting braces had been placed against large posts, and they were so arranged that none were nearer to the center of the mound than 6 to 8 feet. Their arrangement suggested a series of posts supporting a structure of some kind which was destroyed when the fire was first started. Most of the holes contained considerable charcoal." — Putnam, XX., 551-3, condensed.

Under a mound seventy feet in diameter near St. Martin's in Brown county was found "about eighteen feet from the center * * * a large pile of burned earth and charcoal intermingled with fragmentary remains of human bones which had been burned until they were almost destroyed; but as there was about a bushel of small pieces, it was obvious that several bodies had been cremated. They had not, however, been burned on the spot, for not only did the surrounding earth show no evidence of the intense heat that would have been required to reduce them to the condition in which they were found, but the mass itself showed the curvature of the mound's surface, the end nearer the center being about two feet higher than that first struck. Several similar, but smaller masses were found on the original surface at various distances from the center."

"Forming a circle twenty-five feet in diameter around the center of the mound was a series of pockets, placed about three feet apart. These were twenty inches across the top, fourteen to sixteen inches at the bottom, three feet deep, and filled with small, flat, slightly burned pieces of limestone, weighing from two to three pounds each. * * * The spaces between the stones were tightly packed with earth which had also been burned." — Moorehead, 70.

CLERMONT COUNTY.

"Just north of Marathon, in Clermont county," stood a tumulus "eight feet high and fifty feet in diameter; * * * before it was cleared

off it was twelve or thirteen feet in height. * * * Near the center of the mound a pit had been dug to a depth of nearly two feet below the original surface, and the sides of it burned quite hard; this was filled with ashes, fragmentary bones, and calcined limestone, intermingled with which were a few mussel shells, pottery fragments, and pieces of deer antlers. Just above it was a slab of limestone fifteen inches wide and nearly three feet long, which had been almost disintegrated by an intense heat. Adhering to the upper side of the stone were portions of ribs and traces of vertebrae, burned until they were scarcely distinguishable. It was plain that a skeleton or body had been placed on this stone and then cremated." — Moorehead, 63.

MONTGOMERY COUNTY.

THE MIAMISBURG MOUND.

This, the largest mound in Ohio, has never been explored. It is mentioned here partly to give the reader an idea of its massive proportions, partly to correct some errors of statement.

Squier and Davis say it

"is 68 feet in perpendicular height, and 852 in circumference, containing 311,353 cubic feet." — S. & D., 5.

If the linear measurements are correctly given, as they probably are, the cubic contents of the mound are more than five times as much as their computation; because with the same height and base an exact cone would contain somewhat more than 1,300,000 cubic feet, while a segment of a sphere is more than one-half larger. The mound comes between these in shape and consequently in volume.

Howe states in one place that it

"measures about 800 feet around the base, and rises to a height of 67 feet. * * Many years since a shaft was sunk from the top; at first some human bones were exhumed, and at a depth of about 11 feet, the ground sounding hollow, the workmen were afraid to progress." — Howe: II, 566.

A little farther on he gives a confused account, with conflicting measurements, of an attempt at examination by "resident citizens" who

"sunk a shaft five or six feet in diameter from the top to two feet below the base." They found "eighty feet from the top a human skeleton, in a sitting posture." — Howe: II, 569.

A depth of "eighty feet" would bring the diggers about 12 feet below the natural surface. His first statement may be cor-

rect; the second certainly is not, for the appearance of the mound proves that although a shaft was begun it was not carried nearly to the bottom.

BUTLER COUNTY.

A mound in Wayne township

"is twenty feet high and five hundred and forty feet circumference at the base. It is composed of gravel and surface material. [A partial excavation] brought to light the fact that within this mound was a series of stone vaults superimposed one above the other and reaching to within one foot of the apex, the number of vaults in each layer or level increasing in number as we proceed from the top to the bottom. These vaults are not immediately contiguous but separated by a filling of gravel, more or less mixed with clay and surface material. The vaults are composed of limestone averaging in size three feet in length and breadth by three inches in thickness, the stone being set upon end at an angle of seventy-five degrees. Within each vault occurred a human skeleton, which must originally have been placed in a sitting position, for the skeleton had fallen into a heap. * * * No implements have been found within the mound, but ashes and charcoal abound." — McLean, 221.

The burials in this mound appear to be progressive; that is, a number of vaults were constructed and covered with earth, then others placed above them, and so on, until the mound was complete. Many years would probably pass between the earliest and latest interments.

HAMILTON COUNTY.

VICINITY OF CINCINNATI.

The largest mound at Cincinnati was 35 feet high in 1794; General Wayne ordered it cut down to 27 feet in order to put a sentry tower on it.— Drake: Ab. Races, 56.

"The earth of the mound [in which the Cincinnati tablet was found] is composed of light and dark colored layers, as if it had been raised at successive periods by piling earth of different colors on the top. This appearance might have been produced, by successive layers of vegetation and freezings, which was allowed to act on each layer before the mound received a suceeding addition to its height. In some parts the layers are completely separated by what appears to have been decayed vegetable matter, such as leaves or grass, as the earth is in complete contact, except a very thin division by some such substance. In some places through the mound, there are vacancies evidently occasioned by the decay of sticks of wood, leaving a most beautiful impalpable powder. Throughout the mound there are spots of charcoal, and in some places it is in beds. In one or two places which we observed, the action of the fire upon the clay has left marks of considerable intensity. Bits of bone, especially of skull bones, are found in many parts of the mound." — Amer. Pion.: II, 196.

* * * * *

On a hill on the Edwards farm, two miles from Reading, Hamilton county, was a mound "six feet high and sixty feet in diameter at the base. An earth embankment, three feet high and twenty-two feet wide at its base, encloses the mound, forming a circle about it one hundred and fifty feet in diameter measured from the outside of the embankment. This circle has an opening thirty-seven feet wide looking to the southeast. The mound was found to be stratified. The outer layer was composed of fifteen inches of very hard yellow clay. Under this was a layer, ten inches in thickness, of burnt clay, mixed with ashes and charcoal. The clay in this layer was burnt to a brick-red color and was very hard. Below this was a stratum of compact grayish ashes containing pieces of burnt stone. This layer was fifteen inches in thickness. Beneath this was ten inches of burnt clay in which were a small chipped flint and a fragment of burnt bone which was the only piece of bone found in the mound. Beneath this last stratum, and occupying the central portion of the mound, was a conical heap of hard gray earth in which were small flakes of charcoal. This gray earth was so hard that it could only be removed by the use of the pick. It was eight by ten feet in diameter and twenty-two inches in thickness in the center. Under this hard mass, and below the natural surface of the clay, were four circular pockets or excavations, each of which was ten inches deep and fourteen inches wide. These pockets were about four inches apart. Three of them were filled with a dark, pasty substance which becomes hard on drying, and the other contained fragments of stone, burnt clay and earth. The structure of this mound is unusual, and the purpose for which it was erected over the four holes is unknown."

A structure similar to the above was found on the same farm.—Putnam, XVI., 175 and 343.

Near these two was a mound surrounded by a stone wall two feet high, which is below what at first we took to be the natural level. The mound within this was covered by a layer of burnt clay. Under this burnt clay we have discovered a singular series of pits about three feet in diameter and from four to nine feet deep. These pits are connected with tunnels or tubes eight feet long and a foot in diameter, having a slight dip downward from the pit and ending in a small vertical tube which extends to the 'concrete' or gravel layer above the burnt clay. The walls of these pits show the effect of great heat and at the bottoms are ashes containing fragments of burnt bones. The long tunnels, or flues as we are inclined to call them, still retain their form perfectly, and on the floor of each is a layer of fine ashes. At the further ends of these flues the walls are covered with a thin glossy incrustation, evidently formed by the condensation of vapors. In two instances the pits had dome-like coverings of clay, and in one of these covers were two small holes. These covered pits were, like the others, partially filled with burnt material, above which was an empty space. One of the pits without a cover had a short tube extending from it in an opposite direction to the flue. In one instance

two of these pits were connected with a single flue. That there was once a wooden structure over the pits seems to be indicated by many holes in the gravel forming the natural surface, which are now nearly filled with a fine black earth which we think was in part formed by the decay of upright timbers or posts. * *

"At some time after the mound had been completed, a large hole about ten by fifteen feet in diameter and seven feet deep, had been dug in the side of the mound, cutting through all upper layers, including the stone covering, down to the sand layer. At the bottom of this hole were two human skeletons, lying in the ashes, which also extended around portions of the excavation, and arranged about them were sixteen human skulls without other bones." — Putnam, XVI, 340-1, and XX, 555.

In a later report mention is made of "thirty-seven pits with the singular tubes or flues connected with them", in this mound.

The whole structure is so utterly and singularly unlike any other ever reported, that we should be greatly inclined to doubt the correctness of the observations had they been made by any one with less experience in this line of research than Professor Putnam. Everything connected with this mound—the "pits", the "flues", the intrusive deposit with the "sixteen skulls", the covering of "burnt clay"—finds no counterpart elsewhere, and is simply inexplicable.

TURNER GROUP.

The entire State has now been passed in review; and it remains only to give an account of one more group, which is second to none but that on the Hopewell farm in Ross county; and as it is almost at the extreme south and west limits of the State, it fitly concludes the serial of Ohio's prehistoric artisans.

"On the estate of Michael Turner, near Milford is a group of earthworks which embraces thirteen mounds and two earth circles, all of which are enclosed by two circular embankments, one of which is on a hill and is connected with the other by a graded way. Several of the mounds contained 'altars,' or basins of burned clay, on two of which there were literally thousands of objects of interest. One altar contained about two bushels of ornaments made of stone, copper, mica, shells, the canine teeth of bears and other animals, and thousands of pearls. Nearly all of these objects were perforated in various ways for suspension. Several of the copper objects were covered with native silver, which had been hammered out into thin sheets and folded over the copper. Among these are a bracelet and a bead, and several of the spool-shaped objects, which, from discoveries made in other mounds of this group, I now regard as ear ornaments. One small copper pendant seems to have been covered with a thin

sheet of gold, a portion of which still adheres to the copper, while other bits of it were found in the mass of the materials. This is the first time that native gold had been found in the mounds. The ornaments cut out of copper and mica are very interesting and embrace many forms; among them is a grotesque human profile cut out of mica. Several ornaments of this material resemble the heads of animals whose features are emphasized by a red color, while others are in the form of circles and bands. Many of the copper ornaments are large and of peculiar shape; others are scrolls, scalloped circles, oval pendants, and other forms. There were about thirty of the singular spool-shaped objects or ear-rings made of copper. Three large sheets of mica were on this altar, and several finely chipped points of obsidian, chalcedony and chert, were in the mass of materials. But by far the most important things found on this altar were the several masses of *meteoric iron* and the ornaments made from this metal. One of them is half of a spool-shaped object, or ear ornament, like those made of copper with which it was associated. Another ear ornament of copper is covered with a thin plating of iron, in the same manner as others were covered with silver. Three of the masses of iron have been more or less hammered into bars, as if for the purpose of making some ornament or implement, and another is apparently in the natural shape in which it was found. In another altar, in another mound of the group, were several terra-cotta figurines of a character heretofore unknown from the mounds. The peculiar method of wearing the hair, the singular head-dresses and large button-like ear-ornaments shown by these human figures are of particular interest. The ear-ornaments leave no doubt of the character of the spool-shaped objects. On the same altar with the figurines were two remarkable dishes carved from stone in the form of animals. With these was a serpent cut out of mica. On the same altar were several hundred small quartz pebbles from the river, and nearly three hundred astragali of deer and elk. As but two of these bones could be obtained from a single animal, and as there were but one or two fragments of other bones, there must have been some special and important reason for collecting so large a number of these particular bones. Two large masses of native copper and one mass of unworked meteoric iron were also on this altar. Many specimens of fossil shells were found on the two altars.

"Among the articles from this group are included small pottery images of men and women; carved shell and bones; a pendant of buffalo horn; over fifty thousand pearls; thousands of small perforated shell beads, and of disk beads; large numbers of perforated teeth of the wolf, black bear and grizzly bear; hundreds of ornaments made of native copper, including beads, scrolls, bands, circles, and various other shapes, ear-ornaments and pendants." — Putnam, XVI., 170-202, condensed.

A comparison of the analysis of the meteoric iron from the Turner mound, with that of other meteoric speciments, would "seem to show, notwithstanding the outward resemblance, that the specimens from the

mounds must be considered, for the present at least, as portions of a meteorite of which no other fragments are known." — Kinnicutt, 381.

"Under one of the altar mounds, a large ashpit, six feet deep, and similar to those in the ancient cemetery at Madisonville, was discovered, and under another altar mound were several pits of smaller size, but of similar character. Beneath a small mound containing skeletons, was an excavation six feet wide and twenty-seven inches deep, filled with ashes mixed with animal bones, potsherds, and other objects."

"The larger of the two mounds within the earthwork on the hill [see page 209] contained a small central tumulus, surrounded by a carefully laid stone wall and covered in by a platform of stones, over which was a mass of clay. On this wall were two depressions in each of which a body had been laid, and outside the wall in the surrounding clay were found several skeletons, one of them lying upon a platform of stones." — Putnam, XVI., 174.

Near the Turner group, under a mound 14 feet high "was a pit four feet deep, ten feet four inches long, four feet wide at the ends and three feet five inches wide at the center. This pit probably had contained a wooden structure, as its sides showed rough striations as if large logs had once rested against them. The pit had been dug in the drift gravel upon which the mound was built and was nearly filled with soft spongy ashes mixed with a reddish substance. Extended at full length at the bottom of the pit was a human skeleton with head to the west." A part of this mound was a "hard mass of burnt earth and ashes, seven feet deep and a little over nine feet in width and length. [In this] at points several feet apart, * * were three holes, or pockets, each of which contained the remains of portions of human skeletons surrounded by a thin layer of clay." — Putnam, XVI., 343.

CHAPTER XI

STONE MOUNDS. STONE GRAVES. CEMETERIES. VILLAGE-SITES. SHELL HEAPS. FUNNEL-SHAPED PITS. ROCK SHELTERS. ROCK INSCRIPTIONS.

STONE MOUNDS.

WHERE stones of convenient size for handling can be readily collected, they are often used instead of earth for construction of mounds. This is especially the case upon high lands or in other situations favorable to denudation by the action of winds or rains. Such erosion has a double effect. Stones formerly covered are left loose upon the surface; and earth which resists wash is often tough and heavy, requiring much effort for its removal. In either event, the rock material may be easier to procure, and is equally adapted for the purpose. In some cases, a mound of stones was enlarged by heaping earth over it; in others, the two substances are mingled throughout; but, as a rule, only stones were used in the larger structures, the debris now filling interstices being the accumulation from dust and decaying vegetation which has gradually worked downward from the surface to the interior.

Such mounds are far less numerous in any section of the State than are those made entirely of earth; they occur most frequently to the south and east of Columbus. Licking and Perry seem more favored than any other counties, with those of great size. Some of them were upwards of twenty feet in height, while intact; and all that have been examined contained human remains at the base; sometimes, but not always, specimens of general types found in earthen tumuli were recovered.

One near Linville is shown in figure 99; a similar one stands within Glenford Fort. Before being disturbed, both of these had the shape of ordinary "conical mounds".

The largest known structure of this class stood about ten miles south of Newark, near the east end of Licking reservoir.

Most of it was hauled away when the Ohio canal was made. It is thus described, in its original and in its present condition.

"The large stone mound near Newark had a height of about fifty feet, and was 182 feet in diameter. It was surrounded by a low embankment of an oval form, accompanied by a ditch, and having a gateway at the east end. To make the dam at the reservoir, from ten to fifteen thousand wagon loads of stone were removed from it. Near the circumference of the base of the mound were discovered fifteen or sixteen small earth mounds, and a similar one in the center. In one, two feet below a layer of hard, white, fine clay, an explorer came upon a trough, covered by small logs, and in it was found a human skeleton, around which appeared the impression of a coarse cloth. With the skeleton were found fifteen copper rings, and a breast-plate or badge. [The impervious clay had preserved the wood]. The central mound contained a great many human bones, but no other relics of note." — McLean, 53, condensed.

"In April, 1896, the stone mound near Jacksontown measured 189 feet northeast and southwest; 207 feet northwest and southeast; average height 8½ feet; maximum height 12 feet; minimum height 5 feet. From traditions and publications of early archæologists and from the curve preserved by a large tree on the north side, it must have been about 55 feet in height when completed. Excavations proved that the mound rested upon original surface yellow clay, that the ground had been cleared and burned over; the sod line or base was one inch thick and interspersed with flint chips, burnt clay and a little charcoal and gravel. Generally above the base line was about three feet of clay in which a few stones occurred. The clay plainly showed the separate small loads carried in by the toilers. In some places instead of clay, sand was found. Excavations were made at various places, but without results; the teamsters, and subsequent curiosity hunters, had done their work thoroughly where they had been at work." — Field Work, V., 169, condensed.

An earth-covered stone mound in Pike county is described on page 375. Another, located a mile west of Chillicothe is shown in figure 118.

In the eastern part of Anderson Township, Hamilton County, was another containing two skeletons. "A vertical wall of stones, two feet eight inches high, had been built forming a circle thirty-six feet in diameter with [two] bodies near the center. The space inside this wall had then been filled up with stones which were raised in a conical form to a height of four feet three inches in the center. Over this pile of stone there was a covering of about two feet of clay. The stones had all been brought from the bed of a creek nearly a quarter of a mile away." — Putnam, XIV., 169.

A singular misconception once prevailed, regarding the use of large stone-heaps:

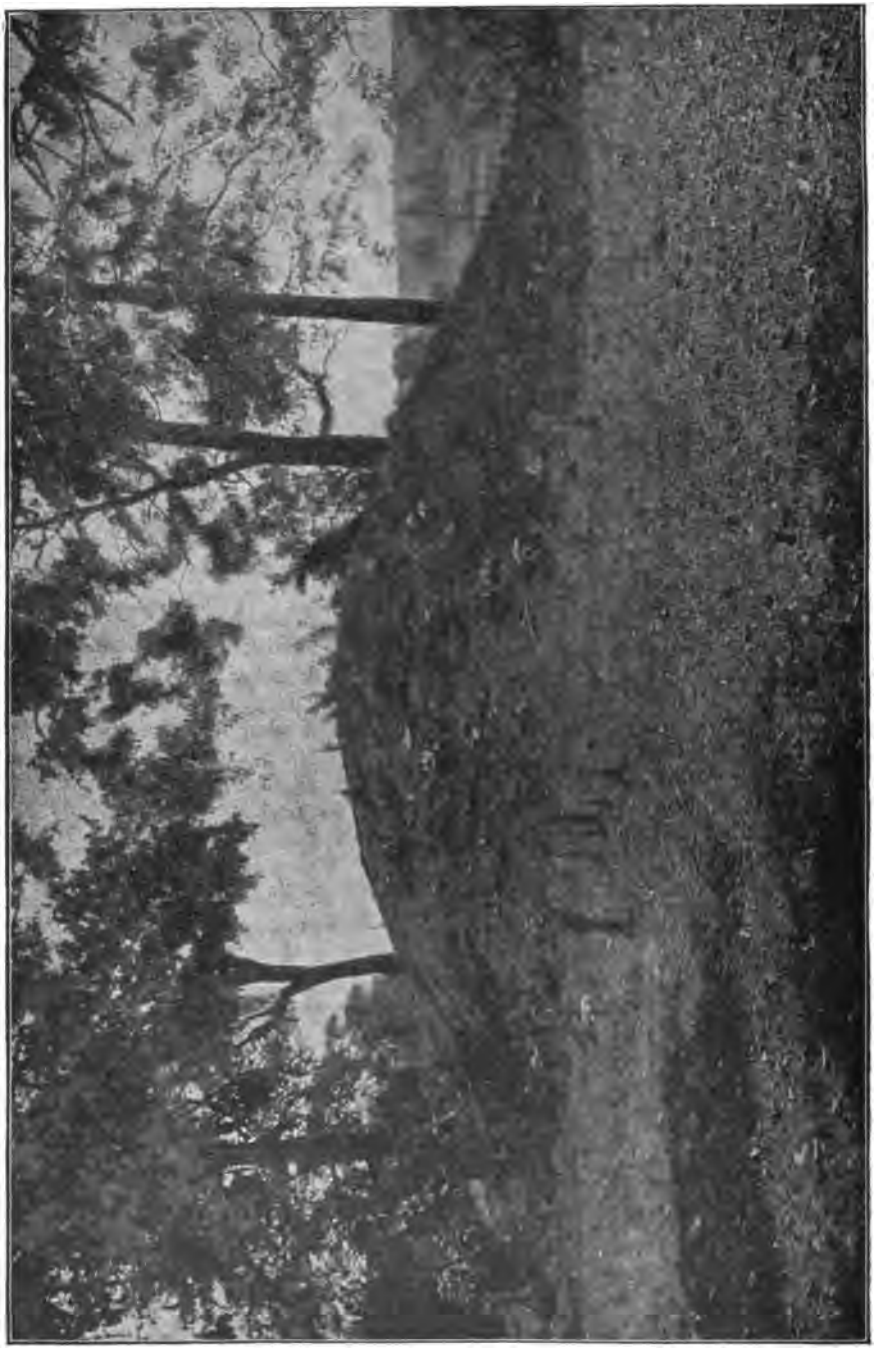


Figure 118 — Mound of Stone Covered with Earth, near Chillicothe.

"Three miles back from the Grave Creek mound, [is] a rude tower of stone standing on an elevated point, which commands a view of the whole plain, and which appears to have been constructed as a watch tower, or lookout, from which to descry an approaching enemy. * * * About six or seven feet of the wall is still entire. It is circular, and composed of rough stones, laid without mortar or the mark of a hammer. A heavy mass of fallen wall lies around, covering an area of some forty feet in diameter. Two similar points of observation occupied by dilapidated towers, are [on the near-by river hills.]" — Schoolcraft, 312.

This was either a burial mound covering a wooden vault whose decay allowed the apex to settle; or one of the peculiar structures such as crown some of the hills on the Kanawha River, where a circular vault or "well" was made in which a corpse—or perhaps more than one—was placed, and a great quantity of loose stones heaped over and around it.

STONE GRAVES.

Small heaps of stones, covering graves made in various ways, occur over many States. In southern and eastern Ohio they are quite frequent. Squier and Davis thus briefly refer to them:—

"Rude heaps of stone, occasionally displaying some degree of regularity, are not uncommon at the west, though by no means peculiar to that section of the country. It is exceedingly questionable whether any of them belong to the same era with the other works here treated of, although they are usually ascribed to the Mound Builders. The stone mounds, of which mention has already been made, are very different structures, and should not be confounded with these rude accumulations. One of the most remarkable stone heaps observed in the course of these investigations, is situated upon the divide between Indian and Crooked creeks, and between Brush Creek and the Scioto river, at its highest point, about ten miles southwest of Chillicothe, Ohio. It is immediately by the side of the old Indian trail which led from Shawanoe town [Old Chillicothe, now Frankfort], to the mouth of the Scioto river, and consists of a simple heap of stones, rectangular in form, and measuring one hundred and six feet in length by sixty feet in width, and between three and four in height. [It] was originally quite symmetrical in outline." A similar, but smaller heap is near Tarleton, where, "large numbers of crumbling human bones [were] intermingled, apparently without order, with the stones" — S. & D., 184.

The first of these has been entirely removed, as interfering with cultivation. No one now living near its site knows whether any human bones were found in it. Possibly it was only a sort

of monument, or a landmark. "Brush Creek" in the text should be " Paint creek ".

The Tarlton mound is probably a modern Indian burial-place.

* * *

Quite different from these is a type of stone graves, once quite abundant on both sides of the Ohio River, from Manchester, Ohio, to Dover, Kentucky, a distance of twenty-five miles. A few stood at varying intervals for some miles below Dover, and as far up the river as Huntington, West Virginia; and some remain along North Fork of Licking River in Mason county, Kentucky. They were most abundant from Manchester to Ripley on the Ohio side of the river, and from Maysville to Dover on the Kentucky side. Between these points, almost every peak, ridge, or high elevation, commanding an extensive view of the Ohio Valley, was crowned with at least one, and in many instances several of these cairns. The smallest ones contained not more than a wagon-load of stones; the largest fully fifty times as much. Between these extremes was every intermediate size.

Two miles above Aberdeen, a narrow ridge extends directly south for about 500 feet from the rolling table land. Its top is horizontal; its sides slope steeply like the roof of a house, to a gorge on either side; the end falls precipitously to the river level.

A cairn on this ridge, about 300 feet from its point, was much the largest tumulus of this character yet discovered. It measured 34 feet from north to south, 37 feet from east to west, with its summit six feet above the southern margin. The surface on this side, however, is much lower than formerly, on account of careless cultivation. It is shown in figure 119.

A trench reaching to the subsoil was dug entirely around the mound, and carried inward until the imbedded rocks were exposed; they covered an area about 26 feet north and south, by 29 feet east and west. These measures are only approximate for roots had so displaced the stones as to destroy the continuity of their outline. There was less disturbance at the southeast side than elsewhere. On this side, near the top, was a grave whose bottom was paved with slabs; it measured three by six feet inside, being longest from northwest to southeast. The sides were formed of similar slabs, set on edge, with the tops sloping

outward; the measurements to the top of the outside row were about $7\frac{1}{2}$ and $8\frac{1}{2}$ feet. Bones were found in the earth from three to six inches above this floor; but none were lying on the stones.

Under this pavement was another of the same kind; the rough faces of the stones were in contact. Between the two were many crushed fragments of human bones. It appeared that more than one body had been placed in each of these graves; but the remains were so decayed and fragmentary that not even a guess could be made as to their number or the manner of their interment.



Figure 119 — Stone Graves in a Mound of Earth, near Aberdeen.

At the top of the mound, on the east side, was a small grave; it was only five feet long and three feet wide, measuring from the tops of the enclosing stones. It contained a few fragments of decayed bone. A foot below it was an extended skeleton, with the head east, lying just above the natural surface, covered and surrounded with dark earth similar to the native soil.

A grave which antedated the mound was found under its margin on the southwest side; it had been dug to the yellow clay. On its level stone floor were rotten fragments of human bones, with a little charcoal and some pieces of burned animal bones. Slabs, lying at the level of the original surface, covered

it and were continuous with those extending up the side of the mound. Those forming the sides enclosed a space only eighteen by forty-eight inches at the bottom; some of them were vertical, and it is probable all were so at the beginning, those now leaning having been pushed from their normal position by the roots which surrounded them on every side. It is shown in figure 120.

Half-way between the center and the south side, on the yellow clay subsoil was a thin irregular layer, from four to five feet across, of charcoal containing some burned animal bones. This had been brought from elsewhere, there being no marks of fire on the earth about it.

Twelve feet south of the center, in the dark earth and at a lower level than any graves in this portion of the mound, were two extended skeletons with heads toward the northeast. One was directly above the other, with nearly a foot of earth separating them. The bones of both were very soft. Close to the head of the upper one was a small, rudely-worked, flint implement, having a triangular section; this may have been buried with the body, but more likely its presence was accidental. The lower skeleton was that of a very tall but rather slender individual; all the molars were gone from the lower jaw and the bone was closed up solid. The skull was flattened between two small stones; near it lay a flat-stemmed pipe. East of the skulls, and close to them, were two limestone slabs, set vertical, and reaching down almost to the yellow clay; each was so large as to tax the strength of three men in removing it. It was evident from the situation of these skeletons and the one previously noted, that at least three individuals were placed here and covered with earth, and that the cairn was built over and around their remains. This fact, in connection with the position of the small stone grave shown in figure 120 is fairly good evidence that the two methods of burial were in use by the same people at or about the same time.

A small pile of rocks shown in figure 119, on the top of the mound, was the covering of a grave six feet from north to south, four feet from east to west, and sixteen inches deep—all measurements made from the top of the inclined slabs. Just west of this grave was another, almost circular, about three feet in diameter. The stones forming the adjacent walls were resting against each other.

When the floors of these two graves were lifted, fragmentary bones were found immediately under them, resting on a similar floor; below this was another layer of bone; and so they continued until eight layers of bone were disclosed, separated by thin, flat stones, with no earth between them except such as had made its way downward through the narrow spaces between the rocks. It appeared that successive burials had taken place, and that each had in some measure interfered with those preceding it;—as if a grave were uncovered, flat stones laid directly on the bones within, and a body placed on them; or a grave partially destroyed to make room for another; or the side or end



Figure 120 — Cairn, Cleared Out, in Mound, Figure 119.

wall of one grave utilized as part of a later one. The resulting confusion was greatest in the four layers immediately below the two top graves; there was less disorder in the next four. The entire area covered by these graves measured fifteen feet east and west by eleven feet north and south. The bones varied much in size; one jaw was massive and nearly two inches longer than that of any one present at the time. Bones of children were also found. None were in condition for preservation.

In the original soil, near the central portion of the earth mound on which these graves were made, were two small shallow holes containing some charcoal and scraps of burned animal bone; in one were two lumps of ochre and a copper spool-shaped object. Though much smaller, and of a slightly different pattern, the latter resembles the so-called "ear ornaments" frequently found in the large earth mounds. Lying loose in the dark earth,

at the same level, within an area of a square foot, were found part of an adult's jaw; half the head of a child's humerus; and one vertebra of an animal as large as a cat. Altogether, the appearance of this portion of the structure gave little evidence of that veneration for the dead which is usually considered so characteristic of the aboriginal American.

Half-way between the center and the north edge of the mound, was a grave more carefully made and in better condition than any other discovered in the course of this work. The floor lay below the original surface, though not so deep as the



Figure 121 — Typical Cairn, with Covering in Place, in Mound, Figure 119.

subsoil, while the side stones forming the walls reached well up into the body of the mound. The earth all about it was so uniform in appearance with the native soil and with the earthen core of the cairn, that it was impossible to establish any conclusion as to the relative times of their construction. The grave may have preceded the mound, or the mound may have been opened and re-filled. When the size of the grave is considered, the former supposition is the more probable. Measuring from the outer part of the enclosing slabs, its length, from east to west, was nine feet, and its breadth four feet. The south wall cut across a thin deposit of charcoal and burned bones; the part that was left of this occupied a space of about one by two feet. The remains of one person lay on the rock floor, head towards the east; near

the skull was a small concretion, possibly used as a paint cup. Figure 121 represents the grave with the covering slabs in place, except as they have been disarranged by falling in, or by the roots which penetrated between them in every direction; figure



Figure 122.



Figure 123 — Grave, Shown in Figure 121, Cleaned Out.

122 looking towards the east, and figure 123 looking toward the west, show it as it appeared when cleaned out. The large stone close to the east end of the grave had no connection with it, but seemed to belong with another burial, as flattened fragments of skull and other bones were found between it and a somewhat smaller slab that lay against it. Such finds as this were noted at scores of places throughout the stone portion of this burial

place; and while in a few instances the peculiar position of the remains may be due to the slipping or settling of stones between which they occurred, it was plain that a majority of them were so placed intentionally. Often there would be no more than a handful of bones so interred—as if a dismembered skeleton had been carried in, piece-meal, at odd times.

In clearing off the north edge of the structure, the rocks at the surface were found to rest on a mass of tough, waxy, yellow clay. On removing this to depth of from 15 to 24 inches, a pavement of large flat rocks was found. This included an area of about six by eleven feet, longest east and west. The margin was tolerably regular, but the stones in the central portion were in disorder. Under the latter were the remains of two skeletons, one of them quite large, extended on the natural surface of the ground, with heads toward the east. Instead of having slabs placed on edge around them as was the case in the other graves, they were enclosed by a mass of yellow clay a foot thick. Charcoal was sprinkled around the east end of the grave as far as the middle, and a row of slabs laid around the margin, as shown in figure 124. The rocks filling the grave had either been thrown in, or, what is more probable, placed upon timbers laid from side to side, and had fallen in when the latter decayed. Yellow clay was piled over and around the whole affair. Although this grave was clearly a part of the general interments at this spot, as it was protected by the same covering of rocks that extended over the rest of the mound, it is worthy of notice that it had neither walls nor floor of flat stone as had all the others; and that this was the only one in whose construction yellow clay was used.

The second cairn opened was situated a hundred feet south of the first. It measured 22 feet from north to south, and fourteen feet from east to west. A shingle-like arrangement of limestone rocks covered the top, as shown in figure 125. These lay upon ordinary soil which for the first three or four inches was free from stones except the tops of some set vertically in the earth below. The east side was much more rocky than the west, perhaps because it was closer to the bluff on that side. On the west slope bones were found within three inches of the top of the ground; although in fragmentary condition, they were much stronger and more solid than would be expected from their position. Some were on a disturbed pavement, others not at all in



Figure 124 — Grave Modeled of Clay and Covered with Stone, in Mound, Figure 119.



Figure 125 — Cairn, near Aberdeen.

contact with rock. The central part of the cairn seemed to be made up of numerous successive, interfering burials, so much so that bones and rocks were promiscuously intermingled. Added to this the roots of several trees had brought the whole interior into such disorder that it was impossible to ascertain anything definite about the burials. A small celt was found among some bones.

The third cairn of this group was on a point one-fourth of a mile east of the first two. It stood slightly below the highest point of the ridge, and was quite small, measuring only ten feet in diameter and two feet high. Many small stones were piled on it. There was no rock floor on the bottom; a body had been laid on the natural surface, with the head toward the east and fully a foot lower than the feet. The stones around the margin of the grave, instead of being placed on edge were laid flat upon one another to make a wall about as high as the body. The interior of the grave was filled with rocks whose order—or disorder—showed plainly that they had formerly been supported by timber resting on the side walls and had tumbled in when this decayed.

The crowns of the teeth were worn flat. Lying across the lower leg bones of the skeleton were the corresponding bones of another person. From their position it seemed that a body had been placed at a right angle to the first, with the head and trunk extending under and to the outside of the wall on the south; but no traces of the skeleton could be found in this direction. The grave vault, cleaned out, is shown in figure 126.

The fourth cairn stood about thirty feet south from the third, on the edge of the steep slope toward the river. It was nearly rectangular in shape; the north, south, and west sides were bounded by very large slabs standing almost vertical; at the east end were ten or twelve tiers of large stones sharply inclined inward, none of them having ever been upright. Nearly all the stones in the walls are more or less pushed out of their original position by the roots of trees growing among them; and it is probable that in past times other trees, which have now disappeared, aided in this work. Many wagon-loads of rocks have been piled on this cairn from the surrounding field. When these were removed and the original top of the structure revealed, it was clear that the central portion, of large and small stones mingled in confusion, had fallen into the grave on the decay of some sup-

porting material, probably logs or poles. They rested, now, upon a floor of thin, small, flat rocks which followed the natural slope of the ground; this was not level anywhere, and was fully a foot higher at the upper side than at the opposite, or southern, side. The floor extended over an area of nine feet north and south, by twelve feet east and west, fitting close up to the vertical slabs, reaching beneath the inclined rocks at the east end and terminating beyond the outside row. Fragmentary human bones were scattered all over this pavement; the leaning stones seem to have



Figure 126 — Grave, in Cairn near Aberdeen.

been set down directly on them. Pieces of skulls were found at fourteen different points, indicating at least that number of interments. Each deposit of bones, however, was quite small; and in some places portions of skull, vertebra, phalanges, ribs, etc., would be in contact within a space a few inches across. These facts denote skeleton burials; though the same results might follow from depositing a corpse folded and bound into the smallest possible compass. A few bones of birds, to the size of a pheasant, and mammals as large as a fox, were found; the only relics were a small, delicately wrought, triangular flint, and the stem of a catlinite platform pipe.

When the inclined stones at the east end were removed, human bones were found between the layers, several inches above

the floor. It is difficult to understand how they got there, for the slabs were in as close contact as the unevenness of their surfaces would permit.

The last cairn opened at this place was 200 yards from the third and fourth, on another point of the same ridge. When the accumulated trash, possibly including some small stones of the original structure, was cleared away, it measured sixteen feet across, with a somewhat irregular outline. The covering rocks were in a confused mass; their original arrangement could not be made out. Underneath them, to one side of the center, were bones of an adult with the teeth nearly worn away; of a child whose molars and lateral incisors were not yet through the bone; of a deer; and of a bird the size of a turkey. Several flat stones lay under them, but not in any order, and not in contact with one another so as to form a floor. Other bones were found below these, partly in the earth and partly lying on a rather even and smooth pavement of thin rocks, none of them more than a foot across; this pavement measured ten feet from north to south, and six feet from the east side to where it disappeared under the trees. It is evident that interment in this cairn occured at two periods.

On the same hill with these cairns stood another, of which no record was kept. Two photographs were made. One of them, reproduced in figure 127, shows the grave after the loose rock had been thrown off; the other, figure 128, shows the vault as it appeared when cleared out. A wall of slabs on the left side, inclined like those on the right, were so displaced by roots that they could not be shown in their proper position and consequently do not figure.

Four miles east of Ripley, large flat slabs, set on edge, enclosed a circle fifteen feet in diameter. Within this, lying on the yellow clay subsoil, was a closely fitted pavement of similar slabs. An extended skeleton lay at the center, with head east; it measured fully seven feet in length. There were many fragments of bones pertaining to other bodies; among them a fragment of a child's skull, a femur corresponding in size to that of the skeleton, and three femora of ordinary size lying side by side. Whether these were so interred or whether the other bones belonging with them had entirely disappeared through decay, could not be ascertained. The circle was filled to the



Figure 127 — Cairn near Aberdeen.



Figure 128 — Grave in Cairn, Figure 127.

level of the ordinary surface with stones of various sizes lying promiscuously. Probably they had been supported by timbers whose decay allowed them to fall in.

In figure 129 (B. E. 12, 455, fig. 312), *A* represents the plan and *B* a vertical section of a grave forty yards from the last. The outer row, *a a*, was a circle nineteen feet in diameter, composed of upright slabs; the next, *b b*, an ellipse, the stones leaning inward and the western edge of each one overlapping the eastern edge of that adjacent; this measured 13 by 9½ feet. within were two rows, *c c*, also leaning inward; and finally another ellipse formed of slabs inclined outward, their tops resting against the slabs *c c*. This interior elliptical trough measured 11 by 2 feet on the bottom, and contained small fragments of bones of at least one adult and one very young child. Several slabs were lying on and over this coffin, but as the inner ends of some were on the bottom, while the outer ends rested on the stones at the side, it is probable that originally a pole or log extended lengthwise over the grave to support them. All the space within the ellipse, *b b*, was paved with flat stones lying on the subsoil, *e e*—the soil, *d d*, being about a foot deep.

On a hill near this were formerly cists, said to be rectangular in form, about two by eight feet, with large slabs laid across the top and other stones piled on these. Enough of them remained to prove the correctness of the statement as to form and size.

In the same neighborhood a grave had been opened by residents who claimed that "it was arched over." Careful examination of the unremoved portion, showed a pavement of slabs covering an elliptical area about twenty by thirty feet. Beginning at the edge of this, successive rows of slabs, *a d*, *b c*, set on edge and inclined toward the center at an angle of 45 degrees, covered a zone six feet in width; the inner row was supported by small fragments, *k l*, tightly packed. This left a clear space of eight by eleven feet, from which it was reported many bones had been taken. Between the upper edges of the flat stones of this bottom row, others were inserted, forming a second tier, which sloped inward at a somewhat greater angle than the first; and there was some evidence of still a third, above these. It seems that this method had been continued until an "arch" was formed over the central portion, the rocks being so interlocked at the top that they could not fall in. A restoration is attempted in figure 130

(B. E. 12, 456, fig. 313). It is interesting to note in this connection that at the old Shawnee town near Winchester, Virginia, a grave was opened whose construction was exactly similar to this, except as to the pavement. At the latter place the smooth bed-rock is only a few inches from the surface, so that no artificial foundation was necessary.

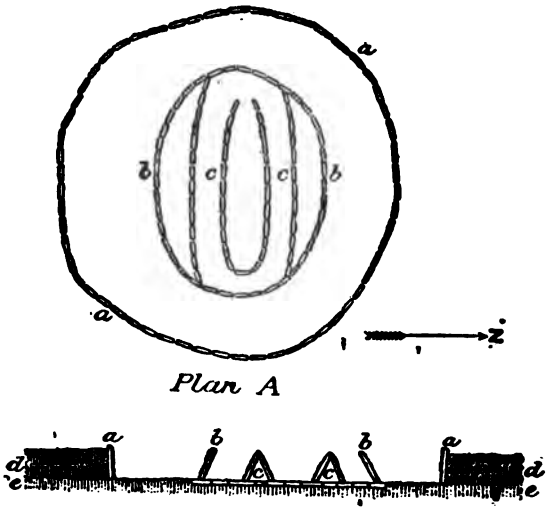


Figure 129 — Plan and Section of Unique Stone Grave near Ripley.

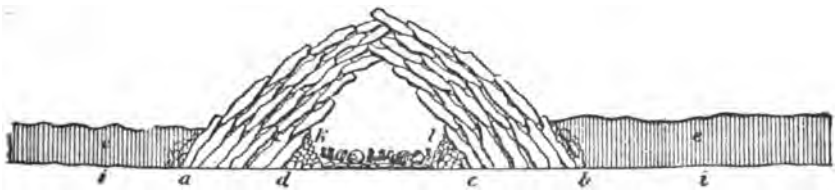


Figure 130 — Cairn Containing an "Arch;" near Ripley.

It is impossible to assign a date to these graves, or to determine what tribe of Indians may have constructed them. The great diversity in their form, size, and arrangement, renders any attempt at classification mere guess-work.

Dr. Cyrus Thomas (B. E. 12, 691) is inclined to attribute them to the Shawnees, who made the "box graves" in various portions of the country; but while the Shawnee method of setting slabs on edge around a body was largely followed in this locality,

there are also found here radical departures from any known Shawnee graves. This may be due, however, to local customs slowly developed during a long period of quiet, unmolested occupancy of the limited area where these cairns are found. The copper "spool-shaped" ornament, and the flat-stemmed pipe are objects which are commonly considered as pertaining to the "Mound Builders;" but this people was certainly not concerned in the stone graves of this portion of the Ohio valley.

Very few articles were deposited with the dead; so far as may be judged from personal exploration and from the reports of others who have made investigations, not more than half a dozen graves out of several hundred opened, have yielded specimens of any sort. This is not in accordance with Shawnee customs in the sepulchers of Tennessee or Illinois.

So far as known, no stone graves as complicated and diverse in structure as these exist in other localities.

VILLAGE SITES.

Near Madisonville is an extensive aboriginal village-site and burial ground. Careful explorations carried on by the Madisonville Society, in 1878-80, yielded abundant results. More than five hundred skeletons were exhumed, many peculiar methods of burial being noted among them. In a large number some parts of the frame were missing; in others the bones were mingled confusedly—indicating that the burials had taken place after the flesh was decayed or had otherwise been removed from the bones. There were discovered with the skeletons, about the hut-sites, and in the ash-pits, various articles of pottery; a considerable number of pipes; a great many bone implements and utensils; some shell ornaments; about a hundred objects of copper; many articles of flint and other stone; and a vast amount of kitchen refuse.

A peculiar discovery at this place was a large number—considerably more than two hundred — of excavations, which, for want of a better descriptive name, are termed ash-pits. They are circular, or well-like, usually about three feet in diameter, and from four and a half to six feet deep; though one was found which extended to a depth of over eight feet. A fair sample of their formation may be seen in figure 131 (Jour. Cin. III, 1, p. 56, fig. 12).

A singular departure from the usual type is shown in figure 132 (Jour. Cin. III, 1, p. 66, fig. 23), in which a very large pit is divided by about six inches of clay; in the bottom of one compartment several bushels of carbonized corn, both shelled and in the ear, was found.

Another variation from the regular form, if it may be so called, is seen in figure 133 (Jour. Cin. III, 3, p. 205, fig. 32.) Here a complete skeleton was found on the undisturbed earth, with the usual stratified

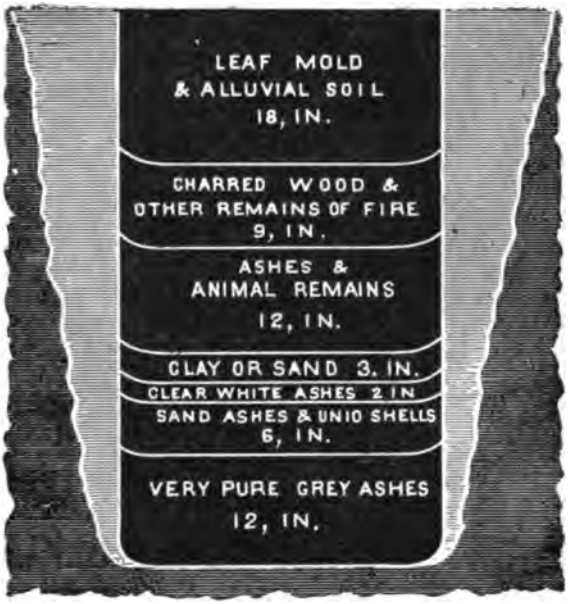


Figure 131 — Refuse-pit, Madisonville Village-site.

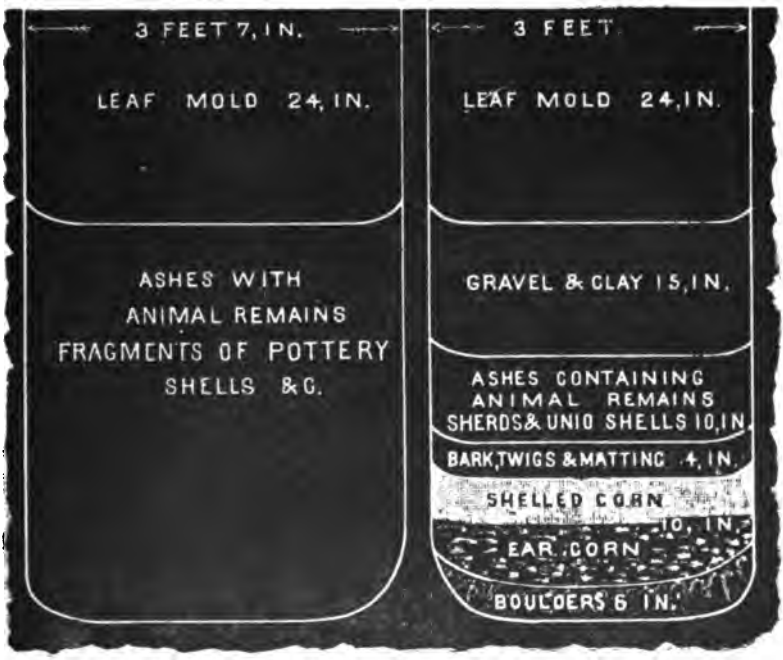


Figure 132 — Refuse-pit Containing a Quantity of Corn, Madisonville.

contents above it. Of this, Mr. Lowe says:—"The discovery of human remains in undisturbed position at the bottom of this ash-pit, furnishes some clue to the purpose of these excavations, and favors the view * * * that they were probably places for temporary burial, from which the human remains have been removed for interment in some of the numerous sepulchral tumuli."

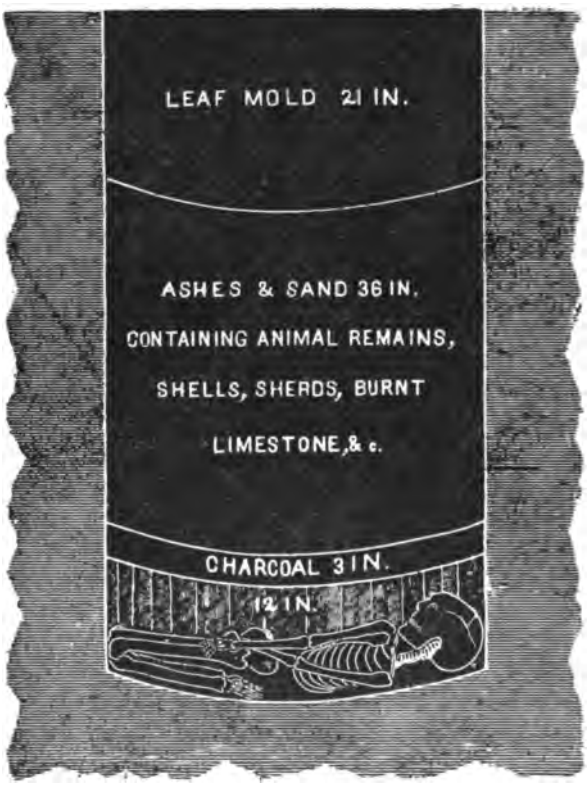


Figure 133 — Refuse-pit Containing Human Skeleton, Madisonville.

"Neither the sides nor the bottoms [of these pits] show any traces of the action of fire, and it is apparent that the ashes were deposited *as ashes,*" and so with the other contents. "In several instances, three or four skeletons have been exhumed, overlying each other at different depths." The excavations by the society were always carried to the undisturbed gravel; below this no skeletons or relics have been found. The natural level of this gravel appears, though it is not so stated, to be about three feet beneath the surface of the ground; so that the pits extend some little distance into it.

"Among all the numerous relics found * * * nothing has yet been discovered *in situ* which shows any evidence of association with European races; and while many of the implements are similar in form and material to those of the so-called 'Mound Builders,' and pieces of copper and marine shells indicate commercial intercourse with distant nations or tribes, neither ornament nor artistic design can be traced to any European source. This fact, in addition to the age of the forest trees, beneath which several of the skeletons have been found, places the age of these remains at a date prior to the earliest French or Spanish explorers of America; how much older than this is purely a matter of conjecture." — Lowe.

The pits could not have been temporary burial places, as surmised by Mr. Lowe, for the ashes were undisturbed in all that were examined, showing that they were never opened after being filled. So few skeletons were found in them that a more probable explanation of their purpose may be found in a practice common to modern tribes over a wide extent of territory.

Quotes from "New England Prospect."—"Their corne being ripe, they gather it, and drying it hard in the Sunne, conveigh it to their barns, which be great holes digged in the ground in form of a brass pot, seeled with rinds of trees, wherein they put their corne." — Schoolcraft, 399.

"The Iroquois were accustomed to bury their surplus corn, and also their charred green corn, in caches, in which the former would preserve uninjured through the year, and the latter for a much longer period. * * * Pits of charred corn are still found near ancient settlements. Cured venison and other meats were buried in the same manner." — Iroquois, 319.

"In the county of Onondaga I examined the remains of a large town, which was obviously indicated by large spots of black mould in regular intervals of a few paces distant, in which I observed bones of animals, ashes, carbonized beans or grains of Indian corn, denoting the residence of human beings. This town must have extended at least one mile from east to west, and three-quarters of a mile from north to south. A town covering upwards of five hundred acres must have contained a population greatly transcending all our ideas of credibility." — Clinton, 5, condensed.

"The first feature which attracts notice upon entering [these enclosures] is the number of pits or excavations in the earth, usually at the points which are most elevated and dry. * * * They are usually from three to four, but sometimes six to eight feet in depth, and of proportionate size at the top. * * * They are the *caches* in which the former occupants of these works deposited their stores. Parched corn, now completely carbonized by long exposure, is to be discovered in considerable abundance in many of them. * * * Traces of the bark and

thin strips of wood, by which the deposits were surrounded, are also frequently to be found." — Squier, N. Y., 12.

In 1679, La Salle descended the Kankakee river, a tributary of the Illinois. Thirty leagues above Lake Peoria, "they reached an Indian villige of several hundred cabins, but destitute of inhabitants, probably yet out on their fall hunt. Their cottages are described as made of great pieces of timber, interlaced with branches and covered with bark. The insides and floors were covered with mats. Every cottage had two apartments, and under them a cave or cellar where they preserved their Indian corn." — Hildreth, 7.

"The modern village was a cluster of houses. * * * No attempt was made at a street, * * * two houses seldom fronting the same line." — Iroquois, 315.

"The Omahas always lived in permanent villages of mud lodges. The lodges were often quite large and could hold a company of two or three hundred. Each family had outside the lodge a cache, and some of the families would have two. These caches would be used sometimes for two or three years as a sort of store house for various articles. When out of repair a new one would be built close beside it. The old caches were used for ashpits. The accumulations of ashes in the entire fireplace (a circular depression in the center of the lodge) would be cleared and the ashes thrown in the pit. So also the bones and refuse of eating, and of feasts, and the broken implements and weapons, worn-out moccasins, and other articles. When the pit was filled up it was closed over and another one taken. The sites of the old villages are honey-combed with these caches." — Fletcher, XVI, 357, condensed.

The Mandans dried their corn and packed it in *caches,* "holes dug in the ground six or seven feet deep. * * * Even dried meat and pemmican are placed in these *caches* being packed tight around the sides with prairie grass." — Catlin, Indians, I, 122.

* * * * *

The overflow bottom at Fort Ancient shows three distinct periods of occupation, all marked by "great quantities of burnt stone, ashes, charcoal, fragments of pottery, bones of animals and birds." These were not in continuous strata, but were formed of refuse-heaps occurring at varying intervals, the intervening spaces free of remains. "Some of the ash-beds were small — such as would result from a single camp-fire; others contained several bushels of ashes, bones, etc., and covered an area of fifty or sixty square feet. In several places the earth was burned to a red color extending to a depth of five or six inches, while a pile of material to one side of it indicated that the spot had been used for a considerable time. As the ashes accumulated and became inconvenient they were scraped away and the fire continued on the same ground." The lower stratum presented no deposit more than 6 inches thick or nearer than five and a half feet to the surface. Above this was a few inches of earth free from remains; then came a second layer of debris. "The

remains found at the level of the second village site far exceeded in amount those from both the others." From twelve to eighteen inches of clean earth separated this from the third deposit, which was about six inches in thickness; then came two feet of sandy loam, to the present surface. "The greatest depth below the surface at which any relic was found in the three village sites was six and a half feet. The specimen was a small, highly-polished celt of "greenstone" in nowise different from surface specimens.— Moorehead, Chap. 13.

The large mound opposite Bourneville (shown in figure 103), is surrounded by a village-site. This was given a slight preliminary examination by Moorehead.

After describing his excavations, which resulted in the discovery of great quantities of broken pottery and other kitchen refuse, some implements, and a few other specimens, Moorehead says:—

"The character of the relics and the lack of high aboriginal art at this place are taken as evidence of the primitive character of the villagers. I do not think they were the same people who erected the earthwork or the same tribe. At Hopewell's, Hopetown, Harness's and Mound City fragments of elaborately carved shells, rings, polished pipes, both effigy and platform, etc., have been found. None of these truly polished, ceremonial, or artistic objects were found in the ash pits or on the habitation sites of the Baum village site. The place is interesting in that it shows a lower degree of culture than that evinced on the sites above mentioned. * * * I am convinced that [this occupation] antedates the construction of the works. I do not think it is of the same historic period and if Indian, of some tribe which knew little or naught of agriculture." — Field Work, VII., 152.

There is much more to the same effect; all based upon the fact that the dwellers on this site failed to throw all their choicest treasures on the scrap-heap. The finer specimens found at the places cited in contrast with this were in mounds, in connection with burials or the supposed "sacrifices". Deductions and conclusions such as the above are utterly worthless, because they have no basis in fact; and they are misleading because it is assumed, or at least implied, that a people would exert the same care and labor in making a common domestic article appear ornate and beautiful, as in the manufacture of a valuable ornament or a necessary adjunct of an important ceremony. Assertions as to prior or subsequent occupancy, superior or inferior culture, etc., founded on such distinctions, are without the slightest value.

CEMETERIES.

The average duration of life in modern communities is accepted as about 33 years. It follows that a number equal to three times the average population of any place must die within a century. The same figures probably hold good for prehistoric people; consequently, it is obvious that, large as may be the aggregate of mound interments, only a small proportion of the dead were thus disposed of.

"It is not to be supposed that the mounds are the sole cemeteries of the race that built them. They were probably erected only over the bodies of the chieftains and priests, perhaps also over the bodies of distinguished families. The graves of the great mass of the ancient people who thronged our valleys, and the silent monuments of whose toil are seen on every hand, are not thus signalized." — S. & D., 171.

Scarcely a day passes that such graves are not discovered somewhere in the State. They are most frequent in gravel beds and alluvial lands, but also occur in various other situations. No definite order is to be observed among them; in many cases it appears that the quickest and easiest way of putting them out of sight was adopted. Occasionally a large number will be removed from a very limited area in the course of road construction or similar work; in such instances the bones are often in confusion, as if the bodies had been thrown in carelessly, or denuded of flesh before burial. These cases are usually heralded as the discovery of an ancient battle-field, where the survivors had hastily thrown all their dead into a pit before decamping. Aside from the fact that Indians were never known to bury their slain in this manner, the bones of women, children, and very old persons, in connection with the plain evidence that the burials were made at different times, disprove any such supposition.

But the great majority of them were buried in ordinary graves. A few large cemeteries are known; their discovery has usually been accidental. The soil above them may be cultivated for many years without a suspicion of what lies beneath until denudation by a freshet, excavation for a cellar or foundation, the cutting of a ditch, or some more trivial cause reveals them. As a rule, there is but one skeleton in a grave; but the latter are scattered in confusion, sometimes several feet apart, again three

or four of them overlapping or merging into one another. Remains of this nature are sometimes found in river bottoms under several feet of silt, that is even now subject to overflow.

They are generally dispersed among the remains of huts on the site of a village, though sometimes at a distance from any apparent signs of occupation. Villages may, nevertheless, be close at hand, awaiting the advent of some one who can find them.

Very frequently it appears that houses were placed wherever most convenient to the builders, and graves dug at random in any vacant space. The apparent lack of order may result from moving the domicile occasionally; with such a system of houses and house-keeping as seems to have prevailed, house-moving would be easier than house-cleaning. In the lapse of time, too, the position of graves would be disregarded or forgotten, and new interments encroach upon the space of those previously made. In addition to this probable shifting of wigwams, or removal from a hut, the entire community may have moved its quarters. With the Canadian Indians

> "No manure was used; but, at intervals of from ten to thirty years, when the soil was exhausted, and firewood distant, the village was abandoned and a new one built." — Jesuits, xxx.

There is no reason why they may not have found themselves back on the old site in the course of two or three generations. if it offered superior advantages of some kind.

SHELL HEAPS.

At many village-sites along some of the rivers mussel shells are abundant. In most places they are scattered about through the soil in the same manner as bones, broken pottery, and other refuse, though they are sometimes in a low mound or spread in a stratum several inches thick over a considerable area. Those on or near the surface have largely yielded to the destructive influence of farming utensils and continual fresh exposure; others, covered by a greater depth of earth, are still in condition to be preserved. Very few notices of them appear in archæological writings; the greatest quantity recorded at one spot is on Blennerhassett's Island, near Parkersburg.

"The largest shell heap on the island near the center, * * * is 1,125 feet long by 200 feet in width at the west end and three feet in width at the eastern extremity. * * * The width has been reduced seventy feet" in the recollection of persons living there at the time the description was written. It varies from four to twelve inches in thickness. Other shell heaps exist, the largest half an acre in extent.—McLean; Blennerhassett, 761.

No doubt mussels were used for food. But a vast number of them would be required, as well, to supply the profusion of pearls found in mounds and graves, as only a very small percentage of them contain the gems. Perhaps the mollusks were sought for both purposes.

Garcillasso says in his "Conquest of Florida" that "the unios and various mussels of the fresh-water streams were eagerly collected and opened with a view to securing the pearls which they contain and for the purpose of food."—Jones, 325.

FUNNEL-SHAPED PITS.

In the Scioto and Miami valleys are several peculiar excavations, having the form of an inverted cone. Their object is entirely unknown. Two are reported in Hamilton county. One, near Newtown,

"has a diameter of sixty feet at the top, depth in the center twelve feet; six feet from the edge of the pit is a well-marked embankment conforming to the circular edge of the pit. The embankment is two feet high, eight feet wide at the base, and is interrupted by a gateway or opening fifteen feet wide at the east."—Howe: II, 23.

The space between the edge and embankment of this pit is not present in any other known. It may formerly have existed in all, and worn away; but there is now a uniform slope from top to bottom on the inner side. The "gateway" seems unique; the embankment in others, where it has not been leveled, forms a continuous ring. In level bottom land, there is one a mile west of Bainbridge, at the "Trefoil" (Figure 88); one with the enclosure opposite Bourneville; one on the brink of the fourth terrace near the mound described on page 377. These have been plowed over until their original dimensions are uncertain; they are probably 80 to 90 feet across and 10 to 15 feet deep, measuring on a line from top to top of the bank.

Two are known on low hills. One just west of Spruce Hill Fort, on the edge of a long ridge, is 80 feet across and was about

twelve feet deep before the owner partially filled it. The other is on the quarry hill at Piketon. It is about 150 feet across and is said to have been twenty-five feet deep when first known, but this is probably an exaggeration.

Near Piketon, also, is a peculiar structure which from the outside looks like a truncated conical mound ten feet high; but on ascending it there is seen a conical hollow extending to the bottom of the structure. It stands in a depression on a long ridge so narrow that the margin of the mound reaches several feet down the slope on either side. In the other two directions the ground rises to a considerable elevation above this point. The only suggestion that has been made offered in explanation of these pits is that they mark the sites of underground houses or store-rooms. Those in level low-lands may have been so utilized; but the others, on hill-tops, though convenient to village-sites, are not easy of access or in suitable situations for such purpose.

ROCK SHELTERS.

The few small caverns in limestone rock in Ohio show no indications that they formed permanent living places, although the aborigines may have taken refuge in them occasionally. In the eastern part of the State, where sandstone cliffs abound, evidences of such occupancy are rather frequent in the "caves" at their base. These "caves" are only depressions eroded in the face of the cliff by rain, frost, and wind, and are usually but a few feet in depth. Three of them will serve as examples of all.

"The Elyria Shelter Cave" was "about fifty feet in length by fifteen feet broad." On clean sand at the bottom of this cave, under the refuse characteristic of Indian camps, were three skeletons. "The position of the skeletons indicated that they were crushed by a large slab of the overhanging sandstone falling upon the party while they were asleep at the back part of the grotto. * * * Judging from the appearance of the bones and the depth of the accumulation over them, two thousand years may have elapsed since the human skeletons were laid on the floor of this cave." — Howe: II, 378.

The "two thousand years" is only a random guess.

"Ash Cave" has probably been more often referred to than any other. It is in the southern part of Hocking county.

"This cave is simply a recess under a high sandrock (of the Waverly sandstone series) bordering a small stream. The shelter appears

to have been a very perfect one, since the ashes are very dry and appear never to have been wet. The ash-heap is about one hundred feet long by about thirty feet wide, and where our trench was dug, nearly two and one-half feet deep. A trench was dug upon a point a little east of the ash belt to the back wall of the shelter; little was found at first except ashes, with an occasional fragment of a food bone and chip of flint, but as the wall rock was approached we came upon a well-defined refuse heap of bones, etc. It was a confused mass of sticks for arrows, stalks of coarse grasses, food bones in great variety, bits of pottery, flints, nuts, corn-cobs, etc., etc. This layer of refuse was from four to six inches below the surface, and covered with ashes. Below this refuse layer was the chief deposit of ashes from one and a half to two feet in depth, according to the inequalities of the sand floor underneath. About three feet from the back wall of the 'cave' and at the bottom of the ashes, we found a skeleton in a fair state of preservation, evidently an Indian. There were traces of bark over it to protect the body from ashes, but the bark was much decayed. The body, doubtless, had been buried in a sitting posture, as the bones were found compactly together, the head resting upon the others. Apparently the body had been placed against a small loose rock and in a cavity in the sand. There were no implements of any kind.

"On a projecting point of the rear wall are several artificial vertical holes in the rock. The largest hole is six inches in diameter and two and a half feet deep to loose stones evidently thrown in. Its full depth is unknown. Another is four inches in diameter and several feet deep. The earliest settlers found these holes as they now appear." — Andrews, Cave, 48, condensed.

It is quite possible that these are only "pot-holes," due to the action of water at some former time.

In a cave in Summit county, "after removing a few inches of vegetable mold a mixture of ashes and earth was reached, extending to the depth of from four and a half to five feet, at the bottom filling fissures and covering rocks, fragments that originally partly occupied the floor of the shelter and which the occupants did not attempt to remove. * * * The whole of this material was filled with the evidences of the place as a human residence — pottery, bones, shells and stone implements. In the deposit of these there was no sudden transition; the bones near the top were in a good state of preservation, those that had not been changed by the fire not blackened but colored yellow by lapse of time. These became darker and less abundant as the excavation was carried deeper, and substantially disappeared before the bottom of the excavation was reached, showing that the earliest occupancy was so long ago that the deposited bones in the dry shelter had been consumed by time. Over two hundred and fifty fragments of pottery were collected; * * * it was all coarse, without any attempt at ornamentation. * * * The stone implements were abundant, but most of them crude and coarse. * * * The most abundant of the [latter] were cutting tools or knives. * * * Not a

single article was found designed for ornament, nor was there any attempt to ornament any of the articles found." All the bones found were those of animals existing in Ohio a century ago. The shelter itself was "composed of two large blocks twenty or more feet in diameter, separated about fifteen feet, with a huge block rising upon the top at the height of about twelve feet." — Read, Shelter.

The ends of this shelter could easily have been closed with brush and weeds, making a warm and dry abode. That it had been in use for a long time is proven by the amount of dust and ashes that had accumulated.

ROCK INSCRIPTIONS.

"In many places within the State rude effigies of man and animals have been observed, chiseled or picked into the natural surface of the rocks. They are most numerous in the eastern half of the State, where the grits of the coal series furnish large blocks or perpendicular faces of sand rock which are easily cut, and which are, at the same time, imperishable. These surfaces are never prepared for inscriptions by artificial smoothing. The figures are sunk into the stone by some sharp-pointed tool like a pick, which has left the impression of its point similar to the rough hewn stone of our masonry. This tool has not been found in the form of a pick and was probably only a small angular stone, held in the hand and used as a chipper until the points and angles were worn off. * * * How ancient the intaglios are can not yet be determined, but there is one instance at Independence, Cuyahoga county, where soil had accumulated over them to a depth of one to one and a half feet, on which were growing trees of the usual size in that region. * * * The investigations hitherto made show them to be of the style and for the purpose of pictorial writing, such as are made by the red men of America. They are found on rocks, trees and sheltered banks of clay throughout the United States, none of which are yet proven to be the works of the Mound Builders. In none of them are the characters alphabetical, but always symbolical or pictorial, [and consequently of] little value as records." — Cent. Rep., 84-8.

Catlin says in regard to the Indian tribes of his acquaintance: —

"I have been unable to find anything like a *system* of hieroglyphic writing amongst them; yet, their *picture writings* on the rocks, and on their robes, approach somewhat towards it. Of the former, I have seen a great many in the course of my travels; and I have satisfied myself that they are generally the totems (symbolic names) merely, of Indians who have visited these places, and from a similar feeling of vanity, that everywhere belongs to man much alike, have been in the habit of recording their names or symbols, such as birds, beasts or reptiles. * * *

At the Red Pipe Stone Quarry, where there are a vast number of these inscriptions cut in the solid rock, and other places also [I have] seen the Indian at work, recording his totem amongst those of more ancient dates; which convinced me that they had been progressively made, at different ages, and without any system that could be called hieroglyphic writing.

"The paintings on their robes are in many cases exceedingly curious, and generally represent the exploits of their military lives, which they are proud of recording in this way and exhibiting on their backs as they walk." — Catlin, Indians, II, 246.

"The great defect of this kind of record [picture writing] is that it can only be understood within a very limited circle. It * * merely suggests some event [and the inscriptions] can only convey their full meaning to those who know by heart already the composition they refer to." — Mankind, 84.

Squier and Davis describe and figure rock-inscriptions in Cabell county, West Virginia; near Steubenville, Ohio; and mention others at Catlettsburg, Kentucky, and in Scioto and Lawrence counties, Ohio. They attribute them to the modern Indians.

"The lines * * * do not appear to have been chiseled, but pecked into the stone. Where hard iron seams occur in the rock, a narrow ridge is left,— the rude instruments having evidently been inadequate to cut or break through them." — S. & D., 293, *et seq.*

On the Ohio side of the river, one mile above Wellsville, there is a large group of sculptures, on a flat sand rock of the coal series, scarred by floating ice and flood wood. "These figures are only visible in low water, as they are only two or three feet above the extreme low stage of the river. * * * In one respect they differ from all others which I have examined. They are made in double outline, and not by a single deep channel. The outlines are a series of dots made with a round, pointed instrument, seldom more than half an inch deep." Among the objects represented are a rattlesnake, a turtle (?), bird, fish-like figure, and human feet.— Cent. Rep., 104.

The so-called "Barnesville Track Rocks" are shown in the three figures 134 (Cent. Rep., plate I); 135 (Cent. Rep., plate II), which is an enlargement of some of the characters in the preceding figure; and 136 (Cent. Rep., plate III).

"This coarse grit is so nearly imperishable that whatever distinct marks were originally cut upon it are doubtless there now and are not perceptibly injured by exposure." — Cent. Rep., 89.

"The inscriptions near Newark, shown in figure [137 (Cent. Rep., plate IV)], originally covered a vertical face of conglomerate rock, fifty or sixty feet in length by six or eight feet in height. This rock is soft, and, therefore, the figures are easily erased. As the place was partially

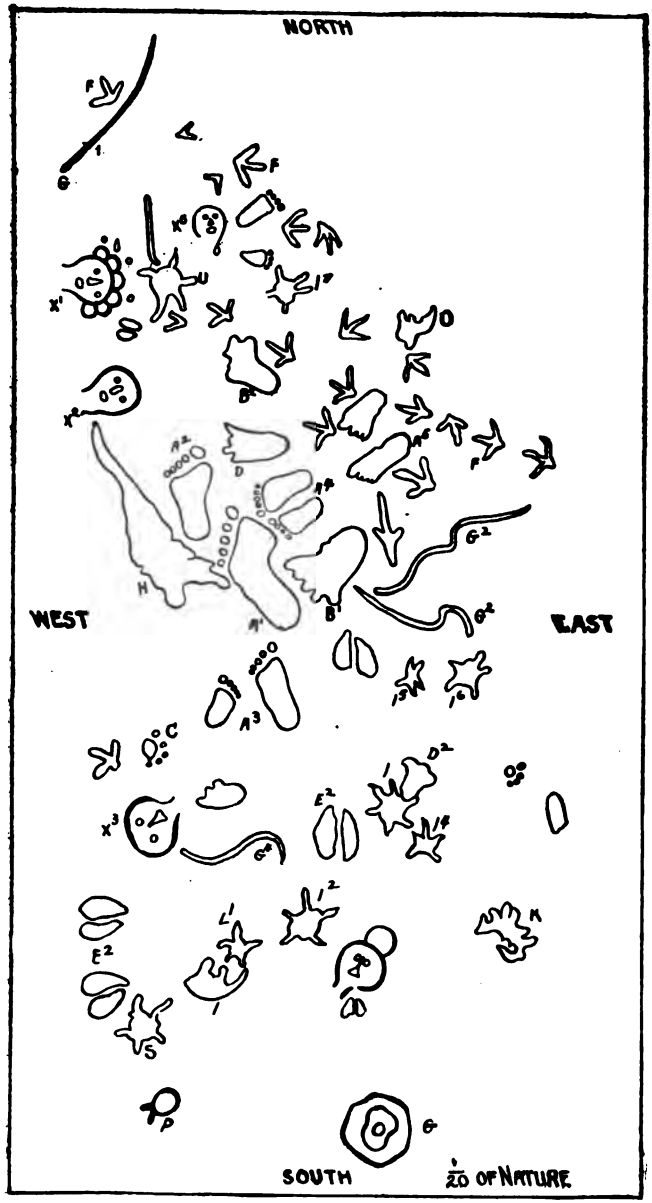


Figure 134.

One of the "Barnesville Track Rocks."

sheltered from the weather by overhangs, the injury done to them by exposure was not much. This illustration is a *fac simile* of the tracing on muslin in 1859. The rock is not hard, and shows signs of decomposition. White settlers, about the year 1810, cut their names on this cliff; many of these names are already obliterated. The straight grooves at C and D are common in other rock inscriptions. Those at H, at *a* of group No. 7, and at *c* of group No. 1, are rare in Ohio. Under this

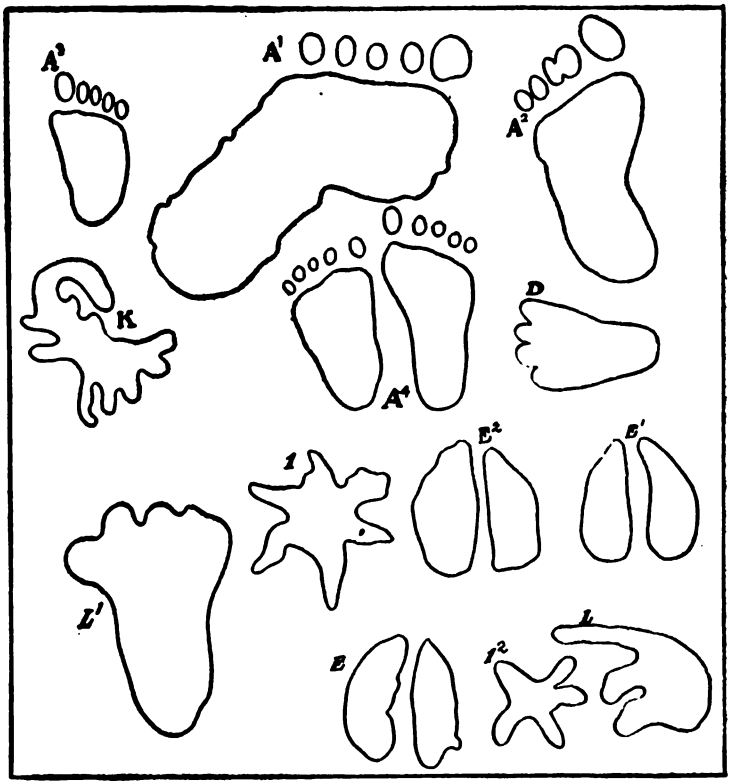


Figure 135 — Some Details of Figure 134, Enlarged.

cliff is a deep deposit of kitchen refuse." — Cent. Rep., 94, condensed.

In figure 138 (Cent. Rep., plate V) is shown "The Independence Slab," so named from the village near which it was found. "The rock on which [this] inscription occurs is the grindstone grit. * * * It is almost pure silex, and possesses the property of resisting atmospheric changes to a remarkable degree. * * * The durability of the rock and the fact that these markings were covered with earth, explains why they have been so finely preserved." — Cent. Rep., 100.

"For the benefit of those who wish to pursue the study of rock inscriptions here, I give the location of a number of them which are

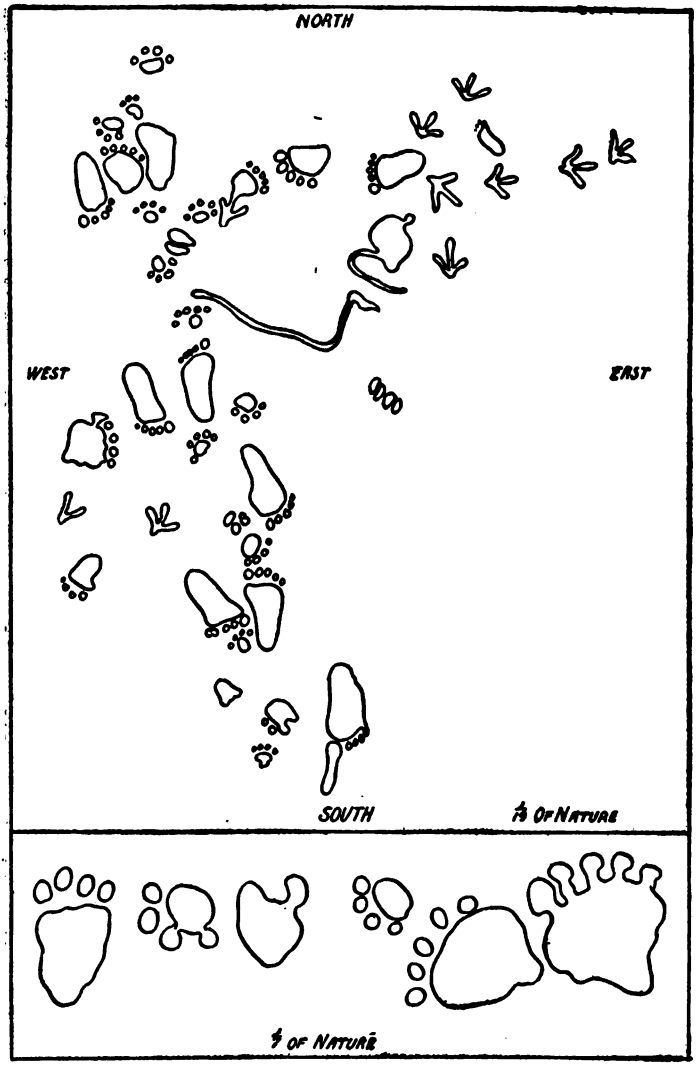


Figure 186 — One of the "Barnesville Track Rocks."

easily accessible. * * * More thorough researches would disclose them by hundreds in neglected ravines, where there are rocky faces, precipitous walls or large boulders.

PLATE IV.—NEWARK TRACK ROCK—1-24 OF NATURE.

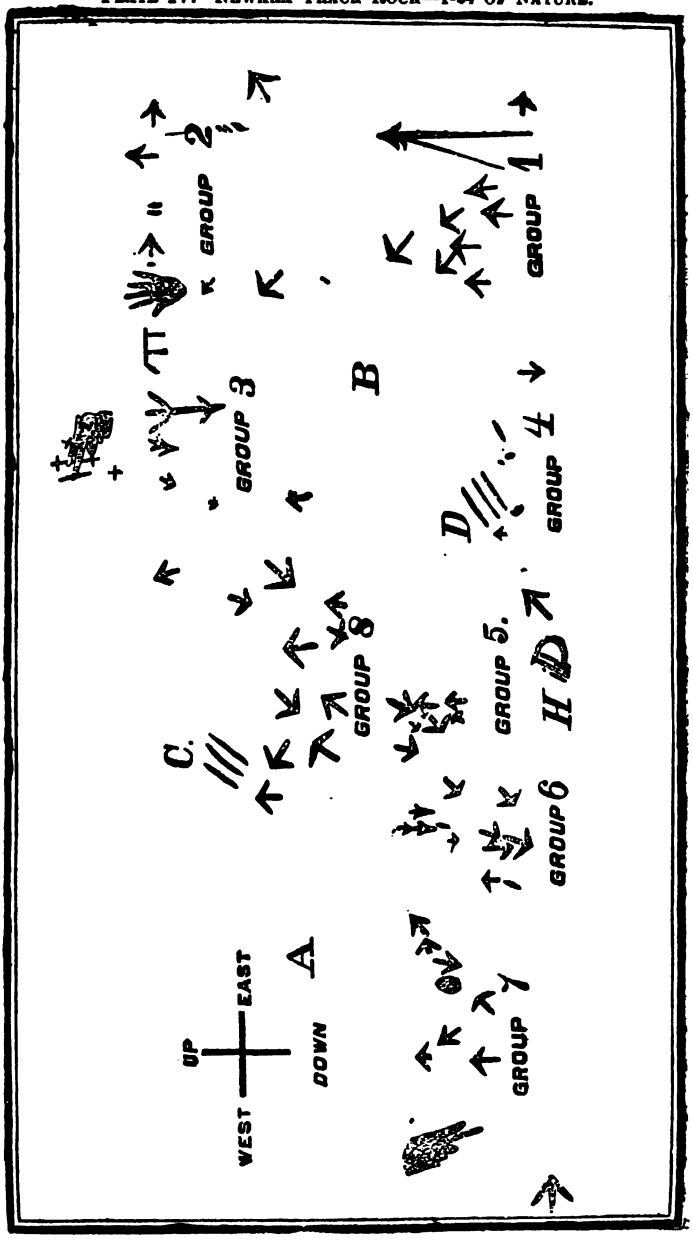


Figure 137.

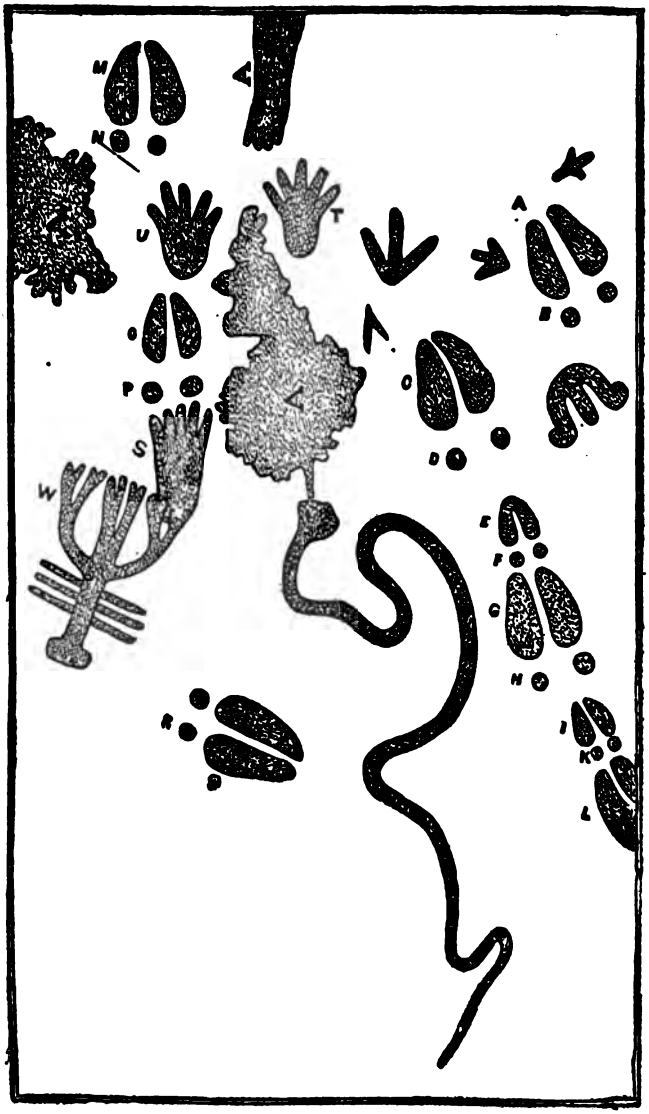


Figure 138 — The "Independence Slab."

"LOCALITIES OF INSCRIBED ROCKS.

[Only those which are convenient to Ohio readers are given here.]

"1. On the Alleghany River, in Pennsylvania, not far from Brady's Bend, formerly known as the 'God Rock.'

"2. One mile above Wellsville on the Ohio River, north shore, upon a flat surface of grit covered at high water — wrought in double channels by a pointed tool like a pick.

"3. South shore of the Ohio, four miles above Steubenville, on sandstone — wrought with a pointed tool, effigies of turtles, snakes, tracks of quadrupeds, and human feet, also a circle with rays.

"4. Nearly opposite the mouth of Wheeling Creek, below Wheeling City, on the north bank of the Ohio.

"5. Sixteen miles up Guyandotte River in Cabell county, West Virginia.

"6. On Elk River, near Charleston, West Virginia.

"7. At Cattlettsburg, Kentucky, near the mouth of Big Sandy on the Ohio — now obliterated.

"8. Three miles above Burlington, Lawrence county, Ohio, on the north side of the Ohio.

"9. Near Hanging Rock, on the river, Lawrence county, Ohio.

"10. A colossal human head, on a flat rock, only visible at low water; a few miles above Portsmouth [on the Scioto.]

"11. 'Turkey foot Rock' — Maumee City, Lucas county, Ohio, on a block of limestone, at the foot of the rapids.

"12. Kelly's Island, near the landing, south side, on a block of limestone.

"13. On a boulder of quartzose granite, north side of Kelly's Island. — Whittlesey, Inscriptions, 53, *et seq.*

There is also a very large sandstone block, covered with inscriptions, on the hill overlooking the Monongahela, opposite Greensboro, Pennsylvania, ten miles above Brownsville.

"The most authentic copies of the Dighton Rock inscriptions, when compared with that on the south shore of Kelly's Island, disclose a very close similarity. The best preserved and the best described intaglios of the Ohio valley have so close a resemblance to both of the above, as to indicate the use of a similar and wide-spread picture language in North America."—Whittlesey, Inscriptions, 54.

CHAPTER XII

SOME ANALOGIES BETWEEN THE REMAINS OF MOUND BUILDERS AND THOSE OF MODERN INDIANS.

IT is not difficult to understand why so many extravagant theories are zealously proclaimed and readily accepted.

"There is sometimes, it appears to me, an unwillingness to look at all sides of objects classed as ancient, lest something should be discovered which might reduce their age and render them possibly modern and commonplace." — Mitchell, 18.

"The charm of mystery is so great that men are apt to be carried away with it, and to seek in the development of unknown or improbable causes for the solution of phenomena which are often to be found in plainer and more obvious considerations. That this charm has thrown its spell, to some extent, around the topic of our western antiquities, cannot be denied." — Schoolcraft, History, I, 60.

It is as true of our own prehistoric remains as it is of those of Yucatan or Central America, that

"Most American writers speak of ancient monuments from hearsay * * * they never having taken the trouble to travel any distance to see them." — Charnay, 147.

The results are often as unfortunate as that of Brasseur de Bourbourg, who

"attempted to translate part of [the manuscript Troana], which he has published; but in a subsequent work he confesses that he began his reading at the wrong end of the manuscript." — Short, 422.

Such lucubrations render their authors eligible for admittance to the class so wittily described by Lowell.

"There seems to be, in the average German mind, an inability or disinclination to see a thing as it really is unless it be a matter of science. It finds its keenest pleasure in divining a profound significance in the most trifling things, and the number of mare's nests that have been stared into by the German *Gelehrtes* through his spectacles passes cal-

culation. They are the one object of contemplation that makes that singular being perfectly happy, and they seem to be as common as those of the stork." — Lowell, II, 163.

Various fallacies have been pointed out in previous pages. They may be condensed in a few quotations ranging almost through a century.

"More recent examination has confirmed an opinion previously formed, that the works described in this publication were erected by a race of men widely different from any type of North American Indians known in modern times." — Amer., I, 3.

"The ancestors of our North American Indians were mere hunters, while the authors of our tumuli were shepherds and husbandmen."— Atwater, 213.

Of the small stone sculptures made by Indians of the Northwest Coast, "the utmost that can be said is, that they are elaborate, unmeaning carvings, displaying some degree of ingenuity. A much higher rank can be claimed for the mound sculptures; they are faithful copies, not distorted caricatures, from nature. So far as fidelity is concerned, many of them deserve to rank by the side of the best efforts of the artist-naturalist of our own day." — S. & D., 272.

Any "rank can be claimed" for anything. A comparison such as may be made in any of our large museums, of collections from mounds and from the North Pacific Coast Indians, will show the emptiness of this claim. The carvings are not "distorted caricatures" but faithfully carry out the intentions of the artists, as symbolical and allegorical representations.

"Monuments of a bygone race, of whose history no tradition known to the white man has been preserved by the occupants of the territory." — Cox: quoted by Foster, 113.

"A broad chasm is to be spanned before we can link the Mound-builders to the North American Indians. The latter since known to the white man has spurned the restraints of a sedentary life, which attach to agriculture. He was never known to erect structures which should survive the lapse of a generation. His lodges consist of a few poles over which are stretched barks or skins." — Foster, 347, condensed.

"The Mound Builders were, in the distinctive character of their structures, as marked a people as the Pelasgi." — Foster, 97.

"No chief would dare to issue an order to throw up a structure such as that at Cahokia or Grave Creek; no subaltern would engage in the work. All the free instincts of their nature would revolt." — Foster, 349, condensed.

After giving an entirely incorrect description of the Indians occupying the eastern half of the United States, Foster says:—

"To suppose that such a race threw up the strong lines of circumvallation and the symmetrical mounds which crown so many of our terraces, is as preposterous, almost, as to suppose that they built the pyramids of Egypt." — Foster, 300.

"An ancient race, entirely distinct from the Indian, once inhabited the central portion of the United States." — McLean, 13, condensed.

"The professor [referring to Dr. Joseph Jones's 'Antiquities of Tennessee'] has clearly shown that the Mound-builder people and the Indians were distinct, and has set at rest a question upon which some few doubts were still entertained by a certain school of archæologists, which has really never been very strong. The connection with or identity of the Mound-builders and the Toltecs or the same family of people, is also shown satisfactorily." — Short, 65.

Under the necessity of catering to a taste for the marvelous and mysterious, newspapers and periodicals, taking their cue from such statements or deductions, rise to heights of fatuity. Almost daily the confiding public is favored with information somewhat after the following fashion:—

"RELICS OF THE MOUND BUILDERS.

"Those who are engaged in making collections of ancient relics, will read the following with interest.

"Mr. ——— recently made another highly valuable acquisition to his extensive collection of ancient relics, consisting of the finest specimen of a stone war pipe ever seen in this section of the country. It is in the shape of a small stone ax, and is thoroughly made. The stone is of a beautiful rosewood color and is highly polished. The groove around the ax is perfectly formed, as is also the bowl of the pipe, showing great skill in workmanship. This valuable relic, Mr. ——— informs us, was obtained from Mr. ———, whose great-grandfather, during the days of the Revolution, secured it from a noted Indian chief, who had no doubt found it, as the Indians knew nothing about the art of making stone implements, and even if they did know, they did not possess the industry and perseverance to do the work, which must have required great skill, patience and months of toil. This ax was made hundreds of years before the Indians ever set foot upon this country, and was the result of the patient and untiring work of that ancient race of people who built the mounds and earthworks and made the flint arrowheads and spears and all other ancient relics that are so much wondered at and prized by people of the present day." — Newspaper clipping.

TRADITIONS.

Much stress has been laid upon the total lack of knowledge and absence of tradition on the part of later Ohio Indians concerning the earthworks of the State. Admitting, for the moment,

the truth of this argument, so often advanced, it finds a ready and ample explanation.

"Indian tradition is short-lived and evanescent. Except the Creeks, there is scarcely a tribe that has trustworthy tradition of their own annals a century old. The expedition of De Soto is a striking instance of the faint hold tradition had among them. It is hard to imagine anything calculated to make a deeper and more lasting impression on them than the sudden appearance among them of an army of strange beings of different color; bearded, wearing garments and armor of unheard of color and material; mounted on animals that were beyond all experience; armed with thunder and lightning, striding across the continent with a thousand manacled prisoners as slaves, destroying their strongest towns and laying waste their country, and finally wasting away and driven down the river to the great sea, helpless fugitives. Yet when Europeans next visited the country, a century and a half later, they found not a vestige of a tradition of De Soto.

"Besides, the Indians often changed their place of residence. In their continued warfare, entire tribes were not unfrequently exterminated. Jaques Cartier found the Iroquois at Montreal in 1535. Champlain found them between lakes Ontario and Champlain in 1612. After the destruction of the Eries in 1655, the tract now the State of Ohio was uninhabited until the next century. The nations known as Ohio Indians moved into it after 1700. The Shawnees first appear in history in the region which is now Tennessee and Kentucky, but they had migrated there from elsewhere. The Creeks and Alabamas arrived in what is now Alabama and Georgia after the expedition of De Soto. Hence, even if they were a people who preserved traditions, they might well be without traditions concerning the mounds found in their hunting grounds."—Force, 58.

"In the latter half of the seventeenth century, after the destruction of the Eries by the Five Nations, in 1656, what is now the State of Ohio was uninhabited. The Miami Confederacy, inhabiting the southern shore of Lake Michigan, extended southeasterly to the Wabash. The Illinois Confederacy extended down the eastern shore of the Mississippi to within about eighty miles of the Ohio. Hunting parties of the Chickasaws roamed up the eastern shore of the Mississippi to about where Memphis now stands. The Cherokees occupied the slopes and valleys of the mountains about the borders of what is now East Tennessee, North Carolina and Georgia. The great basin, bounded north by Lake Erie, the Miamis, and the Illinois, west by the Mississippi, east by the Alleghanies, and south by the headwaters of the streams that flow into the Gulf of Mexico, seems to have been uninhabited except by bands of Shawnees and scarcely visited except by war parties of the Five Nations.

"In the next half century, the first half of the eighteenth, various tribes pressed into what is now Ohio, across all its borders. Champlain, in 1609, found on the eastern shore of Lake Huron a tribe called by the Five Nations, Quatoghies, but to which the French gave the name

Huron. In some of the earlier relations they are called 'Hurons ou Ouendats.' Ouendat appears to be the name by which they called themselves. About 1650 the Five Nations nearly destroyed the Hurons or Wendats, and drove the remnant to seek shelter near the western extremity, among the tribes inhabiting the borders of Lake Superior. Afterward, threatened with war by the Sioux, in 1670, they gathered under the protection of the French, about Michilimackinac, and gradually shifted down to Detroit. In the early part of the eighteenth century, under the name of Wyandots (the English spelling of the name which the French spelled Ouendat), a portion of them extended their settlements into the northwestern part of Ohio, and became permanently fixed there.

"The Miamis pushed their borders into the western portion. Shawnees settled the Scioto valley. Delawares moved to the valley of the Muskingum. Little detachments of the Five Nations, mostly Senecas, occupied part of the northern and eastern borders. The Senecas who settled in the northern part were called by that name. Those who settled in the eastern portion near the Delaware [Indians] and the Pennsylvania border, were called Mingoes. * * * Parties of Cherokees often penetrated north of the Ohio, between 1700 and 1750, and later a party of them settled among the Wyandots, in the neighborhood of Sandusky. * * * The Eries, so called by the Hurons, were called Rique by the Iroquois, and 'Nation du Chat' by the French. * * * In a list of tribes living south of the St. Lawrence and the Lakes, the Eries are mentioned, and in the [Jesuit] Relation of 1641, they are named as neighbors of the Neutral Nation."

The French called the Eries "the Cat nation, because there is in their country a prodigious number of wild cats, two or three times as large as our tame cats, but having a beautiful and precious fur, * * * from the skins of which the natives make robes, bordered and ornamented with the tails." [This probably refers to the lynx, though it may mean the raccoon.] In one of the Jesuit Relations it is stated "This Cat Nation is very populous. * * * It is said they have two thousand men, good warriors, though without fire-arms."

"In 1654, war broke out between the Eries and the Five Nations."

Finally the Iroquois invaded the Erie territory. The latter constructed a wooden fort in which they took refuge; but the Iroquois carried it by storm. "With this the Eries disappear. They are afterward mentioned only as a destroyed people. Most of the captives taken by the Iroquois were tortured and burned; but some were adopted and became members of the Five Nations.

"On De Lisle's map, published in 1720, appears, near the southern shore of Lake Erie, the words, 'Nation du Chat, détruite.' On the same map, villages marked 'Les Tongoria' are placed on the Ohio, and on the Tennessee rivers. As Colden * * * gives Tongoria as the French equivalent for Erigek, used by the English and Five Nations, Mr. Shea suggests * * * that the Tongorias might be a remnant of the Eries." — Force, Indians, 3, *et seq.*

"The Shawnees were not found originally in Ohio, but migrated there after 1750. They were called Chaouanons, by the French, and Shawanoes, by the English. The English name Shawano changed to Shawanee, and recently to Shawnee. * * *

"According to the French accounts, the original seat of the Shawanoes was the southern shore of Lake Erie. In a letter written * * at New Orleans * * * it is said: 'Besides, the Chaouanons heretofore settled in Canada, * * * are come to settle among the Alibamos.' The French applied the name Canada to all of the territory held by them, east of the Mississippi, and north of the Ohio."—Force, Indians, 12-13.

"The tribes occupying Ohio in the period subsequent to 1754 were all intrusive within the period of history. When first known, the Hurons were settled on the southeast of the northern portion of Lake Huron. The Tobacco nation were found in 1616 south of Lake Huron, and just west of the Hurons. Their language was almost identical with the Huron. After their overthrow by the Iroquois, these two tribes wandered over much of the lake country, and many of them finally settled in Ohio. The Iroquois proper, when first known to the French in 1609, did not extend as far west as Lake Erie. The Neutral Nation inhabited the banks of Niagara river, the east end of Lake Erie, and its north shore. They were called Kahkwas by the Senecas. The Jesuit Relation of 1648 says that Lake Erie was formerly inhabited along its south coast by the Cat nation, who had been obliged to draw well inland to avoid their enemies from the west. They had a quantity of fixed villages, for they cultivated the earth, and had the same language as the Hurons. Charlevoix says that the Iroquois obtained from the country of the Eries a fruit which from its description could be only the pawpaw. The plant rarely occurs along the lake and does not fruit there.

"In one instance, the Iroquois (Senecas) overcame 2,000 men of the Cats in their own entrenchments.

"About 1700, in a war with the Cherokees, the Delawares reached the Ohio, settled, and remained there until 1773.

"We find, then, that about 1640 the Eries ranged in Ohio from near the east end of Lake Erie to near the west, and held the country back and part of the Ohio river. That everywhere west were Algonquins, probably the Miamis and Ottawas pressing upon them. That below them on the Ohio, were the Shawnees, and southeast of them and their kindred the Andastes were the Algonquin nations."—Baldwin, 81-90, condensed.

Colden [History of the Five Nations] says the Shawnees, or, as he calls them, the Satanas, formerly lived on the banks of the lakes, and that they were the first people against whom the Five Nations turned their arms after their defeat and expulsion from the region near Montreal by the Adirondacks. There is good reason to believe that this took part in the latter part of the sixteenth century."—Carr, Mounds, 531, *note*.

"From all authorities, the two tribes [Eries and Neuters] at least spoke a kindred dialect, namely, a dialect of the Wyandot branch of the Iroquois. It is fair to infer that they were closely affiliated. The

remnants of the Eries and Neuters united, but were either completely destroyed or else fled southward. Then the Iroquois attacked the Andastes or Kah-kwas, and drove the survivors of that tribe down the Alleghany. Certainly *one* of these tribes, perhaps all of them in a body, fled to Carolina and are now known as the Catawbas." — Schoolcraft, Eries, 290.

" Perrot says that the Iroquois had their original home about Montreal and the Three Rivers, that they fled from the Algonquins to Lake Erie, where lived the Chaouanans, who waged war against them, and drove them to the shores of Lake Ontario. That after many years of war against the Chaouanans and their allies, they withdrew to Carolina, where they now are. The Iroquois, after being obliged to quit Lake Erie, withdrew to Lake Ontario; and that after having chased the Chaouanans and their allies towards Carolina, they have ever since remained there or in the vicinity."

" Colden says * * * that the French arriving in 1603, found the Adirondacks at war with the Five Nations; that formerly, the Five Nations, then a peaceful tribe, living by agriculture, about the site of Montreal, being oppressed by the Adirondacks, migrated to the southern shore of Lake Ontario, where they at first feebly resisted their pursuers. 'But afterwards becoming more expert and more used to war, they not only made a brave defense, but likewise made themselves masters of the great lakes, and chased the Shawnees from thence.' That they increased their numbers by adopting many of the Shawanon prisoners." — Force, Indians, 14.

"America, when it became known to Europeans, was, as it had long been, a scene of wide-spread revolution. North and south, tribe was given place to tribe, language to language. * * * In Canada and the northern section of the United States, the elements of change were especially active. The Indian population, which, in 1535, Cartier found at Montreal and Quebec, had disappeared at the opening of the next century, and another race had succeeded, in language and customs widely different; while, in the region now forming the State of New York, a power was rising to ferocious vitality, which, but for the presence of Europeans, would probably have subjected, absorbed, or exterminated every other Indian community east of the Mississippi and north of the Ohio." — Jesuits, xix.

Another example of the little importance to be attached to tradition, or the lack of it, is the statement that at Attaffe there was a

"high pillar, round like a pin or needle; it is about forty feet in height, and between two and three feet in diameter at the earth, gradually tapering upward to a point; it is in one piece of pine wood, and arises from the center of a low, circular, artificial hill." The natives of the town made the same professions of ignorance as to its origin and the same statements as to its antiquity, that they made in regard to mounds in the vicinity.— Bartrams, 455.

While some of the southern pine is extremely durable, it is out of the question to suppose this pole would last more than two hundred and fifty years, the period that had elapsed since De Soto's expedition when the same tribes were occupying the country that the Bartrams found there.

"The question has often been raised how long a savage tribe, ignorant of writing, is likely to retain the memory of past deeds. From a great many examples in America and elsewhere, it is probable that the lapse of five generations, or say two centuries, completely obliterates all recollection of historic ocurrences. * * * The federation of prominent tribes, and perhaps a genealogy may run back farther."—Essays, 22.

"The Klallams * * * have no reliable knowledge of their own history earlier than the recollections of the oldest Indian. In obtaining their names for various articles I have often found that persons of eighteen and even twenty-five years of age do not know the names for stone arrow-heads, axes, chisels, anchors, rain-stones and the like, which went out of use soon after the whites came. This shows how quickly the past is forgotten with them."—Eells: Twana, 609.

Be this as it may, whether their traditions covered two centuries or twenty, it is obvious that the historic Indians of Ohio could know nothing, simply from having lived among them for two or three generations, of remains which they found on their arrival in a deserted country.

Among the Indians outside of the State, however, there were at least two well-defined legends which appear to bear directly upon the prehistoric remains within its boundaries. First, is the tradition of the Lenni Lenape, or, as they are better known, the Delawares. This was collected and recorded by Heckewelder as follows:—

"The Lenni Lenape (according to the traditions handed down to them by their ancestors) resided many hundred years ago, in a very distant country in the western part of the American continent. For some reason, which I do not find accounted for, they determined on migrating to the eastward, and accordingly set out in a body. After a very long journey, and many nights' encampment by the way ('Night's encampment' is a halt of one year at a place), they at length arrived at the Namæsi Sipu (The Mississippi or *River of Fish; Namas* a Fish; *Sipu* a River), where they fell in with the *Mengwe* (The Iroquois or Five Nations), who had likewise emigrated from a distant country, and had struck upon this river somewhat higher up. Their object was the same with that of the Delawares: they were proceeding on to the eastward, until they should find a country that pleased them. The spies which the Lenape had sent forward for the purpose of reconnoitering, had long before their arrival discovered that the country east of the Mississippi was inhabited

by a very powerful nation, who had many large towns built on the great rivers flowing through their land. These people (as I was told) called themselves *Talligeu* or *Talligewi*. * * * The Delawares still call the Alleghany *Alligewi Sipu* the River of the Allegewi. Many wonderful things are told of this famous people. They are said to have been remarkably tall and stout. It is related that they had built themselves regular fortifications or entrenchments, from whence they would sally out, but were generally repulsed. I have seen many of the fortifications said to have been built by them, two of which, in particular, were remarkable. One of them was near the mouth of the river Huron, which empties itself into the Lake St. Clair on the north side of that lake, at the distance of about 20 miles north of Detroit. The other works, properly entrenchments, being walls or banks of earth regularly thrown up, with a deep ditch on the outside, were on the Huron river, east of the Sandusky, about six or eight miles from Lake Erie. Outside of the gateways of each of these two entrenchments, which lay within a mile of each other, were a number of large flat mounds, in which the Indian pilot said, were buried hundreds of the slain Talligewi, whom I shall hereafter with Colonel Gibson call Allegewi. When the Lenape arrived on the banks of the Mississippi, they sent a message to the *Alligewi* to request permission to settle themselves in their neighborhood. This was refused them, but they obtained leave to pass through the country and seek a settlement farther to the eastward. They accordingly began to cross the Namæsi Sipu, when the Alligewi, seeing that their numbers were so very great, and in fact they consisted of many thousands, made a furious attack on those who had crossed, threatening them all with destruction, if they dared to persist in coming over to their side of the river. Fired at the treachery of these people, and the great loss of men they had sustained, and besides, not being prepared for a conflict, the Lenape consulted on what was to be done. The Mengwe, who had hitherto been satisfied with being spectators from a distance, offered to join them, on condition that, after conquering the country, they should be entitled to share it with them; their proposal was accepted. Having thus united their forces, the Lenape and Mengwe declared war against the Alligewi, and great battles were fought in which many warriors fell on both sides. The enemy fortified their large towns and erected fortifications, especially on large rivers and near lakes, where they were successively attacked and sometimes stormed by the allies. An engagement took place in which hundreds fell, who were afterwards buried in holes or laid together in heaps and covered over with earth. No quarter was given, so that the Alligewi, at last finding that their destruction was inevitable if they persisted in their obstinacy, abandoned the country to the conquerors, and fled down the Mississippi river, from whence they never returned. The war which was carried on with this nation, lasted many years, during which the Lenape lost a great number of their warriors. In the end, the conquerors divided the country between themselves; the Mengwe made choice of the lands in the vicinity of the great

lakes, and on their tributary streams, and the Lenape took possession of the country to the south. For a long period of time, some say many hundred years, the two nations resided peaceably in this country;—after which the Lenape migrated to the Atlantic coast." — Heckewelder, 47, *et seq.*, condensed.

A translation of Rafinesque, published by Squier, is more literal and goes more minutely into detail.

"The Walum-Olum, (literally *painted sticks*), or painted and engraved traditions of the Lenni-Lenape, embraces one hundred and eighty-four compound mnemonic symbols, each accompanied by a sentence or verse in the original language, of which a literal translation is given in English by Rafinesque. This translation, so far as I have been able to test it, is a faithful one, and there is slight doubt that the original is what it professes to be, a genuine Indian record. I submitted it, without explanation, to an educated Indian chief, George Copway, who unhesitatingly pronounced it authentic, in respect not only to the original signs and accompanying explanations in the Delaware dialect, but also in the general ideas and conceptions which it embodies. He also bore testimony to the fidelity of the translation.

"The details of the emigrations here recounted, particularly so far as they relate to the passage of the Mississippi and the subsequent contest with the Tallegwi or Allegwi, and the final expulsion of the latter, coincide generally with those given by various authors and well known to have existed among the Delawares. The traditions, in their order, relate first to a migration from the north to the south, attended by a contest with a people denominated Snakes, or Evil, who are driven to the eastward. One of the migrating family, the *Lowaniwa*, literally northlings, afterwards separate and go to the snow land, whence they subsequently go to the east, towards the island of the retreating Snakes. They cross deep waters and arrive at Shinaki, the Land of Firs. Here the *Wunkanapi*, or Westerners, hesitate, preferring to return.

"A hiatus follows, and the tradition resumes, the tribes still remaining at Shinaki or the Fir Land.

"They search for the great and fine island, the land of the Snakes, where they finally arrive, and expel the Snakes. Then they multiply and spread toward the south, to the Akolaki or beautiful land, which is also called Shore-land, and the Big-fir land. Here they tarried long, and for the first time cultivated corn and built towns. In consequence of a great drought, they leave for the Shillilaking or Buffalo land. Here, in consequence of disaffection with their chief, they divide and separate, one party, the *Wetamowi*, or the Wise, tarrying, the others going off. The *Wetamowi* build a town on the Wisawana or Yellow River (probably the Missouri), and for a long time are peaceful and happy. War finally breaks out, and a succession of warlike chiefs follows, under whom conquests are made north, east, south and west. In the end *Opekasit*

(literally east-looking) is chief, who, tired with so much warfare, leads his followers towards the sun-rising. The arrive at Messussipu, or Great River (the Mississippi), where, being weary, they stop, and their first chief is *Yagawanend* or the Hut-maker, under whose chieftancy it is discovered that a strange people, the *Tallegwi,* possess the rich east land. Some of the *Wetamowi* are slain by the Tallegwi, and then a cry of *war! war!!* is raised, and they go over and attack the Tallegwi. The contest is continued during the lives of several chiefs, but finally terminates in the *Tallegwi* being driven southwards. The conquerors then occupy the country on the Ohio below the Great Lakes — the Shawanipekis. To the north are their friends, the *Talamatan,* literally not-of-themselves, translated Hurons. The Hurons, however, are not always friends, and they have occasional contests with them.

"Another hiatus follows, and the record resumes by saying that they were strong and peaceful at the land of the Tallegwi. They built towns and planted corn. A long succession of chiefs followed, when war again broke out, and finally a portion under *Linkewinnek* or the Sharp-looking, went eastward beyond the *Talega-chukung* or Allegheny Mountains. Here they spread widely, warring against the *Mengwi* or Spring-people, the *Pungelika,* Lynx or Eries, and the *Mohegans,* or Wolves. The various tribes into which they became divided, the chiefs of each in their order, with the territories which they occupied, are then named — bringing the record down until the arrival of the Europeans. This latter portion we are able to verify in great part from authentic history.

"I have alluded to the general identity of the mythological traditions here recorded, with those which are known to have been, and which are still current among the nations of the Algonquin stock. The same may be observed of the traditions which are of a historical character, and particularly that which relates to the contest with the people denominated the *Tallegwi.* The name of this people is still perpetuated in the word *Alleghany,* the original significance of which is more apparent when it is written in an unabbreviated form, *Tallegwi-hanna,* literally river of the Tallegwi. It was applied to the Ohio, and is still retained as the designation of its northern or principal tributary.

"It will be seen that there is a difference between the traditions, as given by Heckewelder, and the *Walum-Olum* in respect to the name of the confederates against the Tallegwi. In the latter the allies are called *Talamatan* literally not-of-themselves, and which, in one or two cases, is translated *Hurons* with what correctness I am not prepared to say. Heckewelder calls them *Mengi,* Iroquois. This must be a mistake, as the Mengwi are subsequently and very clearly alluded to in the Walum-Olum as distinct from the Talamatan. In Heckewelder we find the Hurons sometimes called *Delamattenos,* which is probably but another mode of writing Talamatan." — Squier, Algonquins, 14-41, condensed.

Dr. Brinton thus interprets the legend:—

"Were I to reconstruct their ancient history from the *Walum Olum* as I understand it, the result would read as follows:—

"At some remote period their ancestors dwelt far to the northeast, on tide-water, probably at Labrador. They journeyed south and west, till they reached a broad water, full of islands and abounding in fish, perhaps the St. Lawrence about the Thousand Isles. They crossed and dwelt for some generations in the pine and hemlock regions of New York, fighting more or less with the Snake people, and the Talega, agricultural nations, living in stationary villages to the southwest of them, in the area of Ohio and Indiana. They drove out the former, but the latter remained on the upper Ohio and its branches. The Lenape, now settled on the streams in Indiana, wished to remove to the East to join the Mohegans and other of their kin who had moved there directly from New York. They, therefore, united with the Hurons (Talematans) to drive out the Talega (Tsalaki, Cherokees) from the upper Ohio. This they only succeeded in accomplishing finally in the historic period. But they did clear the road and reached the Delaware valley, though neither forgetting nor giving up their claims to their western territory."

Heckewelder's account, or translation, gives a pronunciation which "reduces our quest to that of a nation who called themselves by a name, which, to Lenape ears, would sound like *Tallike*. Such a nation presents itself at once in the Cherokees, who call themselves Tsa'laki. Moreover they fill the requirements in other particulars. Their ancient traditions assign them a residence precisely where the Delaware legends locate the Talliké, to-wit, on the upper waters of the Ohio. Fragments of them continued there until within the historic period; and the persistent hostility between them and the Delawares points to some ancient and important contest.

"Name, location and legends, therefore, combine to identify the Cherokees or Tsalika with the Talliké; and this is as much evidence as we can expect to produce in such researches.

"The question remains, whether the Talliké were the 'Mound-builders.' It is not so stated in the *Walum-Olum*. The inference rather is that the 'Snake people' dwelt in the river valleys north of the Ohio River in the area of Western Ohio and Indiana, where the most important earthworks are found — and singularly enough none more remarkable than the [Serpent Mound.] According to the *Red Score*, the Snake people were conquered by the Algonkins long before the contest with the Talliké began. These latter lay between the position then occupied by the Lenape and the eastern territory where they were found by the whites. In other words, the Talliké were on the upper Ohio and its tributaries, and they had to be driven south before the path across the mountains was open." — Brinton, Lenape, 165 and 230–1.

Schoolcraft ridicules the Lenape tradition; says a request for permission to pass through the country is entirely foreign to

the Indian manner of doing things; and that the whole tradition is simply a local rendering of the 20th chapter of Numbers, where the Jewish leader demands a passport through the land of Edom.—Schoolcraft, Iroquois, 315.

The second tradition is one reduced to writing by Cusick, an Iroquois chief, and printed by Beauchamp.

"About this time the northern nations formed a confederacy and seated a great council fire on river St. Lawrence; the northern nations possessed the bank of the great lakes; the countries in the north were plenty of beaver, but the hunters were often opposed by the big snakes. The people live on the south side of the Big Lakes make bread of roots and obtain a kind of potatoes and beans found on the rich soil.

"Perhaps about two thousand two hundred years before Columbus discovered the America and northern nations appointed a prince, and immediately repaired to the south and visited the great Emperor who resided at the Golden City, a capital of the vast empire. After a time the Emperor built many forts throughout his dominions and almost penetrated the Lake Erie; this produced an excitement, the people of the north felt that they would soon be deprived of the country on the south side of the Great Lakes they determined to defend their country against any infringement of foreign people; long bloody wars ensued which perhaps lasted about one hundred years; the people of the north were too skillful in the use of bows and arrows and could endure hardships which proved fatal to a foreign people; at last the northern nations gained the conquest and all the towns and forts were totally destroyed and left them in a heap of ruins." — Cusick, 10.

"Some have thought the Emperor of the Golden City a Mexican monarch, and that the Mound-builders of the Ohio and Mississippi valleys were his subjects." — Beauchamp, 10.

Hale, probably the most competent authority on languages of eastern Indians; expresses himself as follows on these two traditions:—

In regard to Cusick's tradition. "There is not the slightest reason for supposing that this narrative is a fabrication. Cusick's work bears throughout the stamp of perfect sincerity. There is nothing in it drawn from books, or, as far as can be discovered, from any other source than native tradition. Of the Delaware tradition, the purely historical part has, like Cusick's narrative, an authentic air. The country from which the Lenape migrated was Shinaki, 'the land of fir-trees,' not in the west, but in the far north — evidently the woody region north of Lake Superior. The people who joined them in the war against the Alleghewi (or Tallegwi, as they are called in this record), were the Talamatan, no doubt the Huron-Iroquois people, as they existed before their separation. That this river [the 'Messusipu'] was not our Mississippi, is evident from the fact that the works of the Mound-builders extended far to

the westward of the latter river, and would have been encountered by the invading nations, if they had approached it from the west, long before they arrived at its banks. The 'Great River' was apparently the upper St. Lawrence, and most probably that portion of it which flows from Lake Huron to Lake Erie, and which is commonly known as the Detroit River. There can be no reasonable doubt that the Alleghewi or Tallegwi, who have given their name to the Alleghany River and Mountains, were the Mound-builders. The destiny which ultimately befell the Mound-builders can be inferred from what was known of the fate of the Hurons themselves in their final war with the Iroquois. The greater portion of the Huron people were exterminated, and their towns reduced to ashes. Of the survivors many were received and adopted among the conquerers. A few fled to the east and sought protection from the French, while a larger remnant retired to the northwest, and took shelter among the friendly Ojibwas. The fate of the Tallegwi was doubtless similar to that which overtook the descendants of their Huron conquerers. So long as the conflict continued it was a war of extermination. All the conquered were massacred, and all that was perishable in their towns was destroyed. When they finally yielded, many of the captives would be spared to recruit the thinned ranks of their conquerers. Such adoption of defeated enemies is one of the most ancient and cardinal principals of the Huron-Iroquois well-devised political system. It is by no means unlikely that a portion of the Mound Builders may, during the conflict, have separated from the rest, and deliberately united their destiny with those of the conquering race. Either in such an alliance or in the adoption of captive enemies, we may discern the origin of the great Cherokee nation, a people speaking a mixed language which shows evident traces of its mixed origin,—in grammar mainly Huron-Iroquois, and in vocabulary largely recruited from some foreign source. Another portion of the defeated race, fleeing southward, would come directly into the country of the Chahta, or Choctaws. With these the northern conquerers would have no quarrel and the remnant of the Alleghewi would be allowed to remain in peace. Every known fact favors the view that during a period which may be estimated at between one and two thousand years ago, the Ohio valley was occupied by an industrious population of some Indian stock, which had attained a grade of civilization similar to that now held by the village Indians of New Mexico and Arizona; that this population was assailed from the north by less civilized and more warlike tribes of Algonkins and Hurons, acting in a temporary league, similar to those alliances which Pontiac and Tecumseh afterwards rallied against the white colonists; that after a long and wasting war the assailants were victorious; the conquered people were in a great part exterminated; the survivors were either incorporated with the conquering tribes or fled southward and found refuge among the nations which possessed the region lying between the Ohio valley and the Gulf of Mexico; and that this mixture of races has largely modified the language, character and usages of the Cherokee and Choctaw nations."

It may be considered as beyond dispute that the Cherokees are a branch or off-shoot of the Huron-Iroquois family. Their language proves it. "The striking fact has become evident that the course of the migration of the Huron-Cherokee family has been from eastern Canada, on the Lower St. Lawrence, to the mountains of northern Alabama." — Hale, condensed.

It is rather hazardous to venture a definite opinion regarding the region where the events alluded to in these two legends may have occurred. We can at once, however, discard the Mississippi and Missouri rivers from the problem. The most that can be made of the words resembling the former name is that they denote a river abounding in fish. The term "yellow" would naturally be applied by people accustomed only to clear waters flowing through rocky channels or carrying but little silt, to any stream which remains muddy from one rain to the next.

Heckewelder's identification of Detroit as the crossing place may not be incorrect, but it is clearly not supported by the presence of remains that can be attributed to the Mound Builders of Southern Ohio. In fact, no evidences of their occupation are to be found near the rivers connecting the Great Lakes; and the country about the western end of Lake Erie is especially lacking in remains of the Mound Builders or of any prehistoric race closely resembling them. It is true that various references may be found to ancient works in this vicinity; but the enclosures remaining all belong to the same class with those of New York and northern Ohio; and the latter, as we have learned, are undoubtedly of Iroquois construction. The "mounds" are usually so like ordinary beach ridges or wind dunes, that, as one explorer put it, "the only way to tell which is natural and which artificial, is to dig into them. If we find human remains, we know it is a mound; if not, we know it is a dune." It seems to be forgotten these dunes were sought by Indians as sites for residence and burial purposes, and that their shape is continually changing. The wind piles sand on them at one time, and carries it away at another. Articles left on the surface of the ground may thus be covered to a depth of several feet; while others, once deeply buried, may be brought to light. The methods of interment are usually in close accord with those observed in burial places known to belong to the Hurons.

"There are (or have been, for little remains) several tumuli upon and near the bank of the Detroit River, from two to four miles below the city. All are burial mounds. They occupy sandy elevations, fifteen to twenty feet above the water, are conical in shape, five to twenty-five feet in height, and thirty to fifty feet broad. All contain numerous skeletons, both original and intrusive. The former are found on or near the original surface, and are mostly in a sitting posture, and the faces toward the east, and sometimes a dozen or more are found arranged around the center in a circle. In one case, each held in his arms a pot, of unusual size, having a capacity of about two gallons. In other cases, pots are found near the heads. With these skeletons are the usual stone implements. One, and by far the largest of the mounds in the vicinity of Detroit, seems somewhat exceptional in its character. It is situated at the junction of the River Rouge with the Detroit, and was originally probably not less than four hundred feet long by two hundred broad and thirty or forty high. It is built of the light sand of the neighborhood, and contained many hundreds, if not thousands of skeletons, in every stage of decay and burial. It had two or more *pits* filled with great numbers of bones, promiscuously disposed, and apparently corresponding with those used by the Hurons, and some other tribes at their 'Festival of the Dead.' It is hardly possible to dig into the mound at any point, and to any depth from two to ten feet, or even more, without disinterring human bones. Evidences of *cremation* abound in some parts of the mound, and at various depths. The modes of interment are without uniform system." — Hubbard, Relics, condensed.

There is such discrepancy in the measurements of the "Great Mound," that one is in doubt whether to attribute them to guess-work, or to suppose the "light sand" composing it varied in volume at different times. Hubbard's figures are just given; Gillman tells us that

"With a height of 20 feet, it must originally have measured about 300 feet in length by 200 feet in width." — Gillman, M. B., 305.

Peet multiplies this several fold; for he says

"The Detroit mound was originally 700 or 800 feet long, 400 feet wide, 40 feet high." — Peet, Amer. Antiq., July, 1888, 38.

Gillman made some explorations which he thus reports.

"At what was presumed to be its original center, in the River Rouge mound at Detroit, at the depth of three feet human bones were exhumed. At four feet deep occurred abundant evidence of cremation. Then four feet of nothing but sand. Eight feet from the surface were white lime-like masses, each of a few inches in circumference, which subsequent examination proved to be human bones. These, in general ball-like masses continued to a depth of ten and one-half feet, where operations were suspended." — Gillman, Lakes, 327, condensed.

His asertion that "ball-like masses" "a few inches in circumference" were "human bones," is very improbable. We can not imagine in what manner they could be buried to assume this form or reduced to this limit. If the mound is artificial, even in part, the method of burial reported — granting the supposition of burials — shows its erection to have extended over a long period; and while mounds were thus built up in Virginia by tribes allied to the Iroquois, we find nothing of this particular kind of continuous burial in southern Ohio.

Gillman also reports excavations farther north.

> Numerous mounds extend "for about a mile and a half, along the west shore of the [St. Clair] river and of Lake Huron." They "were largely used for burial purposes." In one, "a wide area at one end [was] covered with a solid crust of black ashes, from eighteen inches to two feet thick, containing the bones of various animals used for food, broken pottery, and stone implements. The relics from these mounds [included] an extraordinarily large number of broken stone hammers of the rudest kind." In one "several interments had been made" and some relics were found.— Gillman, M. B., 372.

It is clearly evident that in this case, as in many others, Mr. Gillman was working on the site of an old Indian camping place, on one of the natural sand-dunes so abundant in that region. His "hammers" were the stones which had been used in boiling food. Interments immediately around, or even within, the huts are not uncommon.

* * * * *

On the other hand, if it be assumed that the Allegwi were the Mound Builders; that they met the invaders at either end of Lake Erie; that they were driven from the borders back to the interior; and that, consequently, the last struggle reached its maximum in southern Ohio;—then the progressive development of defensive works will be accounted for. First to be constructed for such purposes, when the great squares and circles and the minor embankments in connection with them became untenable, would be the hill-top enclosures in the same localities. When these no longer sufficed, the original inhabitants, hard pressed on every side, would be driven to the construction of strongholds in rugged, broken country, as exemplified in structures like Fort Hill and the Glenford Fort. This is on the customary hypothesis that all such works are due to the

same people who made the valley enclosures If the aggressors followed closely on the rear of the defeated Tallegwi, and themselves constructed the irregular enclosures and hill-top forts, either the same or the reverse order might be taken. There might be first a temporary fortification, like the smaller hill-top enclosures, where they could find shelter until an opportunity for retreat; and afterwards a permanent defensive work like Fort Hill, where they could be safe as long as they chose to remain. Or the stronger forts could be occupied first, and the others constructed when the waning strength of the Tallegwi emboldened their foes to close in on them.

In regard to Cusick's legend. Since the day of Prescott's thrilling but delusive romance, the city of Montezuma is popularly considered as possessing a monopoly of glitter and brilliancy. Perhaps the only reason for supposing the "Golden City" must mean Mexico is the idea that gold alone can have a luster that makes it attractive; that savages have the same scale of value for metals that is in vogue among ourselves; and, finally, that no evidence exists of the use of this metal by the aborigines north of Mexico. But among the Mound Builders copper seems to have held the rank accorded to gold in modern days; when well polished it has a brightness and beauty surpassing that of any other substance they could procure. If for "Golden City" we were at liberty to substitute "City of Shining Metal," we would have good warrant for supposing copper was meant instead of gold; because the ancient Iroquois were familiar with copper but knew nothing of gold until they learned its name and value from the whites. If, then, there be any merit of truth in Cusick's tradition, there is some inherent probability that the "Golden City" was located at one of the enclosures in the Scioto valley where copper is comparatively plentiful; possibly at the Hopewell group, for here not only copper but all other precious material was most abundant. It is a rather violent assumption that an Iroquois "Prince" should make the journey to Mexico to see its "Emperor," even if he had ever heard of such a ruler; that this "Emperor" should declare war against a tribe hundreds of miles away when he had nothing to gain by it; send a colony of "subjects" on a career of conquest; have them build forts after a manner entirely unknown in the home country; and leave them to their fate.

"Emperor" and "Prince," by both title and office, were as unfamiliar to Iroquois, until they learned of them from whites, as "gold" or "city;" and the same reasons which permit us to substitute chief or sachem for such fanciful titles, give us a right to replace the term "Golden City" by "town where much copper is."

Besides these two traditions, which must refer to some ancient tribe of Ohio, if not to that known as the Mound Builders, Carr shows that the origin or cause of mounds and enclosures was not unknown to various other tribes. The Cherokees, Senecas, Kaskaskias, Piankeshaws, Muskogees, and others say their forefathers constructed such.—Carr, Mounds, 563, *et seq.*

"De Soto, in 1540, could get no tradition concerning them [mounds] beyond the assurance that the peoples he encountered had built them or some of them." — Winsor: History, I, 397.

"The Iroquois believed that the Ohio mounds were the memorial of a war which in ancient times they waged with the Cherokees." — Essays, 69; from Schoolcraft.

"John Norton, the intelligent Mohawk chief [said] that there was a tradition in his tribe that [mounds and enclosures] were constructed by a people who in ancient times occupied a great extent of the country, but who had been extirpated; that there had been long and bloody wars between this people and the Five Nations, in which the latter had been finally victorious. He added that one of the last fortifications which was taken had been obstinately defended; that the warriors of the other four nations of the confederacy had assaulted it without waiting for the Mohawks, and had been repulsed with great loss, but that the latter coming to their assistance the attack was renewed, the place taken, and all who were in it destroyed." — Stone, II, 486, note.

Norton's statement refers to the war with the Eries; at least the last battle between these two nations was fought much as he describes it.

"The Wyandots have always assumed to have been originally at the head of the Iroquois group of tribes. * * * In mentioning the name of this tribe to Mr. J. C. Calhoun, of South Carolina, he said that when at college at New Haven in 1802, a Mr. Williams, a respectable and intelligent man, a half Wyandot, and a person interested in the land claims of Connecticut in Ohio, informed him that the old forts in the Ohio valley were erected some 150 or 200 years before, in the course of a long war which was carried on between the Wyandots (this, I think, to tally with other traditions, should be Iroquois) and the Cherokees. In this war the northern confederates finally prevailed." — Schoolcraft, Iroquois, 162.

* * * * *

The Cherokees are so frequently mentioned in discussing the Mound Builders, as to require further notice.

In 1650 the Cherokees had a tradition which claimed "they came from the west and exterminated the former inhabitants;" and then says they came from the upper parts of the Ohio, where they erected the mounds on Grave Creek, and that they removed hither [i. e., to East Tennessee] from the country where Monticello is situated. They are not noticed by Mr. Jefferson in his table of original tribes which inhabited any part of Virginia at or subsequent to the year 1606, and from then up to 1669. They say themselves that their nation did not erect the mounds, nor paint the figures of the sun and moon upon the rocks where they are now seen." "The mounds exhibited the same appearance at the arrival of the Cherokees as they now do."

"They have a fabulous tradition respecting the mounds which proves that they are beyond the events of their history. The mounds, they say, were caused by the quaking of the earth, and a great noise with it." — Haywood, 225, 234, and 280.

"The Cherokees themselves are as ignorant as we are, by what people or for what purpose these artificial hills were raised; * * * they have a tradition common with other nations of Indians, that they found them in much the same condition as they now appear, when their forefathers arrived from the west and possessed themselves of the country, after vanquishing the nations of red men who then inhabited it, who themselves found these mounts when they took possession of the country, the former possessors delivering the same story concerning them." — Bartrams, 365.

"From the verbal traditions of Mr. Stand Watie [a Cherokee chief], the Cherokees anciently lived at the Otter Peaks in Virginia,* * * and they were in the habit of crossing the Ohio with their war parties." — Schoolcraft, Iroquois, 163.

The Mohican or Stockbridge tribe had a tradition that "many thousand moons ago" the Cherokees, Nanticokes, and some other tribe whose name they had forgotten, came from the south and attacked the Delawares. The latter were overcome, at first, but the Mohicans came to their relief, and the invaders were driven back. The Nanticokes lived on the eastern shore of Maryland, and it is improbable that the Cherokees could have been their neighbors at any time, even though their traditions claim the Powhatans as being a branch of their tribe. Certainly they could not have been in Virginia as late as 1623, for De Soto found them located in Georgia.— Royce, 136 and 137.

"Swimmer, a Cherokee shaman in western North Carolina, told me that formerly the Cherokees constructed mounds in the following manner: A fire was first kindled on the level surface. Around the fire was placed a circle of stones, outside of which were deposited the bodies of seven prominent men. A hollow cedar log to serve as a chimney or

air hole was then fixed perpendicularly above the fire, and the earth was built up around this so as to form a mound. Upon this mound the town house was built, so that the mouth of the fire pit was in the middle of the town house floor. The fire was never allowed to go out, but was always smouldering at the bottom of the hole.

"Some time later, while talking with an intelligent woman in regard to local points of interest, she mentioned the large mound near Franklin, in Macon county, and remarked 'There's a fire at the bottom of that mound.' Without giving her any idea what Swimmer had said, I inquired of her how the fire had got there, when she told substantially the same story. I found on investigation that the belief was general that the fires still existed. On mentioning this tradition to Cyrus Thomas, he stated that in many of the mounds — especially in some which he believed to be of Cherokee origin — there was found what seemed to be the remains of a perpendicular shaft or chimney, generally about a foot in diameter, coming up almost or quite to the top of the mound and running down into it to the original natural level of the ground, and sometimes a short distance below it. This shaft was always filled with ashes and charred remains of wood. No reasonable suggestion had hitherto been offered as to the purpose of these openings, but the Cherokee tradition explained the whole thing. The roof of the Cherokee town house was covered with about a foot of earth; a new town house was usually built upon the site of the old, and as destruction by fire must have been a common accident, each successive burning causing a deposit of a layer of earth a foot or so in depth from the falling roof, it follows that this cause alone would result in time in raising the floor of the town house considerably above the surrounding surface, even if built originally upon the natural level." — Mooney, Cherokee, 167, condensed.

Thomas calls into question the reliability of Cherokee tradition, in so far as it relates to mound building, and devotes twenty pages to a review of the evidence which leads him to the conclusion that the Cherokees were the authors of the works in their territory.— Burial Mounds, 87-107.

THE MODERN INDIAN AS A BUILDER OF MOUNDS.

The subject of mound building by existing or known tribes will be next considered. No comment or explanation is necessary in connection with the quotations or statements, as their meaning and purpose are apparent.

Lucien Carr has made an exhaustive examination of early literature, proving conclusively that the Indian, as known to the whites, cultivated the ground extensively, was a sun worshipper,

and constructed earthen mounds and enclosures, often of great size and area.

La Vega says: "The Indians try to place their villages on elevated sites; but inasmuch as in Florida there are not many sites of this kind where they can conveniently build, they erect elevations themselves in the following manner: They select the spot and carry there a quantity of earth which they form into a kind of platform two or three pikes in height, the summit of which is large enough to give room for twelve, fifteen or twenty houses, to lodge the cacique and his attendants. At the foot of this elevation [is] a square place around which the leading men have their houses. * * * To ascend the elevation they have a straight passage way from bottom to top, fifteen or twenty feet wide." The village of Capaha "has about five hundred good houses, surrounded with a ditch ten or twelve cubits deep, and a width of fifty paces in most places, in others forty. The ditch is filled with water from a canal * * three leagues in length. * * The ditch * * surrounds the town except in one spot, which is enclosed by heavy beams planted in the earth." — Essays, 73.

According to the Century Dictionary, "for some time later" than the fifteenth century, the pike was "from fifteen to twenty feet long. It continued in use, although reduced in length, throughout the seventeenth century."

Biedma remarks: "The caciques of this region were accustomed to erect near the house where they lived very high mounds, and there were some who placed their houses on the top of these mounds." — Essays, 74.

"The 'Portugese Gentleman' tells us that at the very spot where De Soto landed, generally supposed to be somewhere about Tampa Bay, at a town called Ucita, the house of the chief 'stood near the shore upon a very high mound made by hand for strength.' Such mounds are also spoken of by the Huguenot explorers. They served as the site of the chieftain's house in the villages, and from them led a broad smooth road through the village to the water. These descriptions correspond closely to those of the remains which the botanists, John and William Bartram, discovered and reported about a century ago."

"Within the present century the Seminoles of Florida are said to have retained the custom of collecting the slain after a battle and interring them in one large mound. The writer on whose authority I state this, adds that he 'observed on the road from St. Augustine to Tomaka one mound which must have covered two acres of ground,' but this must surely have been a communal burial mound."

"M. Le Page du Pratz * * * observes that the one on which was the house of the Great Sun was 'about eight feet high and twenty feet over on the surface.' He adds that their temple * * * was on a mound about the same height." — Essays, 75, 77, and 78.

"The Indians located along the Yazoo River 'are dispersed over the country upon mounds of earth made with their own hands, from which it is inferred that these nations are very ancient and were formerly very numerous, although at the present time they hardly number two hundred and fifty persons.' This language would seem to imply that at this time there were numerous mounds unoccupied." — La Harpe (about A. D. 1700); in B. E. 12, 653.

"In one of their [the Natchez] villages Dumont notes that the cabin of the chief was elevated on a mound. Father Le Petit [says] the residence of the great chief or 'Brother of the Sun,' as he was called, was erected on a mound of earth carried for that purpose. When the chief died, the house was destroyed, and the same mound was not used as the site of the mansion of his successor, but was left vacant, and a new one was constructed. This interesting fact goes to explain the great number of mounds in some localities." — Essays, 77.

La Vega in his history of Florida, page 231, speaking of a flood in the Mississippi, says that "During similar inundations, * * * the Indians contrive to live on any high or lofty ground or hills, or if there are none they build them with their own hands, principally for the dwelling of the caciques." — B. E., 12, 626.

The name Florida was at that time applied to all the southern country east of the Mississippi.

The historians of De Soto make mention more than once of villages surrounded by walls, and ditches filled with water, the work of the Indians living in them.— B. E., 12, 669.

De Soto found that "on both sides of the [Mississippi] River, the natives lived in walled towns." — Carr, Mounds, 526.

Lawson describes burial under mounds of earth and also of stone; but both seem to be very small.—Lawson, 42-3.

The celebrated shell mound at Old Enterprise, Florida, stands on a ridge partly on the original sea beach and partly on the swamp back of it. In this swamp live the mollusks whose shells have been so important in the construction of the mound. It is evident that the structure is formed of mud and marl brought to the spot from the swamp. After it had been carried to a sufficient height to maintain a dry surface, it was used as a dwelling site, and its elevation gradually increased by refuse from the houses and probably to some extent by additional material occasionally carried in from the swamp.— Dall.

A group of mounds located in the southern part of Union county, Mississippi, is supposed to mark the site of an Indian town near which De Soto encamped one winter. In one of the mounds, which was at least ten feet high before its reduction by cultivation, three feet above the original surface was a saucer-shaped bed of fine ashes six feet in diameter, six inches

thick at the center, and running out to an edge on every side. There was no evidence of fire on the earth above or below, and there were many thin layers as though the ashes had been carried in small quantities and carefully spread out. Within an inch of the bottom of the ashes was a small fragment of glass, apparently broken from a thick bottle. Resting upon the ashes, though not extending to the edge at any part, was a confused mass twelve inches thick of charcoal, soil, ashes, and broken pottery, in which lay an iron knife and a thin silver plate stamped with the arms of Castile and Leon. This seemed an intrusive deposit as there was an unconformity between it and the surrounding earth; but if the mound had ever been opened since its construction, such excavation antedated the settlement of the country by the whites, for the first man who settled in the region was at that time still living only a few rods from the mound and was positive in his statement that it had never been disturbed. At any rate, it would have been impossible to restore the ash-bed to its former condition had it ever been broken; and that it was coeval with the body of the structure is proven by the fact that it reached into undisturbed earth on every side. Moreover, there were found just above the ashes several pieces of glass similar to that which lay five inches beneath their surface, two or three of them being chipped into the form of gunflints, possibly for scrapers. The knife-blade was almost destroyed by rust; the silver plate was not at all corroded, though a hole had been made in one end apparently to suspend it by. There was no trace of bone or other evidence of burial anywhere in the mound; but as the entire mass of clay of which it was composed was very wet and sticky, a skeleton would have disappeared within a comparatively short time. It is quite probable that this mound was opened by the Indians themselves very soon after it was made, and the loose earth, with the relics mentioned placed or thrown in. As the whole group was of one character and apparently of one period, we are justified in placing the date of their construction at about the middle of the sixteenth century — some of them earlier, perhaps, some of them later. Of the eleven mounds opened only this one contained anything of European origin.

The supposed winter camp of De Soto, on the Tallahatchee river, is seven miles from this place.

Jefferson, in his "Notes on Virginia," describes a mound opened by him near Charlottesville; it was plainly an ossuary containing the bones of those who had died at different times or places and were brought hither for interment. He estimates their number at not less than one thousand. He further relates that about the middle of the last century a party of Indians traveling through this section had, without inquiry or instruction, diverged several miles from their road and taken a straight course through the woods to this sepulchre, where they remained several hours seemingly mourning over the dead. Unfortunately, it is not told to what tribe they belonged; had he recorded this, it might have dispelled our ignorance concerning the authors of the mounds in eastern Virginia.

Glass beads and iron bracelets were found with skeletons at the bottom of a mound at Lenoir's, Tennessee. — B. E. 12, 398.

"The Cherokees were in the habit of using just such ornaments as are found in these mounds [in Cherokee territory]." Articles of various sorts found in the mounds of Eastern Tennessee are "precisely similar" to others found about Indian village sites in connection with objects of European make, and answer the description given by early writers of ornaments and utensils made and used by Indians in this locality as well as in Virginia.— Burial Mounds, 94.

"If we can point out a well known race of Indians who, at the time of the discovery, raised mounds and other earthworks, not wholly dissimilar in character and not much inferior in size to those in the Ohio Valley, and who resided not very far away from that region and directly in the line which the Mound Builders are believed by all to have followed in their emigration, then this rule [that the simplest explanation of a given fact or series of facts should always be accepted] constrains us to accept for the present this race as the most probable descendants of the Mound Builders, and seek no further for Toltecs, Asiatics or Brazilians. All these conditions are filled by the Chahta tribes."

"I believe that the evidence is sufficient to justify us in accepting this race [the Chahta-Muskokees] as the constructors of all those extensive mounds, platforms, artificial lakes and circumvallations which are scattered over the Gulf States, Georgia and Florida. The earliest explorers distinctly state that such were used and constructed by these nations in the sixteenth century, and probably had been for many generations." — Essays, 79 and 80.

"Major Sibley * * stated that an ancient chief of the Osage Indians informed him while he was a resident among them, that a large conical mound, which he, Major Sibley was in the habit of seeing every day whilst he resided amongst them, was constructed when he was a boy.

That a chief of his nation * * had unexpectedly died whilst all the men of his tribe were hunting in a distant country. His friends buried him in the usual manner, with his weapons, his earthen pot, and the usual accompaniments, and raised a small mound over his remains. When the nation returned from the hunt, this mound was enlarged at intervals, every man assisting to carry materials, and thus the accumulation of earth went on for a long period until it reached its present height, when they dressed it off at the top to a conical form. The old chief farther said that he had been informed and believed, that all the mounds had a similar origin." — Featherstonehaugh, 70.

According to later authors, the "old chief" was not above playing tricks upon travelers.

"Mr. Collet, of St. Louis, says he made a search for this mound, but was unable to find it." — B. E. 12, 658.

Snyder goes still farther, and denies there are any artificial mounds whatever in that part of Missouri, and asserts that all such features are produced

"by aqueous or glacial action," although Indian burials may have been made upon some of the latter. "I traversed the entire valley of the Osage River. * * * I saw no artificial earthen mounds there of any description." — Snyder, Osages.

At Bellaire, Michigan, north-east from Traverse City, in a mound four feet high and twenty feet in diameter, with a slight depression around the base, was a skeleton, sitting, with feet extended. By it was the outer whorl of a Busycon shell, the outer surface of which was covered with incised lines crossing each other practically at right angles. The skull was very thin, compact as ivory almost, and unusually symmetrical. The crown and forehead were very full and prominent, indicating a high intellectual development. There was nothing Indian in its appearance, and its presence under such conditions is puzzling. Possibly one of the early Jesuits was interred here by his proselytes.

On Rapid river near Traverse City, Michigan, are two mounds, each about six feet high and twenty feet across. An old Chippewa told me that one was erected over Sioux, the other over Chippewas, slain in a battle here in the latter part of the eighteenth century. Several small mounds in upper Michigan cover Sioux, Iroquois and Chippewas; the Indians about there preserve traditions of the fights in which these were

slain and in some cases know the name or family of one who is buried in a given tumulus. A few years ago one of these mounds was opened by some wood-cutters and the bones scattered around. The Indians were furious when they knew of it, and endeavored to find the perpetrators, swearing to slay them if they could be identified.

"A small burial mound on the west shore of Ottawa Point" was opened. "The utensils, trinkets, &c., were all of a period subsequent to the advent of the white man." Consequently, Mr. Gillman decides that this mound was not built by a Mound Builder. He says "such mounds are frequent all along the lake shore, and seems to be invariably of more recent origin than the first-described works. They are generally quite small." — Gillman, M. B., 379.

There is a considerable number of other mounds in the region within a hundred miles around Mackinac Island, which are known to be the work of Sioux, Chippewas and Iroquois. There are traditions, also, among the two first named, of a race in Wisconsin and Minnesota, known as the "Ground House Indians" from their custom of banking and covering their houses with earth; they buried their dead in mounds near the dwellings. These were exterminated in the first half of the seventeenth century.—O. A. H., Dec., 1888.

"I must remark that whatever be the legitimate inference drawn from similar works and remains in other places, concerning the state of civilization attained by the Mound Builders, the evidence here [he had been exploring in the vicinity of Racine] goes to prove that they were an extremely barbarous people, in no respect superior to most of the savage tribes of modern Indians." — Dr. P. R. Hoy: quoted by Lapham, 10.

At the Pipe-Stone quarries "is a mound of a conical form, of ten feet height, which was erected over the body of a distinguished young man, son of a Sioux chief," who was killed there about 1835.— Catlin, Indians, II, 170, note.

Major Powell "has himself seen two burial mounds in process of construction — one in Utah, * * * the other * * * in the valley of the Pitt river." "The evidence in favor of the Indian origin of the western structures has been so great and the facts have been so well known that writers have rarely attributed them to prehistoric peoples." — Introduction, B. E. 12, xlvii.

Uncas, the Mohegan, killed Miantonomo, the Narragansett, in 1643; he "was buried there on the scene of his defeat, * * * and for years afterward, * * * parties of Narragansetts used to visit the spot. * * * A heap of stones was raised over the grave, and no Narragansett came near without adding to the pile." — Fiske: 172.

"A stockade fort had been reared [by the Indians] near the village [Old Piqua] * * * which included a space of about two acres." — Howe: I, 390.

"The Huron-Iroquois were accustomed to fortify their forts or castles with a ditch and wall, the latter surmounted by a stockade." — Carr, Mounds, 592.

Such structures as these and the next would form embankments.

In 1637, the Pequot fort near where Stonington, [Conn.,] now stands "was enclosed by a circle of two or three acres in area, girdled by a palisade of sturdy sapling trunks, set firm and deep into the ground, the narrow interstices between them serving as loop-holes wherefrom to reconnoitre any one passing by and to shoot at assailants."—Fiske: 132.

"The most elaborate structure used for a dwelling by the tribes of the west was the earth lodge. The outline — a circle with an oblong projection toward the east—was carefully measured and traced on the ground, the sod cut from within the figure, and the earth well tramped by the feet of the builders. The framework was of poles, and the dome-shaped roof of closely laid poles was supported by large posts, five or more in number, set in a circle a little back of the central fire-place. Outside the wall of poles great bundles of the coarse prairie grass were laid, and over all a double layer of sods, so that when completed the wall was nearly two feet thick at the bottom, and sloped gently to the line where it joined the roof, which was also very thick. * * * The exterior resembles a mound more than a dwelling." — Fletcher: Omahas.

The decay of such a house would produce a small circular embankment like those of so frequent occurence in Ohio.

Catlin gives a chart showing what he believes to be Mandan remains, from their last village back to the mouth of the Kaskaskia. From the similarity of the Mandan works to those in Ohio, he thinks it probable they all belong to this tribe; a supposition which is strengthened by the close resemblance of the pottery found in the two regions.—Catlin: Indians, appendix.

"This tribe is at present located on the west bank of the Missouri, about 1800 miles above St. Louis, and 200 below the Mouth of the Yellow Stone river. They have two villages and number about 200 souls. These people formerly lived fifteen or twenty miles farther down the river, in ten contiguous villages; the marks or ruins of which are yet plainly to be seen. At that period, evidently their numbers were much greater than at the present day. I think, for various reasons, that they formerly occupied the lower part of the Missouri, and even the Ohio and Muskingum. The river protects two sides of the village; they have therefore but one side to protect, which is effectually done by a strong piquet, and a ditch inside of it, of three or four feet in depth. The piquet is composed of

timbers of a foot or more in diameter, and eighteen feet high, set firmly in the ground at sufficient distances from each other to admit of guns and other missiles to be fired between them. The ditch (unlike that of civilized modes of fortification) is inside of the piquet, in which their warriors screen their bodies, whilst they are reloading and discharging their weapons through the piquets. Their lodges appear from without, to be built entirely of earth. They all have a circular form, and are from forty to sixty feet in diameter. Their foundations are prepared by digging some two feet in the ground. The superstructure is then produced, by arranging, inside of this circular excavation, firmly fixed in the ground and resting against the bank, a barrier or wall of timbers, some eight or nine inches in diameter, of equal height (about six feet) placed on end, and resting against each other, supported by a formidable embankment of earth raised against them outside; then resting upon the tops of these timbers or piles are others of equal size and equal in numbers, of twenty or twenty-five feet in length, resting firmly against each other, and sending their upper or small ends toward the center and top of the lodge; rising at an angle of about forty-five degrees to the apex or sky-light, which is about three or four feet in diameter, answering as a chimney and a sky-light at the same time. The roof of the lodge being thus formed, is supported by beams passing around the inner part of the lodge about the middle of these poles or timbers, and themselves upheld by four or five large posts passing down to the floor of the lodge. On the top of, and over the poles forming the roof, is placed a complete mat of willow-boughs, of half a foot or more in thickness, which protects the timbers from the dampness of the earth, with which the lodge is covered from bottom to top, to the depth of two or three feet; and then with a hard or tough clay, which is impervious to water. At intervals there is a large post, fixed quite firm in the ground, and six or seven feet high, with large wooden pegs or bolts in it, on which are hung all manner of personal effects." — Catlin, Indians, I, 80-3, condensed.

The presence of posts on which various articles were hung suggests an explanation for the holes found at random under mounds or on the sites of villages, where there are other evidences of the former existence of houses.

"The lodges are covered with earth, and so compactly fixed by long use, that men, women and children recline and play upon their tops in pleasant weather." They "were of 40 to 60 feet in diameter." — Catlin, Mandans, 349.

The Minatares and the Riccaries also had earth-covered wigwams. — Catlin, Indians, I, 186 and 204.

"The Ricara lodges are in a circular or octagonal form, and generally about thirty or forty feet in diameter; they are made by placing forked posts about six feet high around the circumference of a circle; these are joined by poles from one fork to another, which are supported

also by other forked poles slanting from the ground; in the center of the lodge are placed four higher forks, about fifteen feet in length, connected together by beams; from these to the lower poles the rafters of the roof are extended so as to leave a vacancy in the middle for the smoke; the frame of the building is then covered with willow branches, with which is interwoven grass, and over this is mud or clay."— L. & C., I, 106.

"The Mandans sacrifice their fingers to the great Spirit, and of their worldly goods, the best and the most costly. * * * A white buffalo robe is a great curiosity, even in the country of buffaloes, and will always command an almost incredible price, from its extreme scarcity; and then, from its being the most costly article of traffic in these regions, it is usually converted into a sacrifice, being offered to the Great Spirit, as the most acceptable gift that can be procured." — Catlin, Indians, I, 133.

"A stranger in the Mandan village is first struck with the different shades of complexion, and various colors of hair which he sees in a crowd about him. * * * There are a great many of these people whose complexions appear as light as half-breeds; and amongst the women particularly, there are many whose skins are almost white, with the most pleasing symmetry and proportion of features; with hazel, with gray, and with blue eyes * * * there may be seen every shade and color of hair that can be seen in our own country, with the exception of red or auburn, which is not to be found. * * * Governor Clark told me, before I started for this place, that I would find the Mandans a strange people and half white." — Catlin, Indians, I, 93.

"The Mandans are a proud, high-toned tribe, and could not bear the idea of losing their name and nationality by being amalgamated with the Arickaras or any other nation.

"There are great diversities of opinions as to what tribe or tribes the Mandans originally belonged. I am inclined to believe they are a distinct tribe, or at least their relationship to other tribes is so very remote that it cannot now be traced. In their language, manners, customs, and modes of life, they are altogether different from the Indians occupying that region of country; and in fact differing from any Indians on the continent of America, so far as my observation extends; and I have some knowledge of a large majority of the existing tribes.

"Apart from their peculiar language and habits, there is a physical peculiarity. A large portion of the Mandans have gray hair, and blue or light brown eyes, with a Jewish cast of features. It is nothing uncommon to see children of both sexes, from five to six years of age, with hair perfectly gray. They are also much fairer than the prairie or mountain tribes; though this may be somewhat attributable to the fact of their living in dirt lodges, and less exposed to the sun than the prairie tribes.

"The scenes described by Catlin, existed almost entirely in the fertile imagination of that gentleman." — D. D. Mitchell.

In a personal letter to Professor Henry, Mr. Kipp, who lived in the Mandan village for thirteen years, asserts that Catlin's statements in regard to the Mandan religious rites, are absolutely accurate. "It is a great pity that Mr. Schoolcraft, who never visited the Mandans, should have put forth such false and unfounded assertions as these on a subject so important to science, and so well established by approved facts." — Kipp, 437.

At Little Bow Creek, about twelve miles below the mouth of the Yankton, was "an old village of the same name. This village, of which nothing remains but the mound of earth about four feet high surrounding it, was built by a Maha chief named Little Bow, who being displeased with Blackbird, the late king, seceded with two hundred followers and settled at this spot, which is now abandoned, as the two villages have reunited." — L. & C., I, 54.

"Immediately opposite our camp [somewhere among the Ricara villages below the Cannonball River] on the north side are the ruins of an ancient fortification, the greater part of which is washed into the river; nor could we discern more than that the walls are eight or ten feet high." — L. & C., I, 108.

About thirty miles above the Cannonball River, "on a point of a hill ninety feet above the plain, are the remains of an old village which is high, strong, and has been fortified; this our chief tells us is the remains of one of the Mandan villages, and are the first ruins which we have seen of that nation." Twelve miles farther up "immediately below [a] bluff and on the declivity of a hill, are the remains of a village covering six or eight acres, formerly occupied by the Mandans, who, says our Ricara chief, once lived in a number of villages on each side of the river, till the Sioux forced them forty miles higher; whence, after a few years residence they moved to their present position." [Further mention is made of] "these villages * * * nine in number, scattered along each side of the river within a space of twenty miles; almost all that remains of them is the wall which surrounded them, the fallen heaps of earth which covered the houses, and occasionally human skulls and the bones and teeth of men, and different animals, which are scattered on the surface of the ground."

Several other abandoned Mandan villages were passed, before their town was reached.— L. & C., I, 112.

The immense walls described on pages 102-3 must be due to Mandans, as we know of no other tribe to whom they could be assigned; provided, of course, they are artificial, of which fact Lewis and Clark seemed to have no doubt.

REPORTED OBJECTS OF MODERN DATE, EXHUMED FROM MOUNDS.

The knowledge that many mounds, with their contents, are of recent origin; the reported discovery in others of articles

which could not be produced by means at command of a primitive artisan; an instinctive protest against the disposition to put forth vague speculations as ascertained facts; desire to correct unfounded belief in a "high civilization;" — are responsible for a tendency on the part of some students to modernize to a greater degree than facts will warrant. The bone object mentioned on page 348 is one example; others will appear on subsequent pages. Two instances which have attained undue prominence led Carr to say,

"That some of them were built after the arrival of the whites * * * is proved by the contents of mounds opened at Circleville and Marietta." — Carr, 588.

He refers to Atwater's record of explorations, which is next presented.

In the center of the circle at Circleville was a mound "about ten feet in height, and several rods in diameter at the base." The level summit "was nearly thirty feet in diameter. * * * The writer was present at its removal, and carefully examined the contents. It contained, (1) Two human skeletons, lying on what had been the original surface of the earth. (2) A great quantity of arrow heads and spear heads. (3) The handle either of a small sword or a large knife, made of an elk's horn; around the end where the blade had been inserted, was a ferrule of silver, which, though black, was not much injured by time. Though the handle showed the hole where the blade had been inserted, yet no iron was found, but an oxyde remained of similar shape and size. (4) Charcoal and wood ashes, on which these articles lay, which was surrounded by several bricks very well burnt. (5) [A plate of mica] about three feet in length, one foot and a half in breadth, and one inch and a half in thickness. (6) A plate of iron, which had become an oxyde; but before it was disturbed by the spade, resembled a plate of cast iron." — Atwater, 177.

Dr. Hildreth describes various relics found in a mound at Marietta in 1819. "Lying immediately over, or on the forehead of the body, were found three large circular bosses, or ornaments for a sword belt, or a buckler; they are composed of copper overlaid with a thick plate of silver. * * * Two small pieces of the leather were found lying between the plates of one of the bosses; they resemble the skin of an old mummy. * * * Around the rivet of one of them is a small quantity of flax or hemp. Near the side of the body was found a plate of silver which appears to have been the upper part of a sword scabbard; it is six inches in length and two inches in breadth, and weighs one ounce; it has no ornaments or figures, but has three longitudinal ridges. * * * It seems to have been fastened to the scabbard by three or four rivets, the holes of which yet remain in the silver. * * * Two or three broken pieces of a copper tube, were also found, filled with iron rust. These pieces

from their appearance, composed the lower end of the scabbard near the point of the sword. No sign of the sword itself was discovered, except the appearance of rust above mentioned." — Atwater, 168.

Thomas also accepts without reserve Atwater's statement in regard to the knife or sword said to have been taken from the mound at Circleville, and says.

"We therefore feel fully justified in giving this mound as one example where evidence of contact with European civilization was found." — B. E. 12, 716.

Putnam, however, who has had the opportunity of making a careful examination and analysis of the articles themselves, demonstrates the incorrectness of such conclusions, by proving that similar specimens are not rare, and that both Atwater and Hildreth were mistaken in their identification of them.

So far as Atwater's "sword handle" from the Circleville mound is concerned, "similar pieces cut from antler have since proved to be common and are generally believed to be handles for small drills and knives made of stone or copper. * * * One has been found with a small stone knife still in the perforated end, and others with small awl-like points of copper inserted." As to the "plate of cast-iron" oxide, "something more definite than this statement is required." — Putnam, Iron, 350.

In the Marietta mound "not a shadow of a sword can be traced in this connection; the point of the supposed scabbard is a common copper bead; the supposed upper part of the scabbard is an ornament of a particular pattern, of which three others almost identical in shape are known from other mounds [one of copper from Cincinnati; one of copper from Franklin, Tennessee; one of meteoric iron from the Little Miami valley], and the 'bosses' or supposed ornaments of a sword belt are ear rings. * * * Not a particle of iron rust could be found in the folds and cavities of the bead, and it can hardly be doubted that the oxide of copper was mistaken by Dr. Hildreth for oxide of iron. * * * The copper had changed to a red carbonate." — Putnam, Iron, 361.

What the supposed "plate of cast-iron" may have been, it is impossible to say. The iron in clay often segregates in such a way as to resemble iron rust; sufficiently, at least, to deceive one who can mistake irregular masses of burned earth for "bricks." Powdered hematite would produce the same appearance.

Another remarkable find at Marietta has been reported; it has escaped comment for the reason, probably, that the specimen is so evidently modern.

"A gold-lined cup in the form of an inverted cone was found in a mound at Marietta, half a mile east of the enclosures. A stream had gradually undermined the mound, and in this situation the cup was noticed by the discoverer. It is a perfectly plain, heavy piece of workmanship, and appears to be of solid silver, with the bottom soldered to the upper portion." — Schoolcraft, Mines, 276, condensed.

The author seems to be convinced that it is a genuine mound relic; though he fails to state the depth at which it was found. The statement should, perhaps, be set aside as without proper authentication, and with it, that of Haywood who, writing of the Grave Creek mound *fifteen years before it was first opened,* says:

"In the interior of this mound, human bones were found, of uncommonly large size; [also] *two or three plates of brass,* with characters inscribed upon them resembling letters, but of what alphabet no one could tell." — Haywood, 330.

Thomas makes reference to various articles, manufactured by whites, found in mounds in Minnesota, Wisconsin, northern Ohio, southern Illinois, Arkansas, North Carolina, Georgia, Florida and Mississippi.— B. E. 12, 713-8.

In every one of these cases, the mounds whose measurements are given are quite small, and none of them are in the "Ohio Mound Builder" region, but in localities where there is plenty of other evidence that the later Indians made small tumuli. To cite a single instance, he gives a plan of several mounds from "2 to 4 feet high," of Iowa and Pottawatomie Indians who were buried in 1830. Black Hawk's grave is between the two groups; it is even smaller than the others.— B. E. 12, 111.

It is rather straining a point to adduce such evidence as this in attempting to prove a recent origin for the large mounds in which no modern articles have been discovered.

Under the skull at the bottom of a mound five feet high in Loudon County, Tennessee, was an engraved tablet of stone. "The engraved characters on it are beyond question letters of the Cherokee alphabet said to have been invented * * * about 1821." Yet the mound, in 1881, "had been covered by a cluster of trees and grapevines as long ago as the oldest settler in the locality could recollect"; and one of them "stated that he had cut trees from it forty years ago." — B. E. 12, 393.

It is not very clear what we are expected to infer from this paragraph unless it be that the mound was erected as late as 1821. But it is as easy to believe that Se-quo-yah, in construct-

ing his alphabet, used marks resembling some that another person had formed, as to think he would invent a series of signs or characters utterly unlike any others ever thought of. Trees would scarcely grow to a size worth cutting in twenty years; and if Cherokees had continued to build mounds for 35 years after the country was settled, we would find the fact stated in some of the early histories.

In his effort to "make out a case" Thomas gives two entirely different descriptions of a peculiar form of interment in Caldwell county, North Carolina.

"The T. F. Nelson triangle *is not a mound but simply a burial pit* [1] in the form of a triangle, the two longest sides each 48 feet and the base 32 feet, in which the bodies and accompanying articles were deposited, and then covered over, but not heaped up into a mound; or, if so, it had subsequently settled until on a level with the natural surface of the ground. The depth of the original excavation varied from 2½ to 3 feet. With one skeleton, the principal personage of the group, were five elongate copper beads or rather small cylinders varying in length from one and a quarter to four and a half inches. These are made of thin pieces of copper cut into strips and then rolled together so that the edges meet in a straight joint on one side. At his right hand were *four* [1] iron specimens, much corroded but still showing the form." * * * *"At the bottom of one of the largest mounds found in this region* [1], the T. F. Nelson triangle heretofore described, and by the side of the principal personage in it, were discovered *three* [1] pieces of iron. A chemical examination shows that these were not made of meteoric iron." — Burial Mounds, 63 and 90, condensed.

This error is repeated in a later report. Thomas flatly contradicts himself by saying that "It is simply a burial pit. * * * The top was not rounded up, but level with the surrounding surface," and subsequently referring to specimens from the pit as "The fragments of iron implements obtained from a mound."— B. E. 12, 335 and 715.

Evidently the specimens were exhumed from a burial pit differing only in its triangular form from many others known, which are the cemeteries of modern Indians.

In the account on pages 97-100, of the works at Aztalan, the true nature of the so-called "bricks" is explained. Some cases of "sun-burned bricks" are also reported.

"The north side of the great mound at Seltzertown, Mississippi, is supported by a wall of sun-dried bricks, two feet thick, filled with

[1] Italics not in the original.

grasses, rushes and leaves. Angular tumuli mark the corners which were formed of large bricks retaining the impression of human hands. Professor Swallow has also observed the imprint of human hands in the clay which enters into some of the ancient structures in the region of New Madrid." — Foster, 112.

The embankments near Helena, Arkansas, were built of sun-dried bricks, mixed with stems and leaves of cane. I could in no instance, find any evidence of the cane having been charred by fire. Nor is there any appearance of finished brick, of which it has been said this wall is built. The clay and stems of cane appear to have been mixed together and moulded into a wall, somewhat after the manner of *pese*." — Cox; quoted by Foster, 113, condensed.

There is no probability that such "bricks," or bricks of any kind as we understand the term, were ever made this side of the Pueblos. The features mentioned in the two preceding extracts are remains of some kind of structures whose nature can not be understood from the description. The construction of the "walls" was no doubt similar to that of the houses.

According to Tonti, the temple of the Tensa Indians "was about 40 feet square, and the walls, 10 feet high and 1 foot thick, were made of earth and straw mixed. The roof was dome-shaped, and about 15 feet high. Around the temple were strong mud walls. * * * We are also told that, at one time, these temples were quite common throughout all the vast region then known as Florida, a majority of the tribes and even many of the villages having their own, and keeping up in them perpetual fires." — Carr, Mounds, 540.

Gravier says of the Arkansas Indians in 1700, "Their cabins are round and vaulted. They are lathed with canes and plastered with mud from bottom to top, within and without, with a good covering of straw." — Shea, 134.

Figure 139 (117, B. E. 12, p. 208) shows the clay floor of a three-room house in Poinsett County, Arkansas; and figure 140 (118, B. E. 12, p. 209) shows the method of lathing the primitive dwellings in the same region. A mound was erected, high enough to raise the surface above the overflow of this swampy region, except in the time of unusual floods, to serve as a foundation. In this particular instance, there were three rooms, each about twelve feet square, with floors of clay; in room *a* blocks were roughly moulded and packed in, while in *b* and *d* the clay was laid in a solid mass. The walls were formed by upright posts, about two feet apart, as indicated by the black circles. Cane or reed lathing was interwoven on these posts and thickly coated with clay inside and out. When one of these buildings was destroyed by fire, the floor was burned to a varying depth, and the plastering converted into a brick-like mass. This is the whole basis for the reported "brick floors" or "brick walls" so often reported. Numerous excavations show the truth of

this statement. First, there is the surface soil; next below, these supposed "bricks," bearing the imprints of canes and twigs and sometimes with impressions of grass or weeds worked into the clay when put upon

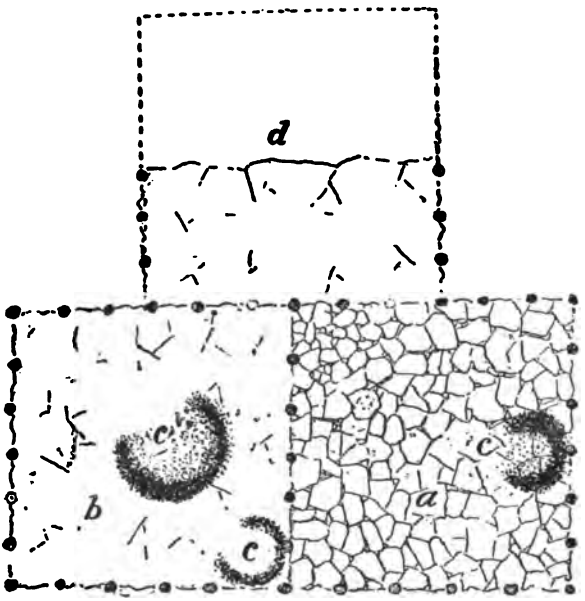


Figure 139.

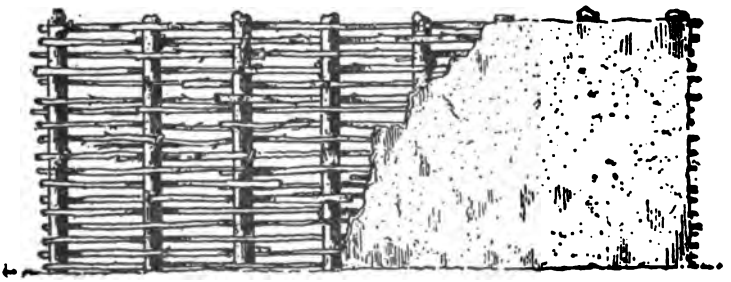


Figure 140 — Hut with Mud Walls and Floor; Arkansas.

the walls, as plasterers mix hair with mortar; beneath this are ash-beds, implements and pottery fragments, resting on the clay floor. Below the floor is the earth of the mound. If further evidence were needed, it is to be had in the fact that not infrequently the nests of mud-daubers, burned hard, are found adhering to the smooth under surface of these fallen walls.— B. E. 12, 208 and 209.

SALT-MAKING.

Foster claims as one of the distinctions between "Mound Builders" and "Indians" that the former understood the manufacture of salt, whereas the latter were ignorant of it. He probably overlooked references to its use in different parts of the country.

"The Knight of Elvas informs us that the natural salt and the sand with which it was intermixed were thrown into baskets made for the purpose. These were large at the mouth and small at the bottom, or, in other words, funnel-shaped. Beneath them—suspended in the air on a ridge-pole—vessels were placed. Water was then poured upon this admixture of sand and salt. The drippings were strained and boiled on the fire until the water was evaporated, and the salt left in the bottom of the pots. * * * To the saline springs of Tennessee and Kentucky the natives constantly resorted from time immemorial, and in large numbers, for the manufacture of this necessary seasoning for food. They also obtained rock salt from natural deposits near the mouth of the Mississippi River." — Jones, 45.

"De Soto found the natives at the saline Springs of Tulla, Arkansas, making salt, which was 'made into small cakes, and vended among the other tribes for skins and mantles.'" — Thruston, Tenn., 82.

Mrs. Mary Ingalls was taken prisoner by the Shawnee Indians in (now) Montgomery County, West Virginia, taken down the Kanawha, to the salt region, and after a few days spent in making salt, to the Scioto. — Collins, II, 55.

At the treaty of Fort Wayne, in 1803, the United States agreed to give the Delawares and Shawnees 150 bushels of salt every year for their title to the salt spring on Saline river, near Shawneetown. Pottery similar to that at the above spring has been found in connection with the stone graves in the Cumberland Valley (1); and also about the salt lick near Ste. Genevieve, Missouri, where the Shawnees and Delawares lived for a time. — B. E. 12, 696.

Smith relates that after Braddock's defeat he was "taken to an Indian town on the west branch of the Muskingum, about twenty miles above the forks, which was called Tullihas." From here they went on a hunt; and "then moved to the buffaloe lick, where we killed several buffalo, and in their small brass kettles they made about half a bushel of salt. I suppose this lick was about thirty or forty miles from the aforesaid town, and somewhere between the Muskingum, Ohio, and Sciota. About the lick was clear, open woods, and thin, white-oak land, and at that time there were large roads leading to the lick, like waggon roads." — Col. Smith, 13.

The first white settlers on the lower Beaver river, in western Pennsylvania, found evidences of the manufacture of salt at the mouth of Brady's Run, a mile from the Ohio. It has always been supposed that this work was done by Indians, as there is no knowledge of salt-

[1] There is a strong sulphur spring at Nashville.

making ever having been carried on there by the whites.— Thomas Wilson.

"None of these tribes upon the Great Plains use salt in any way, although it is easily obtained. I have been unable to prevail on them to use it in any quantity whatever. This applies exclusively to those tribes living entirely on meat; where they eat a variety of vegetable food they use a great deal of salt." — Catlin, Indians, I, 124, condensed.

"The use of salt previous to the arrival of Europeans is likewise claimed by the Indians. They trace the origin of their acquaintance with this valuable condiment, to the observation of the preference given by elks to the water from salt licks; having tasted it, they liked it, and took some to boil their vegetables, and having found it palatable, they boiled down the water in the manner that they had done the sap, and thus obtained salt." They also "profess to have been well acquainted with the art of making maple sugar previous to their intercourse with the white men." — Long, St. Peter's, 116.

Thruston has been quoted before; but as the remains of middle Tennessee, though differing somewhat in character from those of southern Ohio, denote a stage of culture at least equal to that of the Mound Builders, it is deemed appropriate to give here his latest conclusions in the matter. They apply with the same force to our own State.

"The conclusions reached (often unwillingly) as the result of these investigations in all departments of research, historic, ethnological, and traditional, may be briefly stated as follows:

"First. The progress made by the ancient tribes in the direction of civilization or semi-civilization has been overestimated. The stone-grave race and the builders of the ancient mounds and earthworks in Tennessee and probably in the Mississippi Valley were Indians, North American Indians, probably the ancestors of the Southern red or copper-colored Indians found by the whites in this general section, a race formerly living under conditions of life somewhat different from that of the more nomadic hunting tribes of Indians, but not differing from them in the essential characteristics of the Indian race.

"Second. The interesting collection of mounds, earthworks and stone graves found in Tennessee and Southern Kentucky are simply the remains of ancient fortified towns, villages and settlements, once inhabited by tribes of Indians more devoted to agriculture and more stationary in their habits than the hunting tribes generally known to the whites.

"Third. No single implement or article of manufacture or earthwork or defensive work has been found among their remains indicating intelligence or advancement in civilization beyond that of other Indians having intercourse with the whites within the historic period.

"Fourth. The accumulation of dense population in favored localities, and progress made toward civilization, were probably the results of

periods of repose and quiet that enabled these tribes to collect in more permanent habitations, and to pursue for a time more peaceful modes of life than some of their neighbors and successors.

"Fifth. These periods of peace and advancement were probably suceeded by years of wars, invasions, migrations or changes which arrested the limited development in the art of peace and civilization, and left the native tribes in the status in which they were found by the whites.

"These propositions I am satisfied can be successfully maintained, and will afford the most reasonable solution of archæological problems long in controversy.

"Nothing has been found in mound or grave or elsewhere in Tennessee or the Mississippi Valley, showing an advanced state of civilization or semi-civilization. No article has been found requiring in its manufacture skill or intelligence beyond the capacity of the best representative tribes of modern Indians.

"No antiquarian or archæologist can distinguish the implements, pottery, pipes or inscriptions of the mound building people from the same general character of articles manufactured by the more advanced tribes of modern Indians within the historic period. * * * Rare and unique forms of stone, clay, bone, shell and copper; mysterious objects whose exact uses we cannot always discover, beautiful implements, wrought with infinite labor and no little skill have been found in abundance; yet all indicate, or are consistent with, the theory of a comparatively rude and primitive state of society.

"No prehistoric implement, or article of iron, or evidence of manufactured iron, has been found, excepting objects made from the unmelted ores.

"No writing or intelligible inscription indicating a written language or decipherable symbol language, no pictograph or tablet or inscription approaching the higher grades of hieroglyphic writing, no cloth or fabric except of coarse or rude manufacture, no piece of masonry or stone wall, or of architecture worthy of the name, or trace of burned brick wall, has been found.

"Utensils and objects of well-burned clay are found, * * * but they indicate no knowledge of the potter's wheel. They are without glaze and are but comparatively rude conceptions, fashioned by the hand.

"The images or idols of stone found are rude, and belong to a low grade of sculpture.

"Indeed, all the infinite variety of articles and antiquities found within the widely extended limits of the Mississippi Valley, * * * tell only the same story of primitive barbaric life, the life of the town, village and hunting Indian." — Thruston, 376, *et seq.*, 389.

After long study of the results of explorations extending over a number of years and including nearly every state in the Mississippi valley, Professor Thomas, in a bulletin issued by the Bureau of Ethnology ("The Problem of the Ohio Mounds"),

presents the testimony connecting the Mound Builders with the modern Indians. A brief abstract follows:

In chapter I, "The Historical Evidence," he proceeds to show from the early Spanish and French chronicles that the Indians of the southern states erected mounds of considerable size in De Soto's time. Also, from a number of writers within the past century that many different tribes, north and south, piled mounds over their dead.

In chapter II, "Similarity of the Arts and Customs of the Mound Builders to those of Indians," he makes the following heads: —

"*Architecture.*—One of the first circumstances which strike the mind of the archæologist who carefully studies these works as being very significant, is the entire absence in them of architectural knowledge and skill approaching that exhibited by the ruins of Mexico and Central America, or even equalling that exhibited by the Pueblo Indians. * * * In all the mound building area of the United States not the slightest vestige of one [stone edifice] attributable to the people who erected the earthen structures is to be found. The inference is therefore irresistible that the houses of the mound-builders were constructed of perishable materials [and consequently] in this respect at least the dwellings of the mound-builders were similar to those of the Indians." Furthermore, after comparing the results of excavations of numerous mounds with the descriptions of Indian life by early writers, he says: "Numerous other references to the same effect might be given, but these are sufficient to show that the remains found in the mounds of the south are precisely what would result from the destruction by fire of the houses in use by the Indians when first encountered by Europeans."

"*Tribal divisions.*— As the proofs that the mound-builders pertained to various tribes often at war with each other are now too numerous and strong to be longer denied, we may see in them evidences of a social condition similar to that of the Indians."

"*Similarity in burial customs.*—The mortuary customs of the mound builders, as gleaned from an examination of their burial mounds, ancient cemeteries, and other depositories of their dead, present so many striking resemblances to those of the Indians when first encountered by the whites, as to leave little room for doubt regarding their identity." Various methods of burial are cited in evidence; for instance —

"*Removal of the flesh before burial.*—This practice appears to have been followed quite generally by both Indians and mound-builders."

"*Burial beneath or in dwellings.*—[There was] a custom among the mound-builders of Arkansas and Mississippi, of burying in or under their dwellings. * * * It is a well-attested historical fact that such was also the custom of southern Indian tribes."

"*Burial in a sitting or squatting posture.*—It was a very common practice among the mound-builders to bury their dead in a sitting or

squatting posture. * * * The same custom was followed by several of the Indian tribes." [This is not the case as regards Ohio].

"*The use of fire in burial ceremonies.*—The evidences of this custom are so common in the mounds as to lead to the supposition that the mound-builders were in the habit of offering human sacrifices to their deities. * * * Among the Indians fire appears to have been connected with the mortuary ceremonies in several ways."

"*Similarity of their stone implements and ornaments.*—So precisely similar are the articles of this class that it is impossible to distinguish those made by the one people from those made by the other."

"*Mound and Indian pottery.*—The statement so often made that the mound pottery, especially that of Ohio, far excels that of the Indians is not justified by the facts."

In chapter III, "Stone Graves and What They Teach," after describing the different variations of stone graves from the ordinary box or coffin shapes, and recounting the localities in which they are found, he says: —

"Taking all the corroborating facts together there are reasonable grounds for concluding that graves of the type now under consideration, although found in widely separated localities, are attributable to the Shawnees and their congeners, the Delawares and Illinois, and that those south of the Ohio are due entirely to the first-named tribe. * * * The fact that in most instances (except when due to the Delawares, who are not known to have been mound-builders) the graves are connected with mounds, and in many instances are in mounds, sometimes in two, three, and even four tiers deep, proves beyond a doubt that the authors of these graves were mound-builders. [This evidence] forms an unbroken chain connecting the mound-builders and historical Indians which no sophistry or reasoning can break." At the bottom of one of the mounds of the Etowah Group "were found stone graves of precisely the type attributable, when found south of the Ohio, to the Shawnees. * * * In these graves were found the remarkable figured copper plates and certain engraved shells," similar to those found in the stone graves and small mounds in Tennessee and Illinois, as well as in the Hopewell and Turner mounds of Ohio.

In chapter IV, "The Cherokees as Mound-Builders," he shows how the construction of the mounds and the specimens exhumed from them, correspond with the ordinary methods of living and the personal possessions of Cherokees as set forth by those among them at an early day.

In chapter V, "The Cherokees and the Tallegwi," Thomas makes of the alleged similarity in form of the "monitor pipe" characteristic of the Ohio mounds, to that in common use among the Cherokees, a basis for the assertion that the Cherokees are

a remnant of the Mound Builders. But the fact is that the two types are quite different; although there are variations in both, closely approaching each other. It is very true, as he asserts, "that among the specimens obtained from various localities can be found every possible gradation, from the ancient Ohio type to the modern form;" but the same statement is equally true of almost every pattern of implement and ornament in this region. If we accept his conclusion that "There is, therefore, in this peculiar line of art and custom an unbroken chain connecting the mound-builders of Ohio with the Indians of historic times," we are simply admitting as established a tribal relationship of the ancient, or prehistoric, with the modern tribes in any part of the Mississippi valley; for relics, the most diverse in appearance and probable use can by such reasoning be assigned to the same class. He says further: —

> "As pipes of this form have never been found in connection with the stone graves, there are just grounds for eliminating the Shawnees from the supposed authors of the Ohio works." There are also "other reasons for eliminating the Shawnees and other Southern tribes from the supposed authors of the typical Ohio works, * * * but there is nothing of the kind to forbid the supposition that the [Cherokees] were the authors of some of the Ohio works."

In chapter V, also, Thomas analyzes the Lenape Legend and compares it with Cherokee traditions. "It is precisely in accordance with [these traditions] that we find in the Kanawha valley, near the city of Charleston, a very extensive group of ancient works." He finds in the method of mound construction, in the forms of burial, and in the enclosures of Charleston,

> "beyond all reasonable doubt the connecting link between the typical works of Ohio and those of East Tennessee and North Carolina ascribed to the Cherokees. * * * It is at least apparent that the ancient works of the Kanawha valley and other parts of West Virginia are more nearly related to those of Ohio than to those of any other region, and hence they may justly be attributed to the same or cognate tribes. The general movement, therefore, must have been southward as indicated, and the exit of the Ohio Mound Builders was, in all probability, up the Kanawha valley on the same line that the Cherokees appear to have followed in reaching their historical locality." — Thomas, Problem.

* * * * *

Our lack of definite knowledge seems to be considered by various authors a valid excuse for filling libraries with theories

and sentiment. All of them neglect to explain why a great nation covering most of the Mississippi valley should construct its strongest forts in Ohio, leaving hundreds of miles exposed in all directions. They also fail to tell where a foe could exist in sufficient numbers to conquer this great nation almost in a day; for we are told,

"The final overthrow or expulsion of the Mound Builders was so sudden that the mines of Lake Superior were abandoned in such haste as to cause them to leave their implements behind." — McLean, 145.

The wonder seems less, however, when we remember that the "implements" were only bark buckets; shovels or paddles, troughs and bowls, roughly hewed from wood; handspikes, made of saplings; and large bowlders, some with a groove pecked around them. The failure to carry such things on their flight to unknown regions may be due to other causes than necessity for rapid traveling. It might imply only the exercise of a little common sense.

Some earlier writers arrived at conclusions more consistent with observed facts.

"Ignorant as we are and shall ever remain of the internal revolutions, which may have formerly taken place amongst the uncivilized tribes of North America, it is not probable that we can ever know by whom the works in question were erected. Should it appear, from a review of all the facts, that they must be ascribed to a populous and agricultural nation, we must, I think, conclude that this was destroyed by a more barbarous people. It appears at least extremely improbable, that, independently of external causes, or of some great catastrophe, a people once become agricultural should take such a retrograde step, as to degenerate again into a hunting or savage state." — Gallatin, 149.

"Their departure (if they did depart) must have been a matter of necessity. For no people, in any stage of civilization, would willingly have abandoned *such a country.* * * * If they had been made to yield to a more numerous and more gallant people, what country had received the fugitives and what had become of the conquerers? * * * And why had so large a portion of country, so beautiful and inviting, so abounding in all that is desirable, in the rudest as well as the most advanced state of society, been left as a haunt for the beasts of the forests, or as an occasional arena for distant tribes of savages to mingle in mortal conflict?" — Harrison, 222.

These questions are thus answered by Force: —

"Two facts observed among the tribes found here by the Europeans have a bearing upon the possibilities of this inquiry. One is the usage

among them to adopt not only individual captives into their families, but also to receive remnants of reduced tribes into their tribes or confederacies. * * * The other fact is that sedentary tribes, when conquered, retrograded. The Hurons, after they were driven from their homes by the Five Nations, abandoned the practice of living in fortified towns. Even the Five Nations never rebuilt their palisaded works after they were destroyed by the French. The Andastogues * * * living on the Susquehanna in strongly fortified towns, were classed among the partly cultivated tribes. After a continued war with the Five Nations, * * * the few survivors, the Conestogas of Pennsylvania, lingered a poverty-stricken clan, and disappeared in the next century. The Natchez preserved their language after their incorporation into the Creek Nation, but forgot all their other distinctive usages.

"Hence it would be in accordance with what we know of the Indians, if individual members of the Mound Builders were adopted into the tribes that succeeded them, and if some of the remnants of the Mound Builder tribes survived, dropping their customs and industries, either as separate clans or incorporated into the intruding tribes." — Force, 67.

CONCLUSIONS

The main questions concerning the great earthworks of Ohio remain unanswered. We have no data from which can be determined what people built these mounds and enclosures, whence they came, how long they lived here, when or why they left or whether they left at all, whether they were exterminated by other tribes or faded away from natural causes, or what finally became of them.

The evidence at hand is scanty, and mostly negative in its nature, serving rather to correct mistakes than to extend our knowledge. There has been developed, however, a scientific and systematic way of dealing with the subject, by which false impressions due to those who have sought with more zeal than knowledge to light the way for inquiring minds, are being gradually effaced.

It is now well known that many tribes were builders of mounds in quite recent times; but none of their remains are to be compared with those of Ohio, although many efforts have been made to prove that to the ancestors of some or other of these tribes the latter works are to be ascribed. Many other similarities and coincidences, natural enough among unrelated peoples who live under practically the same conditions, have been taken as clews and followed into the wilderness of speculation,

where the theorist soon becomes bewildered and frankly abandons his task, or loses himself in a tangle of words.

In magnitude and intricacy the "geometrical" enclosures and large fortifications of Ohio have no equals; but, as a rule, other remains are less impressive than similar works occurring elsewhere. Externally the ordinary mounds present no remarkable features, unless it be the great size of a few; and in this respect they are surpassed by many in other states. Excepting the Serpent Mound, the few effigies are inferior in size and interest to those of the northwest; the same is true of the flat-topped mounds when compared with the same form farther west and south. The latter appear to have had an origin independent of those in the upper Ohio valley.

The diversity in extent, form, and position, of enclosures in southern Ohio runs counter to the belief that all are due to one race and to one period. The same doubt arises in regard to mounds on hills and those in river valleys. The structure, the character and arrangement of contents, and the different methods of burial, which are so often obvious to an investigator, strongly impress upon his mind the idea that he is dealing with the tangible labors of different peoples. The cairns and the rude stone heaps point to still a third race, perhaps nomadic.

When possible descendants of the Mound Builders are sought among known tribes, search seems narrowed to Cherokees and Mandans; the former, because they are apparently a composite of the Iroquois and some unknown face, preserve traditions of a northern home, and built mounds in the south; the latter, because they differ much in appearance and customs from other Indians, constructed heavy earth walls, and made houses whose ruins resemble small enclosures in Ohio. Catlin's theory of their migration from east of the Mississippi, though it may never be disproved, is not to be accepted; for it is based solely on the occurrence of mounds and enclosures which may as well be due to other, and unknown, people.

The theory of an off-shoot or colony from the far southwest is even more untenable; for while it is possible that the above tribes may be descended from the Mound Builders, the Mound Builders themselves seem to have nothing in common with either the Aztecs or the Pueblo Indians beyond a few small personal possessions which can easily be accounted for by the extensive

traffic of aborigines. The theory would never have gained such strength had Morgan personally examined the Scioto valley enclosures before making his "restoration."

There has not yet been found in one of the larger mounds of Ohio, under circumstances that put beyond question the fact of its being deposited by the original builders, a single article of such pattern or material as to prove incontestably that it was obtained from Europeans. Reported discoveries of this nature are not authenticated; and nothing less can be accepted as positive proof that the structure is of a date more recent than the year 1492. How much earlier than this some of them may have been erected it is impossible to ascertain. Trees on them of the same size as those near by prove nothing except that they are older than the forests; which is self-evident, for they could not well be built on land covered with timber.

Any statement, drawing, or description of remains which attempts to show that the Ohio Mound Builders were a race essentially different from, or of a higher grade than all other native tribes of the United States, or even of the Ohio valley, is not justified by any evidence so far discovered.

And the contrary assertion that they were the ancestors of any tribes living north of the Ohio river, of whom historical or traditional knowledge has been handed down to us, is equally without proof.

We simply do not know who they were.

But we have abundant reason for asserting that in no particular were they superior to, or in advance of, many of the known Indian tribes. They hunted with the same kind of weapons. They worked with similar tools. The various positions in which the bodies are buried, and the character of objects placed with them, are in close accordance with what is observed among many modern Indians. They seem to have been patient and plodding. Agriculture was crudely conducted and practicable only in loose soil. They had no appliances or conveniences for economizing time or lightening labor.

Under such conditions a dense population is impossible, even among the most peaceful people, with no quarrelsome neighbors; intestine disputes, or wars with other tribes, would effectually prevent any appreciable increase in their numbers, no matter how extended their boundaries might be.

But if there was not a word of these vague traditions; if no records such as those of the early French and Spanish explorers were in existence; if no accurate explorations had ever been made; if, in short, we had no evidence of any sort save such as may be derived from the superficial examination of Mound Builder remains alone;—it would be considered an unreasonable proposition that an intellect which could organize a confederacy such as Tecumseh came very near consummating among indifferent or hostile tribes, or a conspiracy like that of Pontiac, which almost wiped out of being the settlements over a wide territory, could not plan earthworks similar, and equal, to those in the Ohio valley. No less invalid is it to assert that a man who will chase a deer a hundred miles or travel several times that distance to attack a foe, or that a woman who will raise a crop of corn, is too lazy to assist in building a mound; or to claim that persons who will maim, starve, mutilate or otherwise maltreat themselves, or will destroy property representing months of labor, on the death of a chieftain or leader, would not be at the trouble to carry a few yards of earth or stones, in conjunction with other mourners, if inclined to show their grief or respect in that manner.

CHAPTER XIII

INDIANS.

False Beliefs Regarding Them. Home Life. Character, as Portrayed by Those Familiar with Them.

THE name "Indian," as generally used is not more definite than the term "European." In the earlier stages at which they were known to the whites, the various tribes, although none of them had passed the lower stage of barbarism, were as diverse in their manner of life as different nations in the old world. The peaceable Mandans or timid "Ground House Indians," and the blood-thirsty Comanches or Apaches; the energetic Iroquois or restless Shawnees or sun-worshipping Natchez, and the stupid Diggers, scarcely more intelligent than beasts;—were as unlike in their characteristics and dispositions as Hollanders and Turks, as Scots and Russian serfs. Yet, all were thrown into a single class, and by common consent the manners and actions most reprobated in our code of morals and behavior are taken as the index of their composite character. The ferocity and implacability of enraged savages who know no other methods of redressing grievances than by the infliction of bodily pain upon the objects of their wrath, have served as a gauge for measuring the ethical and intellectual qualifications of the entire race; while superficial study of the life of Indian communities, by prejudiced persons incapable of interpreting Indian thought and feeling, has led to equally erroneous opinions regarding social and domestic regulations.

The conventional belief in regard to all Indians, in all times, is appositely expressed in a single unjust, unfair, and in some respects untruthful paragraph.

"They [the pioneers] knew him for what he was—filthy, cruel, lecherous and faithless. * * * The greatest Indians, chiefs like Logan and Cornstalk, who were capable of deeds of the loftiest and most sublime heroism, were also at times cruel monsters and good-for-

nothings. Their meaner followers had only such virtues at belong to the human wolf." — Roosevelt: II, 147.

There are two inconsistencies in this sweeping accusation; first, a civilized standard is applied to an uncivilized race; secondly, in order to make their shortcomings more apparent, tribes defending their homes from an immigration which, if successful, must destroy them, are virtually abased from their proper station, poor as it is, to that of brutish savages thus accurately described:—

"But indeed the whole life of these wild, red nomads, the plumed and painted horse-Indians of the Great Plains, belonged to times primeval. It was at once terrible and picturesque, and yet mean in its squalor and laziness. From the Blackfeet in the north to the Comanches in the south, they were all alike; grim lords of the war and the chase; warriors, gamblers, hunters, idlers; fearless, ferocious, treacherous, inconceivably cruel; revengeful and fickle; foul and unclean in life and thought; disdaining work, but capable at times of undergoing unheard-of toil and hardship, and of braving every danger; doomed to live with ever before their eyes death in the form of famine or frost, battle or torture, and schooled to meet it, in whatever shape it came, with fierce and mutterless fortitude." — Roosevelt, IV, 335.

The same inability to perceive the relative values of things from an uncivilized point of view, to adjust his mental vision to the Indian's perspective, leads another writer to say,

"An incapacity for progress is characteristic of his entire career, and a mental inertia which no known power in civilization can overcome, marks his history, with but few exceptions." — Short, 22.

There is an apparent foundation for these strictures; but so far as applied to Indians of the Ohio valley, they are mainly based upon hasty and careless observations, in our own day, of degraded individuals or small bands who have been contaminated by frontier "enlightenment." Despised, despoiled, cheated on every hand, treated as outcasts by the truculent, as legitimate prey by rascally agents and other swindlers, the native American who still remains within territory taken up by the white settlers is not undeserving of the low opinion in which he is held by them. Such as contend for their rights, manfully resist aggression, resent imposition, refuse to submit to unjust and unconscionable deprivation of their natural rights and privileges, are branded as remorseless savages whose extermination is a righteous and lawful duty. From such as are willing to accept existence deprived of nearly everything

that makes existence desirable, "models" are chosen by most of our writers whose statements and conclusions are received as trustworthy by readers who have no opportunity to judge for themselves.

Men like Tecumseh, Pontiac, Joseph, and a score of others whose names are a part of American history, could not have sprung from a degraded and bestial people; the laws of heredity disprove such assumption. The history of nearly every tribe east of the Rocky Mountains proves them to have been a vigorous and hardy race, physically, and in some cases mentally.

There is no record that any Indian, of the eastern United States at least, ever begged for his life in battle or captivity; or that any ever survived more than a few months in slavery.

There is not a large city in any civilized part of the world where are not congregated hundreds and thousands of individuals belonging to the foremost nations, who are as depraved and cruel as the assumed "typical Indian," and who are restrained from the commission of innumerable hideous crimes only by fear of punishment. The same injustice would be done in arraying these ignorant and criminal classes as representative of our culture as in selecting the frontier vagabond for a "type" of the Indian race.

If a majority of authors have falsely represented American Indians as incarnate devils, others, too sentimental, have gone to the opposite extreme and clothed them with attributes more angelic than human; while many romancers have endowed a single individual with some of the best traits of humanity along with some of the most ignoble. A few have soberly written the facts.

Fiske well says:—

"It has long been recognized that Cooper's Indians are more or less unreal; just such creatures never existed anywhere. The secret of Parkman's power is, that his Indians are true to the life. In his pages Pontiac is a man of warm flesh and blood, as much so as Montcalm or Israel Putnam. In reading Prescott's account of the conquest of Mexico, one feels himself in the world of the 'Arabian Nights'; indeed, the author himself, in occasional comments, lets us see that he is unable to get rid of just such a feeling. His story moves on in a region that is unreal to him, and therefore tantalizing to the reader; his Montezuma is a personality like none that ever existed beneath the moon. Prescott was misled by the Spaniards' inevitable misconceptions of the strange Aztec society which they encountered; the Aztecs in his story are unreal. In

his Peruvian story, Prescott made a much truer picture; but he lacked the ethnological knowledge needful for coming into touch with that ancient society." — Fiske, Science, 200-1, condensed.

* * * * *

With the belief that they will materially assist in dispersing the fog which obscures the "Indian question," observations and conclusions by men familiar with Indian character, either from residence among them, or through exceptional opportunities for acquiring authentic information in other ways, will form the bulk of this chapter.

"There is no subject that I know of within the scope and reach of human wisdom, on which the civilized world in this enlightened age are more incorrectly informed than upon that of the true manners and customs, and moral condition, rights and abuses, of the North American Indians." — Catlin, Indians, I, 83.

"Books and the readers of books, have done much to bewilder and perplex the study of Indian character. Fewer theories and more observation, less fancy and more fact, might have brought us to much more correct opinions than those which are now current. The Indian is * * * much more fully under the influence of common-sense notions * * * than he passes for. If he does not come to the same conclusions, on passing questions, as we do, it is precisely because he sees the premises under widely different conditions." — Schoolcraft, 69.

"It would be unjust to form an opinion of the original inhabitants of this country, by reference to their descendants of the present day. In the short period of half a century, they have been so changed, that scarcely a trace remains of what they were, when their country was first entered by the pioneers of our race; an event which sealed their destiny." — Burnet, 392.

"We have seen enough of [Indian] character, to be aware, that very few writers have done more than theorize, and declaim upon the subject. Seldom have they brought to it the only true lights—those of observation and experience." — Flint, I, 156.

"Many a man who has been a few weeks along the frontier, amongst the drunken, naked and beggared part of the Indian race, and run home and written a book on Indians, has no doubt, often seen them eat to beastly excess; and he has also seen them guzzle whiskey * * * and beg a whole week to get meat and whiskey enough for one feast and one carouse; but amongst the wild Indians in this country [the upper Missouri region] there are no beggars—no drunkards—and every man studies to keep his body and mind in healthy shape and condition. * * * There are, however, many * * * occasions * * * when they fast for many days in succession; and others when they can *get* nothing to eat; and at such times (their habits are such) they may be seen to commence with an enormous meal." — Catlin, Indians, I, 123

"In the Indian communities, where there is no law of the land or custom denominating it a vice to drink whiskey, and to get drunk; and where the poor Indian meets whiskey tendered to him by white men, whom he considers wiser than himself, and to whom he naturally looks for example; he thinks it no harm to drink to excess, and will lie drunk as long as he can raise the means to pay for it. And after his first means in his wild state, are exhausted, he becomes a beggar for whiskey, and begs until he disgusts, when the honest pioneer becomes his neighbor; and then, and not before, gets the name of the "poor, degraded, naked, and drunken Indian," to whom the epithets are well and truly applied." — Catlin, Indians, II, 251.

"An opinion which is too current in the world is, that the Indian is necessarily a poor, drunken, murderous wretch. I have traveled several years already amongst these people and I have not had a blow struck me; nor had any occasion to raise my hand against an Indian; nor has my property been stolen. That the Indians in their *native state* are 'drunken,' is false; these people manufacture no spirituous liquor themselves. and knew nothing of it until it was brought into their country and tendered to them by Christians. That these people are 'naked' is equally untrue; many of them dress not only with clothes comfortable for any latitude, but with some considerable taste and elegance. Nor am I quite sure that they are entitled to the name of 'poor' where they are all indulging in the pleasures and amusements of a lifetime of idleness and ease, with no business hours to attend to or professions to learn." — Catlin, I, 210, condensed.

"Mr. McCormick, M. C. from Arizona, well said: 'We have Indians [in Arizona] that differ as much from each other as Americans do from Japanese or Chinese. We have a class of Indians whose tendency is to civilization. We have a large class whose tendency is to barbarism.' There is as much difference between Pueblo and an Apache, or a Nez Perce and an Arapahoe, as there is between a Broadway merchant and a Bowery tough." — Dunn, 25.

* * * * *

Yet, different as they are, and were, all confronted the same problem of food supply. As to the Plains Indians,

"It is difficult to realize how severe was the struggle for existence of primitive man in America before horses and guns were introduced. In those days the securing of daily food must have been a difficult matter for many tribes, and the laying up of provision for the future doubly hard. The great beasts, so easily slaughtered by the rifle, or even by the iron-headed arrow shot into them at close range by a mounted man, must have been well nigh invulnerable to the stone-headed arrow." — Grinnell, 53.

In a land of forests and streams conditions are easier.

"They are acquainted with a great many herbs and roots of which the general part of the English have not the least knowledge. If an

Indian were driven out into the extensive woods, with only a knife and tomohawk, or a small hatchet, it is not to be doubted but he would fatten, even where a wolf would starve. He could soon collect fire, by rubbing two dry pieces of wood together, make a bark hut, earthen vessels, and a bow and arrows; then kill wild game, fish, fresh water tortoises, gather a plentiful variety of vegetables, and live in affluence." — Adair, 410.

"I saw about 450 of the Shawano on a tedious ramble to the Muskohge country; they had been straggling in the woods, for the space of four years, as they assured me, yet in general they were more corpulent than the Chikkasah who accompanied me, notwithstanding they had lived during that time, on the wild products of the American desarts." — Adair, 410, condensed.

"Judging from the quantity and quality of the products of his fields, from the many ways of cooking his food, and from the relatively elaborate character of the table ware used in serving it, we may safely say that he had reached a degree of progress far in advance of what we understand by the term savage. Indeed, in each and every one of these particulars, he had nothing to fear from a comparison with his white neighbor. * * * He certainly showed commendable foresight in his efforts to guard against the proverbial rainy day, by curing and preserving his surplus stores of game, fish and other kinds of food. * * * That these supplies sometimes fell short is, of course, well known. The presence of an enemy, or the failure of his crop or of his hunt might, any time, precipitate a condition of scarcity, such as occasionally occurs in the frontier life of to-day." — Carr, Food, 188.

Assertions of improvidence, lack of energy, and dependence upon spontaneous growth of natural productions for subsistence, are utterly without foundation. From New England to the upper Missouri, from the St. Lawrence to the Gulf states, corn was a staple crop, while other vegetables were raised in abundance.

"The testimony is so uniform that of the main fact — the cultivation of corn in greater or less quantities by all the tribes living east of the Mississippi and south of the St. Lawrence and Great Lakes — there can not be a shadow of doubt. All the early writers agree upon the point, and there is no room for a difference of opinion, except, perhaps, in regard to the amount grown. Upon this point, too, the evidence is explicit. Instead of cultivating it in small patches as a summer luxury, it can be shown, on undoubted authority that everywhere, within the limits named, the Indian looked upon it as a staple article of food, both in summer and winter; that he cultivated it in large fields, and understood and appreciated the benefits arising from the use of fertilizers. Indeed, such was his proficiency and industry, that even with the rude and imperfect implements at his disposal, he not only raised corn enough for his own use, but, as a rule, had some to spare to his needy neighbors, both red and white." — Carr, Mounds, 508.

"That he was a hunter, and as such occupied a place in the first, or lowest stage of development as we have marked it out, is most true. It is, also, true that he was something more, for he was, in a small way, a farmer just like his white neighbor. Indeed, so far as the comforts and conveniences that belong to this condition of life are to be regarded as a measure of progress, he did not materially differ from the advance guard of the band of pioneers that crossed the Alleghanys and won the west to civilization." — Carr, Food, 190.

The Indians had at least four different kinds of corn. "With so many kinds, and planting them at different times during the spring and early summer, they not only had successive crops which they ate green so long as the summer lasted, but they also raised enough for winter use, and not infrequently, had some to spare to their needy neighbors, white as well as red." — Carr, Food, 160.

"Beans were sown in the same hills with the corn; and sometimes in between the rows they planted pumpkins of different kinds, watermelons and sunflowers, though, generally, these latter were cultivated separately in patches by themselves. This was also true of sweet potatoes and tobacco, which were started in beds specially prepared for the purpose." — Carr, Food, 165.

In the Gulf States, De Soto "landed 620 men and 223 horses," besides a large drove of hogs. All these were amply fed from the natives' corn.— Carr, Mounds, 526.

"We find the Spaniards under De Soto feeding almost exclusively on maize, and complaining of the want of meat. Two hundred years later, Bernard Romans says, that nearly one half of the Choctaws have never killed a deer during their lives." — Gallatin, 108.

"They plant their corn in straight rows, putting five or six grains into one hole, about two inches distant. They cover them with clay in the form of a small hill. Each row is a yard asunder, and in the vacant ground they plant pumpkins, watermelons, marshmallows, sunflowers, and sundry sorts of beans and peas, the last two of which yield a large increase. They have a great deal of fruit, and they dry such kinds as will bear it. * * * It is surprising to see the great variety of dishes they make out of wild flesh, corn, beans, peas, potatoes, pompions, dried fruits, herbs and roots. They can diversify their courses, as much as the English, or perhaps the French cooks: and in either of the ways they dress their food, it is grateful to a wholesome stomach." — Adair, 409.

"The *French* had settled at the *Natchez*, without any opposition from these people; so far from opposing them, they did them a great deal of service. * * * Had it not been for the natives, the people must have perished by famine and distress." — Du Pratz, I, 58.

In the time of La Salle, about 1682, "peach, plum, and apple trees were found among the tribes living near the mouth of the Arkansas; and these same tribes are said to have had great quantities of domestic fowls, including flocks of turkeys." — Carr, Mounds, 529.

In December, 1780, "all the country of the Overhill Cherokees was laid waste, a thousand cabins were burned, and fifty thousand bushels of corn were destroyed." — Roosevelt: II, 303.

"All the records tell us that the early colonists in New England, Virginia, and elsewhere throughout the eastern portion of the United States owed their lives on more than one occasion, to the timely supplies of corn begged, bought or stolen from the natives." — Carr, Mounds, 507.

Quotes from Percy, in Purchas Pilgrims: — "It pleased God, after a while, to send these people [Powhatan's Indians] to relieve us with victuals, as Bread, Corne, Fish, and Fleshe in great plenty, which was the setting up of our feeble men, otherwise we had all perished. Also we were frequented by divers Kings in the countrie, bringing us store of provision to our great comfort." [This relates to the "starving time" in Virginia.] — Carr, Mounds, 523.

In 1779, General Sullivan, at the head of the American army, invaded the Iroquois country and is said to have destroyed 160,000 bushels of corn. By the French under Denonville in 1687 four villages of the Senecas were burned, and, including the corn in *cache* and what was standing in the fields 1,200,000 bushels of grain were destroyed. This amount is doubtlessly much exaggerated, but the troops were for several days engaged in cutting up the corn belonging to the four villages." — Carr, Mounds, 513, *et seq.*, condensed.

"The arts of life among them [the Iroquois] had not emerged from their primitive rudeness; and their coarse pottery, their spear and arrow heads of stone, were in no way superior to those of many other tribes. * * * In 1696 * * * Count Frontenac found the maize fields extending a league and a half or two leagues from their villages; and in 1779, the troops of General Sullivan were filled with amazement at their abundant stores of corn, beans, and squashes, and old * * * apple orchards." — Pontiac: I, 16.

General Wayne says of the Maumee country, in 1794, "nor have I ever before beheld such immense fields of corn in any part of America from Canada to Florida." — Carr, Mounds, 533.

After the battle of Fallen Timbers, "but for the corn and vegetables they [the soldiers] obtained from the Indian towns which were scattered thickly along the Maumee they would have suffered from hunger." — Roosevelt, IV., 90.

"The old Indian town of Piqua, the ancient Piqua of the Shawnees, and the birth-place of Tecumseh, was situated on the north side of Mad River, about five miles west of Springfield. * * * At the time of its destruction, Piqua was quite populous. There was a rude log hut within its limits, surrounded by pickets. It was * * * sacked and burnt on the 8th of August (1780). * * * All the improvements of the Indians, including more than two hundred acres of corn and other vegetables then growing in their fields, were laid waste and destroyed."

On their march toward Old Piqua, the army encamped at the Shawnee town of old Chillicothe, about three miles north of Xenia, and twelve

miles from Old Piqua: "on the following day they cut down several hundred acres of corn."

"It was estimated that at the two Indian towns, Chillicothe and Piqua, more than five hundred acres of corn were destroyed, as well as every other species of eatable vegetable. In consequence of this, the Indians were obliged, for the support of their women and children, to employ their whole time in hunting." — Howe: I, 387, 388, and 389.

"The Mandanes and the stationary Minetares cultivate the soil and live in villages. They have been often quarreling with the Ricaras, who like them are an agricultural people." — Gallatin, 125, condensed.

* * * * *

Another count in the indictment against the Indian is his alleged harsh treatment of women. Upon these presumably long-suffering, over-burdened creatures has been expended a vast amount of sympathy for which they would be at a loss to account if they could be made to comprehend it. They are supposed to undergo all the toil, drudgery, privation and misery unavoidably attendant upon the manner of life in which they are compelled to spend their dreary, monotonous days. While the men are lounging about the wigwams, gambling, drinking, or recovering from the effects of a debauch; leisurely smoking while reclining on a grassy bank; fishing or hunting when they can muster sufficient energy for the task; indulging in the pleasure of a predatory foray, or otherwise having a general good time—the poor "squaws" must, so runs the story, till the stubborn ground, amid roots and stumps or in a tough sod, with rude implements of wood, or horn, or bone, or stone; plant, cultivate and gather, the corn, beans, and pumpkins which are to keep life in their half-frozen bodies through the winter; cut up what game may be brought in to them from time to time, and dry or smoke for future use so much of the flesh as may not be at once devoured; daily spend hours in rubbing between two flat stones corn or acorns to provide bread; range through the forest hunting for fallen timber which they can drag home for fuel; toil on their knees day after day dressing skins of animals to make wearing apparel or covers for their miserable apologies for houses; act as pack-horses for the transportation of their belongings when they seek a new home; and with all this submit meekly and uncomplainingly to every manner of contumely, abuse and ill-treatment.

But in reality, no farmer need work so hard as must a hunter whose subsistence depends upon the results of the chase; no Indian woman was ever, unless to escape impending danger, so driven to exhaustion as are many poor white women, in city and country alike, on whom falls a large part of the task of supporting a family. It is safe to say that on most of the smaller and many of the larger farms in the northern and western states, and in nearly all of our tenement houses, nine-tenths of the white women with the average number in family, have an unceasing round from daylight until late at night, winter and summer, year after year, of worry and planning and onerous physical labor that not one-tenth of Indian women, or women of any lower race, have, or ever had, or would endure. They would simply refuse to be so imposed upon.

"That the Indian woman was not the overworked drudge she is usually represented to have been, has been shown elsewhere (Mounds of the Mississippi Valley, Historically Considered). Certainly, if her duties be compared with those that generally fall to the share of the wives and daughters of our early pioneers, her lot cannot, in any sense, be regarded as exceptionally hard. Indeed, it is scarcely possible that it could have been so, since she possessed and used the right of divorce equally with her husband; and it would be too great a tax upon our credulity to ask us to believe that she would have submitted to any very unequal distribution of the labor necessary to the support of the family, when she held the remedy for such injustice in her own hands." — Carr, Women, 212.

"The duties and labors of Indian life are believed to be equally, and not, as has been generally thought, unequally divided between the male and the female. * * * It is the duty of the male to provide food, and of the female to prepare it. * * * To the man belongs not only the business of hunting, for this is an *employment* and not a *pastime,* but the care of the territory, and keeping off intruders and enemies, and the preparation of canoes for travel, and of arms and implements of war. * * * To the share of the hunter's wife [falls] the entire care and control of the lodge. * * * Much of the time of an Indian female, is passed in idleness. This is true not only of a part of every day, but is emphatically so of certain seasons of the year. She has not like the farmer's wife, her cows to milk, her butter and cheese to make, and her flax to spin. She has not to wash and comb and prepare her children every morning to go to school. She has no extensive or fine wardrobe to take care of. She has no books to read. * * * When a skin has been dressed, and a garment made of it, it is worn, till it is worn out. * * * The laundry adds but little to the cares of a forest housekeeper. * * * Her husband is compelled by their necessities, to traverse large tracts, and endure great fatigues, in all weathers in quest of food. * * *

Long absences are often necessary, on these accounts. It is at such times, during the open season, that the Indian female exerts her industry. * * * It is also a part of her duty, at all seasons, to provide fuel for the lodge fire. * * * She takes a [small] hatchet, and after collecting dry limbs in the forest, she breaks them into lengths of about 18 inches. * * * Small as these sticks are * * * but few are required to boil her pot. The lodge, being small, but little heat is required to warm the air, and by suspending the pot by a string from above, over a small blaze, the object is attained. * * * Could the whole of this physical effort (including the cultivation of the soil), therefore, be traced to female hands, which is doubtful, for the old men and boys will often do something, it would not be a very severe imposition." — Schoolcraft, 74.

"Corn-planting, and corn-gathering, * * * are left entirely to the females and children, and a few superannuated old men. It is not generally known, perhaps, that this labor is not compulsory, and that it is assumed by the females as a just equivalent, in their view, for the onerous and continuous labor of the other sex, in providing meats and skins for clothing, by the chase, and in defending their villages against their enemies, and keeping intruders off their territory." — Schoolcraft, 169.

Gravier, writing of the Arkansas Indians in 1700, says, "the men do here what the peasants do in France; they cultivate and dig the earth, plant and harvest the crops, cut the wood and bring it to the cabin, dress the deer and buffalo skins when they have any. They dress them the best of all the Indians that I have seen. The women do only indoor work, make the earthen pots and their clothes." — Shea, 134.

"The character and influence of women, among our red men, have been, and still are greatly misconceived. The females have been often represented as mere slaves of the men, whereas they are not. Each sex has appropriate duties to perform, and according to their ideas of things, the labors and pleasures of life are equitably divided between them." — Atwater, Indians, 111.

"The pride of the good wife is in permitting her husband to do nothing for himself. She * * * does everything that is to be done * * * What she gets in exchange for all this devotion it is impossible to say, but * * * it is absolutely certain that a happier, more light-hearted, more contented woman cannot be found." — Dodge, Indians, 205.

Along the Delaware "the men hunt and fish and provide meat for the household, keep their wives and children in clothing, build and repair the houses and huts, and make fences around the plantations, occasionally assisting in the labors of the field and garden." — Loskiel: Missions. — Quoted in Carr, Mounds, 522.

In nearly all the Indian tribes east of the Mississippi the men usually assisted in the work of raising maize. The Iroquois are an exception; but what "with fighting the French and Hurons on the north; the Miamis and Illinois on the west; the Cherokees, Catawbas, and Shawnees on

the south, to say nothing of his immediate neighbors in New England on the east, it would seem as if his hands were so full as to leave but little time for hunting, much less for raising corn." — Carr, Mounds, 513.

"Singularly enough, too, the reason given by the old chronicler why the [Iroquois] men took no part in the labor, *i. e.*, because 'they were always at war or hunting,' is the same that is to-day made to do duty in justifying the existence of a similar condition of affairs among people who boast not a little of their civilization. Among most of the other tribes north of the Ohio and south of the St. Lawrence, Huron as well as Algonquin, the men not only habitually cleared the ground — no small undertaking, be it understood, in a heavily-timbered region — but they frequently took part in * * * working the crop, and also aided in the labors of the harvest field. This may not have been a part of their duty, but we have the authority of Charlevoix for saying that when asked to aid in the gathering the crop 'they did not scorn to lend a helping hand.'" — Carr, Mounds, 511.

General Ely S. Parker, himself an educated Iroquois, in a letter to Mr. Carr, says, in part:—

"Among all the Indian tribes, especially the more powerful ones, the principle that a man should not demean himself or mar his dignity by cultivating the soil or gathering its product was most strongly inculcated and enforced. It was taught that man's province was war, hunting, and fishing. * * * When any [vigorous] man chose to till the earth, he was at once ostracised from men's society. * * * It is within my recollection that a very large proportion of the Iroquois men did no manual labor whatsoever, because as they argued it was menial and beneath their dignity." — Carr, Mounds, 517.

Before we condemn the Iroquois warrior for thus asserting his dignity at the expense of his women, let us reform the white man who from a similar motive—or a worse one—compels his wife to start the fire on a cold morning; carry in coal; or milk cows in stormy weather. Such culprits are numerous.

Mary Jemison was taken captive in 1775, when quite young, adopted into the Seneca tribe, and spent the remainder of a long life with them. Of the women's work she says "Our labor was not severe; and that of one year was exactly similar in almost every respect to that of the others, without that endless variety that is to be observed in the common labor of the white people. Notwithstanding the Indian women have all the fuel and bread to procure, and the cooking to perform, their task is probably not harder than that of white women, who have those articles provided for them; and their cares are certainly not half as numerous nor as great. In the summer season, we planted, tended, and harvested our corn, and generally had all our children with us; but we had no master to oversee

or drive us, so that we could work as leisurely as we pleased. * * * In order to expedite their business, and at the same time enjoy each other's company, [the women] all work together in one field, or at whatever job they may have on hand. In the spring, they choose an old active squaw to be their driver and overseer, when at labor, for the ensuing year. She accepts the honor, and they consider themselves bound to obey her.

"When the time for planting arrives, and the soil is prepared, the squaws are assembled in the morning, and conducted into a field, where each plants one row. They then go into the next field and plant once across, and so on till they have gone through the tribe. If any remains to be planted, they again commence where they did at first, (in the same field) and so keep on till the whole is finished. By this rule, they perform their labor of every kind, and every jealousy of one having done more or less than another is effectually avoided."

"While the Indians were thus engaged in their round of traditionary performances, with the addition of hunting, their women attended to agriculture, their families, and a few domestic concerns of small consequence, and attended with but little labor." — Seaver, 69-70, and 111.

"The custom of reckoning descent in the female line, is the only way of accounting for many of their institutions, and notably for that singular phase of society in which woman by virtue of her functions as a wife and mother, exercised an influence but little short of despotic, not only in the wigwam but also around the council fire. Even among the Iroquois, her influence was absolutely paramount. Chiefs, warriors and councils were all obliged to yield to her demands when authoritatively expressed; the eloquent Red Jacket, and that magnificent half-breed, Corn-planter, were constrained to do her behests in the face of their repeated declarations to the contrary. Bear in mind that among them the gens or clan, with its privileges and obligations, was, in reality, nothing but a brotherhood of individuals bound together by the ties of blood, and it will at once be seen why woman through whom, alone, this bond of union could be preserved and perpetuated, should have been accorded a prominence which can scarcely be paralleled outside of the realms of fable." — Carr, Woman, 211.

"Of the cabin the wife was the absolute mistress; and not only was this true of the cabin and all that it contained, but she seems also to have owned the fields and the harvests. In fact, we are told that the whole of the land occupied by the tribe belonged to her. At a council held in 1791 the women told Col. Proctor, the American Commissioner, *'we are the owners of this land* — and it is ours.' This claim of the women was made under the most solemn circumstances, and in the most positive manner, and as it was not disputed, we are justified in inferring that it was recognized as valid by those who took part in the council. In another instance, in conjunction with the warriors, they obliged the chiefs to re-open a council that had been declared closed, and to make a sale of lands upon terms which had been previously rejected by these chiefs — Corn-planter among them. These two instances at least justify us in

concluding that, either wholly or in part, the land belonged to the women. According to Morgan the title was vested in all the people of the tribe, including of course females as well as males; and of this there cannot be much doubt in view of the many deeds, receipts, and other official documents that have come down to us, bearing the signatures, conjointly, of the principal women, the chiefs, and the leading warriors." — Carr, Women, 216, condensed.

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It is not to be denied that the Indian is frequently cruel to a supreme degree. But the reason is not far to seek.

"The cruelty of the Indian is inexplicable except on the hypothesis that cruelty is a normal trait of humanity. [It] is inborn and inbred, and it clings to him through life. * * * As a boy, his special delight is the torture of every bird or animal he can get hold of alive. As a man, the torture of a human being gives him more pleasure than any other act of his life. * * * The plains Indian, while not so degraded as many other tribes and peoples of this and the older continent, is as thoroughly savage as any. * * * But, however savage he may be, it is worth while to reflect that the ancestors of the most enlightened nations were at some time in the world's history as savage as he is now." — Dodge, Plains, 416 and 431.

"Cruelty is a trait natural and common to humanity. The savage dances with delight at the groans wrung from his enemy by physical torture; the enlightened gentleman plunges a dagger of courteous words into the heart of his friend, and smiles blandly at his mental torture. I know kindly disposed and estimable savages, who would tie their enemy to the ground, and pleasantly warm themselves by the fire built on his naked breast. I know accomplished gentlemen standing high in the estimation of society, who never use an angry tone, yet whose wives have cause to envy the victim of the savage. Barbarism torments the body; civilization torments the soul. The savage remorselessly takes your scalp, your civilized friend remorselessly swindles you out of your property. The progress of enlightenment of a people would seem to be measurable by * * * the ingenuity and politeness with which mental torture may be inflicted. The actual cruelty is possibly about the same in either case." — Dodge, Indians, 533.

"As I have in a former place said, cruelty is one of the leading traits of the Indian's character; and a little familiarity with their modes of life and government will soon convince the reader, that *certainty* and *cruelty* in punishments are requisite (when individuals undertake to inflict the penalties of the laws), in order to secure the lives and property of individuals in society. In the treatment of their prisoners also, in many tribes * * * cruelties are practiced by way of retaliation; * * * and these cruelties are practiced but upon the few whose lives are required to atone for those who have been similarly dealt with by their enemies, and that the remainder are adopted into the tribe. * * * If their punish-

ments are certain and cruel, they have the merit of being *few*, and those confined chiefly to their enemies. It is natural to be cruel to enemies. * * * To their friends, there are no people on earth that are more kind." — Catlin, Indians, II, 240.

"There are no people that appreciate kindness more than Indians. * * * To force an Indian into measures, is to compel him to dissimulation. If he thinks he is not able to withstand your power, he will wait till he has the vantage ground. Then you will feel the force of the revenge that has burned in his soul. It will burst like a volcano, when you are at least aware of it." — Finley, 420.

This will explain much of the apparent caprice in their treatment of prisoners, now adopting one with all kindness, again putting one to the most terrible torture.

After reciting many instances of outrages by whites upon the Indians, Catlin says: "From these, and hundreds of others that might be named, and equally barbarous, it can easily be seen, that white men may well feel a dread at every step they take in Indian realms, after atrocities like these, that call so loudly and so justly for revenge, in a country where there are no laws to punish; but where the cruel savage takes vengeance in his own way — and white men fall, in the Indian's estimation, not as *murdered* but *executed*, under the common law of their land.

"Of the hundreds and thousands of such *murders* as they are denominated by white men, who are the only ones to tell of them to the civilized world; it should also be kept in mind by the reader, who passes his sentence on them, that they are all committed on Indian ground — that the Indian hunts not, nor tramps anywhere on white man's soil, nor asks him for his lands — or molests the sacred graves where they have deposited the bones of their fathers, their wives and their little children." — Catlin, Indians, II, 254.

"The Indians set a high value on life, and do not willingly risk it. Warriors and chiefs always tried to keep those under their command from exposing themselves, for it was a disgrace for the leader of a war party to lose any of his men. It was their policy to inflict the greatest possible injury on the enemy with the least possible risk to themselves. * * * Their war was one of ambuscades and surprises, and having been educated to this method of fighting, they were not at all fitted to carry on battles in which there was open and steady fighting. * * * The fact that they had been brought up to fight on a different principle from the white man has gained for the Indian the reputation of being cowards, but in later years the warfare of more than one tribe of plains Indians has demonstrated that when they have learned the white man's way of fighting, they are as brave as he." — Grinnell, 153.

The fortitude with which they endure suffering and death under torture, proves them endowed with at least the physical courage that scorns to shrink from pain.

"The personal misfortunes and peculiarities which an Indian has in life stick to him beyond the grave. A one-legged man in life is one-legged to all eternity. * * * A warrior killed in battle and not mutilated, shows, in his future life, no signs of wound; but if the soul be not annihilated by scalping, every mutilation inflicted on the body after death, also mutilates the soul. If the head, or hands, or feet are cut off, or the body ripped open after death, the soul will so appear and exist in the Happy Hunting Grounds. Some believe that if the dead body is transfixed with arrows and left to decay, the soul must always wear and suffer from the phantasms of those arrows. * * * If a body so found, pierced with many arrows, is unscalped, it was the vindictive purpose of the murderers forever to torment the soul." — Dodge, Indians, 180.

Cruelty, either conscious or careless, is, as Dodge remarks, an innate trait of the human race. Like other selfish characteristics, it is manifested in nearly all children and becomes subordinate to higher qualities only through the effect of education and example. A large proportion of the population in the most advanced communities is not susceptible to good influences and requires stringent laws, rigidly enforced, to restrain the tendency toward wanton brutality. Even reputable citizens, individually or as components of a mob, seeking revenge for insult or injury, are seldom content with only such degree of punishment as the offense warrants; almost invariably they inflict a measure of acute physical suffering in addition to all that justice could demand. This peculiarity of temper is a survival of conditions in times when every man was his own guardian; when he who could not resist the encroachment of an aggressor must submit to imposition until he found opportunity for freedom; when strength developed into brutality, and weakness degenerated into hypocrisy and meanness, with indifference to suffering on the part of the one and delight in inflicting it on the part of the other. Only within a few centuries has our own race been partially emancipated from this stage of progress; the disposition remains in many who are restrained only by fear of punishment; but while individuals may be made to bear the penalty of misdeeds, nations guilty of acts of criminal aggression are safe as long as no stronger nation is put to loss or inconvenience.

Nor is it necessary to confine our search to the criminal and degenerate elements of civilization in seeking for parallels to the worst cases of Indian cruelty. We are not compelled to hunt examples among the classes which torture little children to death

for the sake of collecting a small insurance on their lives. Quakers were hung and witches drowned in New England by men from whom many of our "best citizens" are proud to trace descent. The natives of Peru, Mexico, and West Indies were flogged, starved and butchered out of existence by the nation which long maintained the Inquisition and in the closing years of the just gone century followed the same methods with its own people. In the Sepoy rebellion, Britons blew Hindoos into fragments at the cannon's mouth, for the reason that the benighted heathen thought this destruction of the body involved annihilation of the soul. The officials in some southern states are cognizant of the horrible torments of convict camps. The lumber camps of the northwest, into which women are decoyed and kept close prisoners until relieved by insanity or death, have been attacked in the press time and again—and still exist. Criminals, or sometimes those against whom no crime has been proven, are shot to pieces, dragged and beaten to death, slowly strangled, or burned at the stake, by yelling mobs whose ranks contain "representative business men" and "prominent farmers," if we are to believe the reports. The closing year of the nineteenth century witnessed the atrocities of European armies in China.

The frenzy of excitement and anger; the force of suggestion from one mind to another; the influence of example; the principle of mutual support; the intoxication of a desire to surpass one's comrade; the "insanity of a crowd;" will sometimes convert a respectable soldier into a thief and bummer, or will lead a mob to excesses from the mere thought of which many individuals composing it would shrink with horror in cooler moments.

What leads to all this?

It is the destructive and self-protecting spirit, essential to the preservation of primitive man, carried on, latent or suppressed but never wholly extinguished, into the most advanced grades of culture, now bursting the bonds with which it has been confined through all the centuries, and seeking the ancient manner of expression.

Among savage races, all over the world, there is no separate title to any property beyond what each may carry about with him. Land, food, goods, all are held in common. Such community of interest makes them as one family, where the affairs of each concern all the others. A whole tribe is responsible for the action

of any member; a crime or offense of any kind committed by one, can be atoned by punishing another. All the game that is within reach of a village is needed for the sustenance of its inhabitants; consequently, strangers who come within these limits, for hunting, are intruders, and in a sense robbers or marauders, who must be driven away or killed as a matter of self-defense. Resistance kindles anger; the death of a warrior calls for torture of a captive, for, as said before, a private avenger is never satisfied to stop at a degree of punishment commensurate with the offense. Retaliation follows, of course, where possible; so that in time torture becomes a customary mode of execution. The cumulative influences of heredity, custom, and instruction, finally create a callousness of moral sense which feels no compunction at the most outrageous transgressions of justice, and each vies with his fellow in devising some more efficient method of producing excruciating pain.

It was natural that Indians should be more cruel to whites than to their own compeers. Their most desperate efforts towards retaining possession of their lands, availed them nothing; with every war, every purchase, they found themselves crowded farther westward. In desperation, they destroyed life and property wherever found; they gratified their vengeance, and sought to appease the spirits of their slain warriors, by inflicting on prisoners every form of torment their ingenuity could invent. In conformity with their own policy of government, they held every white person responsible for every act of the entire community; there was no question of discriminating innocent from guilty, for from their point of view all were guilty alike of every offense committed against them. Some whites have the same feeling.

"But it must be confessed that these acts of savage cruelty were not all on the side of the Indians. Indeed, had the acts of the pioneers toward the Indians always been characterized by kind treatment and fair dealing, it is doubtful whether the savage cruelties inflicted on them would ever have occurred." The author then describes "one of the most cruel and tragic outrages ever perpetrated by mortal man, whether savage or professedly civilized. This was the butchery of the Moravian Indians, by a party of whites, in 1782." — Finley, 68.

"The conduct of the backwoodsmen toward these peaceful and harmless Christian Indians was utterly abhorrent." — Roosevelt, II, 146.

"The outrages of this class of people [namely, those who believe "an Indian has no more soul than a buffalo"] often incited the savage cruelty of the wild Indians." A description then follows of the slaughter

of the Andastes, or Conestogas, in the jail at Lancaster, Pennsylvania, where they were locked up by the authorities in a vain attempt at protection.— Finley, 118.

Parkman gives a full account of the murder, by a gang of white men, of these helpless and defenseless Indians.— Pontiac, Chap. 24.

At Point Pleasant, Cornstalk, his son, and companions were murdered by a mob of soldiers headed by their captain.— Roosevelt, III, 242.

A party of Arickaras stole all the horses of a party led by one of Bonneville's men. The latter captured two spies "and declared that, unless all the horses were relinquished, the prisoners should be burnt to death." The Arickaras refused to give up all their plunder, though offering a considerable part; "the prisoners * * * made a desperate effort to escape. They partially succeeded, but were severely wounded and retaken; then dragged to the blazing pyre, and burnt to death in the sight of their retreating comrades." — Irving, 225.

Some of Bonneville's men were sent toward Salt Lake. In this party, "one morning, a trapper of a violent and savage character, discovering that his traps had been carried off in the night, took a horrid oath to kill the first Indian he should meet, innocent or guilty. As he was returning with his comrades to camp, he beheld two unfortunate Diggers, seated on the river bank, fishing. Advancing upon them, he leveled his rifle, shot one upon the spot, and flung his bleeding body into the stream. * * * The only punishment this desperado met with was a rebuke from the leader of the party."

These Root Digger, or Shoshokee, Indians, "are a simple, timid, inoffensive race, unpracticed in warfare, and scarce provided with any weapons, excepting for the chase." Nevertheless the trappers feared them. "One day they came to the banks of a stream * * * which they were obliged to ford. Here a great number of Shoshokees were posted on the opposite bank. Persuaded that they were there with hostile intent, they advanced upon them, leveled their rifles, and killed twenty-five of them upon the spot. The rest fled to a short distance, then halted and turned about, howling and whining like wolves, and uttering the most piteous wailings. The trappers chased them in every direction; the poor wretches made no defense, but fled with terror; neither does it appear from the accounts of the boasted victors, that a weapon had been wielded or a weapon launched against them by the Indians throughout the affair." — Irving, 406-7.

General Harrison says: "I wish I could say that the Indians were treated with justice and propriety on all occasions by our citizens; but it is far otherwise. They are often abused and maltreated, and it is very rare that they obtain any satisfaction for the most unprovoked wrongs."— Finley, 197.

Their treatment by the Government itself, through its authorized agents, has been no better. It is one long record of deception and injustice.

"The principal causes of wars with the Indians are:—*First.* Non-fulfillment of treaties by the United States Government. *Second.* Frauds by the Indian agents, and *Third.* Encroachment by the whites."—Blackmore; in Dodge, Plains, xli.

The Sioux outbreak in 1890, to state the matter as briefly as possible, was due to political jobbery; ignorance of Indian character; restriction of the tribe to limited areas where game was almost destroyed; stopping of supplies, until the Indians were half-starved, sick, and shivering with cold; inattention to treaties; and refusal or neglect upon the part of the Government to fulfill promises made in all solemnity.—Mooney, 824, *et seq.*

"The Wyandots, at Upper Sandusky * * * were making rapid strides in civilization, when the policy of government compelled them to abandon their farms, dispose of their stock and other property, at a great sacrifice, and migrate to the 'Far West.'"—Burnet, 386.

"Their [the Cherokees'] history shows that when the improperly directed power of the white race did not absolutely prohibit their advance in civilization some such advance was always attained, and it was always resumed after interruption when possible. * * * Their forced removal in 1838 to the west of the Mississippi for a time * * * menaced their prosperity; yet five years later their energy and determination had exhibited renewed improvements, which continued until the war of the rebellion brought to them more desolation than to any other community. * * * Their country became a waste, and in the few years of the war their numbers were reduced by at least one-third; yet to-day they are more prosperous than ever before and have probably a greater population than at any time since they have been known to history."—B. E. 5, introduction, xliii.

"What motive of ambition was there, to stimulate them to effort; when they were made to feel, that they held their country as tenants at will, liable to be driven off at the pleasure of their oppressors? As soon as they were brought to a situation in which necessity prompted them to industry, and induced them to begin to adopt our manners and habits of life, the covetous eye of the white man was fixed on their incipient improvements, and they received the chilling notice that they must look elsewhere for permanent homes." [The charges made against the Indians of treachery and cowardice are then refuted by showing what these alleged vices really are.]—Burnet, 388.

The Seminole war had its origin in an act as perfidious and dastardly as ever disgraced a freebooter. Osceola

"visited Fort King, in company with his wife and a few friends, for the purpose of trading. Mr. Thompson, the agent, was present, and, while engaged in business, the wife of Osceola was seized as a slave, Evidently having negro blood in her veins, the law pronounced her a slave; and as no other person could show title to her, the pirate who had got possession of her body, was supposed of course to be her owner..

"Osceola became frantic with rage, but was instantly seized and placed in irons, while his wife was hurried away to slave-holding pollution. He remained six days in irons, when, General Thompson says, he became penitent, and was released.

"From the moment when this outrage was committed, the Florida War may be regarded as commenced. Osceola swore vengeance upon Thompson and those who assisted in the perpetration of this indignity." — Giddings, 98.

After seven years of successful resistance to the United States forces,

"Osceola, Wild Cat, and Micanopy, the principal chiefs of the Seminoles, with a large number of their followers, by invitation met officers of the American army under a flag of truce, to negotiate for peace. They were seized, while unsuspicious of such treachery, and imprisoned at St. Augustine." — Giddings, 167-170, condensed.

* * * * *

No stronger vindication of the Government's policy in displacing the Indians has ever been offered than the following, written three-fourths of a century ago. Whatever may be thought of the justice of the argument, its logic is unassailable. If the world is to be run, as it must and should be, on the principle of "the greatest good to the greatest number," this is certainly a case where "the end justifies the means."

"In the ancient states, in the legislative halls, on the floor of congress, from the pulpit and the press, it has been the favorite theme of eloquence, and the readiest passport to estimation for philanthropy and benevolence, to bring up the guilt of having destroyed the past races of this people, and of having possessed ourselves of their land. One would think, it had been discovered, that the population, the improvements, and the social happiness of our great political edifice, ought never to have been erected in the place of these habitations of cruelty. * * * It is as unchangeable, as the laws of nature, that savages should give place to civilized man. We conceive that it is not altogether owing either to the proximity of the whites, to ardent spirits, or smallpox, that the Indian tribes are constantly diminishing.

"The ten thousand mounds in this valley, the rude memorials of an immensely numerous former population, but to our view no more civilized, then the present races, are proofs that the country was depopulated, when white men first became acquainted with it. If we can infer nothing else from the mounds, we can clearly infer, that this country once had its millions. Their places are occupied by a race, who were depopulating in their turn, when our forefathers first saw this country. Who of them owned the land, that we now inhabit? The races that lie buried and forgotten on these plains? or the tribes, that advanced to-day,

to dispossess the present occupants, to be dispossessed in their turn by another race? We firmly believe, that all ideas of property in the lands, over which they roamed after game, have been derived from seeing the value, which lands acquire from the occupancy of the whites. It is out of all question, that ages before they had seen white men, they were divided, as now, into a hundred petty tribes, engaged, as but for the interference of our Government they would now be, in endless and exterminating wars. If they found the country, that pleased them, full of game and unoccupied, they fixed themselves there peacefully. If occupied, they made upon the occupants a war of extermination. They are evidently depopulating, not only in the proximity of our people, but in regions too remote, to be affected by our contiguity." [The author then proceeds to show that the contrary is the case among the tribes which have adopted a settled agricultural life.] — Flint, I, 162, *et seq.*, condensed.

* * * * *

"'Two hundred years ago it required millions to express in numbers the Indian population, while at present less than half that number of thousands will suffice for the purpose.' This quotation from General Custer is a concise expression of the most common and, perhaps, the most remarkable delusion concerning the American Indians. It would give a population of 540,000,000 for two hundred years ago. Within the bounds of the United States at the time of the discovery by Columbus there were possibly 1,000,000 Indians, but more probably there were only about half that number." — Dunn, 1, condensed.

Even half a million is a very liberal estimate, if we may rely upon the correctness of results reached by those who have studied the matter thoroughly. It is not probable that the aboriginal population of the United States was ever much, if any, greater than it is at present.

"Schoolcraft says it would take 8,000 acres of land to support a single Indian by the chase; or 40,000 for a family of five persons. The United States would, on this basis, support 240,000.— Dunn, 2.

Schoolcraft's estimate is absurd. No one man could eat all the rabbits that would attain maturity on 8,000 acres; not to mention turkeys and other birds, raccoons, opossums, groundhogs, deer and bears. As to the objection sometimes urged, that large carnivorous animals would destroy most of the smaller game, it is plain that the Indian would destroy enough carnivora to allow a sufficient increase in the game for his own use; or, in a pinch, he would eat the carnivore itself.

"Capt. Smith, in a voyage to this coast in 1614, supposed that on the Massachusetts islands there were about three thousand Indians.

* * * Three years before the arrival of the Plymouth colony, a very mortal sickness, supposed to have been the plague or yellow fever, raged with great violence among those in the eastern parts of New England. Whole towns were depopulated. The living were not able to bury the dead; and their bones were found lying above ground many years after. The Massachusetts Indians are said to have been reduced from three thousand to three hundred fighting men." — Trumbull, 111.

The country occupied by the Powhatan confederacy was fertile and salubrious; yet, in 1669 they numbered less than 3,000.— Dunn, 4.

"At the conference with the five cantons at Albany, in 1677, the number of warriors was carefully made out at 2,150, giving [on the basis of five persons to each able-bodied man] a population of 10,750, and this was the strength of the [Iroquois] confederacy reported by an agent of the governor of Virginia, who had been specially despatched to the conference for the purpose of obtaining this fact." — Schoolcraft, Iroquois, 23.

"About the year 1700, the Iroquois reached their culminating point. * * * Having established their dominion securely against all races of Indian lineage * * * they would seem to have prepared themselves for a still higher progress, through the pursuits of peace." — Iroquois, 15.

"About the year 1650, * * * their total population may be safely placed at 25,000." — Iroquois, 26.

"When we declared ourselves an independent nation * * * the Iroquois * * * numbered only some ten or twelve thousand all told. * * * Between the Tennessee and the Gulf the so-called Appalachians lived. In all they amounted to perhaps seventy thousand souls." — Roosevelt, I, 49.

"An estimate by Colonel Morgan, probably very accurate," shows that in 1778 "the number of warriors in different tribes, who could at any time within a few weeks be assembled to fall upon the frontiers," including all from the Mohawk to the Wabash and from the Ohio to the Upper Lakes, amounted to 10,000.— Hildreth, 129.

"During the forty years intervening between Braddock's defeat and Wayne's victory, * * * these northwestern tribes * * * never at any one time had more than three thousand warriors in the field, and frequently not half that number." — Roosevelt: I, 78.

We have assurance that this insignificant figure is not too small; for

at the battle of Fallen Timbers the force opposed to Wayne was made up from "the Shawnees, Delawares, Wyandots, Ottawas, Miamis, Pottowattamies, Chippewas and Iroquois." — Roosevelt, IV, 85.

In Ohio, Indian towns of a thousand inhabitants were rare. No reason exists for supposing a different state of affairs in prehistoric times. The conditions of life were practically the same;

and from all indications they were met in pretty much the same way.

* * * * *

It seems incredible that this sparse population, thinly scattered over an area now comprising all or parts of eight large states, could be able to terrorize a frontier hundreds of miles in length for more than a generation. To berate such a foe as "cowardly" or "a mob of savages," is no compliment to the tardy victors.

From two considerable wars, it will be seen that Indians possessed no small degree of military skill.

"The forest tribes are exceedingly formidable opponents; it is not too much to say that they formed a far more serious obstacle to the American advance than would have been offered by an equal number of the best European troops. * * * Their victories over Braddock, Grant, and St. Clair [were] gained in each case with a smaller force. * * * Almost all the victories, even of the backwoodsmen, were won against inferior numbers of the Indians." — Roosevelt, II, 372.

"At the Kanawha the Americans outnumbered their foes, at King's Mountain they were no more than equal; yet in the former battle they suffered twice as much as they did in the latter, inflicted much less damage in return, and did not gain nearly so decisive a victory." — Roosevelt: II, 373.

The Americans were victorious at Kanawha only because they adopted Indian tactics.— Roosevelt: III, 233.

The following statements are from reports of army officers who took part in or were connected with the war against the Seminoles.

General Clinch (p. 182) — "I never believed, however, that the Seminoles could have concentrated more than from 1,200 to 1,500 fighters, including negroes."

General Scott (p. 441)—"Of fighting men, including blacks, I do not believe they have more than 1,200 in all Florida, and I am morally certain that, of that number, not more than 500 have been imbodied at any time since the commencement of hostilities."

General Scott (p. 331) — "It is now my opinion that the Seminoles cannot be promptly reduced to submission by a force much short of 5,000 men, and that the greater part of this force ought to be mounted."

Captain Thruston (p. 424), in command of the right wing, reports his force at 1,968 men and two six-pounder cannon.

General Eustis (p. 427), commanding the left wing, began his march with 1,400 men.

Colonel Lindsay, of the center (p. 428), gives his force as eleven companies and one battalion, without stating the number.

General Jesup, in command, June 5, 1837 (p. 88) — "This campaign, so far as relates to Indian emigration, has entirely failed. The Indians, generally, would prefer death to removal from the country, and nothing short of extermination will free us from them. Not a single first-rate warrior has surrendered since the commencement of the war; nor has a single instance occurred of a Seminole having proved false to his country." — H. R., 25

"The Seminole war of 1835 to 1842 was the most stubbornly contested of all the Indian wars, and, considering the numerical force of the tribe, or perhaps even without that qualification, was the most costly and disastrous to the United States. During the seven years mentioned nearly every regiment of the regular army was engaged against them, besides marines and sailors, and in addition, for longer or shorter periods, 50,000 militia and volunteers. The cost of the war was $30,000,000 and over 3,000 lives. Of the Seminole probably not more than 400 warriors were engaged, their numerical weakness being counter-balanced by the topographic character of the country which they defended." — B. E. 5, introduction, xlix.

One of the foremost of American Indians, worthy to take his place with the greatest chiefs of whom history preserves a record, is Joseph, the Nez Perce. Of magnificent physique, with a strong and noble face, a keen and penetrating glance, he impresses one as a man who under favorable circumstances would have earned a place among noted commanders. The highest military qualities were displayed by him in his retreat in 1877, as so graphically described by Mooney, and also by General Howard whose volume from beginning to end reads like one long apology.

A bare recital of facts will establish his claim to uncommon ability.

"As is generally the case with Indian wars," the Nez Perce war of 1877, "originated in the unauthorized intrusion of lawless whites." The Nez Perces had been removed to smaller reservations as whites encroached on them from time to time, in violation of solemn promises by the Government. Finally, "while the Nez Perces were gathering up their stock to remove to the [last] reservation selected, a band of white robbers attacked them, ran off the cattle, and killed one of the party in charge." Exasperated beyond endurance, "the enraged Nez Perces attacked the neighboring settlement on White Bird Creek, Idaho, and killed 21 persons. The war was begun." In the first three fights the troops lost 84 killed and wounded. "Then began one of the most remarkable exhibitions of generalship in the history of our Indian wars, a retreat worthy to be remembered with that of the storied ten thousand. With hardly a

hundred warriors, and impeded by more than 350 helpless women and children — with General Howard behind, with Colonel Miles in front, and with Col. Sturgis and the Crow scouts coming down upon his flank — Chief Joseph led his little band up the Clearwater and across the mountains into Montana, turning at Big Hole Pass long enough to beat back his pursuers with a loss of 160 men; then on by devious mountain trails southeast to Yellowstone Park, where he again turned on Howard and drove him back with additional loss of men and horses; then out of Wyoming and north into Montana again, hoping to find safety on Canadian soil, until intercepted in the neighborhood of the Yellowstone by Colonel Sturgis in front with fresh troops and a detachment of Crow scouts, with whom they sustained two more encounters, this time with a heavy loss of men and horses to themselves; then again eluding their pursuers, this handful of starving and worn-out warriors, now reduced to scarcely fifty able men, carrying their wounded and their helpless families, crossed the Missouri and entered the Bearpaw mountains. But new enemies were on their trail, and at last, when within fifty miles of the land of refuge, Miles with a fresh army, cut off their retreat by a decisive blow, capturing more than half their horses, killing a number of the band, including Joseph's brother and the noted chief Looking Glass, and wounding forty others.

"Forced either to surrender or to abandon the helpless wounded, the women and children, Joseph chose to surrender to Colonel Miles, * * * after a masterly retreat of more than a thousand miles. He claimed that this was a conditional surrender, with a distinct promise that he should go back to Idaho in the spring. * * * Seven years passed before the promise was kept, and in the meantime the band had been reduced by disease and death in Indian Territory from about 450 to about 280."

"In all our sad Indian history there is nothing to exceed in pathetic eloquence the surrender speech of the Nez Perce chief." — Mooney, 713, *et seq.*

When he found it impossible to advance, Joseph sent the following message which was taken verbatim on the spot by Lieutenant Wood: —

"Tell General Howard I know his heart. What he told me before I have in my heart. I am tired of fighting. Our chiefs are killed. Looking Glass is dead. Too-hul-hul-sote is dead. The old men are all dead. It is the young men who say yes or no. He who led on the young men is dead. It is cold and we have no blankets. The little children are freezing to death. My people, some of them, have run away to the hills, and have no blankets, no food; no one knows where they are — perhaps freezing to death. I want to have time to look for my children and see how many of them I can find. Maybe I shall find them among the dead. Hear me, my chiefs. I am tired; my heart is sick and sad. From where the sun now stands I will fight no more forever."—Secy. War, 630.

* * * * *

There is a fascination about life in mountains and deep forests, on large rivers and the great plains, that no man after prolonged experience can ever overcome. The hard labor, the exposure, the absence from home and friends, the almost absolute certainty that if old age outcreeps death he will eventually find himself without means and unable to work, have no terrors for him. He yearns for the free independent life, the open air, direct communion with the multitude of things he does not pretend to understand with his mind but none the less feels deeply in his soul. Allusion is not made to those who may own large tracts of land or hold positions on river steamers; but to humbler persons who are forced to daily labor for daily bread. As hunter or trapper, as fisherman or raftsman, as hermit or inmate of a "shanty boat," Nature claims him; the dormant instincts of primeval life are awakened and civilization lose its attractions for him. Almost invariably he deteriorates; he becomes indifferent to his manner, his appearance, his food. He is a barbarian once more; and if his lot is cast among a primitive race, he becomes as the worst of them. No greater atrocities were ever committed among savages or pirates than by the renegade or "the gentleman gone to seed."

"[With] reference to the white people, who have been taken prisoners in childhood, and brought up among the Indians. In every such case, the child of civilization has become the ferocious adult of the forest, manifesting all the peculiarities, tastes and preferences of the native Indians." — Burnet, 386.

It is not always that white men thus degenerate; often they form partnerships and make their homes deep in the wilderness. Thousands of lonely graves or bleaching skeletons mark the last stopping place of those whose friends are ignorant of their fate.

At the Mandan village, on the return journey, one of the party named Colter asked for his discharge in order that he might accompany two trappers up the river. His request was granted. "The example of this man shows how easily men may be weaned from the habits of a civilized life to the ruder but scarcely less fascinating manners of the woods. This hunter had now been absent many years from the frontiers, and might naturally be presumed to have some anxiety, or some curiosity at least to return to his friends and his country; yet just at the moment when he is ap-

proaching the frontiers, he is tempted by a hunting scheme, to give up those delightful prospects, and go back without the least reluctance to the solitude of the woods." — L. & C., II, 408.

Small wonder, then, that a few years of irksome study, in strange, unpleasant surroundings, fail to convince "wild Indian" boys or girls of the advantages of an education that fits them for life in a city. The hereditary influences of centuries are not thus overcome. A cat will never learn to like corn from being stuffed with it continuously.

* * * * *

It has been shown that the Indian of the central valley was neither so barbarous nor so lazy as usually represented. It remains to be proven that morally and intellectually he is far from being as black as he is painted.

"By nature they are decent and modest, unassuming and inoffensive—and all history (which I could quote to the end of a volume), proves them to have been found friendly and hospitable, on the first approach of white people to their villages on all parts of the American Continent — and from what I have *seen*, (which I offer as proof rather than what I have *read*), I am willing and proud to add, for the ages who are only to read of these people, my testimony to that which was given by the immortal Columbus, who wrote back to his Royal Master and Mistress, from his first position on the new continent, 'I swear to your Majesties, that there is not a better people in the world than these; more affectionate, affable, or mild. They love their neighbors as themselves, and they always speak smilingly.'" — Catlin, Indians, II, 245.

"The Wyandots were always a humane and hospitable nation. This is clearly manifested in their suffering their former enemies to settle on their lands, when driven back before the white population * * Another proof of their humanity is their treatment of their prisoners, the most of whom they adopted into their families, and some in the place of their own chiefs who had fallen in battle." — Finley, 95-6.

Bonneville says of the Nez Perces: "Their honesty is immaculate, and their purity of purpose, and their observances of the rites of their religion, are most uniform and remarkable. They are certainly more like a nation of saints than a horde of savages." — Irving, 130.

At one time Captain Bonneville's men met a party of Nez Perces, who "were on a hunting expedition, but had been almost famished on the march. They had no provisions left but a few dried salmon, yet finding the white men equally in want, they generously offered to share this meagre pittance, and frequently repeated the offer, with an earnestness that left no doubt of their sincerity." — Irving, 124.

Later "they were joined by a party of five families of Nez Perces. A more forlorn set they had never encountered; they had not a morsel of

meat or fish; nor anything to subsist on, excepting roots, wild rose-buds, the bark of certain plants, and other vegetable productions; yet of these they furnished Bonneville's men a supply from their own store. A few days afterwards four of them went hunting. In the course of four or five days they returned laden with meat. The poor savages generously shared with them the spoils of their hunting; giving them food enough to last for several days.— Irving, 127, condensed.

"To each other I have found these people kind and hospitable, and endowed with every feeling of parental, of filial and conjugal affection, that is met in more enlightened communities. I have found them moral and religious; and I am bound to give them great credit for their zeal, which is often exhibited in their modes of worship." — Catlin, Indians, II, 242.

Mary Jemison says, "Nothwithstanding all that has been said against the Indians, in consequence of their cruelties to their enemies — cruelties that I have witnessed and had abundant proof of — it is a fact that they are naturally kind, tender, and peaceable toward their friends, and strictly honest; and that those cruelties have been practiced only upon their enemies according to their idea of justice." — Seaver, 73.

"I look upon the Indians as the most honest and honorable race of people that I have ever lived amongst in my life; and in their native state, I pledge you my honor they are the last of all the human family to pilfer or to steal, if you trust to their honor; and for this never-ending and boundless system of theft and plunder and debauchery * * by acquisitive white men, I consider [stealing] a few horses, but a lenient punishment."— Catlin, Indians, I, 46.

"These Indians [the Seminoles[are a cleanly, healthful and thoroughly peaceful people. They are a truth-loving class; liars among them are held in utter contempt. Lewdness is an unknown sin. They seldom commit crime, and their only punishment for it is ostracism. Murder and wife-beating are the worst of their crimes. Wife-beating is not tolerated. The chief social reason for their slow propagation is the custom of counenancing no marriage of persons who have a drop of the same blood in their veins. The mothers, although intensely fond of their offsprings, will allow them to stuff themselves with food and indigestible substances. If the parents knew more of diet the race would rapidly increase for a stronger, sounder people are not to be found on the earth. The school is not largely attended, because of the prejudice among them against the government." — Brecht, 683, condensed.

One winter during Smith's captivity, he was in camp with only an old man and a little boy, the former too badly crippled with rheumatism to stir abroad. Smith had been very unsuccessful in hunting and the party was in dire straits. On coming in one night, faint with hunger and fatigue, the chief had the boy make a soup of bones gathered up around the camp, all of which he gave to Smith.

"He then said he had something of importance to tell me; * * the reason why he had deferred his speech till now, was because few men are in a right humor to hear good talk, when they are extremely hungry, as they are then generally fretful and discomposed. * *

"*Brother*, I know that you are now afraid that we will all perish with hunger, but you have no just reason to fear this.

"'*Brother*, I have been young, but am now old — I have been frequently under the like circumstances that we are now, and that some time or other in almost every year of my life; yet, I have hitherto been supported, and my wants supplied in time of need.

"'*Brother*, Owanyee some times suffers us to be in want, in order to teach us our dependance upon him, and to let us know that we are to love and serve him; and likewise to know the worth of the favors that we receive, and to make us more thankful.

"'*Brother*, Be assured that you will be supplied with food, and that just in the right time; * * be strong and exert yourself like a man, and the great spirit will direct your way.'"

The next morning Smith determined to make an effort to reach the white settlements; the chances were all against his reaching them, but starvation was imminent where he was. While making his way eastward, he saw a buffalo, which he managed to kill; after eating, he carried a load of the meat back to camp. In a few pathetic lines he describes his remorse when he contrasts the trust and gratitude of the old Indian, with his own turpitude in deciding to abandon these two helpless persons in the depths of winter. — Col. Smith, 89.

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"Were any of the American languages suitable for employment in literary composition? * * Mr. Ernest Renan * * was, by implication, so indiscriminately averse to the native tongues of America that Abbe Cuoq felt himself called upon to stand up in their defense. In an able pamphlet he claimed for the Algonquin and Iroquois languages all excellence that his antagonist attributed to the Aryan tongues, while he put them far above the Chinese and even those of the Semitic group. * * Professor Whitney says, "'Of course there are infinite possibilities of expressiveness in such structure, and it would need only that some native American should arise to fill it full of thought and fancy and put it to the use of a noble literature, and it would be rightly admired as rich and flexible, perhaps, beyond anything else that the world knew.' But as it is, he considers it 'cumbrous and time-wasting in its immense polysyllab-

ism.' * * Professor Max Müller on this as on some othter points is at variance with Professor Whitney. [To a Mohawk student] Professor Müller said one day: 'To my mind the structure of such a language as the Mohawk is quite sufficient evidence that those who worked out such a work of art were powerful reasoners and acute classifiers.' In a letter to Mr. Hale, Professor Müller has also given the following emphatic testimony to the value of the American tongues to the philological student: 'It has long been a puzzle to me why this most tempting and promising field of philological research has been allowed to be almost fallow in America — as if those languages could not tell quite as much of the growth of the human mind as Chinese or Hebrew or Sanscrit.' No one, I think, need wait for a more forcible incentive to the scientific study of our native American languages than what we find in this distinct avowal of their worth from one of the greatest philologists of our day. * * The judgments just quoted apply to the whole range of American speech." — Reade, 17.

"During a long intercourse with various tribes, I have often been surprised by the noble style of their thoughts, and their capacity to rise above selfishness and assume a high heroic attitude. It is difficult sometimes for the interpreters to follow, or understand these veins of lofty thought, and to do justice to the aboriginal oratory. If these flights are not always sustained, it may be said that they are sometimes so; and we must judge the Indian as we do the civilized nations, by their best examples. French missionaries to New France were struck by the bold and manly bearing of the Indian sachems, and their ready powers of oratory. Pere le June remarks, 'I think the savages, in point of intellect, may be placed in a high rank. Education and instruction alone are wanting. The powers of the mind operate with facility and effect. The Indians I can well compare to some of our own villagers who are left without instruction. Yet I have scarcely seen any person who has come from France to this country, who does not acknowledge that the savages have more intellect or capacity than most of our own peasantry.' Lafitau says, 'They are possessed of sound judgment, lively imagination, ready conception, and wonderful memory;' and that 'they are high-minded and proud; posess a courage equal to every trial; an intrepid valor, and the most heroic constancy under torments; and an equanimity which neither misfortune nor reverse can shake.'

"Lallement writes: — 'I can truly say that, in point of intellect, they are not at all inferior to the natives of Europe; and had I remained in France, I could not have believed that, without instruction, nature could have produced such ready and vigorous eloquence, or such sound judgment in their affairs, as that which I have so much admired among the Hurons.' Colden says: 'I must own that I suspect our interpreters may not have done justice to the Indian eloquence. For the Indians, having but few words and few complex ideas, use many metaphors in their discourses, which, interpreted by an unskillful tongue, may appear

mean, and strike our imagination faintly, but under the pen of skillful representations, might strongly move our passions by their lively images.'

"But their powers of oratory cannot be taken as a measure of their capacity for meeting the practical questions of life. To think closely and consecutively, to plan well, and to execute with firmness and perseverance, are the characteristics of the human mind in a high state of civilization. If the Indian mind could be taken apart, as a piece of mechanism, it would be found to be an incongruous and unwieldy machine, which had many parts that did not match, and which, if likened to a watch, only ran by fits and starts and never gave the true time.

"What are the facts that the Indian mind has had to guard against? Physical suffering of the intensest character! This has made him to exhibit the most hardened and stoical qualities. Sometimes deception of a deep dye! This has made him eminently suspicious of every one and every thing, even things without life; for, being a believer in necromancy and witchcraft, he has had to suspect all forms of life and matter. Imperturbability, in all situations, is one of the most striking and general traits of Indian character. Neither fear nor joy are permitted to break this trained equanimity. The newest and most ingenious contrivance placed before him, is not allowed to produce the least expression of wonder; it is deemed to be a mark of timidity or cowardice to permit his countenance to denote surprise. Taciturnity is a habit of mind very consonant to the maxims and experience of the hunter life." — Schoolcraft, History, III, 54-9, condensed.

"They [the Indians] have exhibited repeated proofs of intellectual powers apparently very superior to those of the African, and not very inferior to those of the European race. Father Le June * * says that it was admitted on all hands, that they were superior in intellect to the French peasantry of that time." — Gallatin, 156.

"Sequoyah, or Guess, a native Cherokee, unacquainted with the English language, saw books in the missionary schools, and was informed that the characters represented the words of the spoken language. He undertook to make characters of his own for the Cherokee. In a short time he produced his syllabic alphabet consisting of only eighty-five characters, through which he was enabled to teach within three weeks every Cherokee, old or young, who desired it, how to write his own language. It wanted but one step more to reduce the whole number of characters to sixteen, and to have had an alphabet similar to ours. In practice, however, and as applied to his own language, the superiority of Guess's alphabet is manifest, and has been fully proved by experience. You must indeed learn and remember eighty-five characters instead of twenty-five. But this once accomplished, the education of the pupil is completed, he can read, and he is perfect in his orthography without making it the subject of a distinct study. It is true that the original idea of expressing sounds by characters was suggested to Guess by our books; it must be admitted that his plan would have failed if applied to perhaps any other language than the Cherokee; and it is doubtful whether, in such case, he would

have ascended to the discovery of one character for each analyzed sound. But it cannot be denied that this untaught Indian, in what he has performed, has exhibited a striking instance of the native intelligence of his race." — Gallatin, 92, condensed.

"There were some in each of the tribes falling not one whit behind the sharpest of the whites in skilled sagacity and calculation, who were swift to mark and to interpret the changes in the balance of fortune. * * * The occupancy of this continent by Europeans would [no doubt] have been indefinitely deferred and delayed had all the native tribes * * * made a bold and united front to resist the first intrusion upon their common domains. The conspiracy * * * of Pontiac, in 1763, * * * was thwarted only by a resistance which engaged at several widely severed points all the warlike resources of the English." — Winsor: History, I, 284.

Tecumsen, Logan, Black Hawk, Cornstalk, Red Jacket, Pontiac, and scores of others, were the intellectual peers of many prominent men of today. Their lack of education and their ignorance along the lines of knowledge considered necessary in civilized countries if a man is to rise above the ordinary, only bring into bolder relief their sagacity and good judgment. Individuals of this class are impossible in a debased or degraded community; they must have at least a moderately intelligent ancestry and constituency.

In putting a stop to the butchery of Colonel Dudley's troops after their surrender at Fort Meigs, Tecumseh proved himself a far superior man to Proctor, the British General.— Finley, 218.

Pontiac's conspiracy included the tribes from the Chippewas of Minnesota to the Six Nations of Central New York. His plans involved simultaneous attacks on all the posts from Wisconsin to Pennsylvania. Had his followers proven faithful and efficient, he would have succeeded." —Finley, 111.

"Cornstalk, the Shawnee chief; a far-sighted seer, gloomily conscious of the impending ruin of his race, a great orator, a mighty warrior, a man who knew the value of his word and prized his honor, and who fronted death with quiet, disdainful heroism; and yet a fierce, cruel and treacherous savage to those with whom he was at enmity, a killer of women and children." — Roosevelt: I, 203.

When Cornstalk surrendered to Lord Dunmore "he addressed the white leader with vehement denunciation and reproach in a tone that seemed rather that of a conqueror than of one of the conquered. The Virginians * * * were greatly impressed by the chieftain's eloquence, by his command of words, his clear, distinct voice, his peculiar emphasis, and his singularly grand and majestic, and yet graceful bearing; they afterward said that his oratory fully equalled that of Patrick Henry himself." — Roosevelt: III, 235.

"Logan, * * * a man of splendid appearance, * * * of commanding dignity, who treated all men with a grave courtesy, loved for his straightforward honesty, and his noble loyalty to his friends." — Roosevelt: I, 203.

Short sketches given by Finley of Tecumseh and Blackhoof (Shawnees), Little Turtle (Miami), Pontiac (Ottawa), and Keokuk (Sac), show them to have been the superiors of the average white man, even when considerable allowance is made for the bias of the writer.

"Their bravery has never been questioned, although there was certainly a considerable difference between the several tribes, in this respect. With all but the Wyandots, flight in battle, when meeting with unexpected resistance, or obstacle, brought with it no disgrace. It was considered rather as a principle of tactics. And I think it may be fairly considered as having its source in that peculiar temperament of mind, which they often manifested of not pressing fortune under any sinister circumstances, but patiently waiting till the chances of a sucessful issue appeared to be favorable. With the Wyandots it was otherwise. Their youth were taught to consider anything that had the appearance of an acknowledgment of the superiority of an enemy, as disgraceful. In the battle of the Miami Rapids, of thirteen chiefs of that tribe who were present, one only survived, and he badly wounded.

"As it regards their moral and intellectual qualities, the difference between the tribes is still greater. The Shawnees, Delawares and Miamis were much superior to the other members of the confederacy. I have known individuals among them, of a very high order of talents, but these were not generally to be relied upon for sincerity. The Little Turtle, of the Miami tribe, was one of this description, as was Blue Jacket, a Shawanee chief. I think it probable that Tecumthey possessed more integrity than any other of the chiefs who attained to much distinction; but he violated a solemn engagement, which he had freely contracted, and there are strong suspicions of his having formed a treacherous design, which an accident only prevented him from accomplishing. Sinister instances are, however, to be found in the conduct of great men in the history of almost all civilized nations. But these instances are more than counterbalanced by the number of individuals of high moral character, which were to be found among the principal, and secondary chiefs, of the four tribes above mentioned. This was particularly the case with Tarhe, or the Crane, the grand sachem of the Wyandots, and Black Hoof, the chief of the Shawanees. Many instances might be adduced, to show the possession, on the part of these men, of an uncommon degree of disinterestedness and magnanimity, and strict performance of their engagements, under circumstances which would be considered by many as justifying evasion. But one of the brightest parts of the character of those Indians, is their sound regard to the obligations of friendship. A pledge of this kind, once given by an In-

dian of any character, becomes the ruling passion of his soul, to which every other is made to yield." — Harrison, 237.

In the following narrative by Catlin, is recorded an instance of bravery and chivalry unsurpassed by any deed of a romantic age: —

A party of about 150 Shienne warriors had made an assault upon the Mandan village at an early hour in the morning. Ma-to-toh-pa went in pursuit with 50 warriors, all he could muster. When they found themselves so outnumbered, the Mandans wished to retreat; but Mah-to-toh-pa stuck his lance in the ground and fastened a red sash to it, to indicate that he would fight to the death. The Shiennes, meantime, were prepared for battle; the chief admiring the bravery of Mah-to-toh-pa, offered single combat, their followers to remain neutral. The Shienne chief then stuck his lance in the ground by the side of the other.

"The two parties then drew nearer, on the beautiful prairie, and the two full-plumed chiefs, at full speed, drove furiously upon each other, both firing their guns at the same moment. They passed upon each other a little distance and wheeled, when Mah-to-toh-pa drew off his powder-horn, and by holding it up, showed his adversary that the bullet had shattered it to pieces and destroyed his ammunition; he then threw it from him, and his gun also — drew his bow from his quiver, and an arrow, and his shield upon his left arm! The Shienne instantly did the same; *his* horn was thrown off, and his gun was thrown into the air — his shield was balanced on his arm — his bow drawn, and quick as lightning, they were both on the wing for a deadly combat! Like two soaring eagles in the open air, they made their circuits around, and the twangs of their sinewy bows were heard, and the war-whoop, as they dashed by each other, parrying off the whizzing arrows with their shields! Some lodged in their legs and others in their arms; but both protected their bodies with their bucklers of bull's hide. Deadly and many were the shafts that fled from their murderous bows. At length the horse of Mah-to-toh-pa fell to the ground with an arrow in his heart; his rider sprang upon his feet prepared to renew the combat; but the Shienne, seeing his adversary dismount, sprang from his horse, and driving him back, presented the face of his shield toward his enemy, inviting him to come on! — a few shots more were exchanged thus, when the Shienne, having discharged all his arrows, held up his empty quiver and dashing it furiously to the ground, with his bow and shield, drew and brandished his naked knife

"'Yes!' said Mah-to-toh-pa, as he threw *his* shield and quiver to the earth, and was rushing up — he grasped for *his* knife, but his belt had it not; he had left it at home! His bow was in his hand, with which he parried his antagonist's blow and felled him to the ground! A desperate struggle now ensued for the knife — the blade of it was several times drawn through the right hand of Mah-to-toh-pa, inflicting the most frightful wounds, while he was severely wounded in several parts of the body.

He at length succeeded however, in wresting it from his adversary's hand, and plunged it to his heart.

"By this time the two parties had drawn up in close view of each other, and at the close of the battle, Mah-to-toh-pa held up, and claimed in deadly silence, the knife and scalp of the noble Shienne chief."

The two parties then separated, and Mah-to-toh-pa was borne to his home where in time he recovered.—Catlin, Indians, I, 152, *et seq.*

CHAPTER XIV

SOURCES OF MATERIAL FOR MANUFACTURED OBJECTS.

MOST of the mineral substances utilized by Ohio aborigines in the manufacture of objects for their various needs, are found within the borders of the state. The glacier, or ice-sheet, which once reached diagonally from northern Pennsylvania to the Ohio river near Cincinnati brought from the Canadian highlands vast quantities of granite, sienite, diorite, and some other very dense stone, which answered admirably for axes, tomahawks, pestles, hammers, and other implements that must be at once hard and tough. By the same agency came the banded Huronian slate of suitable texture and appearance for the various ceremonial articles. The latter stone was too soft to withstand the wear and tear of such transportation, consequently it is found only in the northern portions of the state in any great quantity. All other rocks are in profusion as far south as the southern limit of the glacier, except where covered up by later silt deposits, and line the shores of every stream which rises in drift-covered territory. So the native workman was never at a loss for a stone for the fabrication of anything in that line he needed. Flint will be described in the section on flint implements. Copper comes from northern Michigan; mica from North Carolina; steatite from Virginia; galena (lead ore) from Kentucky and Illinois; hematite is found in few spots in southwestern Ohio but occurs plentifully in West Virginia, as does cannel coal. The latter is also in Ohio, but not in position to be reached by primitive workers.

ART IN STONE. METHODS OF WORKING. CLASSIFICATION. USES.

In all parts of the state, but especially along the principal rivers artificial objects of stone are found in such numbers as to astonish collectors and students. Year after year, the same fields yield their tribute to the cabinet; every forest cleared away,

every old meadow put in cultivation, opens up a new source of supply. With each successive plowing, relics in sufficient numbers to stimulate further research are brought to light on village-sites which keen-eyed collectors have scanned until it would seem not a flake could be left. There are localities in Ohio where some article bearing traces of work by a primitive artisan has been picked up on every square yard of surface over many acres. While most of them are fragmentary, or not so carefully finished as to be desirable cabinet specimens, a large proportion are still in condition to have been serviceable to the original owners. Their great abundance has been considered evidence that the aboriginal workman possessed some metal by which they could be "cut out of rock" so rapidly and so easily that it was more convenient to make a new one than to be at the trouble of looking up one already in existence. It really proves just the opposite; if a man were able to make one tool that would produce such results, he could make any number of them, and these tools, when made, would serve his purpose so much better than the stone implements, that he could have no object in making the latter. If a person wishes to crack a nut, and has a hammer, he will use it for the purpose; he will not go to a rock pile and there work out a stone to a convenieut size and shape for his needs.

This profusion of specimens may result from several causes. It may be due to occupancy of the region for a long period of time, by a people whose ghostly fears forbade the use of anything belonging to a generation that had passed away. There may have been a skill or facility in working stone that made little account of a majority of these implements. The utter disregard of the value of time or labor, or the careless indifference concerning small items of personal property, characteristic of those whose possessions are very limited in extent or value; the lack of foresight which wastes today without thought of tomorrow; the ease with which a new supply could be obtained from those who made a business of furnishing such things; any of these reasons may have made the procurement of a new article preferable to the trouble of searching for one that was lost or mislaid. Many were no doubt dropped in the fields or forests, or gathered up and thrown away with the refuse which so rapidly accumulates about a primitive hut or wigwam. Famine, dis-

ease, or war, might cause the relatively few survivors of a community to seek a new home, leaving behind them what was not necessary on the journey; or the same causes may have resulted in the destruction of a village whose site would soon be hidden by a vigorous growth of weeds and bushes and buried beneath the accretions of encroaching forests.

The most plausible explanation is that the prime motive was superstition or childish petulance. Any boy who plays marbles has a favorite "taw" which he believes to be "lucky," and which he can not be induced to exchange for another identical in every respect, even though considerable "boot" be offered; on the other hand, he will soon get rid of one that proves to be "no good." The savage is only a grown-up boy in many cases, and under the same circumstances will act in the same way. For example, if he has been successful in winning a series of wagers with a gambling outfit, he will not part with it at any price. An arrow which has missed a deer, especially if more than once, will be regarded as unlucky or bewitched, or in some other way rendered incapable of bringing success to its owner, and he would be glad to get rid of it; or he might believe that through some innate depravity the weapon purposely miscarried, in which case he would be very apt to break it to pieces with the first convenient stone.

"The North American Indians prefer a hook that has caught a big fish to a handful that have never been tried." — Hearne, 330.

"The Bushmen despise an arrow that has once failed of its mark; and on the contrary, consider one that has hit as of double value. They will, therefore, rather make new arrows, how much time and trouble soever it will cost them, than collect those that have missed and use them again." — Lichtenstein.

So with other belongings. Very many educated people are more or less influenced by similar whims.

The relative scarcity of symmetrical, highly finished, and really artistic specimens of any kind, as compared with the abundance of ruder, rougher ones, no doubt signifies, as does the same state of affairs among ourselves, that a few persons in a community or tribe were more skillful or had greater aptitude for such work than the majority. It may be that any particular phase of industry, as the manufacture of pipes, large symmetrical flint implements, certain kinds of ornaments, etc.,

attained its highest development at the hands of one person whose efforts were confined to this particular class of articles. Another fact of similar import is the occurrence within a limited district of many specimens of a form very rarely found outside of that area; for example, a peculiar flint knife in two or three counties of central Ohio, which, oddly enough, is also abundant in the Kanawha valley. Many such instances could be cited.

It may not be out of place here to warn students to be on the lookout for frauds, as they are liable to appear at any time in the most unexpected places. There are few things of beauty, value, or interest among relics, that have not been counterfeited by unscrupulous tricksters eager to profit by the credulity of inexperienced collectors. To such an extent has this been carried that anything out of the ordinary is to be viewed with suspicion. Much ingenuity has been displayed in hiding tablets, carvings and pottery, in places where they will afterwards be discovered by some one unconscious of the deception, who may thus be deluded into the belief that he has a genuine alphabetic inscription, effigy of a mastodon or other animal, Mexican idol, paleolithic implement, statue of a Mound Builder, or some other wonderful thing that is to throw a flood of light upon the history of an unknown race.

"Many boys often practice on broken specimens until they can repoint them into handsome examples of scrapers, trimmed flakes and other forms. The skill with which one urchin chipped the characteristic beveled edge of a scraper, using only a small quartz pebble as a hammer or chipper, was marvelous. Hundreds of hematite objects are manufactured in Cincinnati and other cities. In mound pottery and striped slate there are abundant counterfeits offered by dealers in curiosities. Philadelphia has the honor (?) of being the headquarters of steatite frauds. Even Indian graves are manufactured to order with a half-decayed skeleton from a Potter's field and various relics either gathered from the surface or manufactured for the occasion." — Abbott: Frauds, condensed.

It must not be supposed that difference in form or finish denotes a difference in age. While a long period must separate the rude beginning of an art such as flint-chipping from the perfection finally reached, it does not follow that improvement is uniform. Crude work may prevail during the entire stage of progress. In fact,

"When an old art dies out, in consequence of being supplanted or superseded by a new art, * * * of any particular kind of implement,

the rudest forms of all may be the very latest." Many objects of stone and clay, which are usually considered prehistoric, are in common use to-day in Scotland and the outlying islands; clay vessels and utensils for daily use are constantly manufactured. "The rudest pottery ever discovered among the relics of the stone age is not ruder than this, and no savages in the world are known to make pottery of a coarser character." — Mitchell, 22 and 28.

When a man discovers that with the proceeds of a day's hunt or a day's labor he can procure implements or utensils more suitable and more durable than anything of the kind he can make for himself, he will naturally spend no more time and labor upon any article than will make it serve his purpose until an opportunity offers of getting something more serviceable.

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A line is drawn by many collectors and authors between objects of prehistoric art found in the mounds and those picked up on the surface, as if they must, of necessity, be distinct in their origin.

The former do not surpass the latter in any particular.

It is remarkable that the contrary opinion should be so commonly accepted and so tenaciously adhered to despite the evidence of abundant material widely distributed and readily accessible for examination. Because many specimens really beautiful in design and execution, are exhumed from tumuli, and many rude or hastily wrought ones are gathered up on the surface, or observed in use among the Indians of the present day, it seems to be taken for granted that all relics may be assigned to one or the other class according to their beauty or lack of that quality. But the converse is equally true; some modern or surface specimens are more artistic and of better finish than most of those from mounds. If a committee were selected, knowing nothing of archæology but thoroughly competent to decide upon questions of form, symmetry, proportions, color, delicate accuracy of touch, mechanical skill, and adaptation to intended use; and were required to decide upon the relative merits of two collections, based upon these properties;— one collection to comprise the exquisite, gem-like arrow points from Arizona and Oregon; the long, slender, finely-chipped knives or spear-heads of agate and obsid-

ian from the Pacific coast; the smooth, compact, perfectly moulded pottery from the Pueblos of the southwest; the ornaments, masks, and engraved emblematic figures of shell, of the Cherokees and Shawnees; the copper tools, weapons and ornaments, from Wisconsin; the carefully-made arrow-heads, spear-heads, and knives of flint, the polished tomahawks and grooved axes, the finely carved "ceremonial stones," found so abundantly throughout the Ohio valley and known to have been in use among the Indians, in the one lot; and the best pieces of a similar character exhumed from the largest mounds, in the other lot:—the modern specimens would have nothing to fear as to the verdict.

With the notable exception of grooved axes, of which very few have been unearthed, all the ordinary forms of so-called Indian relics, whether of a useful, ornamental, or supposed ceremonial character, made of stone or other durable substance, are common in the mounds, and present no special features in appearance or material that may not be observed in similar specimens found on the surface in the immediate neighborhood. Objects peculiar to mounds are almost invariably made of something that would soon be destroyed if exposed to the weather; as pottery, bone, shell, copper, wood, textile fabrics, or soluble mineral, whose preservation is due to the protection afforded by the earth above them. Consequently, they should not be brought out as evidence in making comparisons.

The pottery from the Ohio mounds is much inferior in execution and finish to that from the Missouri-Arkansas district; and this, in turn, does not equal the clay work of the Zuni Pueblos either ancient or modern. The arrow-heads from Arizona and Oregon, made by Indians of a rather low grade, are not equalled by similar weapons from any part of the Mississippi valley, even when chipped from such material as the stone from Flint Ridge or the novaculite of Arkansas.

The popular theory implies that the Mound Builders never lost or mislaid anything, but sedulously hid away all their treasures; while other tribes who have lived on the same ground either before or since, were extremely careless in this respect, scattering their property at random for later collectors to find. It is a singular coincidence in this view of the matter, that the presumed different race should lose upon the village-sites of the Mound Builders so great a number of things precisely similar in every

respect to those which the latter had thus carefully buried out of sight.

On the other hand, the discovery in mounds of objects showing characteristic Indian manipulation does not signify that these mounds were built by known tribes; it is only an indication that the Mound Builders had not, in this particular, advanced beyond the Indian. Still, the following facts are of interest in this connection.

The cairns and small mounds between the Alleghanies and the Blue Ridge, thought to have belonged to tribes which roamed over that region until about 1750, yield numerous slate gorgets and steatite pipes of the forms common to or almost typical of the Ohio mounds, along with relics more plentiful near the seacoast. Very many pipes are found in the mounds; over the whole mound area; and among all the modern Indians. But they are not found, unless in very limited numbers, among the Mexicans or farther south, where cigarettes are in common use. The tubes found on the Pacific coast may be pipes; as may those of Tennessee where the ordinary forms of pipes are abundant. Metates are plentiful in the southwest, but not one has been found east of the Mississippi, and none east of the plains except two or three in Missouri. Mortars occur in plenty from New Mexico to the isthmus, but few were in use among the Mound Builders except in the form of flat slabs which also contain grooves for sharpening and polishing other stones.

In the following pages no distinctions will be made between surface specimens and those excavated from mounds, graves, or village sites. As the commoner forms are quite familiar to readers, either from illustrations in many volumes relating to this subject or from inspection of the articles themselves in collections, no detailed description or classification will be attempted. The text will be chiefly devoted to an explanation of the processes by which the articles are brought into their final shape, and the uses made of them when completed. This information is derived in part from the accounts of travelers and in part from the reports of those who have endeavored to duplicate the various forms with such tools as were at the command of the early artificer. Most of the cuts represent specimens in the collection of the Society and of the Ohio State University, though a few are borrowed from other sources.

The stone objects will be divided into two general classes, the pecked or ground, and the chipped. The former class includes those made from stone suitable for working into form either by pecking with stone hammers or by rubbing it with grit-rock or similar means, both of these methods being frequently resorted to in a single specimen. The latter class comprises such as are more readily wrought by chipping or flaking with tools of stone or bone.

The system of nomenclature in general use has been retained, as it is now familiar to students of North American archæology, though not entirely satisfactory in all respects.

It would appear difficult or impossible to do with such rude tools any work for which we commonly have recourse to the carpenter's chest; and yet, by the aid of fire, or even without it, many primitive tribes contrived to accomplish a great deal with them. Some results challenge comparison with anything executed through the medium of steel tools or other appliances of civilization.

"The Peruvians and Mexicans, whose monuments emulate the proudest of the old world, were wholly unacquainted with the use of [iron], and constructed their edifices and carried on their agricultural operations with implements of wood, stone and copper.— S. & D., 196.

"The Aztec jewelers * * * could cut and polish emeralds, amethysts, cornelians, turquoises and iron pyrites. [One of five emeralds] carved by order of Cortez by the jewelers of Mexico * * * for which certain Genoese merchants offered as many as 40,000 ducats, was cut in the form of a cup and ornamented with four fine golden chains connected with a pearl." — Biart, 280.

In the Sixth Annual Report of the Bureau of Ethnology, on page 250, is a figure of a ceremonial adze, which is a very fine example of Polynesian wood-carving. In beauty and intricacy of execution this specimen would be difficult to surpass with the product of a Swiss or German workshop.

Among the Maories of New Zealand "their large houses and canoes, their weapons, ornaments and utensils were beautifully finished and elaborately carved or painted. Their instruments were of stone, wood, or shell." — Nation; also Wood, 200.

"Until recently the Fijian mechanic had no iron wherewith to form his tools, which were, of course, few and simple. The axe or adze was a hard stone ground into [shape.] * * * Various modifications of this tool were all the Fijian had with which to hew out his posts and planks, to cut down trees, or make the nicest joints, or together with

shells, to execute the most marvelous carving. Fire-sticks and the long spines of echini supplied his boring apparatus. With rats' teeth set in hard wood, he executed his most minute carving or engraving; and for a rasp or file he used the mushroom coral, or the shagreen-like skin of the ray-fish, and pumice-stone for general finishing purposes. With no other aids than these, the workman of Fiji was able to accomplish feats of joining and carving — the boast of mechanics provided with all the steel tools and other appliances which art can furnish."

"The variety of spears is very great, and shows the best specimens of native carving, many of the fine open patterns being beautifully executed." "The handles of some [clubs] and the entire surface of others, are covered with fine and elaborate carving; a few are inlaid with ivory and shell."

"A good canoe [made with these simple tools] would safely convey a hundred persons and several tons of goods over a thousand miles of ocean. * * * Such canoes seldom exceed a hundred feet in length." — Fiji, 58-60.

The Caribs of the West Indies made one style of boat which "was about forty-two feet long and seven feet wide at the middle, * * * built of the Westindia cedar. * * * One tree made the keel of the vessel." The entire work of felling the tree, and preparing the lumber for the boats "was performed by means of sharp hatchets made of flint. The Caribs had not the saw." — Amer., I, 391.

"The boats of the Nootka Indians of British Columbia are dug out each from a single pine tree, and are made of all sizes from ten to fifty feet long, the largest accommodating forty or fifty men. Selecting a proper tree in the forest, the aboriginal Nootka fells it with a sort of chisel of flint or elk horn, three by six inches, fastened in a wooden handle, and struck by a smooth stone mallet. Then the log is split with wooden wedges; it is hollowed out with the aforesaid chisel, a mussel-shell adze, and a bird's bone gimlet worked between the two hands. Sometimes, but not always, fire is used as an assistant. The exterior is fashioned with the same tools." — H. H. Bancroft, I, 180.

The Nootka Sound Indians, with flint knives and hatchets cut the hardest part of elk horns into the form of chisels. With these, struck by a heavy stone mallet with a withe for a handle, they cut around a large cedar till it falls. For digging out the boat a large mussel shell is sharpened at the edge and set in withes of tough wood, forming a sort of adze, with which the work is finished. — Catlin, Rambles, 102.

On the northwest coast "jade implements were cut from blocks of rock, by means of quartz crystals, into slabs of the required thickness, and were afterwards sharpened and ground into shape on sandstone and finished with fine sand and water on a porphyry slab or with oil on a slab of siliceous slate." — Mackey, 102.

"The Root Digger Indians made canoes from pine trees over three feet in diameter. The axes they used were of stone and provided with long, springy, willow handles; the small end of the willow being securely

withed around the stone and then wrapped around the handle and reinforced by strips of raw hide braided in, and the whole made firm with a coating of some kind of gum or glue. In cutting down a tree they used the poll of the axe as a hammer and by hard, quickly repeated blows, soon battered loose a cortical layer of the wood. When the woody fibers were in this way broken or battered loose they were pried up by inserting under them a greasewood stick, chisel-shaped at the end, and hardened by burning; or armed with a chisel-shaped stone fastened to it with deer sinew and gum. To aid this lever in breaking away the loosened layer the axe was reversed and with its edge the wood was cut or hacked until free and then removed. They felled the tree in comparatively a short space of time. The trunk of the prostrate tree was burned off at the proper length and the bark all pounded off with rough or rudely edged stones. Then the top of the log was cut down to a level, flat surface, partly by the hammering process, but largely by burning. In the same way the curved shape was given to the prow. Then commenced the excavation or hollowing out of the log by fire, aided by picking down and scraping out the charred wood with stone implements. To limit the action of the fire wet mud was placed on such portions as were not intended to be further reduced. With broad, sharp-edged flat stones they scraped and rubbed both the interior and exterior until the dug-out was of regulation form, with the entire surface, in and out, perfectly true and even." — Yaple, 323, *et seq.*

"For those necessary purposes for which the axe would seem to be indispensable, the Iroquois used the stone chisel. In cutting trees, fire was applied to the foot, and the chisel used to clear away the coal. By a repetition of the processes, trees were felled and cut to pieces. Wooden vessels were hollowed out by the same means." — Iroquois, 358.

The Virginia Indians at an early day employed a similar process. They also cleared ground for cultivation by deadening trees with their tomahawks, and used adzes made of shell for cleaning away the charred wood when burning out canoes.— Beverly, 198; Wyth, part I, plate 14.

"In the account of his trip through the lake which bears his name, Champlain speaks several times of the use which his savage companions made of their stone axes. He does, indeed, call these axes very bad, but he also tells us that when the Indians wished to camp for the night they made a barricade by cutting down large trees with these axes and that they were able in two hours to make so strong a defense that five hundred men could not break through without great loss. Nor did they use fire in this instance, for Champlain says that when making the barricade they did not kindle a fire lest the smoke reveal their presence to their enemies." — Perkins, 108.

"If the ground where they intended to make a maize field was covered with trees, they cut off the bark all round the trees with their hatchets. * * * By that means the tree became dry. * * * The smaller trees were then pulled out by main force." — Kalm, 341.

In making mortars "they cautiously burned a large log to a proper level and length, placed fire a-top and wet mortar [mud] around it, in order to give the utensil a proper form; and when the fire was extinguished, or occasion required, they chopped the inside with their stone instruments, patiently continuing the slow process till they finished the machine to the intended purpose." — Adair, 416.

In making boards "they cut the tree to a proper length and split it with a maul and hard wooden wedges, when they have indented it a little in convenient places with their small hatchets." — Adair, 419.

Sagard, speaking of the Hurons in Canada, says: "The Indians belt the trees about two or three feet from the ground, then they trim off all the branches and burn them at the foot of the tree in order to kill it, and afterwards they take away the roots. This being done, the women carefully clean up the ground between the trees, and at every step they dig a round hole in which they sow nine or ten grains of maize, which they have first carefully selected and soaked for some days in water." — Carr, Mounds, 515.

"I have seen several [axes] which chanced to escape being buried with their owners, and were carefully preserved by the old people as respectable remains of antiquity. They twisted two or three tough hiccory flips, of about two feet long, round the notched head of the axe, and by means of this simple and obvious invention they deadened the trees by cutting through the bark and burned them. * * * In the first clearing of their plantations they only bark the large timber, cut down the saplings and underwood, and burn them in heaps; as the suckers shoot up they chop them off close by the stump, of which they make fires to deaden the roots, till in time they decay. * * * A common hoe and a small hatchet are all their implements for clearing and planting." — Adair, 405.

"They set fire to a great quantity of wood at the roots of the tree and make it fall by that means. But that the fire might not reach higher than they would have it, they fastened some rags to a pole, dipped them into water, and kept continually washing the tree a little above the fire. Whenever they intended to hollow out a thick tree for a canoe, they laid dry branches all along the stem of the tree as far as it must be hollowed out. They then put fire to those dry branches. * * * Whilst these branches were burning, the *Indians* were very busy with wet rags and pouring water upon the tree to prevent the fire from spreading too far." When it had burned enough, they took "stone-hatchets, or sharp flints, and quartzes, or sharp shells, and scooped off the burnt part of the wood." — Kalm, 340.

By some of the western Indians grooved axes were used to chop up the vertebræ of buffaloes, which are boiled to obtain the marrow.— Long, Rockies, 211.

The Mandans collected the marrow by breaking the bones with axes or hammers and boiling them. The marrow rose to the top and was skimmed off. When cool it "becomes quite hard like tallow, and has the

appearance and very nearly the flavour of the richest yellow butter."— Catlin, Indians, I, 116.

There are specific references, also, to the use of celts or ungrooved hatchets.

"The smaller celts have been supposed to be used as knives for skinning animals, yet no savage was ever seen to skin an animal with one of them. On the contrary, stone knives of a very different pattern are used for this purpose."— Abbott, 36.

They were used, however, in dressing the skins, after the manner described by Dodge, before iron blades were obtained from the whites.

"When the stretched skin has become dry and hard from the action of the sun, the woman goes to work on it with a small iron instrument shaped somewhat like a carpenter's adze. It has a short handle of wood or elk horn tied on with raw hide, and can be used with one hand. * * * With this she chips at the hard skin, cutting off a thin shaving at each blow." Skill is required "to cut the skin, yet not cut through it, and in finally obtaining a perfectly smooth and even inner surface and uniform thickness."— Dodge, Plains, 358.

The Shoshones make a scraper for dressing buffalo skins by striking a spall off from a quartzite boulder. The implement is used without further alteration, having a sharp edge all around.— Abbott, 137, from Leidy.

Stone chisels have been found in various steatite quarries, where vessels and other utensils of this material were made, and the marks of their use is plain both on the vessels in an unfinished state and on the cores, as well as on the quarry face.— Mohr, 618; Barber, steatite, 403; McGuire, steatite, 587; Walker, *Science*, IX, 10; Schumacher, 263.

"In several of the [steatite] quarries [in Virginia] we have found ordinary grooved axes, most of them having been remodeled or resharpened by flaking to make them efficient in picking and cutting; then there is a large class of chisel-like tools of varied sizes and shapes."— Holmes, Implements, 111.

"Steatite and like soft and tough massive substances were cut with pointed pick-like and by edged chisel-like blades, probably in most cases set in some sort of handle for direct free-hand operation, or with other classes of handles, to be operated with the aid of a mallet of bone or of antler or wood. Mica must have been cut with sharp edges or points, such as are furnished by the fracture of glassy varieties of stone."— Holmes, Implements, 105.

Experiments in wood-cutting with the chipped flint axes so abundant in Denmark, are described after the following manner.

"These axes have a sharp border analogous to an edge, which has always been produced by the same process, that is to say, by striking

off a single chip from each side of a flint disc so as to form an edge by the line of the intersection of the two faces. Such an edge had not the resistance of an edge made by polishing. The blades were hafted in the manner supposed to have been customary in the stone age, and used in cutting pieces of green pine wood. A stick 2¼ inches in diameter was cut in two in three-quarters of a minute. Another stick 5 inches in diameter was cut in ten minutes. Both these were firmly fixed perpendicularly on a work-bench. A log 5 inches in diameter, fixed on a table, was cut in eight minutes. Experiment showed that the little blades could perfectly take the place of chisels. With the same instruments used as chisels two logs were shaped to mortise and tenon. All the logs of the experiments were still covered with bark. With the primitive implements one is able not only to cut large trees, but to perform the work of less complicated carpentry without the cutting edge becoming very readily deteriorated." — Smith, G. V., condensed.

PECKED OR GROUND OBJECTS.

AXES, CELTS AND GOUGES.

Axes.

The principal distinction between an ax and a celt is that the one has a groove made around it for securing a handle while the surface of the other is regular from poll to edge. There is a further, but minor distinction as to size; while a majority of axes are smaller than the largest celts, yet none of the latter equal in

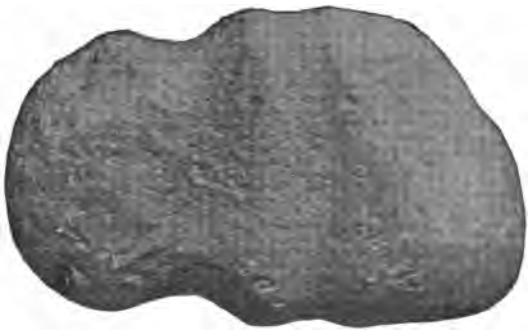


Figure 141 — Axe With Two Grooves.

weight the largest of the former. Grooved axes weighing twenty pounds or even more have been found; but such as these must have a purpose quite apart from any practical use, as no man can handle one. Axes having two grooves occur in considerable numbers in the Pueblos of the southwestern United States, but are extremely rare elsewhere. Only two or three are known in

Ohio; one is shown in figure 141. As they are generally small, the utility of the second groove is not evident; it may be intended to secure a double turn of the withe forming its handle.

"The English used stone weapons at the battle of Hastings in 1066, and the Scots led by Wallace did the same as late as 1288" (Preh. Peo., 22); while stone axes were used by the Germans at as late a period as the Thirty Years' War.— Knight, 242.

* * * * *

In the grooved axes, *edge* means the cutting portion; *blade,* the part below the groove; *poll* or *head,* that above the groove; *face,* the wider or flat portion of the surface; *side,* the narrower part; *front,* that side farther from the hand, and *back,* the side nearer the handle when in use. In celts the terms are the same so far as they are applicable; *blade* referring to the lower half of the implement, that is, to the portion on which the cutting edge is formed.

There are two general methods of grooving. In one, a ridge or protuberance was left encircling the weapon, into which the groove was pecked, as seen in figure 144. The axe thus has greater strength with the same amount of material. Usually the groove has been worked just deep enough to reach the body of the axe; that is, to a depth such that should the projections be ground off there would remain a celt-like implement.

In the second class the groove is formed by pecking into the body of the axe after the latter is dressed into shape; in this pattern a regular continuous line from edge to poll would touch only the margins of the groove, leaving it beneath (see figure 151). An apparent medium between the two is sometimes seen, in which there is a projection on the lower side of the groove only; this is due, usually, to dressing the blade down thinner after the implement was originally worked to a symmetric outline. By continuous or long use the edge of the axe becomes broken or blunted and requires sharpening, and in order to keep the proper outline to make the tool efficient, it is necessary to work the blade thinner as it becomes shorter. No such change is required in the poll, consequently a projection is formed where originally there was no trace of one.

There are different methods of finishing the axe, which may appear with either form of groove. The poll may be worked into the shape of a flattened hemisphere, may be flat on top, with

the part between the groove and the top straight, convex, or concave, or may be worked to a blunt point, with straight or concave lines to the groove. The blade may taper from the groove to the edge, with straight or curved sides, which may run almost parallel or may be drawn to a blunt pointed edge. This latter form is probably due to breaking or wearing of the blade, which is reworked.

There are a very few specimens in which the axe gradually increases in width from the poll to the edge; but such specimens seem to be made of stones which had this form approximately at the beginning, and were worked into such shape as would give a suitable implement with the least labor.

In nearly every instance the groove of an axe with a groove projection extends entirely around with practically the same depth, and the blade of the axe has an elliptical section. Many, if not a majority, of them have the groove wide enough for a very large handle, or for an ordinary withe to be twisted twice around. In those which have the groove pecked into the body of the implement the back is usually ungrooved, the purpose being to admit a wedge between the stone and the curve of the handle. The handles were very firmly fastened; examples are known which have been broken in such a way that on one side, from the top half way down, the blade is gone, carrying away the groove on that side; yet the polish of the groove extends over the fractured surface, which has never been reworked, showing that the tool was long used after this accident. As the handles could easily slip off over the top in specimens thus broken, they must have been tightly lashed; perhaps gum or glue was used.

Partly finished specimens show that the groove was pecked out and the edge ground before the remaining parts of the axe were worked. Some have the edge ground sharp and the groove worn smooth or even polished by long use, while all the rest of the implement retains the original weathered surface. A stone was always chosen that could be brought to the desired form with the least labor, and very often one could be found that required but little work to make a very satisfactory weapon or implement or even ornament.

Occasionally specimens indicate by the manner of wear their application to certain kinds of work. Sometimes the edge is curved by the wearing away of one face until it has almost a

gouge form; sometimes the side of the blade next the hand, again that farthest away, is more worn. This in time would give a blunt-pointed edge. Sometimes a specimen seems to have a ridge on the upper side of the groove; but closer examination will show that it once had a groove projection, and that afterwards the poll was nearly all broken away and a new groove made lower down, so that what was originally the lower projection is now above the groove, the remainder of the poll being worked down to a point.

There are a few hammers which differ from the ordinary axe only in being blunt instead of sharp. They may be nothing more than broken axes, utilized as hammers instead of being resharpened.

Under this head may be placed implements plainly used as adzes. They are much longer than axes in proportion to their other dimensions, have one face convex, the other straight or concave.

Grooved axes apparently found little favor with the Mound Builders. They are very rare in tumuli, although celts or "hatchets" are abundant. Squier and Davis record only two or three in the course of their explorations, and remark that

> "Although abundant in the valleys occupied by the Mound-builders, they are not frequent in the mounds themselves." — S. & D., 216.

Two polished grooved axes were found at the bottom of the conical tumulus connected with the Serpent Mound (Putnam, Serpent); and a small one lay near a skeleton surrounded by limestone slabs in a small mound on the Muskingum river, between Lowell and Marietta (Moorehead, 25). If any others have come to light they have not been reported; nor has it been my fortune either to unearth one, or to learn of their discovery by other explorers, in several hundred mounds opened.

* * * * *

Very exaggerated ideas are entertained regarding the amount of time and labor required for the elaboration of these, and various other, products of the untutored worker in stone.

Lafitau says

> 'Stone axes are prepared by the process of grinding on a sandstone and finally assume at the sacrifice of much time and labor, nearly the shape of our axes or of a wedge for splitting wood. The life of a

savage is often insufficient for completing the work, and hence such an implement, however rude and imperfect it may be, is considered a precious heirloom for his children." — Jones, 271.

This is about the only reference to the idea of "heirlooms" among the Indians. It took the Jesuit missionaries a long time to persuade them not to destroy every vestige of the dead man's property, at his funeral.

Recent experimenters strongly dissent from this belief that so much time was required.

"The writer has demonstrated that a week would be ample time in which to make an axe of the hardest stone, as it is known that a few minutes is sufficient to make an arrow-head." — McGuire, Drilling, 695.

"The hand hammer, familiar to all, was probably the tool upon which races living in the stone age relied more than upon any other object to fashion other stone implements. Not only did the savage rely on the hammer to peck an axe or celt into shape, but it was also used for rubbing or polishing the implement after it had been shaped." A figure of a grooved stone axe is presented, with the remarks: "It is made of a close-grained black porphyry that in 1878 was pecked out and grooved entirely with a stone hammer by the writer as a first effort to demonstrate the method of axe-grooving. The work on this stone represents approximately five hours' labor. When the hardness of the material is taken into consideration, it is safe to conclude that it could not have taken more than half as much time to groove an ordinary axe, since they are of much softer material. From this it may be judged that to fashion a stone axe, or in fact any other stone implement which is made by pecking and polishing, consumed a small portion of the time supposed to be requisite. Any stone implements, statues, etc., can be pecked into form with stone hammers and the pitted surface on all such work is just such as was obtained by the writer." — McGuire, Hammer, 301, *et seq.*, condensed.

With stone hammers, McGuire made a grooved axe from a rough block broken from a boulder of nephrite from New Zealand, one of the hardest and toughest stones known. Various grades of stone were used as hammers; only a piece of very compact jasper was of any value. The pecking occupied 55 hours and 10 minutes. With a jade hammer the work could have been completed in half the time. The pits were removed and the axe made smooth by rubbing on a block of rotten granite, kept wet, for five hours; and in six hours it was polished with a pebble of compact quartzite.

McGuire next took a rough piece of kersantite, a rock much tougher than was generally used by Indians in the eastern part

of the United States. From this, with only a quartzite hammer-stone, and a quartzite pebble as a rubbing stone, he made and polished with less than two hours of actual labor a comparatively well-finished axe. In the same manner, he made a mask of obsidian; and a glyph, representing a toucan, twelve by fourteen inches. The latter required about five hours' work.—McGuire, Lapidary.

In figure 142 is shown an axe of slate on which are marks of the various methods by which such implements are made. The poll has been chipped or flaked; the groove and part of the blade are pecked into form; while the edge is rubbed or ground. Figure 143 represents another specimen which has been utilized while still in a rough state. Figures 144 to 153 are completed; the last two are of banded slate, which will not withstand rough usage.

The object shown in figure 154 differs from the ordinary form in having the lower end brought to a point instead of an edge. It probably formed the head of a war-club.

Celts.

The name "celt" for hatchet, or ungrooved axe, is an innovation which seems destined to hold its place, although a very unsatisfactory substitute. The word means a "chisel." While some specimens have a remote resemblance to this tool and were used somewhat in the same manner, "hatchet" is more appropriate as expressing their ordinary purpose. It would be much better if the native word tomahawk were retained for this, applying the name axe to the grooved form merely to distinguish between the two. The thin or flat celts were suitable for some kinds of work to which axes were not adapted. Some of these were employed as adzes. One form is ground down thin, with a flat-elliptical or nearly rectangular section; the sides are straight or slightly curved, nearly parallel or tapering considerably to the top, which is either rounded or flattened. All these are polished over the entire surface; none show any marks of use as wedges or hatchets, and most of them are too delicate for such use. The longer ones can be readily grasped in the hand, and are as well adapted to stripping off the hide of an animal, dividing the skeleton at the joints, or stripping the flesh from the bones as anything made of stone can be; while the



Figure 142.



Figure 143.



Figure 144.
Grooved Axes.



Figure 145.



Figure 146.



Figure 147.



Figure 148.

Grooved Axes.



Figure 149.



Figure 150.

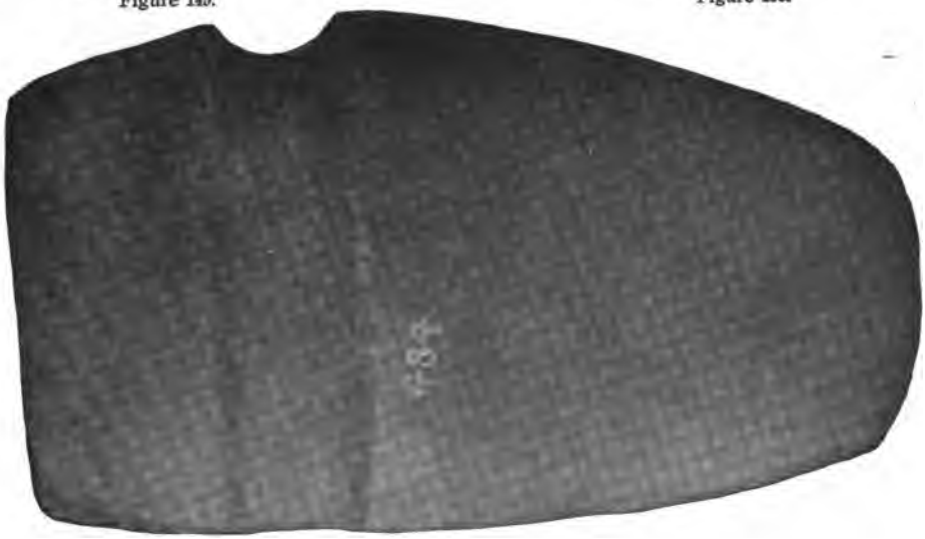


Figure 151.
Grooved Axes.



Figure 152.



Figure 153.



Figure 154.
Grooved Axes.

smaller ones set in a handle to afford a grip, would answer the same purpose. Some are sharp at both ends; one unfinished specimen of this pattern, of rather soft argillite, has marks of pecking, chipping, and grinding, showing that the most expeditious or convenient methods of shaping and finishing were practiced indifferently.

The various ways of hafting were as follows:

(1) A hole was cut entirely through a stick and the celt was inserted so that it would project on both sides.

(2) The hole was cut partly through, and the celt was pushed in as far as it would go.

(3) The top of the celt was set in a socket of deer horn, which was put into a handle as in form 2.

(4) Small celt-shaped knives or scrapers were set into the end of a piece of antler long enough to be used as a handle.

(5) A forked branch was so cut as to make two prongs of nearly equal length, and the celt was fastened to the end of one, parallel with it, the other being used to guide and steady it, a prong being held in each hand.

(6) The fork of a root or branch was trimmed so as to make a flat face at any desired angle, to which the celt was lashed, a shoulder, against which the end of the celt was set, being sometimes cut in the wood.

(7) A stick was split its entire length and a single turn taken around the celt, the ends being brought together and tied, forming a round handle.

(8) A stick was split part way, one fork cut off and the other wrapped once or twice and tied, thus forming a round handle of solid wood.

Forms 5 and 6 were used as adzes; forms 7 and 8 are the same methods as employed in hafting grooved axes.

A mounting similar to form 4 is seen in some Alaska specimens of celt-scrapers in which the implement is fastened to a piece of wood so as to project a short distance, and used like a plane. In all these, the celt is very firmly fastened to the handle with sinew or rawhide, which, when put on green, contracts with great force and binds like wire.

All these are illustrated in the Smithsonian Report for 1879.

"Oftentimes they [the Virginia Indians] use for swords the horne of a Deere put through a peece of wood in form of a pickaxe. Some a long stone sharpnd at both ends, used in the same manner." — Smith, 132.

A singular method of hafting is described by Lafitau. Of course his statement can not be contradicted; but such a plan would probably be followed only by a dealer in the weapons. No one else could wait so long.

"They select a young tree which they make a handle without cutting it. They split one end and insert the stone. The tree grows, tightens around it, and encloses it so firmly that it can hardly be torn out. After-

ward they cut off the tree at the proper length, so as to have a handle to the axe of convenient form." — Jones, 271.

In many instances the top has been roughened as if for insertion into a hole cut in a piece of wood; others have this roughening around the middle or immediately above, leaving a polish at both ends, and these were hafted probably by means of a stick or withe twisted around them. The roughening is a secondary operation, having no relation to the making of the implement; it was produced by pecking after the surface was polished. In a few cases it extends from the top well down the sides; but usually it reaches but a little way below the top, or else is in a circle around the body of the celt. Most of them have sharp edges; a few have edges either chipped or blunted and polished, showing long usage.

Various form of "celts," used as hatchets, scrapers, or chisels, are shown in figures 155, 156 and 157.

Gouges.

Implements of this form are known to have been used to tap sugar maples, and also to hollow out wooden troughs, and are very common in the north, though less abundant in the south. It is in those localities in which bark instead of logs was used for canoes that they are most numerous. Sometimes they were hollowed the whole length and used as spiles. They were also employed instead of celts in hollowing wooden mortars and the like when a more regular concavity was desired.— Dawson, 16 and 32.

HEMATITE CELTS.

These are usually very small, seldom weighing above two or three ounces. Sometimes, however, they will weigh half a pound or more, and occasionally a grooved axe of this material is found. As a rule they are rubbed down directly from the nodule or concretion in which this ore of iron so frequently appears. Occasionally one of homogeneous structure has been chipped into form before grinding, the facets in some cases being rubbed nearly away. Sometimes they have a rectangular outline, but usually the sides taper from the edge to the top by a gradual curve, or are parallel a part of the way and then taper either by a straight or, oftener, by a curved line. The section



Figure 155 — Hatchets, Tomahawks, or "Celts."



Figure 156 — Hatchets, Tomahawks, or "Celts."



Figure 157 — Hatchets, Tomahawks, or "Celts.

is rectangular or elliptical. The prevailing shapes are shown in figure 158.

These implements were probably used as knives or scrapers, being set into the end of a piece of antler, which may in turn have been set into a larger handle of wood. That some were knives is shown by the edge being dulled to a flat polished surface extending from side to side; and that many were scrapers is shown by their celt-scraper shape, a half elliptical section, or by the scraper-form edge.

By celts having a scraper-form edge is meant those with the edge to one side of the median line, due to constant use of one face. This face, at the edge, is in a straight line from side to side; it may have a chisel-like flattening, or may curve toward



Figure 158 — Hematite Celts.

the middle of the celt for a short distance and then have the same form to the top as the other face, which is convex or curved, as in the ordinary hatchet celt. They form a medium between celts whose faces gradually curve from top to edge, and the celt-scrapers which are flat on one side. Among the thicker celts this form is quite rare.

PESTLES.

The fact of the ordinary conical or bell-shaped, long-cylindrical, or somewhat pear-shaped stones having been used for pestles is so well settled that no confirmatory references are needed. A few citations may be given in regard to certain forms sometimes differently classed, especially some of the discoidal stones to be hereafter described.

The corn crushers used by the Swiss Lake-dwellers are spherical; some are flattened on two sides, like an orange, others almost round with depressions on four sides. They are about the size of a man's fist or rather smaller. The Africans have a

piece of quartz or other hard stone as large as half a brick, one side of which is convex to fit the hollow of a larger stone used as a mortar (Stevens, 174). Unpolished disks sometimes show marks of use as hammers or pestles (Evans, 218). In preparing pemmican, the American Indians pounded the dried meat to a powder between two stones (Dodge, Indians, 254; Schoolcraft, History, IV, 107; Catlin, Indians, I, 416); this gives the impression that any suitable stones may have been used. The ancient California Indians worked out a round stone as an acorn sheller, modern tribes using any smooth stone.— Powers, 433.



Figure 159 — Pestles.

The two shapes most common in Ohio are those with a tapering or cylindrical handle and an expanding base, or somewhat like a pear cut across through the thickest part, as in figures 159 and 160; and those which are conical or cylindrical, with the top either pointed or truncate, shown in figure 161. In each form the bottom may be flat, convex, or curved from one side to the opposite. Some are quite smooth on the bottom as if from rubbing either back and forth or with a rotary motion; while many have the bottom pecked rough, showing use as hammers or pounders. For those with curved bottoms a rocking motion seems best adapted; with the palm resting on the longer side, good work may be done in any of these ways. The pestles which have the bottom round or convex are generally found in the same localities as the hollowed stone mortars; while the so-called "rolling-pin," shown in figure 162, which is quite rare in Ohio, was probably used with a wooden mortar.



Figure 160.



Figure 162.



Figure 161.

Pestles.

MULLERS.

The objects known as mullers are generally flat or smooth on one side and convex on the other, sometimes with a pit on one side or both. They are mostly of granite, quartzite, or sandstone, rarely of other materials. The common forms are shown in figure 163. They were also used as pestles with the hollow mortars, as the edge is often chipped or pecked; in these, the pits on the faces are intended to afford a firmer hold.



Figure 163 — Mullers.

PITTED STONES.

Pitted stones occur in every part of the world, being so numerous, indeed, as seldom to be considered worth the trouble of gathering. They are almost invariably water-worn sandstone pebbles, with a pit varying from a slight roughening of the surface to a hollow half an inch in depth pecked in each face. They probably belong with hammerstones, as they seldom show other marks of work, the edge in some being only slightly marked in one or two places, while in others it is much worn.

Slight pits aid in holding stone hammers; they also prevent the jar to a large extent. If used to pound meat or break stones, it would be hard to hold them when greasy without pits. Such implements may have had handles of wood with projections to fit the pits.— Evans, 213 and 218.

If such handles were used at all, which is improbable, a piece of buckskin fastened on each, opposite the pits, would do better service and be more convenient to apply than such "projection."

CUP-STONES.

It is a remarkable fact that archæologists still remain in total ignorance as to the functions of the objects commonly known

as cup-stones. Much has been written about them, including a profusely illustrated monograph by Rau, published as volume V of Contributions to North American Ethnology; but no definite information is forthcoming as to their use or purpose. They occur in all parts of the world, and are surpassed in numbers among the larger stone objects only by pitted stones and hammers. Over the eastern half of the United States they are found by thousands, in all sorts of situations, not only on village-sites, but in mounds and cairns where they are apparently thrown in as part of the component material, like any other stones. They are abundant, too, in places where no effort of the imagination can account for their appearance. For instance on the level top of a hill near Jasper, in Pike county, some 200 feet above the Scioto, more than 100 of these relics were discovered. No other worked objects could be found; although there are two small mounds which are described on page 375. Near this place is a hill known as Jasper Knob having an elevation above the water of considerably more than 600 feet. On its summit were two of these cup-stones, but diligent search failed to reveal anything else of artificial character. Near Chillicothe, on a point overlooking Paint Creek valley, several large irregular blocks of sandstone are firmly imbedded in the earth; each has one or more cups on its exposed surface. On a hill 400 feet high, two miles from this, whose top is liberally dotted with slabs and large fragments of sandstone, an hour's search disclosed 25 or 30 with these indentations. In none of these places is there any other apparent evidence of occupation. The soil is mostly clay and might almost be called sterile when compared with the alluvial loam of the bottom-lands within a few hundred yards; while no water is to be had nearer than the streams at the foot of the hills.

Two miles below Pittsburg are the remains of two Indian villages about one mile apart. The great number of cupped or pitted stones found there has been remarkable. They are principally water-worn boulders taken from the river, measuring from six to eighteen inches in diameter; besides several large, fixed boulders containing ten to fifteen cups on them, averaging half the size of a hen's egg.— Harper, 75.

A mound fifty feet in diameter and five feet high, at the entrance of an enclosure near Charleston, West Virginia, had the top "strewn with fragments of flat rocks, most of which were marked with one or more small, artificial, cup-shaped depressions." — Burial Mounds, 55.

They are almost invariably of reddish sandstone, of varying texture, from a few ounces to thirty pounds in weight. The holes are from one to twenty-five in number, of various sizes even in the same stone, and follow the natural contour of the surface although it may be quite rough; the stone is never dressed or flattened to bring the cups to a level; none show any marks of work but are simply blocks or slabs left in their natural state. The smaller ones with one cup pass into the pitted stones. Flat or thin pieces nearly always have cups on both sides, while blocks or thick slabs have them on one side only. Many of the



Figure 164 — Cup-Stone.

holes are roughly pecked in, but the larger ones are usually quite smooth, as if ground out, and almost complete hemispheres. They range from a pit only started or going scarcely beyond the surface to one two inches in diameter. Occasionally at the bottom of a large cup there is a small secondary hole as though made by a flint drill. A fine example is shown in figure 164.

Conjecture and theory have had full sway in regard to the uses of these objects; but the question is apparently far from a solution.

"So far as the series gathered in New Jersey bears upon this matter, it may be stated that nearly one hundred were found where the ground was literally covered with fragments of pottery and steatite pots, mixed with charcoal and other evidences of fire. Whatever may have been the purpose of these pitted stones, it is evident that they were closely connected with household, and probably, culinary occupations." — Abbott, 190.

"At an arrow-making shop near the mouth of the Saline river in Illinois was a great number of cup-stones. With pick and spade I soon exposed a group or pile of over twenty, and with them a number of slabs of the same sandstone that showed marks of having been used as rub or grindstones, all made from mill-stone grit. Further research developed a number of such piles, some having only the cup-like indentations, others having a center depression of four to six inches in diameter, similar to the rude mortars with the cups irregularly arranged around them. Many were scattered over the entire flaking ground; they varied in size from large pebbles with a single cup on opposite sides up to massive slabs, having eight and ten cups on a side. So many being found where the manufacturing of stone implements has been so extensively carried on is suggestive to a mechanic that they were either made on the ground and kept on hand for sale, or that they were tools in some way used in their works. That they were new can hardly be the case, for very frequently one cup has been worn into another. On the opposite side of the Saline river, above a bluff, is another flaking place or flint shop. Within a space of two acres and not over an hour's tramp, on the fresh-plowed earth, I found scattered over twenty cup-stones. This is another instance of their having been left among the offal of a workshop. Among near-by earthworks, where the densest original population have left their marks, I expected to find the cup-stones. The single-pit and indented hammer-stones were plenty, and also rude mortars, but the cup-stones were comparatively few. An aged farmer tells me that the Indians here, in his boyhood, used the single-pit nut-stones, but they did not know anything about the cup-stones. At that time, too, a Pacific whaler told him that he once saw these stones in daily use in Patagonia. The women fitted a piece of raw hide into each hole, set a spindle in it with enough grease to make it run slick, and then clustered around the stone and spun their yarn." — Sellers, Chipping, 886, condensed.

The spindle theory has been advanced by others; among them a writer in the "Ohio Centennial Report," who figures an ordinary cup-stone with ten holes as a "spindle foot rest" with the explanation,

"I conceive that the universal cup-shaped cavities, which are seen on small stones throughout the Ohio Valley, were formed by the lower ends of such spindles." — Matson, 135.

Whittlesey, noting the fact that hundreds are found throughout northern Ohio, holds the same belief.

How several women could cluster within easy reach of one small stone, or how so many spindles could be worked in so small a space without confusion or entanglement of the separate threads, does not appear. Other suggestions are to the effect that the holes were used as "sockets for fire drills or mortars

for grinding pigment" (Dawson, 112); and for steadying or supporting the shafts of drills used in perforating stone or other material. The same objection applies to all; a single pit, in a stone large enough to remain steady while the work was going on, could be used for any of the above purposes; but when several are in such close array that the partitions between them are worn away, some other interpretation is necessary. Occasionally a cup is found having more or less of a polish, which may be due to the rotation of some tool supported in it; but these are rare.

The most common explanation in regard to cup-stones is that they were used to crack nuts on. Because they occur in the southern States in considerable numbers where nut-bearing trees now flourish, Jones concludes them to be the "morters" referred to by Hariot. It is evident, however, that something quite different is meant by that writer; and, further, we have no warrant for assuming that these trees stood here when the stones were in use, or even that the distribution of timber is now what it was some centuries ago.

Rau thinks they may have been used for this purpose, as the cavities are deep enough to hold a nut in place. He cites in evidence a stone found in a cabin buried 14 feet deep in an Irish bog — a slab three feet long and 14 inches thick, with one hole three-fourths of an inch deep in its surface and hazel-nut shells scattered about it! — Rau, Cup-stones, 142.

Read suggests that the pits were made hollow at first with a rude pick, so that a nut would not slip and allow the finger to be struck.— Read, Cup-stones, 14.

This supposition as to their purpose, which is so prevalent that the name "nut-stone" is frequently applied to them, has its sole foundation in statements by some early writers.

"At the fall of the leaf, they gather a great number of hiccory-nuts, which they pound with a round stone, upon a stone, thick and hollowed for the purpose. When they are beat fine enough, they mix them with cold water, in a clay bason, where the shells subside. The other part is an oily, tough, thick, white substance, called by the traders hiccory milk, and by the Indians the flesh or fat of the hiccory-nuts, with which they eat their bread." — Adair, 409.

"Besides their eating of them ["walnuts," by which he means hickory nuts] after our ordinarie manner, they break them with stones, and pound them in morters with water to make a milk which they use to put into some sort of their spoonmeate; also among their sodde wheat, peaze, beanes, and pompions which maketh them have a far more pleasant taste." — Hariot; quoted by Jones, 317.

"The [Delaware] Indians gather a great quantity of sweet hiccory nuts, which grow in great plenty in some years, and not only eat them raw, but extract a milky juice from them, which tastes well and is nourishing. Sometimes they extract an oil, by first roasting the nut in the shell under pot-ashes, and pounding them to a fine mash, which they boil in water. The oil swimming on the surface is skimmed off and used in their cooking." — Loskiel, 71.

"The Creeks store up the shell-barked hiccory nuts in their towns. I have seen above an hundred bushels of these nuts belonging to one family. They pound them to pieces and then cast them into boiling water, which, after passing through fine strainers, preserves the most oily part of the liquid: this they call by a name which signifies hiccory milk; it is as sweet and rich as fresh cream, and is an ingredient in most of their cookery, especially homony and corn cakes." — Bartrams, 38.

"They take these nuts [of the white hickory], and break them very small betwixt two stones, till the shells and kernels are indifferent small; and this powder you are presented withal in their cabins, in little wooden dishes; the kernel dissolves in your mouth, and the shell is spit out. Another dish is the soup which they make of these nuts, beaten, and put into venison broth, which dissolves the nut and thickens, whilst the shell precipitates and remains at the bottom. This broth tastes very rich." — Lawson, 164.

"We found here good store of chinkapin nuts, which they gather in winter great quantities of, drying them, so keep these nuts in great baskets for their use. Likewise hickerie nuts, which they beat betwixt two great stones, then sift them, so thicken their venison broth therewith, the small shells precipitating to the bottom of the pot, whilst the kernel, in form of flower, mixes it with the liquor, both of these nuts made into meal makes a curious soup, either with clear water or in any meat broth." — Lawson, 53.

Not one of these statements seems to have any reference to a cup-stone. Two of them describe a mortar with a round pestle, while the others say nothing about any particular form of stone; yet they have been alluded to time and again as proof of the nut-stone theory. There would be some difficulty in pounding nuts fine in small holes half an inch or more below where the pounding stone could reach. The shallow ones may have served for such a purpose and so long as they were on the same plane might be thus utilized, as a number of nuts could be cracked with one blow of a flat stone and thrown into a receptacle; but there would be no economy of time or work in this method, as only a portion of the shell could be broken, and many would have to be cracked a second time. At any rate, it is difficult

to understand why an Indian or any one else should want to make a large number of holes in a great many stones for such purpose. Very few of these stones have depressions that will allow the nut to stand on end, and it would be strange that any one should not learn with so much experience that it ought never to be laid on the flat side in cracking, unless it is the intention to crush the kernel and shell together; which could not be done in these "cups" anyhow.

It has recently been suggested that the greater number of such relics, namely, the irregular fragments of stone with cups at varying intervals and different levels, even on opposite sides, were pecked out for the purpose of grinding off the ends of sticks to a convex form, for use in making fire by twirling rapidly. When a hole became too large, as it soon would, another was started (Dellenbaugh). No theory yet advanced, however, will account for the boulder of sandstone weighing at least half a ton, found near Ironton, which contains more than 100 cups scattered all over it. In order that the reader may take his turn in guessing at some possible motive for contriving such an object, it is shown in figure 165 (N. A. Cont. V., figure 42).

HAMMERSTONES.

Hammers or hammerstones show every stage of work, from the ordinary pebble or fragment, with its surface scarcely altered, to the highly polished round or ovoid "ball", and the grooved form to which a withe is attached in the same manner as the handle of an ax or a celt. They are usually of the hardest available material, and seem to be of more frequent occurrence in the northern districts than in the southern states, though found everywhere. Used in their earlier stages merely as tools with which to fashion other implements, they were assigned to specific purposes when brought to a better finish. The types are presented in figure 166.

The Sioux used an oval stone with a piece of rawhide covering all but the point and attaching it to a withe handle.— Dodge: Indians, Plate I, Figure 3.

"The poggamoggon [of the Ojibwa and Shoshonee] is an instrument, consisting of a handle twenty-two inches long, made of wood, covered with dressed leather about the size of a whip handle; at one end is a thong of about two inches in length, which is tied to a round stone weighing two pounds and held in a cover of leather; at the other end is a loop of the same material, which is passed around the wrist, so as to se-

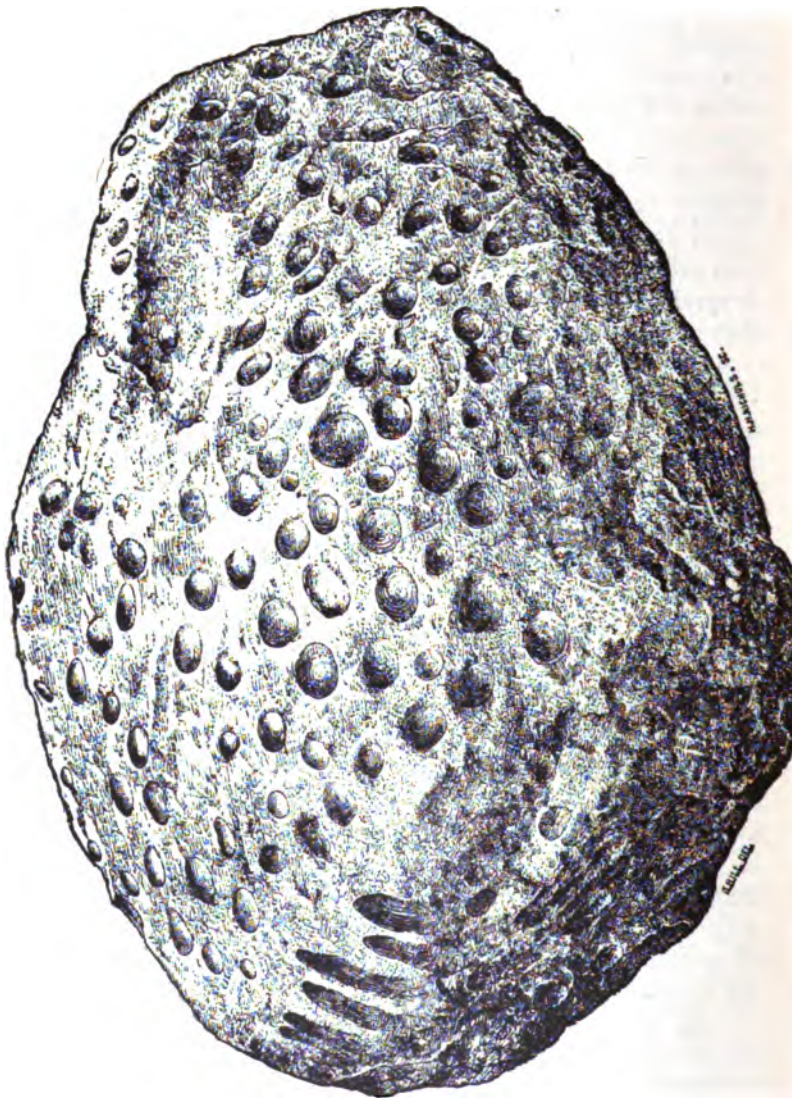


Figure 165 — Large Boulder, with Numerous "Cups."

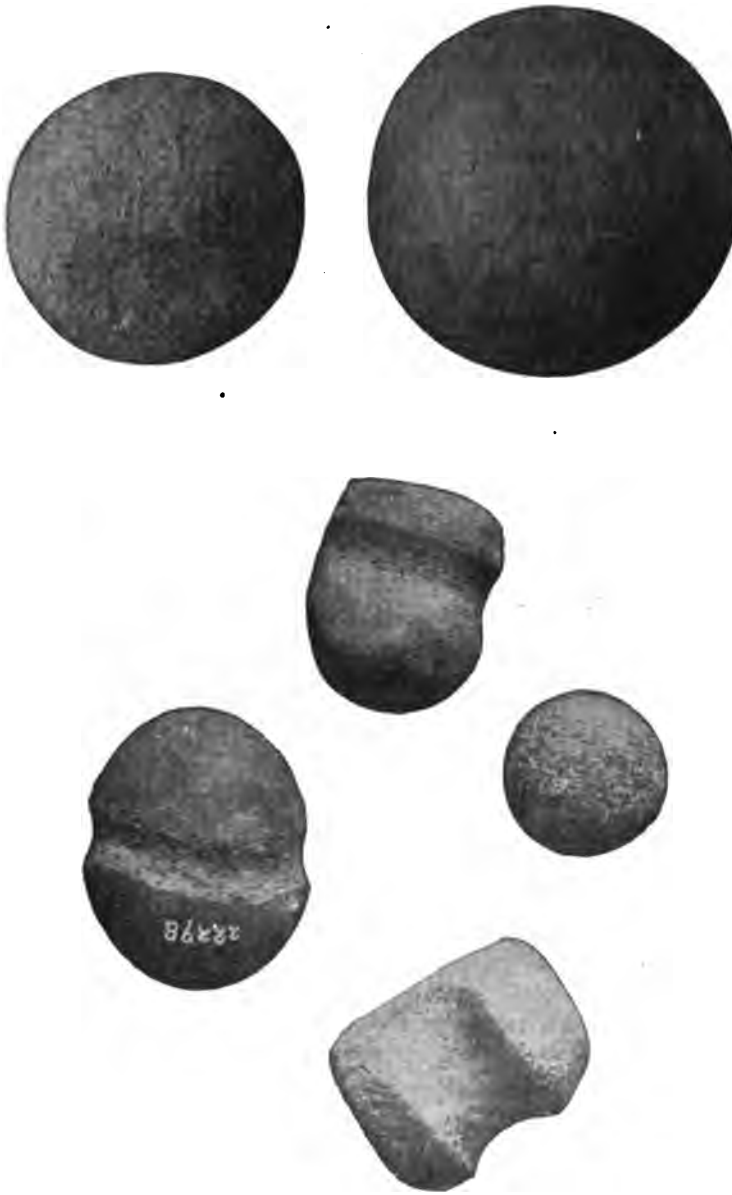


Figure 166 — Hammers, Sinkers, or Club-heads: Round and Grooved.

cure the hold of the instrument, with which they strike a very severe blow." — L. & C., I, 425.

"The war-club of the Apache was an admirable weapon; a stone of suitable size and shape was sewed up in [the skin of] a cow's tail; then a space of four inches was left in the tail, and lastly, a round stick was sewed in to give strength and rigidity and to serve as a handle. The hair was left pendant, as it kept the hand from losing its hold when covered with human blood." — Bourke, Vesper, 59.

Rounded stones are said to have been used by the California Indians for bolas (Powers, 52), though it is more probable that they were slung shots, as there is no evidence that our Indians ever used anything in the nature of bolas like those of the Eskimo and Patagonians. Elaborately carved round stones, mounted in handles in clubs, are known to have been used by the Indians of Queen Charlotte's Island for killing fish (Dawson, 119), and the other northwestern Indians have been seen to use a round stone inclosed in a net and used as a sinker (Stevens, 95). Carver observed that the southwestern Indians used as a slung shot a curiously worked stone with a string a yard and a half long tied to it, the other end being tied to the arm above the elbow.— Carver, 191.

"Oval stones, with grooves around their greatest circumference, were also secured in the head of war-clubs." — Iroquois, 359.

MORTARS.

Indian mortars are nearly always of sandstone of varying degrees of fineness. As is the case with cupped stones, when made of slabs, both sides have been worked; when of rough blocks, only one.

The Senecas and Cayugas used wooden mortars in which to pound the corn after it was hulled (Regents: II, 16.); and it is probable that the long pestles of soft stone were used with wooden mortars, though some are not well adapted to this use. The Iroquois women pounded in stone mortars the stony material used in tempering the clay for their pottery. (Schoolcraft, Iroquois, 239.) The California Indians made mortars by knocking a segment off a bowlder, making a flat surface, and working out with a hammer and chisel (Schumaker, 264); while the tribes of the interior worked directly from the surface of a suitable rock. The Yokuts, according to Powers, use tolerably well made stone mortars, and sometimes place a basket-like arrangement around the top to prevent the acorns from flying out. — Powers, 377.

SINKERS AND LARGE PERFORATED STONES.

Flat stones with notched edges are found along water courses in such situations as to leave no doubt of their use as sinkers (Abbott, Chap. 28); they were attached to grapevines and dragged on the bottom of streams to frighten fish into nets and traps.— Jones, 338.

"The Indians have the art of catching fish in large crails, made with canes and hiccory splints, tapering to a point. They lay these at a fall of water, where stones are placed in two sloping lines from each bank, till they meet together in the middle of the rapid stream, where the entangled fish are soon drowned. Above such a place, I have known them to fasten a wreath of long grape vines together, to reach across the river, with stones fastened at proper distances to rake the bottom; they will swim a mile with it whooping and plunging all the way, driving the fish before them into their large cane pots." — Adair, 403.

While most grooved round stones were club heads and slung shots or hammers, many were used as sinkers. Small stones of this form are used by Greenland fishermen as sinkers (Nilsson, 25); and by their aid it is said,

"The Indians of the Great Lakes formerly caught fish in nets when the water was frozen over. They would cut a series of holes in the ice, and pass one end of a rope from one to another by means of a pole until it was carried as far as desired. The rope was then attached to a net, and drawn back to the starting point. Sinkers of stone, of various sizes, were attached to different parts of the net, to hold it vertical in the water. The fish, in attempting to pass through, would be caught in the meshes by their gills." — Thatcher, I, 69.

Perforated stones seem to have been employed for a variety of purposes in all parts of the world. They were used by the southern Indians to drag along the bottom of streams and frighten fish into nets and traps (Jones, 338). Four disks 4 to 5½ inches in diameter, with handles from 13 to 17 inches long, were found in a cave at Los Angeles, California (Amer. Nat., XX, 574), and objects of this character were used by the Santa Barbara Indians as weights for wooden spades (Schumacher, 265, also in Hayden, 1877, p. 41). Many perforated stones are found in the eastern States, close to rivers and on shores in such positions as to leave no doubt of their use as sinkers (Abbott, 244). Similar stones were used as sinkers by the Scandinavians in comparatively recent times; by the Bechuanas for grinding grasshoppers, spiders, etc., and also as weights for digging sticks; by some savages in the Pacific islands as clubs; by the Icelanders

for breaking up salted fish (Stevens, 95). They were used by the Iroquois as weights for fire drills (Iroquois, 381); by the Eskimo as clubs, having a rawhide handle secured by a knot (Stevens, 499). The natives of Africa use them as a sort of hoe, to scrape the earth away from roots; as weapons; and to give additional weight to digging-sticks (Dale I, 347; Layard, I, appendix, c; Griesbach, I, cliv.; Gooch, XI, 128). Gooch also says they were utilized as club heads by the predecessors of the Bushmen, who now use them as diggers. They were thrown with a stick by the Peruvian Indians, somewhat as a stone is thrown from a sling. Disk-shaped and cylindrical throwing stones, perforated for the stick, are found among the Swiss Lake dwellings (Knight, 232). Evans thinks they were intended mostly for hammers or clubs, as they are hard and battered on the edges; sinkers would be of softer stone.—Evans, 194.

"Among the Indians of southern California, where perforated stones are very numerous, these relics were formerly put to three uses: — First, as weights to digging-sticks; second, as gaming implements; third, as dies for fashioning tubes, pipes and, similar cylindrical objects. The especial function of the digging-stick was to dig a kind of onion-like root called 'cihon.' When in use the weight was slipped over the handle till it rested about the middle of the stick like a collar; its sole function was evidently to give weight to the pointed stick and thus to increase its effectiveness.

"A California Indian said some of the perforated disks of hard stone were made for the express purpose of fashioning pipes. The end of the stone to be fashioned was inserted into the hole of a perforated stone and turned by hand until reduced to the proper shape. Another possible use for such stones, is for ceremonial purposes, which is not at all probable except where they were also used as weapons, but may have been the purpose of carefully finished, symmetrical specimens, many of which still show traces of coloring matter." — Henshaw, Rings, 7, *et seq.*, condensed.

Small perforated disks were also used as weights for spindles. Very delicate fabrics are possible by means of such rude apparatus, though the American Indian never passed beyond the stage of coarse cloth.

"A slender piece of bamboo," as a spindle; "a little ball of unbaked clay," as a whorl or weight; and "a fragment of shell" as a rest for the spindle — are all the appliances a Hindoo woman needs for making the thread for fabrics such as "with all our machinery and wondrous appliances we have hitherto been unable to produce." — Mitchell, 13.

The fire-shaft had "a small wheel set upon the lower part to give it momentum." — Iroquois, 381.

DISCOIDAL STONES.

There are numerous references to discoidal stones by various writers, but a majority of the objects do not fall under any explanation that has so far been given. They are most plentiful in the region traversed by the lower ranges of the Appalachians, the finest specimens being found there. They are also more or less numerous throughout the central Mississippi valley and eastward.

"Throughout all the river valleys, east of the Alleghany mountains, these perforated ceremonial objects are found in about equal abundance. * * wherever villages stood, we may confidently expect to find fragments, at least, of these pretty objects. * * In New England they are by no means uncommon. * * Throughout New York, they are of common occurrence." From Lancaster, Pennsylvania, comes "a very fine series of these implements, mostly made of Potsdam slates. They are in the various stages of manufacture, and show that the slate was first coarsely chipped, then pecked or more delicately chipped until the outline was secured; after which they were carefully polished, and finally perforated. This was done not only with a hollow reed, but sometimes with a solid stone drill. It would seem from their unusual abundance in some portions of the Susquehanna river valley, that many of them were thus made for barter with other tribes or communities." — Abbott, 350.

Many were taken from a mound at Hopewell's. The description indicates a micaceous steatite or chlorite—"it cuts without difficulty and receives a very high polish". Some were solid, like short sections of a cylinder; others were perforated, and some had a flange around the margin, giving them a resemblance to small pulley-wheels (S. & D., 287). They seem to have been confined to one mound of this group.

Certain forms were much in vogue in a sport which seems to have been indulged in over much of the United States.

"The warriors [of the southern States] have another favorite game, called *chungke*. * * They have near their state house, a square piece of ground well cleaned, and fine sand is carefully strewed over it, when requisite, to promote a swifter motion to what they throw along the surface. Only one, or two on a side, play at this ancient game. They have a stone about two fingers broad at the edge, and two spans around; each party has a pole of about eight feet long, smooth, and tapering at each end, the points flat. They set off abreast of each other, at six yards from the end of the play ground; then one of them hurls the stone on its edge, in as direct a line as he can, a considerable distance toward the other end of the square; when they have run a few yards, each darts his pole anointed with bear's oil, with a proper force, as near as he can guess in

proportion to the motion of the stone, that the end may lie close to the end of the stone — when this is the case, the person counts two of the game, and, in proportion of the nearness of the poles to the mark, one is counted, unless by measuring, both are found to be at an equal distance from the stone. * * The hurling stones they use at present, were time immemorial rubbed smooth on the rocks, and with prodigious labor; they are kept with the strictest religious care, from one generation to another, and are exempted from being buried with the dead. They belong to the town where they are used and are carefully preserved." — Adair, 401.

The Indians of North Carolina were much addicted to a sport called "chenco", played with a staff and a bowl made with stone (Lawson, 98). The same kind of game was, or still is, played with hoops or rings of wood or rawhide by the Iroquois (Iroquois, 299), the Pawnees (Irving, J. T., II, 142), the Apaches (Cremony, 302), the Navajo (Matthews, W., 814), the Mohave (Pac. Ry., III., 114), and the Omaha (Long, Rockies I, 205); also, with the rings of stone, by the Arikara (Brackenridge, 256) and other tribes.

The Pawnee "ring game" is played with a hoop of rawhide and a spear about five feet long; the game is the same as chung-kee, the object being to send the spear through a hole in the ring.— Grinnell, 21, *et seq.*

At the Mandan village "a space of about fifty yards, was covered with timbers smoothed and joined so as to be as level as the floor of one of our houses, with a battery at the end to stop the rings; these rings were of claystone and flat like the chequers for drafts, and the sticks were about four feet long, with two short pieces at one end in the form of a mace, so fixed that the whole will slide along the board. Two men fix themselves at one end, each provided with a stick, and one of them with a ring; they run along the board, and about half way slide the sticks after the ring." — L. & C., I, 144.

Among the Mandans "this game is decidedly their favorite amusement. The play commences with two (one from each party), who start off upon a trot abreast of each other, and one of them rolls in advance of them, on the pavement [of hard, smooth clay], a little ring of two or three inches in diameter, cut out of a stone; and each one follows it up with his 'tchung-kee' (a stick of six feet in length, with little bits of leather projecting from its sides of an inch or more in length), which he throws before him as he runs, sliding it along upon the ground after the ring, endeavoring to place it in such a position when it stops, that the ring may fall upon it, and receive one of the little projections of leather through it, which counts for game." — Catlin, Indians, I, 132.

"Rev. J. B. Finley * * states that, "among the tribes with which he was acquainted, stones identical with those above described [disks] were much used in a popular game resembling the modern games of 'ten

pins.' The form of the stones suggests the manner in which they were held or thrown, or rather rolled. The concave sides received the thumb and second finger, the forefinger clasping the periphery." — S. & D., 223, note.

It is further described by Du Pratz.

While many may have been used for the game of "chung-kee", the evident unfitness for this use of most discoidals requires some other explanation as to their purpose.

"It is often the case that these stones are found * * saturated, or heavily coated, with oily pigment, accumulated apparently by long contact with animal fat. * * This fact, together with their great numbers, their wide distribution, their various dimensions, forms, and degrees of fine finish, and their presence in old village sites and camp refuse, strongly suggest the probability of their economic use as domestic implements." — Snyder: Bicaves, 167.

The Indians of southern California, in manufacturing pottery, make the clay compact and smooth by holding a round and smooth stone against the inside (Schumacher, Pea. Mus., XII, 522). The Fijians, in making pottery, use a small, round, flat stone to shape the inside (Lubbock, 648); while the Indians of Guiana use ancient axes or smooth stones for polishing the clay in making their vessels (Im Thurn, II, 647). Some disks were used as pestles, hammers or mullers; a thick one with pitted ends was found in a mortar (Evans, 218 and 227). Under the head of pestles and perforated stones further reference will be found that may apply as well to some forms of these implements.

No kind of relic is more difficult to classify. From the smooth, symmetrical, highly polished "chung-kee" stones they gradually merge into mullers, pestles, pitted stones, polishers, hammers, (for any or all of which purposes they may have been used in the course of their manufacture), ornaments, and the ordinary sinker or club-head, so that no dividing line is possible. Theories constructed on a basis of their use may be far from correct.

They present various forms and degrees of finish; many have the natural surface on both sides with the edge worked off by grinding or pecking, the latter being produced probably by use as a hammer; the sides may be ground down while the edge remains untouched; or the sides may be pecked and the edge ground, being probably of a thick pebble originally. Some of the finer grades, as chalcedony and quartz, that have received the highest

finish, appear to have had all the work done by grinding or rubbing, as even those only slightly worked bear no signs of hammering or pecking. When of the harder materials they are generally made of water-worn pebbles as near the desired form as can be found; in fact, some specimens which are in their natural state, entirely unworked, require a very close examination to distinguish them from others whose surface has been artificially produced. In some jasper conglomerates from Arkansas, however, there is a regular series from a roughly chipped disk to one of the highest polish and symmetry. The larger ones of quartz, particularly those with concavities in the sides, must have been patiently wrought for years before brought to their present state. Many of the smaller ones, especially sandstone, seem to have been designed for grinding or polishing.

An unusually fine specimen is represented in figure 167. Other forms are shown in figure 168.

SPUDS.

It has been a puzzle to archæologists to assign to any class the peculiar stones called "spuds." They are usually of a comparatively soft material, carefully worked and polished, and bear no marks of rough usage. On the other hand, they seem too large for ornament. Perhaps their office may have been in some ceremony or game. Something similar in form seems to be denoted in the folowing extracts:

"In this month (February) we began to make sugar. As some of the elm bark will strip at this season, the squaws after finding a tree that would do, cut it down, and with a crooked stick broad and sharp at the end, took the bark off the tree, and of this bark, made vessels." — Col. Smith, 36.

The Twana Indians, who formerly lived at the south end of Hood's canal, Washington, in barking logs used a heavy iron instrument about three feet long, widened and sharpened at the end. — Eells, Myrom; Hayden, 1881.

The tanbark workers of our day use an instrument of somewhat similar form. The ordinary spud is too weak to endure such usage, though it is claimed by old people living in the Shenandoah valley, Virginia, that in the 18th century the Indians in that locality used an implement of this pattern for stripping the bark from trees. The implement may have been used in dressing hides, the hole being for attachment of a handle.



Figure 167.

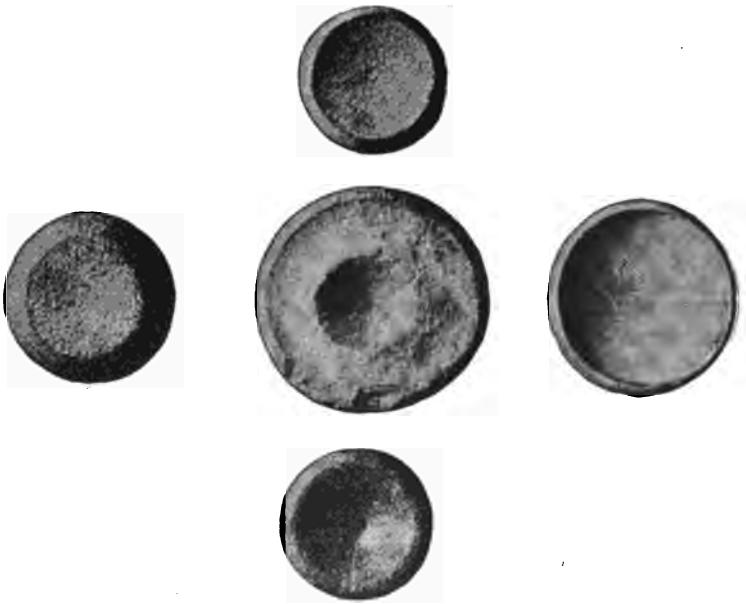


Figure 168 — Discoidal Stones.

On a short, broad spud found in Georgia, "the proofs of long-continued use are evident all along the lower portion of the edge, and for fully two-thirds of the way up, on either hand, towards the shoulders. We incline to the belief that it was a scraper, and that the hole drilled through the lower part of the handle was intended to admit the insertion of a buckskin thong by means of which the implement, when grasped could have been fastened around the wrist or the back of the hand, and thus the steady and forcible use of the tool greatly facilitated." — Jones, 290.

No implements of this class are found in Ohio; an object intermediate between a spud and a celt is shown in figure 169.

PLUMMETS.

The specimens known as plummets vary considerably in form, size, and degree of finish. The general shape is ovoid, sometimes quite slender, sometimes almost round; the ends may be either blunt or pointed. They may be grooved near the middle or near either the larger or the smaller end. Some have two grooves, some are only partially grooved, while others have the groove extending in the direction of the longer axis. Still others have only a crease, scarcely larger than a coarse thread; many are drilled or perforated; while a few have "necks" or slender prolongations at one end. All of these features may have been intended for the purpose of facilitating suspension, though in some instances it would have required no little care and attention to prevent the pendant from hanging awry.

A fine collection of these objects is illustrated in figure 170.

The designation of "plummet" is applied to them merely from their resemblance to the "plumbob" used by carpenters and brick-layers. It is about as far from describing their use as any name could be, if for no other reason than that their owners never had anything to "plumb."

"While on the coast of California, the writer obtained from the Indians a direct and circumstantial account of their use. The moment the stones were shown to the Santa Barbara Indians, and without leading questions from me, I was told that were 'medicine or sorcery stones' used by the medicine men in making rain, in curing the sick, and in various ceremonies. The sorcerer arranged twenty of the stones, the proper number, in a circle, pushing them violently together, sprinkling water over the whole, when smoke issued from them. At San Buenventura substantially the same account was received. Here it was said that twelve was the number required by the medicine-men, exclusive of a center stone of a dif-



Figure 169 — Spud-like Implement.



Figure 170 — Plummets.

ferent character, a beach-worn pebble of quartzite, unworked. It was, as I was told, of peculiar power in rain making, and as evidence of the power inherent in it the Indian held it for a few moments tightly grasped in his hand, when moisture condensed by contact of the moist hand with its cool surface, was pointed to as visible evidence of its rain making power. Similar ceremonies were observed for curing the sick, bringing rain, putting out fires in the mountains, calling fish up the streams, when war was to be made, etc. Several other stones of various shapes were shown to me, to all of which mysterious properties were assigned. The pear-shaped 'sinker' variety was considered the most efficient in sorcery. It is by no means impossible that the original functions of these stones may have been as sinkers. In the case of tribes which depended for their livelihood mainly upon fishing, it is not difficult to imagine that an important implement in constant use might gradually be clothed with mysterious powers, and that success in fishing might be attributed to its direct influence. Under the idea that it brought good luck, its owner might employ it, more or less exclusively, as an amulet. Its shape and peculiarities might then be copied by the medicine-men and used in sorcery, especially in giving good luck to the fishermen and in influencing the movements of fish in the rivers, after which these stones would gradually pass into the hands of neighboring tribes either through barter or by imitation. Their later possessors might know nothing of their origin; for them it would be enough to know that they were a protection from disease or that they would bring them luck in hunting, fishing, etc. Mr. Murdoch relates that one of the Esquimaux, in all his hunting or fishing excursions on the ice, wore, suspended about his neck, a large stone shaped like a sinker and weighing two pounds or more. When at home this sinker was always hung up in the hut. Probably this was originally a true sinker, and, having been handed down to the present owner, it became invested with a new value and a new use.

"In calling the attention of an Indian to the ring pecked near the extremity of one of the 'medicine stones,' he stated that he did not know its purpose, but that the stones so encircled were considered to be more potent than others. Different Indians stated that they 'never saw one used as a sinker; our sinkers were beach stones, and when one was lost we picked up another.'" — Henshaw, Sinkers, 105, *et seq.*, condensed.

The surmise that they were originally sinkers, and gradually became regarded as possessing occult powers, finds strong support in the observations of two other writers.

In Sonoma county, California, a lake of about three hundred acres was drained for cultivation. A very great number of plummets have been found in its bed, how many is not known; but within three years, more than thirty years after it was drained, one man found and picked up more than 500. Even if we assume that he was far more successful in his search than any other of the numerous collectors who have re-

sorted to the spot, it is a conservative estimate to say that the site has yielded 6000 specimens.— Meredith, 322.

"A very old Indian chief of the Napa tribe (California) * * stated to me that the plummet-shaped implements were used as charm stones." They were "suspended over the water where the Indians intended to fish" and "at points in the mountains favorable for hunting." "They were sometimes laid on ledges of rocks on high peaks;" they were supposed to travel about at night, and would drive fish and game to convenient places for capture. "The peculiar pear-shaped form was given them to enable them to cleave through the water and air." It was also supposed they would "make the wearer invisible, invulnerable, and prove beneficial in various ways." — Eells, 304.

Yates gives many references to these relics and shows the errors of most of the explanations in regard to them.— Yates.

Among other uses which they are supposed to have subserved, we may cite:—pestles, for which they are nearly all too small, unless for stirring paint; spinning-weights, though it has never been explained how they would be attached to the loose fiber or, in case a number was used close together, how a hopeless entanglement could be prevented; slung shots, for which they are almost always too small; bolas, which there is not the slightest evidence were ever used by our aborigines; ornaments, which is a convenient and comprehensive designation for all articles that are not easily classified otherwise.

CONES.

The relics known from their shape as "cones" have the base flat and upper surface curving; usually the curve extends regularly over the top, but sometimes the apex is rubbed off flat. A top view of one is presented in figure 171. The conic surface may form an angle with the base, or the line of junction may be rounded into a curve. They vary considerably in thickness, some being nearly flat, others having a height equal to the diameter of the base. Occasionally one has a pit or depression on the flat side, as seen in figure 172; as a rule the cavity is much smaller and shallower than in this specimen.

HEMISPHERES.

Hemispheric stones, like the cones, can receive a name only from the form and not from any known or imagined use to which they could have been applied. Almost invariably they are

made of hematite. Many, if not most of them have been ground down from the nodule, and were probably paint stones originally; at least, the material rubbed from them was used as paint while



Figure 171.



Figure 172.

Cones.

the maker had their final form in view. One, however, has been pecked into shape and is entirely without polish. In all, the base is flat and varies in outline from almost a circle to a narrow



Figure 173 — Hemispheric Stones.

ellipse. A section of the stone parallel to either axis of the base varies from a little more to a little less than a semicircle. They seem most abundant in the Kanawha valley, and along both sides of the Ohio River from Parkersburg to Cincinnati.

The extremes of shape may be observed in figure 173.

CHAPTER XV

STONES FOR CEREMONIAL OR DECORATIVE PURPOSES.

THE great quantity of prehistoric objects whose origin is probably to be sought in a religious or esthetic feeling, the very wide range of form and material, and their unlikeness to almost everything in use among ourselves, has caused much conjecture in regard to their intended functions. They are made of many varieties of shell, bone, metal, and stone, especially slate and steatite. Under such names as gorgets, crescents, wands, tubes, banner-stones, amulets, pendants, butterfly-gorgets, ear-bobs, bracelets, head-dresses, breast-plates, labrets, beads, nose-rings, charms, talismans, and a score of others, they are the prizes of hundreds of cabinets and are delineated in many volumes. No doubt some owe their form merely to a whim or fancy of the maker; others were purely decorative in their purpose; while many of them were symbolic, or for use in the manifold dances, parades, celebrations, religious ceremonies, and other observances, so dear to the minds of ignorant people. The manner of perforation in some indicates that they were for suspension by cords; in others that they were to be placed on a staff; still others, unperforated, may have been secured in various ways. Nearly all are made of material that would break if carelessly handled; many are of such size and shape that no practical use for them can be imagined. To ascribe a purpose to any pattern, unless a similar one had been seen in actual service, would be as presumptuous and probably as fallacious as the attempt by a person entirely unacquainted with modern secret societies to explain the meaning of badges, pins, epaulets, or regalia. A statement that each was for service in a certain way can not be gainsaid; but the one who makes the claim must give satisfactory reasons for his assertion before it is to be accepted as a fact and not as a guess.

Different writers have supposed they were devoted to religious, superstitious, medical, emblematic, or ceremonial purposes; were badges of authority, insignia of rank, tokens of valorous deeds, or perhaps some sort of heraldic device; in short, the uses to which they might, in their different forms, be assigned, are limited only by the imagination.

Observations upon the known habits and beliefs of various people may assist in enlightening us as to the uses of some forms of these objects.

The ancient Scandinavians wore "victory stones" suspended around their necks (Nilsson, 215). Eskimo wear charms and amulets to bring success in hunting and fishing.— Abbott, 408.

"The American archi-magus wore a breastplate made of a white conch-shell, with two holes bored in the middle of it, through which he put the ends of an otter-skin strap and fastened a buck-horn button to the outside of each." — Adair, 48.

An explanation of the purpose of many of the smaller perforated stones also, may be found in the remark that the small ovoid or ellipsoid ones were used as buttons; a string being tied to the robe at one end, run through the hole, and tied in a knot (Nilsson, 83). It is stated of the coast Indians of Alaska, that

"Like the Greenlanders and other Eskimos, they place great reliance on amulets or talismans which are carried on the person, in the boat, or even inserted in weapons, each apparently with some specific purpose." — Murdoch, 434.

"Ceremonial objects have been found in the Huron ossuaries in Canada, in great abundance. A large number of them are made of Huronian slate. These are shaped in the form of animals, birds, butterflies, bars, axes, and other objects in nature and art. * * * Some of these, if not the most of them, must have been used as amulets. Visitors to the camps of the natives would never observe them, as they were, in general, worn next to the skin, and hidden from view by the garments. This is the case at the present day among the Crees and Blackfoots. * * * We seldom read in books written by travelers of these ceremonial stone objects, because they would not be permitted to see them, nor make a drawing of them."

"Our western Indians have been known to wear around their necks stones made of various shapes." — Can. Savage, 205 and 208.

The various Indians of Guiana in their leisure hours often fashion highly ornamental weapons and implements which they never use except ceremonially, but keep proudly at home for show. —Im Thurn, XI, 445.

So, too, the Yurok and Hupa Indians of California, as well as some of the tribes of Oregon, have very large spearheads or knives, which are not designed for use, but only to be produced on the occasion of a great dance. The larger weapons are wrapped in skin to protect the hand; the smaller ones are glued to a handle. Some are said to be fifteen inches long (Powers, 52 and 79). The Oregon Indians believed the possession of a large obsidian knife brought long life and prosperity to the tribe owning it. — Chase.

Several of the wild tribes have a mysterious material something, which they regard as the Jews did the "Ark of the Covenant." The Plains Indians are in no sense idol worshippers, and this "something" is not worshipped, but loved, venerated and held in sacred awe. Among the Cheyennes it was a bundle of arrows; this was once captured by the Pawnees and redeemed with three hundred ponies. "The medicine of the Utes was a little squat stone figure." It was captured by the Arapahoes and never recovered. "The Utes are said to attribute all their trouble of late years to its loss." "The Osage medicine is said to be a similar stone figure, smaller than that of the Utes, and showing no marks of chisel." Besides this "tribal medicine" "each individual warrior has a charm of similar nature, which he keeps secret." — Dodge, Indians, 131.

The Kiowa had a carved wooden image, representing a human face; the Ute captured it, and the Kiowa offered very great rewards for its return; but the Ute believing the Kiowa powerless to harm them so long as it was retained, refused to give it up. — Abbott, 373.

The North Carolina Indians, when they went to war, carried with them their idol, of which they told incredible stories and asked counsel (Brickell, 317); and as a token of rank or authority, the Virginia Indians suspended on their breasts, by a string of beads about their neck, a square plate of copper (Wyth, part I, plate 8). These were worn as badges of authority. The native tribes, from our first acquaintance with them evinced a fondness for insignia of this kind. — (Schoolcraft: Grave Creek, 401, plate I).

Simply for convenience the ceremonial stones will here be divided into two general classes. The first, comprising those pierced through the shortest diameter, will be called gorgets, which name, like that of the celt, has no particular meaning in this connection, but is in common use. The second class will comprise

all others, which will have some name that may or may not be suitable to their form, but by which they are usually called. In this class are included boat-shape stones, banner stones, picks, spool-shape ornaments, and bird shape stones, as well as engraved tablets or stones.

GORGETS.

The relics commonly called gorgets have been found in Europe; they may be convex on one side, concave on the other, and are supposed to be for bracers. They

"may have been attached to the left arm as a protection against the bow-string, and it is possible that the more perfect specimens were used for the same purpose. This use is rendered more probable by the fact that specimens are found in graves in such position as indicates that they were attached to the arm of the buried body." — Read, Arch., 40.

It is said that the Miami Indians wore similar plates of stone to protect their wrists from the bowstring (Amer. Antiq. II, 100). It is very doubtful whether any of them would be suitable for such purpose. Abbott correctly says "they are generally found on the breast of the buried body" (Amer. Nat., VII, 180); but as the left arm of the corpse is often laid across the chest, it is very easy to be in error as to the original position of the gorget. Frequently

"The Indian wore upon his left wrist a band of rawhide, from 2 to 3 inches wide, as a guard against the bowstring. Many of these come from the southwest, where they are ornamented with silver and worn in ceremonies." — Mason: Bows, 646.

This, however, could be easily shaped to fit the contour of the wrist, whereas the rigid stone must be continually readjusted or else bound on so tightly as to interfere with the free motion of the hand.

No one has ever seen a gorget used for this purpose.

A gold ornament in shape like a gorget, but not pierced, is worn on the forehead by some of the Amazon Indians.—H. & G., II, 74.

"Similar stones have been recently seen in use by the Pah-Utes of Southern Nevada 'for giving uniform size to the bow-strings,' yet the clean edges of the perforations make it impossible to believe that these stones could have been used for such a purpose, while the difficulty of supposing they could have been used as buttons, or that they could have been suspended at all is almost as great, unless we adopt the very ingenious theory of Dr. F. W. Putnam, *i. e.*, that the raw deer thong used for suspending them and forced tightly through the holes, becoming

hard when dry, remained motionless in its place, and rendered friction impossible." — Mercer, 4, note.

Another theory is that they were sometimes used as twine-twisters (Schoolcraft, History, I, 90). Stevens denies that they could have been used for any of these purposes; because they show no marks of wear in the holes (Stevens, 478). Other writers suppose the gorgets to have been shuttles, for passing the thread in weaving; but for such use, as well as for twine-twisters, they would be about as awkward as anything that could be devised. As to reducing bowstrings to a uniform diameter, it would seem that if a string were too large in places to pass through a hole, it could not be pulled through; pounding and rolling the wet string with a smooth stone or by some such means, would be the remedy.

Few gorgets show such marks of wear around the edges of the hole as would be made by a cord; but many are thus worn at the middle, where the hole is smallest. Some specimens among every lot are not perforated, or only partially so; the drilling seems to have been the last stage of the work. The hole is almost always drilled from both sides, and the few in which it goes entirely through from one side would probably have had it enlarged later from the other. Some are fragments of larger gorgets, the pieces having been redrilled.

Some of the specimens have various notches and incised lines, the latter being sometimes in tolerably regular order; but there is not the slightest indication that these marks had any meaning or were indeed for any other purpose than to add to the ornamental appearance of the stone.

If they were to be worn at the belt or on any part of the dress they could easily have been fastened by a knotted string, or if the wearer desired he could have an ornamental button of some kind. If suspended around the neck, in order to make them lie flat against the breast they probably had a short cord passed through the perforation and tied above the top of the object, the suspending cord being passed through the loop thus formed.

An article in use among the Indians of the southwest is very like the flat gorgets.

The Rhombus or "bull-roarer," among the Apaches, is a thin flat rectangular piece of wood, usually 7 or 8 inches long, 1¼ inches wide,

¼ inch thick, having attached a cord by which it can be rapidly swung round the head; the noise it makes "faithfully imitating the sound of a gust of rain-laden wind." A similar "twirler" is known to have been used in many parts of the world. "The Apaches, both men and women, wear amulets, * * duplicates on a small scale, of the Rhombus," to which they attribute almost supreme power.— Bourke, 476 and 587.

In figures 174, 175 and 176, are presented seventeen illustrations of as many different gorgets.



Figure 174 — Gorgets.

BANNER STONES.

Under the head of "banner stones" are placed ornaments having the ends at right angles to the perforation. The hole is drilled in a midrib, from which the faces slope by either straight or curved lines to the edges. The two halves of the stone are symmetrical. In most specimens one face is flatter than the other, even plane in some cases. Some specimens are finished to a high polish before the hole is started; others have the hole completed with the exterior more or less unfinished. They may be classified as follows:

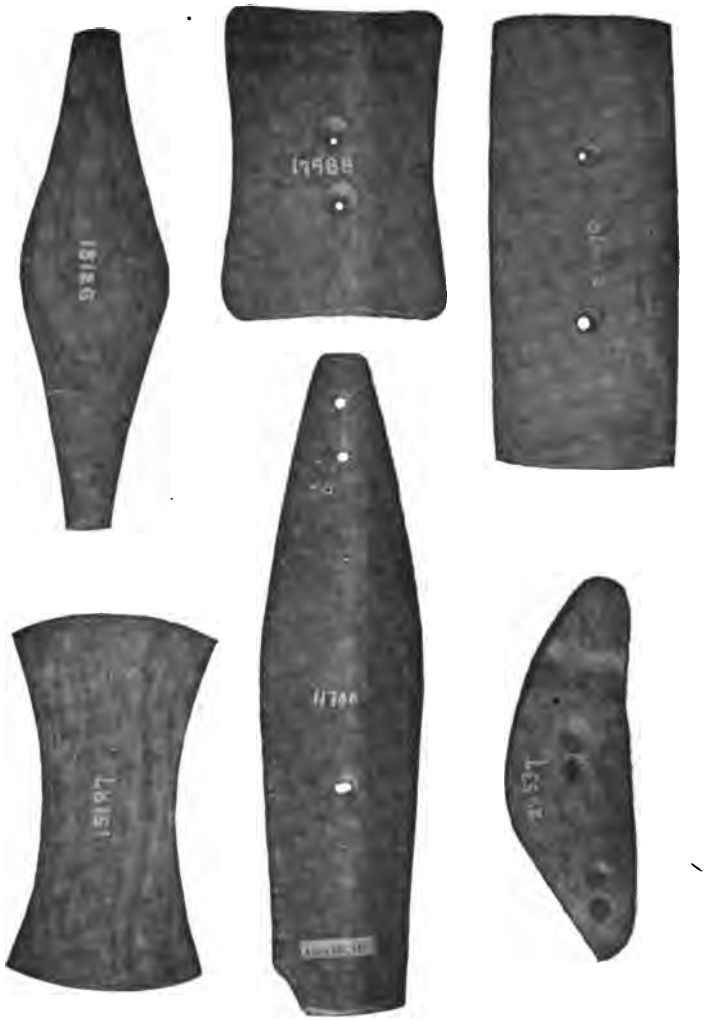


Figure 175 — Gorgets.

A. Rectangular or trapezoidal, with sides and ends sometimes slightly curved inward or outward.

B. Reel-shape.

C. Crescentic.

D. Butterfly pattern.

The last three varieties may be considered as only modifications of the simple rectangular banner stones. By rounding off

the corners of the articles or dressing them to sharp points, by cutting away portions from the sides or by trimming away the central portions at either or both ends of the perforations, all these different forms may be produced.



Figure 176 — Gorgets.

The crescentic banner stones might better be termed "semilunar," since most of them are flat at one end and curved at the other. Occasionally one has both ends curved and parallel, the sides also slightly curved, making the article reniform. Others have the ends straight and parallel, with the sides curved, or like the zone of a circle.

The "butterfly" gorgets are so named from their resemblance to a butterfly with expanded wings. The sides or wings are usually quite thin, either semicular or like a spherical triangle

in outline. The perforated mid-rib is shorter than the wings and carefully worked.

A few of the numerous forms of so-called "ceremonial stones" are given in figures 177 to 180. The soft thin stone being easily broken, it is not unusual to find the pieces perforated so that they can be fastened together with cords. This may be seen in the specimen at the left of figure 177.

BIRD-SHAPED STONES.

A series of ornaments or ceremonial stones apparently highly valued by the natives of the northern States, begins with the straight, almost rod-like, "bar amulet," figure 181, and passes through the "saddle-shaped" to the elaborately finished "bird-shaped" stones, figure 182. They very rarely occur south of the Ohio; but north of that stream are found in considerable numbers throughout the Lake region and in Canada. Many of the last form have projections on each side of the head, which gives them the aspect of a horned animal rather than of a bird; but the other end is flattened to resemble the feathers of an expanded tail. According to Gillman, bird-shaped stones were worn on the head by the Indian women, but only after marriage. (Gillman, M. B., 371.) Abbott quotes Col. Charles Whittlesey to the effect that they were worn by Indian women to denote pregnancy, and from William Penn that when the squaws were ready to marry they wore something on their heads to indicate that fact. (Abbott, 371). Jones quotes from De Bry that the conjurers among the Virginia Indians wore a small, black bird above one of their ears as a badge of their office. (Jones, 30.)

Cushing illustrates a number of rudely executed figures of animals and birds, made of stone, which are representative of the various hunter-gods or gods of the chase. Their possession insures success in hunting or good fortune with domestic animals.— Cushing; Zuni.

SPOOLS.

The peculiar spool-shaped objects shown in figure 183 are confined almost entirely to the territory along the Ohio River between the Big Sandy and the Little Miami. No suggestion of their purpose has ever been ventured.



Figure 177 — Banner Stones.

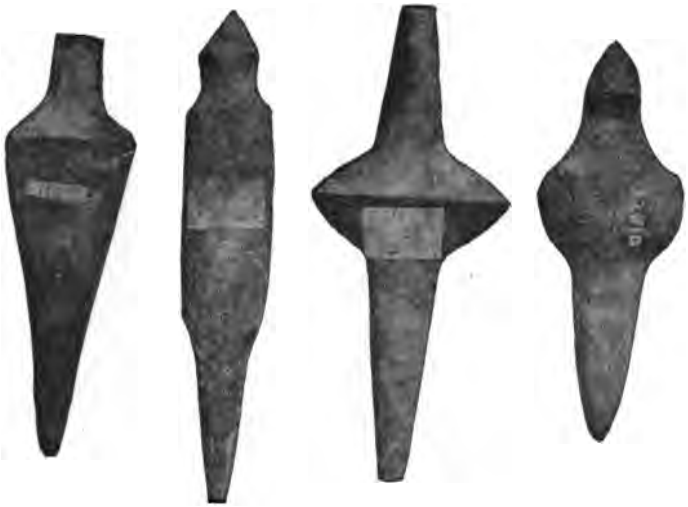


Figure 178 — "Pendants" (?).

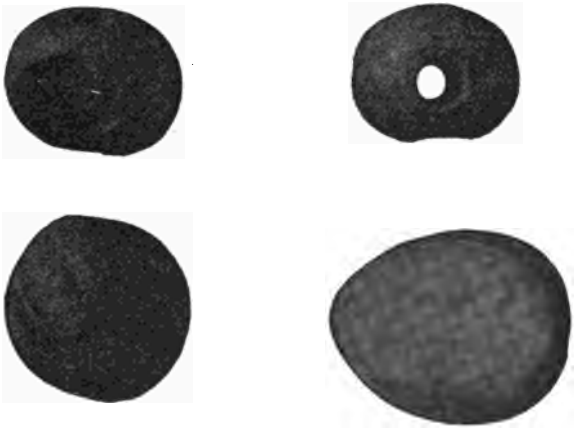


Figure 179.
Perforated Slate Objects.

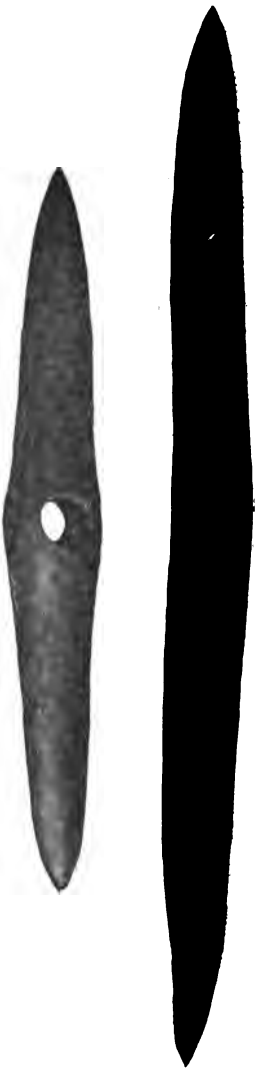


Figure 180 — "Picks."



Figure 181 — "Bar Amulets."



Figure 182 — Bird-shape Stones.



Figure 183 — Spool-shape Stones.



Figure 184 — Unfinished Pipes.

WORKING SOFT STONE.

The unfinished specimens portrayed in figures 184 to 187, afford evidence that in making pipes and slate ornaments the rough stone or block was chipped and pecked into approximately the desired form, and afterward smoothed with rubbing-stones of some gritty material. Three of the latter, apparently for varied uses, are shown in figure 188.



Figure 185 — Unfinished Slate Objects.



Figure 186 — Unfinished Slate Objects.



Figure 187—Unfinished Slate Objects.



Figure 188—Grinding or Polishing Stones.

TUBES.

Various suggestions have been offered in regard to probable uses of long slender stones, usually quite soft, perforated from end to end. The form is conical, cylindrical, or like an elongated hour-glass. In some shape or other, they occur over the entire country.

The larger tube shown in figure 189 (S. & D., 224, fig. 122),

"was found in a mound in the immediate vicinity of Chillicothe. It is composed of a compact variety of slate; the ground is brownish or leaden green, interstratified with veins of variable thickness. [It] is thirteen inches long by one and one-tenth in diameter. * * * It is drilled throughout; the bore is seven-tenths of an inch in diameter at the cylindrical end of the tube, and retains that caliber until it reaches the point where the cylinder subsides into the mouth-piece, when it contracts gradually to one-tenth of an inch at the end. The carving is very fine and much superior to anything of which the Indians at this day are known to be capable." — S. & D., 224.

Three tubes, the longest twelve inches, the shortest eight inches, were found in one of the smaller mounds, "carved by their makers out of a species of compact, blue and white mottled steatite * * * The

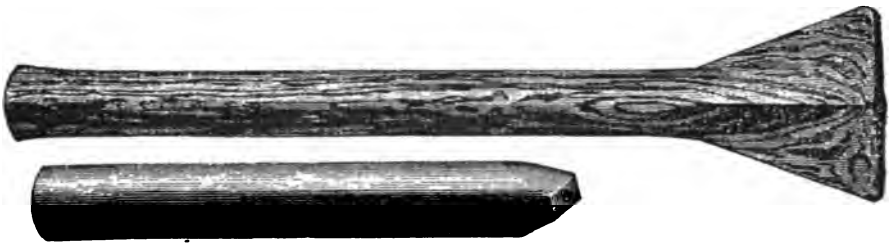


Figure 189 — Tubes.

quality of the stone, like most of the magnesian species, is soft enough to be cut with a knife. * * * I learned by inquiry, that a quarry or locality of this species of rock, exists on the banks of Grave Creek, some four or five miles above the great mound. This establishes the fact that they were made *here*, and not brought from a distance." — Schoolcraft, Grave Creek, 406.

Tubes of a stone similar to that above described, come from the Kanawha valley. It is not steatite, but its composition is unknown as no analysis has been made of it. Steatite does not occur at any place in West Virginia.

Schoolcraft, it seems, did not examine the deposit to which he alludes. It is very probably of a similar nature to a peculiar mixture found in the vicinity of Marietta. Scattered through beds of dark-brown or chocolate colored clay, or "shale" as it is locally termed, are bowlder-like masses of clay and sand containing more or less mica in minute scales; the color is light-gray, sometimes tinged with yellow.

When first quarried from a depth of three or four feet, the gray material somewhat resembles steatite in appearance, and has a similar smooth, almost greasy feel, on account of the mica and the included water. It is then not harder than common chalk or gypsum; on exposure to air it solidifies as the water evaporates, and in a short time becomes as hard as slate or whetstone. The ultimate degree of hardness will depend upon the amount of silica, relative to the other ingredients; and to judge by its action in kilns, the hardness would be increased by heating. It is quite likely that various objects usually classed as "sandstone" or "sandy slate", were made of rock like this; but the tubes from the Grave Creek mound seem to be of a somewhat different though allied substance.

The purposes for which tubes were employed are pointed out by several writers.

"A large pottery tube was taken from a mound near Collinwood, east of Cleveland. The base gradually diminishes toward the smaller end and about three-fourths of an inch from it is much reduced by a square offset. In it when found was a slightly flattened pottery ball, which would drop down the tube until stopped by this offset. It is called a horn, and by blowing in it, a sound can be produced, audible at a long distance. The fact that a louder sound is produced when the ball is in the tube, and the mouth of the tube elevated, favors the idea that it was designed as a horn." — Read, Arch., 44.

Tubes were used for drinking or supping among many peoples, to prevent burning, or taking in dirt, or for convenience.— Bourke, 493.

The California Indians "applied to the suffering part of the patient's body the chacuaco, or a tube formed out of a very hard black stone, and through this they sometimes sucked and other times blew, but both as hard as they were able, supposing that thus the disease was either exhaled or dispersed. Sometimes the tube was filled with cimarron or wild tobacco lighted, and here they either sucked in or blew down the smoke, according to the physician's direction; and this powerful caustic sometimes, without any other remedy, has been known entirely to remove the disorder." — Vanegas, I, 97.

"These jugglers [the medicine men of Lower California] employ a small tube which they use for sucking or blowing the patient for a while;" presently they show him a small object of some sort, "pretending to have at last removed the real cause of the disorder." — Baegert; quoted by Jones, 363.

The healers in Florida "suck that part of the body which causes the patient the most pain; and they do it either with the mouth or with a kind of sheperd's flute, having first made a small incision near some vein." — Coreal: quoted by Jones, 362.

The Dakota Indians used a horn tube in bleeding; one end was set over the cut, and the other vigorously sucked (Schoolcraft, History, I, 253). The Acaxees of Mexico employ blowing through a hollow tube for the cure of disease.—Bancroft, H. H., I, 580).

The Virginia Indians used reeds in treating diseases by sucking or blowing through them, and also used them in cauterizing (Jones, 362-4). Hoffman illustrates the removal of disease through the agency of a tube of bone by a medicine man of the Ojibwa.—Hoffman, W. J., 278, plate XVIII.

"We find all over the world this primitive cure by sucking out the evil, which perhaps even with ourselves lingers among nurses and children in the universal nursery remedy of 'kiss and make it well.'" — Civilization, 20.

The Klamath Indians use tubes for smoking (Powers, 426). The Indians of southern California inhale smoke of certain herbs through a tube to produce intoxication.—Bancroft, H. H., 566.

Oviedo says "The caciques and principal men [of the extreme southwest] have small hollowed sticks about a span long and as thick as the little finger; they are forked in the manner here shown, Y, but both the forks and the stalk are of the same piece. The forked ends are inserted in the nostrils and the other end is applied to the burning leaves of the herb, which is rolled up in the manner of pastils. They then inhale the smoke until they fall down in a state of stupor in which they remain as if intoxicated, for a considerable time. Such of the Indians as can not procure a forked stick, use a reed or hollow cane for the purpose of inhaling the smoke." — Read, Arch., 43.

The Indian mode of inhaling smoke would produce the same result, whether it passed through the mouth or the nostrils. They draw the lungs as full as possible, retain it a moment and then slowly exhale it.

The California Indians drilled their tubes from both ends and enlarged the hole from one end by scraping, the mouth-piece being made of a bird bone stuck on with asphaltum.— Schumacher, 268.

The use of stone, or any other, tubes for astronomical purposes, which has been discovered by some imaginative writers, is, of course, absurd. Nevertheless, they are useful in viewing distant objects on a bright day, especially when looking toward the sun, as they exclude all rays of light except those proceeding from the direction of the point toward which they are turned.

INSCRIBED TABLETS.

More than fifty years ago it was written,

"Hardly a year passes unsignalized by the announcement of the discovery of tablets of stone or metal, bearing strange or mystical inscriptions. * * * But they either fail to withstand an analysis of the alleged circumstances attending their discovery, or resolve themselves into very simple natural productions." — S. & D., 274.

The authors are referring in the above sentence only to specimens which had been exploited as alphabetic or historic in their character. It should have been stated, as we now know, that some genuine aboriginal tablets are capable of interpretation in the light of the ordinary ornamentation or symbolism which finds expression in so many other directions.

"Any inscriptions purporting to be pre-Columbian, showing apparent use of alphabetic characters, signs of the Zodiac or other evidences of culture higher than that known among the North American Indians, must be received with caution, but the pictographs may be altogether genuine, and their erroneous interpretation may be the sole ground for discrediting them." — Mallery, 764.

Since that time, many other inscribed stones have been heralded as furnishing the key that shall unlock the secrets of our ancient history — as soon as we know how to read them. Bare mention will be made of a few. Should the reader care to know more, he will find in McLean's volume the best article yet published on the subject of tablets. It describes those which are discussed in various works, and contains some much-needed caustic remarks in regard to frauds, which ignorant or unscrupulous collectors have imposed upon the public.—McLean, chapters VIII and IX.

No other objects of this kind have given rise to more discussion than three tablets found in small mounds near Davenport, Iowa. Two of them are of shale, the other of limestone. Their modern origin is shown by the following test:

"The aid of actual pictographers among the living Indians, should be adopted regarding all remarkable finds. This course was pursued by Mr. Rust, of Pasadena, California, regarding the Davenport tablets. He exhibited the drawings to several of the older and more intelligent members of the Dakota tribe. They readily gave the same interpretation (and in no instance did either interpreter know that another had seen the pictures so that there could be no collusion). It is quite evident from

the ready reading of these tablets by the Dakotans, that they are either genuine, and of Siouan origin; or that they were made by some one familiar with the Siouan method of representing events. The principal one portrays an ordinary Indian dance." — Mallery, 764, condensed.

Thomas says of them:

"A consideration of all the facts leads us, inevitably, to the conclusion that these relics are frauds; that is, they are modern productions made to deceive." But there is not the slightest suspicion of any chicanery on the part of any member of the Davenport Academy, which has been instrumental in bringing these tablets to the notice of the world. These gentlemen, except one who has expressed his disbelief, believe—or believed—these tablets genuine; overlooking the fact that they *prove entirely too much.*— B. E. 12, 633 to 643.

The limestone tablet has been subjected to considerable heat, as shown by the color of one part of it. Had it lain long in the earth, exposed to percolating waters, that portion must have crumbled. The figure which has been called a "sun-god" is nothing more nor less than a rude copy of a sign which may be seen at almost any saloon; namely, Gambrinus astride of a beer barrel, holding aloft a foaming goblet. The shale tablets, with their aggregation of ancient and modern, Indian and European, native and foreign symbols, have been engraven with a *steel blade,* apparently square-pointed or in the form of a shoemaker's knife. This will be evident to any one who makes a careful examination of the incisions with a pocket lens.

"Six inscribed copper plates [said to have been] found in a mound near Kinderhook, Illinois, were reported to bear a close resemblance to Chinese. * * * it was ascertained that the plates had been engraved by the village blacksmith, copied from the lid of a Chinese tea-chest." — Mallery, 759.

The "Lenape Stone" is a slate gorget found in Bucks county, Pennsylvania, in 1872. It has upon one side an etching of a fight between a mammoth or mastodon, and four Indians. On the reverse side is a medley of characters, representing fishes, tomahawks, and various other things. As usual, the fabricators of the tablet have overdone the matter. In their anxiety to make out a good case they always prove too much, and overlook some minor feature which betrays the modern origin of the "wonderful discovery."—(*See*) Mercer.

"David Wyrick, of Newark, Ohio, * * * discovered in 1860 a tablet bearing on one side a truculent 'likeness' of Moses * * * and

on the other a Hebrew abridgement of the ten commandments. A Hebrew Bible afterwards found in Mr. Wyrick's private room threw some light upon the inscribed characters." — Mallery, 760.

The Grave Creek tablet is another which has come in for a full share of arguments, *pro* and *con.*

There is no reason for believing it to have been deposited in the mound by the builders; or if it was, for attaching any importance to it more than to any other stone marked with uncertain or unknown characters of any description. Col. Whittlesey says "whether a forgery or the work of the Mound Builders, it does not seem to me that the characters have any alphabetic or phonetic value."— Read, Tablet.

The illustrations which accompany the detailed account of the "Wilmington Tablets" by the discoverers, so manifestly show their fraudulent character that no further reference need be made to them.—(*See*) Welch.

The Cincinnati tablet, as proven by Robert Clarke, is a genuine mound relic, found where there was no possibility of its having been deposited subsequent to the construction of the mound.

The "Berlin Tablet," too, is genuine; but it is impossible to decipher the significance, if there be any, in its rudely drawn and apparently meaningless lines.— Sylvester, 73.

PIPES.

The endless variety in form and decoration in pipes finds its readiest explanation in the assumption that Indians in the central valleys observed a custom which prevailed among those resident on the plains.

"For different occasions or ceremonies they have different pipes. Thus they have a peace pipe, a council pipe, a medicine pipe, and a pipe for common use. Each is sacred to its own purpose." — Dodge, Indians, 130.

The manufacture of an article so highly prized would call for the best efforts of which its maker was capable. In the desire to give material expression to a symbol or an idea; to fashion a totem or clan mark which shall attract attention; to signalize some exploit of the owner; or even to excite admiration for ornamental carving — time and labor would not be considered of any moment. This would be equally true whether the pipe were intended for the use of the maker, or for some one else.

Each individual smoker might, for one or another of these reasons, require a pipe differing from all others. At the same time, certain rites and ceremonies might demand a similarity in pipes or other objects necessary to their performance or observance.

"The Mound Builders were inveterate smokers, if the great number of pipes discovered in the mounds be admitted as evidence of the fact. * * * In their construction the skill of the makers seems to have been exhausted." "They are always carved from a single piece, and consist of a flat curved base, of variable length and width, with the bowl rising from the center of the convex side. From one of the ends, and communicating with the hollow of the bowl, is drilled a small hole, which answers the purpose of a tube; the corresponding opposite division being left for the manifest purpose of holding the implement to the mouth." One specimen "is finely carved from a beautiful variety of light brown porphyry, granulated with variously colored materials,—the whole much changed by the action of fire, and somewhat resembling porcelain. It is intensely hard, and successfully resists the edge of the hardest tempered knife." — S. & D., 227-8.

This style of pipe is now generally known as the "Monitor," from its resemblance in outline to the war vessel of that type. Later explorations have shown that Squier and Davis were mistaken in supposing that it is peculiar to the mounds; other forms occur in them as well, while the monitor is not uncommon in graves and village-sites. As will appear later, they secured nothing made of "porphyry;" the hardness in this specimen, as in most others, is doubtless caused by the heat to which it has been exposed. A fine example is shown in figure 113.

"The 'Monitor' type is considered the oldest form of the mound-builder's pipe and yet we not only have the evidence that it was in use among the Indians of this region, but it is easy to trace in the mound specimens the modifications which brought into use the simple form of the modern Indian pipe. * * * Among the specimens obtained from the various localities [from Ohio to New Jersey and Georgia] can be found every possible graduation, from the ancient Ohio type to the modern form [in use among the Cherokees]. There is, therefore, in this peculiar line of art and custom an unbroken chain connecting the mound-builders of Ohio with the Indian of historic times, and what strengthens the argument, in the same fact is evidence that disconnects the makers from the Mexican and Central American peoples." — B. E. 12, 705.

While there is some force in the argument that the Mound Builders were not an offshoot of the Mexicans because pipes were not in use among the latter, it does not follow that the pipe forms a more logical connection between Mound Builders and known

Indians than many other objects do. In all classes of relics there is such an infinity of form and finish that one type may be linked with almost any other by a series in which the change from each one to the next is so slight as to be scarcely perceptible.

One fact upon which Thomas bases his theory that Cherokees are descendants of Ohio Mound Builders, is the following statement by Adair:

"They made beautiful stone pipes; and the Cherakee the best of any of the Indians; for their mountainous country contains many different sorts and colors of soils proper for such uses. They easily form them with their tomahawks, and afterward finish them in any desired form with their knives; the pipes being of a very soft quality till they are smoked with, and used to the fire, when they become quite hard. They are often a full span long, and the bowls are about half as large again as those of our English pipes. The fore part of each commonly runs out with a sharp peak, two or three fingers broad, and a quarter of an inch thick — on both sides of the bowl, lengthwise, they cut several pictures with a great deal of skill and labor; such as a buffalo and a panther on the opposite sides of the bowl; a rabbit and a fox.— Adair, 423.

This is not conclusive by any means. The pipes described have a resemblance to the monitor form, but it must be noted that the effigies are either carved on the outside of the bowl or else on the stem to one side or perhaps both sides, of the bowl; whereas in the mound pipes the effigy contains the bowl. No more satisfying is his contention that the Cherokees migrated to Ohio from Iowa because

Several effigy and platform pipes have been found in the region about Davenport, Iowa. They are much ruder in form and finish than the Ohio specimens, and made of the softer grades of stone.— Barber, 265.

By the same process of reasoning he could have brought them from the eastern sea-board. Abbott figures a monitor pipe from

"Essex county, Mass. Many of the finest example of this pattern of pipe have been recovered from graves in this vicinity." It is "a common Atlantic coast pattern of smoking pipe." — Abbott, 319.

Monitor pipes, with effigy bowls are shown on subsequent pages. Three others, with plain bowls, forming a gradation between the mound types and common modern shapes, are represented in figure 190.

* * * * *

If we may believe one early author, the Indians along the Atlantic procured material for pipes from the "Pipestone" deposits near the line between Dakota and Minnesota. If such be the case, we need look no further than strolling traders to account for the existence of monitor pipes 500 miles from Ohio.

"Peter Kalm, in his "Travels in North America," says the Delawares have 'pipes which are made with great ingenuity, of a very fine red pot-stone, or a kind of serpentine marble. They are very scarce. The fine red stone is likewise very scarce, and is found only on the other side of the river Mississippi.' Pipes made of Catlinite are of very rare occurrence



Figure 190 — Monitor Pipes.

in New England, and even more so in New Jersey or Pennsylvania. In western New York, occasional specimens have been found." — Abbott, 317, condensed.

A stone similar to catlinite is mentioned as existing much farther eastward.

"In this journey of M. de Borgmont, mention is made only of what we meet with from Fort New Orleans, from which we set out, in order to go to the Padoucas; wherefore I ought to speak of a thing curious enough to be related, which is found on the banks of the Missouri; and that is a pretty high cliff, upright from the water. From the middle of the cliff juts out a mass of *red stone with white spots, like porphyry,* with this difference, that what we are now speaking of is almost soft and tender like sandstone. The stone is easily worked and bears the most violent fire. The Indians of the country have contrived to strike off pieces thereof with their arrows, and after they fall into the water plunge in for

them. When they procure pieces large enough to make pipes, they fashion them with knives and awls. This pipe has a socket two or three inches long, and on the opposite side the figure of a hatchet; in the middle of all is the bort or bowl to put the tobacco in.'" — S. & D., 286; from Du Pratz, 179.

There is no place at present known where stone such as that described is to be obtained under the conditions indicated. The material itself, however, corresponds with that which the authors claim to have found in the mounds.

The methods followed in making the effigy pipes are well exhibited in the specimen shown in figure 191 (S. & D., 267, figure 182).



Figure 191 — Unfinished Effigy Pipe.

It "is unfinished. The base and various parts of the figure exhibit fine striæ resulting from rubbing and grinding; but the general outline seems to have been secured by cutting with some sharp instrument, the marks of which are plainly to be seen, especially at the parts where it would be difficult or impracticable to approach with a triturating substance. The lines indicating the feathers, grooves of the beak, and other more delicate features, are cut or graved in the surface at a single stroke. Some pointed tool seems to have been used, and the marks are visible where it occasionally slipped beyond the control of the engraver. Indeed, the whole appearance of the specimen indicates that the work was done rapidly by an experienced hand, and that the various parts were brought forward simultaneously. The freedom of the strokes could only result from long practice; and we may infer that the manufacture of pipes had a distinct place in the industrial organization of the Mound Builders." — S. & D., 267.

The length of time necessary for completing such a piece of work has been greatly over-estimated.

"It has been commonly supposed that to make a stone pipe required weeks if not months of patient labor. The writer has, however, demonstrated that with primitive tools, picking, grinding, and drilling, almost any pipe, such as those which have been used by American Indians, could be completed in less than three days' work and the more ordinary ones in a few hours." — McGuire, 396.

Yet, after this positive statement as to the possibility of making the pipes in a short time, and describing the manner in which he himself pecked and ground various forms of ancient art, McGuire undertakes to prove that the aborigines had no hand in the manufacture of those in use among them even before the mounds were built.

Among the Squier and Davis finds now in the American Museum of Natural History, in New York, there is "enough material to demonstrate that the technical work on the curved base pipes, which have caused so much wonder for the last forty years, is of a very superior order. The artistic skill of those making them is evidenced in every line of the pipes and of their ornamentation. The bowls have been perforated by means of hollow metal drill points and the small stem holes by solid points; the scales on the frogs and the feathers of the birds are cut with an accuracy and delicacy of detail in thin, sharp lines which appears to indicate the use of sharp pointed tools. The head of an Indian, the bowl of which is drilled from the top of the head down by means of a thin tubular drill, the platform being broken off on both sides, is a well executed likeness of an American Indian, while certain incised lines upon his face are probably intended to represent the lines of paint or tattooing. These lines are cut in sharply and deeply and it is an artistic production. A few of the surface lines of this pipe have first been incised and subsequently partially obliterated by grinding and polishing, but yet remain sufficiently clear to suggest the use of the steel file. The whole effect of this head is calculated to impress one who carefully examines it with the idea that it is the work of a skillful European carver." — McGuire, 516.

"The specimens of pipes in the collection of the U. S. National Museum of the mound type * * * have been examined closely for surface indications of tool marks, which were found in most instances, and suggest the presence of the metal file of the whites." — McGuire, 527.

"On a typical mound pipe found in a mound in Clarke county, Ohio, composed of a soft white stone — possibly limestone, the marks of a file on the bowl and stem are in places almost too distinct to be mistaken." — McGuire, 514, condensed.

"The polishing; the apparent file marks; the fine lines; the inlaid eyes; the carving in the round; the objects of copper covered with silver found in contact with them; and the finding in the mounds articles of undoubted European origin — are all suggestive of the comparative modern date of the pipes of the curved base mound type. It does not of

necessity follow that these pipes were of foreign manufacture, but probably they were the handiwork of fur traders and hunters catering to native trade demands." — McGuire, 632.

It is unfortunate that McGuire did not confine himself to the recital of his excellent and instructive work, in showing how the various implements could be shaped, drilled, and polished, with no other tools than lie at the hand of any savage. Unless it bears at the same time other indications of modern work, there are no scratches at all resembling the mark of a file on any so-called Indian relic in the Museum, which may not be produced with a piece of hard gritty sandstone. Besides, exactly similar marks occur in parts of the specimen which can not be reached with either the round or the flat face of a file.

No "articles of undoubted European origin" have been found in those ancient mounds of Ohio which have furnished the effigy or monitor pipes.

"Fur traders and hunters"! And just before he speaks of "technical work * * of a very superior order"! "artistic skill * * in every line"! "skillful European carver"! His other "suggestions" may be passed by as irrelevant; for, excepting the copper, he has proven that primitive artisans could accomplish them all with primitive tools, by doing it himself in primitive ways.

Others besides McGuire have maintained the theory that not only pipes but the various ceremonial stones, copper ornaments, even grooved axes and celts, were made by white men for trading to the Indians. It is not easy to have the patience to contradict such assertions. As to a majority of these things, they are made of stone or metal found in the vicinity of the finished articles. For the most part the materials are not to be obtained in those portions of Europe where the early settlers and traders procured their goods for traffic with the American natives. The objects themselves are unlike anything in other quarters of the globe. There is no mention of their importation in the accounts of Jesuits, or explorers of any nation, most of whom recorded minute, even trivial, circumstances concerning their dealings and the sort of trinkets the Indians desired. They are described in histories and diaries of the earliest pioneers, as among the novelties in possession of different tribes. In several narratives of two or three centuries ago are related the processes by which arrows,

beads, tomahawks, pipes, and other things were perfected. Nevertheless, in the face of all this, we are asked to believe that immediately upon the discovery of America, Europeans provided themselves with material from regions which no white man saw until a century later; made this material into thousands of articles, in scores of patterns hitherto unknown and unthought of by any one in the world; and palmed these articles off on Indians to whom they could have no possible meaning, and, except the pipes, be of no practical use. This, too, when they had great stores of knives, hatchets, kettles, guns, and novelties which would be eagerly bought up at exorbitant prices!

Like some "discoverers" of inscribed tablets, such teleologists " prove too much ". There seems to be a strange unwillingness to admit that Indians were capable of the mechanical and artistic skill involved in the manufacture of monitor and effigy pipes, or in fact of any thing else that pleases the eye. It is insisted that this delicacy of detail and perfection of finish must be ascribed to a more intelligent race. Formerly they were held to be a proof of an extinct race with a higher grade of culture.

" The only fair test of the relative degree of skill possessed by the two races would be in a comparison of the remains of the mounds with the productions of the Indians before the commencement of European intercourse. A comparison of the works of the latter, however, at any period, would not fail to exhibit in a striking light the greatly superior skill of the ancient people." — S. & D., 230.

Now, since it is known that modern Indians are quite expert at such things, it is claimed that all the finer mound relics were made by white men. If this can be established, then there will be no question that the mounds and other earthworks are of recent origin; which is the point these advocates are trying to make.

To assist the reader in arriving at a clearer perception of the merits of this triangular controversy, there will be given copies of some of the more important engravings illustrating specimens obtained from mounds by Squier and Davis. That portion of the text which is in quotation marks is a compendium or resume of their descriptive explanation. It will not, in all cases, be exact as a quotation, but is so denoted in order to distinguish their text from the additions or comments made on it.

When quotations from any other author appear, the proper credit will be given.

The " human effigies " will be first presented.

Figure 192 (S. & D., 244, Fig. 142) " is a hard, compact, black stone. The holes in the head-dress were filled with pearls."

Figure 193 (S. & D., 244, Fig. 143) " is a compact yellowish stone. The base is of plaster to hold it erect. The ears were each perforated; and from the strongly attached oxide of copper at these points, were probably ornamented with rings of that metal."

Figure 194 (S. & D., 245, Fig. 144) " is of the same material as Figure 143" [193.]

Figure 195 (S. & D., 245, Fig. 145) "is evidently that of a female.

" The markings upon the faces of two of these sculptures may be taken as representing paint lines or some description of tattooing. This is an Indian feature; but the singular head dresses bear little resemblance to those of the Indians so far as we know them."

Figure 196 (S. & D., 247, Fig. 146) " is carved from a light-colored sandstone; it was found while digging a mill race, three feet below the surface, near Tippecanoe, Miami county."

Figure 197 (S. & D., 247, Fig. 147) " is made from fine porphyry of a greenish-brown or lead-colored ground. The ears display the usual marks of perforation."

Figure 198 (S. & D., 248, Fig. 148) " very closely resembles Figure 146 [196]. A large serpent is folded around the neck. It is of compact red sandstone, six inches in length, and was found on the banks of Paint Creek, a mile from Chillicothe."

" A stone 'idol' was found near the mouth of the Scioto River. It represents a human figure in a squatting attitude, the arms clasped around the knees, upon which the chin is resting. This is the common position of the North American Indians, when seated around the fires in their wigwams. It seems most likely that these rough sculptures have a comparatively recent date, and are the remains of tribes found in possession of the country by the whites. As works of art they are immeasurably inferior to the relics from the mounds." — S. & D., 249.

Figure 199 (S. & D., 150, Fig. 250) " is of sandstone, and was plowed up near Lawrenceburg, Indiana. It is twelve inches long and weighs nearly fifty pounds."

Figure 200 (S. & D., 251, Figs. 151 and 152) represents " the front and profile of an image of sandstone, six inches long, deeply grooved on the back. It was found in Belmont county, nearly opposite Wheeling."

" Most of the mound sculptures are from a red porphyry, filled with small white and blue granules; sandstone, limestone, etc.— S. & D., 254.

Other forms will now be presented.

Figure 201 (S. & D., 257, Fig. 161) " is a very spirited representation of the head of the elk, although it is not minutely accurate." [It might, with equal propriety, be called a grey-hound.]



Figure 192.

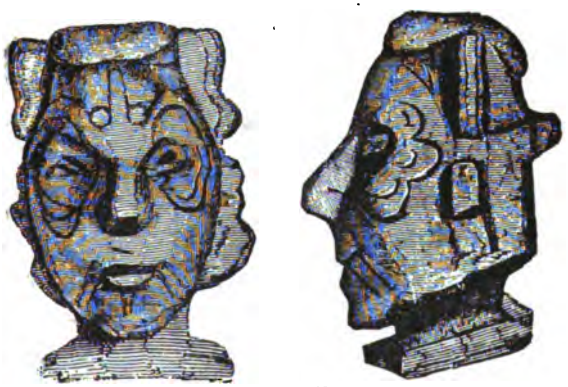


Figure 193.



Figure 194.
Effigy pipes. Human Heads.



Figure 195 — Effigy Pipe. Human Head.

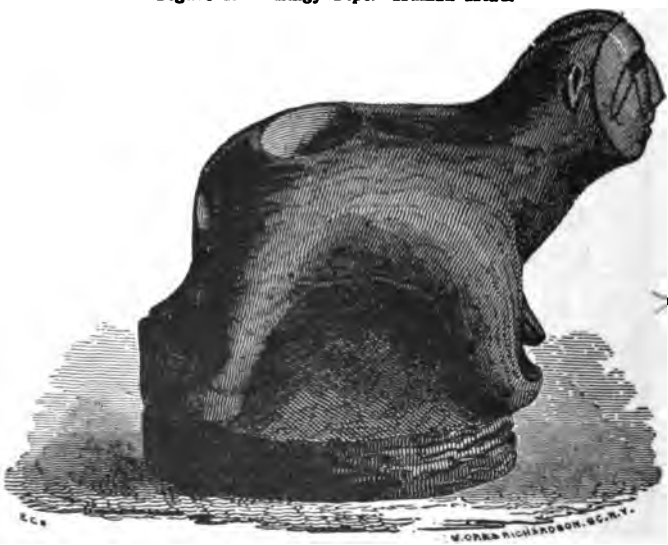


Figure 196 — Effigy Pipe. Human Head on Body of an Animal.



Figure 197 — Effigy Pipe. Human Head on Body of a Bird.

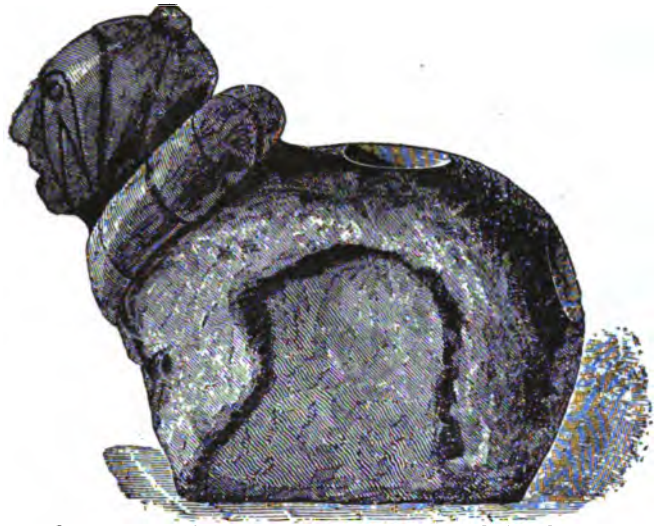


Figure 198 — Effigy Pipe. Human Head with Coiled Snake.



Figure 199 — Human Face, in Stone.



Figure 200 — Human Face in Stone.



Figure 201 — Effigy Pipe. The "Elk."

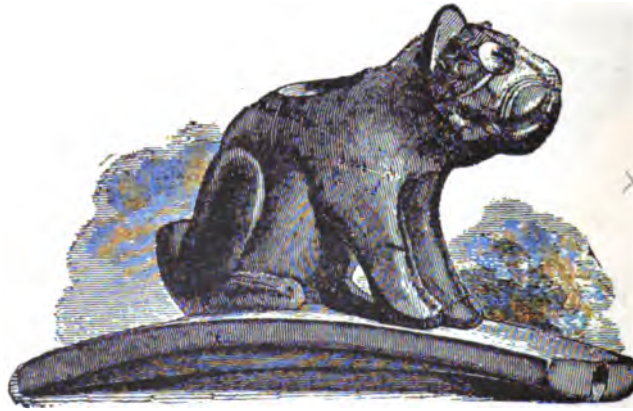


Figure 202 — Effigy Pipe. The Wildcat.



Figure 203 — Effigy Pipe. The Otter.

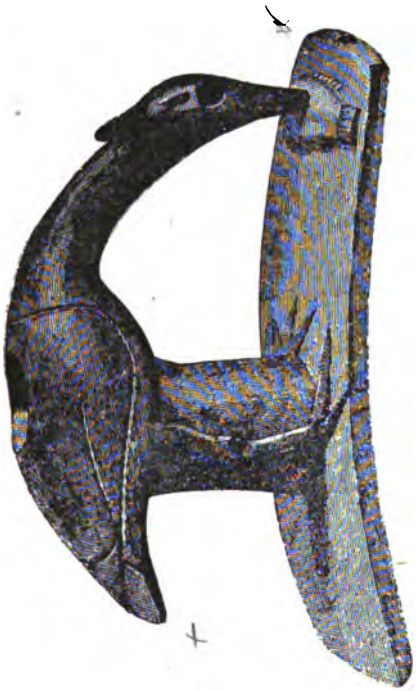


Figure 204 — The Heron.



Figure 205 — The Eagle or Hawk.



Figure 206 — The Buzzard.

Figure 202 (S. & D., 257, Fig. 159) shows "the Wild Cat — one of a large number of this animal and others of the same genus. Most of these are exquisitely carved from a red, granulated porphyry, of exceeding hardness—so hard, indeed, as to turn the edge of the best tempered knife."

Figure 203 (S. & D., 257, Flg. 156). "The otter. The flattened head, small mouth, almost imperceptible ears, rounded body, and short but strong and fin-like legs, no less than the attitude of the figure, enable us to recognize at once the most active, courageous, and voracious of the indigenous amphibious animals."

Figure 204 (S. & D., 259, Fig. 164) "is the tufted heron. The minutest features are shown; the articulations of the legs of the bird, as also the gills, fins, and scales of the fish, are represented. It is carved from the red and speckled porphyry. As a work of art it is incomparably superior to any remains of the existing tribes of Indians. The engraving, in point of spirit, falls far short of the original."

The pipe from the "Adena mound," shown in the frontispiece, is made of material more closely answering to their description of "porphyry" than anything else discovered. It is a kind of clay-stone, with a hardness not exceeding 4, and easy to carve.

Figure 205 (S. & D., 259, Fig. 165) "is probably some variety of the eagle or hawk. The eyes of the bird were composed of small pearls, inserted about half their depth in the stone. Pearls seems to have constituted the eyes of nearly all the birds."

Figure 206 (S. & D., Fig. 171) "of compact limestone, is probably intended to represent the turkey buzzard."

Figure 207 (S. & D., 265, Fig. 172) "The paroquet. The engraving, though very good, fails to do justice to the original."

The next three figures of Squier and Davis (omitted here), "are probably intended to represent a bird of the same variety" as figure 207; but none of them have much resemblance to it or to one another.

Figure 208 (S. & D., 265, Fig. 176) "seems to have been ground or rubbed into its present shape, and is yet unpolished."

Figure 209 (S. & D., 265, Fig. 177) "is in an unfinished state. The lines are sharply graved in the stone."

Figure 210 (S. & D., 266, Fig. 178) is "the Toucan."

Figure 211 (S. & D., 266, Fig. 179) "is of limestone. It is uncertain what bird it is intended to represent."

Figure 212 (S. & D., 267, Fig. 180). "The two heads here presented, probably intended to represent the eagle, are far superior in point of finish, spirit, and truthfulness, to any miniature carvings ancient or modern, which have fallen under the notice of the authors."

Figure 213 (S. & D., 268, Fig. 183) "represents the toad. The folds and lines are clearly *cut* with some sort of graver. The marks of the implement *chipping* out portions a fourth of an inch in length, are distinct."



Figure 207 — The Paroquet.

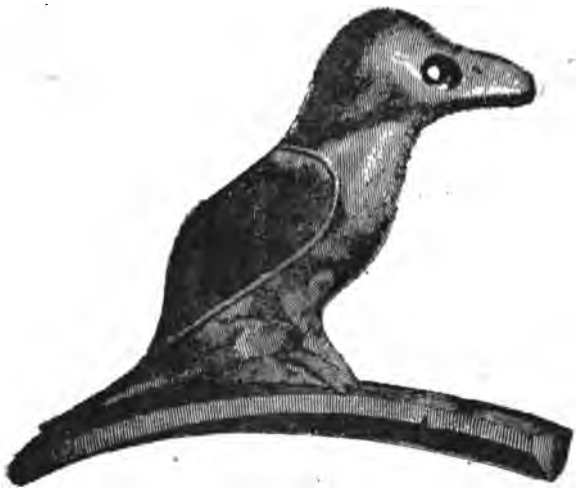


Figure 208. Unfinished.



Figure 209. Unfinished.



Figure 210. The Toucan.



Figure 211. Unnamed.



Figure 212. Eagles.



Figure 213. The Toad.

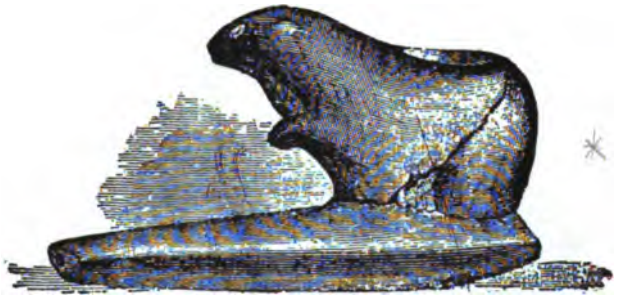


Figure 214. Possibly the Groundhog.

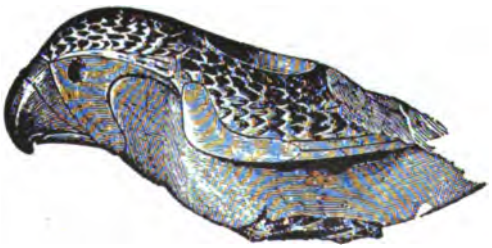


Figure 215 — Possibly Hawk or Eagle.

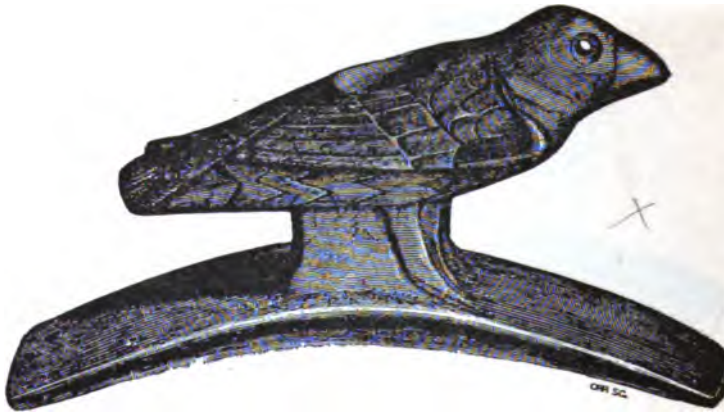


Figure 216 — Unnamed.



Figure 217 — Coiled Rattlesnake.



Figure 218 — Said to be an Owl.

"Two sculptures of the alligator have been found, but much broken up by the fire." — S. & D., 268.

Four other carvings of this nature are shown in figure 214 (S. & D., figure 157), which may be intended for a groundhog; figure 215 (S. & D., figure 166), a hawk or eagle; figure 216 (S. & D., figure 167), probably some song-bird; and figure 217 (S. & D., figure 186), the rattlesnake.

Figure 218 (S. & D., figure 123) is said by Squier and Davis to bear a close resemblance to an owl, on its back, in an attitude of defiance. If the sculpture is intended for that bird, the species is now extinct.

"The lines indicating the folds in the skin of animals, and the feathers of birds, are not ground in, but *cut*, evidently to the entire depth, at a single stroke. Sometimes the tool has slipped by, indicating that it was held and used after the manner of the gravers of the present day." — S. & D., 273.

The last paragraph is sufficient evidence that some, at least, of the pipes, and presumably other specimens, were much softer when made that at the time they were exhumed. Whether this induration was produced by intentional burning or as a natural result of exposure and use, is immaterial; the main point is that it took place.

As to the designs, note what Squier himself says in regard to pipes found at the sites of ancient Iroquois towns.

"The pipes are mostly composed of clay, regularly and often fancifully moulded, and ornamented in various ways. * * * Some, indeed, are so hard, smooth, and symmetrical, as almost to induce doubts of their aboriginal origin. Some of the terra cottas, other than pipes, are really very creditable specimens of art, and compare favorably with any of the productions of the aborigines which have fallen under my notice. They are, with few exceptions, representations of animals; with the minutest features, as well as the peculiar habits of which, the American Indians had, from long observation, a thorough acquaintance." — Squier, N. Y., 13.

It is true the last are made of clay; while it is a common assertion that mound pipes "are usually made of stone of great hardness."— Barber, 265.

Fortunately we are not without definite evidence in respect to this phase of the question. With a few exceptions, the collection of Squier and Davis was sold in England, where a very careful and methodical examination was made of it. The result, briefly, is here presented, as compiled from Stevens.

"The materials of the Ohio pipes and other objects are almost exclusively of four kinds; or rather they may be classed under four distinct heads, although two or more varieties of some of the materials occur:

"A. A hard and siliceous clay slate, approaching more or less closely in different specimens the *whetslate* of Cotta.

"B. An argillaceous ironstone, usually variolite.

"C. A pearly-brown ferruginous chlorite.

"D. Calcareous marls of variable composition, and marly limestones.

"A. Whetslate. I have particularly examined a fragment of 'gorget' made of [whetslate]. It has the hardness of 6.5 on the mineralogical scale. * * * The material is a more less highly siliceous variety of clay slate almost perfectly compact, and often very distinctly stratified with dark bands, in which most of the iron of the rock seems collected. It breaks with an irregular conchoidal fracture, almost without a trace of the peculiar cleavage known as slaty. It generally forms a good hone stone. The skill with which the Mound Biulders have pierced and worked this hard and tough stone is remarkable.

"B. Argillaceous iron stone. This stone is not a definite mineral but a mixture of minerals — a rock. Its hardness varies in different parts of the same specimen — the harder parts approaching 6, and the softer parts not exceeding 4.5. Some of the objects fashioned from this ferruginous stone are much fissured internally, and blacker inside than out. Some [examples] approach in structure to Catlinite."

"C. Chlorite. The hardness of the particular piece of Ohio chlorite which I have specially studied is 2.75.

"D. Carcareous marls and marly limestones. From their composition and softness, they would offer less difficulty in manufacture, but would be more liable to injury both by moisture and fire than the materials already described. Their hardness varies somewhat, but is never high. One specimen was 2.3; another 2.0.— Stevens, 414-6, condensed.

Under each division Stevens gives, by numbers, "characteristic specimens of the material"; but in the absence of an illustrated catalogue, there is no way of determining them, except in a few cases where reference is made to the descriptions by Squier and Davis. These are given below; the numbers, both of page and figure, are those of Squier and Davis. The capital letter following each item corresponds with the classification of material by Stevens, as given on pages 421 to 511 of his work.

"Toucan," page 151. D.

"Toads," figure 183. B and D.

"Swallow," figure 167. B.

"Tufted cherry-bird," figure 174. B.

"Heron striking fish," figure 164. B.

"Bird's head," page 267, figure 181. D.

"Bird," page 266, figure 179. D.
"Toucan eating from hand," page 266, figure 178. B.
"Buzzard," figure 171. D.
"Eagles or hawks tearing small bird to pieces," page 259, figure 165. B and D.
"Rodent," figure 157. B.
"Beaver," figure 155. D.
"Elk," figure 151. D.
"Manatees," figures 153 and 154. B and D.
"Walrus," page 271, figure 192. B.
"Wild-cat," figure 160. B.
"Wild-cat," figure 159. B.
"Human head," pages 244–5, figure 143. D.
"Human head," page 245, figure 144. D.
"Human head," pages 245-6, figure 145. D.
"Snake pipe," figure 186. D.
"Discoids," pages 221-2. C.
"Tube," pages 224-5, figure 122. A.
"Human-headed bird," page 248, figure 148. B.
"Elk-head," page 258, figure 163. C.
"Pulley-rings," page 224. C.

"Whetslate" is thus defined:

"Whetslate, Whetstone, Hone, Oilstone, Novaculite. — This is a very highly siliceous clay-slate, perfectly compact and homogeneous. Usually only indistinctly of slaty cleavage, and its fracture often conchoidal and even splintery. Used for sharpening knives and other instruments."— Von Cotta, 265.

From this description, it will be seen that "whetslate" is a very elastic term. In some forms it seems to resemble the medium grades of argillite; in others, it is nearly ,or quite as hard as glass. Ordinary school or roofing-slate is a kind of argillite; some is softer, some much harder. There is comparatively little of it which can not be cut with a knife. "Whetslate" in any of the forms named by Cotta, while quite hard from the silica or quartz contained in it, has for the same reason a fine close grain which allows it to be readily pecked into shape with a stone hammer, or rubbed down with the coarser grades of sand-rock, such as grindstones are made of. It can also be polished with fine sandstone, and easily so with powdered quartz.

It may assist in comparing these substances named by Stevens, to remember that in the scale of hardness of minerals, talc ranks as 1; it can be scratched with the finger nail. Gypsum is second; it is the basis of plaster of paris, and about as hard as

chalk. Calcite, or the crystal of lime, is 3; it is a little harder than "tailor's chalk". Feldspar is 6, and quartz 7; common glass comes between these. Diamond, the hardest substance known, is 10. It will be seen that very few mound specimens are really hard, as is so confidently asserted. Flint, also quartz sand, both with a hardness of 7, will, when properly handled, cut down any of the polished pieces.

Although the minerals of which the Mound Builders' specimens are made, are no more difficult of manipulation than those used by other people, ancient and modern; and the tools of the latter were no better adapted to producing delicate results than were those of the former; none the less it remains a fact that the work is most remarkable to be accomplished by such means, and argues well for the "artist's eye" and "skillful hand" of the red man who performed it so successfully.

Sir John Lubbock "argues from the excellence of the workmanship in pipe-carving, that a sub-division of labor had already begun with the Mound Builders; that [mound number 8, of the 'Mound City' group, where so many pipes were unearthed] may be but the sepulchre of some celebrated pipe-maker by profession whose surviving friends would place in his grave, not one or two pipes, but his whole stock-in-trade; in the belief that he would gain his living by bartering pipes in the land of spirits as he had already done in this world." — Stevens, 349.

This same belief would account for so many beautiful specimens being ruined or almost destroyed by fire. Where cremation was a common practice, it would be quite natural to suppose that the possessions of one whose body was thus disposed of, must be treated in the same manner.

Squier and Davis, on page 267, express the opinion that such specialized industries had arisen among the Mound Builders.

SCULPTURES.

Speaking of the various carvings, but particularly of the effigy pipes which they exhumed at "Mound City", Squier and Davis remark that

"Some of the sculptures have a value, so far as ethnological research is concerned, much higher than they can claim as mere works of art. This value is derived from the fact that they faithfully represent animals and birds peculiar to other latitudes, thus establishing a migration, a very extensive intercommunication, or a contemporaneous existence of the same race over a vast extent of country." — S. & D., 242.

Overdrawn as this statement is, it is unwarrantably and unreasonably exaggerated by Wilson.

"By the fidelity of the representations of so great a variety of subjects copied from animal life, they furnish evidence of a knowledge in the Mississippi Valley, of the fauna peculiar not only to southern but to tropical latitudes, extending beyond the Isthmus into the southern continent; and suggestive either of arts derived from a foreign source, and of an intimate intercourse maintained with the central regions where the civilization of ancient America attained its highest development; or else indicative of migration, and an intrusion into the northern continent, of the race of the ancient graves of Central and South America, bringing with them the arts of the tropics, and models derived from the animals familiar to their fathers in the parent land of the race."—Wilson, D., I, 475.

Henshaw, who is a naturalist of reputation and holds high rank as an ornithologist, has made a careful study of the figures in "Ancient Monuments" and of casts of the pipes—the originals being beyond his reach. Some excerpts from his report will be given; merely enough to show his conclusions and some of the grounds on which they are based.

"In considering the degree of skill exhibited by the mound sculptors in their delineation of the features and characteristics of animals, it is of the utmost importance to notice that the carvings of birds and animals which have evoked the most extravagant expressions of praise as to the exactness with which nature has been copied are uniformly those which, owing to the possession of some unusual or salient characteristic, are exceedingly easy of imitation. The stout body and broad flat tail of the beaver, the characteristic physiognomy of the wild cat and panther, so utterly dissimilar to that of other animals, the tufted head and fish-eating habits of the heron, the raptorial bill and claws of the hawk, the rattle of the rattlesnake, are all features which the rudest skill could scarcely fail to portray. It is by the delineation of these marked and unmistakable features, and not the sculptor's power to express the subtlety of animal characteristics, that enables the identity of a comparatively small number of the carvings to be established. It is true that the contrary has often been asserted, and that almost everything has been claimed for the carvings, in the way of artistic execution, that would be claimed for the best products of modern skill. Squier and Davis in fact go so far in their admiration (Ancient Monuments, p. 272), as to say that, so far as fidelity is concerned, many of them (*i. e.*, animal carvings) deserve to rank by the side of the best efforts of the artist naturalists in our own day—a statement which is simply preposterous. So far, in point of fact, is this from being true that an examination of the series of animal sculptures cannot fail to convince any one, who is even toler-

ably well acquainted with our common birds and animals, that it is simply impossible to recognize specific features in the great majority of them. They were either not intended to be copies of particular species, or, if so intended, the artist's skill was wholly inadequate for his purpose." Dr. Coues and Mr. Ridgway, two of the ablest ornithologists of the United States, if not of the world, hold, "precisely similar views."

"By the above remarks as to the lack of specific resemblances in the animal carvings it is not intended to deny that some of them have been executed with a considerable degree of skill and spirit, as well as, within certain limitations heretofore expressed, fidelity to nature. Taking them as a whole it can perhaps be asserted that they have been carved with a degree of skill considerably above the general average of attainment in art of our Indian tribes, but not above the best efforts of individual tribes. That they will by no means bear the indiscriminate praise they have received as works of art and as exact imitations of nature may be asserted with all confidence."

"Many writers [believe] they owe their origin to the artistic instinct alone. But there is much in their general appearance that suggests they may have been totemic in origin. * * * A considerable number of the recognizable birds and animals are precisely the ones known to have been used as totems by many tribes of Indians." — Henshaw, 148 and 150.

Wilson, again, in speaking of "accurate miniature representations of" the manatee, cougar, toucan, buzzard, and paroquet, says

"The majority of these animals are not known in the United States; some of them are totally unknown within any part of the North American continent."

He also speaks of "the coast of Yucatan [as] the nearest point where *Pyrula perversa* is found in its native locality."—Wilson, I, 219, 272, and 477.

But the jaguar appears as far north as the Red River of Louisiana; the cougar was a resident of the whole of North America; the toucan is found in Southern Mexico; the buzzard [vulture] is common over almost the entire United States; the paroquet recently ranged as far north as New York, Michigan, and Nebraska; while *Pyrula* (now *Busycon perversa*) "extends along the coast up to Charleston, S. C., with rare specimens as far north as Beaufort, N. C. Moreover, archæologists have usually confounded this species with the *Busycon carica,* which is of common occurrence in the mounds. The latter is found as far north as Cape Cod." — Henshaw, 142-3.

"The *a priori* probability that the toucan was known to the Mound Builders is, of course, much less than that the manatee was, since no species of toucan occurs farther north than Southern Mexico. * * * It is a little perplexing to find at the outset that Squier and Davis, not content with one toucan, have figured three, and these differing from each

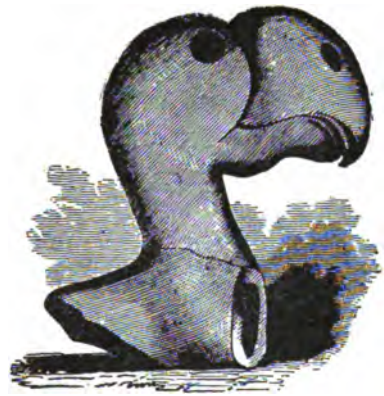


Figure 219.



Figure 220.



Figure 221.
So-called "Toucan" Pipes, and the Toucan.

other so widely as to be referable, according to modern ornithological ideas, to very distinct orders." The first, shown in figure [219], "is vaguely suggestive of a young eagle. * * * The position of the nostrils, however, and the contour of the mandibles, together with the position of the eyes, show clearly enough that it is a likeness of no bird known to ornithology." The second, represented in figure [220, (S. & D., fig. 169)] "is a common crow or a raven, and is one of the most happily executed of the avian sculptures." The third, which is reproduced in figure [210] "in no wise resembles a toucan. Its long legs and proportionally long toes, coupled with the rather long neck and bill, indicate with certainty a wading bird of some kind, and in default of anything that comes nearer, an ibis may be suggested; [but if so intended] the ibis family has no reason to feel complimented." — Henshaw, 135-6.

In regard to the toucans, Squier and Davis say of the first (page 194) "It represents the head of a bird, somewhat resembling a toucan, and is executed with much spirit". Of the second (page 260) "It is supposed to represent the toucan". Of the third (page 266) "probably the toucan". The reader may compare the cuts with that of the living toucan, as shown in figure 221.

It is scarcely fair to turn these cautious, tentative surmises into definite assertions and then vigorously assail them. In all conscience, Squier and Davis made enough mistakes, such as are inevitable to all pioneers in any scientific work, not to mention the results of carelessness, without having to become responsible for erroneous interpretations and ingenious perversions made by others — compared with many of which this one by Henshaw is very mild.

Among the figures identified by Henshaw, are these.

Of the object shown in figure [207] Squier and Davis say on page 265, "'Among the most spirited and delicately executed specimens of ancient art found in the mounds, is that of the paroquet here presented.' The bird thus positively identified as a paroquet * * * is not even distinctly related to the parrot family. It has the bill of a raptorial bird, as shown by the distinct tooth, and this, in connection with the well defined cere, not present in the paroquet, and the open nostril concealed by feathers in the paroquet, places its identity as one of the hawk tribe beyond question." — Henshaw, 140.

The specimen shown in figure [211 (Henshaw 24)] "of which Squier and Davis say it is uncertain what bird it is intended to represent, is an unmistakable likeness of a woodpecker."

Figure [222 (S. & D., Fig. 173)] "it is claimed 'much resembles the tufted cherry-bird,' which is by no means the case, as the bill bears wit-

ness. It may pass, however, as a badly executed likeness of the tufted cardinal grosbeak or red-bird."

Of figure [223 (S. & D., Fig. 170)] Squier and Davis say it "'will readily be recognized as intended to represent the head of the grouse.' The cere and plainly notched bill of this carving clearly indicate a hawk."



Figure 222.



Figure 223 — Effigy Pipes. Wrongly Identified.

"Without going into further detail the matter may be summed up as follows: Of forty-five of the animal carvings, including a few of clay, which are figured in Squier and Davis's works, eleven are left unnamed by the authors as not being recognizable; nineteen are identified correctly, in a general way, as of a wolf, bear, heron, toad, etc.; sixteen are demonstrably wrongly identified, leaving but five of which the species is correctly given. From this showing it appears that either the above authors' zoological knowledge was faulty in the extreme or else the

mound sculptors' ability in animal carving has been amazingly overestimated. However just the first supposition may be, the last is certainly true." — Henshaw, 144-5-6-7.

Henshaw gives his conclusions as follows:

"That of the carvings from the mounds which can be identified there are no reproductions of birds or animals not indigenous to the Mississippi Valley.

"That a large majority of the carvings, instead of being, as assumed, exact likenesses from nature, possess in reality only the most general resemblance to the birds and animals of the region which they were doubtless intended to represent.

"That there is no reason for believing that the masks and sculptures of human faces are more correct likenesses than are the animals carvings.

"That the state of art-culture reached by the Mound Builders, as illustrated by their carvings, has been greatly overestimated."—Henshaw, 166.

THE MANITUS.

Squier and Davis claim to have found seven sculptured representations of the Manitus or sea-cow—"one of the most singular animal productions in the world which naturalists assume to know but little." They copy from a work on natural history a full and explicit description of the animal, and say:

"These external features are faithfully and minutely exhibited in the sculptures from the mounds. Only one of the sculptures exhibits a flat, truncated tail; the others are round. There is, however, a variety of the lamantin which has a round tail. These singular relics have been thus minutely noticed, inasmuch as they have a direct bearing upon some of the questions connected with the origin of the mounds. They faithfully represent animals found, (and only in small numbers,) a thousand miles distant, upon the shores of Florida. Either the same race, possessing throughout a like style of workmanship, and deriving their materials from common source, existed contemporaneously over the whole range of intervening territory, and maintained a constant communication; or else there was at some period a migration from the south, bringing with it characteristic remains of the land from which it emigrated. The sculptures of the manitus are too exact to have been the production of those who were not well acquainted with the animal and its habits." — S. & D., 251.

Henshaw thus criticises the above statement; only the substance of his remarks is given.

"All the sculptures pronounced manatees by Squier and Davis, have prominent ears; yet the manatee has not the slighest trace of a pinna or external ear, a small orifice, like a slit, representing that organ. Further-

more, it has instead of a short, stout fore leg, terminating in flexible fingers or paws, as indicated in the several sculptures, a shapeless paddle-like flipper. Squier and Davis say, on page 251, "Only one of the sculptures exhibits a flat truncated tail; the others are round. There is, however, a variety of the lamantin which has a round tail, and is distinguished as the round-tailed manitus.' But this form is found only in Southern Africa; and at any rate, the tails of the two forms are, as far as known, almost exactly alike. Whether the tails of the sculptured manatees be round or flat matters little, however, since they bear no resemblance to manatee tails, either of the round or flat tailed varieties, or, for that matter, to tails of any sort. In many of the animal carvings the head alone engaged the sculptor's attention, the body and members being omitted entirely or else roughly blocked out."— Henshaw, 130, *et seq.*

Stevens in his description of the so-called manatee or lamantin says:

"In one particular, however, the sculptors of the mound period committed an error. Although the Lamantin is strictly herbivorous, feeding chiefly upon sub-aqueous plants and littoral herbs; yet upon one of the stone smoking pipes this animal is represented with a fish in its mouth." — Stevens, 430.

This fact alone should have convinced all who were cognizant of it, that some other animal than the manatee was intended; especially so, those contending for the "absolute fidelity" of the sculptures. No Indian would ever be guilty of such a mistake in portraiture. The sculpture (figure 203) plainly represents an otter, not simply because it has the fish in its mouth, but from its close resemblance in other respects. In fact, Squier and Davis (page 257) call it such, and direct especial attention to the points of resemblance. In this instance it seems to be Stevens himself who has "committed an error." Figure 224 (B. E. 2, 132, Fig. 10) and figure 225 (same, Fig. 11) present a side view and a front view, respectively, of the only manatee which could have been known to the North American Indians. Figure 226 (S. & D., Fig. 153) and figure 227 (S. & D., Fig. 154) show two of the pipes exhumed by Squier and Davis, and pronounced by them accurate representations of the animal. In these sculptures, the head and paws are distinctly otter-like, while the supposed tail which has aroused so much discussion because it is round instead of flat as a manatee's tail should be, looks much less like the tail of a manatee or of any other animal than it looks like the back of an otter just crawling out of the water onto the bank. Henshaw seems not to have noticed this; at least he makes no mention of it.



Figure 224.



Figure 225.



Figure 226.

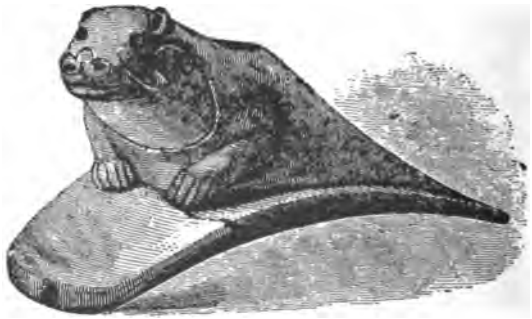


Figure 227.
The Manitus, and the so-called Manitus Pipes.



Figure 228 — Head of Carnivore on Human Body.



Figure 229 — Frog.

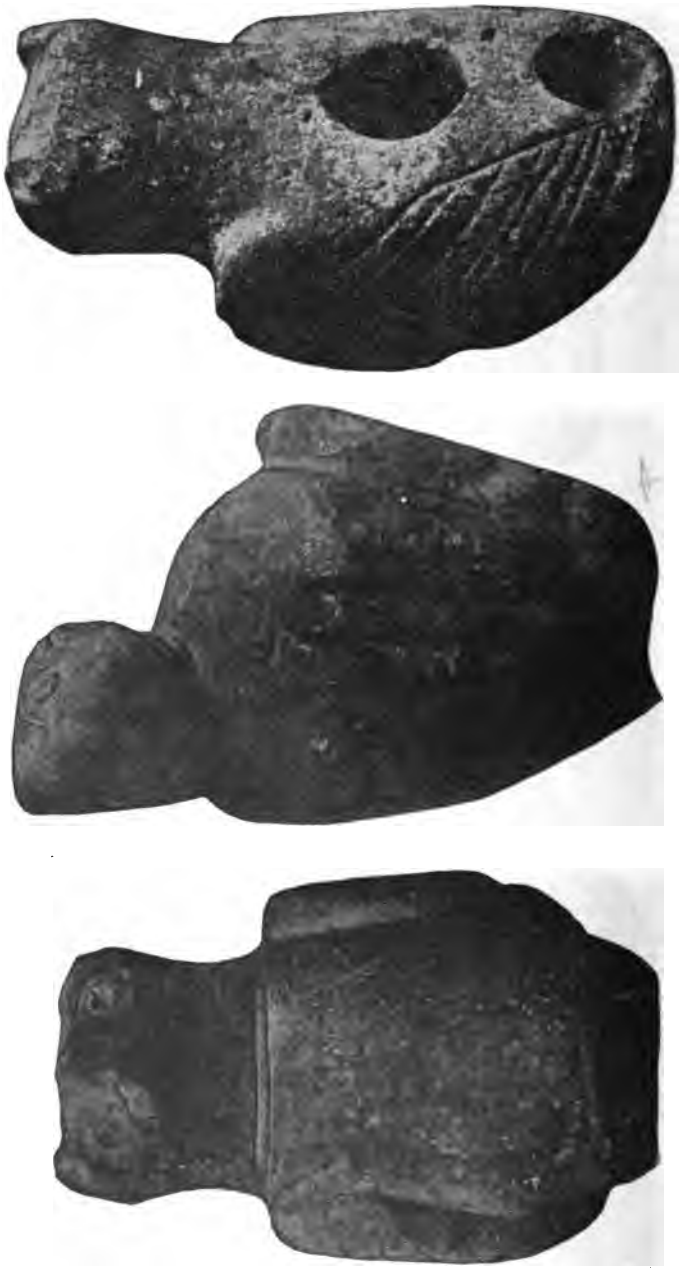


Figure 220.
Owl Pipe. Front, Side and Back.



Figure 231 — Rude Effigy Pipes of Stone and Clay.



Figure 232 — Various Forms of Pipes.



Figure 233 — Various Forms of Pipes.

The general uniformity in style, technique, and material, of the effigy pipes from Mound City, forbid the belief that they were made in widely separated localities, or at long intervals of time. The whole lot pertains to one community and one period. The sculptor must have been familiar with his models, else the resemblance would be more remote than it is. Consequently he would carve images of birds and mammals seen in Ohio; though he may occasionally have essayed one which he saw when on a hunting or trading expedition.

In figure 228 is shown an effigy pipe, which seems intended to represent a human body with the head of a carnivorous animal, probably a bear or panther. Figure 229 is an excellent copy of a frog. Figure 230 gives three views of an owl-pipe. Other pipes in the collection of the Society are presented in figures 231, 232 and 233.

The frontispiece shows the "Adena mound pipe," from the large mound on the old Worthington estate at Chillicothe. It is one of the finest specimens ever exhumed.

CHAPTER XVI

CHIPPED STONE ARTICLES.

SOURCES OF RAW MATERIAL.

CHIPPED implements are nearly always made of some form of flint, as it is easily flaked and can be brought to a keen edge or point. Sometimes quartz, quartzite, argillite, or rock with even coarser grain is used; but this is infrequent, and is due to scarcity of more desirable material.

By some mineralogists the term "flint" is limited to the nodules or concretions found in chalk-beds. As this particular variety does not occur in the United States, it is contended that we have no "true flint," and sundry other names are applied to the allied forms belonging here. This, however, is a distinction without a practical difference; while there is wide diversity in coloring, due principally to minute quantities of iron in combination, in other respects purer varieties of the material are much the same the world over. In hardness, chemical constitution, form of fracture, and conditions necessary for its successful working into useful shapes, no line is to be drawn between the flint of England, the chalcedony of Brazil, and the hornstone of Indiana.

In the popular meaning of the word, as used in archæology, "flint" includes many forms of siliceous stone, such as chalcedony, jasper, hornstone, chert, basanite, agate, and several varieties of quartz which have no outward resemblance to the substance whose name they have borrowed. The basis of all is silex or silica which is nearest its natural state in quartz crystal. Notwithstanding their great dissimilarity in appearance, the principal difference in these various minerals, excepting the last, consists in the manner of their formation and the foreign substances included in them. Such impurities, even though they may form a very small percentage of the stone, give rise to infinite diversity of coloring, and to great difference in texture upon exposure to air and water.

Flint, using the term in the wide sense indicated above, occurs in two principal forms. One is a massive or bed rock, similar to the limestones and sandstones with which every one is familiar; the other is in rounded or flattened nodules or concretions of various sizes scattered through limestone deposits. In Ohio, the latter seem to be confined to the Devonian formation; and it is difficult to find a piece that is suitable for flaking.

The stratified or bedded flint is found in almost every county of the State in which the lower coal-measure rocks come to the surface. In numerous places fragments detached from these layers can be picked up on the ground; and at many outcrops suitable pieces could be broken off fit for conversion into weapons; but in only a few places do we find evidence that the ancient arrow-maker carried on in a systematic manner the labor of procuring a supply.

FLINT RIDGE.

Foremost among places where such operations were conducted is the great flint deposit in Licking and Muskingum counties midway between Newark and Zanesville. Here we find quarries, not only the most extensive of Ohio, but in many respects the most interesting in the United States. From pioneer days the locality has been known as "Flint Ridge", and by this title it has passed into the literature of archæology. At present it consists of a narrow central ridge with a general east and west trend, from which lateral spurs, separated by deep ravines, branch off to north and south. This conformation is due partly to surface erosion and partly to the action of underground drainage. The flint bed seems to have covered, originally, a crescent-shaped area at least ten miles in length by about three in greatest breadth; there are detached knobs at a greater distance from the main body, which may once have formed a part of it, or may be of independent formation. A map of the principal deposit is given in figure 234 (Sm. Rep., 1897, pl. 13). (The top of the page is east).

The flint varies greatly at different portions of the deposit. For some distance from the margin on every side it is whitish or grayish in color, cellular or porous in structure from the weathering out of small fossils, and makes an excellent buhrstone, for which purpose it was formerly in much demand.

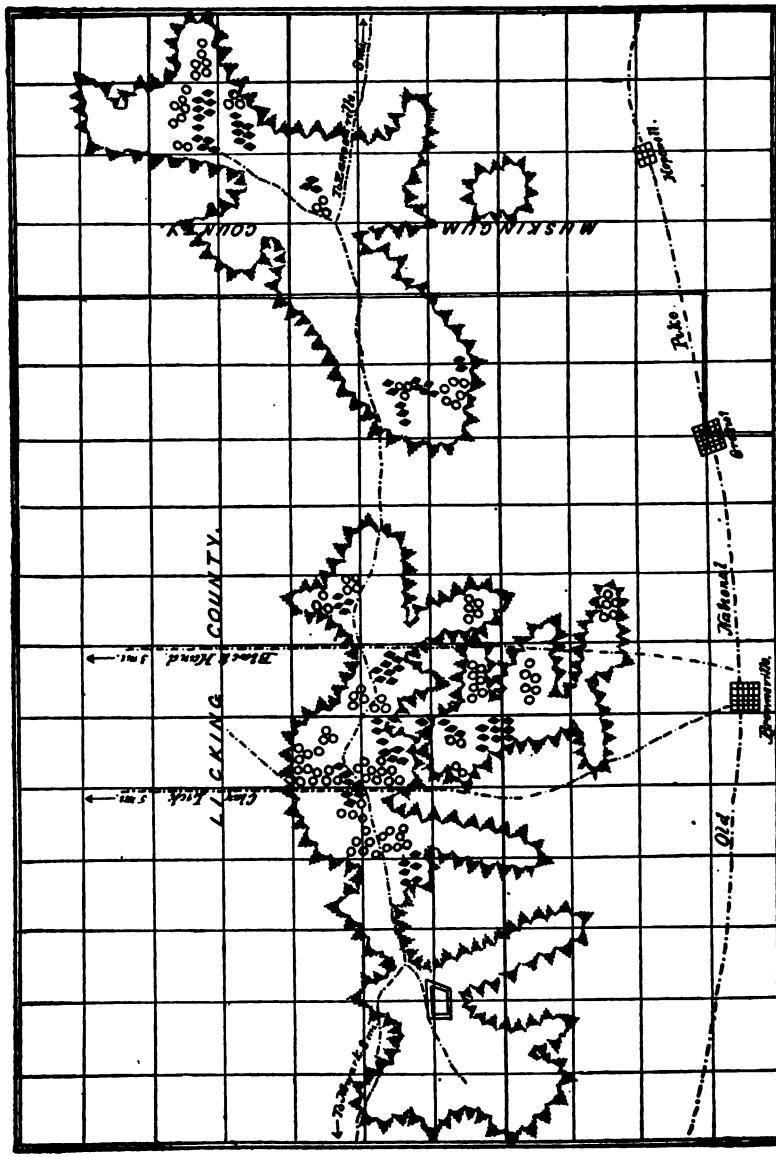


Figure 234 — Map of Flint Ridge in Licking County.

Within this border it is more compact, freer from impurities, and possesses all the colors and shades ever seen in such stone. Much of it is a typical chalcedony, blue or grayish-blue and translucent. Large beds exist of banded or ribbon jasper, with alternating stripes of light and dark gray. In places there is a glassy variety ranging from almost perfect transparency to complete opacity except in very thin flakes, included carbonaceous matter producing every gradation from a slight cloudiness to jet black. Much of this can not be distinguished from moss agate.

In the central part of the ridge, the chalcedony has weathered into various tints of blue, red, brown, yellow, and white; occasional pieces of green and purple are found. All this is susceptible of the highest degree of polish, and the brilliancy and delicacy of the beautiful markings thus brought out are equalled only by the finer grades of agatized wood from Arizona.

Whether or not prehistoric man possessed a sufficient development of artistic sense or esthetic feeling to appreciate this feature, may be open to question; but there can be no doubt that his practical judgment led to a recognition of the fine grain and superior chipping qualities of the stone and the consequent ease with which it could be converted into a high grade of cutting and piercing implements, such as were necessary to his welfare. It would not take him a great while to discover that pieces detached from blocks upon the surface or from the outcrops of the ledge along hill-sides, were not at all suitable for his purposes; they would shatter under a blow, and would not readily yield to pressure, or a flake was liable to split off in any direction but the right one. To obviate these difficulties it was necessary that the raw material should be protected from the weather. This condition was met wherever there was more than three or four feet of earth above the flint stratum. Mile after mile of the ridge and its projecting spurs are pitted with excavations where the superincumbent soil and clay were cleared away in order to obtain the character of stone that was required. Sometimes there is only a single pit within the area of a large field; again the entire surface has been upturned without a break over several acres. The pits vary from twelve to eighty feet in diameter and from three or four to at least twenty feet in depth; continuous trenches sometimes having a length of fifteen or twenty rods. It is a safe estimate to say that not less than one hundred acres of flint has been

removed. Several of these pits have been cleared out to ascertain the manner of operation of the ancient miners. The work is quite similar in all; or so much so, that a description of one will answer for the entire number.

The pit taken as an illustration was at least forty yards from the one nearest to it; it was thirty-two feet in diameter inside of the wall of earth surrounding it, which wall is now two feet higher than the general surface around it, and from twenty to thirty feet across at the base. This form indicates considerable age; as does an oak tree nearly ten feet in circumference, growing on the top of the wall. In clearing out this pit we could appreciate the patience and industry of the aboriginal excavators. The clay subsoil was as hard and tough as frozen ground; frequently half a dozen blows with a pick were required to break off a clod as large as a man's hand. To remove it with primitive tools seems almost an impossibility. The central part of the pit was filled with material that had washed in from the sides. Several days of steady digging were required, by three men accustomed to such work, to reach the surface of the flint stratum, which was found at a depth of nine feet. A hole five by eight and one-half feet had been worked through; clearing this out, we found the layer to be forty inches thick. It rested directly upon a solid bluish limestone. Both the flint and the limestone showed that they had been subjected to an intense heat. The flint was very solid where not burnt, translucent, and a beautiful light-blue in color. On its top, on a corner formed by two seams, was a saucer-shaped depression between three and four inches deep, in the bottom of which was a handful of very fine chips; just such as would result from repeated blows with a large hammer-stone, several of which were found scattered through the entire depth cleared out. One of them weighed nearly or quite a hundred pounds.

Careful observation of this pit—and others as well—enables us to follow the prehistoric quarryman in his labors. He selected a spot where he thought the superincumbent earth was not heavy enough to render the task of removing it too tedious, but at the same time was of ample thickness to prevent injury to the stone from weathering. He then sunk a pit, as large as he wished, to the surface of the flint. On this he made a fire; and when the stone was hot he threw water on it, causing it to shatter.

Throwing aside the fragments, he repeated the process until he penetrated the underlying limestone to a depth which allowed him sufficient room to work conveniently. The top and freshly made face of the flint was thickly plastered with potter's clay, after which fire and water were again utilized for clearing away the limestone until a cavity was formed beneath the flint layer. Thus a projecting ledge would be left, from which the burnt parts were knocked off with heavy stone hammers until the unaltered flint was exposed; in the same manner, blocks of this were procured for converting into implements. Where the flint was well suited for the purpose intended, or was easily worked, the excavation was carried along in the form of a trench, the waste material being thrown to the rear; under less favorable conditions the spot was abandoned.

When the blocks thus obtained were reduced with the large hammers to a suitable size for being handled easily, they were carried to a convenient spot, which may be designated as a blocking-out shop, where the first stages of manufacturing were carried on. These shops are sometimes quite limited in extent, but occasionally they cover an area of five to ten acres. Scattered thickly over the ground in such places are angular fragments of flint, such as would result from knocking off corners and projections from large pieces taken out of the pits and also from breaking them up into smaller pieces. Many tough pebbles of various sizes, from glacial drift, used as hammer-stones, also occur at these shops, most of them weighing between half a pound and five or six pounds. Probably nine-tenths of the flint carried from the pits to these blocking-out shops was rejected; the trimming process revealing some flaw or defect that made it unfit for use. The remainder was carried to other places which may be called finishing-shops. These are characterized by lighter hammer-stones, smaller fragments, thin flakes, and broken implements in all stages of completion. Although never so extensive as the first named, they show a greater amount of work on an equal area. The largest are in the vicinity of the pits and the other workshops; but they may be found, gradually diminishing in extent, at springs, camping-places, and village-sites, as we travel in any direction, sometimes fifty miles or more from the parent ledge.

Evidently aboriginal excavations at Flint Ridge extended over a long period; for the material is found in the largest mounds explored in the Kanawha, Scioto, and Miami valleys, as well as on the sites of modern villages.

Well-diggers and others who have penetrated the flint agree in the statement that when covered by a considerable thickness of earth the stone has a smooth, oily appearance not observed in pieces on the surface; and that it is much tougher, requiring more labor to break it up. Old residents, whose memory reaches to a period anterior to the introduction of percussion caps, say that it was customary at an early day to gather pieces of stone of suitable size and shape for use with flint-lock guns and soak them in oil for several weeks before they were needed. In this way a "flint" which, used in its natural state, would shatter in a day, could be made to last for weeks.

QUARRIES NEAR WARSAW.

Quarries of siliceous stone somewhat similar to those at Flint Ridge exist along the Walhonding River about three miles from Warsaw. The flint as originally deposited formed a continuous layer of varying width about ten or twelve miles long; but subsequent erosion has left only comparatively small detached areas on or near the summits of hills and ridges. At one place a narrow ridge extends for some distance between the river and a tributary ravine, the flint forming the cap-rock beneath a few feet of earth. The aborigines began at the outcrop on one side and dug their way through to the opposite side of the hill, removing all the flint and overlying material, selecting what they could utilize and throwing the residue behind them as they proceeded. The space thus dug over is fully five acres. Many circular pits, the largest not less than 100 feet in diameter, are to be seen on the level summits; and much quarrying has been practiced along various outcrops, the work progressing until the removal of overlying rock and earth required an amount of labor too great for the reward. There is much variety in the quality and appearance of the flint at this place. Part of it is cellular, almost spongy, from the weathering out of fossils and various impurities. By insensible gradations it passes into stone as compact and homogeneous as fine agate. Seams of chalcedony, and cavities filled or lined with quartz crystals, occur abundantly. Chert, glossy

basanite, and small masses of chalcedony are common. The color runs through various shades of white, black, blue, and red, and there is also the pale amber or "honey color," very rare in this country. Some is almost transparent, and from this it merges into complete opacity. There seems to be no regular order in its arrangements; sometimes there are thick strata of considerable extent with but slight variation in character, while again three or four sorts may be seen in one large block. One color may gradually blend with another, or the line of demarkation may be sharply defined without the slightest change in other respects. Only a small proportion of the deposit is of a character suitable for making implements, consequently less digging has been done here than in beds considerably smaller elsewhere. The difficulty of reaching deeply buried parts has also been a deterrent to extensive working.

Five or six miles west of this a deposit of black flint is reported to occur in a thick stratum. Several acres, in detached areas, have been completely dug over; broken flint, spalls, and unfinished implements are said to almost hide the ground in places.

NEW LEXINGTON.

Another worked area is near the town of New Lexington, in Perry county. All the flint here is opaque; the prevailing color is dark, with more or less admixture of white markings, due principally to the presence of fossils which in some parts make up a considerable proportion of the deposits; various others tints also occur. Most of the stone being porous and crystalline, only small pieces could be utilized for arrow-making, and there was much waste; so that in all, not more than half an acre has been excavated.

CARTER COUNTY, KENTUCKY.

Quantities of chipped implements are also found in Ohio, made of material derived from at least two different sources outside of the state. The principal foreign supply came from an extensive deposit, or rather a series of small deposits covering a large area, in the neighborhod of the "Carter county caves," in Kentucky, about twenty-five miles south of Portsmouth, Ohio. The stone is found in small nodules or pebbles where the lime-

stone has been dissolved and carried away by the action of percolating water. The flint is not affected by such agencies and remains imbedded in the clay which is left behind. It is remarkably diversified in color, presenting many shades of red, brown, yellow and gray, and has a luster peculiarly its own which, like that of the Flint Ridge stone, enables one familiar with it to recognize it at a glance wherever found. This quality enables us to determine the fact that fully nine-tenths of all the flint implements found along the Ohio from the Licking to the Guyandotte are made of flint from Carter county; and it may be that the same fact holds good for the region above the latter stream.

KANAWHA VALLEY.

Many implements are found, particularly in the southern counties, made of a compact black chert or basanite which shows a dull luster on freshly fractured surfaces. The material occurs within the state, but, except that near Walhonding, is nearly always under conditions which render the task of procuring a supply almost impossible with means at command of the primitive quarryman. Unlimited quantities, however, are easily accessible in the Kanawha valley. Elk Rapids, just below Charleston, are due to a ledge of this chert which gradually rises from the river bed here, to the hill-tops a few miles east of the Gauley. Over this entire area it forms a solid stratum about four feet thick and the outcrop can be followed for scores of miles in its tortuous windings along the slopes. In almost any ravine it will be found projecting like a shelf, sometimes with a width of twenty or thirty feet. Suitable pieces for working are abundant in the beds of little runs; or an unlimited supply may be secured by following up these to the outcrop and breaking it off from the projecting ledge.

WYANDOTTE CAVE.

The Ohio Indians also made use of a bluish-gray hornstone that is not known to occur nearer than in the vicinity of the Wyandotte Cave in southern Indiana. Here, the disintegration of the limestone has released an incredible number of nodules, of every size up to eighteen inches across. Most of them, especially the larger ones, are flattened or elongated, so that no great amount of chipping is required to reduce them to desired forms. This

flint is more readily wrought than any other to be found in the central valleys, and the vast amount of excavating that has been carried on shows that the Red Man was fully cognizant of its excellent quality.

The statement has been made, and extensively copied, that the Indians resorted to Wyandotte Cave for flint, shaping it into small rectangular blocks, which they carried to the outer air to work up at their pleasure. It is true that much of the hornstone was obtained within the cave at a distance of more than a mile from its mouth; but the work was pursued in the same manner as on the outside—that is, they dug in the clay for nodules which they tested by striking off chips, rejecting such as did not suit them. The angular fragments mistaken for the result of Indian work, are pieces that have been released from a continuous layer in the roof of the cave by natural weathering, and are too brittle to be utilized for implements. The stratum from which they are derived is about three inches thick, and the fracture of the stone being at a right angle to the line of stratification, produces prisms of that length which, so far from being uniform in their other dimensions, as usually stated, vary from the size of a lead pencil to pieces four or five inches square.

* * * * *

Other deposits of flint eminently suitable for aboriginal needs, have been extensively worked in Pennsylvania, Virginia, West Virginia, western Kentucky and Tennessee, Alabama, Arkansas, Indian Territory, Missouri and Illinois; so that it need be no mystery as to where the Indians obtained their supplies.

Traffic in flint was an important aboriginal industry; although its abundance and wide distribution make the fact less noticeable than is the case with materials more restricted in amount and area. The Flint Ridge stone seems to have been in great demand. Implements made of it are found as remote from the source of supply as New York, Michigan, Illinois and Tennessee. The products of other quarries also had a wide range. The same conditions prevailed until quite recently in various parts of the earth.

According to Col. Stephen S. Long "flakes prepared for points and other implements seemed to be an object of trade or commerce among the Indian tribes that he came in contact with; that there

were but few places where chert or quartzite were found of sufficient hardness and close and even grain to flake well, and at those places there were men very expert at flaking." — Sellers: Chipping.

"An Indian usually has his pouch of treasures consisting of unfinished arrow-heads or unworked stones, to be slowly wrought out when industriously inclined." "The materials from which [arrow-heads] are made are often brought from long distances." — Cheever, 140.

"At places distant from the source of supply, the obsidian, which is often brought in large blocks, is chipped off in flakes from around a central core by blows of a rock." — Mason, Bows, 658; from Dulog, in Forest and Stream.

"Erratic boulders of flint are collected (and sometimes brought an immense distance)" to make up into arrow-heads.— Catlin, Rambles, 188.

"The Assinaboine Indians use in pipe manufacture a fine marble, also a coarse species of jasper. These are cut into various simple, but

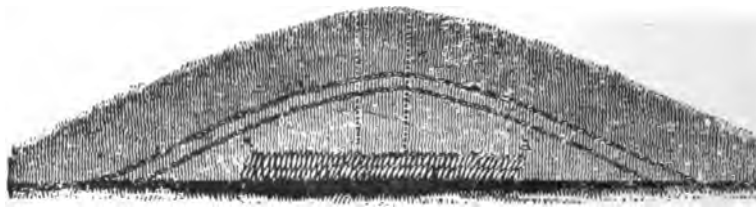


Figure 235.
Disks, covered by a mound, at Hopewell's.

tasteful designs, executed chiefly by the slow and laborious process of rubbing them down with other stones. A suitable stone for such a purpose will be picked up and carried hundreds of miles. Mr. Kane observed his Assinaboine guides select the favorite bluish jasper from among the water-worn stones in the bed of the river to carry home for the purpose of pipe manufacture, although they were then five hundred miles from their lodges." — Dr. D. Wilson; quoted in Can. Savage, 25, condensed.

The various Indian tribes of Guiana have each their special manufacture and exchange with other tribes.— Im Thurn, XI, 447.

Till lately the Patagonians, when they came on their journeys to a place where suitable flint or obsidian was to be found, would load themselves with a supply of lumps to chip into these primitive currier's scrapers.— Tylor, 245.

The most remarkable instance of transportation of material that has yet come to light, is furnished by a deposit of flint disks uncovered in mound number 2 of the Hopewell group. A section is shown in figure 235 (S. & D., 158, figure 46). It is not exactly correct.

This mound was "at least eighty feet in diameter by but six or seven feet in height. It had two sand strata; but instead of an altar, there are two layers of disks chipped out of hornstone, (AA of this section) some nearly round, others in the form of spear-heads. * * * They were placed side by side, a little inclining, and one layer resting immediately on the other. Out of an excavation six feet long and four wide, not far from six hundred were thrown." — S. & D., 158.

The authors estimate that there must have been at least four thousand of these disks. Moorehead, who afterwards thoroughly cleared out the deposit, found this to be less than one-half the actual number. He reports that the entire number taken from the mound, including all from the time of Squier and Davis to his own explorations, amounts to

"Eight thousand one hundred and eighty five disks whose average weight is nearly one pound. * * * We found the disks lying in little pockets or bunches of 12 or 15 each with layers of sand around each mass. The deposits covered an area of 22 by 26 feet."

He also states that Squier and Davis, (probably owing to the limited size of their excavation) were somewhat in error as to the manner in which the disks were stored away.

Some of the Mound Builders "had apparently carried in their hands and arms all the disks they could transport readily and deposited them upon the same level, while others * * * poured sand over and between each man's deposit. * * * a second series of deposits was made [over] the first."

Squier and Davis believed the material came from Flint Ridge; and this opinion has generally been accepted by other authors who had no personal knowledge of its utter lack of resemblance to stone from that locality. Moorehead says:—

"They were made of flint nodules which occur two miles west of Mr. Hopewell's farm." — Moorehead, 190.

What this assertion is based upon, no one knows; not only is there no flint, in nodules or in any form, at or near the place he mentions, but there is none in Ross county except a piece of chert here and there in the glacial drift. Neither is the bluish hornstone from which the Hopewell disks are chipped native to any part of Ohio. It is the same variety that is found at Wyandotte Cave, about forty miles west of Louisville, Kentucky, and none is known nearer than that point.

Three of the disks, greatly reduced in size, are shown in figure 236.

Referring to the theory that caches of chipped flints in general, and the Hopewell cache in particular, were stores or magazines of material intended to be worked up in arrow heads or other implements, Stevens asserts that

"The labor which has been expended upon the flint disks has absolutely unfitted them for the purpose suggested. Had it been intended to store *material* we should have found squared or rough blocks. These would have presented corners from which flakes, adapted for making into spear-heads, could have been readily detached, whereas it would be almost impossible to detach a long flake from these American disks. * * * Had 'ease of transport or saving of space' been the objects of the people who fashioned these disks, it is nearly impossible for them to have

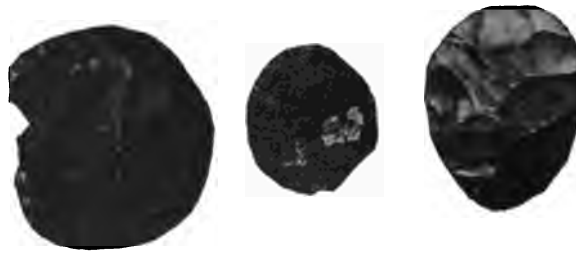


Figure 236 — Disks, from Hopewells. Probably Indiana Flint.

selected a form less adapted to the ends to be answered than that of an oval, thick in the middle and thin at the edges." — Stevens, 443.

All this might be true if the artisans had been able to exercise any choice in the matter. But the nodules from which they were made had an ellipsoid form, and the present shape of the implement results from breaking away the useless weathered surface to lessen the weight. Besides, spalls of ample size for making knives and arrows can be struck off from these disks. If it were the intention thus to utilize them, many such spalls could be obtained from one in the process of converting it into a thin, symmetrical, finely finished implement several inches in length.

The original discovers were undecided what explanation to offer. After describing the find, they add,

"If they were thus placed as an offering we can form some estimate, in view of the fact that they must have been brought from a great distance, and fashioned with great toil, of the devotional fervor which induced the sacrifice, or the magnitude of the calamity which the sacrifice

was perhaps intended to avert." To the suggestion that these disks were simply buried to be used when needed, in making implements, they reply, "It is incredible, however, that so much care should be taken to fashion the mound and introduce the mysterious sand strata, if it was designed to be disturbed at any subsequent period. There is little doubt that the deposit was final, and was made in compliance with some religious requirement." — S. & D., 158.

Later, this opinion is abandoned for another:—

"We are wholly at a loss respecting their purposes, unless they were designed to be worked into more elaborate implements * * * and were thus roughly *blocked out* for greater ease of transportation from the quarries." — S. & D., 214.

Snyder takes exception to the last theory and offers a very strong argument in support of his position.

"At the bottom of a mound thirty feet high, in Brown County, Illinois, was a deposit of more than 6,000 of these disks similar in form and size to those of Hopewell's, but made of black hornstone. They were on a mass of hard-burned clay covering an area of about twenty by thirty feet, and above them was a stratum of the same character. A cache of more than 1,500 specimens was unearthed in Cass County, and another of 3,500 in Schuyler County in the same State — each lot about five feet below the surface, but without any mound over them. These three localities are near together. While it is undoubtedly true that many caches of unfinished implements were thus made, partly for safety, and partly to preserve the flint in workable condition, it is always the case that such deposits are of smaller objects than those above referred to. There would be no reason for the construction of a mound of such size over them; and moreover, not one of these deposits shows the slightest evidence that it was ever disturbed after being made. Had they been intended as stores for material, we should expect to discover in the vicinity quantities of chips, spalls, and broken or unfinished implements; these we do not find. My own limited observations in the field, and all the mound-exploring literature to which I have access, establish — in my opinion — the fact, without exception, that no primal deposit of any kind placed at the base of a mound has ever been subsequently disturbed by the people who made it. It is my belief that all these immense deposits of large disks are votive offerings. They show no marks of use; they are carefully buried, often apparently with some kind of ceremonious observances; and their position frequently indicates that it was not intended they should ever be disturbed." — Snyder, Disks, condensed.

It does not appear that any traces of burial of a human body were noticed in either mound; so we are not to suppose the disks were personal property, and buried at the owner's death.

The opportunity afforded by the coincidence of these immense deposits has not been overlooked by writers seeking to establish identity in time, religion, nationality, etc.

"These disks seem to connect the Mound Builders of the Illinois River with those of the Scioto and convey the idea that the pyramids and sacred enclosures were built at the same time." — Peet, I, 57.

* * * * *

However the question may be settled in regard to the large disks, there can scarcely be any difference of opinion concerning the caches of leaf-shaped (pointed-oval) flint implements, sometimes to the number of several hundred in one spot, so frequently referred to in newspapers and other publications. Almost invariably the account states they were found in "low" or "marshy" or "swampy" places. This is good evidence that they were personal possessions, thus hidden for security, partly, but mainly that they should retain their moisture and consequently their workable qualities until such time as it was desirable to finish them for use or for sale. An interesting discovery of this nature was made by a farmer in Ashland county. While plowing a drained swamp he struck a deposit of leaf-shaped blades, made of Flint Ridge material.

"There were 201 of them, besides a number of unworked fragments." They were enclosed in "a keg-like vessel of red-elm bark, about three-fourths of an inch in thickness, some ten or twelve in diameter, and about thirteen in height. The vessel was a section of the bark, which had been removed from the tree by cutting or notching around the body and then peeling it off. * * * About twenty-five rods southwest of the slough are the remains of an Indian village." — Hill, 364.

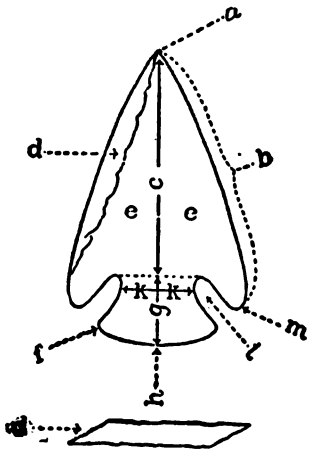
THE MANUFACTURE OF FLINT INSTRUMENTS.

The method of converting flint into implements will be next considered. As various names or descriptive words are often used indiscriminately to denote the same thing, and on the other hand a single word is sometimes applied to objects quite different from each other, it will perhaps be well to explain some of the terms used herein, to prevent confusion.

A *block* of flint is a rough, irregular mass as it is broken off from the ledge, or from a larger mass, with a heavy hammer. In order to bring it to a convenient form for handling, *fragments*

are knocked off with a smaller hammer-stone; these are left where they fall. *Spalls* are flat, thin pieces struck off from a block. *Flakes* differ from spalls in being long, thin, and narrow, sharp on both edges and more or less pointed. *Chips* are very thin, rounded scales, formed by pressure of a bone or similar tool, in the last steps of completing an implement. *Splinters* are long, slender points or spicules, made by a sudden blow; they are somewhat irregular in cross-section though usually rudely triangular, and more or less pointed at the end which was struck. *Cores* are blocks worked into convenient shape for furnishing spalls or flakes. *Rejects* are unfinished implements, thrown aside when some flaw is revealed that prevents their completion. *Blanks* are leaf-shaped or triangular specimens lacking only in some minor features, as notches or barbs, to make them perfect implements; these features probably being left for the user to shape according to his pleasure.

The accompanying diagram, figure 237, will render plain the different terms used in connection with the completed specimens:



a ....Point.
b ....Edge.
c ....Face.
d ....Bevel.
e ....Blade.
f ....Tang.
g ....Stem.
h ....Base.
i ....Notch.
k ....Neck.
m....Barb, or shoulder.

Figure 237 — Diagram illustrating terms.

The only difference between barb and shoulder is that the barb is prolonged toward the base. The shoulder is called squared or rounded according to whether the edge of the implement makes an angle or a curve where drawn in to form the stem.

In stemless specimens the base is the end opposite the point.

FLAKING.

Various methods were adopted for procuring spalls and flakes.

Evans says that blows with a pebble will form just such flakes as those produced by an iron hammer; the blows must, however, be delivered in exactly the right spot and with the proper force. Cores sometimes show markings of hammers when struck too near the edge. Flakes can be produced by using a pebble as a set or punch and striking it with a stone. The use of a set was probably the exception rather than the rule, for great precision may be obtained simply with a hammer held in the hand. The Eskimo use a hammer set in a handle to strike off flakes, or strike them off by slight taps with a hammer of jade, oval in shape, about 2 by 3 inches, and secured to a bone handle with sinew (Evans, 20, 23, and 25). The Peruvian Indians work obsidian by laying a bone wedge on the surface of a piece and tapping it until the stone cracks (Anahuac, 99). Schumacher observed that the Klamath Indians heat a stone and break it into fragments at a single blow (Hayden, 1877, p. 574). The Shasta Indian lays a stone anvil on his knee, and holding on the anvil the stone which he is working, strikes off a flake one-fourth of an inch thick with a stone hammer (Stevens, 77); he also places an obsidian pebble on an anvil of stone and splits it with an agate chisel to the required size (Bancroft, H. H., I, 342). The Shoshoni or Snake Indians of the northwest work in the same way (Schoolcraft, History, I, 212), and certain California Indians strike off flakes from a mass of agate, jasper, or chalcedony with a stone hammer (Stevens, 78, from Powers), while the Apache break a bowlder of hornstone with a heavy stone hammer having a twisted withe for a handle (Catlin, Rambles, 187).

Schoolcraft says experience has taught the Indians that some varieties of hornstone (flint) are less easily fractured than others, and that the conchoidal form is found best in softer varieties; also that the weathered fragments are managed with greater difficulty than are those freshly quarried (Schoolcraft, History, III, 467).

Evans points out that in making gunflints much depends upon the condition of the stone as regards the moisture it contains, those that have been too long exposed on the surface becoming intractable, and there is also a great difficulty in working those that are too moist. Some of the workers, however, say that a flint which has been some time exposed to the air is harder than one recently dug, yet it works equally well (Evans, 17).

Torquemada seems to have recorded two methods in vogue among the ancient Mexicans for obtaining the large flakes of which they made knives. One statement he makes is to the effect that

"They have a stick as large as the shaft of a lance, and three cubits or rather more in length, and at the end of it they fasten firmly another piece of wood, eight inches long, to give more weight to the part; then pressing their naked feet together, they hold the stone as with a pair of pincers, or the vice of a carpenter's bench. They take the stick (which is cut off smooth at the end) with both hands, and set it well home against the edge of the front of the stone, which is also cut smooth in that part; and they press it against their breast, and with the force of the pressure there flies off a knife, with its point and edge on one side, * * * and in a very short time these workmen will make more than twenty knives in the aforesaid manner." — Lubbock, 99.

According to Biart he describes a process just the opposite of the last.

"Torquemada, who saw them [Aztecs] at work, says * * * They took a block of obsidian as large as a leg, then a stick the size of a lance-shaft, to which they attached a small piece of the stone. Then seating themselves on the ground, the block of obsidian held between the feet as in a vice, they grasped the stick by its ends, placed it in contact with the top of the stone, and drew it toward them with all their strength. A pointed chip, sharpened on its two edges, suddenly detached itself. A workman thus made scores of knives in an instant. * * * in addition [they] worked granite, marble, and rock crystal." — Biart, 280.

Frequently the spalls are of such form that very little additional labor converts them into serviceable scrapers, knives, spears, or arrows. Sometimes the edges are bluntly chipped (always from the concave side) for use as scrapers. Others are trimmed only enough to give a general leaf-shape, the faces being left unchanged; but they are well suited for knives or arrow-heads, though most of them are small. Either form may or may not have notches for the attachment of a handle or shaft.

Nilsson describes how he made his own gun-flints when a boy. With a pebble he broke a flint to pieces; selecting a suitable flake, he held it on a large stone and pecked it into shape with his improvised hammer. "But it was of the utmost importance that, during the operation, the point of the splinter on which I was operating should rest upon the support, as otherwise the splinter would immediately break." That is, the impact of the pebble must be directly over the point upon which the flake rested. He infers that flint hatchets and other implements having a section rectangular — or at least quadrilateral — were shaped in the same manner.— Nilsson, 7.

"Easy as it may seem to make such flakes * * * a certain knack is required. * * * a gun-flint maker * * * took two years to acquire the art." — Lubbock, 87.

ARROW MAKING.

Arrow-making, whether from spalls or flakes, or by gradual reduction of blocks, has been witnessed by many persons who have reported the facts as they observed them. Additional ways of forming flakes appear in a few of them.

Among the Eskimo "all the large surface flaking is produced either by blows direct from the hammer, or through an intermediate set or punch formed of reindeer horn. The arrow- or harpoon head thus roughly chipped out is afterwards finished by means of the arrow-flaker." This "usually consists of a handle formed of fossil ivory, curved at one end for the purpose of being firmly held, and having at the other end a [longitudinal] slit * * * in which was placed a slip of the point of the horn of a reindeer, which is found to be harder and more stubborn than ivory. This is secured in its place by a strong thong of leather or plaited sinew, put on wet, which on drying becomes very rigid. * * * The bench on which the arrow-heads are made is said to consist of a log of wood, in which a spoon-shaped cavity is cut; over this the flake of chert is placed, and then, by pressing the 'arrow-flaker' gently along the margin vertically, first on one side and then on the other, as one would set a saw, alternate fragments are splintered off until the object thus properly outlined presents the spear or arrow-head form, with two cutting serrated edges." — Evans, 37-9; also Lubbock, 91. From Sir E. Belcher.

Near Point Barrow, Alaska, a flint pebble is "splintered by percussion into fragments of suitable sizes, and these sharpened spalls are flaked into shape by means of a little instrument consisting of a short, straight rod of some hard material mounted in a short curved shaft. * * * The flint to be flaked is held in the left hand and pressed firmly against the fleshy part of the palm which serves as a cushion and is protected by wearing a thick deer-skin mitten. The tool is firmly grasped well forward in the right hand with the thumb on top of the blade and by pressing the point steadily on the edge of the flint, flakes of the desired size are made to fly off from the under surface. * * * Hard bone appears to be the commonest material for the blade." The chipping instrument is of compact bone or ivory, and is set into the end of a bone or wood handle.— Murdoch, 288.

At Clear Lake, California, "The old expert put on his left hand a piece of buckskin, with a hole cut in it to let the thumb pass through. * * * In his right hand he took a tool of bone ground down to a blunt point. These tools, made often from the leg bone of a deer, are assorted in sizes, large ones being used for coarse work and small ones for fine work. A piece of obsidian was held in the left hand, then the right thumb was pressed on the top of the stone, while the point of the bone was strongly pressed against the under edge of the proposed arrow-head, and a little splinter of obsidian worked off. * * * Around

deserted camps piles of rejected fragments are sometimes found, either broken in putting on the edge or not being near enough the desired shape to pay for working up." "Much of the artisan's work consisted in putting sharp edges and points on damaged implements." — Mason, Bows, 658; from Dulog, in Forest and Stream.

The Viards of California make arrow-heads "in the following manner: Taking a piece of jasper, chert, obsidian, or common flint, which breaks sharp-cornered and with a conchoidal fracture, they heat it in the fire and then cool it slowly, which splits it in flakes. The arrow-maker then takes a flake and gives it an approximate rough shape by striking it with a kind of hammer. He then slips over his left hand a piece of buckskin, with a hole to fit the thumb (this buckskin is to prevent the hand from being wounded), and in his right hand he takes a pair of buck-horn pincers, tied together at the point with a thong. Holding the piece of flint in his left hand he breaks off from the edge of it a tiny fragment with the pincers by a twisting or wrenching motion. The piece is often reversed in the hand, so that it may be worked away symmetrically. Arrow-head manufacture is a specialty, just as arrow-making, medicine and other arts." — Powers, 104.

A Pitt River, California, Indian made from a fragment of quartz, with a simple piece of round bone, one end of which was semi-spherical, with a small crease in it (as if worn by a thread) the sixteenth of an inch in depth, an arrowhead, which was very sharp and piercing. * * * The skill and rapidity with which it was made, without a blow, but by simply breaking the sharp edges with the creased bone by the strength of his hands — for the crease merely served to prevent the instrument from slipping, affording no leverage — was remarkable." — Beckwith, 43.

"The head of the arrow is formed by breaking pieces of obsidian in small parts, and selecting those nearest the desired form. In this selection, those of the right thickness are taken. In finishing them, every edge of such a piece is laid upon a hard stone, and the other struck with another hard stone, varying the direction and force of the blow, to produce the desired result. It is an operation which requires skill, and many are broken when nearly finished, and thrown away. When formed, it is about three-fourths of an inch long and half an inch wide and quite thin." — Wyeth.

"Among the Klamath River Indians," of California, "a piece of bone is fastened to a wooden shaft one and a half feet in length, the working point of which is crooked and raised to an edge. * * * To guide the instrument with a steady hand, the handle is held between the arm and the breast, while the point, with but little play-room, assisted by the thumb, works on the edge of the flake, which again is held for greater safety in a piece of deerskin. After the two sides have been worked down to a point, then another instrument is required, with which the barbs and projections are broken out. This is a needle or awl of about three inches length, and by a pushing motion the desired pieces are broken out similar as with the first mentioned tool." — Schumaker; in Powers, 104.

"In Central California, and among the Klamaths * * * the rock of flint or obsidian, esteemed by the natives for arrow-pointing, is broken into flat pieces. * * * When the pieces have reached a proper size for arrow heads the mode of finishing it is in in this wise: The palm of the left hand is covered with a buckskin held in its place by the thumb being thrust through a hole in it. The inchoate arrow-head is laid on this pad along the thick of the thumb, the points of the fingers pressing it down firmly. The instrument used to shape the stone is a deer's antler, from four to six inches in length, held in the right hand. The small round point of this is judiciously pressed upon the edge of the stone, cleaving it away underward in small scales. The arrow-head is frequently turned around and over to cleave away as much from one side as the other, and to give it the desired size and shape. * * * Old men are usually seen at this employment." — E. G. Waite; in Powers, 374.

The arrow-maker on the plains "holds between his knees a block of stone, from which, by light sharp blows of a small stone hammer, he is chipping off triangular flakes of flint for making arrow-heads. The material used * * * is a black obsidian obtained by trade from the Crows to the south, [or] a piece of milky chalcedony picked up in the mountains to the west. Each of these blocks has been sweated by being buried in wet earth, over which a fire has been built, the object of this treatment being to bring to light all cracks and checks in the stone, so that no unnecessary labor need be performed on a piece too badly cracked to be profitably worked. As the workmen knock off the chips, they turn the blocks, so that after a little they become roughly cylindrical, always growing smaller and smaller, until at length each is too small to furnish more flakes. [He] now collects all the flakes he had knocked off, and piling them together on one corner of his robe, carefully examines each one. Some are rejected at a glance, some put in a pile together as satisfactory. [Next], he takes in his left palm a pad of buckskin large enough to cover and protect it while holding the sharp flake, while over his right hand he slips another piece of tanned hide something like a sailmaker's 'palm,' and used for the same purpose. Against his 'palm' the arrow-maker places the head of a small tool — a straight piece of deer or antelope horn or of small bone — about four inches long, and pressing its point against the side of the piece of flint held in the other hand, he flakes off one little chip of the stone and then another close to it, thus passing along the edge of the unformed flint until one side of it is straight, and then along the other. * * * Sometimes an unseen check will cause the head to break across without warning, and the labor expended on this particular piece is then wasted. But usually the arrow-maker works rapidly and spoils but few points. * * * I have seen a beautiful and perfect dagger, six or eight inches long, made from a piece of glass bottle." — Grinnell, 147, *et seq.*

Chase gives a similar account, but says that iron points have now taken the place of the bone or horn points formerly used.

The Plains Indians lay the flat side of a flake of obsidian on a blanket, or other yielding substance, and with a knife nick off the edges

rapidly. In their primitive state they probably used buckskin instead of the blankets, and pointed bone or horn instead of a knife.— Crook; in Sm. Rep., 1871, p. 420.

Holding the flake in his left hand [in the same manner as the Klamath], he places the point of a punch where the flake is to start; an assistant then strikes the punch a quick *rebounding* blow with a stone hammer. This punch was made of a whale's tooth; it "is about six or seven inches in length, and one inch in diameter, with one rounded and two plane sides; therefore presenting one acute and two obtuse angles to suit the points to be broken."— Catlin, Rambles, 188.

The "rebounding blow" is one of the necessary features in procuring large flakes. It is delivered by means of a flexible handle to a stone hammer, or by relaxing the muscles controlling the wrist. The downward impulse of the blow is checked immediately before the instant of impact, and the hammer flies back as soon as it touches the block. In this manner a flake may be detached from a stone which would shatter if struck in the ordinary manner. The Fuegians use a similar process and make as fine implements.— Catlin, Rambles, 290.

In making very large implements, such as spades or hoes, a notch six inches in depth was made in one side of a tree; the farther side of this was perpendicular and the bottom horizontal. On the bottom a slab of hard rock was placed. A short distance above this rock a small hole was made in the back part of the notch. Into this hole was set one end of the leg-bone of a deer, and under this, resting on the flat rock, a piece of chert was placed, on edge. The implement was worked into shape by pressure with the bone, the position of the chert being changed as necessary. — Webster, 601.

"Mr. Peale said he had seen squaws chipping flakes into small arrow-points, holding the flake in the left hand, grasped between a piece of bent leather, and chipping off small flakes by pressure, using a small pointed bone in the right hand for that purpose." Catlin, the artist, "considered making flakes much more of an art than the shaping them into arrow or spear points, for a thorough knowledge of the nature of the stone to be flaked was essential, as a slight difference in its quality necessitated a totally different mode of treatment." He described a tool for flaking. It is a stick of varying size acording to the sort of work. In one end is inserted a point of bone or horn [antler], to the other a cross-piece is secured. The point was placed where the flake was to start, and the cross-piece against the chest of the operator; a vigorous, sudden thrust split the stone to the desired thickness. For very large flakes, an assistant struck a projection on the shaft with a club or heavy hammer at the instant of pressure. Usually there was a division of labor; certain workers would quarry the stones and select suitable pieces, which others would dress

into shape for the flakers by knocking off projections or defective portions with a stone hammer.

A great workshop near the mouth of the Saline River, Illinois, is described. More than six acres are covered with flint chips, flakes and refuse. Nearly all this debris is from chert quarries three miles to the southeast. The evidence is plain that implements of every size have been made here from these flakes, and almost invariably by pressure from the flat [or smooth] side. The flake is laid with the convex side downward, in a support, and held firmly with one hand. "The handling of the tool and flake to form an arrow-point is as much an act requiring exactness and precision as the handling the cold-chisel and hammer is to the machinist." The "dentiled" or "beaded" edges and serrated edges and angles which some consider "marvels of artistic execution which can not be imitated in the present age," are "but the natural result of the mode of working." It is easier to leave these "saw-teeth" caused by the interlocking of the flakes at their meeting, "than it is to remove them."

In attempting to make the large agricultural implements, "all the experiments that I have tried with a hammer, whether of stone, steel, soft iron, or copper, have failed to produce the desired result; the seat of the flake is much more conchoidal, shorter and deeper depressed [that is, the "bulb of percussion" is more pronounced], whereas the direct *percussive pressure* throws off the shape of the flake that we find has been done in making these spades." Such flakes, however, require greater power than can be exerted by the unaided muscles. This is accomplished by "a mode still in practice among remote Indians." A projecting root of a tree is flattened to afford a firm support for the block of flint; in the trunk, just above, a notch is cut to make a fulcrum; a bar of wood is then used as a lever, the bone or horn point being inserted into it or a pointed stick set directly on the stone. One man then brings his weight to bear on the outer end of the lever, while another "with a stone mall or heavy club strikes a blow on the upper side of the lever, directly over the pointed stick or horn point, and the flake is thrown off." — Sellers: Chipping.

"Consolulu brought a piece of obsidian, a fragment of a deer horn split from a prong lengthwise, about four inches in length and half an inch in diameter, and ground off squarely at the ends—this left each end a semi-circle, besides two deer prongs with the points ground down into the shape of a square sharp-pointed file, one of these being much smaller than the other. Holding the piece of obsidian in the hollow of the left hand, he placed between the first and second fingers of the same hand, the split piece of deer horn first described, the straight edge of the split deer horn resting against about one-fourth of an inch of the edge of the obsidian—this being about the thickness of the flake he desired to split off; then with a small stone he with his right hand struck the other end of the split deer horn a sharp blow. A perfect flake was obtained, showing the conchoidal fracture peculiar to obsidian. The thickness of the flake to be split off depends upon the nearness or distance from the edge of the obsidian on which the straight edge of the split deer horn is held at the time the

blow is struck. He then placed in the palm of his left hand a piece of thick well-tanned buckskin, soft and pliable. On this he laid the flake of obsidian, which he held firmly in its place by the first three fingers of the same hand. He then took in his right hand the larger of the two deer prongs, and holding it as an engraver of wood holds his cutting instrument, he commenced reducing one edge of the circular form of the flake to a straight line. With the thumb of the right hand resting on the edge of the left palm as a fulcrum, the point of the deer prong would be made to rest on about an eighth of an inch or less of the edge of the flake, then with a firm downward pressure of the point, a conchoidal fragment would be broken out almost always of the size desired. The point of the deer prong would then be advanced a short distance and the same operation repeated, until in a few minutes the flake was reduced to a straight line on one edge. As this operation broke all the chips from the under side of the flake, if left in this condition the arrow would be unequally proportioned, that is, the two cutting edges would not be in the center [meaning the middle plane of the implement]. He therefore with the side of the deer horn firmly rubbed back and forth the straight edge he had made on the flake until the sharp edge had been broken and worn down. The flake was now turned end for end in the palm of his hand and the chipping renewed. When completed an equal amount was taken from each side of the edge of the flake and the cutting edge was left in the center. He in no instance appeared to fail in breaking out with the point of deer prong the exact piece desired. The piece of deer skin seemed to serve no other purpose than to save his hand from being cut by the countless sharp chips as they were broken off. One of the long sides of the arrow-head having been thus formed, the flake was turned over and the other side formed in the same manner. As, however, very much more of the obsidian had to be chipped away, he brought more pressure upon the point and broke out larger chips until the flake began to assume the shape desired, when the same care was exercised as when the first straight edge was made. In breaking out large or small chips the process was always the same. The pressure of the point of deer horn on the upper edge of the flake never appeared to break out a piece, which, on the upper side, reached beyond where the point rested, while on the under side the chip broken out might leave a space of twice the distance. Invariably when a line of these chips had been broken out the sharp edge was rubbed down, the flake turned end for end and the chipping renewed on the other side. By this process the cutting edges of the arrow-head were kept in the same line. The base was formed in the same manner. He now held the point of the well-shaped arrow-head between the thumb and first finger of his left hand, with the edge of the arrow-head upwards, the base resting edgewise on the deer skin cushion in the palm. He then used the smaller deer prong, which had been sharpened in the same form as the larger one, but all its proportions in every respect were very much smaller; its point could not have been larger than one-sixteenth

of an inch square. He rested this point on the edge of the arrow-head where he desired to make the slot [notch], and commenced sawing back and forth with a rocking motion, the fine chips flew from each side, the point of the deer horn descended, and in less than a minute the slot was cut. The arrow-head was turned over and the same operation repeated on the other side." — Redding, Condensed.

Redding gives two cuts, showing the flake and the completed arrow-head. These are reproduced here as figure 238 (Amer. Nat., XIII, No. 11, Nov., 1869, p. 671).

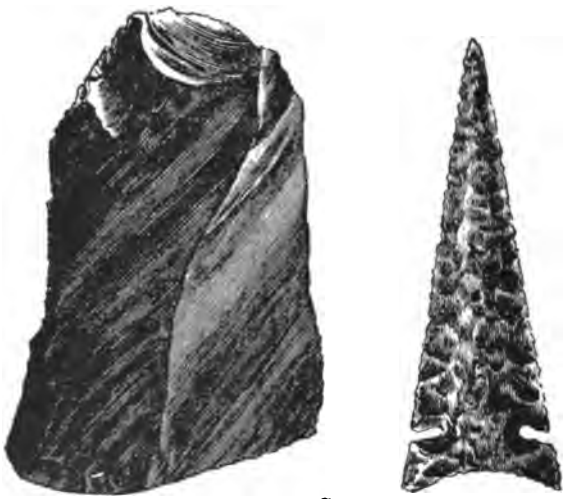


Figure 238 — Obsidian Flake and Arrow-head Made from It.

"Obsidian and agate are probably selected," by the California Indians, "not so much for beauty of coloring as for their close grain, which admits of more careful shaping. They use a tool with its working edge shaped like the side of a glazier's diamond. The arrow-head is held in the left hand, while the nick in the side of the tool is used as a nipper to chip off small fragments." — Cheever, 139.

Peale describes a tool similar to the last, and adds that the notches are different sizes to suit the different stages of the work.— Stevens, 78.

In Southern Nevada, "The shaping of the points and the chipping of the cutting edges were effected by first taking a piece of buckskin with which to grasp the flake, the latter being securely held between the tips of the fingers and the edge or base of the thumb, the narrow edge of the flake protruding, then flaking by pressure with a piece of bone or a bear's claw mounted on a short wooden handle. The flaking instrument, while being held against the edge of the flake so as to get a grip and prevent slipping, was steadily, but forcibly, directed upward

at right angles to the axis of the edge, and slightly backward and toward the left—that is, in the direction of the base of the arrow-head when working along one side, and toward the intended point when flaking along the other." — Hoffman, 283.

The Apache holds the flake or flint in his left hand, places his punch at the point where the chip is to be broken off, and it is struck by an assistant, thus knocking a chip from the under side; the flake is then turned and the process repeated, until the arrow is complete. The stone is held in the hand, as it can not be chipped on a hard substance.— Catlin, Rambles, 184.

"To make the notch of his arrow [the Virginia Indian] hath the tooth of a beaver, set in a sticke, wherewith he grateth it by degrees. His arrow head he quickly maketh with a little bone, which he ever weareth at his bracert, of any splint of a stone, or glass in the forme of a heart, and these they glew to the end of their arrowes. With the sinewes of Deere, and the tops of Deeres hornes boyled to a ielly, they make a glew that will not dissolve in cold water." — Smith, 132.

"Craveri, who lived sixteen years in Mexico * * * relates that when the Indians wish to make an arrow-head or other instrument of a piece of obsidian, they take the piece in the left hand, and hold grasped in the other a small goat's horn; they set the piece of stone upon the horn and dexterously pressing it against the point of it, while they give the horn a gentle movement from right to left, up and down, they disengage from it frequent chips, and in this way obtain the desired form. * * * De Pourtales speaks of a small notch in the end of the bone into which the edge of the flake is inserted, and a chip broken off from it by a sideways blow." — Evans, 39.

The various stages of work, from the rough block to the blank ready for the notches, are shown by the series of partially completed objects illustrated in figure 239.

THE TIME REQUIRED.

It may not be out of place in this connection to give a few quotations in regard to the length of time required for making an arrow-head.

According to the Marquis de Nadaillac, the Mexicans could turn out a hundred and fifty flint knives (probably only unworked obsidian flakes) an hour (Nadaillac, 170), while Crook says that the Plains Indians with only a knife for nicking off the edges, will make from fifty to one hundred knives in the same period (Crook, 420). Chase found that a Klamath Indian required five minutes to complete a perfect arrow-head (Chase); though Stevens observes that a Shasta Indian spent an hour in chipping one from a flake of obsidian (Stevens, 77), and Lubbock states that the most

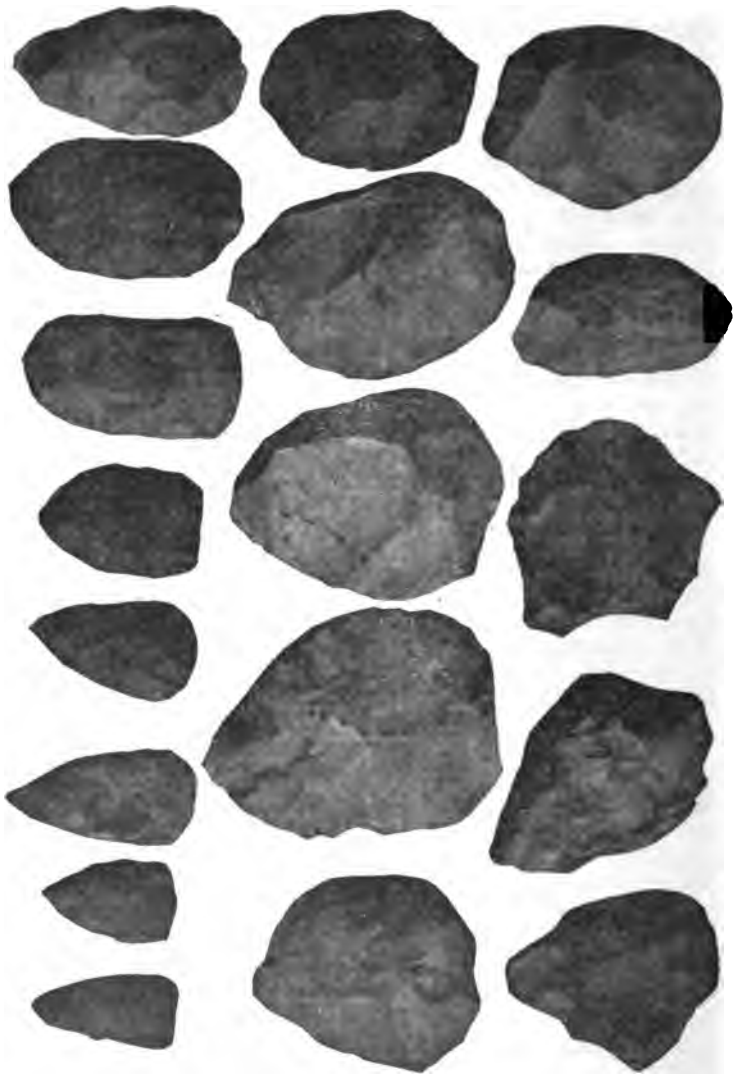


Figure 239 — Progressive Stages in Arrow-head Making.

skillful Indian workman can not hope to complete more than a single arrow in a day's hard work (Lubbock, 106). Powers also speaks of the aborigines of California as "using that infinite patience which is characteristic of the Indian, spending days, perhaps weeks, upon a single piece (Powers, 104);" and Tylor notes

"that utter disregard of time that lets the Indian spend a month in making an arrow-head" (Mankind, 108).

The last two references are probably to the large and finely worked pieces for ceremonial or ornamental purposes.

"To determine exactly how many minutes were requisite for making a serviceable arrow-head, I singled out an Apache at random and stipulated that he should employ no tools of iron, but allowed him to gather from the ground such pieces of chalcedony as he pleased. He made a number of barbs, the time * * being five, six, seven, and eight minutes. An expert would have completed the barbs in less time. * * A good lance-head could not be perfected quite so soon." "The process of manufacture * * * consisted in chipping small fragments from the edges of suitable pieces of material, the chipping implement being a portion of hardened deer or elk horn, held in the right hand, the siliceous stone being held in the left over a flap of buckskin to protect the fingers." — Bourke, Vesper, 57.

USES OF CHIPPED FLINT ARTICLES.

A casual inspection of any collection of arrow-heads, spear-heads, and knives, would impress one with the idea that the forms are almost as numerous as the specimens. No two of them are exactly alike. Yet they may be reduced to a comparatively few classes; and all are evolved from two simple primary forms — the pointed oval or "leaf-shaped," and the triangular. These two forms may be combined, or modified, to make four. Either may borrow the shape of its base from the other; that is to say, a specimen with straight edges may have a curved base, or the base of the one with curved edges may be in a straight line from side to side. From these four basic forms, by a few minor touches from a shaping tool arise the varied patterns of the smaller chipped flint implements. This will be more clearly understood if the notches of any specimen be filled with wax; or a tracing be made of the margin without any regard to these indentations.

It does not follow that flints without notches are unfinished. Such objects were used to a great extent as knives, scrapers or spear-heads, and the smaller ones sometimes formed the tips of arrows. Abbott (Amer. Nat., X, 116) mentions three triangular jasper implements three or four inches long from graves, associated with fragments of large bones which showed plainly that they had been used for clubs, after the manner of the Iroquois weapon which had a sharp-pointed deer-horn about four inches

long inserted in the lower side. Schoolcraft (History, II, 74, Fig. 5) figures a pointed stone with a square section (apparently one of the class usually called "picks"), mounted in a club which is curved at the end to let the spike set in it at a right angle to the handle.

"In the western mounds rows of similar chert heads have been found lying side by side, like teeth, the row being about two feet long. This has suggested the idea that they were set in a frame and fastened with thongs, thus making a species of sword." — Iroquois, 358.

The Mexicans had a similar sword, with obsidian teeth gummed in holes in a war-club (Anahuac, 342), and at Taos Pueblo a similar weapon was observed, with iron teeth.— Bourke, Snake Dance of the Moquis, 251. Dodge, Indians, plate 5.

But the number of specimens without notches found mounted indicates that the use of this class as knives or scrapers was a general custom.

A common error is the use of the name "dart" or "arrow-head" for nearly all pointed flint implements. The name fits only the minority of specimens, as none but the smaller ones could be so used; the larger are too heavy. It is wrongly believed that the size of the projectile is to some extent gauged by the size of the game for which it is intended; hence the popular name "bird-arrows" applied to small, delicately wrought points. A large weapon would, to be sure, be more effective than a small one, if the propulsion were in ratio to the size; but there is a limit to the power of a bow which a man has strength to bend, and a slender arrow-point may pierce the body of an animal whose tough hide would prevent injury from a large missile propelled with the same force. The longest stone arrow-head in the extensive collection of arrows in the National Museum measures two and five-eighths inches in length and is narrow and thin.

"Colonel Long said that two inches was the greatest length of stone arrow-heads that he found in use among the Indians; that all longer not used for javelin and spear-heads were strongly hafted and used as cutting implements. This was confirmed by Catlin." — Sellers, Chipping, 884.

It would be difficult, however, to assign any certain use for a particular type, the markings on so many indicate usage for which their shape would seem to render them unsuitable. It is probable that a single specimen served a variety of purposes. A man would scarcely provide himself with an assortment of hunt-

ing knives, for example, in order to have a special form for every demand that can be met with such a tool.

A variety of patterns of flint arrows, spears, knives, and other pointed or edged specimens for numerous uses is shown in figures 240 to 249. The types in figures 240, 241 and 242, with



Figure 240 — Flints with Polished Bases.

but few exceptions, have the bases polished. The motive for this polishing is not understood. It is intentional, because it can not be produced by any kind of wear to which the mounted specimen is liable. It can not be due to the implement "working loose in the handle," as commonly stated; because in such a case the polish would be most apparent on the face, or flat side, instead of on the base.

* * * * *

While flint was most suitable for various purposes, in cases of emergency other substances might be utilized.



Figure 241 — Flints with Polished Bases.

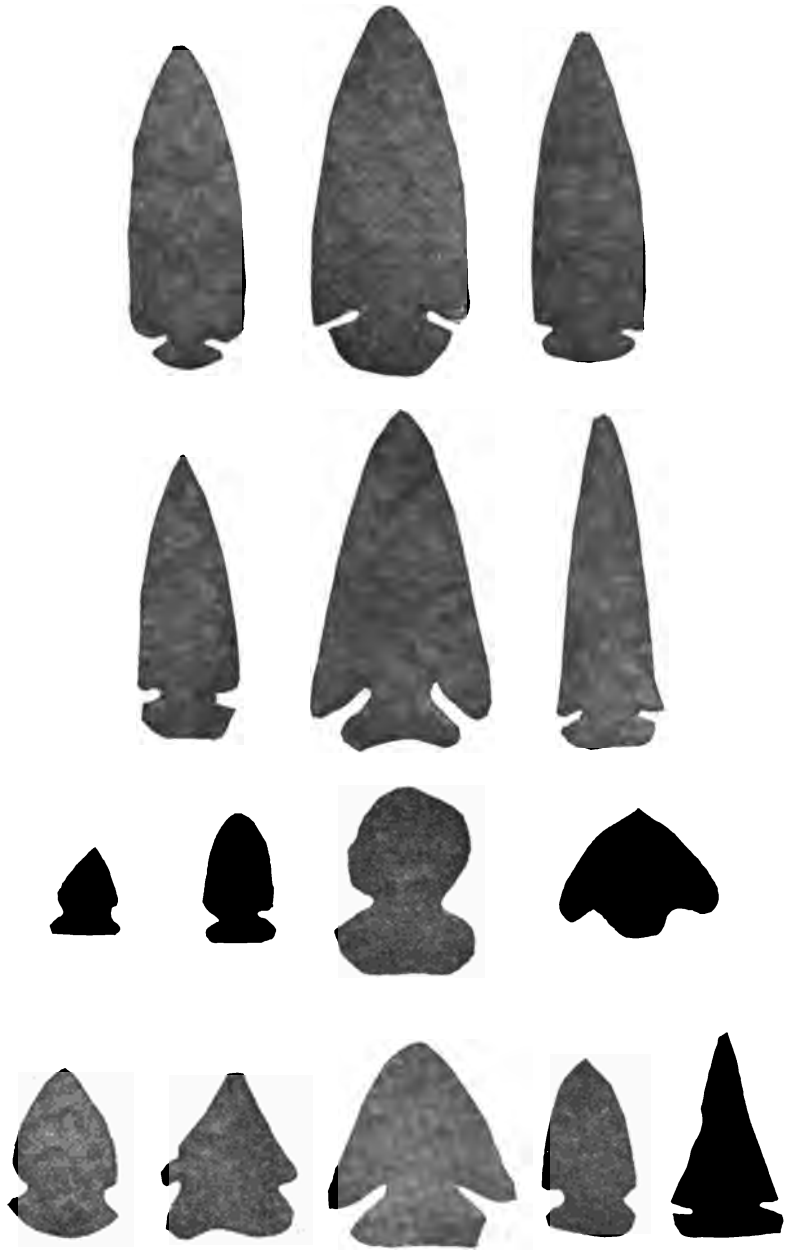


Figure 242 — Flints with Polished Bases.



Figure 243 — Knives or Spear Heads.



Figure 244 — Flint Knives.

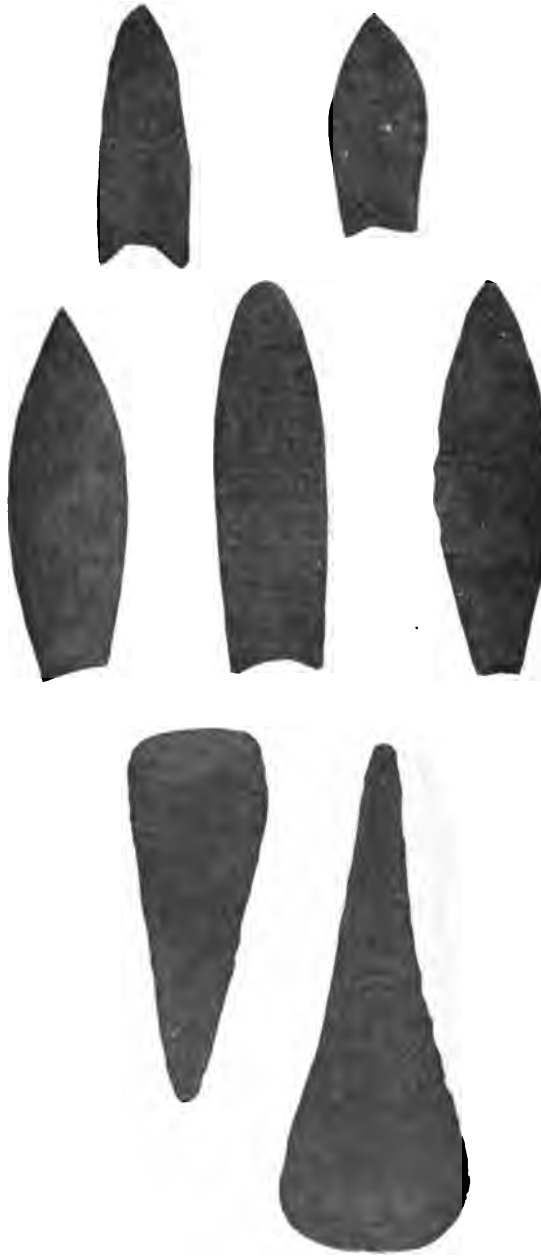


Figure 245 — Flint Knives.

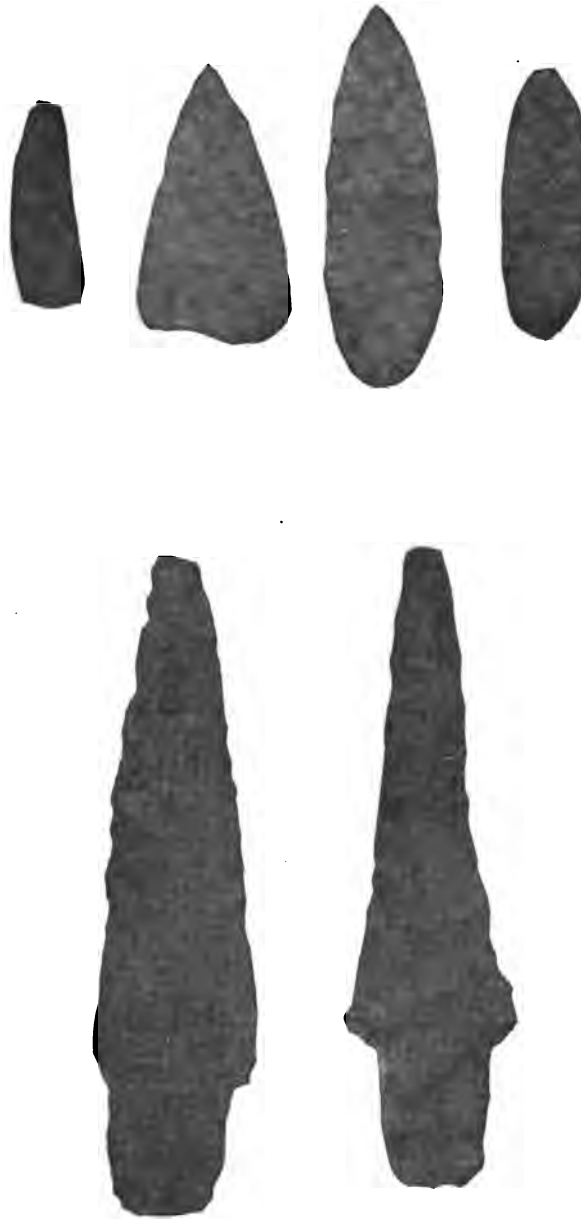


Figure 246 — Roughly Finished Knives or Spear Heads.



Figure 247 — Flint Scrapers.

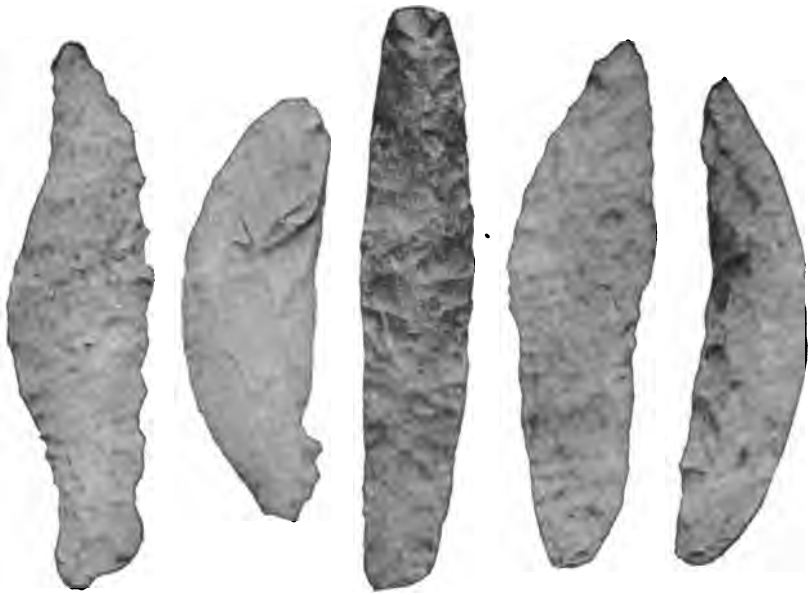


Figure 248 — Rare Forms of Knives and Scrapers.



Figure 249 — Unusual Forms, Possibly for Cutting or Scraping.

Some "Indians are very expert in striking large fish out of their canoes, with long sharp-pointed green canes, which are well bearded and hardened in the fire." "Formerly they made their knives of flint stone, or of split canes and sometimes they are now forced to use the like, in flaying wild animals, when in their winter hunt they have the misfortune to lose their knives." — Adair, 403 and 410.

"For his knife he hath the splinter of a Reed to cut his feathers in forme. With this knife also, he will ioynt a Deere, or any beast, shape his shooes, buskins, mantels, &c." — Smith, 132.

* * * * *

While it is likely that the smaller flints were intended for arrows, it can not be stated with confidence whether they were for use in war or in hunting.

"The war arrow differs from that used for hunting, in having a barbed spear-head, very slightly attached to the wood, so that if it penetrate the body of an enemy, it cannot be withdrawn without leaving the point in the wound." — Long, Rockies, I, 291.

"The shape of the iron arrow-head indicates the use to which it is expected to be put. Hunting arrows have long, tapering blades, the rear shoulders sloping backward. The blade is firmly fastened to the shaft, and can easily be withdrawn from the wound. The war arrow has a short, sharp blade, like a lancet; the rear shoulders slope forward, forming barbs; their attachment to the shaft is very slight, as it is intended that the head shall remain in the wound." — Dodge, Indians, 419.

The case was presumably the same with arrow-heads made of flint; but it is also probable that some war points were made with long or wide barbs, and firmly attached to the shaft, in order that when extracted the barbs would mangle the flesh and enlarge the wound. On the other hand, if an arrow-head be made with long barbs, so that it is difficult to pull from a wound, and at the same time be firmly bound, it has the form best adapted for hunting some kinds of game. The dragging of the shaft against weeds and bushes will impede the flight of an animal to some extent, while the point, from the same cause, will still further cut and pierce the internal organs, thus more rapidly exhausting the prey.

In many modern arrows with triangular points the sinew with which the flint is fastened to the shaft is brought over the corner or shoulder in such a way that it binds the point as firmly as could be done if it were barbed or stemmed, so that when the shaft is drawn from the wound the point must come with it. If an arrow-head of this form were inserted in a shaft, which was

then wrapped behind the flint, the latter would remain in the wound when the shaft was withdrawn.

OTHER FORMS OF FLINT IMPLEMENTS.

PERFORATORS.

The implements variously classed by different writers as awls, drills, needles, rimmers or reamers, and the like, represent a graded series, and as no distinction can be made in the different kinds, if, indeed, there is any room for distinction, they are grouped under one term, "perforators." Many of them, in widely different forms, have polished edges and points, the result of drilling other stones.

There was found in New York, an unfinished "banner-stone," partly perforated lengthwise, with the drill remaining in the bore. The drill is of black hornstone, carefully chipped and entire. It most resembles the small, thin, triangular arrow-heads, except that the point is rounded instead of sharp.— Rau, Drill, 540.

Thick, strong specimens with triangular or rhomboidal section are well adapted for making the small holes in shell, slate, and material of a like degree of hardness.

In "the manufacture of articles requiring perforation, I was informed that the Menomini used sharp-pointed pieces of quartz and jasper, rotating these rude drills with the hand and fingers." — Hoffman, 266.

"With an ordinary arrow held between the hands and vertically revolved, the Apaches bored holes in beads. A bead of [turquoise] was made in my presence, under very disadvantageous circumstances, in a trifle less than twenty-six minutes." — Bourke, Amer. Anth., Jan. 1890, p. 61.

Before leaving this subject, it is proper to state that primitive man must have placed but little dependence upon flint in his requirements for a drilling instrument. Evans specifies five ways of making holes in stones, viz.:—

(1) Chiseling or picking with "picks," "celts," or "drills," of flint or other stone; (2) boring with a solid borer, as wood, hard or soft, or horn, with sand and water; (3) grinding with a tubular grinder, as horn, cane, elder, etc., with sand and water; (4) drilling with a stone drill, e. g., of flint or sandstone; (5) drilling or punching with metal. "Holes produced by any of these means could, of course, receive their final polish by grinding." "Dr. Keller, after making some experiments with a hollow bone and quartz sand, tried a portion of ox-horn, which he found surprisingly more effective, the sand becoming imbedded in the horn and acting like a file." — Evans, 50 and 52.

"I have myself bored perfectly round and smooth holes through both stag's horn and wood with flint flakes, and when a little water is used to facilitate the operation, it is almost surprising to find how quickly it proceeds, and how little the edge of the flint suffers when once its thinnest part has been worn or chipped away, so as to leave a sufficient thickness of flint to stand the strain without being broken off."— Evans, 321.

It is quite probable that the aboriginal American was acquainted with all these methods; but it must be remembered there is no evidence he made use of any metal except copper; and very little of this served him for any economic purpose in Ohio.

Among the various ways in which this work was done by savages, the following have been observed:—

The Nootka, in boring wood, use a bird bone drill worked between the hands (Bancroft, H. H., I, 189). The Santa Barbara Indians chip out rough disks of shell, pierce them with a flint drill, and enlarge the holes with a slender, round piece of sandstone (Schumacher, in Hayden, 1877, p. 43). The Atlantic coast Indians drilled shell beads with a nail stuck in a cane or stick, rolling the drill on their thighs with the right hand and holding the shell in their left (Brickell, 339); and the southern Indians pierced shell beads with heated copper drills (Jones, 230). Such operations are not the result of high mechanical skill, but merely of the most simple and savage processes.— Mankind, 188.

"The Indians made pipes which are excavated by means of friction with harder substances and the intervention of sand and water." [From Hunter.] "Their pipes were made artificially, as ours are, but far bigger, with the bowl fashioned together with a piece of fine copper." [From Smith]. — McGuire, Drilling, 639.

In his letters describing the Sioux, Catlin refers to their use of the material from the Pipe-stone quarries; and on plate 98 figures several of their pipes which are as ornate and well carved as any specimens of this nature found in the mounds. In making them "the Indians shape out the bowls of these pipes * * * with nothing but a knife." They make the hole "by drilling into it with a hard stick, shaped to the desired size, with a quantity of sharp sand and water kept constantly in the hole." — Catlin, Indians, I, 234.

"In the recent excavations of graves [in southern California], bundles of thin triangular pieces or spicules of hornstone have been found. Each of these bundles contains several hundred specimens, the individual drills being flaked from a core so as to be almost perfectly triangular longitudinally, gradually tapering to a sharp point. These specimens have an average length of an inch and three-fourths, and a diameter at the thicker end not exceeding one-eighth of an inch. These delicate drills had no doubt been employed in making the indentations at the ends of the cylindrical beads, which subsequently served as a starting point for the bristle drill used in perforating the entire length of the bead. In several

graves * * * there were found * * * bundles of whiskers or bristles of the sea lion." On Santa Cruz Island are found shell beads "4 or 5 inches in length, with a bore just large enough to permit the passage of a broom straw. Even smaller perforations are noted." Broken specimens showed that a depression was first made with the small flint drill, "the bristle was next applied, and twisted or rotated between the thumb and fingers, while, at the point of contact with the shell, siliceous silt or fine sand was applied to aid in cutting away the calcareous matter of the shell. The soft stratum between two layers of the harder enamel was naturally followed by the drill, thus without the slightest difficulty causing the perforation to be curved, from end to end, to conform to the convexity of the shell." — Hoffman, 266-7.

Sometimes a long curved shell was drilled from each end, the holes meeting at some point near the middle. This method is illustrated in figure 250 (McGuire, figure 4).



Figure 250 — Illustrating the manner of drilling curved objects.

On the Rio Negro, "I now saw several of the men with their most peculiar and valued ornament — a cylindrical, opaque, white stone, looking like marble, but which is really quartz imperfectly crystallized. These stones are from four to eight inches long and about an inch in diameter. They are ground round, and flat at the ends, a work of great labor, and are pierced with a hole at one end, through which a string is inserted, to suspend it around the neck. It appears almost incredible that they should make this hole in so hard a substance without any iron instrument for the purpose. What they are said to use is the pointed flexible leaf-shoot of the large wild plantain, triturating with fine sand and a little water; and I have no doubt it is, as it is said to be, a labor of years. Yet it must take a much longer time to pierce that which the [chief] wears as the symbol of his authority, for it is generally of the largest size, and is worn transversely across the breast, for which purpose the hole is bored lengthways from one end to the other, an operation which I was informed sometimes occupies two lives. The stones themselves are procured from a great distance up the river, probably from near its sources at the base of the Andes; they are therefore highly valued." — Wallace, 278.

McGuire disputes the correctness of Wallace's statement.

"It will be observed that Wallace speaks entirely from what he has been told. * * * It is known that such twirling would cut the hole of the indicated size in a comparatively few days with the proper abrading tools or material. Even with quartz sand the work would require but a few weeks, though engaged in only during the leisure

hours of the workman. * * * Even if these tubes were eight inches long, to make a hole the entire length of the cylinder, should not require a month, and the average white man, given a couple of days to familiarize himself with the tool, would decrease the time here allowed by one-half." — McGuire, Drilling, 670 and 695.

"Recent investigations are fast forcing the conclusion that primitive mechanical methods did not entail the vast amount of patience which they would be supposed to require." In drilling catlinite "it was found that drill points either of stone or metal readily took hold of the mineral and cut rapidly as long as the edges of the points were kept rough. Solid points of wood or bone were not effective, as they made very slight headway and had a tendency to polish rather than to cut. With the use of the dry sand, however, some wood was found almost as effective in cutting as stone or metal. * * * A brass cylinder bored catlinite with comparative ease so long as its edges were kept rough, yet hammered copper cut it much better owing to the particles of quartz crystal taken up by the copper, the reason of which was that the copper was hammered into shape with a quartzite hammer, whereas the brass had no grit in it and consequently wore smooth when the copper did not. Water was found to be impracticable for use in boring catlinite, as the material ground into powder made a cement on becoming wet, and formed a hard crust in the perforation, until the shaft choked and would no longer revolve, unless it was cleaned out. * * * In boring with drill points of stone or metal without sand, choking usually begins to cause trouble at about five-eighths of an inch from the surface. In using the metal drill on most stones, water obviates choking, and sand and water make the work progress more easily. * * * If, however, a wooden shaft point is being employed, water retards the work very materially by softening the wood and allowing the sand to cut the drill point away. * * * A hard wood rolls the sand and rounds its edges; * * * if the shaft is too soft [it wears rapidly]. In the writer's experience he has found hickory as much too hard as pine is too soft for drill points. Ash apparently furnishes one of the best shafts."—McGuire, Drilling, 660.

"A copper drill point such as the writer has often employed [is] made by battering a nugget of native copper into a plate, by means of a quartzite hammer, and then setting the plate on edge on a stone and tapping it with another stone until it assumes a cylindrical form. In hammering this nugget into shape the copper has had beaten into it fine particles of the crystals of the stone, which are firmly imbedded into the metal, so that as the copper wears the crystal begins to cut. This implement the writer has found to make a most excellent cutting tool, equal to almost any tried in the course of his experiments." With slender rods or tubes of copper, so prepared, "the writer has bored crystallized quartz." — McGuire, Drilling, 685.

In the order of effectiveness and rapid progress, McGuire found the gradation of drilling tools to be: copper tube; reed; elder; bored wood; copper rod; and wooden stick. With a solid rod of any sort, all the material to be removed must be ground away; but with a tube a ring is cut out a little wider than the thickness of the drill, leaving a core which falls out when the work is completed.

Figure 251 (McGuire, 13) represents

"a pipe made from a block of catlinite by a Sioux chief, his only tools being a knife, with which the stone was cut, and a piece of wire by means of which it was bored. * * * Not being able to pierce the entire stem in any other way, a perforation has been made from the outside at the base of the stem, from which a hole was bored into the

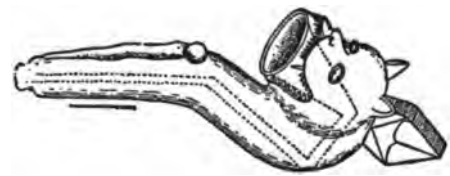


Figure 251 — Modern Sioux Pipe, made of Catlinite.

bowl, and a second one met the perforation which had been made from the mouthpiece of the stem, after which the hole in the base of the stem has been plugged with a piece of lead, neatly fitted into the stone, thus completing a continuous tube." — McGuire, Drilling, 635.

The conical hole naturally results from the wear of the drill, especially one of wood. An example is shown in figure 252 (Nat. Mus., 1894, page 639, figure 20).

Figure 253 (McGuire, 42),

"shows two holes bored through a block of catlinite with the same drill, the end of the drill shaft having in one instance a thin mercantile copper cylinder [tube] for a point, and in the other case a [joint] from a 1½ inch water pipe, about three-eighths of an inch thick. * * * Each of these tubes was used with sharp quartz sand; beginning with the use of the water pipe, after perforating a hole one-third of an inch deep, because of the thickness of the pipe, which caused the removal of such an unnecessary amount of material, the perforation was completed with the thin copper cylinder. The striæ on the core, as also on the interior of the cylinder, were very distinct, being caused, as they were, by grains of sand working in one place as the drill alternated back and forth." — McGuire, Drilling, 654.

In figure 254 (McGuire, 69) is shown

"the typical wood-boring tool common to the northern continent, for which purpose this shape is more suitable than another. * * * It will bore through an inch of wood in from three to five minutes, depending upon the velocity of the drill. To bore a hole in a block of steatite of similar depth would require very little more time." — McGuire, Drilling, 681.

The manner in which the ordinary hand-drill is applied to its work, may be seen in figure 255.

"The perforations and hollows of the mound-pipes, and of some other objects, are drilled with extreme accuracy, showing that the tool used was not merely turned between the hands, but was moved by an arrangement probably resembling the 'bow-drill' used by watchmakers

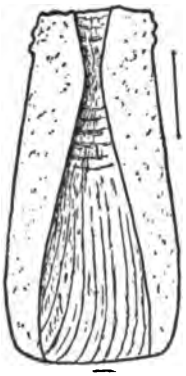


Figure 252.

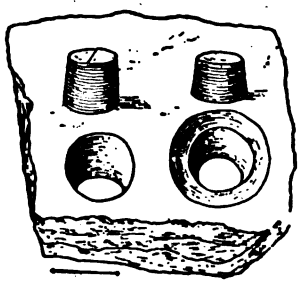


Figure 253.
Experiments in Drilling.



Figure 254 — Flint Drill.

and others. The ordinary 'bow-drill' consists of a straight tool, which passes through the center of a disc grooved on the outside, motion being imparted to the tool by means of a bow, the string of which is made to encircle the disc. It appears probable that a ring may have formed part of a drilling apparatus somewhat of this kind." — Stevens, 511.

It is suggested that the "pulley-rings" found by Squier and Davis at the Hopewell mound, and in the Cincinnati mound as described by Dr. Drake, may have been used with bow-drills; it is not known whether they show the marks of wear that would result from such use.

With a bow-drill and stone point, McGuire drilled a hole through a siliceous rock an inch and a half thick in three hours. A hole five inches deep was drilled in a piece of catlinite in three hours; this is about as hard as banded slate.— McGuire, Lapidary.

Different forms of bow-drills, and methods of using them, are shown in figures 256 to 260 (from McGuire).

For some reason, Rau could not make the progress which McGuire considers possible. With a pump-drill, he undertook to perforate



Figure 255.



Figure 256.



Figure 257.

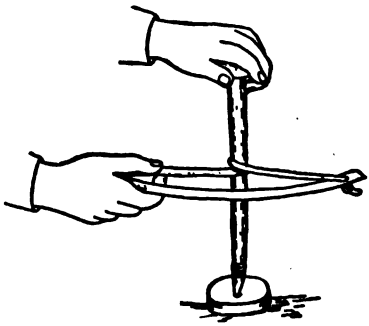


Figure 258.

Primitive Methods of Drilling and Fire-making.

"a piece of diorite 1⅜ inches thick, so hard that the point of a well-tempered knife produces no scratch upon its surface. At first, a piece of ash was used as a shaft; but pine proved to be just as efficient. The material used in drilling was a sharp quartz sand of middle grain. Emery was not more effectual than sand. The work was tedious beyond description. Every five or six minutes the bore had to be cleaned by immersing the stone in water, the sand being by that time perfectly ground, and forming in connection with the water and the particles of wood rubbed from the stick, a sort of paste which was no longer serviceable for drilling. Two hours of constant drilling added, on an average, not more than the thickness of an ordinary lead-pencil line to the depth of the hole." — Drilling, condensed.

Figure 261 (McGuire, 48) illustrates one of McGuire's

"experiments in boring a stone by means of the pump-drill. It is of siliceous material and is quite hard. The point used in drilling this object was of jasper. It required about three hours' labor to both shape and bore it." — McGuire, Drilling, 662, condensed.

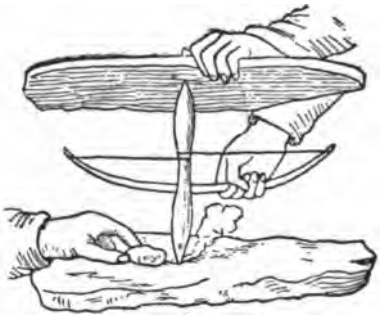


Figure 259.

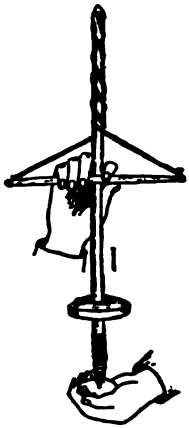


Figure 260.

Primitive Methods of Drilling and Fire-making.

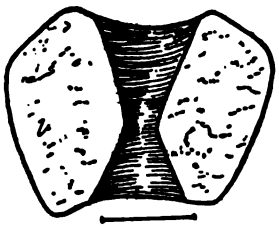


Figure 261.

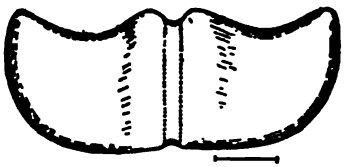


Figure 262.

Experiments in Drilling.

McGuire shows several other objects which were drilled by him in various ways; among them, the one reproduced in figure 262 (McGuire 36).

This was

"a steatite ceremonial implement which was pecked with a stone hammer into shape by the writer, bored by means of a pump drill with a wooden shaft and sand, ground smooth with a piece of sandstone, next with a jasper pebble, and finally rubbed with a piece of wood and a piece of buckskin as a polisher. This implement is shaped entirely by the eye, the hole meets with accuracy in the middle, and the surface is as smooth if not smoother than the average implement of Indian manu-

facture. Less than five hours was required to make this object. To have made it of indurated clay would possibly have required a day's work." — McGuire, Drilling, 650.

He thinks it probable that emery was used in drilling the harder materials (McGuire, Drilling, 631); but does not explain how this may have been obtained by the aborigines.

Many flint objects, usually classed with perforators, were available for very different branches of labor. Some were no



Figure 263 — Flint Perforating Tools.

doubt used after the manner of burins in the manufacture of pipes, ornaments, and sculptures, and especially for executing the incised lines on inscribed shells and stones.

Bushmen are known to use triangular pieces of flint for cutting figures in rock.— Holub, 460.

"Hundreds of beautiful stone axes and ornaments have been found in the immense tumuli of Brittany. Experiments prove that the stone can be cut with flint, while bronze produces no effect on it." "The engravings on the Scotch rocks, even those on granite, may have been carved with a flint tool." — Lubbock, 119.

Slender specimens with sharp points would make excellent piercing tools, necessary in the manufacture of articles from skins or leather. A series of these appears in figure 263.

Drills with slender blades, and wide base or long barbs, are the perfection of hunting arrows. They would deeply penetrate the body of an animal and resist any attempt to pull them from the wound. Thus all of them could be recovered when the game was secured.

Despite their popular name, comparatively few of these specimens could be used as drills; most of them are too fragile. The thicker, stronger pieces would answer very well for drilling shells and thin tablets of slate or similar stone. Those which are double pointed and slender, may have been used for bait-holders in fishing.

"There have been found in the cave debris of Southern France small bone rods tapering toward both ends, and sometimes grooved around the middle, to facilitate the fastening of a line. These pointed rods are employed in fishing on the Northwest Coast of America."—Fishing, 12.

Bait-holders similar in form to the above are, or were until quite recently, in use among the Indians of Florida. They differed only in having a perforation instead of a groove at the middle. A line was passed through this hole and tied, and a "half-hitch" taken over one point. The rod, upon which the bait was placed, was thus made to hang vertically in the water. When swallowed by a fish, a slight jerk released the loop and the bait-holder, assuming a position at right angles to the line, held as firmly as a hook.

BLUNT ARROWHEADS, OR "BUNTS."

Certain arrowheads have the end opposite the base rounded or flattened instead of pointed. Commonly, both faces are worked off equally, to bring the edge opposite the middle line of the blade, though sometimes it may be a little to one side. The stem and base are of any form found in the common patterns of arrowheads. Few are barbed, though many have shoulders. For the most part, they are probably made from the ordinary spearpoints or arrowheads and knives that have had the points broken off, though some seem to have been intentionally made this way originally. A few are smooth or polished at the ends, as though used as knives or scrapers; but most of them have no marks ex-

cept such as would result from being struck or shot against some hard substance — even this being absent in many.

SCRAPERS.

The same remarks as to form and method of making apply to stemmed scrapers as to blunt arrows, except that the chipping of the end is always from one face so as to produce a chisel edge. This edge is frequently smooth or polished from use. Thev would



Figure 264 — Blunt Arrow Heads, or Bunts, and Scrapers.

answer very well for smoothing down articles made of wood, or for cleaning hides in tanning; they would also serve excellently for removing scales from fish, and as they are usually abundant in the vicinity of good fishing places, they were no doubt employed for this purpose.

Bunts and scrapers are illustrated in figure 264.

A few quotations regarding the use and mode of manufacture of stemless scrapers may be given.

According to Evans, they are made by laying a flake flat side up on a stone, and chipping off around the edge with a hammer. The point struck must rest directly on the under stone,

and but a thin spall is struck off at each blow. Leidy observed that the Shoshoni by a quick blow strike off a segment of a quartz bowlder in such a way as to form a circular or oval implement flat on one side, convex on the other, which is used as a scraper in dressing buffalo hides (Hayden, 1872, p. 653); the Australians obtain, in exactly the same way, specimens which they use as axes (Knight, 236). Peale remarks that while hides are green they are stretched on the ground and scraped with an instrument resembling an adze (Knight, 390); and Dodge says more explicitly that when the stretched skin has become hard and dry, the woman goes to work on it with an adze-like instrument, with a short handle of wood or elkhorn tied on with rawhide; holding this in one hand, she chips at the hardened skin, cutting off a thin shaving at every blow.— Dodge, Indians, 256.

The scrapers of this class are usually chipped over the entire surface to the form of the ordinary celt, except that the scraping edge is in the same plane with one face. Some have a scraping edge at each end. In a few the flat or straight face is chipped off slightly, bringing the edge toward the middle line; but this was probably done after the implement had become broken or blunted from use. When there is any polish, it is always on the flat face, showing use as an adze, or, possibly, as a plane. They vary much in width, some measuring almost the same in either direction, while others are more like the "chisel" celts, though the position of the cutting edge shows their use.

CORES.

The generally accepted name "cores" is applied to the blocks from which are struck off the flakes to be next described. A few are shown in figure 265.

Dr. Gillespie says of these objects:—

"They have been generally looked on as the blocks left after flakes had been struck off for use, and that they were then thrown aside as refuse, nobody having appeared to recognize the fact that they are all in reality implements of very definite construction. The chief reasons for calling them implements are: 1st. The fact that they follow a definite typical arrangement. 2nd. That some of them are so small that the flakes struck from them could be of little practical use as working tools. 3rd. That the number of cores found in any one locality are out of all proportion to the number of flakes. 4th. That immense numbers of flakes are found which bear no marks of use, and which may properly

be looked on as waste. 5th. That almost all the cores found do bear undoubted marks of use.

"One of the most typical forms is generally elongated, and sometimes smoothly rounded off at one end, which would admit of its being readily held in the hand, and used probably in the manner of a plane.



Figure 265 — Cores.

Some of these have been refaced, when the edge was lost, by fresh flakes being struck off. In the smaller cores the chipping at the edge is much finer, as if they had been used as planes or scrapers for working some substance, such as bone or horn, which requires a stronger and thicker edge than could be got by the acute angle of the ordinary flake. There is never any appearance of the pointed end having been used. A further proof of intent as tools is found in a plain surface as a base, from which the sides rise at angles of 60° to 80°." — Gillespie, 260, condensed.

So far as Ohio cores are involved, this whole argument presents a most ingenious warping of facts. Taking his points in their order, 1st—The "arrangement" naturally results from the plan of work necessary to obtain flakes of the usual form. 2nd—They are of various sizes, from one just reduced to proper shape to one which can no longer be conveniently flaked. 3rd — The great number in one place is evidence that they are not tools; otherwise they would be of wide distribution, as are other implements. 4th—The flakes are ready for use when struck off and few are designed for purposes which would leave marks on them. 5th—On a hundred cores chosen at random not five will have the least "mark of use." The "finer chipping at the edge" is produced by ineffective effort to get a flake, and the "angle of 60° to 80° from a plain surface" follows as a result of the manner in which the stone is struck.

Nearly all the cores found in Ohio were made at Flint Ridge. Thousands of them have been collected at that place. All are small, few being of a size to furnish flakes over three inches long. Usually all the flakes were obtained from only one side of the core until it became too small to work. Occasionally they were chipped from the opposite sides, leaving the core of a conical or roughly cylindrical shape.

The flakes were undoubtedly struck off by means of stone hammers, hundreds of which are to be found about the quarries; or removed by pressure, many showing the bulb of percussion, others being perfectly smooth on the flat face.

"In all cases where a splinter of flint is struck off by a blow, there will be a bulb or projection, of a more or less conical form, at the end where the blow was administered, and a corresponding hollow in the block from which it was dislodged. This projection is usually known as the bulb of percussion." — Evans, 274.

FLAKES.

The use to which flakes could be put has caused some discussion.

Schoolcraft says that the Dakota bleed patients by scarifying with these flakes; or sometimes one is fixed into a piece of wood, held over a vein, and driven in as far as the wood will let it go (Schoolcraft, History, I, 253), the use being similar to that of the modern fleam. Harpoons in the Kurile islands are made

of bone, with a deep groove along each side; in these grooves thin and sharp flakes are fastened with gum (Nilsson, 46). According to Evans, similar flakes were used for scraping, just as broken glass is used among modern woodworkers. Flakes have been found in the Swiss lakes in wooden handles in the fashion of Eskimo knives; also in Australia with skin wrapped around one end to protect the hand (Evans, 256).

As nearly all the flakes in Ohio are the product of Flint Ridge cores, it follows that very few of them are as much as three

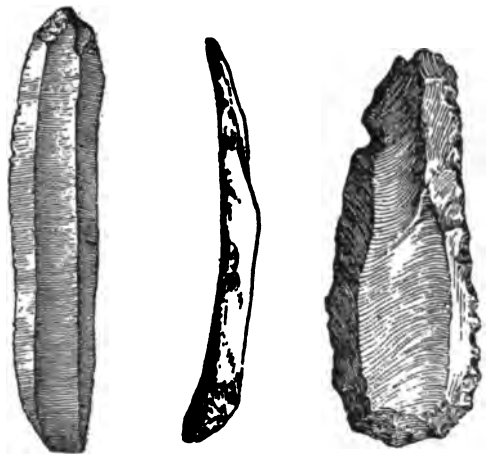


Figure 266 — Flakes.

inches long. They are more or less curved from end to end, with the concave face always regular and smooth; but this is due to the fine even grain of the stone, and not to any "polishing" as stated by some writers.—Nadaillac, 73.

On the opposite or convex face are three or four facets caused by others having been struck off above. This is exhibited in figure 266. The edges are as keen as broken glass, and the points are usually quite sharp. In a great many the points have been worked off by fine, secondary chipping. When this is done it is always at the end which was struck in knocking off the flake. In some cases it may be due to the shattering effects of the blow; but in many specimens the evidence is plain that it was done afterward for the purpose of making a sharper point. Some flakes of this kind have notches for attachment to a shaft, proba-

bly for arrows; such specimens, however, are without the secondary chipping, and the notches are at the end opposite the one struck.

"We have no conclusive evidence as to the purpose to which such minute flakes were applied, but they may have been fashioned into drills or scraping or boring tools, of very diminutive size. * * * Numerous flakes, however, quite as minute, with their edges showing evident signs of wear, are present among the refuse left by the cave-dwellers of the Reindeer period of Southern France. These minute flakes have also been found in Egypt and in Asia, as well as in Britain. There is a class of ancient Scandinavian harpoon heads, the stems of which are formed of bone with small flint flakes cemented into a groove on either side so as to form barbs. Among the Australians we find very minute splinters of flint and quartz secured to wooden handles by 'black boy' gum, and forming the teeth of rude saws and the barbs of javelins." — Evans, 276-7.

The Mexicans used obsidian flakes as razors. Most flakes, as struck off, have points sufficiently strong for use as arrows or spears, or edges sharp enough to be used as knives, without further work. It would be folly to rework or sharpen such, when a new instrument could be made from a core with a single blow.

CEREMONIAL FLINTS.

Large, carefully wrought objects of stone, which seem too heavy or too delicate for practical use, were probably intended only for display or to have a place in some ceremony.

The Yuroks have "large jasper or obsidian knives which they used to make and use, but which nowadays are kept only as ornaments or objects of wealth, to be produced on occasions of a great dance. [They have] some very large jasper spear-heads four inches long and two inches wide; but these also are now brought forth only at a dance, to give the owner distinction." — Powers, 52.

"The Hupa have articles paraded and worn in ceremonial dances, which they will on no account part with to an American. One of these is the flake or knife of obsidian or jasper. I have seen several which were fifteen inches or more in length and about two and a half inches wide in the widest part. Pieces as large as these are carried aloft in the hand in the dance, wrapped in skin or cloth to prevent the rough edges from lacerating the hand, but the smaller ones are mounted on wooden handles and glued fast. The largest ones cannot be purchased by a white man at any price. These are not properly 'knives,' but jewelry for sacred purposes, passing current also as money." — Powers, 79, condensed.

SERRATION.

The serrated or serpentine edges on worked flints, which are supposed to require a great deal of skill in their production, are simply the natural result of a particular mode of chipping. They are only incidental to the process of manufacture, and are allowed to remain either from choice or from indifference. Less skill and less work are required to give a flint an edge of this character than to make a smooth, sharp margin.— Sellers, Chipping.

The only difference between these and others of the same general pattern is that wider spaces were left between the points at which the flaking tool was applied along the edge.

BEVELING.

In speaking of the beveled edges seen on so many flints, Jones says:

"The object of this arrangement was to cause the arrow, in its flight, to take a rotary motion, thereby increasing the violence of the wound when the barb had entered the flesh. The same effect was accomplished by using the half twist in feathering the shaft. By such mountings the flight of the arrow was rendered more steady." — Jones, 255.

Morgan expresses the same idea in the statement that

"occasionally [arrow-heads] are found with a twist to make the arrow revolve in its flight. It is well known that the Indian always feathered his arrow for the same purpose." — Iroquois, 358.

It will be observed that both these authors also attribute the rotary motion to the feathering upon the rear of the shaft. Others claim that the feathers alone exert any influence of this kind.

"An arrow is not directed or held to its course by its point, but by the feather at the butt end of its shaft; and if a rotary motion was required it would naturally be given by placing the feathers spirally around the shaft." — Sellers, Chipping, 884.

"The base of the shaft is feathered with three half feathers, bound on with sinews and twisted so as to give the arrow a rotary motion." — Coville, 360.

Schoolcraft (History, I, 213), Powers (page 52), and Cheever (page 140), also say that the modern Indians sometimes have a spiral arrangement of the feathers on their arrow to produce a rotary motion.

The object of this rotation is to prevent any deviation from a direct line, which may arise from a lack of balance between different parts of the missile. Vanes of feathers placed spirally on the end of an arrow shaft accomplish this result. There may be either two or three strips; occasionally there is none, the weight of the point being sufficient to hold it in a practically straight line, at least for a moderate range. The principle is the same as that involved in the rifling of modern guns.

Wilson attached beveled points of various sizes to smooth, straight shafts, took them to a considerable elevation, and let them fall point first; he also launched them in every direction. He found "a universal rotation." He attached others to a wire frame which left them free to move on the longer axis; on placing them, point first, in front of a blower or "driving fan" in a machine shop, the current of air set every one revolving. He holds it "to be conclusive that, whatever may have been the intention of the maker of the arrow-heads, the fact was, that in their flight through the air the beveled edges produced a rotary motion." — Bevel, 142.

Whether the rotation due to impact of air upon so narrow a surface as the edge of a flint would be sufficiently rapid to hold it to a straight course, has not been determined. At any rate, the weapon could not "tear and mangle the flesh of the victim" or even "increase the violence of the wound," since a rotary motion, however produced, must cease as soon as the point pierces the skin of either man or beast; the force which the weapon could exert in this manner would be inappreciable when compared with that necessary to lacerate flesh and muscle almost as tenacious as soft rubber.

A better explanation of their peculiar form, and a hint at the sort of work for which they were intended, are offered by Sellers.

"It has been urged that the bevel-points were reamers and the uniform direction of the bevel proved that they had been turned from right to left; this is considered proof "that the people who used them belonged to a left-handed race. [But] the direction and uniformity in the bevels is to me evidence of exactly the reverse. The bevel edge is the result of direct downward pressure on a flake lying flat on a support with a tool held in the right hand. All I have found have been among the waste where the users lived, * * * associated with broken bones, etc., never scattered as if lost in hunting. * * * One peculiarity of the bevel-point is its strong, massive shank to secure it to a shaft or handle." — Sellers: Chipping, 884.

He might have added that fully ninety per cent of the beveled flints are entirely too large for arrow-heads; they may have served for spear-heads, but their size and the strong stems would indicate that most of them were knives used for skinning game, and other domestic work. When properly shafted and held in the right hand, it will be seen that almost invariably the bevel is downward and to the left, bringing the chisel-like edge in the correct position for loosening the hide of an animal; for which this form is better adapted than any other that can be given to flint, as it will stand rough usage, and can readily be forced between the flesh and the pelt without danger of cutting either.

Besides the method described by Sellers bevel edges could



Figure 267.

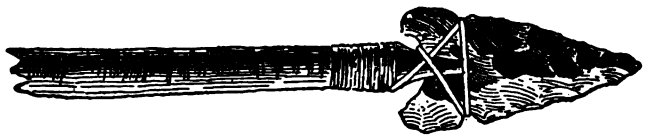


Figure 268.
Methods of Hafting Knives and Arrow Heads.

be quickly put on flint implements by means of a bone tool, with a notch cut in the side similar to that with which a glazier breaks glass. If the edge of a flint spall be placed in this notch and the tool used as a lever, small chips, reaching from one face to the other will be detached, thus giving the typical "bevel." The size of the chips and the angle of the bevel will depend somewhat upon the width of the notch and the depth to which it is cut.

* * * * *

The method of mounting flint implements in handles or shafts, is shown in figure 267 (Hoffman, 283), which is a stone knife from the Utes; and in figure 268 (Hoffman, 284), an Apache stone point.

* * * * *

The object of notching the base of an arrow-head, may be to secure a method of firmly attaching it to a shaft without the necessity of deeply notching the latter.

SOME ODD SUGGESTIONS.

The theory has been advocated that

All blades with a leaf-shaped outline and a rough protuberance or "hump" on one face (the other face being flat) are so made intentionally, to be used as cutting instruments. They are to be held in the hand, and the "hump" is to afford a resting place for the thumb in order to give a firm hold. "No reason is, or, I take it, can be given why the workman, having gotten his implement into its present hump-backed condition, should not have continued his work by striking off the hump if he desired it stricken off." — Wilson, 951.

The only reason, or at least a sufficient reason, for not "striking off the hump" is, that it will not come off. The splintered condition of so many of these specimens is evidence that numerous efforts were made in this direction, without success. It is true that one edge of some of them—not all, nor even a majority—is sharpened for use as a knife; but so far from proving that such end was in view from the start, this merely indicates that being balked in completing a leaf-shaped blank, by reason of a fractious grain in the stone, the chipper made the best of a bad bargain and finished into knives such pieces as would be fit for that purpose. Most "hump-backed" flints do not show the secondary chipping necessary for this process; and many are too small to hold in the hand unless they are mounted in some sort of a handle—in which case the "hump" would be not only useless but a decided disadvantage; besides which, the supposition of a handle upsets the whole argument in favor of the "intentional hump."

* * * * *

As the natural fracture of flint is conchoidal, it is frequently difficult to reduce a spall or flake to a symmetrical form. For some purposes implements made from such pieces with no more alteration than will suffice to give a keen edge or point, or permit secure attachment to a handle, are quite as serviceable as specimens requiring more time and skill in chipping. Consequently many such are found. But some writers, not satisfied with any-

thing short of the marvelous, have decided that great ingenuity has been exercised to produce this form with mathematical accuracy, to make heads for arrows or fish-spears. In the former case, according to these expositors, if the arrow leaves the bow with the convex side of the "curved" or "twisted" head downward, the upward tendency due to resistance of the air will counteract the influence of the earth's attraction; thus causing the projectile to follow a horizontal line until its impetus is exhausted. The idea seems to be that an object of this form will slide through the air somewhat as a flat stone will "skip" over water.

By the same process of reasoning, larger implements of this class are shown to be intended for spearing fish. It is well known that an object immersed in water seems, viewed obliquely from above, to be higher than its actual position. A common spear cast directly at the place where a fish appears to be swimming, will pass over it; but one provided with a twisted head will, according to these authors, be so deflected as to pierce it. Why the spearman does not aim at the proper spot in the first place, is not explained; perhaps because the fish could dodge anything coming in a straight line towards it, but is not able to calculate "curves."

Such theories as these—and they are numbered by the score—are on a par with that advanced by some writers who maintain that head flattening is practiced by western Indians in order that they may peep over logs and from behind trees without exposing their craniums as a target for an enemy.

CHAPTER XVII

OTHER MANUFACTURED ARTICLES.

BONE.

IT is a well-settled fact that most Indians depended largely upon agriculture for subsistence; consequently some method of cultivation was necessary. It is not to be inferred that "cultivation" implies all that is now meant by the term: the Indian seems merely to have worked the hill in which his corn was planted and not the whole surface of the field, a shallow hole being scooped out in which the grain was dropped, and as the stalk became larger the dirt was heaped up around it.

Among the Iroquois "the same hill was used for planting, during a succession of years. Thus the corn hill became large and distinct, and in fact a hillock." — Schoolcraft, History, 57.

The remains of many "Indian old fields" in various parts of the country show this to have been a common method, there being no long ridges as in cornfields of the present day, but only a great number of these detached hills. The scarcity of implements suitable for such work argues nothing, for in most parts of the country stone easily worked and adapted to the purpose is unobtainable. Recourse must be had, therefore, to wood, the shoulder blades of large animals, tortoise shells, and mussel shells perforated for attachment to a handle. The last are frequently found, but the other materials have almost entirely disappeared, as they readily succumb to decay.

Connecticut Indians used spades rudely constructed of wood, or of a large shell fastened to a wooden handle (De Forest, 5); and Palmer (271) figures a hoe made of horn, 14 by 5 by one-fourth inches, in a wooden handle 5 feet long, which is split and slipped over the smaller end; such, with others of wood and stone, were used among the Utah Indians before iron was introduced.

"The Mandans raise a great deal of corn and some pumpkins and squashes. This is all done by the women who make their hoes of the shoulder-blade of the buffalo or elk." — Catlin, Indians, I, 121.

Among the Omahas "The only implement of husbandry is the hoe; if they have not an iron one, they substitute the scapula of a bison, attached to a stick in such a manner as to present the same form." — Long, Rockies, 290.

Bone (including horn and teeth in the term) was abundantly utilized for many purposes. We find arrow-heads; perforators, of many sizes, for use as needles and awls; fish-hooks; hide-scrapers; and various forms of ornaments.

In finishing a hide the squaws use "the shoulder-blade or other large bone of the animal [buffalo or elk], sharpened at the edge somewhat like an adze; with the edge of which they scrape the fleshy side of the skin, bearing on it with the weight of their bodies." — Catlin, Indians, I, 45.

"All the wood being cut [by the Shoshones] with the flint or elk-horn, the latter of which is always used as a wedge in splitting wood." — L. & C., I, 427.

Some of the numerous forms of these articles are represented in the accompanying figures.

The scrapers shown in figure 269 are for removing the fat and hair from skins, which are laid on a log or other rounded surface so that the concave side of the implement can be conveniently applied.

Some bone arrow-heads are represented in figure 270.

In figures 271 and 272 various forms of perforating, weaving, and sewing tools are portrayed.

The methods of making fish-hooks are represented in figure 273, which shows the different forms as well as the various stages from the flat bone "blank" to the completed hook.

The peculiar form of many teeth, which have the roots ground or rubbed off, was not understood until the discovery, recently, in mounds and village-sites of jaw-bones whose lower surface was cut away, only enough being left sometimes to retain the teeth in place, as illustrated in figure 274. Not only animal but human jaws as well were thus treated. Among the ornaments found in the Hopewell mounds were a few made of human jaw-bones, both upper and lower (Moorehead, 226). In fact, all the larger bones of the human frame, skull, humerus, femur, ribs, etc., have been found carved and etched in a great many patterns.



Figure 269 — Bone Scrapers, or Skin Dressers.



Figure 270 — Bone Arrow Heads.



Figure 271.
Piercing, Weaving, and Sewing Tools of Bone.



Figure 272.
Piercing, Weaving, and Sewing Tools of Bone.

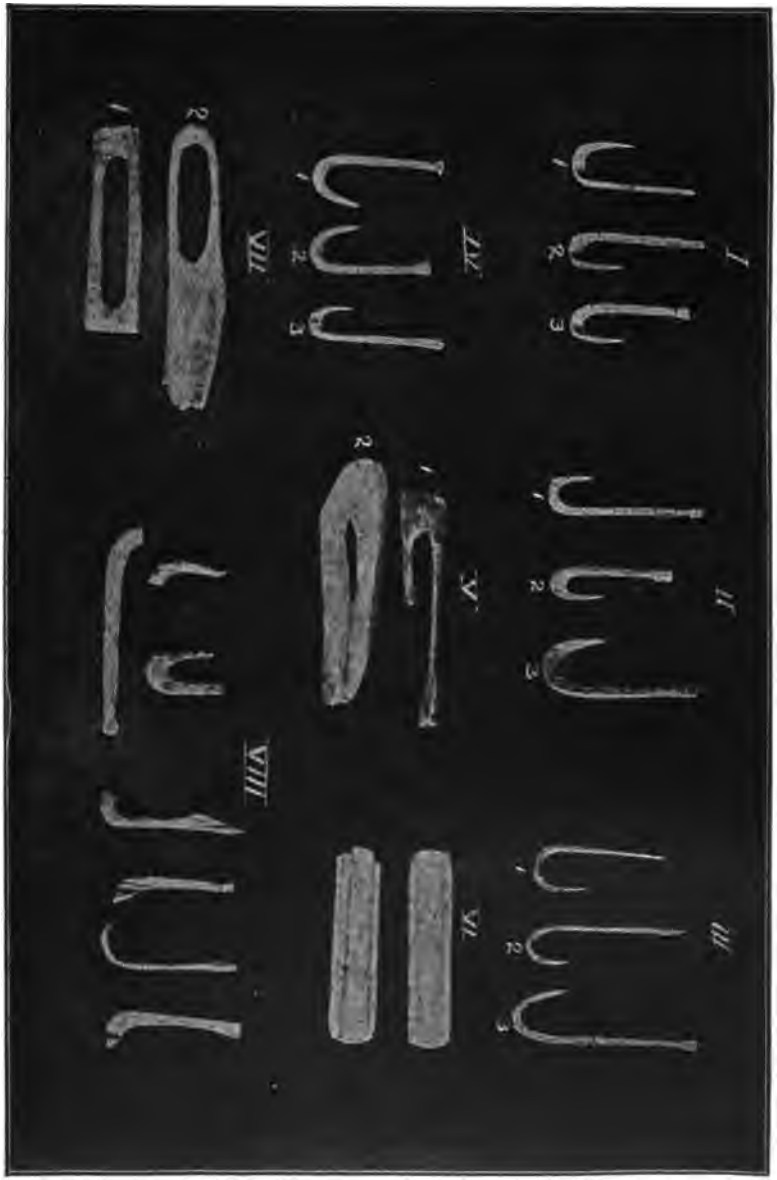


Figure 273 — Evolution of Fish-hooks from Flat Bone.

SHELL.

Wrought shell, in any form except beads and perforated valves of mussels, is comparatively scarce in Ohio. But over the entire country

"From a very early date shells must have been employed quite extensively by the ancient Americans as implements, as weapons for war and the chase, as appliances for fishing, as agricultural implements, and as knives, gouges, scrapers, perforators, etc., in a variety of arts." "Shells artificially shaped and sharpened were also sometimes used for shaping objects in wood and clay, in preparing food, in dressing game, and in human butchery." "According to Sproat, shell knives were used by the



Figure 274 — Human and Animal Jaws, cut into Ornaments.

Indians of Vancouver's Island, in carving the curious wooden images placed over graves." "The same Indians, like those of New England, used shells as adzes in clearing out the interior of canoes.— Holmes, Shell, 201-205.

"An other work [of the Indian women] is their planting of corne, * * * keeping it so clean with their clamme shell-hooes, as if it were a garden rather than a corne-field." — "New England Prospect;" quoted by Schoolcraft, 399.

In a large mound near Charleston, West Virginia, "Many stone implements [mostly broken] were scattered through the hard upper layer; also a number of single valves of mussels which had been used as digging tools until they were worn from the outside entirely through." These had been taken up with the earth used in building the mound, and had no significance whatever. The shells may have been used in digging or loosening the earth composing the mound. — B. E. 12, 429.

Figure 275 (B. E. 2, Plate XXVI, 3) represents a mussel shell hoe, which came from a mound at Madisonville. Clam shells, probably like this, were used in cultivating the soil, by the Virginia and New England Indians. Figure 276 (B. E. 2, Plate XXVII, 1) shows a similar implement in which the edge instead of the end was placed opposite the handle.— Holmes, Shell, 208.



Figure 275 — Hoe, made of a Mussel Shell.

"Dr. Drake, writing of the Cincinnati mounds, mentions 'several large marine shells, * * * cut in such a way as to serve for domestic utensils.'" — Holmes, Shell, 197.

Figure 277 (B. E., 2, Plate XXIV, No. 4), shows a shell spoon found at Madisonville by Dr. Metz.

Among the Choctaws "both sexes pluck all the hair off their bodies with a kind of tweezers, made formerly of clam shells." — Adair, 6.

The Virginia Indians "pull their Beards up by the Roots with Muscle-shells, and both Men and Women do the same by the other parts of their Body for Cleanliness sake." — Beverly, 140.

Strachey and Heckwelder both say the shells were used for cutting hair. Smith uses a more appropriate word than "cutting."

"With two shells will grate away the hayre, of any fashion they please." — Smith, 129.

Various patterns of shell beads, disks, and engraved tablets, were constantly worn by the Indians of Virginia.— Beverly, 196.

All these forms are found in abundance in the mounds and graves east of the Alleghanies, in connection with stone objects common in the mounds of Ohio; and the shell objects, in limited numbers, are, in their turn, found in the western tumuli.

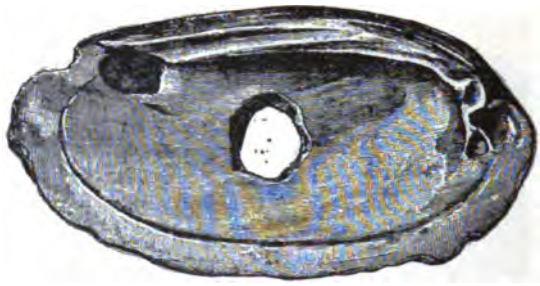


Figure 276 — Hoe, or Scraper, made of a Mussel Shell.



Figure 277 — Spoon, made of a Mussel Shell.

The object shown in figure 278 (B. E., 2, plate L, 5), "is made from the body of a large *Busycon perversum*, and is nine and a half inches long by three inches in width at the widest part. * * * It was found associated with human remains in a mound at Sharpsburg, Mercer county, Ohio. Another, quite similar, was found on the head of a sitting skeleton near the center of a mound in Hardin county." The character of wearing around the perforations indicates that these disks were firmly attached, concave side outward, to some other substance. One "bears evidence of considerable use, and the two holes are much worn by a string or cord, which, passing from one hole to the other on the concave side of the plate, gradually worked a deep groove between them. On

the back or convex side, the perforations show no evidence of wear." — Holmes, Shell, 265-6.

There are figured and described three engraved shells from Tennessee and one from southeastern Missouri, with human forms undoubtedly Mexican in character. They are entirely similar in design to the copper plates from Illinois, Georgia and Ohio. But the shell gorgets do not seem to have been in use among the Aztecs, and in all other respects except the designs, these specimens are "identical with the well-known work of the mound-builders." "As an ornament this Missouri gorget [and the same is to be said of the Tennessee gorgets and the copper plates] is a member of a great family that is peculiarly northern, but the design engraved upon it affiliates with the art of Mexico, and so close and striking are the resemblances, that accident cannot account for them, and we are forced to the conclusion that it must be the offspring of the same beliefs and customs and the same culture of the art of Mexico." — Holmes, Shell, 297 and 305.

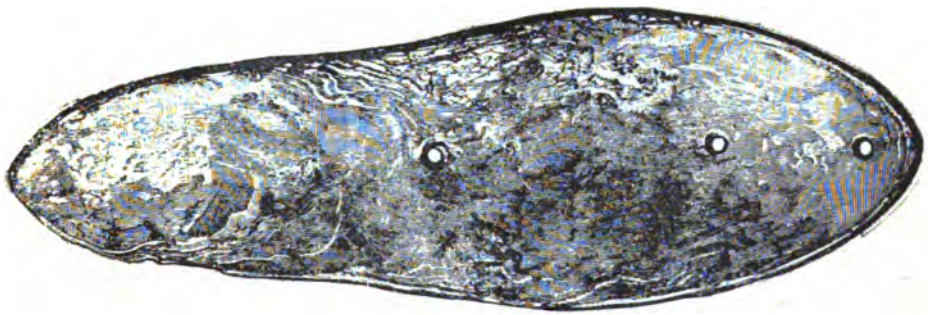


Figure 278 — Shell Gorget.

But the correctness of this conclusion does not depend upon the theory of a racial or tribal connection between the two people. There was a continual interchange of art products all over North America, and it is not an unreasonable supposition that the artist himself may have lived, for a time at any rate, among a tribe with whom his own people had nothing in common. (See page 49, also page 724.)

On some of these shells from southern States, the rattlesnake, highly conventionalized, is engraven. Of different material and finish, but apparently belonging to the same stage of art and representing the same idea, are some carvings of this reptile, from Ohio mounds. One of these, shown in figure 279 (S. & D., 276, figure 196), is thus described:—

"From mound 1 of the [Hopewell] group, were taken several tablets, of one of which the figure here represented is a copy. It represents

a coiled rattlesnake; the material is a very fine cinnamon-colored sandstone. The original is six and a quarter inches long. It is impossible to restore the head, which, so far as can be made out, has some peculiar and interesting features — plumes or ornamental figures surmounting it. An entire tablet was obtained from this mound by a relic-hunter, who represents it to have been carefully and closely enveloped in sheets of copper, and says that the head was surmounted by 'feathers.' It seems that several of these tablets were originally deposited in the mound; the greater portions of four have been recovered, but none displaying the head entire." — S. & D., 276.

From the central shafts of conchs and other large shells, were made slender, rod-like ornaments for the hair. Sometimes these had a knob or head on one end. From the whorls were made large ornaments to be attached to the clothing or worn at the neck.

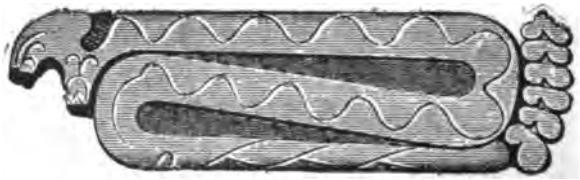


Figure 279 — Rattlesnake, Carved in Stone. Hopewell Works.

Circular disks with holes near the margin, show marks of wear on both sides, sometimes, as if suspended by a cord from the neck.— Holmes, Shell, 276.

Shell beads, or "wampum," seems to have been in general use as money, or at least as a medium of exchange, among all the Indians. They were formed by a tedious process of rubbing down on stones and drilling with a flint or other perforator. In some places, after the settlement by the whites, the English tried to make it, but the results were not satisfactory. The Dutch of New York, however, adapted a lathe to its manufacture and soon achieved a monopoly.

Probably as a display of wealth and as an emblem of power, the small shell beads were worn in great quantities by later Indians.

King Philip, besides a coat made entirely of shell beads, had two belts, one of which was nine inches wide and reached from his shoulders to his feet. Probably "the greatest collection ever taken from a prehistoric mound could not compare for a moment with the treasure of this historic chieftain." — Holmes, Shell, 234.

They served also as tokens of promises and to some extent took the place of written documents.

"One of the most remarkable customs practiced by the American Indians is found in the mnemonic use of wampum. [This] might readily develop from the practice of gift giving and the exchange of tokens of friendship, such mementos being preserved for future reference as reminders of promises of assistance or protection. [Then would come] the permanent association of a single object or sign with a particular idea. The wampum records of the Iroquois, * * * by association simply, were made to record history, laws, treaties, and speeches — a fact, a law, a stipulation, or a declaration being 'talked into' a particular part or pattern of the design with which it was ever after associated. * * * Such records were, of course, quite useless without the agency of an interpreter." — Holmes, Shell, 240.

Two "wampum belts," one of them partly dissected to show the manner of its construction, are represented in figure 280 (B. E. 2, Plate XXXVIII).

With the Mound Builders they probably had a value and signification similar to that pertaining to them among historic tribes; and in the same way, they seem to have been used in conjunction with many other small articles.

"The number of beads found in the mounds is truly surprising. They may be counted in some instances in hundreds and thousands — each one the product of no inconsiderable amount of labor, unless our estimate of the means and facilities at the command of the makers is greatly underrated. * * * Some of these beads [are] made of shell and enveloped in metal. * * * Others are composed of shell, worked into every variety of shape, round, oblong, and flattened; others still of animal bones and tusks, and many of *pearls* and small marine shells — such as the *marginella, natica, oliva, etc.* The perforated teeth of the wildcat, wolf and shark, as well as the claws of animals and sections of the small bones of birds, were also used in the manner of beads, either for the purpose of distinction and decoration, or as amulets. * * In all these we observe remarkable coincidences with the decoration of the existing tribes of Indians, who are extravagant in their use of beads and pendants." — S. & D., 230-1.

Most beads are made of sea shells, either the smaller varieties, entire; or the larger ones cut into pieces of convenient size and worked into a hundred shapes according to the fancy of the wearer. Nearly all these, however, at least in the west, are small perforated disks. Many were made from fresh-water shells. Bears' teeth were favorite ornaments; often holes are drilled in them, in which are set pearls or the teeth of small animals.

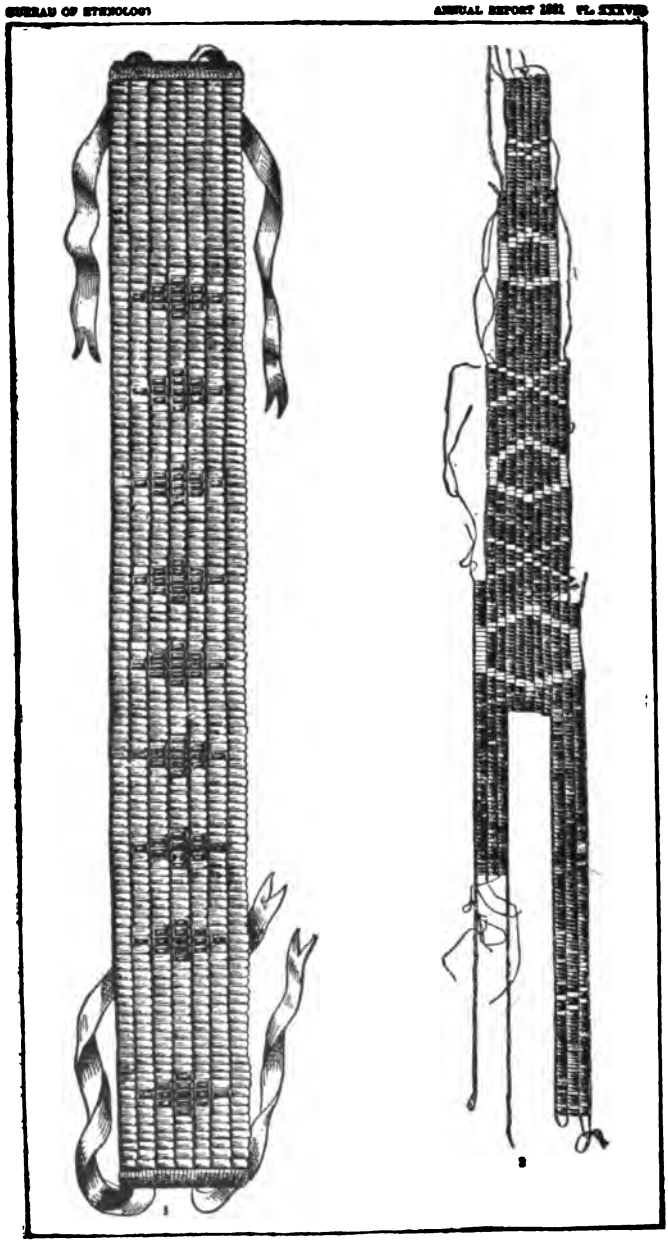


Figure 280.
Belts of Wampum.

POTTERY.

In the days of Squier and Davis little was known of the fictile ware of southeast Missouri and the Pueblo region. Had the opportunity been afforded them to examine specimens such as have come to light within the past twenty years, we should not have found in their volume this utterance:—

"Among the mound-builders the art of pottery attained to a considerable degree of perfection. Various though not abundant specimens of their skill have been recovered, which, in elegance of model, delicacy and finish, as also in fineness of material, come fully up to the best Peruvian specimens, to which they bear, in many respects, a close resemblance. They far exceed anything of which the existing tribes of Indians are known to have been capable." — S. & D., 188.

With very rare exceptions the pottery exhumed in Ohio is comparatively rude in design and workmanship. Neither is the quantity at all what we should expect it to be, in view of the vast number of other articles, and the evidence of a considerable number of people having occupied the State, first and last, especially in the valleys.

Specimens in the collection of the Society appear in figures 281, 282, and 283.

Four specimens of Ohio Mound Builders' pottery are reproduced here from Squier and Davis in figure 284 (S. & D., 189, Plate XLVI). The first two, if we may judge from the illustrations, are thin, delicately executed, and symmetrical; but as both were found in fragments, it is uncertain how much allowance is to be made for the "personal equation" of the artist. The other two are from a mound, but belong to intrusive burials.

The specimens shown in figure 285 (S. & D., 192, figure 72, Nos. 1 and 2), both "clearly of modern workmanship, were found a few feet below the surface, near Hamilton, * * placed beside a human skeleton."— S. & D., 192.

In figure 286 (S. & D., 194, figures 76 and 77), are presented two pipes of clay, plowed up opposite the mouth of the Hocking river, among earthworks.— S. & D., 194.

The object shown in figure 219 (S. & D., 194, figure 79), which is, apparently, the handle of a vessel, broken off, was "taken from a mound in Butler county, Ohio. It represents the head of a bird, somewhat resembling the toucan."— S. & D., 194.



Figure 281 — Specimens of Ancient Pottery.



Figure 282 — Specimens of Ancient Pottery.



Figure 283.



Figure 284 — Specimens of Mound Pottery.

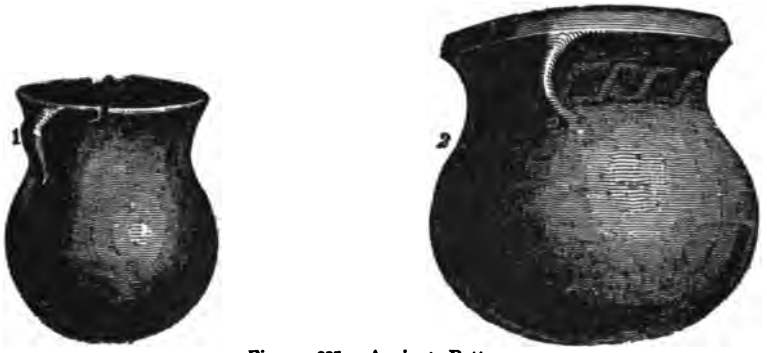


Figure 285 — Ancient Pottery.

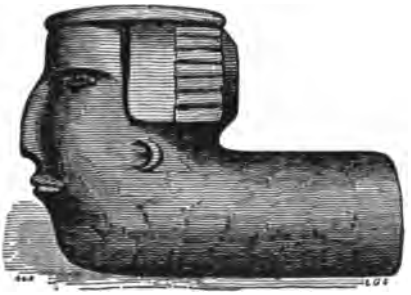




Figure 286 — Clay Pipes.

This is the "young eagle" of Henshaw. See page 608.

* * * * *

In making pottery, mussel shells or quartz pebbles were beaten fine and either one, but never both together, mixed with clay; the compound was thoroughly kneaded, molded into form, dried in the open air, and then burned. None of it was glazed, and it is doubtful whether any was painted.

As regards the methods by which it was made into form, Foster says of the pottery from Gallatin county, Illinois: —

"A basket of rushes or willows had first been constructed inside of which the clay was moulded and allowed to dry before burning." Cites Rau: "The earthenware has evidently been moulded in baskets." Cites Hunter: "Another method practiced is to coat the inner surface of baskets, made of rushes or willows, with clay, to any required thickness, and when dried to burn them." — Foster, 249.

Holmes shows these statements to be erroneous unless in a few exceptional instances.

"It has been supposed that vessels of clay were often modeled in baskets, and that the native earthenware preserved numerous impressions of baskets. On closer analysis these impressions turn out to be the application of pliable cloths, or of cords singly or in groups, or of stamps covered with textiles or having geometric textile-like patterns engraved on them. I cannot recall a single example from eastern United States in which it is entirely clear that the clay vessel was modeled in a basket. The impressions of basket work occasionally seen are only partial, having been applied after the vessel was practically finished." — Holmes: Textile Art, 38.

Sellers denies the possibilities of "keeping in form and lining with heavy clay fragile baskets of the large size of these old salt kettles." "I discovered [in southern Illinois] what at first I took to be an entire kettle bottom up; but on removing the earth that covered it, it appeared to be a solid mass of sun-dried clay. * * * I became satisfied it was a mould on which the clay kettles had been formed." He also found a place which is without doubt "the center of a great pottery manufactory," in which were many of these moulds. "They appeared to have been small mounds built of stone, and covered with a tenacious yellow clay, which, by sun-drying, had become as hard as common salmon-brick." "I examined carefully quantities of specimens of pottery, and found the markings on all of them to have been made by *woven cloth of twisted threads*, and in no single instance by rush or willow baskets. * * * I can see the use of a bandage in holding the moist clay firmly bound while being raised from the mould on which it was formed, and which was essential to prevent cracking as it hardened or

dried." Some pans previously unearthed and destroyed, were described by an eye-witness as "basins, as large around as the hind wheel of his wagon, with flattish bottoms." These large vessels were used to evaporate water in making salt.— Sellers: Pottery, 574.

"At the advent of the whites, the natives were observed to build their vessels by a process known as 'coiling,' and by modeling over gourds, and over blocks of wood and masses of indurated clay shaped for the purpose.* * * Baskets were also used as moulds and pliable fabrics, such as nets and coarse cloths, were employed in some sections. * * * The material employed was usually a fine-grained clay, tempered, in a great majority of cases, with pulverized shells. * * * Powdered potsherds were also used. * * * Nothing resembling a glaze has been found on pieces known to be ancient. * * * Generally, however, it was more or less carefully polished by rubbing * * * and in very many cases a thick coating of ochre was applied." — Holmes, Pottery, 372.

Among the Mandans "Earthen dishes or bowls * * * are manufactured * * * in great quantities, and modeled into a thousand forms and tastes. They are made by the hands of women, from a tough black clay, and baked in kilns which are made for the purpose." —Catlin, Indians, I, 116.

When the southern Indians made pottery "their method of glazing is, they place them over a large fire of smoky pitch, which makes them smooth, black and firm." — Adair, 425.

FABRIC.

What sort of work the prehistoric people may have done in wood, textile fabrics, feathers, furs, robes, skins, or other perishable material, can never be known; but as far as can be judged from the few scraps remaining and from the cloth impressions on pottery, it seems to have been on a par with that of the present day among tribes but little changed from their condition when first known to the whites.

By taking impressions in modeling clay of the markings on pottery, Holmes obtains exact reproductions of the substances by which these markings were produced. In this manner he reveals fragments of cloth woven in at least seven different ways. Five of these are reproduced in figures 287 and 288 (B. E., 13, pages 38 and 44).

"The degree of success in the textile art is not necessarily a reliable index of the culture status of the peoples concerned, as progress in a particular art depends much upon the encouragement given to it by local features of environment. The tribe that had good clay used earthenware and neglected basketry, and the community well supplied with skins of animals did not need to undertake the difficult and laborious task

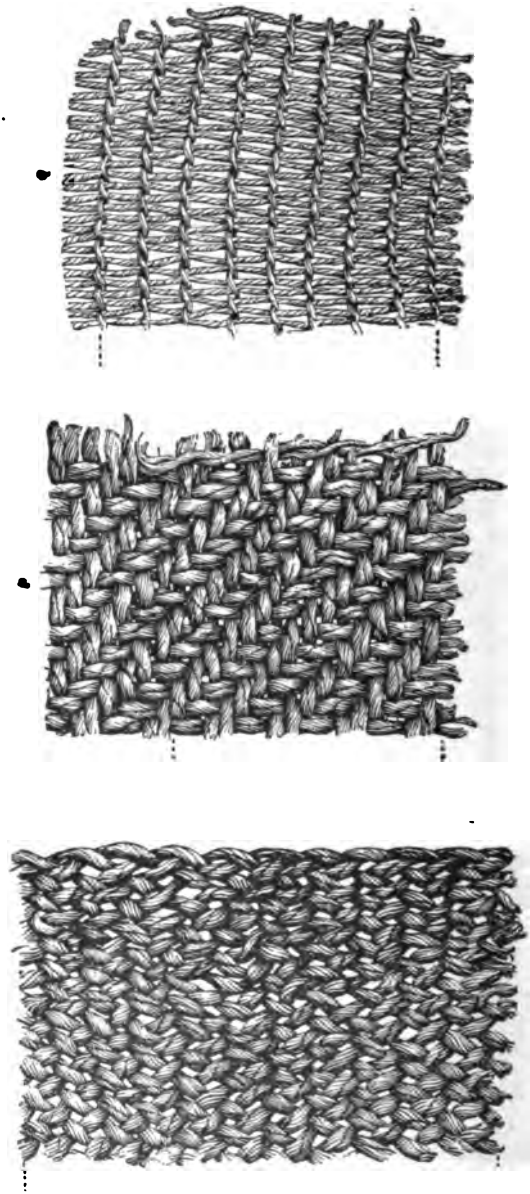


Figure 287 — Specimens of Weaving. From Impressions on Pottery.

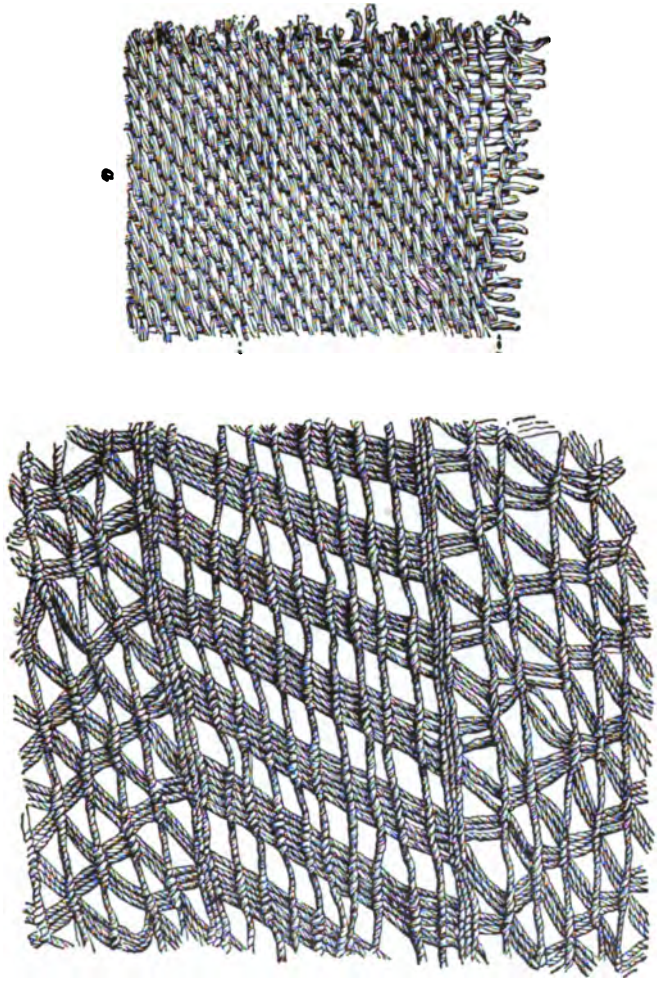


Figure 288 — Specimens of Weaving. From Impressions on Pottery.

of spinning fibers and weaving garments and bedding. Thus it appears that well-advanced peoples may have produced inferior textiles and that backward tribes may have excelled in the art." — Holmes: Textile Art, 10.

The same thing is true of pottery and baskets.

In the double mound described on page 376 were many fragments of charred cloth, showing at least three distinct styles of weaving. They are shown in figure 289, by the courtesy

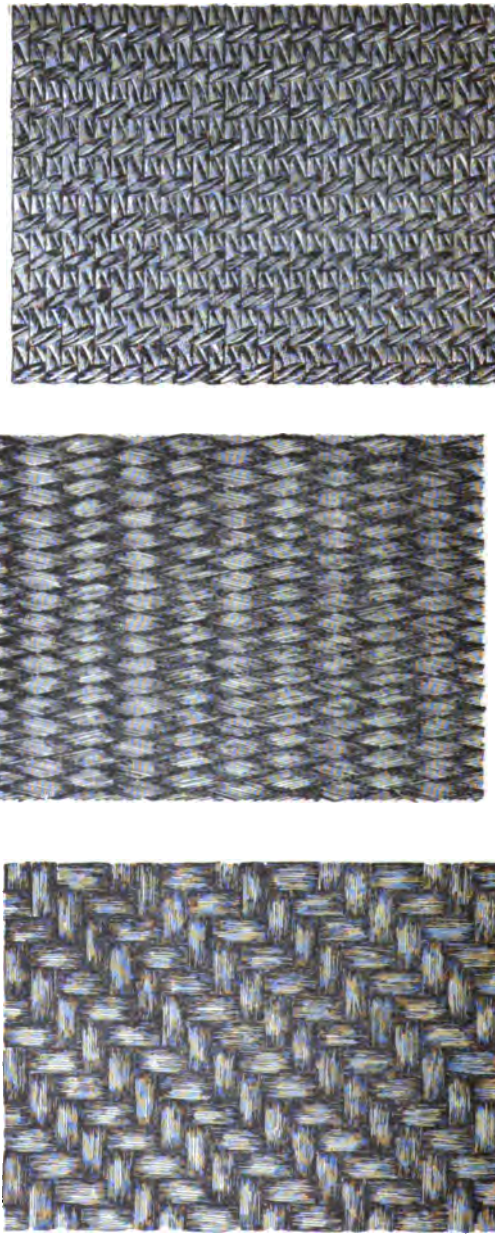


Figure 289 — Cloth, Recovered from a Mound.

of the owner, Mr. Clarence B. Moore. A fourth variety is a slight modification of one of these. Another fragment from the largest mound near the "Graded Way" at Piketon (see page 373) is shown in figure 290 (B. E., 13, figure 10). Mr. Holmes says this is "the finest piece of work that has come to my notice." — Holmes, Textile Art, 36.

MICA.

Mica was in great request among the Mound Builders. Large plates, blacked on one side, would make tolerable substitutes for mirrors; and some of them may have reflected the smirk of satisfaction on the gaudily bedaubed countenance of a young buck as he sallied forth on a career of conquest.

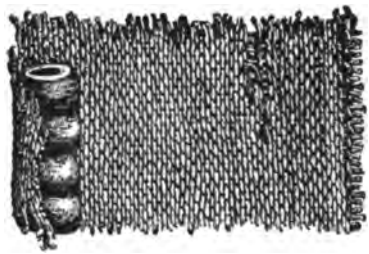


Figure 290.
A fine example of Mound Builders' weaving.

Most of it, however, was for conversion into various forms of ornamental appendages; and the extent to which it was brought into Ohio may be judged by the amount found in single mounds. The deposit at Mound City is described on page 352. Still larger was the cache, if it may be so called, near Newark, where,

> in removing a small mound while constructing the canal, fifteen or twenty bushels of it were thrown out, much of it in sheets eight to ten inches long, by four or five inches wide, and from half an inch to an inch thick.— S. & D., 72, note.

Large quantities were sometimes interred with a single individual.

> "In the Grave Creek mound were found with one of the skeletons, about one hundred and fifty bits of mica, an inch and a half or two inches square, each perforated with two or more small holes. * * * In a mound * * * near Lower Sandusky, upwards of twenty oval plates of mica of great beauty were discovered, each perforated with a small hole at one end." — S. & D., 241.

Crescents (figure 291), scrolls, and various other forms are found. The holes are usually punched, as if with a coarse needle or small awl. A bone dressed to a slender point, or a fragment of copper wire, may have been the instrument; or a sliver of flint would answer the purpose.

It is probable that nearly all of the mica in possession of the Mound Builders came from North Carolina, though some of it may be derived from Virginia where evidences of prehistoric work are still to be seen in the mica district.



Figure 291.
Parts of Mica Crescent. From a Mound near Chillicothe.

"For about thirty years several companies have been actively engaged in mica mining in North Carolina, and almost the entire supply of the United States is derived from this locality; yet the total amount of excavations by the present operators is scarcely one-tenth of that performed by the aborigines.

"The mica is in masses in the dikes or veins of quartz intersecting the mountains; the prehistoric miners ascertained this fact in some way, and followed the veins, carrying some of their trenches to a depth of forty feet or even more. They desired only large pieces of the best quality, rejecting much that is commercially valuable at the present day. Many persons in the vicinity of the mines make moderately good wages by working over the ancient refuse piles and selling what they may find. Quite frequently fragments are picked up which have been cut into scrolls and various other patterns and afterward, for some reason,

thrown away. Quantities of small, sharp flakes of flint occur wherever the work of trimming or assorting seems to have been carried on; these are not dressed in any manner, the cutting being done with the natural edges of the fragment. Since they could be struck from a flint pebble or block at a single blow, it is probable they were used only once or twice; as soon as one became nicked or dulled, it would be cast aside and another taken.— Gill.

One of the members of the North Carolina Geological Survey says:—

"This industry is not really new here, it is only revived. The present shafts and tunnels are continually cutting into ancient shafts and tunnels; and hundreds of the spurs and ridges of the mountains all over Mitchell county [especially] are found to be honey-combed with ancient workings of great extent, of which no one knows the date or history. A few miles southwest of Bakersville I found open pits forty to fifty feet wide, by seventy-five to a hundred long, filled up to fifteen or twenty feet of depth, disposed along the sloping crest of a long terminal spur or ridge of a neighboring mountain. The excavated earth was piled up in huge heaps about the margins of the pits, and the whole overgrown with the heaviest forest trees, oak and chestnut, some of them three feet or more in diameter, and some of the largest belonging to a former generation of forest growth, fallen and decayed; facts which indicate a minimum of three hundred years. Subsequently I learned that the mica was of common occurrence in the tumuli of the Mound Builders, and upon further inquiry I ascertained that cut forms, similar to those found in the mounds were occasionally discovered among the rubbish and refuse heaps about, and in the old pits. These circumstances revealed unmistakably the purpose and date of these works, and showed them to be contemporary with the extensive copper mining operations of Lake Superior. Since the development of mica mining on a large scale in Mitchell and the adjoining counties, it has been ascertained that there are hundreds of old pits and connecting tunnels among the spurs and knobs and ridges of this rugged region; and there remains no doubt that mining was carried on here for ages, and in a very systematic and skillful way; for among all the scores of mines recently opened, I am informed that scarcely one has turned out profitably which did not follow the old workings, and strike the ledges wrought by those ancient miners. The pits are always open 'diggings,' never regular shafts; and the earth and debris often amounts to enormous heaps.

"One of the most profitable of all the modern mines [on Cane Creek] is one which is marked by the greatest of the old excavations and the largest earth heaps about its margins, in the whole region, showing that this was the richest of the ancient diggings. The tunnels are noted as being much smaller than such workings in modern mining, being generally only three to three and a half feet in height and considerably less in width. Some of these tunnels have been followed for fifty and a hundred feet and upwards. It is asserted by the miners that distinct tool marks are often found along the walls of these tunnels, re-

sembling the stroke of a pick or chisel. It is also noticed that the best parts of the veins were often abandoned by the old workers, evidently on account of the hardness of the rock; they do not seem to have been able to penetrate the unweathered and more solid portion of the ledges in any case, a circumstance which shows the inferiority of their tools." — N. C., 1875, 300.

"The processes of [mica] mining * * * appear to have been much the same as in the quarrying of steatite." In Mitchell county, North Carolina, "numerous quarrying implements resembling those used in the soapstone quarries were found, and the excavations are reported to be quite as extensive as in any other class of aboriginal quarries in the east." — Holmes, Implements, 106.

At some time in the past, white men, probably the Spanish or French, knew of the existence of the mineral and attempted to work the veins.

While cleaning out an old shaft in Macon county, there were found at depths of 35 to 50 feet below the surface, a rude axe, wedge, and gudgeons of a windlass made of iron; the latter are the irons driven into the ends of a wooden axle, for raising water, etc.— Simonds, 8.

Had this work been done by English, even in colonial time, it is probable some record of the fact would have been preserved; but it seems the present knowledge of the deposits resulted from a curiosity to ascertain the purpose for which the ancient excavations were made.

COPPER.

Imperfect and vague knowledge concerning the use of this metal among the Mound Builders is responsible for two wide departures from fact, which have taken a prominent place in popular misconceptions. One is that

"In point of workmanship the tools of the modern Indians are always inferior to the copper ones of the mound-builders and the ancient mine workers." — Whittlesey, Weapons, 477.

If by "tools" is meant stone or bone implements, a comparison is not germane between materials so different in composition. If, however, the term refers to copper knives, spears, hatchets, and other articles subject to rough usage, implements from shallow modern graves in the north, or even from the surface, are in some cases, better adapted for their intended work than similar ones from mounds. This will be apparent from a casual inspection of collections in which a large area is represented.

The second mistake consists in a belief that Mound Builders were acquainted with some means, at present a "lost art," of hardening copper until it would compare favorably with high-grade steel. Not infrequently the claim is advanced that even a file will make no impression upon a knife or hatchet in some collector's private cabinet. It is only necessary to apply the test, to be convinced of the fallacy. No such "secret" was ever known. Despite all assertions to the contrary, not one piece of unalloyed copper has ever been found, in any part of the world, having a greater degree of hardness than can be produced by hammering. The belief, so far as the Mound Builders is concerned, probably had its origin in the assertion of Squier and Davis, that

> The Peruvians and Mexicans "possessed the secret of hardening [copper] so as to make it subserve most of the uses to which iron is applied. Of it they made axes, chisels and knives." — S. & D., 196.

These authors, in turn, were misled by statements of early Spanish annalists, among them Mendieta, who says of the aborigines of Mexico and Central America:—

> "It is all the more inexplicable that they should have only used stone implements, that copper was abundant, and that they knew how to temper and make it nearly as hard as steel." — Charnay, 69.

The argument seems to proceed about in this way:—The Mound Builders had an abundance of copper. They are descended from the Aztecs. The latter knew how to temper copper. Therefore, the Mound Builders practiced the art.

Of these four steps, only the first has any foundation.

There is still another belief which seems quite unfounded, although it meets with the approval of scientific men who are in position to determine its correctness. This is to the effect that while Indians — or aborigines of the United States in general — were able to fabricate hatchets and such comparatively simple forms, the designing and execution of more complicated pieces was entirely beyond their capacity; and that for the origin of the latter we must look to European sources. (See pages 719-724.)

HOW COPPER WAS OBTAINED AND WORKED.

Before touching upon this part of the subject, however, it will be in order to give a brief account of the sources of raw

material available to aborigines, and their methods of mining and working it.

"So many evidences of prehistoric intercourse with regions to the south have been found in the mounds of our western states that it is safe to assume that the Lake Superior district furnished the greater part of the copper in use by Southern Indians, which was doubtless traded for shell implements and ornaments, or for the raw material obtainable only on the seaboard of the Gulf Coast." — Moore, Fla., 238.

In the same article Mr. Moore gives a list of all known localities whence copper may have been obtained by the Indians, along with analyses of numerous specimens of aboriginal manufacture from various sources in different parts of the country. It is more complete and satisfactory than any other paper on this subject.— Moore, Fla., 213-241, inclusive.

The glaciers of the Ice Age which, as shall presently appear, created conditions that led to the discovery of copper veins, also distributed the metal over a wide territory.

Native copper has been discovered over an area of about 700 miles from east to west and about 600 miles north and south, with the Lake Superior copper region at the northern edge. This brings it as far south as Cincinnati, and the mouth of the Wabash. It seems, however, that south of northern Indiana, it is found only in small nuggets; few of them weighing as much as two pounds." — Salisbury, 42.

It is very probable that many pieces of copper thus transported were gathered up by Indians of Ohio and Indiana and worked into such forms as they desired; but the sum total of these accidental nuggets is insignificant when compared with the great quantities dug out from the deposits whence they were derived.

Gillman describes the ancient copper mines in such a manner as to convey the idea that a thin covering of glacial drift was removed and excavations carried downward in solid, compact rock, with underground connections and drains.

"The discoveries on the Isle Royale throw new light on the character of the 'Mound Builders,' * * * dignifying them with something of the prowess and spirit of adventure which we associate with the higher races. The copper * * * must, in all probability, have been conveyed in vessels, great or small, across a stormy and treacherous sea, whose dangers are formidable to us now, being dreaded by even our largest craft, and often proving their destruction. Leaving their homes, those men dared to face the unknown, to brave the hardships and perils of the

deep and of the wilderness, actuated by an ambition which we today would not be ashamed to acknowledge." — Gillman, M. B., 384.

As they were beings not entirely devoid of understanding, it is more likely they attempted such voyages only in fair weather. At other times, if it was imperative for them to seek the mineral, they mined it on Keweenaw Point, in the vicinity of Ontonagon, and at various other places on the mainland.

Schoolcraft's explanations are free from such romanticism, and are doubtless quite near the actual truth.

"The Mound Builders, and also the roving tribes of the west, had many uses for copper. * * * It is apparent, that the Red miners of Lake Superior supplied the demand in its fullest extent. They probably received in exchange for it, the Zea maize of the rich valleys of the Scioto and other parts of the West; the dried venison and jerked buffalo meat of the prairie tribes; the sea-shells of the open coasts of the Atlantic and Gulf. It is not improbable, indeed, when we examine the rocky character of much of the Lake Superior region, and the limited area of its alluvions and uplands, which appear ever to have been in cultivation, that parties of various tribes performed extensive journeys to this upper region, in the summer season, when relieved from their hunts, to dig copper, that it was a neutral territory; and having supplied their villages, in the manner the Iowa and Minnesota Indians still do, in relation to the red pipestone quarries of the Coteau des Prairies, returned with their trophies of mining." — Schoolcraft, History, I, 99.

Whittlesey also summarizes the facts in a few lucid, comprehensive sentences:—

"The following conclusions may be drawn with reasonable certainty:

"An ancient people extracted copper from the veins of Lake Superior of whom history gives no account.

"They did it in a rude way, by means of fire and the use of copper wedges or gads, and by stone mauls.

"They had only the simplest mechanical contrivances, and consequently penetrated the earth but a short distance.

"They do not appear to have acquired any skill in the art of metallurgy or in cutting masses of copper.

"For cutting tools they had chisels, and probably adzes or axes of copper. These tools are of pure copper, and hardened only by condensation or beating when cold.

"They sought chiefly for small masses and lumps, and not for large masses.

No sepulchral mounds, defences, domiciles, roads or canals are known to have been made by them. No evidence has been discovered of the cultivation of the soil.

"They had weapons of defence or of the chase, such as darts, spears, and daggers of copper.

"They must have been numerous, industrious, and persevering, and have occupied the country a long time." — Whittlesey, Mines, 29.

The last sentence of his conclusions can not be accepted just as it stands; industrious and persevering the old quarrymen were, but not necessarily numerous; while Whittlesey himself, as noted elsewhere, has shown that their occupation of the country could be only intermittent. Owing to the climate, such work must be abandoned for several months in the year; and as Schoolcraft well says

"A large body of miners could not have been kept together [through the winter] without a stock of provisions. On the contrary, as the theatre of summer mining, in a neutral country, or by self-dependent bands, hundreds of years may have passed in this desultory mining." — Schoolcraft, History, I, 100.

The method of procuring the copper is now well understood.

"In their mining operations, the vein-rock was made hot by building a fire on or against it; then, by dashing on water, the rock would not only be fractured, but the exposed pieces of copper be softened, so that it could be beaten into shape. When the metal became hard in consequence of its being pounded, it was again heated and plunged into cold water; for copper is, in this respect, the opposite of steel; the one is softened, while the other is rendered hard, when rapidly cooled after being heated. In this way copper was fashioned simply by pounding." — Hoy, 5.

"At the Waterbury mine, beneath the surface rubbish the remains of a gutter or trough composed of cedar bark were discovered, the object of which was clearly to conduct off the water which was bailed from the mines by wooden bowls. Portions of the fine or pulverized copper scales remained at the end of this trough. After removing the water and decayed leaves at the bottom of the excavation a piece of white cedar timber was found, one end of which exhibited the marks of a cutting instrument like those of a narrow axe. In the debris, Dr. Blake discovered several shovels, of white cedar, resembling the paddles in form now used by the Chippewa Indians in propelling their canoes. Had these been found elsewhere, they would have been regarded as ordinary paddles, but in this place they had evidently been used as shovels. This is also evident from the manner in which the blades are worn. The shovels which were found beneath the water level were sound in appearance, and the strokes of the tool by which they were formed remained perfectly distinct, but on being dried they shrunk very much, opening in long cracks, the wood retaining little of the original strength or hardness. In one of the trenches, a hammer was found with a root of cedar still twisted in the groove, but so much decayed that it fell to pieces." — Whittlesey, Mining, 7-10, condensed.

"The average width of the vein is four feet, extending to eight feet in places. It has well defined walls, and is filled with quartz, epidote, calcareous spar, and copper. The copper exists in strings, sheets, nests, and masses, sometimes across the vein, sometimes on one side, and sometimes on the other. The thickest sheet I saw was two and a half feet." — Schoolcraft, History, I, 97.

Lapham offers the following suggestions as to the length of time that may have passed since the mines were abandoned.

"If we assume the age of the tree growing upon the rubbish thrown out of an ancient mine (three hundred and ninety-five years) as indicative of the epoch, or near it, when the mines were worked, it is only about double the time that the Chippewas have been known to occupy this region. The discovery of wooden levers and wooden bowls, forbid us to assign a much greater antiquity to these works. As far back as 1666, the Chippewas were superstitious and shy in regard to copper nuggets in their possession, keeping them wrapped up with their most precious articles. If, then, these fragments of copper were held so sacred as to be kept and handed down as household gods, we may certainly allow some lapse of time for such superstitions to originate and become incorporated into the religious system of the Chippewas; and a comparatively slight draft upon the past, anterior to that period, will carry them back to the age of the ancient mining and mound building."

"The sleepers, levers, wooden bowls, etc., are rather indicative of Caucasian ingenuity and art.

"Nor do the copper knives of Lake Superior have the appearance of great antiquity. Their form indicates quite plainly the knife of the white man; although the method of attaching the handle by turning up the edges, may be of aboriginal design." — Lapham, 75-6 condensed.

All these data are uncertain guides. The rubbish may have lain for a long time before the particular tree in question began to grow. The wooden articles mentioned were all in use among Indians, and would last indefinitely under water, especially when it contains copper in solution; the form of the handle certainly proves the knife aboriginal; the blade is like the white man's simply because that is the best shape. Had the Indian borrowed the blade of the modern knife, he would also have borrowed the handle, because he could make that form easily when he learned its advantage. The fact that mystic or magic powers were attributed to nuggets proves their scarcity among Chippewas and is evidence that the latter had no knowledge or traditions of the mining operations.

Some years since a man who had lived in this region since boyhood told the writer that fully sixty years before he had

made inquiries of the older Chippewas concerning the mines. They stated in reply that the pits and other signs of digging were found, practically as they were at that time, when the first Chippewas came into the country; that their tribe had never mined copper, but "the old men" (meaning their ancestors) had chopped fragments with their hatchets from boulders lying on the surface and carried them to the sea-coast to exchange for shells.

"After the arrival of the Europeans, * * * there was no reason why the Indians should trouble themselves further to obtain domestic copper by the toilsome process of searching and digging for it." — Packard, 179.

"Most of the misapprehension in this matter has arisen from the use of the misleading term 'mine.' The ancient mines were not mines in the strict sense of the word, because they were not underground workings. * * * The ancient miners did not sink any shafts and do real mining; they were only surface prospectors, and appear to have dug for copper wherever they happened to find it. There was much small mass or nugget copper released by the disintegration of the soft epidote vein stone; and pieces of many tons weight are occasionally met with. The ancients were after these pieces of copper." — Packard, 192.

Mr. W. H. Holmes, who has made a careful investigation of this region, furnishes the following abstract of his report. Brief as it is, it fully explains all important points at issue except as to the time within which the work was done. This must, for the present and perhaps always, remain unknown.

"The Lake Superior copper occurs in veins, bounded on either side by the hard metamorphic rocks making the upper peninsula of Michigan. The action of the atmosphere and of the acids from decaying vegetation upon the mineral, having produced a partial disintegration of the gangue, or rock in which it is held, the glacier scooped out deep troughs or channels in the rock thus softened. Often these depressions were only partially filled with drift, leaving more or less of the copper-bearing rock exposed as a wall on either side. Aboriginal mining in this region had its beginning in the hammering or cutting off of portions of the metal thus left visible; when the level of the gravel was reached, it was cleared away to follow the wall downward. From this it was but a step to removing the loose material in order to reach the copper vein at the bottom; and soon it was discovered that wherever one of these partially filled trenches occurred, copper was to be found beneath the gravel, whether any of it could be seen on the surface or not. When quarrying in the solid rock began, it was carried on in the ordinary Indian fashion, namely, by heating the rock, pouring water on it, and breaking up the fragments thus obtained, with stone hammers; perhaps using these hammers before the

application of fire, so long as effective work in this manner was feasible or profitable. The hammers were rounded, water-worn boulders, carried up from the lake shore or from the lower valleys. Modern work has shown that some excavations thus made were fully twenty feet in depth; and it is quite possible that others which have not yet been cleared out are much deeper."

These hammer-stones were of various sizes. Whittlesey says

"One of the heaviest mauls yet seen, weighing thirty-six pounds, has a *double groove* which is not usual, and it was intended, no doubt, to be used by two men." — Whittlesey, Mining, 18.

This means, apparently, that two handles were attached. A little reflection will make it clear that two men trying to wield one instrument in this manner would only thwart each other's efforts. As a hammer of such weight would need to be very stoutly hafted, the second groove was pecked so that two turns of a withe could be made.

Later discoveries have shown that the southern Indians were perhaps not entirely dependent upon the Lake Superior deposits. They could have obtained a moderate supply, enough perhaps to account for all relics of this material found in Virginia and southward, at points much nearer home.

Mr. W. H. Weed, of the United States Geological Survey, says in a personal communication:—

"I have found native copper at a number of localities in Virginia and North Carolina. In the Blue Ridge country it has been found at certainly a dozen or more localities, as reported by authentic observers. I myself have seen it in masses large enough to be worked into Indian implements at High Knob, near Lindon, Virginia, and in pieces weighing a quarter of a pound or more from the flanks of the Blue Ridge, west of Barbersville, Virginia. I also have native coppper from surface croppings in Person and Rowan counties, North Carolina, and Fairfax county, Virginia. All of this material is perfectly pure copper, free from sulphides or other impurities, and soft and malleable. There have been a number of copper excitements through the south, and at such times the country people have prospected the hillsides and gathered great quantities of native copper specimens, which have been taken home and may be found in many cabins in the Blue Ridge country. I had known of the supposition that the Virginia Indians, and in fact the Indians of the Atlantic states generally, derived their copper from the Lake Superior region. Inasmuch, however, as native copper can be found at all of the localities I have noted, and at many others, I have no doubt that the Indians discovered its presence in the early days. At some of the ledges which I have seen, the native copper stands out prominently upon the surface of

the rock and one can hardly fail to observe it. The largest mass which I have seen in place weighed perhaps a pound. The geological and mineralogical association of the Blue Ridge copper is very similar to that of the Lake Superior copper."

So far as its working qualities are concerned, copper at ordinary temperature is much more malleable than pure soft iron; and it is more easily worked into shape when at a red heat than when cold. If hammered cold, it must be annealed occasionally, otherwise it becomes brittle. It is somewhat hardened by pounding, which will account for the harder edge of celts and other aboriginal specimens beaten out thin.

A copper bead was made thus: "A thin, flat piece of metal, with parallel edges, had the ends brought to a bevel on the opposite sides, and was then bent around a cord or thong of leather until the ends overlapped, after which they were beaten closely together." — Moorehead, 169.

"Cylindrical articles were evidently rolled between two flat rocks. * * * Some of these implements that have been supposed to be cast, were, I think, swedged; that is, a matrix was excavated in stone, into which rudely fashioned copper was placed, and then by repeated blows the article was made to assume the shape of the mould. Nearly all those plano-convex articles could be made in this manner. [In] 'Davenport [Iowa] collection * * * the axes are all of two forms, one plano-convex, the other with flat sides. They are all cold wrought by hammering, * * * and are notably harder on the edges than elsewhere.' * * * Besides this half-swedging process, I am persuaded that, in a few instances at least, there was a complete mould worked out in halves, on the face of two flat stones, so that by placing a suitable piece of copper between them and giving it repeated heavy blows, the copper was made to fill the mould accurately." — Hoy, 5.

"A fibrous texture is another evidence that these implements were hammered or rolled out. This fibrous quality is well exhibited by the action of strong acid on the specimens. On articles that are cast, the acid acts in a uniform manner, revealing no striæ or hard bands." — Hoy, 3.

Holmes says that some of the Wisconsin specimens are of homogeneous consistency throughout, showing no lamination or variable degree of hardness, such as Hoy says would result from being hammered into form; and McGee is confident that they were made with white men's tools, if indeed they were not actually made by white men. The truth of the last statement may be fully admitted without thereby assenting to the suggestion that other specimens, which do not show such structure, were not made by Indians, and in primitive ways. The copper region

was among those earliest visited by white men in the northwest; and if copper was then in use among the tribes they visited, their more expeditious modes of working would be adopted by the Indians whenever it was practicable for them to do so. Whittlesey thinks

"It is quite singular that they had not discovered the art of melting copper, which can be effected so easily in an open fire made of wood, but no evidences have fallen under our notice that this was done by that ancient race." — Whittlesey, Mining, 13.

Even if copper could be melted in an open fire, which is very doubtful, it must not be overlooked that Indians had no materials of which to make crucibles or moulds capable of withstanding such heat. Admitting they had clay receptacles which would have answered these purposes, there was no way of handling the molten metal with safety. A leading authority in metallurgy says

"The melting point of copper has not been determined with sufficient certainty; it lies between 1000° and 1200° C., and according to Violle is about 1054°." — Schnabel, 1.

The last figure is equivalent to 1930° on the Fahrenheit scale in general use. This is probably more nearly correct than Hoy's figure. He says

"Copper melts at from 2000 to 2600 degrees, a temperature that can be reached only in a furnace, assisted by some form of coal and an artificial blast. 'Copper, when melted, is thick and pasty, and without the addition of some other metal, will not run into the cavities and sinuosities of a mould.' In consulting with an intelligent brass founder, I was shown a hammer weighing three pounds, cast of pure copper, and was assured that this was the smallest casting he could make of this metal." — Hoy, 2.

Pure silver, in a free state, is found in the Lake Superior copper, and according to Hoy affords an unerring test as to whether the metal has been fused.

"A majority of copper implements found have specks or points of silver scattered over their surfaces. * * * One single speck of pure silver, visible even with the microscope, is positive evidence that the copper was never melted." — Hoy, 3.

But the crowning proof that Indians could never succeed in casting solid and perfect implements, granting that they could have melted the metal and handled it in that state, is found in the fact that

"When cast in moulds, copper has the property of rising and becoming porous. Sound castings can only be obtained by means of special precautions, such as pouring at the lowest possible temperature, the addition of lead before pouring, or pouring in an atmosphere of carbon dioxide." — Schnabel, 2.



Figure 292 — Cutting and Piercing Tools of Copper.



Figure 293 — Copper Hatchets or Celts.

IMPLEMENTS AND ORNAMENTS OF COPPER.

Except some awls, needles, drills, knives, and arrow or spear heads, such as are shown in figure 292, and a number of celts or hatchets, of the general type represented in figure 293; — nearly all the copper objects from Ohio were intended for personal adornment or ceremonial parade. The same fact has been noticed in other sections distant from the mines; while toward the north implements for practical uses predominate.



Figure 294.
Copper Plate, with Fragments of Cloth Adhering.

"In the eastern and southern parts of the country the majority of the copper articles which have been found are breast-plates, bracelets, beads, bobbin-like objects and other ornaments, while in the north and west, and especially in Wisconsin, implements and weapons prevail." — Packard, 178.

"It is a little singular that so few tools of copper have been found [in the Michigan mounds]. Finds of this kind in Wisconsin have far exceeded those from our soils, and this would seem to indicate less acquaintance with the copper quarries of Lake Superior on the part of the



Figure 295.
Ornaments of Copper, Battered out of Form.

ancient inhabitants of our peninsula, than among the dwellers west of Lake Michigan." — Hubbard, 211.

"Wisconsin covers a district which was near the mines and is in a direct course for people leaving them going south. It may be found that that district was the seat of the ancient miners themselves." — Packard, 178.

Packard has here probably struck the key-note of all mining operations; namely, that they were carried on by the people who lived in the region where the raw material existed, and that these people had a regular system of exchange with others farther away.

The same remarks concerning the purposes to which various articles made of other substances were assigned, are equally applicable to copper. By the natives, it was considered a mal-



Figure 296.
Ornaments of Copper, Battered out of Form.

leable stone, to be worked and utilized as other rocks except in so far as its ductility added to its usefulness.

A large copper plate, to which fragments of cloth are adherent, is shown in figure 294.

In figures 295 and 296 are shown part of a collection of gorgets, bracelets, and other objects which were found in a cache just outside the eastern wall of Fort Ancient. They were carefully buried in a small excavation, made solely for their reception, and covered with a sheet of mica. Why they were thus bent, twisted, and pounded, in a manner that would render them forever worthless so far as their original use was involved, is a question which can not be answered. Had they been in a

mound or in connection with a burial, they could be regarded as a "sacrificial offering", like the pipes of Mound City, and similar objects; but the circumstances under which they were discovered seem to preclude this construction of their meaning. They were plainly not hidden for the sake of safety, or they would not be battered out of shape. As in so many other things connected with our predecessors, we can only record the fact without throwing any light upon its cause.

The so-called "spools", shown in figure 297 have been found, in a few cases, with the bones of the fore-arm, as if intended for wrist ornaments; but so many occur at the sides

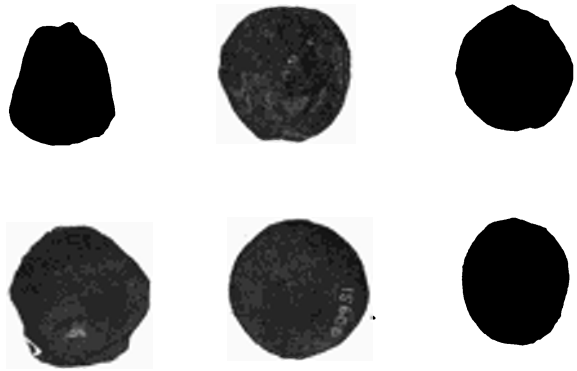


Figure 297.
Spool-shaped Ear Ornaments of Copper.

of the head that it seems almost certain they were worn in the lobes of the ears, slits being cut for inserting them. A majority, perhaps, do not seem to have been attached to either the body or the clothing of the deceased, but were apparently deposited like other property, sometimes several feet from the nearest skeleton. It is not uncommon to find strands of fiber or leather cords wrapped around the center shaft. A similar "spool" was found in a mound near Selma, Alabama.— Moore, Ala., 303.

During the exploration of the largest mound of the Hopewell group, a great number of copper objects was found, so far beyond the ordinary forms of mound relics in complexity of design as to create serious doubts whether they could be produced by any methods or implements at command of a North American Indian, or Mound-Builder, of any period. Some of

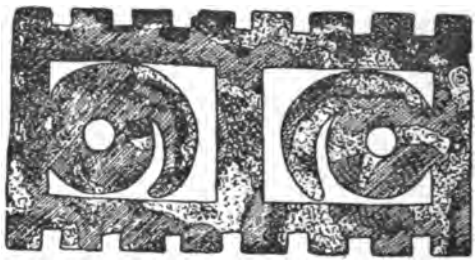


Figure 298.
Wooden Head-dress Covered With Copper. Hopewell Mound.

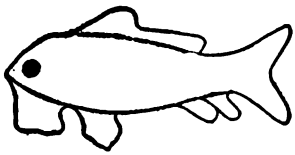
them are represented in figures 298, 299, and 300, from plates in Moorehead's report. The find is described on pages 344-6.

The same arguments are adduced to prove the European origin of these objects, that have been applied to other intricate patterns, a few of which are exhibited here in order that the reader may compare the different forms.

Figure 301 (B. E. 12, page 309, figure 192) shows the "copper eagle" found by Major Powell in a mound at Peoria, Illinois.



Scrolls.



Fish.



Bear (?) Claws.



Spider (?).

Figure 299 — Symbols of Copper. Hopewell Mound.

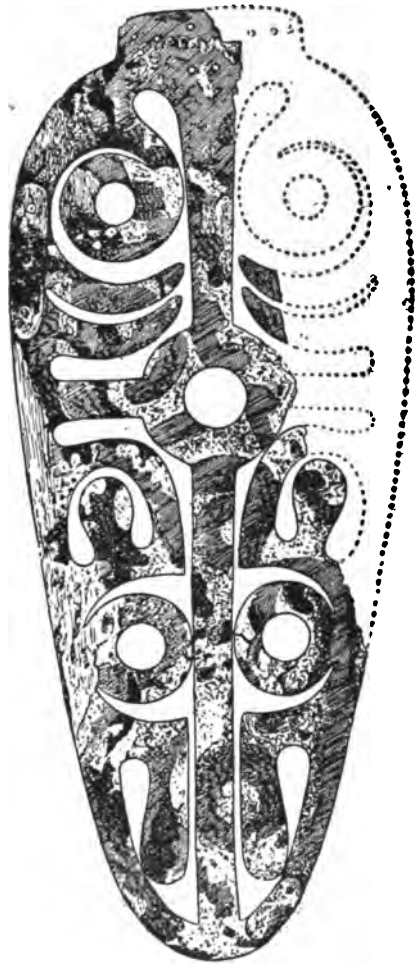


Figure 800 — Serpent-head Symbol. Hopewell Mound.

It "appeared to be made of rolled sheet copper, or if the sheet was made by hammering this was so deftly accomplished that every vestige of the process had disappeared, leaving only flat surfaces on both sides, with a uniform thickness of metal. If these articles were the work of the Mound Builders in pre-Columbian times, then the people must have possessed arts more advanced than those shown by the mound arts previously studied." — Introduction, B. E. 12, xxxix.

Figures 302 and 303 (Burial Mounds, 100-1, figures 42 and 46

43) show two remarkable copper plates from the Etowah mound, near Cartersville, Georgia.

"These plates are very thin, and as even and smooth (except as interrupted by the figures) as tin plate. The figures are all stamped, the lines and indentations being very sharp and regular. * * * In all their leading features the designs themselves are suggestive of Mexican or Central American work. Yet * * * the wings are represented as *rising from the back of the shoulders* * * * an idea wholly foreign to Mexican art. * * * That these plates are not the work of the Indians inhabiting the southern sections of the United States, or of their direct ancestors, I freely concede. That they were not made



Figure 301 — Copper Eagle. Peoria, Illinois.

by the aboriginal artisan of Central America or Mexico of ante-Columbian times, I think is evident, if not from the designs themselves, certainly from the indisputable evidence that the work was done with hard, metallic tools." — Burial Mounds, 104.

"As a matter of course, no one denies that the Mound Builders made implements and ornaments of native copper, and frequently hammered this copper into thin sheets with the rude implements of which they were possessed. What is here affirmed, and what, it is believed can be successfully maintained by reference to and inspection of the articles, is, that many of them, found in mounds as well as in ancient graves, have been made from sheets of copper so uniform and even as to forbid the belief that they were hammered out with the rude implements possessed by the Mound Builders of pre-Columbian times. A careful chemical and microscopical examination of the various specimens might possibly settle the point; however, as this has not been done, we must for the present rely upon inspection." — B. E. 12, 711.

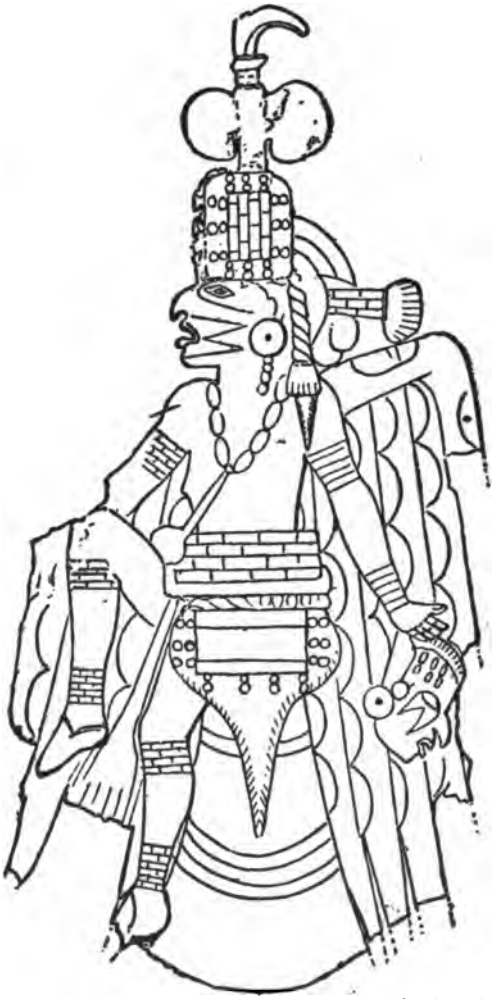


Figure 802 — Copper Plate. Etowah Mound. Georgia.

In a discussion of the "copper beads or cylinders" found in the T. F. Nelson triangle, Thomas remarks that "a careful examination of these specimens shows * * that the copper plate of which they were made was not manufactured by any means at the command of the Indians or the more civilized races of Mexico or Central America, as it is as smooth and even as any rolled copper; moreover, the beads appear to have been cut into the proper shape by some metallic instrument." — Burial Mounds, 91.



Figure 808 — Copper Plate. Etowah Mound. Georgia.

"What explanation shall we give of the presence * * * of thin sheet copper [in the mounds]? The simple and most natural explanation would be that it was derived from European traders and early adventurers. * * * The distinction between the sheets and ornaments hammered from native copper with the rude implements of the aborigines, and many specimens of this smooth sheet copper found in the mounds, is too apparent to be overlooked." — Burial Mounds, 48.

These designs are of the same character as those on the large shells from Tennessee and Missouri, mentioned on page 687. They may have been made in Mexico and imported; or at the localities where they were unearthed, by some one familiar

with Mexican art; but all the proof is against the assumption that they are the work of white men.

In the first place, the theory meets the same objection urged in the case of ceremonial stones; that is, Why should Europeans, all at once, begin to make objects of entirely different shapes from anything they had ever made before, for the express purpose of trading them to a people who never saw anything of the kind, and to whom, consequently, they would have no meaning?

Secondly, the same mound at Hopewell's yielded copper in various forms intermediary between the nugget and the finished product.

Professor Putnam, in a letter to the author, says:—"copper began to come in from our Ohio explorations in a wonderful manner. * * * We have it hammered and cut into all manner of shapes, * * * and we have the copper in all stages from the rough nuggets, through those partly hammered to the sheets and the objects cut from them. To consider this the work of Europeans is an absurd peryersion of the facts before us." — Moore, Fla., 220.

Holes in a copper plate from a mound in Florida were repaired by a thin sheet of copper firmly riveted. "The patch was not cut to fit closely the part repaired but extends well beyond, and presents a rough, irregular, unworked margin as though the piece had been hammered from a thin lump of metal. That this work was done before the completion of the plate, and not to repair holes made during subsequent use, is shown by the way in which the plates participate in the decoration."

"At several points where a tendency to exfoliation was evident, rivets were used to hold the loosened edges in place." The exfoliation arose "during the process of construction of the sheet as evidenced by the rivets. This condition is frequently observed in hammered masses of copper, and in copper ornaments and implements obtained from mounds. * * * We are of the opinion that these plates may not under any circumstances be attributed to the handiwork of artisans of Europe." — Moore, Fla., 217 and 219.

Thirdly, Moore had a large number of analyses made of European copper, of various ages, and of objects from the mounds.

"As a result of these analyses, we see that in 'Lake' [Superior] copper, silver and iron are constant, and sometimes the only impurities; while arsenic, nickel and cobalt are occasionally present in minute quantities. Lead and bismuth are invariably absent. *All these characteristics Lake Superior copper has in common with the copper of the mounds.*"

"Mound copper from other localities [than Florida], including the copper of the famous Etowah plates of Georgia, and of the no less well-known Hopewell mounds of Ohio, is, like the Florida copper, aboriginal, having nothing in common with the products of the impure European sulphides and imperfect smelting processes of the fifteenth, sixteenth, and seventeenth centuries." — Moore, Fla., 241.

"In a great majority of cases where the discovery of the copper with articles giving evidence of White contact is reported, the metal is in reality *brass*." — Moore, Fla., 225.

There is an additional test which has not yet been made by any collector, or if so no report of it has become public; but the condition of the objects from Fort Ancient, shown in figures 295 and 296, could not be duplicated in European copper of two centuries ago.

"Take a piece of mound copper and hammer it thoroughly to harden it, then bend it double and hammer it down flat. If it is native copper it will stand the test without a show of cracking, but if it is smelted copper it will break short in bending double." — Moore, Fla., 232 — on the authority of Superintendent Cooper, of the Lake Superior Smelting Company.

Fourthly, the process of rolling metal into thin sheets was apparently unknown prior to the eighteenth century. Such was certainly the case with iron; and it is extremely improbable that metal-workers would have known how to roll copper for two or three centuries before it would occur to them that iron could be made into sheets in the same manner.

"In 1783 Henry Cort, of Gosport, England, obtained a patent for rolling iron into bars. John Payne and Major Henbury rolled sheet iron as early as 1728. The refining of pig iron in forges and its subsequent conversion into bars and plates under a hammer formed the only general method of producing finished iron down to Cort's day, both in Great Britain and on the continent." — Swank, 53.

Finally, Cushing, with his characteristic propensity for doing things first and talking about them afterwards, showed how these articles could be made with appliances no more complicated or difficult to procure than many other tools devised by savages. It should be stated, however, that the specimens of his own handiwork were rather poorly executed, by comparison, and the edges were not smooth and uniform along the sharp curves as in the mound specimens. This defect might be remedied with practice.

After giving a synopsis of the discussion raised by copper plates from the Hopewell mounds, and comparing them with the work done by the Zuni, he proceeds to describe his own experiments with copper.

By laying a piece of the metal on a hard, smooth stone and beating it gently with a fine-grained stone hammer, he spread it out into a thin but irregular sheet. The blow must always be slanting, from the center toward the edge. With another hammer, smooth or polished, slight inequalities are reduced. The latter effect may also be produced by a rolling or rocking motion with a smooth pebble. Then, laying the copper on a firm level space, with a piece of buckskin beneath it, he rubbed first one surface, then the other, with a piece of fine-grained, smooth-surfaced sandstone. In this manner he secured a plate of practically uniform thickness and surface. To reproduce a given design, he "lightly traced the outline of the figure on one face of the metal plate, and placed the latter, with tracing uppermost, on a yielding mat of buckskin, folded and laid on a level, hard spot of ground. Then I took a long pointed tool of buckhorn and pressed downward with as much of my weight as was needful to make it sink slightly into the metal. * * * Moderately deep and remarkably sharp smooth grooves were thus plowed or impressed in the ductile metal wherever the horn point had traversed it except along upward curves and around sharp turns or where hard places happened to occur in the plate." These defects were remedied by "a rounded chisel made from the humerus of a deer, like an Indian skin-flesher of bone. This, firmly grasped and pressed by the hand alone, then rolled or rocked to and fro, served admirably to deepen straight grooves to any extent desirable, or, if twirled while it was being pressed down and rocked, to impress or deepen curved lines. When all the lines of the design had been completed by these combined processes * * * the plate, on being turned over, exhibited in clearly raised outline the reverse of the pattern I had traced and thus embossed. On grinding these sharp edges crosswise with a flat piece of sandstone their apices were speedily cut through and the eagle form as outlined by the embossing was thus completely severed from the plate." He also made patterns from thin rawhide. By holding one of these "against the plate to be embossed for cutting out, then running the horn point around it to strike-in one side of the design, reversing the pattern and continuing the embossing operation for the other side, an outline at once intricate, and of course, bilaterally symmetrical, could be almost as rapidly struck in as could the simplest device." "An inspection of [the Hopewell] specimens, and, subsequently, of those comprising the collection now in the Bureau of American Ethnology, convinced me that they had been worked by methods probably similar to, if not identical with mine. First, the plates of which these figures were made had been smoothed by scouring; second, the cut edges of figures or open-work patterns were slightly beveled, except at points where they had been more or less dressed down by crosswise grinding with gritty stone; third, the edges of small open spaces, such as holes

[other than drilled ones] less than an eighth of an inch in diameter (too small for the introduction of pointed grinding stones), had not been dressed from the inside, as they might have been had the artificers of the specimens possessed slender files, but had been left sharp and raised, and showed distinct trace of the horizontal grinding by which, after they had been partially punched or raised, they had been cut through; fourth, after the outlines and open spaces had been cut in the more elaborate of these specimens, the latter had been again turned over and embossed, mainly by pressure, from the side opposite the one from which they had been impressed for the cutting." "I do not hesitate to say, * * * first, that I have neither seen nor heard of a single object of copper from the mounds which I cannot reproduce from native or nodular copper with only primitive appliances of the kind described, by successive processes of stone-hammering, beating and rolling, scouring, embossing and grinding — such processes as, in more or less modified ways, are actually employed today by comparatively rude Indians in the fashioning and embossing of parfleche, horn, and other like substances; second, that sufficient results of these experimental studies have been above brought forward, I trust, to establish as an easy possibility, if not probability, the aboriginal and prehistoric character of the workmanship on the sheet-copper articles from the Ohio and more southern mounds." After discussing the similarity of the designs on copper plates to those on the engraved shells, and the analogy of both to some work done by the Indians of the southwest, Cushing remarks: "The bearing of these observations on the question as to whether or not the copper and shell arts of the Mound Builders, both in design and workmanship, were indigenous, is important. They show conclusively, I think that both arts were Indian, and that both were North American Indian. Thus, some of the copper works may be as ancient as the fondest romanticist could wish, or on the contrary (and some of them probably are), as modern as the days of De Soto; but, whether ancient or recent, they are of Indian origin and neither Oriental, as some have claimed, nor European, as others have naturally been led to infer by the very high degree of workmanship they exhibit and by certain supposedly analogous art traits." — Cushing, Copper.

APPENDIX.

EXPLANATION OF REFERENCE NOTES.

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