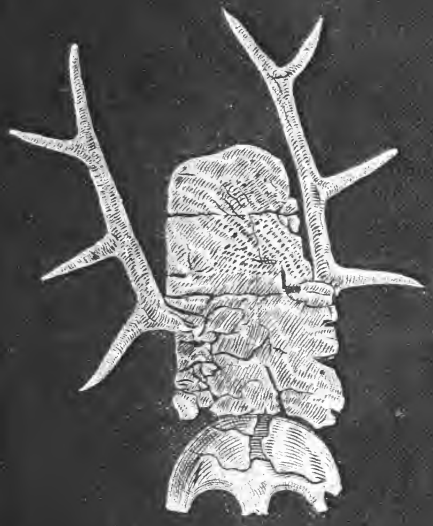
Primitive Man in Ohio

Moorehead



With the
Compliments of the Author

A. F. Barrott,
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April 1900

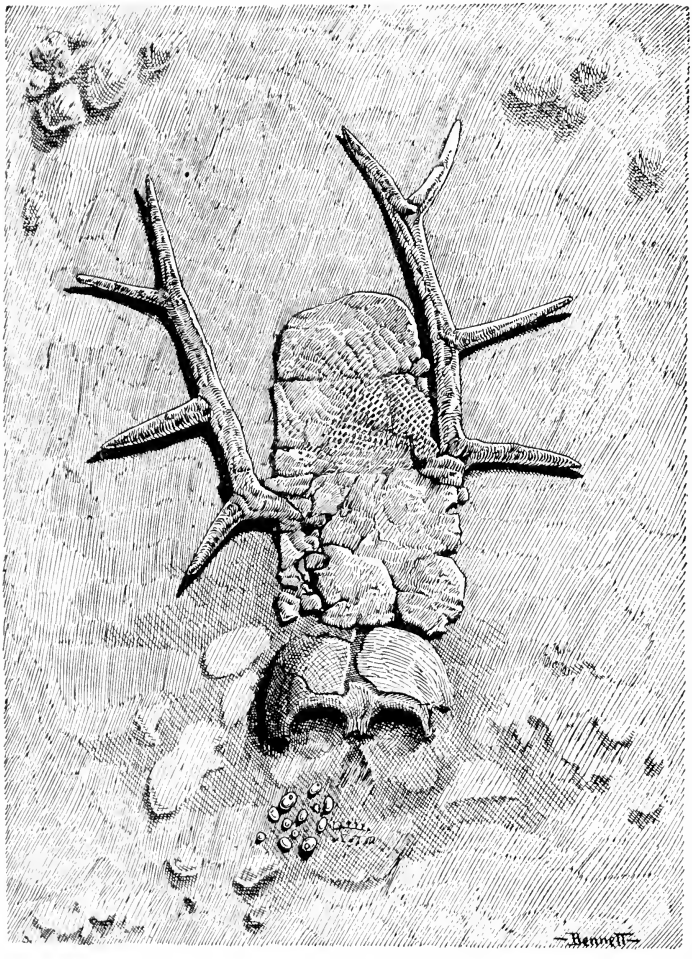

FIG 1.—Head-dress of skeleton, No. 248, consisting of copper antlers, Effigy Mound, Hopewell's Group, Ross County, Ohio. See page 194.

PRIMITIVE MAN IN OHIO

BY

WARREN K. MOOREHEAD

FELLOW OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
AUTHOR OF "FORT ANCIENT, THE GREAT PREHISTORIC EARTHWORK OF OHIO," ETC.

G. P. PUTNAM'S SONS
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PREFACE.

For many years the great majority of readers upon American archæology and ethnology have believed in the existence throughout the Mississippi valley of a nation called, for want of a better name,[1] "The Mound Builders." Hasty explorations of tumuli and enclosures in various parts of the Ohio and Mississippi valleys have been made by those desiring to further the popular belief. Books and numerous articles have been published in which the imagination was permitted to range unchecked. Statements were made without proper authority, speculations freely indulged in, and hypotheses were built upon foundations as unstable as those of sand. As a natural result, many persons were led to attribute a high degree of civilization to the mound-building tribes of the Mississippi valley. Fine relics or carved images taken from the mounds, the signification of which the collector could not satisfactorily explain, were accepted as evidence in support of the high status of these people. In spite of investigations and publications upon the part of learned institutions and private individuals, tending to dispel such deceptions, many intelligent people still retain false impressions while reading works that treat of primitive man.

[1] We are in favor of employing Dr. D. G. Brinton's term, "The American Race." See pp. 17 and 18, *The American Race*, New York.

It is the purpose of our book to do away with certain of these illusions. In attempting this we are aware that a herculean task has been undertaken. But the time has arrived when men prefer facts to flights of fancy. We are therefore quite confident that our material, so carefully collected and thoughtfully weighed, will not be cast aside and its place usurped by the rash statements of hasty and incompetent investigators. Why there should be so much speculation and uncertainty concerning the life of our aborigines is inexplicable to us. No question of equal importance could have been more easily determined had the early writers given as much care and patience to mound exploration as is given at the present time.

Some writers have misrepresented and distorted field testimony to uphold theories previously formed. As an illustration of this, and of the great damage that it has done, we need but call the attention of our readers to the famous "Holy Stone" of Newark.

An enthusiastic archæologist resided many years ago at Newark, Ohio. He was thoroughly in love with his work, and his life's ambition was to discover the origin of man upon the American continent. He believed the lost ten tribes of Israel to be the ancestors of the mound-building tribes. After opening mound after mound and finding no evidence whatever in support of his hypothesis, he became desperate. He purchased a Hebrew Bible and primer, and shortly afterwards there was discovered in a stone box, in a mound that he had investigated, a slab, on

one side of which was a likeness of Moses, and on the reverse an abridged form of the ten commandments. The stone attracted world-wide attention, and many publications were issued describing it. No one doubted the genuineness of the affair until after the man's death. In cleaning up his office the administrator found in a small rear room bits of slate with attempts at carving Hebrew characters upon them. They also found a fair copy of the wood-cut of Moses used as a frontispiece in the testament.

The influence of this over-zealous deceiver has gone throughout the length and breadth of our land, and one may still hear at lectures upon American archæology statements concerning the Indian's descent from the Jew, basing such assertions upon the testimony of the supposed "Holy Stone of Newark," which, as is above shown, was simply a counterfeit.

The moral requires no explanation. One "popular" book by a superficial observer has a bad influence and does more harm than can be remedied by much honest conscientious endeavor on the part of workers in the field. Those who have endured the rains of spring, the heat of summer, the chilly snows and sleet of winter, living in thin tents or barn-like sheds alongside the tumuli that must be studied inch by inch with pick and shovel, have a right to cry out in honest indignation when the reports of men who have never thrust a spade into the structures they attempt to describe pretend to be conclusive on this subject.

Many volumes upon American archæology in the

last few years have been written by field workers and consequently have a value far in excess of previous publications. Most writers seem to agree of late that the various tribes and clans which formerly inhabited the river valleys of the State of Ohio were alike in color and general habits, having certain variations in stature common to all races, and differing in many of the details of tribal organization and domestic life. Their languages were unlike, it is thought, and undoubtedly they warred against each other.

In writing a complete description of each mound, repetitions are unavoidable. A mound may be more or less like its fellow structures, and our desire not to overlook any detail in the position of objects and skeletons has led us to follow one general rule in writing the report of mound contents. The rule is, "Note everything."

No attempt is made to give any description of the earthworks found in the different parts of Ohio; such an effort would not only swell a volume to unwieldy proportions, but would be entirely foreign to our purpose.

In every excavation careful field notes were made on the spot, and each night the result of the day's work was fully written out. The text of this volume is the sum of those records.

The total number of mounds, graves, and cemeteries opened during the four seasons of exploration was one hundred and seven. The field numbers are retained in the text, when necessary, but not in their regular order, as some portions of the country were worked at different periods during the years in which

excavations have been made. The record of a number of mounds is omitted, as they contained nothing that would instruct or interest the reader. In mounds of small dimensions the ready access of water and air to their contents will sometimes destroy every trace of such deposits as are affected by these agencies. Hence a mound, which as constructed would prove of great interest, may in the course of time appear only as a homogeneous mass of earth.

During all the years described herein Mr. Moorehead had general charge of the explorations.

Mr. Gerard Fowke has contributed Chapter IV. (on Flint Ridge), and has rendered valuable assistance both in the field and in the preparation of this book.

Dr. H. T. Cresson also assisted in the preparation of this book, and spent several months in the World's Columbian Exposition service at Anderson, Ross Co. The sectional drawings and ground-plans of the mounds at the Hopewell Group are copied from his pencil studies by Mr. Bennett, who has illustrated the book. The result of his observations upon the osteological collections from the Little Miami and Scioto valleys, and other parts of Ohio, together with remarks upon palæolithic man, have been incorporated in this volume under Chapters I. and XVII.

To Mr. W. H. Davis, of Lowell, Ohio, we are indebted for Chapter III., on the Muskingum valley.

Each author is responsible for the statements set forth in his department.

Mr. Jack Bennett, the well-known artist, made pen drawings for the illustrations, and has also furnished notes upon the bone carvings.

To the *Illustrated American*, of New York, we are indebted for the loan of four cuts, Figures IV., XII. A, XIX., and XX.

In 1888 Mr. Clinton Cowen superintended excavations in Mr. Moorehead's absence, and in 1889 he assisted in surveying Fort Ancient.

In May and June, 1890, Mr. W. E. Myer had charge of explorations near Wilmington, Ohio.

The farmers who so kindly permitted excavations to be carried on in the mounds and village sites, have greatly aided science. Without the consent of land-owners work cannot be projected, and hence nothing learned regarding primitive man and his associates. In this volume we have given the name and owner of every spot examined.

Conspicuous among the farmers who introduced us to other mound-owners and were instrumental in securing permits for us to dig are the following: Tighlman Porter, Captain C. W. McGinnis, Strawder James, and Mr. Coiner, of Frankfort; John Boyle, of Fayetteville; Messrs. Cowdin, Ridge, Poor, Van Riper, and Nixon, of Fort Ancient; Messrs. Janes, Redman, Fullerton, Miller, and Madeira, of Chillicothe. General reference only is made to the finds of the Hopewell group of mounds. The notes taken in 1891 are the property of the World's Columbian Exposition, and our use of them had to be limited. Mr. Hiram Taylor, of Oregonia, has our thanks for his many kindnesses.

Mr. Cloud Hopewell, owner of the famous works at Anderson, Ross County, kindly allowed the survey to carry on explorations to an unlimited extent.

We are his debtor for many kindnesses and personal favors. No community could have been more interested in archæological discoveries than the citizens of the home of Messrs. Squier and Davis, Chillicothe. Old residents in the city remember well the work of the two pioneers just named, and were accordingly anxious to witness the examination of the territory so ably explored by them nearly half a century ago. Younger persons hearing their elders speak of Squier and Davis also became interested. For the cordiality with which we were received, the many mounds offered us for inspection, and the general desire on the part of all Chillicotheans to aid us in our work, we acknowledge our great indebtedness and tender in return our most sincere thanks and appreciation.

WARREN K. MOOREHEAD.

CHILLICOTHE, OHIO,
December, 1891.

CONTENTS.

ILLUSTRATIONS.

PRIMITIVE MAN IN OHIO.

CHAPTER I.

PALÆOLITHIC MAN IN OHIO.

The labors of Professor G. Frederick Wright, of Oberlin College, Ohio, have been of great importance in connection with the antiquity of man in America. He has traced the great terminal moraine of the northern ice sheet across Pennsylvania,[1] thence across Ohio, Indiana, and far beyond the Mississippi, making besides extensive study of the Muir and other glaciers in Alaska, continuing his studies of glacial phenomena even so far as the Eastern continent. He has shown[2] that glacial floods, operating while the ice remained over the head waters of streams, have deposited beds of drift gravel in the valleys of southerly flowing rivers, and calls attention to the similarity of these beds of drift gravel to those deposited by the ice floods of the Delaware valley, suggesting that they be carefully examined for evidences of palæolithic man.

[1] Professor Wright was assisted in Pennsylvania by his pupil, Professor H. C. Lewis.

[2] *The Ice Age in North America*, G. F. Wright, p. 528, *et al.* See also Professor Wright's *Report of the Western Reserve Hist. Soc.*, p. 26.

"Man was on this continent," says Wright, "at that period when the climate and ice of Greenland extended to the mouth of New York Harbor. The probability is that, if he was in New Jersey at that time, he was also upon the banks of the Ohio, and the extensive terrace and gravel deposits in the southern part of our State should be closely scanned by archæologists. When observers become familiar with the rude forms of these palæolithic implements they will doubtless find them in abundance. But whether we find them or not in this State (Ohio), if you admit, as I am compelled to do, the genuineness of those found by Dr. Abbott, our investigations into the glacial phenomena of Ohio must have an important archæological significance, for they bear upon the question of the chronology of the glacial period, and so upon that of man's appearance in New Jersey."

This prediction that traces of pre-glacial man would be found in terraces and gravel deposits of southern Ohio, was verified later on at a meeting of the Boston Society of Natural History, held November 4, 1885, when Professor Putnam displayed a chipped implement of black flint found by Dr. C. L. Metz (Fig. II., No. 1). It was discovered eight feet below the surface, at Madisonville, Ohio. This is the first announcement of the finding of a palæolith in the gravels of Ohio. The town of Madisonville is situated about eleven miles northeast of Cincinnati, about five miles back from the Ohio River. The Little Miami, on its way to join the Ohio, passes through the valley of the same name about three miles to the eastward of Madisonville, the town standing in a depression between

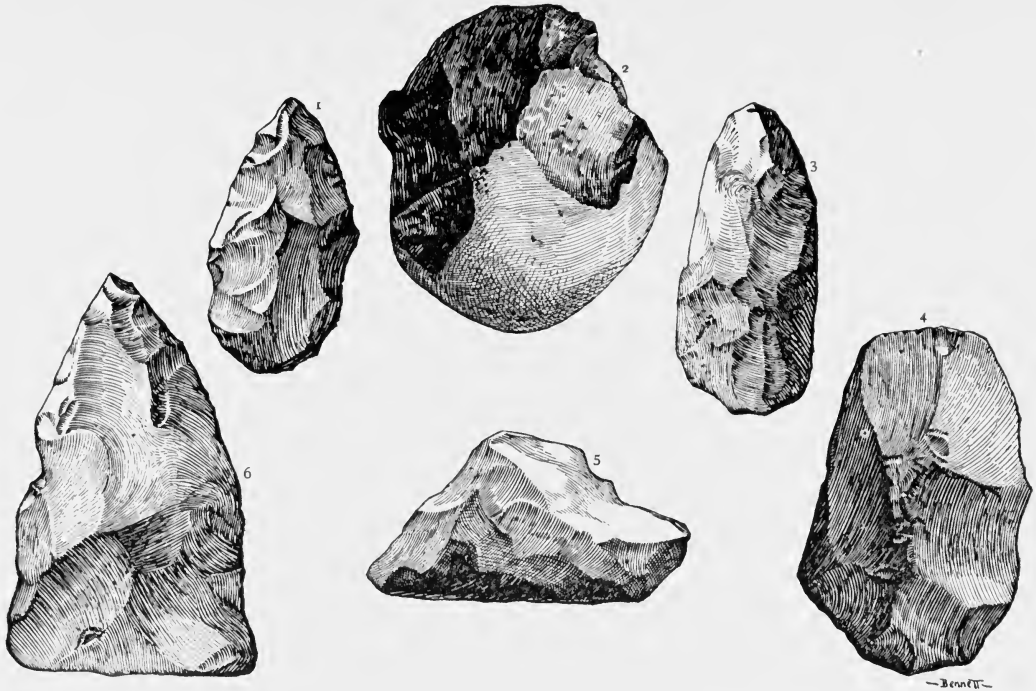

FIG. II.—Palæoliths from different parts of the United States. 1. Implement; black flint, Madisonville, Ohio. 2. Palæolith from aqueous gravels, Carpenter Station, near Wilmington, Delaware. 3. The Tuscarawas palæolith. 4. Chipped implement of argellite, Trenton, gravels. 5. Implement from Little Falls, Minnesota; quartz. 6. Chipped implement of flint from aqueous gravels, Medora, Indiana. See page 2.

this stream and that of Mill Creek, which empties below Cincinnati. This depression is surrounded by hills rising above the river and is filled by a deposit of gravel, sand, and loam belonging to the glacial terrace epoch. At Red Bank, on the east side of the Little Miami River, several miles from Madisonville, the gravel is interstratified with sand and underlaid with clay, being overlaid by a thin deposit of loess. Farther to the west of Madisonville beds of loess exist[1] eight feet, and even more, in thickness, and the gravels disappear. The gravel terraces of the Little Miami show that it was an important outlet of waters during the glacial epoch, and there is little doubt that this small valley in which Madisonville stands, connecting the last-named river with Mill Creek, has been filled in by deposits brought down by turbulent floods from the north.

It was just below the loess in the gravel that fills the small valley which we have referred to, that Dr. Metz discovered his implement at Madisonville.

A chipped limestone pebble was also discovered northeast of Madisonville by Dr. Metz, at Loveland, Ohio, in 1887. It was in similar deposits to that of his first find, but lay at a great depth, nearly thirty feet from the surface. Bones of the mastodon have been found to the west side of the gravel pit in which the palæolith was discovered.

Several years after the last find which we have mentioned, a palæolith was discovered in the

[1] *Ice Age in North America*, G. F. Wright, p. 532.

terrace gravels at New Comerstown, Tuscarawas County, Ohio, a small village which stands on the right bank of the Tuscarawas River (Fig. II., No. 3).

Mr. W. C. Mills in describing his find[1] says:

"In the northern part of the town . . . is a large gravel terrace, deposited in a recess near the mouth of Buckhorn Creek and derived from northern drift. For several years past the Cleveland and Marietta Railway Company have been taking out this gravel in large quantities, which they used in ballasting their railroad, and so have kept the gravel exposed to the depth of about twenty-five feet. The top of the terrace is about thirty-five feet above the flood plane of the Tuscarawas and extends up the Buckhorn about a quarter of a mile, gradually diminishing in height as it recedes from the main line of deposition. In this gravel bank, on the 27th day of October, 1889, while examining the different strata of the gravel, I found the specimen that you have before you, fifteen feet from the surface of the terrace. The bank was almost perpendicular at this time, exposing a front of about twenty feet. The small part of the bank was in place in the side of the terrace, until I struck it with my walking-cane, when a space of about six feet in length by two feet in height tumbled down, exposing to view the specimen. At first I recognized the peculiar shape and glossy appearance of the specimen, such as were characteristic of palæolithic specimens described to me by Professor Edward Orton, while I was a student at the Ohio State University."

Mr. Mills then compared the object which he had found with other flint implements collected in the valley of the Tuscarawas, amounting to at least

[1] Discovery of a Palæolithic Implement at New Comerstown, Ohio, by G. F. Wright, LL.D., in *Report of Western Reserve Hist. Soc.*, Dec. 12, 1890. Account by W. C. Mills.

three thousand chipped specimens taken from mounds and on the surface of the ground. None of the specimens in his collection, however, resembled it. He then requested Mr. A. A. Graham, secretary of the Ohio Archæological and Historical Society, to forward the specimen to Professor Wright for examination, who at once recognized it as a true palæolith, having a striking resemblance to those which are found in the valley of the Somme, in northern France.

Professor G. Frederick Wright in speaking of the Tuscarawas palæolith[1] says:

"As is to be expected, however, the material from which the implement is made is of local origin, and differs much in appearance from that of the French implement. Upon showing this specimen from New Comerstown to my associate, Professor Albert A. Wright, who did much work upon the State Geological Survey, in Holmes County, immediately adjoining Tuscarawas, he at once recognized the material as a black flint, or chert, which occurs with much frequency in the 'Lower Mercer' limestone strata, an exposure of which passes through the eastern part of Holmes County, and he was able at once to go to his drawer and produce the accompanying specimen, which he brought home from that vicinity several years ago."

The same authority gives a most complete description of the Tuscarawas implement in the New York *Nation* of April 24, 1890.

"The flint implement referred to is a perfect representative of the palæolithic type of northern France and southern England. It is four inches long, two inches wide, and an inch and a half through at its larger end,

[1] Paper by G. Frederick Wright, LL.D., in *Rep. of Western Reserve Hist. Soc.*, Dec. 12, 1890. Tract No 75.

tapering gradually to a point, and carefully chipped to an edge all around. Figure 472 in Evans' *Ancient Stone Implements of Great Britain* would pass for a very good representation of it [See Fig. II., No. 3, in this work]. The material is black flint, or chert, such as occurs in the 'Lower Mercer' limestone strata, not many miles away, and has upon its surface the peculiar glazed appearance which indicates considerable age."

A distinction must be made between the term glazed appearance or glossiness of surface and what is technically known as the *patina*. The palæolithic implements of France and England are generally made of flint very compact in grain, which is found in the chalk deposits of those countries. Glossiness of surface may be due in a great measure to long-continued use, and there is but little doubt that chemical causes may also add to its smooth surface. *Patina* is due to the infiltration of certain substances through the beds in which the palæolith had been deposited, this action partially dissolving the substance of the flint.

New Comerstown is situated upon the right bank of the Tuscarawas River, forty miles south of the glacial boundary of Ohio. The latter part of the journey from the north to reach the place is so complete a demonstration of the now accepted theory concerning the origin of the terraces along this river, and others similarly situated, that a brief description of it will be profitable.

"The head waters both of the Tuscarawas itself and of the several branches which unite with it before reaching Canal Dover, are all within the glaciated area, thus afford-

ing access to an unlimited quantity of debris brought by the continental ice sheet from the Laurentian region in Canada. Immediately below the glacial boundary all these streams are bordered with extensive terraces, the material of which consists of assorted matter from the glacial drift, such as would naturally have been carried during the closing turbulent floods of the glacial period.

"From Canal Dover to New Comerstown the Tuscarawas River makes a bend to the east, but the railroad cuts across the elbow, and for twenty miles or more finds its way through two small valleys tributary to the main line of drainage. The course of the railroad first strikes up the valley of Stone Creek, following it for several miles, but no sooner does it enter this tributary valley than it leaves behind the terraces and other gravel deposits which mark the main valley and every tributary farther north. At length the road, after passing through a tunnel, strikes into the head waters of Buckhorn Creek, which runs southward to join the Tuscarawas at New Comerstown. Here, too, for several miles, there is a total absence of terraces or any deposit of gravel. On approaching the mouth of the creek, however, a vast gravel deposit, derived from the northern drift, is encountered, in which the railroad company is making extensive excavations to get material for ballasting their track. Thus, in this short journey there was demonstrated before our eyes the limitation of these gravel deposits to the main valley of the river, and so by consequence their glacial age and origin.

"A glance at the physical features of the region in Ohio and Indiana where these palæoliths have been found, shows their eminent adaptation to the primitive conditions of life indicated by the implements themselves. The Tuscarawas valley has been formed by erosion through the parallel strata of sandstone and limestone here composing the coal formation. The summits of the hills on either side rise to the heights of from 300 to 500 feet, and

their perpendicular faces abound even now with commodious shelters for primitive man, but in pre-glacial times the trough of the Tuscarawas was 175 feet deeper than at present, that amount of glacial gravel having been deposited along the bottom, thus raising it to its present level. Hence, in pre-glacial times the opportunities for shelter must have been much superior even to those which are now in existence."

Just as early man in the Old World had to contend with ferocious brutes, such as the terrible machairodus, with its keen, dagger-like tusks, and the mammoth, so did our primitive American race have to contend with huge jaguars and bears larger and more formidable than those of the present day. These were not the only animals that they battled with in their struggle for existence; the mastodon, the megatherium, the mylodon, the megalonyx, and the elephant had to be attacked with wretched weapons of stone, in order to obtain the necessary food for subsistence. Naked and wretched as primitive man was, he triumphed over the trials and dangers that beset him, and his descendants gradually increased until they were to be numbered almost as the leaves of the forest, again to disappear as these solitudes were cleared away by the axes of the hardy American pioneers.

Attention has been called in this chapter to traces of man's occupancy of America at different epochs, viz.:

1st, in times so remote that we cannot appreciate its vast antiquity or approximate to it by any time measure.

2d, when the glacial terraces were in process of deposition, these primitive beings having been associated with the period when the great glacier came down from the north. Here we find traces of a people who built rude hearths upon the surfaces of the terraces along the banks of rivers, and it may be about the same period, or even in more recent times, erected imposing mounds and earthworks upon them.

These primitive men, to whom we especially refer, were a part of the American race that once dwelt in what is now called Ohio, a description of whose remains is given in the ensuing chapters.

CHAPTER II.

LICKING COUNTY AND OPENING REMARKS.

Messrs. Squier and Davis in their volume, *Ancient Monuments of the Mississippi Valley*, have given a series of surveys of earthworks and enclosures, mounds and fortifications, which, taken as a whole, is sufficiently accurate to follow. There are certain of the more important structures which have been resurveyed with improved instruments, and hence the maps that have been made of Fort Ancient, the Serpent Mound, and Fort Hill are more accurate and correct in detail. Assuming that every one is more or less interested in American archæology and familiar with Squier and Davis' book, we shall proceed at once to the tumuli, graves, and village sites which were explored between the months of June, 1885, and October, 1890, taking it for granted that reference on the part of the reader to the maps in *Ancient Monuments of the Mississippi Valley* will establish the location of our excavations. Reference has been made to the plates in the above-mentioned work, and overlooking all small errors that may have resulted from carelessness or inferior measuring instruments, we would emphatically say that, in our estimation, no work of

recent times has approached that of Messrs. Squier and Davis in the accuracy and numbers of maps set forth. We know, from excavations and our own surveys, that in the truthfulness of their reports they frequently have been over-cautious and moderate in their enumerations of finds in order to keep entirely within the bounds of truth. Frequently in trenching mounds previously explored by them, we found shafts they had sunk from the summit, and, by following the disturbed earth into hard layers near the base, were able to discern the pick and mattock strokes still plain on the sides of the excavation. While we do not desire to give countenance to their conclusions, and believe much of their work to have been hastily projected, yet we are confident of the very grave errors committed by those who have endeavored to prove them untruthful and grossly inaccurate. So much for Squier and Davis, and our reasons for hereafter referring to their maps.

In the valley of the Muskingum River and its tributaries there are numerous evidences of the existence of aboriginal man. From the Muskingum eastward, through Ohio, there are but few mounds and village sites, the country being very hilly and broken, the soil, as a rule, poor, when compared with other sections of the State. But in the proximity of the Ohio River, from Pittsburg to Cincinnati, there are numerous tumuli, village sites, and earthworks. When we consider the great fertility of the soil nearest the Ohio and of the valleys of its principal tributaries, we are not surprised that primitive man should have chosen to live in places

where all conditions were most favorable for him to cultivate corn, beans, and tobacco, rather than to dwell amongst the high and gloomy hills, where tangled underbrush and the irregularities of the surface would impede his progress while in pursuit of game. Before speaking of the Muskingum valley, at length, we would say it is evident that in the southern portion of the State he has left scarcely any traces of occupancy. We refer to a region known as the "Sunfish Hills," which extend between Portsmouth and Georgetown on the south, Chillicothe and Hillsboro on the north and south. The valley of Brush Creek, however, which passes directly through the Sunfish Hills, has some evidence of his existence—the Serpent Mound, Fort Hill, several village sites, and a few mounds,—all of which were described by Professor F. W. Putnam in the *Century Magazine* of March and April, 1890.

In Muskingum and Licking counties we also note a scarcity of mounds in the hilly sections. Near Rix Mills, in Muskingum County, are three small mounds, all placed upon high points of land; none of these are more than six feet in height, and their exploration yielded nothing of interest or value, a few skeletons only, being found within them.[1]

In Licking County no large mounds are found back of the watercourses. As we have noted in Muskingum County, there are a few small mounds, scattered here and there, occupying prominent points upon the highest hills. In all elevated regions throughout the State we find these small

[1] Explored in June, 1882.—W. K. M.

isolated mounds. Excavations show them to be so unimportant that they cannot be classed with the great works of the Miami, Scioto, and Muskingum valleys. The water-sheds between the rivers just named contain more of the small mounds referred to than the Sunfish Hills or the elevations of the coal regions. Some of the hill-top mounds will be described in Chapter III.

The northern portion of the State is singularly deficient in mounds and earthworks. A line drawn from Darke and Shelby counties on the west, to Columbia County on the east, represents the farthest extension northward of the mound groups. We are aware that some of the valleys of the northern tributaries of the Miami, Scioto, and Muskingum rivers contain mounds, and we cannot overlook the existence of scattered mounds in the Maumee, Sandusky, Vermilion, Cuyahoga, and Grand River valleys. There are many fertile tracts and localities in the northern part of Ohio which aborigines, in all probability, would have found desirable for village sites. Why primitive man should have left scarcely any traces in the counties near Lake Erie we do not know. Indians in historic times (Shawnees, Delawares, Wyandots, Eries, and Mingoes) inhabited the shores of this lake, and a few villages of greater antiquity than those left by the tribes just named have been discovered in the vicinity of Toledo, Sandusky, and Kelley's Island. In Allen, Hardin, Marion, and Morrow counties the country is quite flat.

Before the advent of white settlers who have ditched, tiled, and drained thousands of square

miles of land, an enormous swamp belt extended through the counties named. The forest growth is excessively heavy, even at the present day, and, so far as we are aware, the region in early times was not only unhealthy but practically uninhabitable. There seems to be a considerable number of tumuli and village sites at the head of the Cuyahoga and Muskingum rivers in Wayne, Stark, and Portage counties. From an inspection of village sites in the counties just named, along the Maumee River to the west, and in Wyandot County near the head waters of the Sandusky River, we are quite positive in our assertion that only roving bands, who may or may not have been related to the great mound-building nations of the south, moved frequently from one place to another, remaining perhaps only a few months in a spot. They did not manufacture fine implements of stone and flint or construct large mounds; with the exception of a few circles discovered here and there, they built no fortifications. The evidence of aboriginal man in this portion of the State is so scattered and of such a limited character that we do not care to theorize in regard to the movements of those clans living near Lake Erie. We shall treat largely of the early people who dwelt in three river valleys toward the south, and although referring in a general sense to the men of the lake region, yet we think there is sufficient evidence to say that they were much inferior to their neighbors. The village sites examined upon the Maumee River yielded quantities of burnt bones, fragments of pottery, a few awls, celts, and ornaments. Finer objects,

such as carved pipes and copper implements, were not present. The graves were constructed in the sand-banks of the river, and the bodies, judging from their nearness to the surface, were hastily and carelessly buried.

In the summers of 1885 and 1886 a considerable amount of work was done upon the village sites and mounds in the neighborhood of Granville, Licking County, and at Flint Ridge, ten miles to the southeast. The town is situated in a valley a mile in width. Raccoon Creek traverses the valley, emptying into the Licking River a short distance south of the city of Newark. The valley from Newark northward, for a distance of ten miles, is dotted here and there with mounds on the second and third terraces. The great earthworks known as the "Newark Fair-Ground Enclosures," and described upon pages 67 to 73 of Squier and Davis' volume, the fortified hill two miles northeast of Granville,[1] and the so-called Alligator Mound[2] are all within a mile of the banks of Licking River.

A very hilly region lying to the north called the "Welsh Hills" contains a few hill-top mounds, but no enclosures. Two miles east of Granville, within sight of the famous Opossum Mound referred to above, there is a large village site covering from fifteen to sixteen acres of ground. It is upon the second creek terrace, with its greatest diameter east and west. The terrace lies thirty feet higher than

[1] Plate ix., p. 24, *Ancient Monuments of the Mississippi Valley.*

[2] It is our opinion that this structure represents an opossum rather than an alligator.

the first or latest, and its edge is distant three hundred yards from the water. Through the first terrace flows the creek, and, so far as we are aware, no implements or arms have been found lower than the second terrace.

The habitations of the village site were circular, but we do not attempt to say they were occupied for any great length of time. The ash-pits discovered within the circles of burnt earth were of little depth, and the amount of animal bones found was far less than those of the great villages of the Miami and Scioto valleys. The village site in question was probably occupied during the summer months by tribes whose home was lower down in the Muskingum valley, and here they fashioned implements of flint. The distance in a straight line from the flint quarries on the ridge is but ten miles. Numerous broken and unfinished arrow-heads, thousands of flint chips, flakes, cores, and hundreds of large blocks of raw material lie scattered over the surface. The beautiful colors so common in the chalcedony of Flint Ridge—blue, pink, red, yellow, and pure white—are noticeable in many of the specimens. No pestles and but few celts were picked up. Stone hammers, both grooved and ungrooved, portions of elk and deer antlers, and numerous broken stones, discovered upon spots where the chipping was carried to the greatest degree, gave indisputable evidence of the object of the location of the village. A great many fragments of pottery, resembling those in the Muskingum valley nearer the Ohio River, occurred in the ash-pits, and led us to

conclude that tribes living at no great distance had occupied the lodges.

One and a half miles west of Granville is a larger village site. It occupies a hillside to the south of the creek, and is distant a quarter of a mile from the stream. From an examination of the spot we conclude it to have been occupied during summer and winter. Both pestles and grooved axes have been found, and it is therefore probable that corn was raised in quantities. There are some mortars at the top of large glacial drift bowlders in the neighborhood, and we know that mortars were extensively used for maize grinding. A few flint flakes and chips exist upon the surface. Burnt stones are to be found in large quantities, together with broken animal bones and ashes, marking the position of each family lodge. Pottery is also found everywhere, and is of the rougher, undecorated kind, moulded, while in a plastic state, within rush baskets, as it retains upon its outer surface the imprint of the reeds.

Professor Appey has opened quite a number of mounds in Licking County. His finds have been of a different character from those made in other portions of the State. We believe that ornaments of slate occur in mounds in the vicinity of Granville and Newark, if the reports of those examined are to be relied upon, as they undoubtedly are. No altars and scarcely any copper, but few shell ornaments, and few, if any, Busycons have been taken from the mounds of this region. The skeletons, as a rule are well preserved. Many of them are accompanied

by beads and bone awls, and, occasionally, pipes. The entire skeleton of a bison was found by Professor Appey in a large tumulus, associated with human remains, but we have no details of the discovery.

Raccoon Creek valley (partly in the neighborhood of Granville, as previously mentioned) contains many mounds, all of them smaller than the average Ross County tumuli. Primitive man here seems to have devoted most of his time to the working of flint implements, and probably lived chiefly by exchange with the tribes who came from a distance to secure the superior chalcedonys of Flint Ridge.

There is quite a large village eight miles northwest from Granville, near the banks of Raccoon Creek. The stream opposite the village is very small, and we think there are no habitation sites of more than ten or fifteen lodges in extent farther up. The site just mentioned must have accommodated forty or fifty tepees. The debris upon the surface is identical with that of the town upon the south side of the creek, one mile and a half above Granville.

As will be seen in the following chapter (which treats of the remainder of the Muskingum valley), the village sites and contents of the mounds are largely similar in character. Undoubtedly the whole valley was occupied by the same race, and this race, according to cranial peculiarities, is called the dolicocephalic stock.

CHAPTER III.

THE MUSKINGUM VALLEY, FROM MARIETTA TO ZANESVILLE.

Although the Muskingum valley is undoubtedly very rich in prehistoric remains, but little work has yet been done to ascertain facts pertaining to the life of those primitive men who once dwelt along its beautiful shores. We can assign no reason for our limited knowledge concerning its pre-Columbian inhabitants, unless it be that investigators followed too closely in the footsteps of Squier and Davis. These gentlemen confined their attentions largely to the Scioto and Miami valleys.

Mr. Fowke's observations upon Flint Ridge, Mr. Davis' remarks concerning the mounds and village sites lying between Zanesville and Marietta, Dr. Cresson's study of the crania, and Mr. Moorehead's brief sojourn in the valley may give the reader an idea of the domestic life of the long-heads who predominated in eastern Ohio. It is very interesting to note that the short-headed people did not monopolize the Muskingum valley as they did the Scioto and Miami regions. Dr. Cresson believes from his study of the crania of this region that the dolicocephali predominated, and as among other people of

this type were not competent to hold their own in intellect and attainments in the art of implement-making and in the construction of mounds and fortifications; but in the western and southwestern part of the State they were enslaved and conquered by the more numerous short-headed race, and hence lived in the hilly regions of Clermont and Clinton counties and the valley of Brush Creek, as mentioned in Chapters IX. and XVI.

Beginning at Marietta, we find the wonderful series of embankments shown in Plate 26, pages 73 to 77 of Squier and Davis' *Ancient Monuments of the Mississippi Valley.* Proceeding up the river we find the mounds and village sites of the dolicocephalic race upon the second and third terraces and frequently upon the high points of land two or three miles removed from the river. The structures do not closely resemble those of the Scioto and Miami valleys.

No better idea can be obtained of the Muskingum valley than from the substance of a letter written by Mr. Willard H. Davis on December 14, 1891.

He has observed during an acquaintance of twenty years with the Muskingum River, among hills, terraces, and alluvial lands from Marietta to Meigs Creek, in Morgan County, mounds irregularly distributed. But one mound was ever found upon the alluvial bottom.

One mile and a half from Marietta, upon the farm of Mr. Strecker, are two mounds three or four feet in height. In the same neighborhood are sev-

eral mounds upon the farm of Josiah Deveol, one fourth of a mile from the river. Mounds are also numerous in the following localities: just back of Devol's dam near Marietta, on John Drake's farm in the same neighborhood, upon the farm of Joseph Stow five miles up the river, on Bear Creek upon the farms of Messrs. Wilkings, Snyder, etc.

It is very interesting to note that Mr. Davis has occasionally found whole pottery in the mounds. Pottery is very rare in the tumuli of any section of Ohio, although it has been frequently found at Madisonville and occasionally in the Miami valley. In exploring the mound upon Mr. John Drake's farm, a whole pot, decorated, filled with charcoal and ashes, was taken from a point three feet below the surface. There seems to have been nothing else in the structure, except a badly decayed skeleton.

Just below the mouth of Bear Creek is a small village site, while on the high bluffs above there is a fair-sized mound which commands a good view of the surrounding country. As in the case of the major portion of the mounds throughout the Muskingum valley, it seems to have been designed more as a place of observation than for the interment of the dead.

Above Bear Creek there is a fine alluvial bottom, and near the hills a splendid gravel terrace, one third of a mile in width, extends for some distance. An elliptical stone mound, thirty-five by twenty-five feet, and four feet in altitude, a village site and other evidences of occupation are upon this terrace. In May, 1881, the mound was thoroughly

explored ; two copper bracelets, slightly oxidized, and human bones, were found scattered among the stones.

The hills, several miles above Bear Creek, recede from the river to the northwest and leave a broad bottom, part of which is occupied by a terrace similar to the one described above. A large village site and several mounds are located upon the terrace on the Davis estate, Wilkings, Snyder, and other farms. One of the mounds, forty feet in diameter by four feet in height, was explored with the following results :

Near the surface was a decayed skeleton and a polished hematite spherical object. In the centre, above the base line, was an ash-pit containing an arrow-head, while at the bottom lay a decayed body. A cannel coal gorget, four by six inches with two perforations, was found upon the breast. There were no stones in the mound. One hundred yards west of the structure is a ravine, on the west side of which once existed a small mound. A few rods farther west a roadway is traceable. It has been cut into the bank of the terrace, and leads from the top of the hill above to the river bottoms below. As in the case of some of the Miami valley terraces it is under discussion regarding its origin, whether natural or artificial. Upon the river bank at this point, many mussel shells, flint chips, and pieces of pottery seem to indicate the presence of a village.

There are three mounds surrounded by a semicircular embankment near the same spot. The circle has an inside ditch. A fourth mound is

distant fifty yards west, on the edge of the bluff at the bottom of which runs Wilson's Creek, a small tributary of the Muskingum. Mr. Davis thoroughly explored these mounds and also made excavations in the semicircle, finding flint implements, an unfinished sandstone tablet, and decayed skeletons. The best entire earthen pot, which it was his privilege to take from the tumuli in his neighborhood, was found at the head of one of the skeletons in the largest mound. The vessel had a contour like a cocoa-nut, and exhibited on its exterior the impression of a twisted bark basket.

A most singular slate effigy was found upon the surface near the semicircle. It is of banded slate three and a half inches long, the upper portion being semicircular, the lower portion having been drawn and narrowed until it gracefully ends in a fair representation of a child's feet and toes. So far as we are aware no effigy of this kind has ever been found in the State of Ohio.

Several mounds lie on the Davis estate on the bluffs overlooking the Muskingum. From their summits views can be had for a distance of eight or ten miles up the beautiful river. In reference to these mounds much cannot be said, except that a few relics, cremated skeletons, and mussel shells were in the tumuli, and the usual village site debris upon the hearths. One or two stone graves are also to be found on this property.

In December, 1888, a mound upon the farm of Mrs. Mary Hall, seven by forty feet, was examined. The position of nine skeletons was strangely like

those which we have taken from mounds containing dolicocephalic crania in Clinton, Clermont, and Brown counties. The ash-pits were small, and one or two layers of sandstone slabs were observed. Upon the same farm a skeleton was found in a small mound surrounded by limestone slabs. The interment was similar to the one mentioned in Chapter VIII., to some of the burials made in the Taylor Mound. The stone coverings were fitted so closely as to exclude earth, and when lifted off gave a perfect view of the body. About the wrists were beads of copper, bird bones, elk and bear teeth, with short pieces of buckskin strings preserved by the copper; a small grooved axe[1] and a bone awl accompanied the remains.

Another small mound, just to the east of the one described, was excavated by Mr. Davis. In it he found three skeletons with heads to the east. With them were elk teeth, beads, and a worked hematite object similar to a cylinder. A mound west of the group enclosed by the semicircle, as described above, was found to contain four skeletons. The largest of the skeletons was placed in one of the stone graves, such as are described in Chapters VIII. and IX. The head of this skeleton was separated from the rest of the body by a distance of a foot. A large stone was placed in an upright position back of the head, and another large one stood near the lower jaw. Thus the head was enclosed in a small stone

[1] In all our mound explorations we never found a grooved axe. The find is certainly very remarkable. *Ungrooved* axes, however, are common in the tumuli.—W. K. M.

box-shaped cavity entirely separate from the one that enclosed the body. Seven dark-gray sandstone objects, similar to an axe in outline, and a cup, constructed from the shell of a land tortoise, were with the head. In the right parietal was an aperture where an arrow had penetrated the brain. The point was found within the skull. One of the fragments of another cranium had a small arrow-head imbedded in it.

Just above Cat's Creek, which empties into the Muskingum a mile above Lowell, is a gravelly terrace on which are eleven mounds and a small enclosure. This is the only enclosure in the Muskingum valley, save the large one at Marietta. The highest mound between Marietta and Zanesville lies upon the farm of John Newton. It is twelve feet in altitude and has a base of ninety or one hundred feet. North of the enclosure is a small mound which Mr. Davis explored, finding upon the base line an altar four feet square, dipping toward the centre, and six inches high. In the altar were the following objects, together with charcoal and ashes: a sandstone tablet, three by four inches, and half an inch thick; a diamond-shaped tablet of slate, two and a half by three inches; a flint spear-head five inches long; a striped slate ornament four inches in length, with two perforations; another beautifully polished ornament, oval-shaped, with two perforations; a thick tablet of sandstone four inches in length, a somewhat smaller tablet, fragments of copper, and a tube of clay and sand.

Below the altar just described were found logs ten

to twelve inches in diameter resting upon a second and larger altar, but in it there were no remains.

It is very singular that hematite should have been used so largely by the aborigines of the Muskingum valley for fashioning implements, when tribes of the Miami or Scioto regions used it only to a limited extent. Mr. Davis reports finding a highly polished hematite celt and cone and fragments of hematite in a tumulus upon the same terrace as the altar mound. Upon a terrace near Big Run a rich stone mound was examined, in which were found fragmentary bones and four large beautiful slate ornaments all perforated for suspension. These were six or seven inches in length and beautifully worked.

Copper in the Muskingum valley is exceedingly rare. In a mound near Rainbow Station, upon Mr. Joseph Dayrs' farm, was a decayed skeleton. At the hips lay a copper spear-head six inches in length. At the head lay a copper disk three inches in diameter with a central perforation. In a mound upon Mr. S. S. Stowe's land Mr. Davis found the bones of a young woman in a kneeling position with a child's skeleton in her arms.

There are surface indications of a large village site near the same place. (This is not far from Lowell.)

In Mr. Davis' letter some twenty more mounds were mentioned than are here recorded. Nearly all of them he had explored, and found objects similar to those described in the preceding pages. The village sites he found to be small when compared with those in the Scioto and Miami valleys. But while no single village site equalled in extent the

ones at Hopewell's, Fort Ancient, or Madisonville, yet when combined they would contain a population equal to the larger towns in the western part of the State.

He finds no high mounds or extensive fortifications, and even such as he found are not near the river, but are usually on high ground. The predominance of slate objects is noted in the mounds of the lower Muskingum valley, and many of them occur in Clinton and Clermont counties. None of the fine objects, such as we describe in Chapter XV., were discovered. The crania are all dolicocephalic.

In size and contents the mounds are very like those of Clinton, Clermont, and Brown counties, where the long-headed stock had small villages. The copper found in the mounds may have been obtained by force in wars with the Scioto valley peoples. From the limited extent of the villages and the general inferiority of the implements and ornaments to those found in the short-heads' country, we are of the opinion that primitive man in the Muskingum valley was a confirmed warrior, waging battle with the short-heads to the west for many years, keeping up his towns upon the Muskingum as headquarters, to which the marauding bands which he sent out might return.

The upper Muskingum, namely, the valleys of the Licking and the Tuscarawas rivers, contains several large fortifications and two or three hundred tumuli. The Tuscarawas region has never been thoroughly explored, and therefore little is known regarding it.

Concerning the Licking region, we are of the opin-

ion that the skulls are dolicocephalic. Judging from the field evidence it was occupied by a larger body of the long-heads than were in the lower Muskingum. Living so near Flint Ridge—to which all tribes were compelled to resort for material to be used in the manufacture of implements—they probably suffered greatly by the incursions of flint-seeking tribes. Hence we can readily see why it was necessary for them to erect earthworks and fortifications. The southern portion of their country needed no such protection.

In Chapter IX. further testimony will be offered concerning a few villages of the long-heads that have been found in the Miami and Scioto valleys.

CHAPTER IV.

FLINT RIDGE.

Aboriginal man was a practical lithologist. Unacquainted with any method of reducing ores, he was unable to avail himself of the harder metals, and consequently was compelled to utilize some form of stone in the manufacture of implements intended for ordinary use. The glacial drift, covering three-fourths of the State, furnished an abundance of material for axes, pestles, celts, and other utensils required for rough work; but, while quartzite, syenite, and diorite are well adapted for making any tool or weapon which must be both hard and tough, they are unsuitable for use when a keen cutting edge is necessary. For the latter purpose nothing else at the command of the ancient artificer was so suitable as the different varieties of chalcedony. Obsidian and the various forms of agate, so plentifully at the command of Indians in the extreme west, could not be obtained by the prehistoric inhabitants of the Ohio valley, who were therefore forced to adopt the flint, hornstone, chert, and chalcedony found nearer home. These occur in quantity from central Ohio eastward, generally imbedded in limestone, but sometimes replacing that rock to a

small extent. Many of these deposits contain stone that is coarse, impure, of uneven texture, or otherwise unsuitable for the needs of the primitive hunter or warrior. Direct exposure to atmospheric agencies also detracts from its availability, the manner of cleavage being so altered that the stone no longer splits into conchoidal flakes when struck, but shatters or breaks into irregular fragments. Thus, while a small, sharp-pointed fragment of stone, such as could be picked up almost anywhere, might be serviceable for an arrow-head, the requirements of a manufacturer of finer flint implements were more difficult to meet. He must have a stone very hard and compact, of homogeneous texture, free from any admixture of foreign material, with a definite line of fracture that could be determined beforehand, and covered by a stratum of earth or rock which would prevent deterioration by weathering; at the same time the overlying mass must not be of such depth or solidity as to prevent convenient access to the desired material.

In the State of Ohio there are two flint deposits presenting these essential features to a marked degree.

The first of these is between Newark and Zanesville. At no other place in the Ohio valley can be found so great a quantity of this material; and probably nowhere else in the United States are to be seen aboriginal excavations on so extensive a scale. The magnitude of the deposit is such that it has given to the locality the distinctive name of "Flint Ridge," by which it is well known to geologists and

collectors. Its outline is extremely tortuous, owing to the erosion that has made the whole country a succession of hills and ravines. Throughout its length it forms the cap-rock of the high land, all the superincumbent material having been either removed or converted into soil.

The salient points of the surface in the region being practically in a horizontal plane, while the dip of the rock is to the southeast, it follows that the flint stratum was, at its eastern end, first covered by a considerable thickness of earth. The rounded knolls characteristic of the landscape are in some places eighty feet above the flint. This, however, is not common; for the most part the overlying earth is only a few feet in depth, and toward the ends or sides of the numerous ridges the flint stands out in relief.

Geologically the formation belongs to the carboniferous or coal-measure rocks, being the last or uppermost layer of the "Putnam Hill Limestone" of the Ohio Geological Survey.

A fine bed of cannel coal lies one hundred and four feet below the flint, and is mined on a considerable scale. Bituminous coal also is found south of the ridge, some distance below the level of the flint stratum; the exact interval has never been measured. If the Kittaning coal of the Pennsylvania Geological Survey were extended thus far toward the west, it would lie about thirty-five feet above the flint.

The western extremity of the flint is found in a detached hill in Franklin Township, eight miles

southeast of Newark. It here appears as a porous stone, similar to buhr or millstone, but more open or cellular. This continues only a short distance, when it is cut off by a depression formed by ravines having their beginning on opposite sides of the ridge, of which this hill was formerly a part. These ravines have worn back until they have broken down and removed all the flint, as well as much of the subjacent rock.

Beyond this depression is a level tract extending eastward a little more than a mile, with an average width of about four hundred yards. Much of the flint about the outcrop is of the same nature as that to the west; but there are several places where the exposed portions are quite solid and nearly white in color. The main body of the deposit has been protected from weathering by a considerable thickness of earth; in places where this has been removed the flint proves to be translucent, very dense, and with a decided tinge of blue, thus almost answering the description of chalcedony.

Another depression similar to the one noted above, and due to the same cause, terminates this body of flint to the east. In this, on the north side, is a mine from which the cannel coal has been taken for many years.

Reappearing east of this depression, the flint extends without another interruption for nearly three miles. The outcrop along the northern side of the ridge in this part is tolerably regular, and follows, approximately, an east and west line; on the southern side, however, several spurs project to a distance

of more than half a mile. There are also detached hills and ridges which once were connected with the main ridge, but have been cut off by erosion.

Beyond this large area of flint is an interval of three fourths of a mile in which the flint is entirely absent, except in scattered fragments or boulders sufficiently compact and homogeneous to resist the destructive atmospheric agencies that have reduced the general level from forty to sixty feet below the surface of the limestone which underlies the flint stratum.

After passing this the flint is again found, but much of it is buried beneath a thickness of earth that precludes any definite knowledge of its nature. Such of it as is visible, either along the slopes or occasionally in places on the surface where removal of the soil has been more marked, is either buhr-stone or a white, compact stone whose monotony of color may be due to weathering; for fragments about the ancient quarries show a considerable variety in texture and color, many of them being quite translucent, others containing an amount of carbonaceous matter that makes them almost black, while still others have the bluish-gray tints of chalcedony.

This portion of the deposit, which at one point is almost a mile in width, extends in a general easterly direction for fully a mile beyond the Muskingum County line; it then trends toward the north, forming a curve whose farthest limit is a mile to the north of any other part of the ridge.

How much farther it may have extended eastward cannot now be ascertained; but the present termination is certainly much within its original boundary, for the rock which juts out from the hillside at its very extremity is thicker than the flint at any other point, there being a vertical exposure of fully seven feet. How far downward it may reach is not known. In a number of places in the west and middle portions of the ridge, wells have been dug and other excavations made; but nowhere has the stone been found more than four feet in thickness.

The entire length of the deposit, measured on a section line, is eight miles, and its greatest breadth is three miles. Its actual area as it now exists is probably not more than four square miles, the remainder having been removed by denudation. It is not improbable that, as deposited, it comprised fully thirty square miles, with an average thickness of four or five feet.

Baryte is found in small quantities in some places; quartz crystals are abundant; while nearly all the flint, except the clear chalcedony, is highly fossiliferous.

As to the evidence of human occupation and industry, the first remains of this nature are on the western end of the level tract mentioned as extending to the depression in which the coal mine is situated. A space of about ten acres is here surrounded by an ancient wall built of flint blocks that have been gathered up along the outcrop on the hillsides. The enclosure has almost disappeared, the stones

composing it having been hauled away by those cultivating the field. Enough remains, however, to indicate its outlines. It commanded the valleys to the north and south, the wall being carried along the hill just at the top of the slope on either side, and connecting across the level surface of the ridge. Before being disturbed it was fully five feet in height and eight or ten feet in breadth at the base.

Within the walls are two mounds not more than thirty feet apart. One, built entirely of earth, is fifteen feet in height, and seventy-five feet in diameter at the base; the other, a pile of loose stones heaped together, is not more than three feet in height, with a diameter of fifty feet.

This structure was undoubtedly designed as a fort. From the north or south, approach is possible only by climbing a steep hill strewn thickly with angular fragments of flint and sandstone; from the east or west an attacking force would have a level space to cross, with little opportunity for shelter from the missiles of the defensive party.

Nothing else of artificial character is found on this hill; there are no quarries, workshops, or other remains, until the great deposit east of the coal mine is reached. Here occur the most interesting features of the entire region. Few persons have ever seen more than a small part of it, and yet such superficial examination as can be made in a day's visit will impress the observer with a feeling that he is viewing the scene of operations by comparison with which the construction of Ohio's most extensive earthworks would be mere holiday sport.

On almost every farm thousands of cubic yards of earth have been removed that the flint beneath might be reached. Acre after acre has been so thoroughly excavated that scarcely a single foot of earth or stone retains its original position. Hundreds of wagon-loads of spalls cover the ground, the refuse of ancient implement making. In many places one may walk forty rods or more in a direct line with the certainty that nowhere within fifty feet of him would it be possible to find a spot that had not been dug for a depth of five to fifteen feet, or even more. To comprehend fully the labor necessary to accomplish all this, it must be borne in mind that the subsoil is as solid as the earth in a public highway. Sharp picks, wielded by muscular arms, cannot be driven into it more than two or three inches. The stone, when reached, is so extremely hard that, unless favored by a baryte or crystal deposit, a person, in digging a well, for example, may have to work an entire day with the best steel drills in order to make a hole deep enough to put in a blast. When one witnesses the slow progress made by good workmen aided by steel and powder, and remembers that the Indians had no better tools than they could fashion from wood, bone, or stone, and when he finds further, that it requires several days merely to walk over the area included by the ancient quarries, he realizes the vast amount of toil involved in these excavations.

Eleven miles from Newark the Zanesville road is intersected by the road leading from Brownsville, on the old National Pike, to the Baltimore and Ohio

Railway. This point, locally known as "The Ridge Cross-road," is one mile east of the coal mine, and three miles north of Brownsville. For fully half a mile to the east, west, and south, and half that distance to the north, the debris from pits and workshops literally covers the surface, not only on the spurs and minor ridges, but in many places on the lower ground. Most of the stone is very solid, though some of it is so porous as to be unfit for use.

One of the pits near here is almost a hundred feet in diameter. A pole eighteen feet long has been thrust full length downward into the muck with which it is filled, without reaching the bottom.

The flint in this entire central area shows an almost endless diversity in coloring. Much of it is milk-white. There are large beds, perhaps a hundred acres in all, of striped jasper, the colors being alternate light gray and dark gray in thin and regular bands. This is an excellent material for arrow- and spear-heads, and has been extensively quarried. Segregated masses occur of lustreless, dull black, gray, or yellowish-brown. These contain various impurities, and apparently were not sought after. At various places, but mostly in the immediate vicinity of the cross-road, are immense deposits of what should have a distinct classification as "Flint Ridge Stone." It is a chalcedony, pure or nearly so, but differing somewhat in appearance from that in any other known locality. When thoroughly protected from weathering it is of a light grayish-blue color, translucent in pieces of considerable thickness,

exceedingly hard, and yet, when freshly dug, easily wrought by the usual methods in vogue among modern Indians. When exposed to the atmosphere for a long period it assumes an almost infinite variety of tints, equalling or even surpassing in beauty and brilliancy the finest agates or carnelians. But, no matter how it may have changed in other respects, it retains a peculiar gloss or lustre that enables one familiar with it to detect at a glance an implement from this locality, no matter where it may be found. This property has been useful in aiding to establish two facts. First, that people using it covered a wide territory; weapons made from it have been found in New York, Illinois, and eastern Virginia, as well as nearer to its source. Secondly, that the aborigines resorted to this spot for a long period of time, perhaps many centuries; chips or blocks of exactly the same composition found side by side on the surface vary greatly in appearance, some being as yet scarcely affected by the exposure, the exterior of other pieces being completely changed in color, while in still others the change of color may be uniform through the fragment.

It was quarried anterior to the construction of some, at least, of the large mounds in Ohio and West Virginia, for many arrows, cores, and flakes of it have been found in them. In the large mound described in chapter xiv., a chip of it was found lying upon the original surface as if it had been carelessly thrown there prior to the beginning of the first or oldest part of the mound.

It was unquestionably used by the Indians occupying the Ohio valley at the time of its settlement by the whites, for thousands of implements made of it have been picked up on or very near the surface of the ground in spots where it is known that modern tribes had their domicile in quite recent times.

Several hills situated between the ridge and the National road were once part of the plateau covered by the flint; but erosive agencies have cut them off, and they are now entirely isolated. On all of these which retain their former elevation excavations have been made on a very large scale. None of the material here, however, has the diversified colors so noticeable in that nearer the cross-road.

The only indications of permanent occupation along this portion of the ridge are three circular enclosures—two near the cross-road, now obliterated by cultivation, the third a mile and a half south. The last, which is still quite distinct, consists of an embankment with interior ditch, the outer diameter being about three hundred feet. They are probably the sites of small stockaded villages or camps. There are also two small mounds of earth, both of which have yielded human bones to investigators.

On the third principal deposit of the flint, that lying along both sides of the line between Licking and Muskingum counties, the excavations are on a smaller scale than those heretofore noted. There is but one group of pits west of the county line; these extend over an area of five or six acres. They occur at a place where the covering of earth was quite thin, and present no features worthy of special notice.

The first excavations in Muskingum County are small. The stone is of the same general character as the chalcedony at the cross-roads, and therefore well adapted to the uses made of it; but the quantity of earth to be removed before it could be reached was an obstacle too great to be overcome, and the attempted quarries had to be abandoned.

It is not until the margin of the flint area in this direction is reached that evidence of extensive work is found. Almost the entire spur forming the northern and eastern extremity of the deposit has undergone extensive denudation, owing to the peculiar arrangement of the drainage system about it; consequently the stone is easy to reach. The pits extend very nearly to the final outcrop on the east and as far toward the north as workable material is to be obtained. But they are all shallow, and the immense piles of refuse show that only a small portion of the stone obtained was fit to be wrought into implements.

Careful researches by various parties have shown the methods by which the primitive worker obtained the coveted material and made from it weapons or implements suitable to his wants.

Probably numerous experiments and repeated failures in working the fragments found on the surface had taught him that if he wished to make specimens of symmetrical form and definite outline, he must procure a stone that was solid and uniform in texture. Either by accident, or by the use of his reasoning powers, he discovered that such material is to be found in the ground instead of upon it.

Digging away the earth with such tools as he could improvise—pointed sticks hardened by fire, antler, bone, or stone,—he came to the surface of the flint. This resisted all his efforts until he thought of the effects of heat. Placing wood upon it, he set fire to the pile. When the stone had reached a high temperature he threw cold water on it; this caused it to shatter and crack in all directions. Casting aside the fragments, he repeated the operation, until he had finally burned his way to the limestone beneath. Removing all burned portions of the flint, he next procured a quantity of fine clay and spread a thick coating on the top and sides of the stone, to prevent injury to it. Then building a fire at the bottom of the hole, he soon burned away the limestone and the lower part of the flint stratum, leaving the top projecting. This he broke loose with large boulders of quartz or granite; hammers of this sort, weighing from twenty to one hundred and fifty pounds, have been found in the bottoms of pits that have been cleared out. Knocking loose the clay, which had burned almost as hard as the stone, he found himself in possession of a block of clear, pure flint. By means of the same hammers he broke this into pieces of a convenient size for handling. These were carried to a spot near by, which may be termed a "blocking out" shop. Here they were further broken by smaller hammers, and brought somewhat into the shape of the implements which were to be made from them. The work was never, or very seldom, carried beyond this stage at the spot where it was begun; the subsequent manipulation was at some

other place, best designated as a "finishing shop." These are characterized by quantities of small chips, flakes and spalls, broken implements, and unfinished pieces, which were unavailable by reason of some flaw or defect not discernible until the final work was begun. The finishing touches were always made by means of pressure with a bone, antler, or some other tough substance. Many finishing shops are located near the quarries, others at a distance, some of them several miles away. The principal one was near the cross-road; here a pile of fine chips, covering one fourth of an acre, and fully six feet in depth at the central portion, existed when the country was first settled by the whites, but from various causes it has been reduced until it now is all of one level. This, while the largest, is only one of several hundred such places.

Second in importance only to Flint Ridge are the aboriginal quarries of Coshocton County.

They are located on the south side of the Walhonding River, four miles above Warsaw. The flint forms the cap-rock of a high hill intersected by numerous ravines, and is covered by a layer of earth whose thickness varies greatly owing to the contour of the surface.

The area worked over, the piles of earth thrown aside by the diggers, and the fragments and blocks of stone scattered about in profusion, show that this was long a place of resort by the Indians.

In one place is a pit more than one hundred feet in diameter, whose depth has never been ascertained, owing to the accumulated earth and decayed organic

matter that forms a bog within it; but the quantity of debris scattered on every side shows that a great amount of labor was expended in opening it. In many other places in the vicinity smaller holes bear witness to the same industry. As a rule, these follow a line parallel with the outcrop of the flint. One of them has been cleared out, and the process of excavation found to be the same as that followed at Flint Ridge. On most of the hill-tops, the superincumbent earth, having in some places a thickness of twenty-five feet, or even more, proved an efficient barrier against such tools as the ancient workers could procure.

The most interesting feature of this quarry is in a ridge or promontory bounded on three sides by the river and a deep ravine, the sides being very steep—almost precipitous in places. A careful exploration of its summit has never been made, but sufficient evidence is at hand to justify the statement that the Indians began work at the outcrop on one side, next to the river, and followed the flint stratum entirely across to the outcrop above the ravine, throwing the earth and refuse material behind them as they proceeded. Probably five acres have been removed in this manner, while the sum of the areas dug in the different pits would be still greater.

The flint forming this deposit is of various shades, from a pale amber or "honey color" to a jet black, much of it being banded like agate, or variegated with colors imperceptibly blending. The lighter varieties are translucent or almost transparent, in pieces of considerable size; the darker are

usually opaque except in very thin chips. In much of it the grain is as close as in the finest agate or chalcedony, consequently it is susceptible of very delicate manipulation. Some of the specimens from this locality are as thin, symmetrical, and highly finished as can be found among the best of those belonging to the neolithic age of Europe, and many may be found which, after decades or even centuries of exposure to an inclement climate, have an edge or point almost as keen as a piece of freshly broken glass.

To a people living in the condition of the early inhabitants of the Ohio valley, stone possessing such qualities was invaluable. Arrows, spears, and knives were essential to their existence, and in the absence of steel or iron no better material is obtainable for the manufacture of such implements than the finer grades of chalcedony, of which the Coshocton flint is a variety, or the "Flint Ridge Stone," which is fully equal to it. That the aborigines fully understood their worth for such uses is proven by the evidences still remaining of the great amount of labor which they performed in obtaining them.

There are various other flint deposits in the State that have been worked to some extent, notably those in Perry County. In fact there is scarcely a county along the line of this geological formation, from the western border of Pennsylvania to central Kentucky, where these flint quarries do not occur. None of them, however, present any feature, except it be in the character of the stone, that is different from

what may be observed in the two localities herein described.

A short explanation of the origin of flint deposits may not be out of place.

Certain microscopic organic bodies belonging to both animal and plant creation extract from the sea-water in which they exist small quantities of silica, which enters into their composition as lime enters into the shells of mollusks or the skeletons of animals belonging to a higher class. Most sponges also abstract from the water silica, which may be found in them in minute particles. On the death and decay of these organisms the silica is released and settles to the bottom. Being in the finest possible state of subdivision it forms a very compact mass which, when free from impurities, hardens into fine-grained chalcedony or flint. Should there be contained in it foreign substances of any sort the stone is correspondingly altered, and there may result all the different varieties of flint, chert, buhr, and similar stone, which is so abundant as compared with the purer kind.

It is essential in this method of formation that the water in which it has its origin should be free from currents, and containing a smaller proportion of salt than in the open ocean, otherwise the necessary forms of life will not thrive. These conditions can only be met with in a small gulf almost enclosed by land, or in a depression protected by shoals, and in either case receiving a constant supply of fresh water with silica in solution. In this way is formed most of the chalcedonic stone occurring in large de-

posits. Flint Ridge was thus made; we find the baser stone or chert around the edges of this deposit nearer to the old shore line, while the finer grain of the central deposits shows a body of water untroubled by currents and free from sediment. Moreover, the deposit is irregular in its bedding, being considerably lower in some places than in others, showing that it was laid down on an uneven bottom. The single blocks or boulders, lying in some places many feet above the main body of flint, are of later origin.

A second manner in which rock of this character may be made is by a process of substitution or petrifaction. A body soluble or subject to decay, being covered with water charged with mineral of any sort, will, under certain conditions, be changed from its natural form into one exactly similar in shape and size agreeing in composition with the mineral solution in which it is immersed. As each particle of the original substance is removed it is replaced by a particle of the dissolved mineral; and after a time the entire body is thus changed. In this way are formed petrified forests, silicified wood, and the many fossil remains that have been converted into flinty rock.

Still a third method in which such stone is formed is by deposition. Water settling into a cavity and evaporating must deposit all the solid matter contained in it. If this be repeated a sufficient number of times the cavity will be filled; and should the deposits thus made be of matter held in solution and not merely carried mechanically, they may harden

into a stone much more compact than that by which they are surrounded. Such is the origin of most agates, opals, and stones of that character. Should the evaporation be exceedingly slow crystals will be produced, their size and perfection depending upon the length of time allowed for their completion.

CHAPTER V.

MADISONVILLE CEMETERY.

No aboriginal village site found within the limits of the United States has exceeded in extent that of Madisonville. The hundreds of important discoveries made under the auspices of the Madisonville Literary and Scientific Society, and afterwards completed by the Peabody Museum of Cambridge, Mass., attracted the attention of archæologists both abroad and in our own country. It is extremely difficult to give anything like a comprehensive treatment of Madisonville cemetery in one brief chapter. In attempting to describe the more remarkable features of the place we are compelled to draw largely from the following publications: *Archæological Explorations of the Literary and Scientific Society of Madisonville, Ohio*, part ii., September 1 to December 8, 1879; *The Journal of the Cincinnati Society of Natural History*, volume iii., Nos. 1 and 3; Appendix A of Professor John T. Short's *North Americans of Antiquity.*

The cemetery or village site occupies a plateau facing the Little Miami River, half a mile west of Batavia Junction, on the P. C. C. & St. L. Railway. Prior to the spring of 1879 no thorough work

was projected, and no definite knowledge existed as to the extent and character of the remains. Curiosity collectors of the vicinity had called the place "The Pottery Field."

In March, 1879, Dr. C. L. Metz had in his employ a laborer who, prompted by curiosity, sank an excavation in the southwest section of the plateau. He discovered a skeleton at the depth of two feet. The editors of part i. of the Madisonville Scientific Society's report say with reference to the find:[1]

"This was the initiatory step toward a most important archæological discovery, as further investigation has revealed the interesting fact that the entire plateau is the site of an ancient cemetery, from which have since been exhumed upward of four hundred skeletons of a prehistoric people, accompanied by numerous evidences of their handiwork, in the shape of flint and stone implements, pipes, pottery ware, charred matting and corn, tools, and ornaments of bone, shell, and copper, some of which are believed to be unique, all indicating an industrious people, who lived in large communities, and obtained their support by cultivating the soil, as well as by fishing and hunting."

The gentlemen were afterwards permitted to take thousands of fine implements, ornaments, and utensils, together with nearly eleven hundred skeletons, principally of brachycephalic stock, from the various slopes of the plateau.

"On Friday, March 21, 1879 the excavation, begun on the previous day, was continued, and a skeleton in a horizontal position, with its head to the south, was exhumed. This appeared to be the remains of a female of

[1] *Madisonville Historical Society Report*, part i., page 3.

large size (5 feet 10 inches). Near the left hip was deposited a large earthen vessel, capacity about one gallon; unfortunately this vessel was broken by the spade and thrown out of the trench, but most of the fragments were recovered.[1] Near the head, lay four hollow cylinders, or beads, of polished bone, two to four inches in length, and fragments of some others were found; these were apparently portions of a necklace. Two chisels or gouge-shaped implements, one of horn, and the other of flint, and an imperfect perforated stone implement, were also found with these remains."

During the next two years several hundred skeletons were exhumed, buried under various conditions and in many attitudes. The sitting posture was a favorite mode of burial. Frequently, as in the case of the cemetery at Fort Ancient, the interments were made in groups, but seldom in stone graves. The ash-pits were much more extensive than those we excavated at Fort Ancient. On April 22d to 28th, several ash-pits were opened, varying from three to six feet in diameter. In them they found the unio shells, fine bone implements, broken bones, and other debris such as we have excavated in Warren County. Several entire grooved bone implements were taken from the pits, made from the tibiæ of the elk and deer. One large scraper was made from the right femur of an elk.

"On Wednesday, April 23d, a second ash-pit was explored, but only a few fragments of pottery were found. Close by this pit, a large skeleton, six feet two inches in length, was uncovered. These remains were in a horizontal position, and badly decayed, but a portion of the

[1] *Madisonville Historical Society Report*, part i., page 4.

cranium was preserved as an interesting pathological specimen. In the right parietal was a perforation, the effect of a blow which had crushed the skull, and which had been repaired and almost obliterated by an internal deposit of new bone.

"Another ash-pit was opened on the following day, and several bone implements, together with animal bones and shreds of pottery, were found. One skeleton, in a sitting position, and two in horizontal, with heads toward the south, were also removed. With these two latter skeletons were found small vessels, one at the head of each. Fragments of two other vessels were found in the same excavation." [1]

It is very singular that so many objects should be found with skeletons, in the Madisonville cemetery, and comparatively few in the Fort Ancient and Oregonia cemeteries. In the latter part of April the members of the society dug up seven skeletons in one day.

"Two were in a sitting position, three horizontal, with heads to the south, and two others in the same position with heads directed east. A nearly perfect vessel, and fragments of another were taken from near the crania of those lying north and south. A polished stone implement (chisel-shaped), was found lying by the side; and among the bones of the right hand a medium-sized jasper spear-head was discovered. The third horizontal skeleton was of small size, and the skull rested upon the pelvic bones of the second skeleton." [2]

On April 28th they took from one ash-pit a large tube and the bones of *Mastodon Americanus*. The most important relics found were a sandstone pipe, a

[1] *Madisonville Historical Society Report*, part i., page 11.

[2] *Ibid.*, p. 12.

perforated stone disk, numerous fine bone awls, bone beads, and implements of bone and flint; one large vessel of about three quarts' capacity, and another quite small, not larger than an ordinary teacup—the latter was found with a child's skeleton.

"On Tuesday, August 26th, one of the most interesting discoveries in this cemetery was made. In excavating an ash-pit, a large deposit of several bushels of carbonized maize was found. Newspaper accounts of this remarkable discovery were published at the time, which are more or less erroneous. A correct diagram of the pit is here given, with a brief description of its contents.

"Layer No. 1 consists of about two feet of rich black earth and leaf mould. No. 2 is fifteen inches of gravelly clay, in which were found numerous animal remains, several implements of flint, stone, and bone, an unfinished pipe, and some charred animal bones.

"Next came layer No. 3, about ten inches of ashes, intermingled with bones of a great number of animals, of which the following were identified: deer, elk, raccoon, opossum, mink, woodchuck, beaver, and turkey, together with unio shells of various species. Immediately below this was a layer (No. 4), about four inches thick, of coarse matting and twigs, cornstalks and bark, completely carbonized. No. 5 was a layer of shelled corn, probably three or four bushels, and below this was a quantity of ear corn, all of which was completely carbonized. On the bottom of the pit was a layer of fire-cracked boulders, with some ashes and a few animal bones. The adjoining pit was separated from the corn pit at the bottom by about six inches of clay, and did not differ from the usual pits, except that no implements were found in it.

"August 29th and 30th, two ash-pits were explored, from which the usual implements were taken, and an unfinished pipe representing a bear on its haunches. An

adult skeleton was also exhumed, lying horizontally, head south and face upwards; a vessel was found at its feet. Immediately under this skeleton was an ash-pit three feet in diameter, and four feet ten inches deep." [1]

In Number 3, volume iii., the report of the Madisonville Society describes a very peculiar occurrence:

"On Tuesday, January 20th, an ash-pit was opened three feet four inches in diameter, and six feet in depth; the layer of leaf mould was twenty-one inches, then a layer of ashes thirty-six inches, with sherds, unio shells, animal remains, and burnt limestones; third, a layer of charcoal about three inches in thickness, and below this twelve inches of pure grayish ashes. In these ashes were found an entire human skeleton.

"This skeleton was lying in the bottom of the pit on its back, head toward the northwest, with the lower limbs sharply flexed on the thighs. Surrounding the skeleton were a number of flat limestones ten or twelve inches square, set on edge, forming a wall around the base of the pit. All these stones showed distinctly the marks of fire, but must have been burned before being placed in their present position, as a very careful examination was made of the walls and bottom of the pit and no traces of the action of fire were visible." [2]

In the report of the society for 1879, part ii., September 1st to December 31st, are many remarkable discoveries chronicled. The following quotations will give an idea of the character of the burials.

"On Thursday, 25th, a very interesting ornament was found with the skeleton of a child. It is made of a

[1] *Madisonville Historical Society Report*, part i., p. 27.

[2] *Ibid.*, part iii., p. 42.

single piece of copper of irregular shape, the edges of which have been brought together so as to form a ball, or rather like a sleigh-bell, leaving an irregular opening on one side. A small hole was punched through the top and a strip of copper doubled up and the ends pushed through the opening from the inside, forming a handle. Inside this bell is a fragment of copper, about the size of a large pea, and when the ornament is shaken it produces a rattling or tinkling sound. It is without question one of the most unique specimens of aboriginal workmanship ever recovered." [1]

"On October 7th, three skeletons were uncovered; the first, that of a child, about six years of age, in horizontal position, head east, at a depth of fourteen inches; the next, an adult female, length five feet two inches, head northeast, depth twenty inches; a small vessel was found at the right side of the cranium. The third skeleton, an adult male, was lying in the same position, at a depth of twenty-two inches. From near the right side of the head was taken a vessel, with a base or pedestal, the only one of this peculiar form yet found; beneath the cranium was a small discoidal stone and a bone fish-hook." [2]

"On Tuesday, October 28th, skeleton No. 8 was found, an adult male, with head southeast, length five feet eight inches, depth fifteen inches. A broken vessel was found at the right of the head, and on the left side a pipe made of limestone, well finished, and carved to represent the head of some animal. A copper ornament was also found at the right side of the neck. This relic, which has two bars or cross-arms, is made of a very thin piece of copper, rolled or beaten evenly, with small perforation at one end, doubtless for suspensory purposes; and, excepting the double arms, somewhat resembles the copper ornament

[1] *Madisonville Historical Society Report*, part iii., p. 32.

[2] *Ibid.*, part ii., p. 32.

found in the stone graves of Tennessee, described and figured in the *Eleventh Annual Report of the Peabody Museum of American Archæology and Ethnology*, page 307.

"The total absence in this cemetery of any evidences of contact with European races, of which fact mention was made in our first paper, makes the remarks and conclusions of Professor Putnam, relative to the Tennessee ornament, very appropriate in this connection.

"'The cross-like form of this ornament may give rise to the question of its derivation; and had any article of European make, such as glass beads, brass buttons, etc., so common in Indian graves subsequent to contact with the whites, been found in any one of the hundreds of graves I opened in Tennessee, I should consider the form of this ornament the result of contact with the early missionaries; but, from the total absence of articles denoting such contact, I think it must be placed in the same category with the "tablet of the cross" at Palenque, and be regarded as an ornament made in its present form, simply because it is an easy design to execute, and one of natural conception.'"[1]

In inspecting the contents of the Peabody Museum one is impressed with the extent of the collection from Madisonville. During the time that has elapsed since the Madisonville Scientific Society ceased operations upon the cemetery, both Professor Putnam and Dr. Metz have been very active in the interests of the Peabody Museum. There are so many large cases filled with implements and debris that one can obtain nearly as complete a knowledge of the inhabitants of the village by studying in the museum as in the field. The display is admirably made.

[1] *Madisonville Historical Society Report*, part ii., p. 34.

From an inspection of this collection, the one in the Cincinnati Historical Society rooms, and another in the Art Museum in Eden Park, Cincinnati, we have come to the following conclusions.

More of the short-heads were at Madisonville than upon any other spot in the Ohio valley. They must have dwelt there for many years, using the village as a general rendezvous, to which to return from hunting, fishing, or warring expeditions. They made better pottery at Madisonville than at any other of their villages. They did not construct good stone graves, such as we find farther up the Little Miami valley. From the limited number of dolicocephalic crania taken from the ash-pits and cemetery, we would infer that, in proportion to the size of their town, they suffered less from attack than did the tribes at Fort Ancient, Oregonia, or the Scioto valley.

Possibly the Madisonville people may have resorted to Fort Ancient, in company with all the short-heads living in the Miami valley, upon the appearance of their enemies. It was a splendid structure for defence, and at so short a distance as to render access to it comparatively easy.

We feel safe in placing the inhabitants at Madisonville at the head of the brachycephalic race in Ohio. Probably the *Cacique* controlling all the mound area of southern Ohio had his dwelling there.

NOTE.—Dr. Cresson informs me that he is impressed by the resemblance of many of the bone implements found at the Madisonville cemetery, displayed in the cases at the Peabody Museum, and a few implements exca-

vated by himself at the place, to those of the lake-dwelling people of Europe during the stone age ; in fact, bone implements seem to predominate over those of stone at this cemetery of the brachycephali.

He also states that he believes Fort Ambush at Foster's, Ohio, to have been a stronghold of the brachycephalic people, and has found this type to predominate in the small aboriginal graveyard partially excavated by him at Burton's farm, near Madisonville.

W. K. M.

CHAPTER VI.

TUMULI OF THE EAST FORK OF THE LITTLE MIAMI RIVER.[1]

THE country at the head of East Fork is a monotonous level, except where broken by small streams, but the lower portion is hilly and we find there hill-top mounds such as have been mentioned in the first chapter of this work. The soil is generally of clay resulting from the weathering of the Cincinnati limestone, although considerable glacial deposits are of frequent occurrence. We do not observe the wide fertile bottoms and productive uplands so characteristic of some other portions of Ohio where evidences of aboriginal occupancy are abundant.

As the size and number of the mounds and earthworks seem to be in direct ratio to the fertility of the soil, we would not expect to find within the area drained by the East Fork so many large mounds as are to be seen in sections more favored by nature, or to obtain from them such a number and variety of specimens conforming to aboriginal ideas of utility and beauty. Investigation confirms the belief. Those found in this vicinity do not contain

[1] May, June, and July 1888.

much of importance, and from their construction we would infer that they are the work of a race or tribe who placed small value upon this form of monuments. It has been thought by some authors that the builders were a small clan of the tribe which erected Fort Ancient, and probably had its principal seat in the Miami valley with its chief settlement in a great village at Madisonville. Others are of the opinion that they were a branch of a great tribe inhabiting the Scioto valley. Both theories are untenable, as we will proceed to show.

Fourteen tumuli were examined in this section, and the results are herewith presented.

Mound Number One.—This structure is situated at a high point of land on the farm of Richard Shumard, in Stone Lick Township, Clermont County. It overlooks a deep and narrow valley with almost precipitous sides, at the bottom of which flows a small stream known as Rocky Run. It was two feet in height in the centre, nearly circular in outline, twenty-five feet in diameter at the base, and had never been disturbed by plough or shovel.

The entire mound was removed, and the illustration given (Figure III.) shows its ground-plan. A layer of charcoal was discovered extending across the mound one foot above its original surface. Immediately beneath the charcoal was a floor or pavement of limestone slabs (marked D in the figure) such as may be found in the creek beds or along the hillsides. They were from twenty to thirty inches in length, about a foot in breadth,

and weighed perhaps forty or fifty pounds each. This pavement measured nine or ten feet in breadth.

On taking away the stones at the central portion, we found a layer three inches in thickness of com-

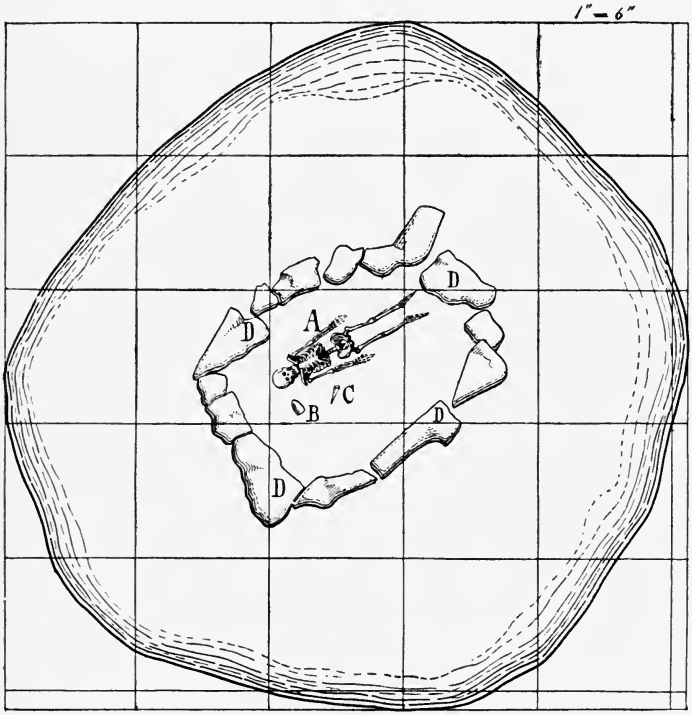

FIG. III.—Ground plan of mound No. 1. Skeleton surrounded by stone slabs. See page 60.

mon soil, covering a skeleton of medium size (A in the figure). We removed this dirt, which had evidently been placed to prevent the stones from coming in contact with the body, and thus endeavored to secure the skull. Although the greatest

possible care was exercised, atmospheric agencies had reduced the bones to such a fragile state that their removal was an utter impossibility, and we were unable to preserve any portion of the skeleton save the lower and upper jaws and some fragments of the skull.

Near the right side of the skeleton lay a small polished bone awl or perforator (c in the figure); about twenty inches from the right shoulder was a finely polished celt of greenstone (B), four and a half inches in length and two and one fourth wide. Underneath the body was a mass of red ochre.

GRAVES.—Before proceeding with the excavation of other mounds along Stone Lick Run several graves were examined. Although these differ somewhat in minor details they, as a general thing, correspond in the method of their construction. First, the surface soil is removed to the depth of a few inches, possibly as much as a foot; then large flat stones are laid down, with other stones set on edge around this floor, forming a rude, box-shaped structure in which the body is placed. Finally, a covering of flat stones is placed over the top. When the vault is finished a mass of earth or stone, or both, is thrown over it and the structure is complete. Inside these box-shaped graves were found skeletons in various stages of decay. No objects or implements were placed with the remains.[1] This peculiarity has been frequently noticed in graves at Fort Ancient and throughout Greene County.

[1] It is singular that *no stone floors* exist in the Fort Ancient or Oregonia graves.

Mound Number Two.—The structure lies upon the farm of Harvey Anderson, just north of the village of Marathon, in Clermont County. It is upon one of the highest points in the vicinity, and from it a view can be obtained of the surrounding country for a distance of three miles. It is now eight feet high and fifty feet in diameter at the base; but, as the field in which it is situated has been cultivated for many years, its original altitude has been considerably reduced. Old citizens of the village informed us that before it was cleared off, it stood twelve or thirteen feet in height, and was covered by large trees.

The work of excavation was begun upon the east side; a trench twenty feet in width was carried through on a level with the original surface, and continued until within a few feet of its western margin.

For some distance nothing was discovered except the usual charcoal flakes, animal bones, and chips of flint which are found in all these structures. The presence of such objects has no significance, as they are scattered over the surface about every Indian village or camp, and are gathered up with the earth that is taken to form the mound.

Fifteen feet from the edge a layer of bark was discovered, about one inch in thickness. It extended nearly the entire width of our trench, and was decayed to such an extent that only a few small pieces retained their structure sufficiently to be identified. The bark rested upon a layer of ordinary clay eighteen inches thick; below was a stratum of

burnt earth, then another layer of clay, and finally the structure resting upon the original surface, a bed of yellow sand. This extended from the point to the centre, where it came to an end and was replaced by a bed of black earth, mingled with charcoal and decayed wood, reaching to about the same distance on the western side.

It was evident that the burned earth was not due to a fire made at this place. It had been carried from some outside point and deposited in the same manner as the remainder of the material composing the mound. Then a large fire is built upon the ground, that is allowed to remain afterwards undisturbed, the effects of the heat being plainly marked at the surface and become less apparent as the depth increases, until they are no longer perceptible. In the mass referred to the color was of a bright red and uniform throughout. The line of separation between it and the next lower stratum was so plainly marked as to admit of no doubt in the matter.

About four feet east of the centre and two feet above the base a skull was uncovered, but not the slightest trace of any other bones could be found. As the surrounding earth was of uniform consistency, the inference is unavoidable that no other portion of the body to which this skull belonged had been placed there.[1]

A little to the east of the highest portion of the mound, about three feet beneath the surface, was found the skeleton of an intrusive burial, covered by

[1] In Scioto valley mound interments of partial skeletons have been observed.

a thin layer of bark or rotten wood. Just west, and at a slightly higher level, were two small thin masses of burned clay, separated by six inches of clean sand; this deposit, however, seemed to have no connection with the skeleton.

Near the centre of the mound a pit had been dug to a depth of nearly two feet below the original surface, and the sides of it burnt quite hard; this was filled with ashes, fragmentary bones, and calcined limestone, intermingled with which were a few

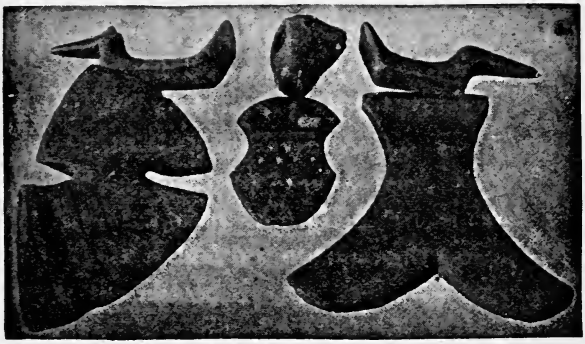

FIG. IV.—Various ceremonial and ornamental objects, Miami valley, Ohio.

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 vertebræ, burned until they were scarcely distinguishable. It was plain that a skeleton or body had been placed on this stone, and then cremated.

The slab was carefully taken from its resting-

place and put where the rays of the sun would not fall upon it; we hoped to preserve it entire, but exposure to the atmosphere caused the stone to crumble rapidly, and the bones to scale off bit by bit, until at last nothing remained but a shapeless mass.

On the east and west sides, at very nearly equal distances (about ten feet) from the central pit, were two small holes, eight inches in diameter and fourteen inches deep, which were very smooth and symmetrical; a small amount of ashes lay at the bottom of each. Holes of this description are called "pockets," or "post-holes," and are of frequent occurrence in the mounds. In them posts or logs were frequently placed as supports for small structures.[1] Other holes, or pockets, similar to these, were found above the lower stratum. Each was neatly covered with a chunk of hard-burned clay, and had in it a few shells and a small amount of fine black earth.

At the centre[2] of the mound, just below the dark stratum, lay a decomposed skeleton. Above this stratum, and a few feet west of the first, lay another skeleton; this was so much decayed that we could only save a portion of the lower jaw. Still farther west, just above the edge of the red clay stratum,

[1] At the Hopewell group, in 1891, we came upon numerous burials in holes or caves three by five or four by seven feet in extent. The skeletons were usually covered by logs and saplings, placed two or three feet above them, and resting upon post supports. When the coverings decayed, considerable earth would fall into the interior. But so long had the logs supported the earth above that it formed a partial arch, the remains lying in the caves thus formed.

[2] It may be well to explain that by "centre" is meant the line extending from the summit to the middle point of the area covered by the mound.

—W. K. M.

lay a rather small skeleton, evidently that of a young person.

All these burials were placed with heads to the west, and each, except the intrusive one at the top, was within a space eighteen by thirty-six inches, indicating that the bodies had been folded or doubled up before they were placed in the ground. Nothing of interest was found with them.

Mound Number Four.—This is in Wayne Township, Clermont County, on the farm of Mr. Crane. It was small, and contained very little charcoal or burned earth.

The remains of two badly decayed skeletons were found. On the breast of one lay a small chisel-shaped celt, and on the other was an arrow-head; by the side of the latter implement lay a scraper of red flint. Nothing else was found.

Mound Number Five.—This is situated on the farm of Mr. John Boyle, in Perry Township, Clermont County; it is in a dense forest on a level table-land, there being no valley or stream within three miles. It measures four feet in height, and thirty feet across the base. Surrounding the mound is an earthen embankment two feet high and seven feet in breadth, with a shallow interior ditch.

Two bodies had been interred; one at the centre, on the original surface, the other two feet above. Beneath the former, of which only a few fragments remained, were a rude flint arrow-head and a sand-stone pebble with two small cup-shaped depressions on opposite sides.

The upper skeleton was partially covered by a

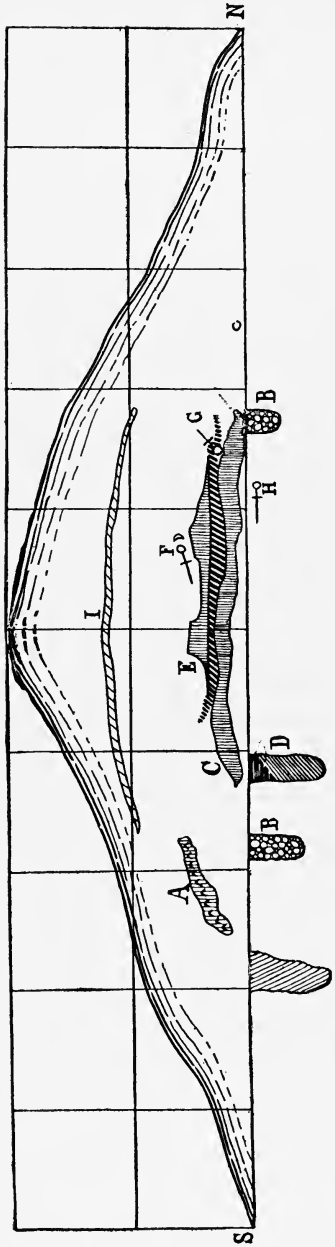

FIG. V.—Vertical section of mound No. 6.

layer of mica, consisting of forty-one sheets, the edges of which had been slightly trimmed to give them a more regular outline. They occupied an irregular space of about two by three feet and were so placed that the edges somewhat overlapped in the same manner as scales on fish. A single piece lying to one side, was much larger than the others, being five by eight and one half inches, and half an inch thick. The skeleton itself was so decayed that no portion of it could be recovered.

A careful examination of the entire tumulus disclosed nothing more than the objects mentioned.

MOUND NUMBER SIX.—The mound about to be described lies upon very high ground and overlooks the East Fork.

It lies upon the farm of Mr. John Boyle, in Brown County, one mile and a half north of the village of St. Martins. It was originally much higher than at present, but the surface has been plowed over for so many years that the mound is now only about seven feet in altitude with a diameter of seventy feet, while a circular embankment of considerable elevation, by which it was formerly surrounded, has almost entirely disappeared.

In this, as in many other mounds that it has been our privilege to examine, a hole had been dug at some former time, from the summit directly toward the base, but, in this case, the work had been abandoned before any damage ensued.

It is a matter of regret that so many persons take it upon themselves to destroy these interesting remains merely for the sake of such relics as may be found. The construction and method of arrangement of the contents are what we must depend upon for scientific classification, and yet these are the very points to which relic-hunters pay no attention. Even intelligent men who have witnessed or assisted in the work of demolition can give only the most vague and unsatisfactory statements in regard to them. Such methods are objectionable, not only on account of the unworthy motives that impel the searchers, but because if prosecuted to any extent they completely ruin the mound for subsequent investigations.

In order to make a thorough examination we began our work by opening from the south side a trench twenty feet in width. (Figure v. represents a vertical section through the centre.)

Our first find was made at a point about eighteen feet distant from the centre. Here we came upon a large pile of burned earth and charcoal, (A in the figure) 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 nearest the centre 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 centre, but none of them were so large as the one first discovered.

We can offer no explanation of these singular deposits; it is scarcely possible to suppose their presence accidental, or to consider them in any other way than as having a direct connection with the funeral ceremonies held at the interment of the personage in whose honor the mound had been erected; and yet had this been the case, we would naturally expect the cremation to have taken place at the spot where the bodies were entombed.

Forming a circle twenty-five feet in diameter around the centre 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; they are shown at B in the figure. The spaces between the stones were tightly packed with earth which had also been burned. No relics or remains of any kind whatever were placed with them.

While, as before mentioned, these pockets are of frequent occurrence, in all our experience of mound opening we have never met with another instance in which they were completely filled with burned stones; nor can we recall a similar example in the reports of other explorers.[1]

As we proceeded with the trench a heavy layer of earth was discovered (C), burned until the upper surface had become a bright red color; this lay about six or seven inches above the large pockets, and was separated from them by a mass of very fine black earth (D).

The clay composing the burned layer had been placed in the mound when in its natural state, and a fire kept burning upon it for a considerable time. The earth above showed some evidences of the heat, as though it had been piled on while the clay was still very hot; but owing to the thickness of the latter the heat had not penetrated to the black loam below; at least not to a sufficient extent to produce any alteration in its appearance.

When we reached the centre of the mound we made the most important find of the week. A rough

[1] Since the above was written pockets filled with burnt stone were examined in the Hopewell group of mounds, Ross County.—W. K. M.

altar of hard burned clay, represented by E in the figure, had been constructed six inches above the burned stratum, and resting upon a little mass of charcoal. It was oval in outline, measuring seven by nine feet, the longer axis being east and west, and was ten inches in height. The upper surface dipped slightly from the edge toward the centre; extended upon it at full length, with head to the east, lay a skeleton (F). Both the skeleton and the altar were unusually well preserved, but the latter was so thin and soft that it was impossible for us to remove it; an enlarged view of them is given in Fig. VI.

Just above the forehead of the skeleton, and bent back over the crown, was a thin plate about eight inches in length, and five inches in breadth, made of copper ore, probably from the Lake Superior region, and evidently beaten out in the cold state. It had a circular indentation in the lower edge, as if designed to fit over the bridge of the nose, and was perforated near the top with two small holes an eighth of an inch in diameter, apparently to afford means of vision. It is shown in Fig. VI.

The finding of the plate is a noteworthy feature, as such relics rarely occur in this locality.

Another skeleton (G in Figure V.) was found east of the altar, lying just above the stratum of burnt earth. No objects of any description were placed with it.

The skulls of these two skeletons were very fragile and it required the utmost care to secure them. As soon as uncovered they were given a heavy coat of varnish, left in the sun for half an

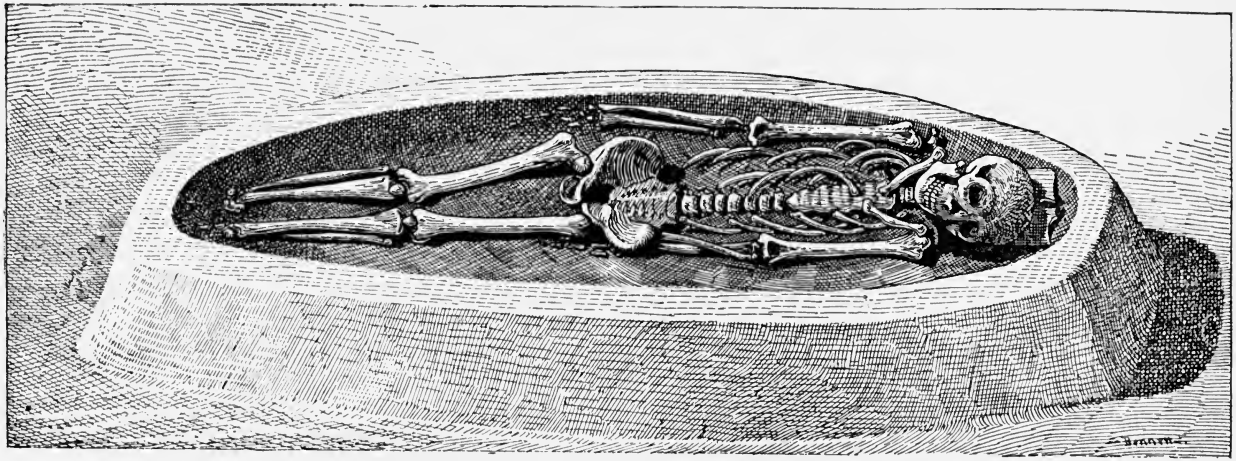

FIG. VI.—Skeleton lying upon altar of burnt clay, mound No. 6. See page 72.

hour to dry thoroughly, and then another coat of varnish was put on. When this had dried they were removed from their resting-place, packed in cotton, in baskets, and then carried to Cincinnati by hand, so there would be no danger of breakage. This amount of trouble may seem uncalled for, but as there is only a comparatively small number of Mound Builders' skulls in the United States, one cannot be too careful with specimens in good condition.

On the east side of the mound, lying underneath the burnt clay, with head toward the east, was the skeleton, tolerably well preserved, of an individual somewhat below the average size; this is represented by H in the figure. A small piece of galena, which showed some attempts at working, lay near the skull.

There were some animal bones scattered throughout the mound, mostly those of the deer. About three and a half feet above the bottom of the mound, a thin layer of bark and charcoal (I) extended beyond these deposits on every side.

This was all of importance that the structure contained; we spent a full week upon the excavation, and left nothing undone.

MOUND NUMBER SEVEN.—The position of this mound was on a tract of low ground near a small creek in Brown County about one mile distant from Number Two, and owned by the same gentleman. Its height was three feet, while its breadth was about forty feet. It was composed in a large part of limestone slabs averaging in weight forty or fifty

pounds each, which were taken from the stream near by, and thrown in at random. The want of regularity in their position, and the compactness with which the clay had settled into the spaces between them, made the work of excavation very difficult.

In the exact centre of the mound was a hard burnt altar or elliptical layer of clay about six inches thick, three feet long, and two feet wide, resting upon the original surface; above this were a few inches of sand, upon which lay the skeleton of a child perhaps six years of age. The bones were very badly decayed; some had entirely disappeared, while of others only faint traces remained. A large slab was placed on edge at the side of the body, another at the head, and one at the feet. It is unusual to find such care taken in the burial of so young an individual. No relic of any kind was found in the tumulus, except a small arrow-head by the side of the skeleton.

Mound Number Eight.—Upon the farm of Mr. J. G. Hutchison, two miles and a half southeast of Marathon, are eight mounds placed in the form of a semicircle upon the brow of a high hill overlooking the valley of the East Fork; they average two feet in height and thirty in diameter, and stand at intervals varying from sixty to two hundred feet. Groups of this character are not common in Ohio.

Judging from their contents we conclude that they were all erected at the same time to cover the remains of individuals who fell in battle. Twenty persons, whose skeletons we found in more or less

advanced state of decomposition, were here interred Some of the skulls were crushed and broken, several having large holes in the sides as if a fatal wound had been inflicted with a rude stone axe. While the artificial objects found were few, and of small importance, the fractures in the bones of the head and the condition of some of the other bones make the mounds very interesting.

As the mounds were quite small we removed each one entirely, generally commencing at the east or south side.

Number Eight was near the centre of the crescent. It consisted mainly of earth, although some eight or nine wagon-loads of limestone slabs were scattered through it. Upon the east side, near the bottom, were five large flat stones placed on edge, while others were laid horizontally, thus enclosing a long narrow space. We looked in vain for any traces of the body which had undoubtedly been placed within the tomb—not the slightest fragment of decayed bone remained; atmospheric agencies had resolved them all into their elements.

Near the centre of the mound and lying upon the original surface of the hill-top were three badly decayed skeletons. One of the skulls we managed to save nearly entire, but the others were too far gone to be removed even in pieces. By the side of the best-preserved individual lay a small, keen-edged celt of syenite, five inches in length and two in width.

One of the fragmentary skulls had four flint implements about two by three inches lying just back of it near the occipital bone.

Mound Number Ten.—This structure contained many irregular pieces of limestone and sandstone scattered throughout its entire upper portion. Near the base was a skeleton, above the average in size, and quite well preserved, which lay upon the floor of seven large flat stones. The stones had been selected with great care and were fitted together as closely as it would be possible to join them without artificially cutting the edges or using cement. We saved the cranium nearly entire; it shows a large ragged aperture upon the right side, as though the whole temple had been crushed in before death. The worn condition of the teeth indicated that the person was well past middle age.

Mound Number Eleven.—This was the most western one in the crescent and was the largest, as well as the most interesting, in the entire group. Like the others, it contained stones, and, in addition, some charcoal flakes were scattered through the first eighteen inches of soil.

We uncovered in the course of our excavation a layer, four by eight feet, composed of ten large flat stones, which proved to be the top of a box-shaped coffin of slabs, containing a skeleton in a better state of preservation than any other we found while here.

Usually the bones in mounds and graves are displaced and broken by the superincumbent earth or stones, or softened to such an extent by the moisture of the soil as to crumble when an attempt is made to remove the dirt from them; even if they remain in good order and condition, there is generally such a close correspondence in color between them and

the earth in which they lie that it is almost impossible to obtain a good photographic view of them; but in this case a most excellent negative could have been secured, for every bone was in its proper position. All were perfect except the skull, which showed the same marks of violence as the others, and the left humerus, which was broken near the upper end. As there was no weight upon any of the bones, these fractures undoubtedly were the result of injuries which terminated the life of the person whose remains had been buried here.

Mound Number Twelve.—This is one of the smaller tumuli, and is the fourth from the eastern extremity of the crescent. It was opened by Mr. Cowen, who reported that the structure contained many stones, and that a number of small deposits of ashes and animal bones were discovered here and there throughout the excavation.

There was a decayed skeleton near the eastern side, and a few traces of another skeleton by which lay a roughly chipped arrow-head, close to the western margin. Lying upon the base near the centre were many small fragments of a clay vessel, made from a mixture of very coarse clay and pulverized shells; like all pottery found in the valley of East Fork it was very rude, apparently representing the lowest degree of art in pottery making.

The other mounds of this group were mingled masses of earth and stone, in which nothing was found except slight traces of bone, sufficient to show that each had been erected above the remains of a single individual.

Satisfied that the large number of tumuli opened in East Fork valley had given us sufficient material for our conclusions regarding the tribe inhabiting it, we ceased operations and located in Warren County in the valley of the Little Miami River.

Primitive man in the East Fork did not possess the mental capacity of his neighbors to the east and west. He was content to bury his dead in small mounds and shallow graves. He used the rudest of implements, manufacturing only such as were absolutely necessary articles. The limited quantity of copper and mica he employed was undoubtedly secured from the Scioto valley people.

We have no evidence that he cultivated the soil, and are of the opinion that he lived solely by hunting and fishing. The skeletons exhumed from his burial-places prove him to have been low in stature with receding forehead. His crania are of the dolico-cephalic type. He lived so near the Clinton County villages of his own race that we think he was intimately associated with them. As remarked in Chapter IX. it is probable that, in company with the Clinton County long-headed savages, he made incursions upon the short-heads of the Miami and Scioto valleys.

We place him far beneath the mound- and embankment-building peoples of the larger streams in tribal organization, in skill as a flint, stone, and metal worker. In short, we assign him place as a nomadic warrior.

CHAPTER VII.

EXCAVATIONS IN AND AROUND FORT ANCIENT.

Fort Ancient being the centre of aboriginal life in the Little Miami valley, one need but study it alone to acquire a comprehension of the lives and customs of two separate races—named according to the shape of the skull—brachycephalic and dolicocephalic.

At the time of Mr. Moorehead's first view of this celebrated fortification in 1885, he was strongly impressed with its importance, and there suggested itself to his mind to make a thorough and exhaustive study of everything pertaining to the earthwork. Previous to 1889, on one or two occasions excavations were attempted with the aid of one or two parties living near the fort, but from some cause or other the work was always interrupted, and he was compelled to bring it to a close before attaining any valuable results. It was not until the spring of 1889 that an opportunity was afforded for extended and continuous investigation. The results of that work have already been given to the public,[1] and there is no necessity of repeating any description of the

[1] In a volume entitled, *Fort Ancient, Ohio,* by Warren K. Moorehead, with maps and illustrations. Published by Robert Clarke & Co., Cincinnati, Ohio.

structure as a whole, or to give the details of the work done with pick and shovel. But as additional work projected in 1890 at his own expense, and four months' work in the spring and summer of 1891 in the interests of the World's Columbian Exposition [1] resulted in new discoveries, and in adding further testimony in support of the conclusions set forth in Fort Ancient, we take pleasure in submitting the following chapter.

When we consider the magnitude of the walls of Fort Ancient, the immense amount of labor involved in their erection, and in the construction of the miles of terraces connected with them, we realize that all this required a long period of time or a large number of workers; perhaps, when we bear in mind the primitive methods of the builders, we are even justified in believing that it represents the prolonged and continuous industry of a numerous population. Taking this view of the case, it is a surprising feature to note that so few mounds occur in connection with this great earthwork, and that even such as do exist are of insignificant proportions. Omitting a few small elevations which have been plowed over until it is impossible to determine whether they are natural or artificial, and which have never disclosed

[1] When he was appointed to the position of field assistant for the World's Columbian Exposition Survey in 1891, Professor Putnam wrote him on March 18th of that year, giving instructions for the work to be carried out at Fort Ancient, viz.: "Taking into consideration the fact that the Exposition will have the benefit of your former work at this place, and the use of such plans and notes as you already have, I herewith agree that all material obtained during this expedition shall be at your service for study and description."

anything that would throw light on the question, there are only ten mounds in sight from any portion of the enclosure; all these except one,[1] which is in the loop or curve formed by the junction of the parallels, at the farthest extremity of the fort, were thoroughly examined.

The builders of Fort Ancient atoned for the small number of mounds thrown up by leaving numerous village sites, richer in some respects than the more imposing tumuli of the Scioto valley. The greatest village site in extent, the one from which such a great number of skeletons, implements, and utensils used for domestic purposes were exhumed in 1889, occupies the broad bottoms fringing the south side of the Little Miami River. One can see the spot from a hundred places upon the towering fort walls above. It is so near the enclosure that but three or four minutes would be occupied in reaching safety should the villagers be compelled to flee at the approach of an enemy.

One mile and a half below the southern extremity of Fort Ancient is another large village covering some eight or ten acres rich in graves and debris. Two miles up the river is still a third, so large that it must have been occupied by two or three hundred lodges—while at the mouth of Cæsar Creek, six miles distant to the north, are two extensive sites, one in the bottoms and the other upon the hills to the south. All of these save one were carefully explored under Professor Putnam's direction. Fig. IX. shows one of the Oregonia skeletons.

[1] This was examined in April, 1891. It contained nothing.

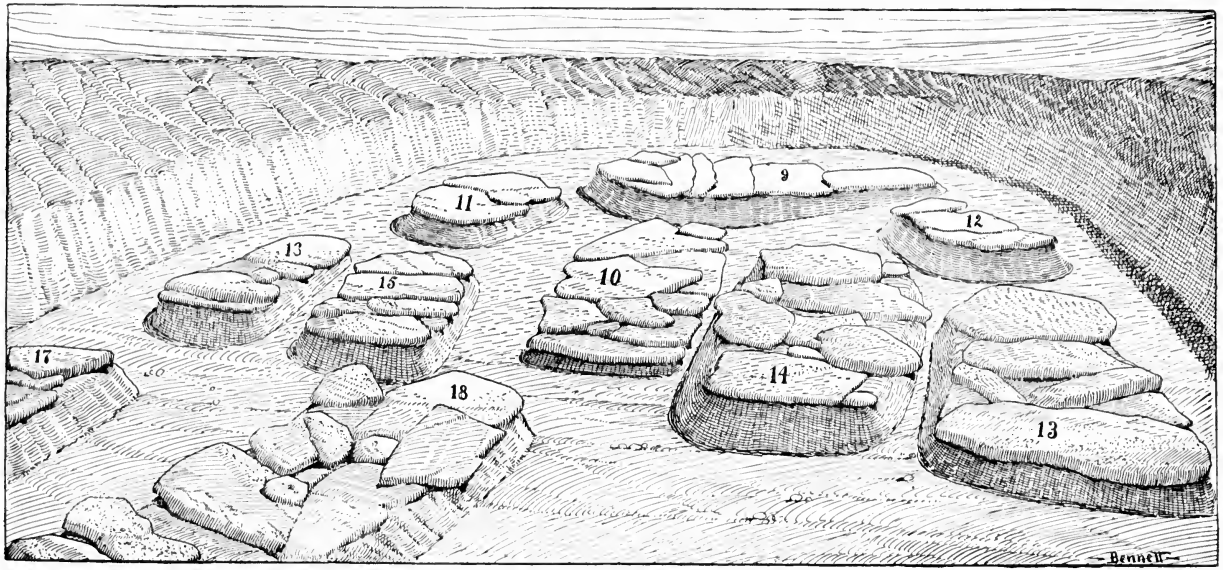

FIG. VII.—Group of graves at Fort Ancient, Nos. 9 to 18 inclusive. See page 92.

THE VILLAGE SITE.—For a number of years pieces of pottery, broken animal bones, flakes of charcoal, and other refuse found on the spots occupied by aboriginal settlements, have been discovered along the river bank just above the station of Fort Ancient. Occasionally a whole pot, or a portion of a human skeleton, was discovered, indicating that burials had taken place. These finds are usually made after a period of high water has caused the banks to cave in. An earthenware vessel thus found is shown in Fig. XII. A.

The field containing these remains is usually planted in corn. Permission to excavate it has always been refused previous to the time of our survey, but the owner had become so interested in our work on the hill above that he willingly allowed pits to be opened wherever we wished.

Availing ourselves of this privilege, we undertook a series of explorations, which resulted in unexpected and valuable discoveries.

The ground in question is subject to overflow during unusually rainy seasons, and consequently is slowly increasing in elevation above the ordinary level of the river. This condition has existed for an indefinite period, and was of much assistance to us in determining the fact that considerable time had elapsed between different periods of prehistoric occupation.

For a depth of two feet below the surface there was no appearance of anything different from the ordinary sandy loam characteristic of river terraces. This level was found to be the highest, and therefore

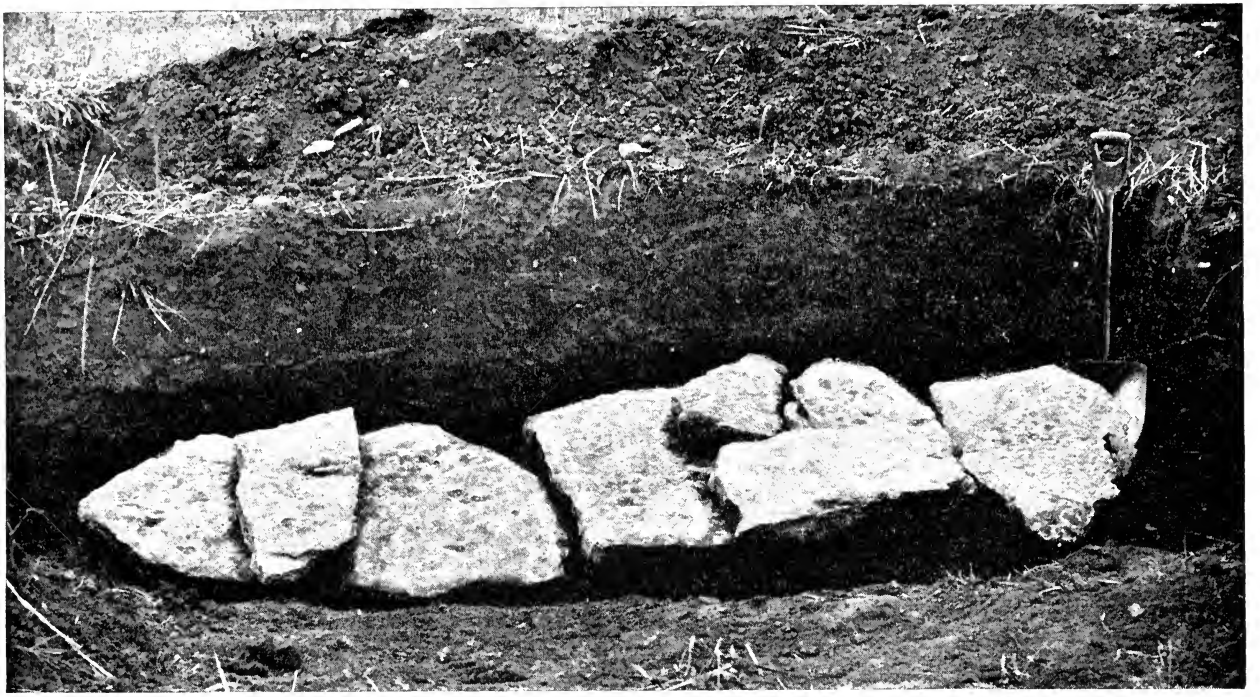

FIG. VIII.—Unopened stone grave, Taylor's farm, Oregonia, Warren Co., Ohio. See page 97.

the latest, of three villages that had been situated upon the bottom. We found great quantities of burnt stone, ashes, charcoal, fragments of pottery, bones of animals and birds. Implements of stone lay scattered about and were, with few exceptions, broken or thrown aside in the waste so abundant in such places. This layer had a thickness of about six inches. After passing through it we found another stratum of soil not less than a foot thick, and in some places as much as eighteen inches. It did not contain any specimens of human handiwork. At a depth of one foot below the first layer the level of the second village site was discovered. It had been occupied for a longer period of time than the other.

A few inches of clean earth had formed between the second layer and the debris of the lowest or oldest site. Its highest point is fully five and a half feet below the present surface. The depth of this layer is less than six inches.

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 green stone.

It must not be inferred that the "kitchen-middens" extended in a continuous, unbroken stratum at the various levels. In some of the pits we found all three strata, in others either one or two. A few places were entirely without layers and did not show any traces of fire from the surface to the bottom of the pit. Articles of aboriginal manufacture were also absent.

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 remains found at the level of the second village site far exceeded in amount those from both of the others. There is no essential difference between them either in character or quality. They comprise ashes and charcoal, and several bushels of broken pottery. Among the pieces are some which, if we may judge from their slight curvature, must have been portions of vessels holding five or six gallons. Many of these sherds were decorated with designs varied in character and quite artistic. (See Figure XII.) Quantities of bones of almost every species of animal, bird, or fish known to have lived in this region were excavated; also burnt stones, probably used in building fire-places, and thousands of mussel shells perforated at or near the centre. Among other articles discovered were hammer and grinding stones, broken celts, spear- and arrow-heads and knives of flint, bone awls and needles, some pointed at both ends, and tibiæ of deer with the shaft worked to give a sharp edge on each side, making an implement like that now in use among the southwestern

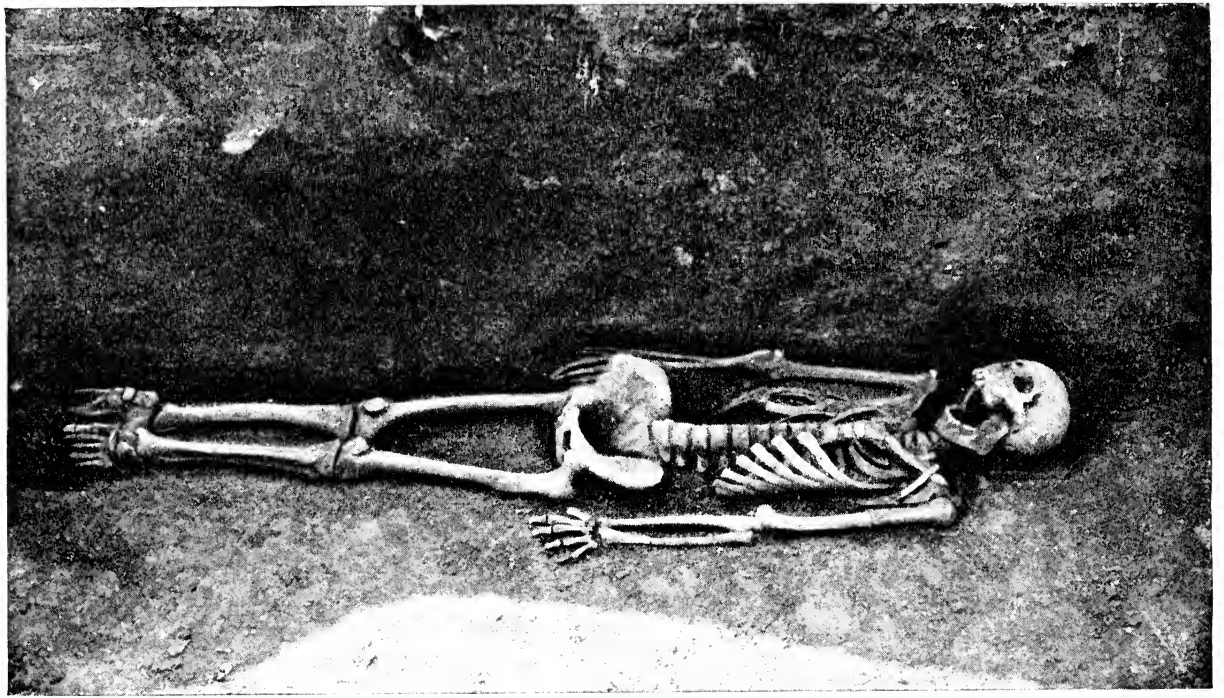

FIG. IX.—Skeleton from stone grave, Oregonia, Ohio. See pages 82 and 102.

Indians for removing the hair from hides in preparing leather or buckskin. Deer antlers, some of which showed marks of use as perforators or polishers, were collected, and a few slate gorgets, together with some beautiful perforated shell disks of a small size.

Ashes have a remarkable preservative quality. The small soft bones of fishes which were found in it were as perfect as if they had been buried but a day. In one pit we discovered a large mussel shell heaped full of fish scales, and in another the leg-bone of a very large turkey, with the sinews in their proper positions alongside. Objects so easily destroyed would soon disappear in ordinary earth.

The general character of the objects found may be seen by referring to Figures XII., XIIA., XIII., XIV.

No whole pottery was found nor was there evidence of a hut or shelter of any kind, except in one place, at the level of the upper or most recent village. Even this, so far as we could make out, was nothing more than what loggers call a "shack"—that is, a shelter formed by setting up a single row of posts, varying in number according to the space required. A pole or small log is run across the top, and then saplings placed close together with one end on the log and the other on the ground. The whole structure is then covered with bark or brush. We found the remains of five or six posts, each about eight inches in diameter, with a mass of charred wood extending between them. In a few places, reaching out to one side, were small pieces of charcoal such as would result from burning small poles.

It is obvious then, that at three different periods in the past, separated from one another by considerable intervals, this bottom was a place of resort for the aboriginal hunters and fishermen of the Little Miami valley. But whether they came to spend the summer only, or whether the villages were permanent places of abode will never be known. On one hand is the great amount of refuse accumulated; but on the other is the fact that the ground is subject to an occasional overflow. At any rate, the intervening strata of earth containing no evidence of human residence, would show that, whichever view of the matter we take, occupation of the site was not continuous.

During the excavations at this point we unearthed three skeletons some rods back from the river. The first was that of an adult of small size, not more than five feet six inches long. This burial is noticeable for its peculiarity. The earth had been removed for a depth of two feet, and in the bottom of the space a hole had been dug large enough to contain the body. At each end of this hole a rectangular limestone slab had been placed to serve as head and foot stones. The body had then been deposited and four large flat limestones placed across with their ends resting on the earth at either side so they would not touch the body. The soil had then been thrown over the structure. The bones were well preserved, but no relics of any sort were found in the grave.

Within three feet of the end of the grave just referred to was one containing the remains of a child. It was similar in construction to the first, except

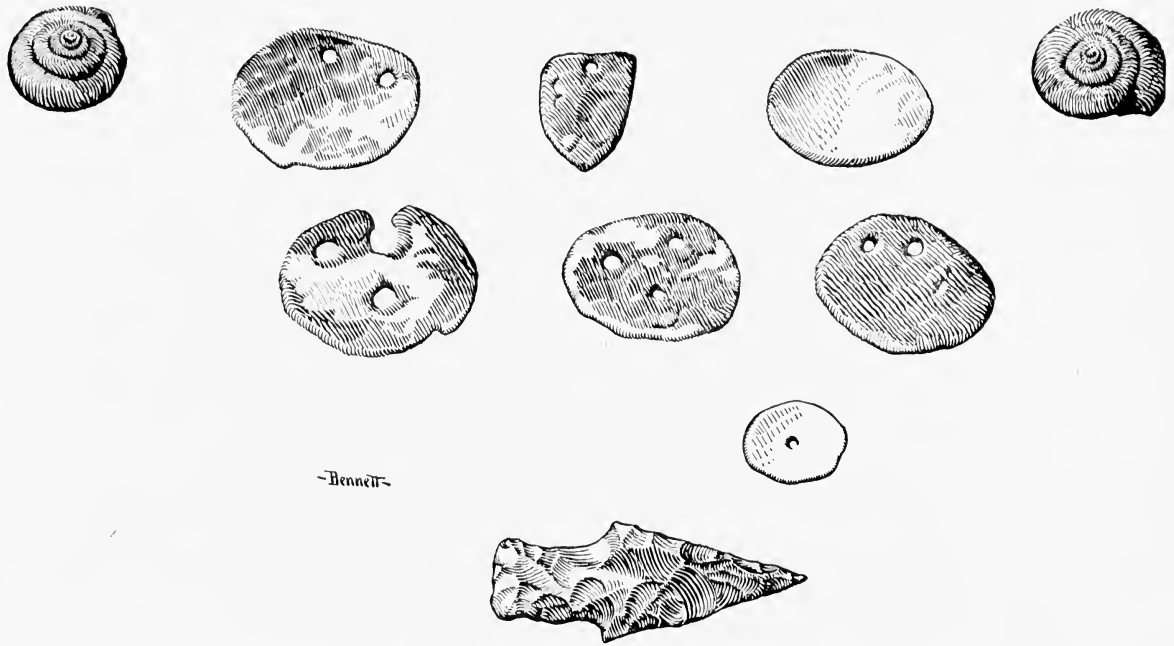

FIG. X.—Shell ornaments and arrow-head from children's graves, Fort Ancient. See page 90.

that the headstone was omitted, and only two stones placed over it. These weighed at least seventy-five pounds each. Near the head was placed a triangular arrow-point of chalcedony, two small shell pendants, each with one perforation, and a couple of well finished circular shell disks, one inch and a half in diameter, with two perforations. Two were similar to the others in shape but had three perforations. This skeleton was extremely small. The femur measured from its head to the lower end of the tibia, as the bones lay in their proper position, only seven inches, while the clavicle was one and seven-eighth inches long. The bones of the skull were no thicker than a piece of ordinary blotting-paper. A small quantity of very fine soft black earth was with the bones—possibly the remains of the garments in which it had been clad. We can account for the unusual preservation of the bones only by the fact that they lay in very sandy soil, and the large rocks placed over them prevented any water from percolating down to them from above.

The third grave, about twenty-five feet from the other, was also that of a child, but somewhat older than the last. The method of burial was the same, except that five stones, none of them large, were placed above the body. By the head lay several shell beads. No other relics were with it.

In Figure XI. is shown a femur of the second child. The other bones were excavated from the smaller grave. Figure X. shows some of the objects found with them.

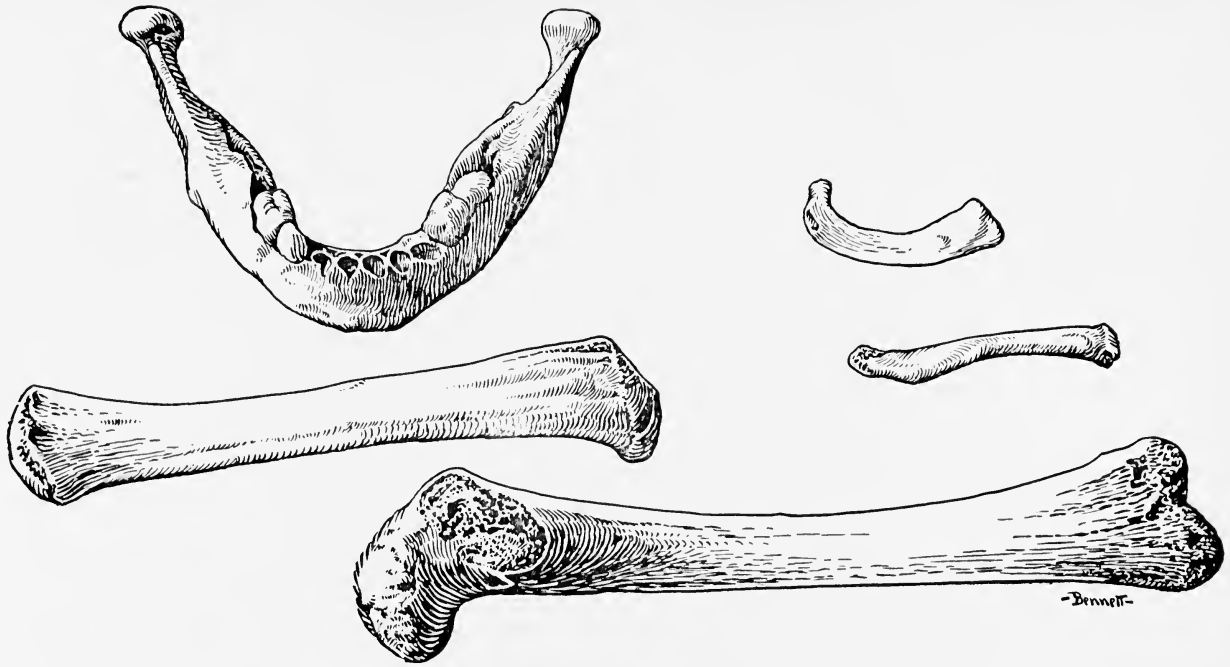

FIG. XI.—Infant's bones. Stone grave, Fort Ancient. See page 90.

CHAPTER VIII.

GRAVES OF THE VILLAGE SITE.

We are forced to admit that in 1889 our excavations at the village site, just mentioned in the last chapter, were not as complete as those of 1891. We did not have the opportunity for thorough investigation of the village sites such as we desired to make, consequently we had not discovered graves in groups. In April and May, 1891, long trenches were dug traversing the area in every direction. Three groups of graves, ranging from seven in the smaller to seventeen in the larger, were laid bare and photographed. They were found at an average depth of two feet, and the following illustrations truthfully portray their appearance. Nearly all of the interments extended east and west, but a few were obviously headed north and south.

The smaller group presents no peculiarities whatever from the others, and need not here be described. Near the smaller group, distant five or six hundred feet from that farther down the stream (known as the "Lower Village Site"), were sixteen graves, which we have designated "Upper Village Site Burials." As will be seen by Illustrations VII. and VIII., the interments were somewhat different from

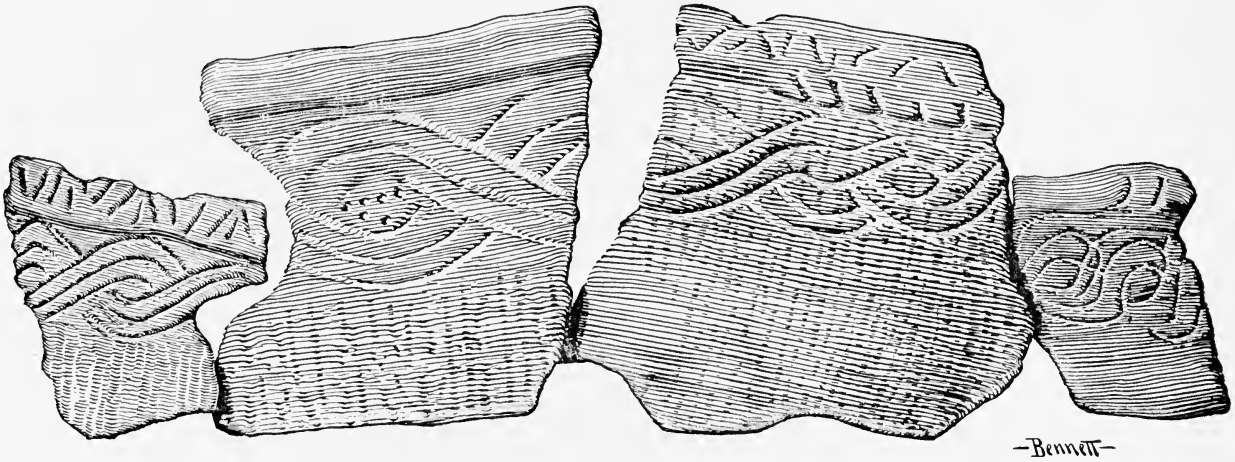

FIG. XII.—Fragments of decorated pottery, lower village site, Fort Ancient. See page 86.

those in the large cemetery at the southern portion of Fort Ancient, to be described later. After the excavation of the grave had been made by the friends of the deceased, stones were set upon edge one foot apart on each side, at the head and the feet. The slabs selected for such purposes were long, narrow, and not more than twenty-four to thirty inches in length, by eight or ten inches in width. About eight or ten were sufficient to uphold the layer of larger slabs placed above. The stones were stuck in the ground to a depth of five or six inches, and firmly imbedded in the hard river sand. When we uncovered them they still retained their upright position.

In the lower village site nearly all the graves were hollow, only a little earth having filtered in between the crevices. In the construction of the hollow tombs larger slabs were employed than those used at the upper village site. Some of the slabs measured three or four feet across, weighing one hundred and fifty to two hundred pounds. At neither the upper nor lower sites were stone floors in the graves.

In Tennessee many stone graves are found of a more sepulchre-like form than those of the Miami valley. Gen. Gates P. Thruston, in his excellent work recently published, entitled, *Antiquities of Tennessee* (pages 28 to 32), describes the graves of Duck Creek, S. Drake Creek, and in the vicinity of Nashville. They are strangely like the Fort Ancient graves, with the exception of the stone floors above mentioned.

General Thruston says:

"The rude cists, or box-shaped coffins, are made of thin slabs of stone. Sometimes the stones are broken or cut, or rubbed down so as to fit evenly and form a well shaped case, but more frequently they are rudely joined together. Occasionally they are found in mounds or layers, four or five tiers of graves deep. The graves are usually six or seven feet long, a foot and a half to two feet wide, and eighteen inches deep; but graves of greatly varying sizes and shapes are found intermingled with those of more regular form. The children's graves are proportionately smaller. Frequently the same cist contains two or three skeletons, and is not more than three or four feet long, the bones having been placed in a pile irregularly within it, indicating that they were probably interred long after death, and after some intermediate preparation or ceremonies similar to the burial customs of some of the historic tribes.

"Many of the graves in the vicinity of Nashville are lined with large, thick fragments of broken pottery, as neatly joined together as if moulded for the purpose. The author recently excavated several graves of this kind on Hon. W. F. Cooper's farm, near Nashville. The pottery burial cases were symmetrically formed, and seemed to be moulded in single pieces, until an attempt was made to raise them, when they fell apart, and were found to be composed of neatly joined fragments of large vessels; the heavy rims of the vessels, more than an inch and a half thick, having been used as rims or borders for the burial cases.

"Nearly all the stone graves are found to be filled with earth inside, by infiltration. The roots of trees have penetrated them. The very skulls are usually packed solid with earth, but now and then the iron pick will strike a hollow cist in its original state, and the fortunate explorer may be rewarded by finding a vessel or bowl of clay, perhaps

two or three, within easy grasp, beside the still uncovered skeleton, and he will thus secure a better opportunity of observing at his leisure all the interesting details of the burial.

"Sometimes a little cluster of stone graves is found, with the usual accompaniments of pottery and rude ornaments, like many modern plantation burial-places, containing the remains of a single family, or group of families, that doubtless lived an agricultural life in its own farm dwellings. The remains sometimes found in these small isolated burial-grounds show that some of these villagers or country people must have been supplied with many of the domestic conveniences enjoyed by the inhabitants of the larger towns."

The burials in both upper and lower village sites were about equally divided as to adults and children, save in one or two instances. No objects were buried with the adults, but near the children were bead necklaces, small shell ornaments, and shell toys. Frequently a child would be placed alongside an adult woman, probably its mother. Occasionally the short grave of the child, but three or four feet in length, rested directly upon the long hollow vault in which lay the mother. But one or two male skeletons were found in the group of graves and those were young persons, not over eighteen or twenty years of age.

The lower burial site when uncovered presented a very singular appearance. We had excavated a great hole one hundred feet in length and forty feet in width to a depth of four feet, or until we struck hard river sand. Above this floor stood the graves from one to eighteen inches high. See Illustration

VIII. Many of them were roughly hollowed out and had partially filled with earth, because the stones across the top were broken by horses or other weighty animals passing over them in the field.[1]

The illustration shows some of the stones sloping toward the centre of the grave, thus permitting the water and earth to penetrate to the cavity beneath.

FIG. XIIA.—Whole pot of clay. Lower village site, Fort Ancient.
See page 101.

Upon a given day the sixteen graves comprising the lower group were opened in the presence of eleven hundred people. In those graves which were covered by perfect stones the skeletons remained well preserved. Out of thirty-seven graves in the three groups we secured twenty-five crania entire.

[1] It must be borne in mind that the tops of the graves were sometimes within twenty inches of the surface.—W. K. M.

It would be impossible for any one to say how great a period of time had elapsed since the interments had occurred. It may be readily granted from the following reasons that the graves were constructed in pre-Columbian times. First, two previous periods of occupation have been shown to have existed upon the site since the burials. Second, in the débris of both villages no glass beads, or implements of iron were ever discovered. It is a well known fact that the Shawnees, who inhabited the Miami valley at the time of its settlement by the whites, adopted their superior weapons more rapidly than any other tribe known to history. Had they occupied the village site, which we have just described, they would have left evidences of their association with the whites. The two villages then were in existence before the advent of the French or English traders among the savages. How long prior we cannot say. The burials were made sufficiently early for a deposit of six or eight inches of river sand to have accumulated above them.

In 1812, when Mr. John Hughes, at the age of fourteen, came to Ohio, the village site was covered with the heaviest of sycamore, elm, and walnut timber. Mr. Hughes is still living in the valley. He assured us of the great size and age of the timber growing above the graves in the early part of this century. We give the testimony for what it is worth, and, while acknowledging the rapid growth of the average forest tree when located near a stream, we do not believe that such a heavy growth of forest as he describes could have sprung

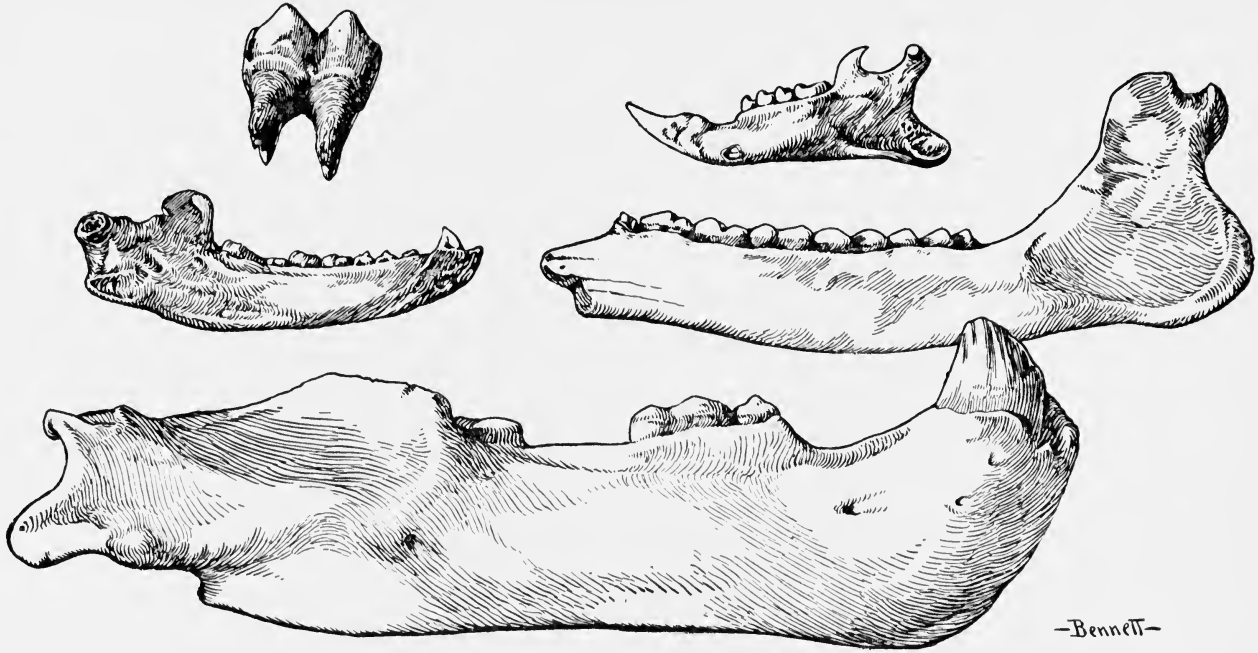

FIG. XIII.—Animal jaws, from ash-pits, Fort Ancient. See page 87.

up in less than one or two centuries.[1] The very character of the graves and the skeletons is evidence, to our minds, of their great antiquity.

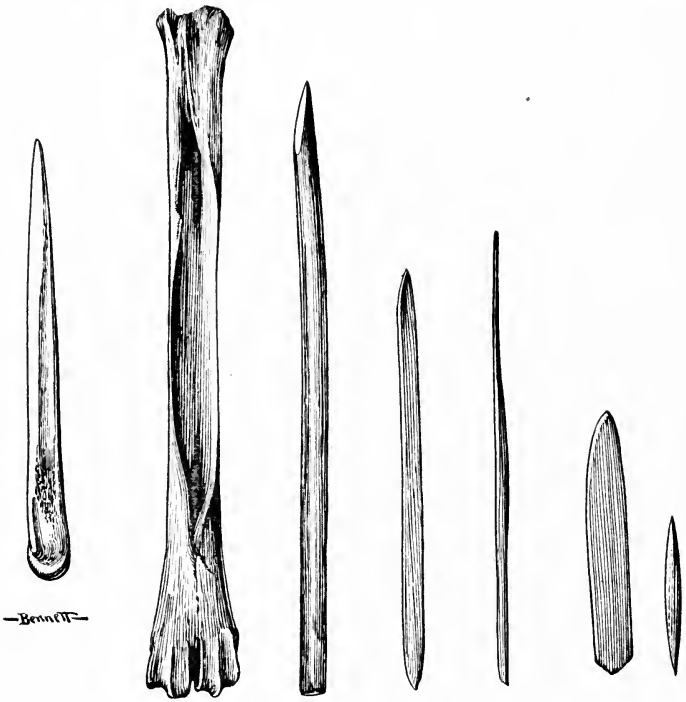

FIG. XIV. Bone awls and scrapers, from ash-pits, Fort Ancient. See page 87.

Gen. G. P. Thruston, in his work, *Antiquities of Tennessee* (page 1), makes the statement (referring

[1] I am informed by Dr. H. T. Cresson that while he was attached to the Peabody Museum, Harvard University, as an assistant in the field, Professor Putnam showed him a letter written by the late Asa Gray, which stated that the growth of trees in the United States might be estimated by the so-called ring marks. Five centuries can be attributed to Fort Ancient, counted upon trees cut down during the excavations.—W. K. M.

to stone graves): "A hundred or more of these rude sarcophagi are occasionally found deposited in several tiers, or layers, in a single burial mound."

This statement is borne out in the Ohio valley by our own investigations, as well as those of others. While not at liberty to speak in detail of the work done by the World's Fair at Oregonia, Ohio, a few general remarks will be permitted regarding a mound of unusual character. Cæsar's Creek, a tributary of the Little Miami River, is noted for the large number of mounds existing near its banks. No archæological work was ever carried on in Cæsar's Creek valley prior to 1891. Hence, the field was unusually rich. Upon the heights overlooking the creek and the Miami River to the south is a large village site, covering sixty or seventy acres of ground. In the bottoms on the south side of the river, below the mouth of the creek, is another large village site, while just above the delta is still a third, and smaller one. At the edge of the village upon the hill is a gravel knoll, from which we exhumed ten skeletons, two whole pots, etc. As is always the case when interments are made in gravel or sand, the bones were remarkably well preserved. Just back of the gravel pit is a mound eight feet in altitude and one hundred and ten feet in length. In the mound were seventy-nine skeletons, twenty of which were enclosed in stone cists, such as we find at Fort Ancient. Two of the vaults were hollow, the others being filled with loose earth which had settled in through the crevices. In many places in the mound there were three or four

layers of graves, one on top of each other. The skeletons resting upon the base line were not incased in stones. Upon the extreme southern edge of the mound were five graves in a row, all heading the same way, and some of them containing two or three skeletons each. A flint dagger (see illustration No. XLIII.) made of chert, double-pointed, and fourteen and one eighth inches in length, lay by the right femur of one of the largest skeletons buried in the tumulus. This skeleton lay upon the base line, and seemed to be the most distinguished person of the seventy-nine. By the side of one of his neighbors were a pair of antelope horns. This is exceedingly interesting, as we have no historical record of the presence of antelope in the Ohio valley, although we do know that both elk and bison were here. The horns have been either transported from the west, through traffic with other tribes, or the burial was made at a greater period of antiquity than we would assign it.

In Figure IX. we show one of the best-preserved skeletons in Mr. Taylor's mound.

It is very interesting to note the varied methods of burial of these seventy-nine skeletons. Some lay extended, others with knees drawn up against the sternum, and others lay upon their sides. The people making the interment frequently placed the head and trunk of the person in the mound, or would inter the legs, pelvis, and lower portion of the spinal column. Early French and Spanish writers mention tribes who kept the bones of their dead in little buildings until a sufficiently large

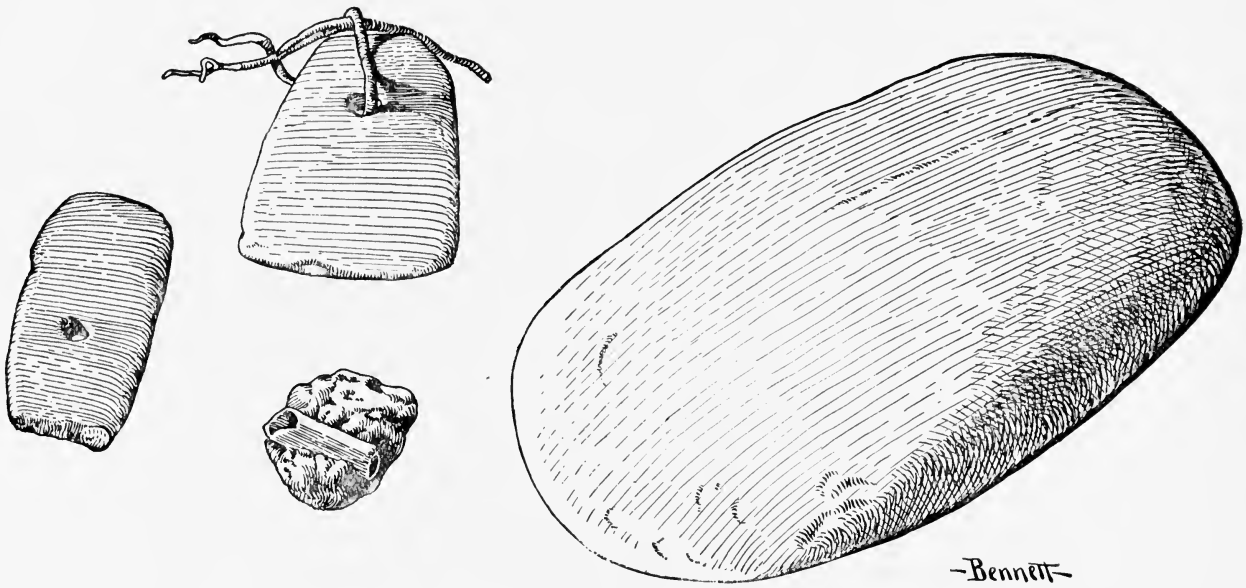

FIG. XV.—Celt, ornaments, and ocre, from terrace grave, Fort Ancient. See page 105.

number had accumulated, when they would make yearly interments. The presence of fragmentary skeletons may be satisfactorily accounted for by taking this into consideration.

The term "Old Fort," used in a book recently published upon Fort Ancient, referring to the southern portion of the fortification, is apt to mislead the reader, therefore, in this volume, that portion of the structure will be called South Fort.[1]

Near the western portion of the South Fort is a knoll of regular outline with gentle slopes leading to every side, whose summit is the highest point within its walls. Here is an aboriginal cemetery. Three hundred graves have been opened by different parties, and old settlers tell us that not less than one thousand wagon-loads of stones have been plowed up and hauled away. These graves were similar to those in the bottoms of the Little Miami River, not so carefully constructed; smaller limestone slabs having been used as sides, ends, and coverings of the bodies. The soil here is very different from that in the valley, being a tough yellow clay, with little or no sand or gravel. The graves are always filled with earth and never hollow. Sometimes there are two layers of stones with six inches of intervening soil between them and the skeleton. Occasionally the body was crowded into a small hole without any side stones whatever, just four or five irregular slabs having been thrown across the narrow, shallow grave.

In 1889 our survey examined upwards of thirty

[1] See map, page 20, *Fort Ancient*, W. K. Moorehead, 1890, Cincinnati.

of these, and in 1891 we opened twenty-five for Dept. M. of the World's Columbian Exposition.

Although the South Fort cemetery is one mile and a half from the groups near the river, the burials are most identical; the crania present the same brachycephalic type, and we are therefore inclined to the opinion that they were constructed by the same people. The South Fort graves may be somewhat ruder, yet in spite of their slight inferiority they present many striking features in common. The skeletons in the hill-top graves are generally badly decayed on account of having been interred in the soil, which in spite of its hardness allowed the water to penetrate to a depth of about eighteen inches. At this depth there is a stratum of bluish glacial clay, which is so impenetrable that the water lies above it, forming a sticky mire. Under such conditions the decay of human bones was inevitable. Figure xv. shows some of the objects from South Fort graves.

All the graves explored by us in the vicinity of Fort Ancient contained crania of the brachycephalic type. The graves of Tennessee, described by both Professor Putnam and General Thruston contain graves of the same people. These burials cannot be assigned, by any careful investigator, to the Shawnee Indians, either in Ohio or Tennessee. There are hundreds of stone heaps in the Ohio valley that cover the remains of Indians who fell in wars with the whites and among themselves in historic times. Such interments have unfortunately been classified with those of the stone grave people of far greater

antiquity. We have never heard that objects of iron, glass, terra-cotta, or modern implements were found in any of these hollow or earth-filled stone graves. We are aware that modern implements and various utensils are frequently found in stone heaps near the many trails which penetrated different parts of the State. We are also cognizant of the fact that these arms and objects have been discovered in the summits of mounds, the result of burials by recent Indian tribes. At Oregonia, in the northern part of Warren County, we opened a large cemetery and village site more recent than those at Fort Ancient, but did not, even in its graves, or upon the surface, find a single trace of contact with the civilization of the white man. The very character of the graves themselves, their decayed condition, the rude and primitive implements found within their walls, together with forest giants towering above, all combine to establish our assertion concerning the great age of these burials. When we state the probability that the skeletons are those of some of the primitive people whose hands aided in the erection of the towering walls of Fort Ancient, we make no hasty assertion, but simply give our long and carefully considered opinion, which is based upon extensive explorations.

CHAPTER IX.

EXPLORATIONS IN CLINTON COUNTY.

In Clinton County, in the valleys of Cowen's Creek and Todd's Fork, are many small mounds. No villages of great size are found, but a few of limited extent exist upon the streams named.

Mr. Richardson, a resident of Wilmington who has made the mounds the subject of intelligent study, has excavated extensively in this region. He informed us concerning the skeletons and implements found during his investigations, and his remarks, together with the facts ascertained by our own observation of seven of the tumuli, lead us to assign the works to Muskingum valley people.

Before considering Mr. Richardson's observations in detail we will give a *résumé* of the seven mounds opened. The explorations of these mounds were made under the supervision of Mr. W. E. Myer of Carthage, Tennessee, Mr. Moorehead being present only a portion of the time.

Mound Number Seventy-seven. — This was opened May 28, 1890. The structure is thirty feet in diameter and two and a half feet in altitude. It is upon the farm of Simeon Cass near the Midland Railway, three miles southwest of Wilmington.

Scattered through the upper part of the structure were many pieces of flint broken and partially worked. They were of a grayish-white color. The earth forming the structure had been scooped from the surface of some village site, hence the presence of flint flakes and blocks. One small spear-head of pink and white quartz was taken from a small ash-pit midway between the summit and the base. Implements of such material are rare in southern Ohio.

Near the exact centre of the mound, about eighteen inches from the surface, was found a small tablet, five by four and a quarter by three fourths of an inch, composed of sandstone. This remarkable object was taken from a mass of sticky, yellow clay, its position being carefully noted by the six persons present. Upon two sides were three grooves of the same depth, similar to those upon the back of the famous "Guest Tablet" found in a mound upon the site of Cincinnati during the early part of this century. Along both the narrow edges were two shallow grooves, while on the ends were two short but deep grooves. The depth of the various grooves range from one sixteenth of an inch to one third of an inch. The tablet has the appearance of serving the purpose as a sharpener of bone or copper tools.

The mound 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. Near the tablet were two pockets of charcoal and also a large limestone, four-

teen by sixteen inches, polished upon one side. The latter may have been used for grinding corn, as scratches seen upon its surface are rotary in character and may have been made by a stone pestle.

Mound Number Seventy-eight.—It lies upon the same farm as Number Seventy-seven but is placed upon the second terrace, distant three or four hundred yards from Cowen's Creek. Its dimensions were eighty by forty by seven feet. We trenched through the greatest diameter, making our excavation thirty feet in width and fifty feet long. The mound contained many burnt patches of earth and numerous pottery fragments, but no human remains except that of a child seven or eight years old were discovered. The skeleton was unaccompanied by ornaments or implements.

Mounds Numbers Seventy-nine and Eighty, located near Todd's Fork, six miles southwest of Wilmington, contained nothing but fragmentary skeletons. Both structures were small.

Mound Number Eighty-one.—This tumulus is two miles northwest of Wilmington on the Clarkesville Pike. It was examined June 6th. The owner's name we have unfortunately forgotten. The dimensions are fifty-seven by forty-five by five feet. Like the mounds in the Hopewell group[1] the surface had been burnt hard, the skeletons placed upon the level thus obtained, and the structure heaped above. Near the centre of the mound were three skulls in a fair state of preservation, and the ashes and charred bits of other portions of the bodies.

[1] See Chapter XII.

Just beyond the skulls was a beautiful diamond-shaped ceremonial stone of banded slate. It was an inch and three quarters wide in the centre, one third of an inch in width at the rounded ends, and six inches in length. As is usual with ornaments and emblematic stones, it was highly polished. A fine black arrow-head, unfinished and broken arrow-heads, and a small diorite celt were near the slate object. All of the skulls headed toward the west and were surrounded by masses of charcoal.

Mound Number Eighty-two.—This structure is seven miles from Wilmington, on the farm of Mr. Austin, and is situated upon a bluff seventy-five feet above the waters of Cowen's Creek. The creek has cut under the high bank to some extent, and about ten feet of the southern portion of the mound has already fallen into the depths below. It is circular, having a diameter of one hundred and ten feet and a height of twenty-three feet. On account of its great size, teams and scrapers were employed. Three feet from the surface, near the centre, we came upon a well preserved skeleton. Copper bands, about one fourth of an inch in thickness, surrounded the ankles, but nothing else, except two large arrow-heads, were with the remains. We have in mind at the present writing no instance of mound exploration where a skeleton has been found with copper anklets. Copper on or near other portions of the body is a frequent occurrence.

We had excavated but five feet when a misunderstanding caused the work to be brought to a sudden close. Undoubtedly this mound contains

much of interest, and it is to be hoped that some one will complete our examination in the near future.

Mr. Richardson has whole pottery from the mounds of his neighborhood, ornaments and ceremonials of slate, celts, flint implements, and a few copper hatchets and beads. He has found no evidences of extensive working in bone or shell. We do not remember of his finding mica or galena. No large ocean shells, no altars, no *caches* of flint implements, and but few pipes have ever been taken from the mounds of Clinton County. The crania are dolicocephalic. In other sections, where brachycephalic crania are exhumed, we find objects similar to those named above. This will be seen by reference to Chapters IX., X., XI., and XII. The Clinton County skulls being of the long-head type, we find implements such as that race employed. From the mound testimony we conclude that no short-heads lived in Clinton County.

The whole pottery that has been exhumed by Mr. Richardson is very much like the pottery of the mounds in Brown and Clermont counties.[1] Neither the mounds nor the implements of Clinton County evince the skill exhibited in those of Ross or Warren counties; yet we would class their builders above the small tribes inhabiting the hilly regions and the swamp regions of Brown County. Probably the smaller long-head tribes combined with the people of Cowen's Creek and Todd's Fork to invade the Miami and Scioto valleys. The evidence that no

[1] See Chapter VI.

short-head skulls have been taken from the many mounds of Clinton County is certainly contrary to the general belief that this tribe was a part of either the Miami or Scioto valley peoples. They would be quite secure from their enemies amongst the hills of Clinton and Clermont counties. The presence of a few dolicocephali in the Miami and Scioto valleys would indicate that some of these people, when upon incursions into the territory of their enemies, remained. They may have been held as captives, or the braver ones who fell in battle may have been interred by the short-heads as a special mark of appreciation of their bravery.

While the matter set forth is offered largely as a suggestion, we think Clinton and Clermont counties to have been the home of a portion of the tribe of long-heads. We find no trace of the short-heads entering their territory, but we do find many long-head skulls in the short-head territory.

CHAPTER X.

EXCAVATIONS AT FRANKFORT, ROSS COUNTY.

The location of this village is eleven miles northwest of Chillicothe, in a region that appeals no less to the susceptibilities of the lover of nature than to the enthusiasm of the archæologist.

Approaching it from Chillicothe, the first view is from a high hill somewhat more than a mile away, on the summit of which stands a small mound.

Taking this as a point of observation, one sees stretching away toward the north, mile after mile, until lost in the horizon, a tract of level or slightly rolling land, productive to the highest degree.

Ages ago, when the great ice-sheet came slowly but resistlessly down from the frozen regions of the north, it carried with it great masses of powdered rocks which it had gathered on its way, from the quartz and granites of Canada to the limestone areas of central Ohio; it intermixed them with the clays which it formed by pulverizing the shales that abound in all the hills throughout this region. Later, when the great floods came, they sifted and sorted this abundance of material, throwing the heavier parts to the bottom as a foundation upon which to place in orderly strata the finer deposits forming the

thousands of acres of inexhaustible fertility which are now spread out before us, covered with comfortable homes, large barns, the finest of livestock of every sort, and all the other testimony of a thrifty, prosperous, and contented farming community.

To the left, forming a definite boundary to this charming valley, is a range of high hills whose summits command a view of equal beauty toward the west.

Flowing across the bottom, following closely to the western and southern hills, is the little stream known as the North Fork of Paint Creek, which in pre-glacial times seems to have had its outlet toward the northeast. On seeking its former channel when the retreat of the ice-mass allowed the streams to resume their course, it found great barriers of drift interposing as an obstacle which it could neither surmount nor evade. It was therefore compelled to pursue another course, and now makes its escape through a deep, narrow gorge which the overflow from the lake that lay in front of the glacier on its backward journey had cleft in the hills toward the south—a place as wild and gloomy now as when it was the haunt of the Indian.

Preceding the advent of the white settlers, the place where Frankfort now stands was the site of the Shawnee town of Chillicothe. In many of the houses in the neighborhood may be seen various relics of that tribe, found on the surface—silver ornaments, iron hatchets, now almost destroyed by rust, glass beads, gun flints, and many articles which could not have been obtained except from the whites. Along

with these are also found celts, arrow-heads, and ornaments of native manufacture.

We find evidence, too, that this region was occupied by an industrious community, long anterior to the invasion of the Shawnees. Lying immediately to the west of the town is one of those remarkable enclosures, so many of which exist in this county. It consists of a square and two circles in combination, the three including an area of about fifty acres. The necessary grading in making streets, erecting buildings, etc., over a portion of it—for the town has encroached upon the eastern side—and the cultivation of the soil over the remainder has almost obliterated it. One can now find only a trace here and there of the walls, which had once an altitude of five or six feet.

Many mounds, also, are to be found on this level ground, but they, like the walls of the enclosure, have been sadly damaged by the plow and harrow. Other small mounds are to be found on the high land in various directions. So far as these have been explored they have revealed nothing to repay the investigators for their labor.

Upon the farm of Mr. Tighlman Porter, whose dwelling is at the western side of the village, are five mounds; three of them form a connected group a few yards south of the pike leading to Washington, C. H. The two others are near together, about three hundred yards from these, on the opposite side of the pike.

Mr. Porter had always refused to allow these mounds to be disturbed; but finally accorded to us the privilege of opening two of them.

Mound Number Fifteen.[1]—This is the larger one of the two north of the pike. When we began work a careful measurement showed it to be oval in outline, the length being one hundred and ten feet, breadth sixty feet, and height five feet. The bearing of the longer axis was north, thirty degrees east, and the greatest width was at a distance of forty-eight feet from the southern end. For distinction, the point where these two diameters cross will be called the centre of the mound. The real centre, of course, lay several feet farther toward the north. According to old residents, it was originally twenty feet in height, an impossible figure, as we shall demonstrate, and mentioned only to show how little reliance is to be placed on statements regarding matters of this kind, and how, with no intention whatever of deception, people unaccustomed to careful measurements invariably exaggerate the height of mounds. Our work revealed that within four feet of the margin entirely surrounding the mound, was a stone pavement not over two feet in width. It was formed by a single layer of pebbles the size of a man's fist, taken, apparently, from the creek bed near by. It may be considered certain that when this pavement was made it lay at the foot of the slope, the completed mound rising from its inner edge. This being the case, if all the earth washed from above were restored to its original position over the upper surface, the height of the mound would not be increased thereby to an amount exceeding four feet—making

[1] A short account of the exploration of this mound was printed in the Journal of the Cincinnati Society of Natural History for April, 1889.

the structure nine feet instead of twenty feet in hight.

The same tendency to error prevails in estimating the degree of slope. This is often represented, even in what are considered standard works, at as much as sixty-five or seventy degrees; whereas, it is impossible to find a mound the diameter of whose base does not exceed, or at least equal, four times its height. Earth piled up and left to the action of the elements will not stand at a greater angle. We often find the breadth at the base of a mound to be ten or even fifteen times its elevation.[1]

All this, however, has no bearing upon our explorations, which will now be taken up.[2]

Beginning at the south end of the mound, we extend a trench entirely through it, twenty-two feet wide at the margin. This was gradually extended until at the centre it measured thirty-four feet—narrowing somewhat thence to the northern extremity. Thus we were at no time more than about seven feet from the circumference of the mound as it was built. As everything we found was in these limits, the results of the exploration would have been the same had every spadeful of earth been removed. To satisfy ourselves fully upon this point, we dug narrow trenches at several places toward the outer edge of the mound, always with the same result—finding only the stone pavement alluded to.

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[1] See page 102 of Marquis de Nadaillac's work, *Prehistoric America*, for an exaggeration of the slope of the Marietta mound.

[2] See page 60, *Ancient Monuments of the Mississippi Valley*. Also Plate XXI., Figure 4, *ibid.*

There were two skeletons about three feet below the surface at the highest point of the mound; nothing had been placed with them, and they were evidently intrusive burials.

One foot below the surface, near the western side of the trench, about twenty feet from the margin at which we began, was the outer whorl of a sea-shell. It measured six inches in width by ten and a half inches in length, and the whorl and edges had been cut down with great care, and had apparently been used as a vessel. It was filled with clean, fine sand, and lay with the opening downward.

With these exceptions there were no objects found anywhere above the base of the mound. Possibly the shell had been buried with a body whose last trace had disappeared by reason of its proximity to the surface. If this was the case, it may reasonably be looked upon as an intrusive burial, like the skeletons mentioned.

The mound was distinctly stratified, although the strata were not always regular, being thicker in some parts than in others. Beginning at the top it was composed of:

Black soil, one foot.
Gravel, one foot.
Brown earth, or loam, three inches.
Yellow clayey loam, three inches.
Black soil, six inches.
Clean white sand, eight inches.
Black soil containing pebbles, three to four inches.
Gravel, mixed with a clayey sand, one foot.
Immediately underneath this bottom layer, upon

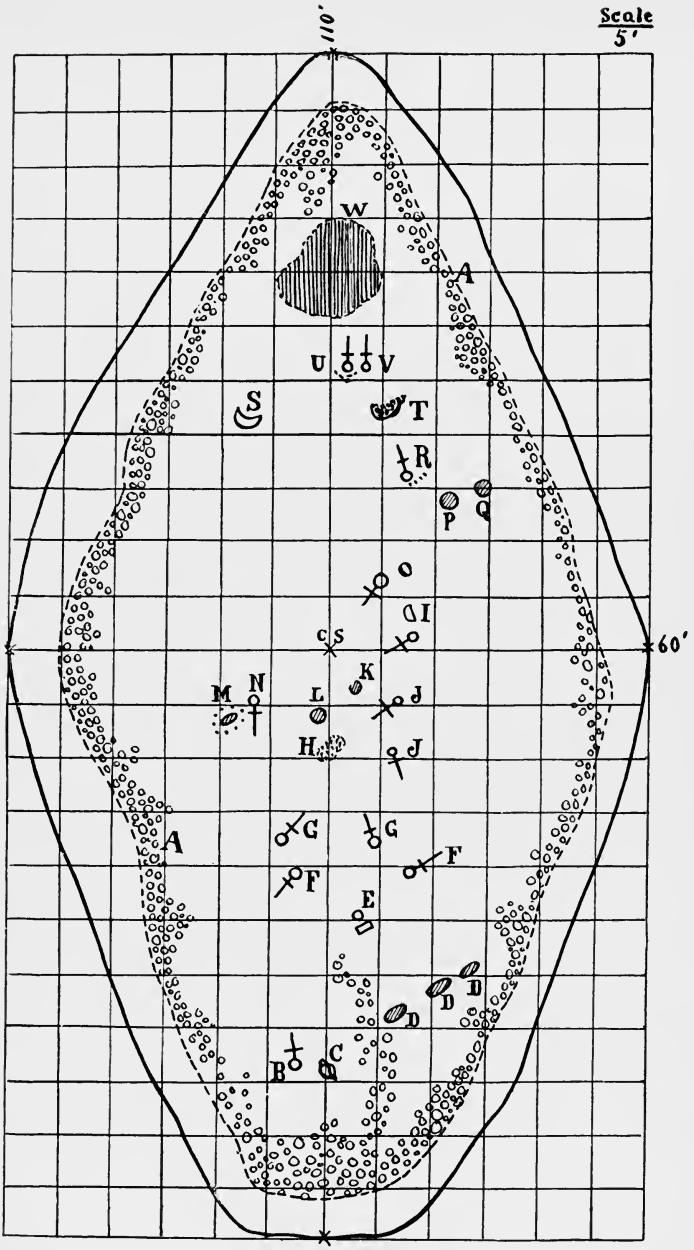

FIG. XVI.—Ground plan of Porter mound, No. 15. See page 116.

the original surface, we found the most remarkable deposits, both as to quantity and variety, that it had, so far, been our fortune to unearth. We will describe these in the order in which we came upon them.

To aid the reader in locating the various objects, we shall give their distance from the inner edge of the stone pavement (A) at the southern end, and east and west, as the case may be, of the longer axis, which may be called the middle line of the mound.[1]

At fourteen feet inside of and four feet west of this line, were some fragments of a cremated skeleton (B), small portions of the skull of which remained, showing very distinctly the marks of fire. The burning had evidently taken place elsewhere. Alongside of these pieces of bones lay the outer whorl of a sea-shell (C), measuring seven by twelve and a half inches. It was placed in a mass of very fine black earth, and, like the one found near the top of the mound, was filled with sand.

It may be a matter of some significance that all the shells of the kind we refer to present this same peculiar feature. They are either partially or entirely filled with sand, wholly free from clay or gravel, as if taken from a stream of water.

At twenty-five feet inside of the middle line were three pockets (D), two feet apart, nearly in an east and west line. The most western one was four feet

[1] The diagram given, Fig. XVI., which represents the ground-plan, will be of assistance, although not accurate in every particular. The original drawing, made at the time of the excavation, was lost, and this is made from the description in the text.—W. K. M.

from the line and twenty-eight inches deep, being filled with ashes.

The next discovery was at a distance of thirty-two feet from the stone circle, and two feet east of the middle line, at the point E, where we made a very interesting find. 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 one hundred and ninety-seven large shell beads, neatly drilled, finely polished, and perfect in every respect. Resting upon these, in contact with the upper plate, were twenty-one of the spool-shaped copper objects, which Professor Putnam, Curator of the Peabody Museum, is of the opinion were intended for ornaments to be worn in the lobe of the ear. As we shall have to record the discovery of quite a number of these, we shall use the term, "spool-shaped ornaments" in referring to them, and restrict that term to this particular class of specimens.[1] They are made of two disks of copper, each having a double curvature, and joined by a hollow cylinder of the same material. Around some of these cylinders were traces of leather, or a similar substance, that had been preserved by the copper—possibly a thong or cord, by which they had been suspended, or of something that had been used to

[1] We beg leave to differ from the learned Professor. We have found spool-shaped ornaments upon the hands and wrists of some forty skeletons in our mound experience. Never but twice have we seen them near the head.—W. K. M.

prevent the rough edges of the copper from causing pain, if they were used for the purpose above indicated.

Traces of wood fibre were discernible in several places on the outer surface of both plates, from which we infer that the specimens were wrapped in bark before being deposited. The whole mass was probably enclosed in skins or cloth of some kind which had entirely decayed, for the soft earth on which they lay was certainly not natural soil.

Some of the spool-shaped ornaments, the bear teeth, flint knives, and spear-head, are shown in Figure XVIII. Several of the beads may be seen in the upper portion of Figure XX., together with two of the perforated panther teeth.

At the same distance from the margin as these plates were two skeletons (F F), one on either side of the middle line and about ten feet from it. Five feet farther on, lying six feet nearer together than the last, were two others (G G). All these had their heads to the southwest. The bones were so decayed that the various parts comprising the skeleton could not be taken out.

At the centre of the mound was a space two by four feet (H), where the earth had been burnt 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. The fire from which they resulted, which had evidently been made of hickory wood, had been made elsewhere and the ashes carefully

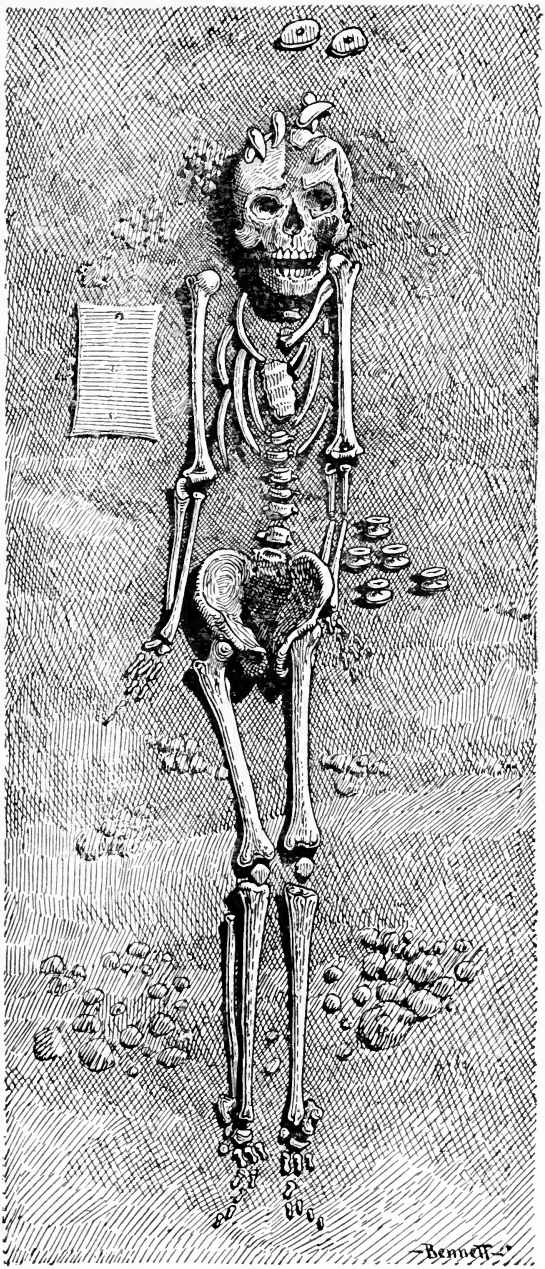

FIG. XVII.—Skeleton "R" with accompanying objects, from Porter mound, No. 15. See page 126.

gathered and carried to the spot. No relic, fragment of bone, or any other object was found in or near either the ashes or the burnt earth upon which they rested.

Forty-five feet from the stone circle, and five east of the middle line, were two skeletons side by side, the heads pointing nearly east. Resting on the skull of the first (I) was a copper plate, which had been beaten out so thin as to be almost destroyed by the damp ground in contact with it. Only small fragments of it could be secured. Immediately to the right of the other (J) was found a pocket (K) thirty inches deep, filled with ashes. A similar pocket (L) was found almost on the middle line, and about six feet west of it still another (M), which was covered by a layer of small stones, extending far beyond its edge on every side, to make a bed two feet across. Between the last two were traces of a skeleton (N), the head of which lay toward the north.

The next skeleton (O) was fifty-eight feet from the stone circle, and five feet east of the middle line. Only one object had been buried with it. This was a very rare specimen—namely, an ornament made from a bone of some large animal, and wrought in imitation of one of the commoner forms of slate gorgets.[1] It was well finished, with two perforations, and, although one end is broken off so that the exact length cannot be determined, it probably measured about six inches when perfect.

[1] The ornament mentioned is shown in Fig. XVIII., together with strung pearl beads, bear tusks, knives, beads, etc.

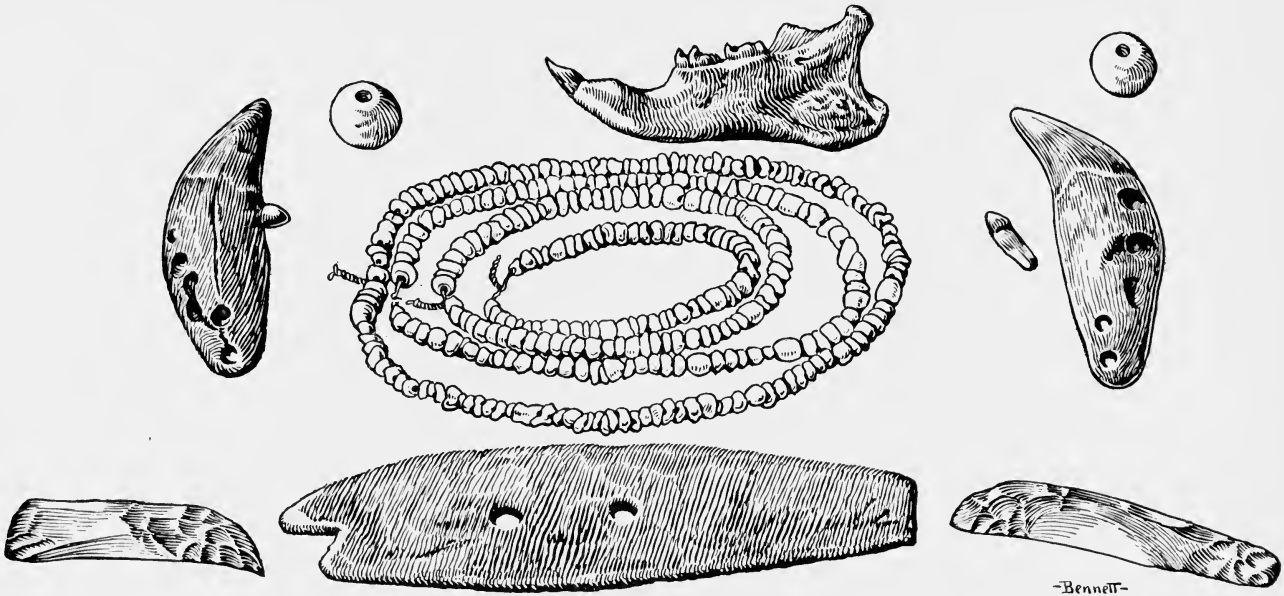

FIG. XVIII.—Various objects from Porter mound, No. 15. See pages 124 and 126.

At sixty-two feet in, and ten feet east of the middle line, we came upon another pocket (P). All of those previously discovered had been carefully examined and found to contain nothing but ashes. This one, however, was covered with a large sheet of mica, which gave promise of better results below. We were not disappointed in our expectations, for scattered through the ashes within the pit were nine hundred and ninety pearl beads. Most of them were very small, although a few were as large as buckshot. They were from the common unio shells, so abundant in the streams of this region, and each one was neatly drilled.

Just to the east of the pit were some small fragments of the cranium and other portions of a skeleton (Q).

Two feet to the northwest of the pit was found a skull, which proved to belong to a well preserved skeleton (R), measuring over six feet in length, that lay extended, with head to the south. On the forehead were five bear tusks, each with several holes drilled partially through it. Probably all these perforations had formerly held smaller teeth, pearls, or some other objects which were supposed to enhance the beauty of the ornaments. One of them still holds the tooth of a ground-hog neatly fitted into it. Two of them are represented in Figure XVIII., one on either side of the pearls.

By the left side of the head lay four spool-shaped ornaments; at the top of the head were two flat beads, about three fourths of an inch in diameter, made of the mussel shell, each with two holes

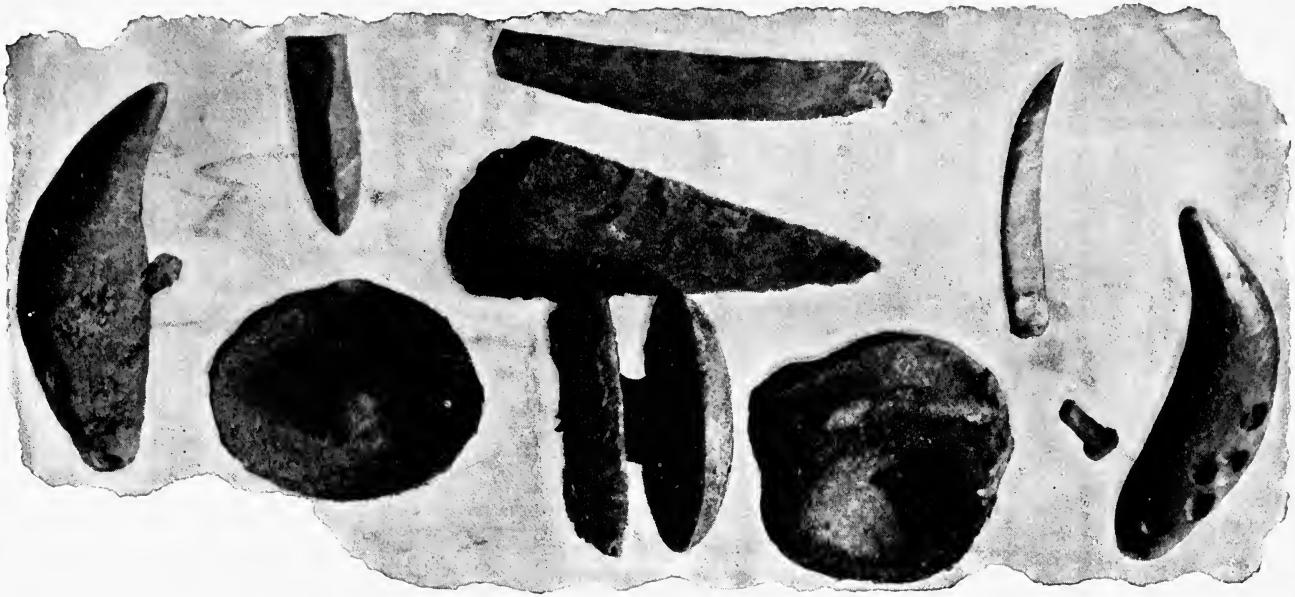

FIG. XIX.—Various objects from Porter mound, No. 15. See page 126.

drilled in it. Near the right elbow was a copper plate, six by seven inches. The position of the skeleton, with the accompanying objects, is shown in Figure XVII.

At seventy feet in, and twelve feet west of the middle line, at a point marked s in the plan, we found one of the altars first described by Messrs. Squier and Davis, the first of the kind we had ever seen. 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 then been dressed off at the sides until the top was a rectangle twenty-four by thirty inches, the corners being neatly rounded. A depression twelve by eighteen 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. After this the entire altar had been subjected to an intense heat, for we found it burned red and hard 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. We were very desirous of securing this altar, for no one had ever succeeded in removing one entire.[1] The men dug carefully around it,

[1] Since these notes were made Prof. Putnam has taken out, near Madisonville, Ohio, one of the largest that has ever been found, if we except the remarkable one at Mound City, mentioned by Squier and Davis.—W. K. M.

leaving what we considered a safe margin of earth on every side, and then endeavored to lift it out. In spite of all our efforts it broke in two pieces, but each part was removed without further injury and placed in a large box. Unfortunately, we allowed it to dry out too rapidly, in consequence of which it cracked and scaled badly, and in a few days was in fragments.[1]

Directly east of it, twenty-five feet distant, was a mass of burnt clay (T), irregular in outline, about four feet across, and four inches in thickness. The surface was flat, and had no remains of any kind placed on it.

Seventy-eight feet from the starting-point and exactly on the middle line were two extended skeletons, laid near together, with feet to the north. Near the head of one (U) was a plate of copper six by seven inches, and four spool-shaped ornaments. The plate had fragments of thread adhering to both sides, as though it had been wrapped in cloth. Under the head of the other (V) were four more spool-shaped ornaments. Eleven wolf teeth were found among the cervical vertebræ. They were neatly drilled for suspension. Two perforated ornaments made from a mussel shell were also excavated. No doubt

It is placed on exhibition in the rooms of the Cincinnati Society of Natural History; on account of its great weight, Professor Putnam feared to risk its shipment to Cambridge, as it would certainly be injured or broken. Several altars have likewise been shipped to Professor Putnam from the Turner group of mounds, near Milford, Ohio.

[1] This was in 1888. In September and October, 1891, and January, 1892, we removed entire three large altars for the World's Columbian Exposition, one for the Smithsonian Institution at Washington, and two for the Peabody Museum of Cambridge, Mass. —W. K. M.

these had formed a necklace. Between the jaws were fifty pearl beads which had evidently been placed inside of the mouth at the time of burial. The cranium was saved entire.

The last thing in the mound was at a distance of eighty-two feet from our place of beginning. Here we came upon the edge of an ash-bed (w), which measured seven by ten feet, and two feet in thickness, its

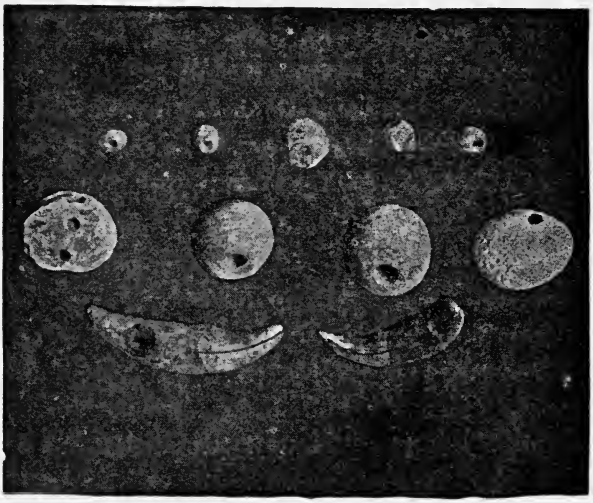

FIG. XX.—Beads and panther teeth, from Porter mound, No. 15. See page 122.

long axis at right angles to that of the mound. Scattered about through the ashes with no regularity as to position, we found a number of flint flakes and twenty-six 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 a half 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. Owing to the looseness of the ashes, we could easily uncover them sufficiently to determine their size and shape. It was impossible to get any of them out, as they were very soft and much broken, although all the pieces remained in their proper positions—thus proving the vessels had been entire when deposited.

It appears that this mound therefore contained many interesting features throughout almost its entire extent; while others much more imposing in appearance held nothing worth digging for.

Mound Number Seventeen.—This is the largest mound of a group of five others on the farm of Mr. Coiner, on the high table-land three and a half miles southwest of Frankfort. It is eleven feet high and sixty feet in diameter.

Success with the Porter mound had raised our hopes to a high pitch, and we began on the west side with a trench twenty-two feet in width, which was increased until at the centre it was thirty feet.

About ten feet from the centre, we came upon five skeletons lying close together; these were two feet above the original surface, with heads to the east. Four of them had been buried without any ornaments or relics. Under the head of the fifth was a broken arrow-head and a diamond-shaped

stone ornament. At the side of the head were thirty-two disk-shaped shell beads, and a piece of slate the size of a dollar, with some peculiar markings on it.

A small copper bead lay one foot below the summit and was discovered accidentally. Finds of such nature do not signify anything, as many articles are lost in mounds during their construction.

Upon the base line exactly at the centre were remains of a skeleton. It was not ascertained whether any objects were with the bones, for a few moments after observing them the mound caved in, owing to an excavation which had been previously made. Mr. Moorehead was caught by the falling earth and so seriously injured that he was compelled to abandon the work.

CHAPTER XI.

MOUND NUMBER THIRTY-EIGHT.[1]

The three mounds heretofore mentioned, situated on Mr. Porter's land, south of the Chillicothe and Washington pike, are nearly in a straight line, and built so closely together that the bases of each unite. The northern mound has a height of fifteen feet, with a diameter of one hundred and twenty. The mound farthest to the south measures nine feet high and seventy-two feet across the base. The other, built between these two, has a height of six feet, with a breadth from east to west of about sixty-five feet. It reaches nearly four feet up the slope of the mounds which stand on either side. If this structure were to be removed and the others continued to a general level with the same slope that they present at other parts, their distance from each other, at the surface of the ground, would be about thirty feet.

Mr. Porter was unwilling that the large mound should be defaced, but allowed us to open the one next in size.

We began on the south side with a trench which, as we progressed, was enlarged sufficiently to unearth every deposit that had been made. Besides removing

[1] April, 1889.

all the earth for several feet beyond where any deposits were found, we dug minor trenches at short intervals into the portion not worked, in order to make sure that nothing had been overlooked.

The only objects found in the upper portion of the mound were at a point twenty feet from the southern margin, three feet above the general surface and five feet below the top. Here were three copper celts, upon which rested eight spool-shaped ornaments. With them were portions of three human ribs, preserved by the copper. There may have been an intrusive burial at this place, but it seems improbable, for no traces of other bones could be found with the specimens, and there is no reason why a skeleton should not last a long time in earth such as that which surrounded them. Neither did the layers above seem to be disturbed. On the other hand, the number of specimens and the evident care in their arrangement preclude the idea that they had been unwittingly cast in with the earth. While the identity of the ornaments with those found at the base warrants the supposition that they are of the same age, the reason for depositing them at a distance from any other objects is not manifest.

The disposition of the various layers is such that this may be called a stratified mound, although the strata have little regularity in either extent or thickness, and sections taken at different points would all present a different appearance. Our best section was made from east to west, at a point seven feet north of the centre, where the layers are more plainly marked than elsewhere. Beginning at the top we

find first the soil which had been removed by cultivation and erosion; then—

Yellow clay	twelve	inches,
Dark clay	six	"
Gravel	six	"
Yellow clay	twelve	"
Coarse gravel	four	"
Yellow clay	eight	"
Gravel	four	"
Yellow clay	streak.	
Gravel	six	"
Yellow clay	forty	"

The thickness of the lowest stratum is given from its top to the bottom of the mound. From this is to be deducted the thickness of such deposits as occurred beneath it, thereby causing a considerable variation in its amount at different points.

The first step in the work of erecting the mound consisted in levelling and burning over the area to be covered. This made a hard, smooth surface, on which were placed the many interesting remains now to be described.

The south side of the mound, for a distance of twelve feet from the margin had been hauled away to fill a hole near by, and we began on that portion of the bank which remained.

Within two feet we made our first find, and for thirty feet we unearthed one interesting object after another, until our discoveries here surpassed those made in any other mound that it has been our fortune to excavate.

The accompanying diagram, Figure XXI., which is made on a scale of seven feet to an inch, shows the limit of our excavation. The position of everything discovered is also indicated, so that it will only be necessary to refer to the different finds by the corresponding letter.

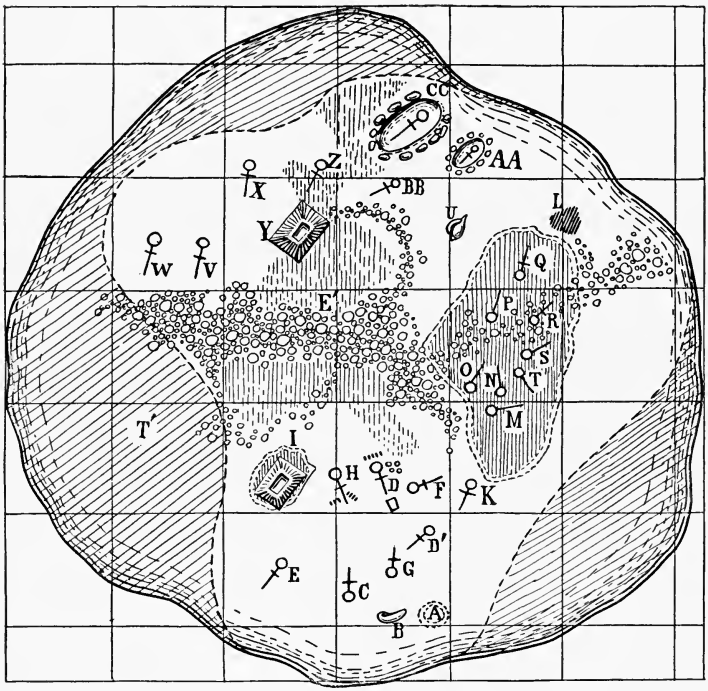

FIG. XXI.—Ground plan of Porter mound, No. 38.

At A we found a mass of charcoal and ashes containing many bones of animals and birds in a broken and charred condition, as if the whole had been taken from a fire-place or ash-bed where a meal had been partaken of. Similar masses were found frequently,

but as none contained anything more than the one mentioned, they are not indicated on the plan.

West of this charcoal, at the point marked B, we found a large *pyrula* shell and the upper jaw of a ground-hog, imbedded in a small amount of soft, black earth, which seemed to have resulted from decayed organic matter of some kind.

The first skeleton unearthed is shown at E. It lay extended with the head toward the north, the bones being badly decayed. Two bear teeth lay close to the cranium.

The next skeleton, C, lay to the southeast of this. The bones were much better preserved than those of the previous interment. No relics were placed with it.

At D was found a skeleton with head to the northwest, on the head of which lay a copper plate. It is five by eight and one quarter inches, and the surface was covered with a network of fibre, the impression of which cloth was plainly perceptible on the salts of copper covering it. Near the right hand were three spool-shaped ornaments and a copper celt.

To the east of D was another skeleton, F, with head toward the west. Nothing was found with it, and the bones were so soft that they crumbled away in a short time after it was uncovered. The bones of the next skeleton, K, lying east of F, with its head to the north, were in a similar condition to that described in the preceding interment.

An interesting discovery was made at the point marked G. A skeleton in a fair state of preserva-

tion, except that the feet and skull were badly crushed and decayed, lay with its head to the south, in a mass of soft black earth, six inches above the base line. Upon the ground at its feet was a copper plate, seven by twelve inches in length, which was covered on both sides with the remains of cloth and a fragment of wood. About the head and neck were six hundred and six beautiful pearl beads, which were much larger than those discovered in Number Fifteen; many of them were half an inch, and some fully three fourths of an inch in diameter. All were drilled, and most of them still retain their lustre. Among the vertebræ, as if they had been placed on his breast, were eight perforated bear tusks; three spool-shaped ornaments lay by one, which was discolored by the oxidized copper. Between the femurs were found twenty disk-shaped, double perforated beads, cut from mussel shell and well polished.

One more body, marked H on the plan, had been placed in this group; it lay near and parallel to G, and had four of the spool-shaped ornaments near the head. These were so badly corroded that they could only be taken out in small fragments.

From the appearance of the earth about these remains and the position of such articles as had been buried with them, it was plain that the bodies had been interred without having the flesh removed.

Eight feet west of the last skeleton we uncovered an altar (I). A hole a foot deep had been dug in the natural soil, the bottom paved with small burnt stones, and clay packed in until the hole was filled

to the general level. The surface of the clay had been flattened and smoothed, though no effort was made to give any regularity to its outline, and in it was excavated a basin which measured twelve by twenty inches and four and a half inches deep. This was not placed at the centre, the breadth of the border around it varying from eight to twenty inches in different parts. Nothing was found except the earth of the overlying stratum, and the clay was only slightly burned. The builders had evidently abandoned work without carrying out the intention which led to its inception.

North of skeleton K we came upon a mass of loose black dirt (enclosed by dotted lines on the plan), and removing all the earth that lay above this we found it to extend over a space of nine and a half by fourteen feet, with a thickness of one and a half to two and a half feet. Under this, upon the original surface, were the remains of seven cremated bodies, each lying in a little pile by itself, and occupying a space from twenty by twenty-four inches to twenty-four by thirty inches. A few of the vertebræ and several of the ribs remained intact in two of them, though much charred. With the exception of these, no entire bones were found. The fragmentary skeletons are indicated by the letters M to T inclusive.

With N no articles whatever were found; with O was a copper plate; close to P we found three spool-shaped ornaments; with R were a copper plate five by six inches, and a pipe in small fragments. Enough of this remained to show that it was of the "platform" or "mound-builder" type. All the objects

FIG. XXII.—Copper plates, with imprint of cloth and copper celt, Porter mound No. 38. See page 141.

enumerated had been greatly injured, some of them almost destroyed, by the intense heat to which they had been subjected.

Near s was a small celt, unhurt by the fire, and with T were four spool-shaped ornaments, only slightly burned. In every case the relics were lying directly on top of the bones. The earth lying below had no indications of such a large fire as the condition of these objects would lead us to believe had been necessary; yet their position, together with the charcoal and ashes that were scattered throughout the mass, makes it reasonable to suppose that cremation had taken place. Whether all the bodies or only the skele-

tons had been burned, we cannot say. If the former, then they must have been folded or doubled up, so as to occupy as small a space as possible. The plate that lay upon the skeleton marked R, and the celt with the one marked S, are shown at the left and right, respectively, of Figure XXII.

Three feet from the northern edge of the black dirt was a large sea-shell, marked U on the plan.

Contrary to what is usual, this mound had few remains, not even an ash-bed, at the centre or within several feet of it.

At a distance of twelve feet, a little north of west from the centre, were two cremated bodies, marked V and W. Eight feet northeast of them lay the badly decayed bones of another skeleton, X, which did not show any marks of burning. No objects were found with any of these skeletons, except a few flint fragments with the first.

About six feet east of the last skeleton was another altar, Y, similar to the one above described, except that it did not extend quite so far into the ground, and had no stones under it. A mass of ashes and charcoal filled the basin, but no bones were among them. In one corner was a pipe of the platform pattern, made of rather soft but very fine-grained stone. It was well finished and almost perfect, a small piece being broken off one end of the stem.

Just north of this altar, with head to the north, lay a large skeleton, Z, whose bones were in better condition than any other we had found. Nothing was placed with it. A noticeable feature was a peculiar curvature of the left femur, the middle being fully

two inches within the normal line from the hip to the knee. The bones were too soft to be removed.

To the east of z was a pit resembling the cavities in the mound altars, being rectangular with rounded corners, though it had not been burned in the least. It measured ten by twelve inches at the bottom, eight inches deep, and contained the remains of a young child, which had been laid on its side. The bones were tolerably well preserved, though no covering of any kind had been placed over the body. Two perforated panther teeth and some small snail shells were found with the bones. This pit is marked AA on the plan.

West of the pit was a cremated skeleton, BB, with head northeast. Nothing was found buried with it, but near the right side was a mass of ashes and fragments of pottery occupying a space nine by sixteen inches and one inch thick.

At cc we found a shallow pit, the sides of which had been slightly burned. In this lay the remains of a large but badly decayed skeleton, the head being turned toward the northeast. The body had evidently been folded, as the pit was less than four feet in length.

This completed the exploration of mound Number Thirty-eight.

An inspection of the plan will show that, if we omit the mass of cremated skeletons on the east side, the deposits here were scattered at random, as in Number Fifteen.

The mounds on the hill-tops have yielded nothing to repay our labor, and there being no other mounds

in the bottoms that we could obtain permission to excavate, our work in the neighborhood of Frankfort was brought to an end. Removing to Chillicothe, we made some examinations in that vicinity, the results of which will be set forth in the next chapter.

CHAPTER XII.

EXCAVATIONS NEAR CHILLICOTHE.

The beautiful scenery in the immediate vicinity of this city has called forth expressions of admiration from travellers who are familiar with the noted landscapes of the world. Almost every feature essential to natural beauty is to be found within a few miles. The views from the rugged hills, some of them nearly seven hundred feet in height above the streams that flow at their base, are equal to many that have been celebrated in song and story, or transferred to the canvas of the painter. The broad level valleys that stretch to the limits of vision along the sparkling waters of the Scioto River and its main tributary which joins it near here exceed in fertility even the famous "Blue Grass" region of Kentucky.

It is not, then, a matter of surprise, but is rather only what we should expect, to find this favored region the chosen abode of the race who built the great earthworks in the three sister States whose corners meet at the point near which so many streams pay their tribute to the Ohio. These unknown people were thus afforded facilities for easy transit from place to place within the region over which they held dominion.

In Ross County are to be found more of the large enclosures erected by the American Race than on any other equal area in the country. At the first settlement of this territory by the whites, mounds were to be seen everywhere. They existed on the level lands in almost as great numbers as do the farm-houses at the present day. Scores, even hundreds, have been opened, and at present very few are intact.

It was here that Squier and Davis carried on the work and collected the material which they used as the foundation for their celebrated volume on the aboriginal remains of the Mississippi valley. Here are to be seen many private collections of surface specimens whose symmetry and finish would seem impossible of attainment by the methods at command of a rude or barbarous people.

Mounds on the Farms of Redman and Janes. —Three miles from Chillicothe, on the east side of the Scioto, the drift deposits form three terraces, the highest having an elevation of considerably more than one hundred feet above the river, resting against a slope that ascends by an easy grade to the hills farther back.

Formerly a number of mounds and small enclosures were to be found on this slope and the two terraces next below it. At the time our work was undertaken only five mounds remained, all of which we opened.

The first three were on the farm of Mr. Jesse Redman, which lies partly on the hillside and partly on the highest terrace.

Mound Number Thirty-four.—This was the smallest of the three, being only twenty-five by thirty-eight feet and three and a half feet high. We removed almost the entire mass of earth, finding one fragmentary skeleton a foot below the top, at the centre. Immediately below it was a small quantity of ashes. Nothing else was found.

Mound Number Thirty-five.—This is five hundred feet northeast of the last. It was very regular in form, never having been disturbed by cultivation.

The height was seven and a half feet, the diameter at the base fifty-five feet. A trench twenty feet wide was begun on the south edge, widened to thirty feet at the centre, and carried to within fifteen feet of the opposite side.

At fourteen feet from the margin, one foot above the base, were the decayed bones of two skeletons.

Twenty feet in, and near the east side of our trench, was a slight depression in the original soil, covering a space five by six feet. It was filled with a deposit of ashes, charcoal, burnt bones, shells, etc., more than thirty entire mussel shells being taken out. About three feet west of this and one foot above the base was a well preserved skeleton with head to the north. Three feet north of the ashes, lying on the base, was a number of small pebbles, placed so as to form a circle eight inches in diameter, which had nothing else in or near it. At the same level was another skeleton, near the west side of our trench, in a fragmentary condition. None of these had any objects buried with them. Lying among the cervical vertebræ of one six feet east of the

centre, three feet above the bottom, were forty-two copper beads, one mussel shell, and five snail shells, which had at one time, no doubt, formed a necklace.

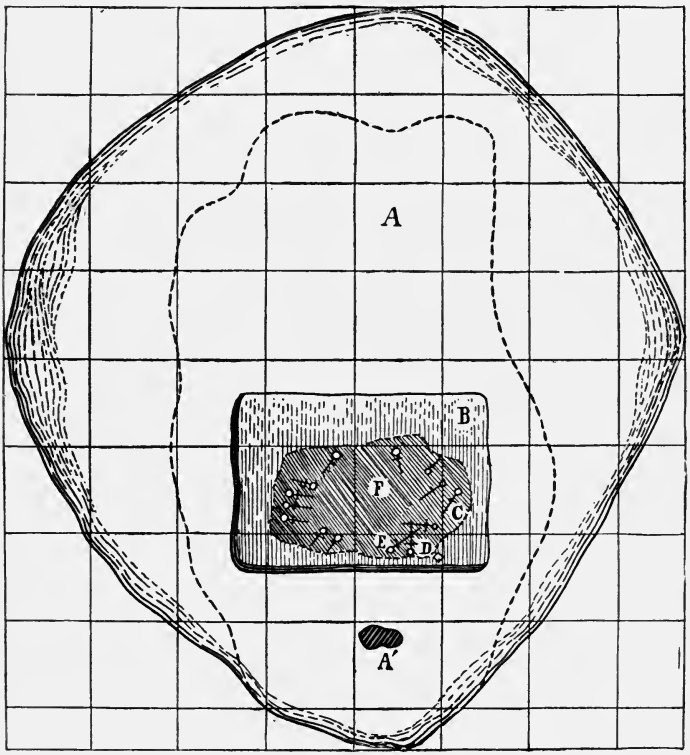

FIG. XXIII.—Ground plan of mound No. 36, 14 skeletons. See page 148.

The only variation from the yellow clay of which the mound was built was a stratum, about three inches in thickness, of clay burned to a bright red. It had nearly the same curvature as the mound's surface, the edge resting upon the general level at about ten feet from the centre on every side.

Mound Number Thirty-six.—This, the third of the mounds on Mr. Redman's place, is nearly south from the other two, and on lower ground. It measured eight feet in height and fifty feet across the base. A trench twenty-five feet in width was carried into it from the south side.

A plan and vertical section are presented (Figs. XXIII. and XXIV.) which will give a clear idea of the structure and its contents. The same letters serve for both drawings, so far as it is necessary to use them.

At a point seven feet from the margin, on the bottom of the mound, was a small amount of black earth (A), containing over two hundred pieces of pottery, the fragments of vessels which were perfect when deposited, but had afterward been crushed by the weight of the earth resting upon them.

For a space of twelve feet on every side of the centre the earth had been burned quite hard, and of a bright red color, forming a floor (B in the figures), upon which rested the remains of fourteen adults and one child (C in Fig. XXIII., G in Fig. XXIV.). Among the bones of the right hand and wrist of the latter were three shell beads and two copper rings, only large enough for a child's finger. The rings are shown in Fig. XXVI. They were made by bending a small rod until the ends overlapped, and then pounding them as closely together as possible. Specimens were found near two of the adult skeletons. With the first (D) was a tube of soft clayey sandstone, two celts, one of hematite, the other of granite, and twelve flint knives and spear-heads.

These were all deposited by the outer side of the right femur. Between the femura of the other skeleton (E), reaching from the pelvic bones almost to the knees, was a fine celt, two perforated ornaments, an unfinished pipe of ferruginous sandstone, and ten finely worked flint implements. Some of these relics are shown in Figs. XXV. and XXVI. All of the skeletons were so decayed that we could only recover the skulls and a few other bones of three individuals.

The bodies had been covered with a layer of charcoal (F) 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.

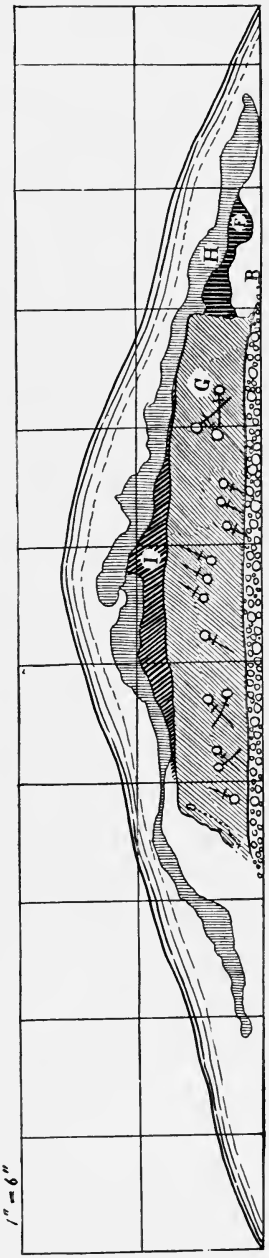

FIG. XXIV.—Vertical section of mound No. 36, 14 skeletons. See page 148.

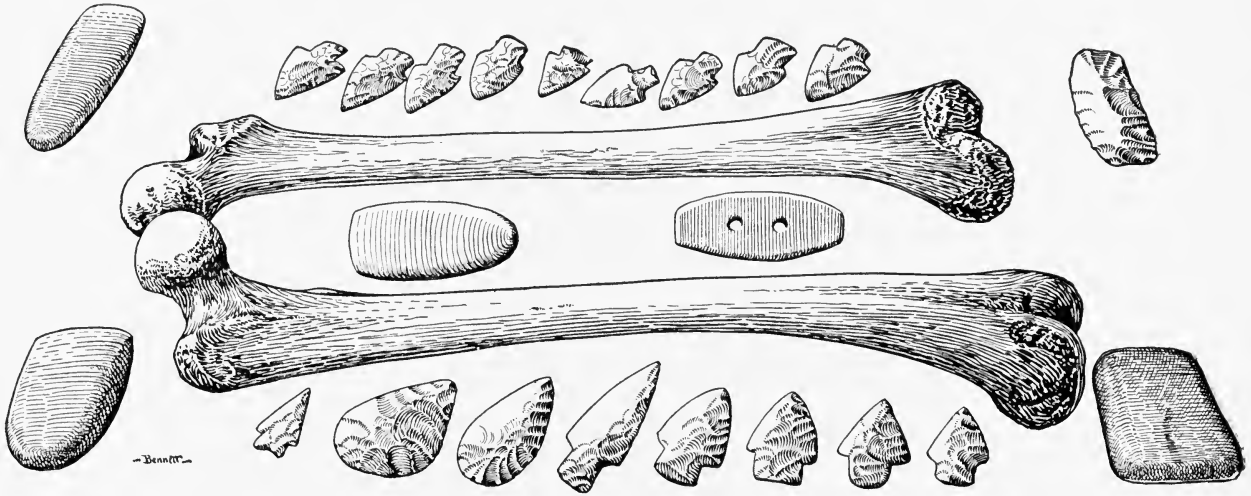

FIG. XXV.—Femura, with 17 arrow-heads in rows along each side. See page 149.

The other two mounds in this group are on the farm of Mr. Joseph Janes, between Mr. Redman's and the river.

MOUND NUMBER THIRTY-SEVEN.—This is on the second terrace, in a field where a great many relics have been gathered from the surface, and which has some indications of having once been the site of an Indian village.

The mound is fifty by ninety-five feet, the longer axis nearly east and west. The height is thirteen feet.

A trench thirty-two feet in width, begun at the east end and carried twelve feet beyond the centre, showed that it was built of the sandy clay forming the surrounding soil. A large depression, a hundred yards to the north, holding water the greater part of the year, was probably the source whence the dirt composing it was taken. From the size and situation of the mound, it had been a matter of common belief that the excavation would result in valuable discoveries, but it yielded almost nothing.

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 in the direction of our trench, and reached beneath the walls at both sides. It measured not less than twenty-five feet in length; perhaps more. 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. A few charred hickory nuts were also found.

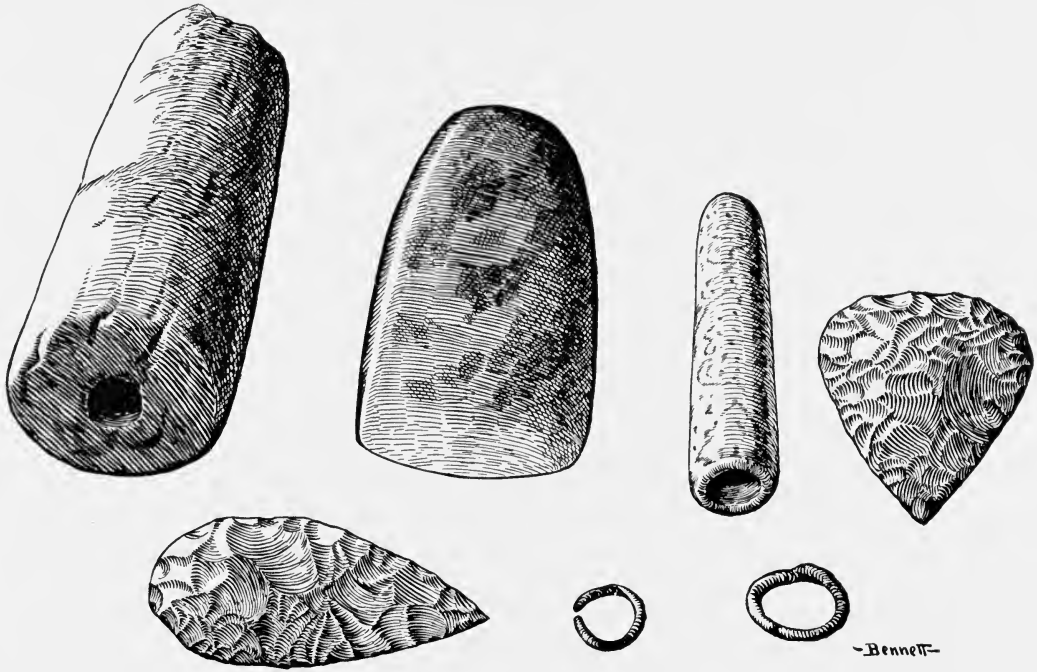

FIG. XXVI.—Two tubes, two leaf-shaped implements, two finger-rings and one hematite celt from mound No. 36.
See page 148.

On the bottom, at the centre, we found the skeleton of a child not more than ten years of age, with its head to the east. By the neck were one hundred and nineteen 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 earth above 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. There was no evidence at any point which indicated that the work had not been carried on steadily to its completion.

It will be seen from the sketch made at the time (Fig. XXVII.) that 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 cervical and lumbar vertebræ are missing, as are some bones of the hands and feet. The right radius is turned almost at a right angle to the ulna, and the right tibia is lying across the left fibula, which is itself several inches out of the true position. 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 shell beads by the right wrist.

It seems scarcely credible that a mound of such magnitude should be erected in honor of a young

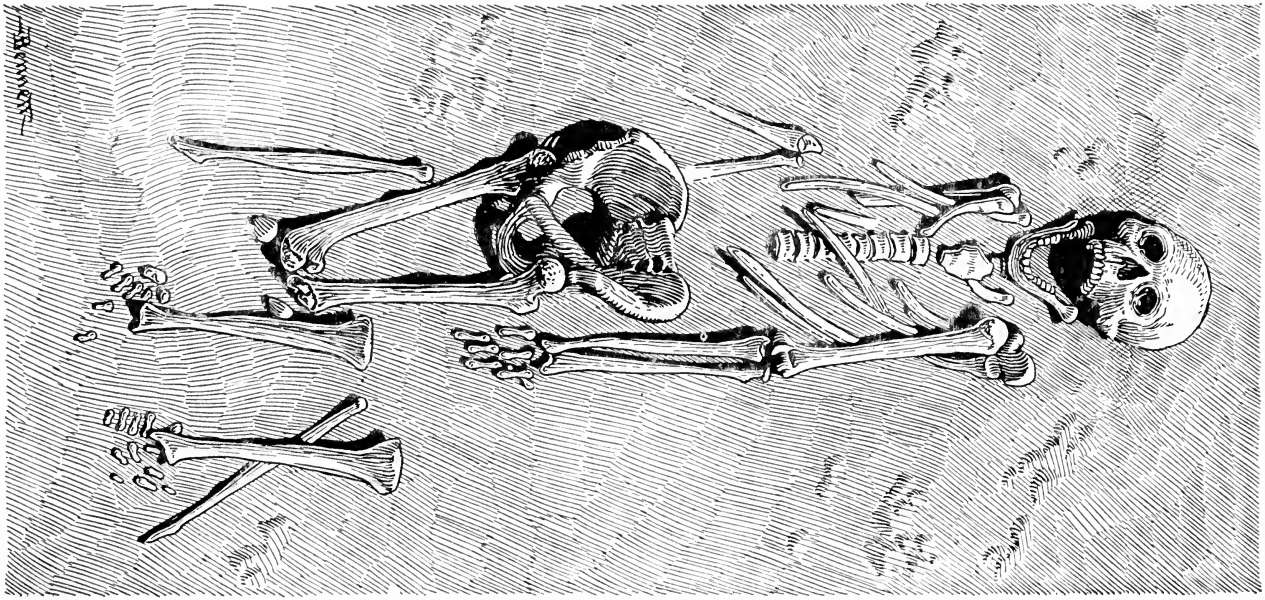

FIG. XXVII.—Displaced skeleton from mound No. 37. See page 153.

child. This conclusion is forced upon us by the facts disclosed—that the adult's skeleton was not placed here until the structure was more than half finished. No other remains were found that would indicate additional burials.

The skull of a wolf was found two feet above and a little south of the large skeleton referred to. Almost the entire framework of another lay at a point some ten feet south of the skull.

Mound Number Thirty-nine.—This is on the upper terrace, three hundred yards northeast of Number Thirty-seven. It had been plowed over a great many times, reducing its height to about six feet, the diameter of the base being seventy feet.

The ground rises in every direction from the mound, except toward the southeast, consequently the interior was very wet, and digging quite difficult—the earth clinging to the shovels so that constant scraping was necessary. For a like reason the bones we found were in a condition almost like wet ashes.

A twenty-two-foot trench was carried from the south side nearly through the mound. Near the edge we found a chalcedony spear-head, and twenty feet farther in, a small copper bracelet. The presence of both of these was accidental. Pieces of burnt sandstone and bits of charcoal were scattered promiscuously through the mound, and we could easily detect below it the sod line forming the original surface. The bracelet lay just at the edge of a thin stratum of burned clay, which had been carried from some outside point and deposited upon this sod. It ex-

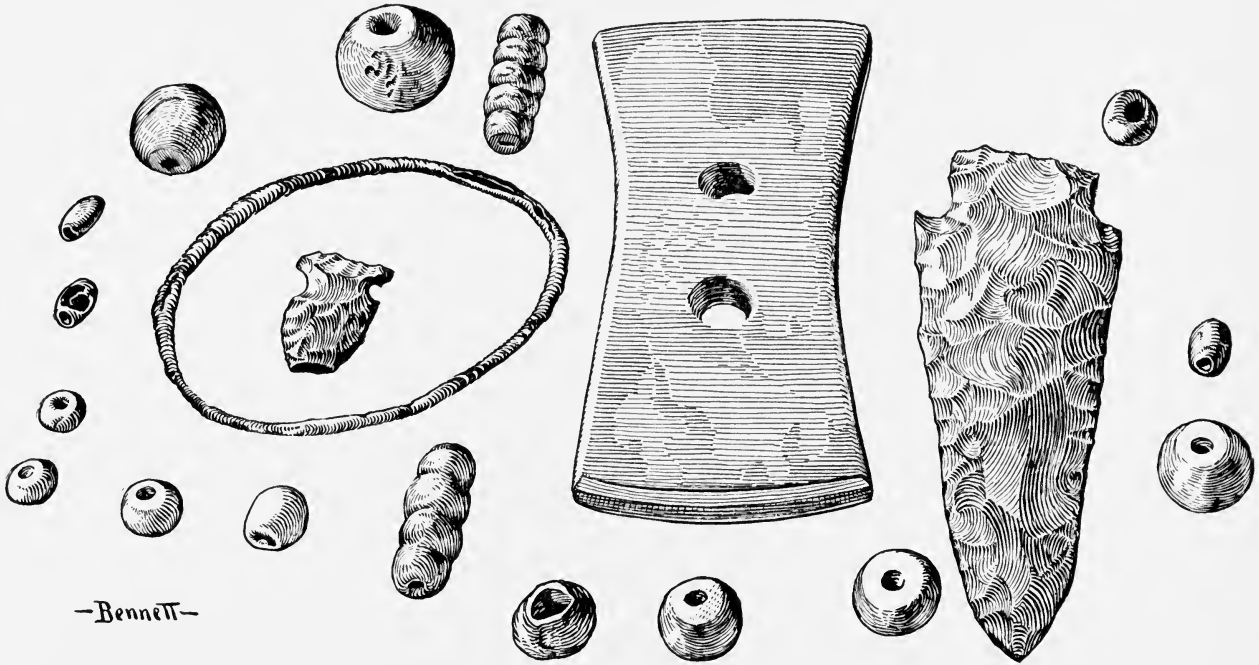

 FIG. XXVIII.—Tablet, bracelet, spear-head, and beads from mounds Nos. 39 and 43. See pages 157 and 168.

tended beyond our trench on each side, but ran out just before we reached the centre.

We found the badly decayed bones of two individuals, both extended on the back, with heads to the east. The first was on the burned clay, five feet from its southern edge. The head of the second lay over a hole eighteen inches deep, which had been dug in the original soil at the centre of the mound; at the bottom of this hole were some flakes of mica and small pieces of charcoal. On the head of the second skeleton was a fine slate gorget (see Fig. XXVIII.)

At a foot northwest of the centre was a child's tooth, and close by a small amount of red ochre. No traces of bone were discovered. Three feet north and five feet west of the centre, was a hole three feet deep and two feet in diameter, which contained pieces of human bones—possibly it was a sort of vault in which a folded body or skeleton had been placed.

Nothing else was unearthed, except some fragments of pottery, enough to form a small vessel, which lay at the edge of our trench, northwest of the centre.

CHAPTER XIII.

MOUNDS NEAR SLATE MILLS, ROSS COUNTY.

Four miles west of Chillicothe, near the station of Slate Mills at the point where the Cincinnati Pike crosses the Ironton branch of the C., H., & D. Railway, is a group of three small mounds, two of them being on the farm of Mr. W. D. Fullerton, the other on Mr. John Madeira's land.

In one, at eight feet north of the centre, was a skeleton, with head northwest, of which only fragments remained. In the second we found on the south side another in the same condition; also small pieces of three other skulls.

Both of these mounds had been dug out for a space of several feet around the centre by some preceding explorer. We were not aware of this fact until the condition of the mounds made it apparent. It was impossible to learn who had opened them or what the results had been, as the work had ruined them for our purpose, and we did not proceed with our investigations upon discovering this fact.

Mound Number Forty-five.—This is the most eastern of the three. A trench was excavated through from the east side and disclosed nothing until we were within six feet of the centre. Here

we came upon a layer of rotten wood, near the edge of which we found some portions of a skull, including the zygomatic arch and mastoid process, unaccompanied by any other bones.

On following this wood, we found that a rude

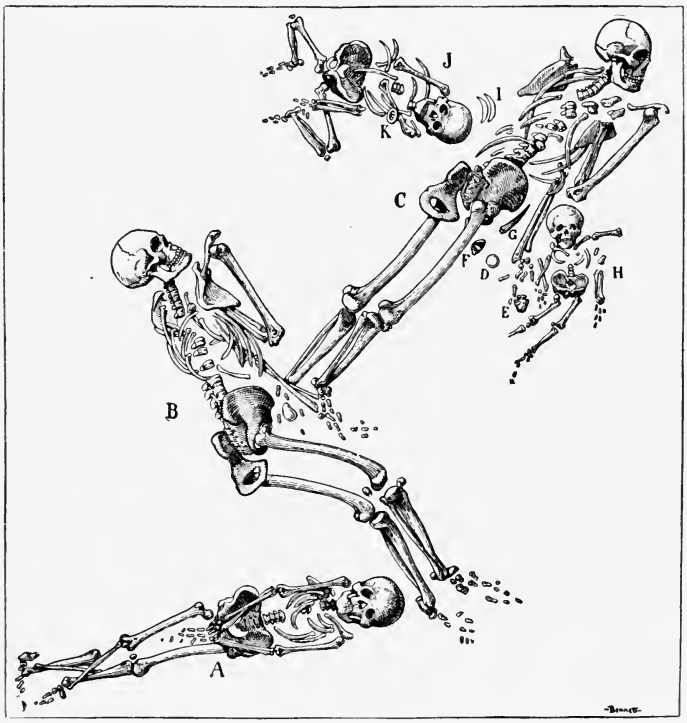

FIG. XXIX.—Group of skeletons from mound No. 45, with objects. See page 160.

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 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 exploration presented the appearance of ashes having about as much consistency as fine earth.

The positions of the skeletons, with accompanying objects, are shown in Fig. XXIX. All were extended at full length, and all were on the back except one.

The first uncovered was that of a young person, marked A, with feet to the southwest. Among the bones of the head, as though they they had been laid on the forehead, were thirty small shell beads.

The second body, B, had been laid on its left side, with its feet almost at the exact centre 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 (C), whose feet rested against the hips of the second, its head being toward the northeast. Near its right thigh lay a disk of yellow ochre, D, one side of which had been rubbed off, probably for use as paint. Under the back was a mass of burnt and broken bones in soft black earth, perhaps the remains of food deposited with the body. Near the left hand was a broken arrow-

head, E, a fine hematite cone, F, and a point of deer antler, G, about six inches long.

With the bones of the middle portion of this skeleton were intermingled those of an infant (J). On the forehead of the child had been placed several pieces of mica (I), cut in the form of a half-crescent, with smooth edges and rounded points. Each plate had several small holes punched in it. A number of beads, some of them copper, others of small marine shells, the remainder perforated disks made of mussel shells, were scattered about the necks of the two, but the bones were in such confusion that we could not say what portion of them belonged to each. A small copper bracelet was on the left wrist. It is marked K.

The fifth skeleton was that of a child (H), with its head near the waist of the last adult, and feet to the southwest. On its forehead was a single plate of mica like those above described, but much thicker, and long enough to reach down over each temporal bone. About the neck were one hundred and six beads of small sea-shells.

The relics of this mound are shown in Figure xxx.

Mounds on the Worthington Estate.

Our next field of operation was in the Scioto bottoms, northwest ofthe city.

Most of the mounds in this direction have been opened. There are a few which, partly on account of their large size and the consequent expense of careful investigation, and partly owing to the reluctance of their owners to have them disturbed, have remained untouched.

The largest and best preserved are on the estate of Thomas Worthington, one of the early governors of Ohio. His heirs, respecting his wishes, have never allowed them to be injured in any way.

A portion of the estate, however, on which four of them stood, had recently passed into other hands, and the new owners gave us permission to excavate them.

The four form a connected group, being built in such a manner that the adjacent edges unite several feet above the level of the ground, in the same manner as those noticed in the description of Number Thirty-eight. Figure 57, page 170, of *Ancient Monuments of the Mississippi Valley*, giving a view from above downwards, will show their peculiar arrangement. They are numbered in the order of their exploration.

Mound Number Forty.—This is the second in size, and stands at the southwest extremity of the group. The diameter at the base from north to south is about sixty-five feet, and the height thirteen feet, making the sides quite steep.

A trench thirty-three feet in width was begun at the southwest side, and widened somewhat toward the centre. At first the earth was dry and loose, but a few feet farther in became wet, and soon was so soft and sticky that the workmen sank half-way to their knees, and found it impossible to shake the mud from their shovels. We were compelled to engage a team and scraper to remove this mire, which would ooze out from the sides of the trench and flow slowly down the track left by the scraper. The whole up-

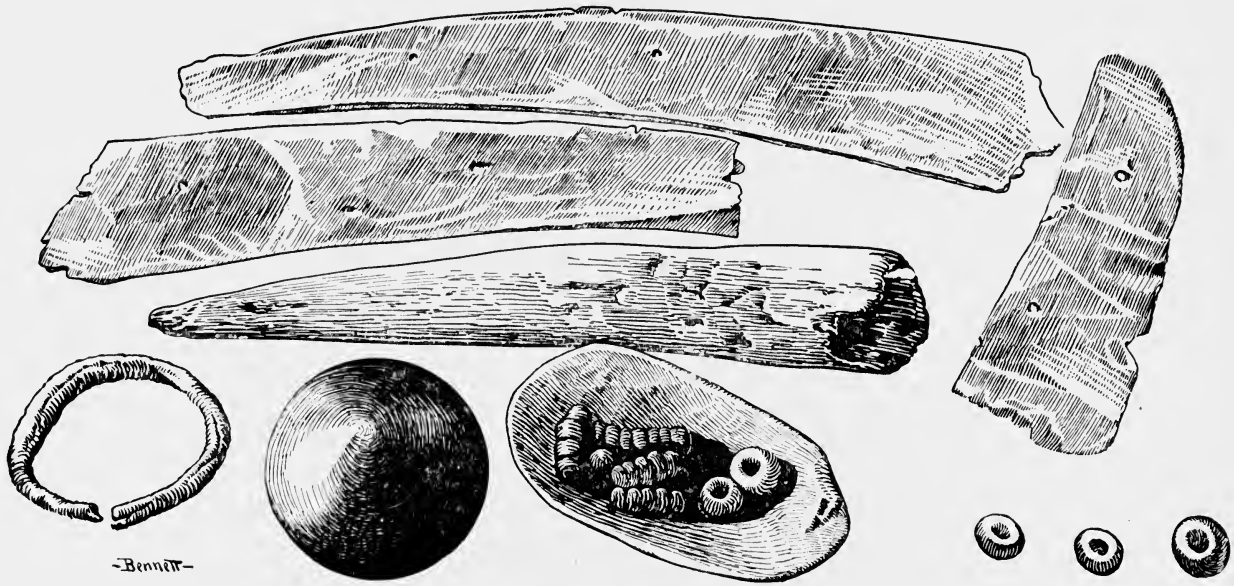

FIG. XXX.—Hematite cone, bone awl, circular disk, and broken spear-head. See page 169.

per portion of the mound, to a depth of four feet at the summit, was in this condition, giving rise to many speculations as to its cause.

When we succeeded in getting it out of the way, the reason was apparent. In erecting the mound the builders had carried it up to a height of nine feet with a very fine dark sand which had become so compact as almost to equal mortar in hardness. This was impervious to water. The rain and snow melting and soaking into the ground was checked by it as by a floor. Coming from above more rapidly than it could escape along the surface of the sand core through the overlying clay produced the mud.

When we finally reached the original level, 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. This had an inside measurement of seven by eleven feet, being longest from north to south. In it were the remains of a single individual, with head toward the north. It was evident that the skeleton had been buried after the flesh had been removed from his bones, as the lower jaw and bones of the hands were covered with a coating of red ochre of uniform thickness, while the surrounding earth, except that immediately in contact with the bones in question, showed no traces of the coloring matter. This could not have been the case had the flesh not been removed before burial. Why no other bones had been colored is, of course, impossible for us to explain. Over this vault had been placed another layer of wood or bark, and the whole thing then covered with sand.

The pen was about eighteen inches high, the logs forming it being four or five inches in diameter, and extending out for two or three feet at the corners. The floor and covering were each about three inches thick. Of this only a soft, ashy mass remained. It could not be determined whether the material was bark, or split wood, like puncheons. Enough of the logs remained, in places, to show that they were of some soft wood like poplar or willow.

Nothing whatever had been buried with the skeleton.

MOUND NUMBER FORTY-ONE.—This lies at the eastern end of the group, and is the smallest of the four, being fifty feet in diameter and seven feet high. It had been opened by Squier and Davis in their customary manner—by sinking a shaft from the summit to the base.

While it is not the intent of the writer to offer any criticisms on the work done by others, it may not be out of place here to reproduce what the authors mentioned have to say about this group, and allow the reader to see wherein their work was deficient.

Figure 57 in *Ancient Monuments of the Mississippi Valley*, page 170, represents the group as it appeared in 1845.

While the depressions between the mounds, along the line *ab*, are much greater as shown here, than they were when our work was begun, it is probable that the measurements taken at the time this sketch was made are correct. The mound *h* (our Number Forty), however, is made too far toward the south as regards its position relative to *g* (our Number Forty-

three). The authors inform us (page 171) that this group—

"· · · occurs upon the plain in the immediate vicinity of Chillicothe, and is numbered 4 on the map of a section of the Scioto Valley, Plate II. The small one indicated by the letter *j* was excavated, and found to contain the skeleton of a girl enveloped in bark, in the manner already described. The largest of the group is about thirty feet in height."

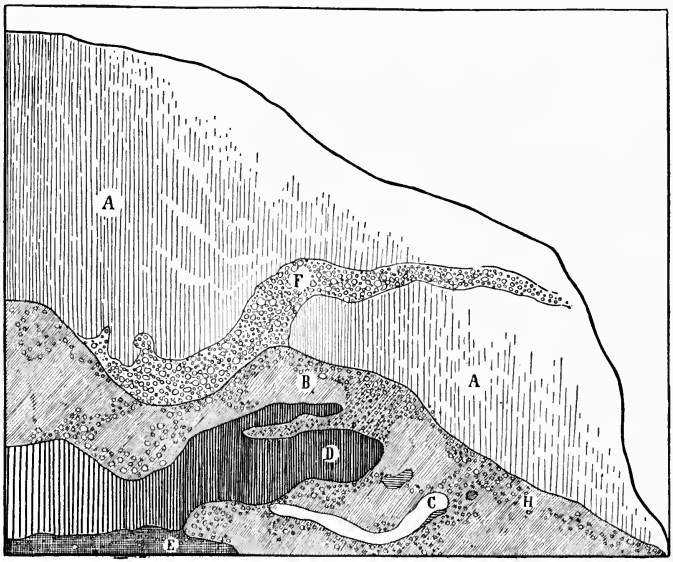

FIG. XXXI.—Peculiar construction of mound No. 43. A. Clay constituting the upper portion of the tumulus. F. Gravel and small stones. B. Sand and fine gravel patches strangely intermingled. D. Charcoal layer coming up from below. C. White ashes. E. Burnt earth on base line. H. Variations of charcoal and burnt earth.

The statement in the last sentence in regard to the height of the largest is one half in excess of the true measurement. The mound *j* in their description is the one we have numbered Forty-one.

The skeleton they exhumed was not "enveloped in bark" but placed between two layers of split wood. The explorers had done their work in such a way that the feet and skull of the skeleton had not been touched, although they had disturbed all the other bones, even taking away the lower jaw. The wood 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. An old man, who, by a lifetime of work in timber, was qualified to judge, said that he could distinguish beech, sycamore, and black walnut among the fragments.

The head lay to the southwest; and not more than a foot to the west of it was the skull of another skeleton which had been placed parallel to the first, and which the former explorers had not discovered, as their shaft was not extended far enough to reach it. The bones of this were so soft that they would not hold together when the contiguous earth was removed.

Mound Number Forty-two.—This is between the largest mound and the one last described. Its height is thirteen feet. In construction it resembled Number Forty—a core of very fine sand seven feet in height covered by six feet of soft, muddy clay. This being removed by scraper, we ran a trench fourteen feet wide through the mound from north to south.

In a little pocket at the bottom near the centre 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, to repay us for more than a week of steady work.

CHAPTER XIV.

MOUND NUMBER FORTY-THREE.

The altitude of this, the largest mound in the group, was twenty feet above the general level of the ground around it, except that on the side toward the south. Here much of the earth composing the four had been gathered, thereby lowering the surface from two to three feet over a considerable area.

A few rods north of the group is a hole fifty or sixty feet across, and now about four feet deep, which may be the place whence was obtained the fine sand, or at least a part of it, that formed the core in all but Number Forty-one ; such sand is found near by, at a depth of about two feet.

Owing to the height of this mound and the looseness of the earth composing the upper portion, we deemed it best not to run a trench from side to side, as in the others. The risk of injury from possible caving in of the walls was great, and besides, if we should come upon any deposits occupying a large space, the difficulty of uncovering them properly would be greatly increased by the amount of material above. Consequently after marking out a line on the surface to include all that portion which we

considered it necessary to excavate, work was begun on the slope at a point half-way between the summit and the base, the earth above this level having been hauled away that it might not interfere with subsequent operations.

Near the centre, four feet from the top, were a few decayed bones, among which were thirty-three discoidal shell beads; these belonged to an intrusive burial.

Ten feet to the northwest of this deposit we found twenty-six copper beads lying close together at the bottom of a hole, three and a half feet deep, that had been dug at some time after the completion of the mound and refilled. The line between the undisturbed earth and that thrown back was quite plain. No trace of bone was found, nor was the hole large enough to contain a human body unless the skeleton alone had been packed into a small bundle and buried.

Just west of the centre, over a space ten feet across, and with a vertical range of two feet, were twenty-five copper beads (see beads in Fig. xxx.) that seemed to have been gathered up from the earth and thrown in without any knowledge of their presence, as they were scattered at random in the space indicated. Unlike those found in the hole, which were of nearly uniform size, they varied considerably, some being more than twice as large as others. Among them was one which had corroded in such a way as to show how it was made. 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. Probably this was the method used in making all the heavier beads.

Another deposit of the same character, containing eighty-four large beads, was found about fifteen feet north of the centre, at a depth of four feet. Like the first lot, these lay at the lower part of a mass of disturbed earth. Instead of there being a small hole as in that case, the earth for a distance of seven or eight feet around the deposit seemed to have been upturned. No trace of human remains was found, except one tooth that lay under the beads, and, from contact with them, was almost as green as the copper itself. It would appear that the beads, except the scattered ones, must have been buried here for concealment. Had they been placed with persons interred at the spots where they were found, such portions of the bones as they may have rested upon would certainly have been preserved by them.

At a depth of eight feet below the summit we found sand similar to that in the other mounds. We disturbed this as little as possible, the workmen removing the overlying clay along its slope, thus leaving our terrace or floor about two feet higher at the centre than at the margin. On the north side, near the centre, just below the surface of the sand, we found at intervals of a few inches what seemed to be the remains of short boards, about eight inches wide and four to five feet long. The ends were on nearly the same level, but the edge of each was raised so as to give the face an angle of about forty-

171

FIG. XXXII.—Peculiar construction of mound No. 43. A. Clay forming upper portion of the mound. B. Charcoal. C. Burnt clay. D. Mixture of charcoal and white sand. E. White sand. F. Rotten wood. G. Dark sand. H. Mixture of charcoal and loam. I. Mixture of charcoal and dark sand. K. Ends of logs burned to charcoal. L. Rotten wood and white sand. See page 183.

five degrees. Were it not for this we might suppose them to have been found unnecessary for some purpose for which they were brought here, and thrown aside. The apparent care taken to place them at equal distances apart and at the same angle, would tend to show there was some design in so arranging them, though nothing whatever could be discovered to indicate what this may have been.

At the same distance below the summit, and seven feet north of the centre, was a layer of peculiar substance, the nature of which cannot be determined by any one who has seen it. It has a greasy feel, and is about the consistency of wet clay. In some parts it is a bright yellow, while other portions are of a dull green. It covered a space of three by five feet, with a very irregular outline, was nowhere more than an inch in thickness, and the margin was four to five inches higher than the central portion. It was surrounded by the clay composing the upper portion of the mound, the lowest part being a few inches above the level of the sand at this point.

This constituted the sum of our finds in the upper half of the mound, and we proceeded to an examination of the lower portion.

The trench in Number Forty-two had been carried through on a level slightly below the base, and its western wall made a good starting-point from which to work the larger mound. We began a trench with a width of sixteen feet, which we carried to a distance of fifty feet toward the northwest, widening it to twenty-five feet at the centre.

Almost at the beginning, we found on the north-

ern side a layer of charcoal and burnt earth, the whole varying from an inch to three inches in thickness. This was not horizontal, being in some places a foot higher than in others, and nowhere less than a foot above the original surface. It seemed as if a low, flat mound or platform had stood there, upon which fires had been made, before the erection of the mound proper was undertaken. Between the charcoal and the clayey soil, forming the upper portion of the mound, lay several feet of the sand composing the lower part.

Finding the thickness of the mass before us too great for working conveniently, we divided it into two benches, each five feet in thickness, by removing the upper one entirely before disturbing that which formed the base.

At five feet from the beginning of our trench, and three feet below the surface of the mound, was a lens-shaped mass of fine, black earth, about as much as a man could easily carry, and quite noticeable in the close yellow dirt surrounding it. In this earth—apparently a single basketful carelessly thrown here—were several fragments of bone, and twenty teeth of a child, eight or ten years of age, all strongly colored as if from contact with copper. Careful search failed to reveal a particle of the metal. Only the caps remained of most of the teeth. The coloring was as marked on the interior of these as on the outer surface.

Nothing further was found until we had gone about fifteen feet beyond the point at which the green teeth had been found. Here the stratum of

charcoal before mentioned ascended into the upper bench and continued to the end. As the work progressed we found remains of logs, some of them nearly a foot across, while those with a diameter from four to eight inches were abundant. There were also a great number of small poles, or saplings, and a considerable amount of swamp-grass and weeds. 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, red and white oak, redbud, honey-locust, chestnut, and basswood.

As we found later, this stratum covered a space of fifty feet across, and in some places was fully three feet thick. In it were many logs and branches that had been cut off with stone axes, the marks being quite distinct. We secured a number of these logs, including two that measured eight inches in thickness. They are shown in Figure XXXIII.

Before reaching this charcoal, the bottom of the upper bench had passed out of the clay and into the sand core. On approaching the centre, the clay reappeared below its proper place, and the sand and charcoal were mingled in confusion. This was due to a fact which, so far as we are aware, had never been observed in any other mound. Intrusive burials of modern Indians, made by digging a hole into the top of the mound, are not uncommon; but here was a clear case of intrusive burial by the original builders themselves.[1] After the sand had

[1] Professor Thomas Wilson, of the Smithsonian Institution, and Dr. Cresson remarked two periods of construction in the large mound upon Mr. Hopewell's farm, Anderson, Ross Co., Ohio. See pages 186 *et seq.* for full description.—W. K. M.

FIG. XXXIII.—Two cut logs and point of pick from mound No. 43. See page 174.

been piled up, it was left undisturbed for several years, as is proven 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 dirt above, these must have been broken or cut off.

A large hole had been dug into the top, the material removed being thrown in three or four piles on different sides. It was evidently one of these piles to which we had come in hauling away the clay from the upper part of the mound.

The hole had been carried fully six feet down, and reached a foot into the charcoal stratum. The sides sloped so as to give it somewhat the shape of an inverted cone. In order to make a level space within this, several logs, some of them more than a foot in diameter, had been laid with the ends resting on the sides of the slope. These logs were of white oak and so was all the other timber, its fibres being distinct enough for its kind to be determined. Wood or bark was placed on them to form a floor, on which lay three skeletons, side by side, with the heads toward the south.

By the head of the first was a small stone tube, and beneath its lower jaw 299 large beads made from a conch or similar shell. There was nothing with the second, but with the third were two arrow-heads and 2,542 beads,—some of small entire sea-shells, others cut from mussel shell.

More wood, or bark, had been placed over them,

on which a small amount of sand was thrown. To the west, at a little higher level, were found three other skeletons lying on a platform or shelf cut out on the side of the depression. It may have been the sand removed here that was thrown on those first found. Nothing was placed with the last bodies, and the bones of all six were so badly decayed that none of them could be saved.

After this burial the mound was built to the height which we found it, with the soil lying about its base. It is possible that up to this period there had been only three small sand mounds with conjoined bases, all of which were covered with earth at the same time. The smaller one to the east was probably constructed when these additions were made.

Nothing further was found in this bench, and our workmen now began the removal of the lower one. In doing this we kept well below the original surface of the ground, in order that any excavation which may have been made prior to the erection of the mound might not be overlooked.

The charcoal stratum increased in thickness, the surface rising gradually until, as stated above, it came into the upper bench. Altogether we threw out not less than one hundred bushels of it. Nothing else worthy of note was discovered, until we had nearly reached the centre, where, on the north side of the trench, were five holes in a north and south line, two feet apart, from twelve to sixteen inches across, and reaching well down into the sand, which is found under the soil at a depth of two to three

feet. Four feet south of the most southern of these, were found three of the same character, in an east and west line. 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 trace of wood or anything else to indicate the purpose for which they had been dug.

On coming to the central part of the mound, we found a skeleton on the charcoal just beneath the logs on which had rested the remains due to intrusive burials. 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. Fifty large discoidal shell beads lay by the cranium of the skeleton.

A few inches lower than this skeleton, and immediately under it, was a very peculiar deposit. Extending east and west was a mass five feet long, from twelve to sixteen inches wide, having an elliptical section four inches thick at the middle. This was composed almost entirely of small fragments of human bones. They had been burned until almost entirely destroyed, and were mingled in utter confusion as though hastily gathered up from the place of cremation. We secured a few of the pieces, enough to learn that some belonged to the frame of an adult, while others were from the remains of a child not more than half grown. Scattered here and there among them were over thirty drilled shell beads, none less than three fourths of an inch in diameter, but all so injured by the heat that they crumbled in a few moments. One showed that in

the process of perforating the maker had allowed his drill to work too far to one side of the centre line. Another trial sent it as far toward the other side. Reversing the bead, he began at the other end a hole twice the size of those first attempted, and this time was successful in his efforts.

The most curious object found among these calcined remains was about one half of the top of a human skull, bearing no traces of fire such as marked everything else in the deposit. 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.

These remains were in a mass of charcoal at a place where much earth was mingled with it, and had been carried in from the outside. The manner in which they were placed shows they could not have been burned here. The piece of skull alluded to had been thrown upon them after they were deposited.

Just north of the centre, on the original surface, the earth in a space of four by six feet was burned until to a depth of six inches it was as hard as a brick. Over this lay a mass of white ashes measuring nine feet east and west, and twelve feet north and south, five inches deep where thickest, and running out to an edge on every side. The northern margin of the burnt earth reached to a trench that had been dug after the fire had died down. The layer of ashes extended to the trench, was broken for the space this occupied, and then continued for

two or three feet beyond it, while the sand that came from the bottom of the trench was thrown on top of the ashes on either side.

For more than a foot above the surface decayed wood, charcoal, and earth were intermingled, and on this mass rested two rows of logs crossing each other at a right angle. The trench below made a sharp turn, both it and the logs running into the earth on the north wall of our excavation. To determine their character and extent, it was necessary to make a side cut fifteen feet in width and carry it sixteen feet toward the north, removing the overlying earth that extended to a height of thirteen feet above the logs.

When this was done, we found that a hut or pen ten feet wide and twelve feet long, made from logs of six to eleven inches in diameter, had been built up by crossing the logs at the corners in the ordinary way. 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, so that it must in the first place have been not less than seven or eight feet in height.

After clearing away this charcoal, and the confused mass below it, we came to the trench and found it to extend around a rectangular area twelve by sixteen feet, with slightly rounded corners. It was quite narrow, nowhere more than twelve inches across, though reaching down into the sand substratum, and contained a row of posts or logs, in the form of a stockade. They were set as closely together as possible, no gap being left for entrance or

exit. In some places several in succession had been in contact, so that no earth had settled between them, while occasionally there was a space of three or four inches filled with soil as compact as that on either side of the trench.

The marks left by the tools used in digging were still very plain in the earth on the sides, some of them being vertical as though made by a spud, others horizontal as if the instrument had been used in the fashion of a pick; they were evidently made with an antler or sharpened stick. We were so fortunate as to discover one of the tools. It is a piece of wood five inches long, one end sharpened, the other broken with a ragged fracture, the user apparently having put too much strain on it in prying. It is shown in Figure XXXIII., although the striations caused by its use, which are very distinct in the specimen itself, are not well shown. In the same figure some pieces of logs that have been cut with stone axes may be seen.

The depths to which the posts extended varied from eighteen to thirty inches. Some of them rested upon gravelly sand and clay; others, more than half the entire number, reached into the underlying sand. The remainder were set upon small deposits of what seemed to be a mixture of mud, sand, and ashes, put into the bottom while wet, and in some places bearing on the upper surface the imprint of the end of the post which it had supported. The mixture was almost as hard as stone; pieces an inch thick could scarcely be cut through with the spades. The posts were cut or burned off at the top, none of them, ex-

cept one, reaching more than eighteen inches above the surface. In some of the holes only traces of decayed wood remained, while in others was a little mass of charcoal. In some instances the charred posts retained their original form.

At the corner farthest from the observer may be seen a post which extends upwards four feet. The part of this above the surface had only about half the thickness of the portion remaining in the trench, while the manner in which the top is burnt shows that it was once higher than now.

All through the mound, from the base to within five feet of the top, and from the centre for twenty feet out, were masses of earth from a shovelful to several cubic yards in size. There was every shade of yellow and red, according to the burning to which they had been subjected. The white, brown, and yellow of the decayed wood, the black of the charcoal, and the varying natural colors of the earth gathered from different places, gave a diversified appearance that was quite novel, and some of the combinations were very pleasing.

A part of the last week's work here was a severe trial to our patience and endurance. We were in a pit, with walls from ten to fifteen feet high all around us, so that the air was always still. The sun shone in for several hours during the hottest portion of the day, and the ashes, fine sand, decayed wood, and pulverized charcoal arose in clouds that would sometimes hide from view a person on the opposite side from where the work was being carried on. The thermometer, hanging in the shade outside, marked

from 86° to 96°. After an hour's time we would all look like coal miners coming out of a shaft at the end of a day's labor.

In order to show the complex arrangement of the material constituting the large mound, we present two sections made in different parts of the trench.

Figure XXXI. represents a section of the face of the upper bench, taken at the point where the heavy charcoal stratum came into it from below; only the northern portion appears here, the southern side being shown in the next figure—XXXII.

Figure XXXII. will show how exceedingly complicated were the various substances at the point where we began the side cut for the purpose of uncovering the log pen and space enclosed by the stockade trench. Only a painting could do justice to the vivid colors presented here over a space several feet square. Some of the charcoal was iridescent, like peacock coal, and there was every shade of yellow and red that burnt earth could present. It seemed almost like vandalism to destroy it; but perhaps many think that the whole work of mound excavation is only a form of vandalism, after all.

CHAPTER XV.

HOPEWELL'S TUMULI.

From September 1, 1891, until the middle of January of the following year, we were investigating the tumuli and village sites of Mr. Cloud Hopewell's farm, one mile west of Anderson, in the interests of the World's Columbian Exposition.

It would not be just to Professor Putnam and the World's Fair Commissioners to speak specifically of these remains and our finds, as the excavations were carried on at the expense of the Fair; hence, our remarks will be more of a general character. The farm overlooks the valley of the North Fork of Paint Creek, and its ancient remains are described in Squier and Davis' volume, pages 24 to 29 inclusive, and 156 and 255. At the time of their survey the place was known as the Clark Works.

Twenty-four mounds of various dimensions are enclosed by an embankment of no great height. The remains lie principally upon the second river terrace, the wall of the fortification extending backwards and upwards to the edge of the third or earliest terrace. It has not materially changed since the survey of 1845. There are four or five small mounds situated upon the third terrace, several hundred yards north

of the fortification, which were not mentioned in the early survey. There are two small mounds three hundred feet northeast of the large group enclosed in the circle, which were also not included.

One of the third terrace mounds and thirteen of those enclosed by the embankment were thoroughly examined. As in the case of all mounds on high ground, nothing of note was uncovered. The other structures opened varied from one foot to twenty-eight feet in altitude, having diameters ranging from twenty to five hundred feet. Plate x., page 26 of Squier and Davis' *Ancient Monuments of the Mississippi Valley*, gives the correct representation of the North Fork Works. The mounds which we examined and numbered by the authors of the volume just named were One, Two, Three, Four, Five, Six, Seven, Eight, Eleven, Fourteen, and Sixteen; and of the mounds unnumbered, the one to the right of Eleven, one in the northeast corner of the enclosure near the base of the third terrace, the large one in the southeast corner, being oblong in outline, the three enclosed in the semicircle, and two lying between two springs just north of the words "area 111 acres."

The half circle surrounding the large group has nearly disappeared. From the external appearance of the group before excavation and the internal appearance after the work was completed, we are of the opinion that one large mound in the shape of the human trunk had been constructed. Messrs. Squier and Davis convey the idea in their plan that three mounds were built close together within the circle.

We do not think it was the intention of the builders to represent three distinct mounds, although there are variations in the height of the mound. The internal structure would indicate that it had been built gradually, some ten or fifteen separate additions being noticeable.

Before stating conclusions derived from the examination of the mounds upon Mr. Hopewell's farm, it will be well to sum up the peculiarities of construction and to remark upon the position of skeletons and accompanying objects. All the mounds were erected upon a hard burnt floor. In the instance of the large oblong mound and the great effigy, gravel and clay intermixed have been subject to a heat sufficiently intense to form a cement of equal toughness to that of an ordinary cellar floor. As remarked in foot-note upon page 174 the oblong mound was constructed at two different periods. When first completed its altitude did not exceed ten feet. A few years later gravel, sand, and boulders were heaped upon it to a thickness of six or eight feet in the centre. The gravel has since been affected by erosion, and when we examined the structure we observed the stratum of gravel near the east and west ends to be five feet in thickness, while in the centre it was but two or two and a half feet. Figure XXXIV. shows a ground plan of this mound and the lettered objects, skeletons and layers, are described on page 188. The large busycon shells, and stone bowl from this mound are shown in Figures XXXVIII. and XLIV.

It will be seen by comparison of these illustra-

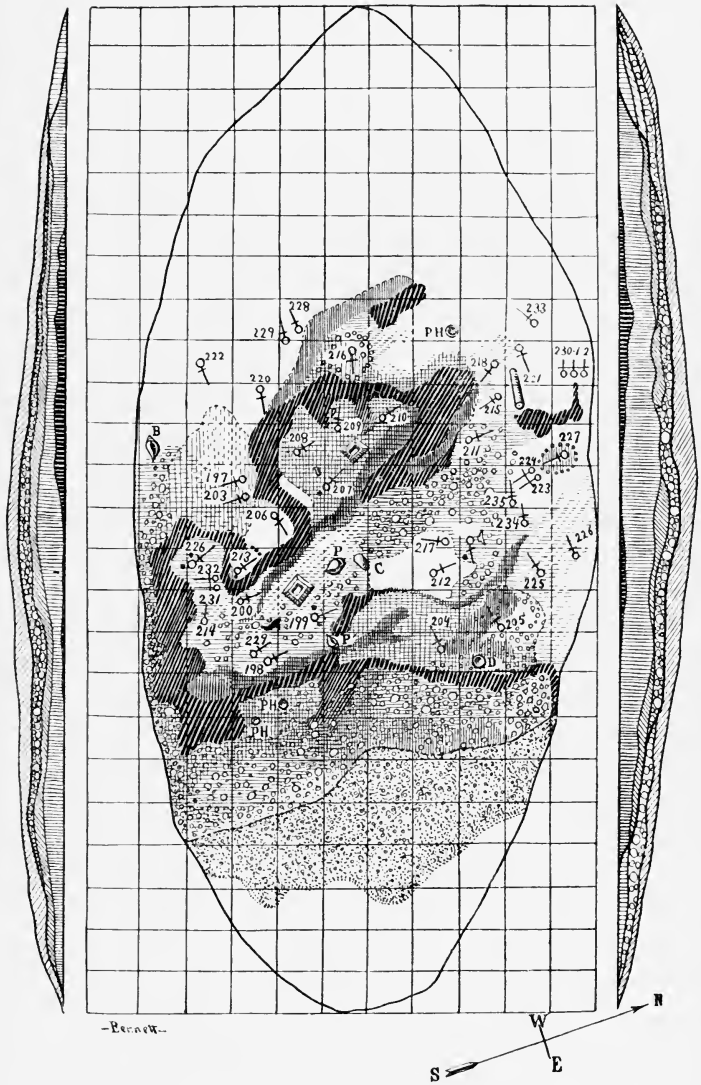

FIG. XXXIV.—Ground plan of Hopewell's mound. See page 186.

tions with those of Squier and Davis, as published in the latter part of their book, that the objects exceed in beauty and workmanship those of the same character taken from the "Mound City Group."

Fig. XXXIV. The oblong mound, Hopewell's Group. Nos. 197 to 235, inclusive, are skeletons. Fourteen or fifteen were accompanied by objects or ornaments. Near Nos. 199 and 209 are two altars of good form. Both were taken out entire.

An enormous log was found below No. 221 and is indicated upon the map.

C is a seventeen-pound copper axe, $12\frac{1}{4}$ by $5\frac{3}{4}$ inches, and $1\frac{3}{4}$ inches in thickness.

D is a stone bowl. This is shown in Fig. XXXVIII.

P P B are shells. B and P are shown in Fig. XLIV.

P H indicates a post-hole.

The dark streaks represent charcoal and black earth. The boulder layers are shown in the lower portion of the figure.

Figure XXXVI. will give the reader an idea of the skeleton of a young person surrounded and covered by numerous copper objects, shells, tablets, and beads. The body lay but two feet from the surface in a very small mound, numbered Eleven upon Messrs. Squier and Davis' plan. Near it was another skeleton from the hand of which we took a beautiful granite pipe, highly polished, and exhibiting the finest workmanship of any object of that nature exhumed from the mounds. It is shown to the left in Illustration XL.

Fig. XL. (p. 207) shows cut mica ornaments, a pipe, and three copper objects perforated for suspension as

FIG. XXXV.—7,232 Flint disks. Largest *cache* of implements known to archæologists. (Mr. Moorehead's quarters.) See page 190.

pendants. The bear tusks and shell ornaments are from the Effigy Mound.

Fig. XLI. The copper spool-shaped ornaments, mica sheets peculiarly cut, and a broad wrist-band of copper exhibited in this figure are all from Squier and Davis' mound No. Eleven.

Fig. XLIII. In this is shown the long copper crescent found under the head of skeleton No. 176, mound No. Eleven, Squier and Davis. The long knife placed above the crescent has been described in Chapter VIII. under the head of Oregonia.

Mound No. Two lies nearly in the centre of the enclosure and was partially explored by Squier and Davis. They refer to it briefly upon page 158 of their volume. Their statement, made with great modesty, that four thousand flint disks were deposited in the structure, six hundred of which they took out, is considerably less than one half the original number. The following table was prepared in our official capacity as assistant in Department M of the World's Columbian Exposition:

	DISKS.
Excavated from the mound by our men	7,232
Taken out by Squier and Davis	600
Taken out by Mr. Steel	200
Given M. Hopewell prior to official count	80
Found upon the surface near mound afterwards	42
From other sources	31
Total	8,185

A large shouldered spear-head, was the only implement in the entire number differing from the circular

and leaf-shaped outline of the disks. It can be seen in Fig. XLII., together with various forms of the disks.

Squier and Davis report that the disks were placed upon edge in several layers. Their error is due to a hasty examination. In taking the mound entirely out we found the disks lying in little pockets or bunches of twelve to fifteen each with layers of sand around each mass. The deposits covered an area, nearly circular in form, of twenty-two by twenty-six feet. In places they ran from a foot to eighteen inches in depth. The builders of the structure had apparently carried in their hands and arms all the disks they could transport readily and deposited them upon the same level, while others of their friends poured sand between and over each man's deposit. Having completed so much of the mound, a second series of deposits was made exactly like the first.

Most of the disks are of a light blue color; some are gray. They are made from flint nodules which occur two miles northwest of Mr. Hopewell's farm. There are extensive chippings upon several estates in the neighborhood.

The magnitude of the find surpasses any discovery previously made. Fig. XXXV. represents the specimens heaped at the side of our tent. They cover a space of fifteen by eight by three feet and weigh nearly six thousand eight hundred pounds. It required four horses to haul them from the mound to the camp site.

Mr. W. H. Holmes, of the Bureau of Ethnology

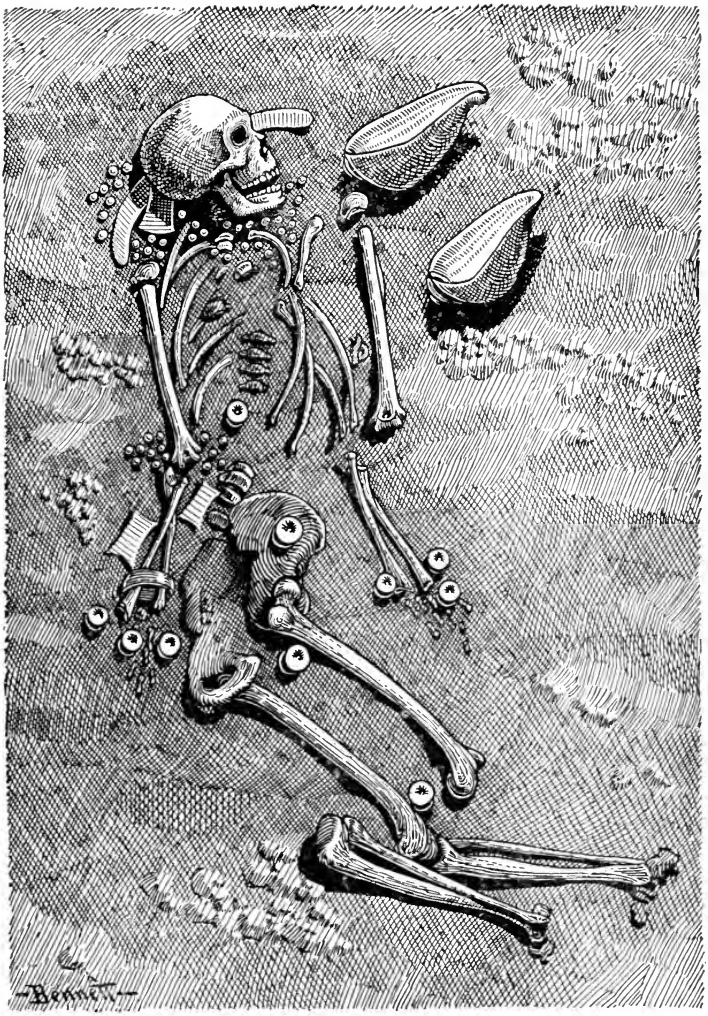

FIG. XXXVI.—Skeleton 176 from mound No. 20. See page 188. The objects are unusually numerous and unique in form.

at Washington City, and Dr. Thomas Wilson, of the Smithsonian Institution, both visited Camp Hopewell before the disks were shipped, and expressed their surprise at the importance and extent of the discovery. Both gentlemen have made a special study of the flaking and chipping of implements, and gave it as their opinion that many thousands of nodules were broken and partially worked in order to produce the eight thousand disks. Mr. Holmes stated that four in five nodules contained flaws or seams which would render the fashioning of perfect disks an impossibility.

The finely chipped circular disk shown in the upper part of illustration No. XLII. (to the left of the shouldered spear-head) was undoubtedly a finished implement, but we question whether the great majority of the disks are complete.

We think the mound to have been a place of storage, where the natives living within the enclosure kept material to be subsequently worked into implements. Flint, freshly taken from the earth, is much more easily worked than that which has been lying exposed to the air for a long time. The aborigines were undoubtedly aware of this fact.

The finds at the Hopewell mounds during the latter part of November and the first half of December exceed in importance all previous discoveries. The examination of the Effigy Mound at the writing of the present page was but half completed, yet two deposits of copper aggregating two hundred and thirty-five pieces have been taken out. There were sheets worked into fantastic designs; squares

and semicircles; Swastika crosses; effigies of birds and fishes; anklets and bracelets; combs and pendants; large and small celts, one weighing thirty-eight pounds, twenty-two and a half inches in length, and an inch and a half in thickness; and, in short, every known form of copper implement or ornament. When the report of the World's Columbian Exposition surveys is published the details of this marvellous find will be made public.

Although Squier and Davis examined most of the mounds upon the Hopewell farm, and took altars and objects from them, had we not trusted to their report it would have been impossible to distinguish the explored from the unexplored. In most of the mounds, there were no burials in the exact centre. After Squier and Davis, such farmers as made up their minds to ruthlessly intrude upon the structures which only the competent should explore, acting upon this belief, sank shafts from the summits downward. Fortunately for us they found little, and our broad trenches, taking in the great body of the mounds, secured everything. In the case of mound Number One there is no elevation to mark where it stood, but we suppose from the number of beautifully carved bones and fragments of discoidals and ornaments found northwest from the "dug hole" indicated upon their map, that we have found where it stood. One of our men excavating for three weeks carefully with a hand trowel for a radius of one hundred yards northwest of the dug hole found near the surface the bits of carved bone exhibited in Fig. XXXIX. The attention of the

reader is called to the designs upon the fragments in the upper row. The carving[1] is much finer in detail than that upon any of the shells occasionally found in Tennessee.

"These carved traceries or engravings upon bone, even in fragmentary state, evince an artistic aptitude much beyond the mineral and vegetable stain, and by their almost microscopic delicacy of execution and unfaltering precision of linework, show a high degree of manual skill.

"Though some are undoubtedly portions of barbaric and desultory design, and unsystematic application of indefinite ideas, others bespeak a clearly conceived idea, a definite motive, and vigorous execution, not inferior to the predominant motives of early Mediterranean decorative art.

"They are clearly not of an illustrative or imitative design, either realistic or conventional, but created design founded on purely mechanical motive, with good conception; and it is regrettable that no complete examples remain to enable a correct artistic valuation of the purpose of the whole."[2]

The mound enclosed in the semicircle, which Squier and Davis have considered as three or four mounds built together, we named the "Effigy," on account of its resemblance to the human trunk.

Figure I., the frontispiece of this volume, gives the head-dress of a most singular skeleton found upon the base line, northeast of the centre of the mound. The Cincinnati *Commercial Gazette* published a brief

[1] Dr. Cresson, who is familiar with carved bones from the caverns in southern France, holds these to be in no way inferior to carvings from Langiere-Basse, Bruniquel, and Grotte de Lortet.

[2] The three paragraphs referring to bone carvings were written by our artist, Mr. Jack Bennett.—W. K. M.

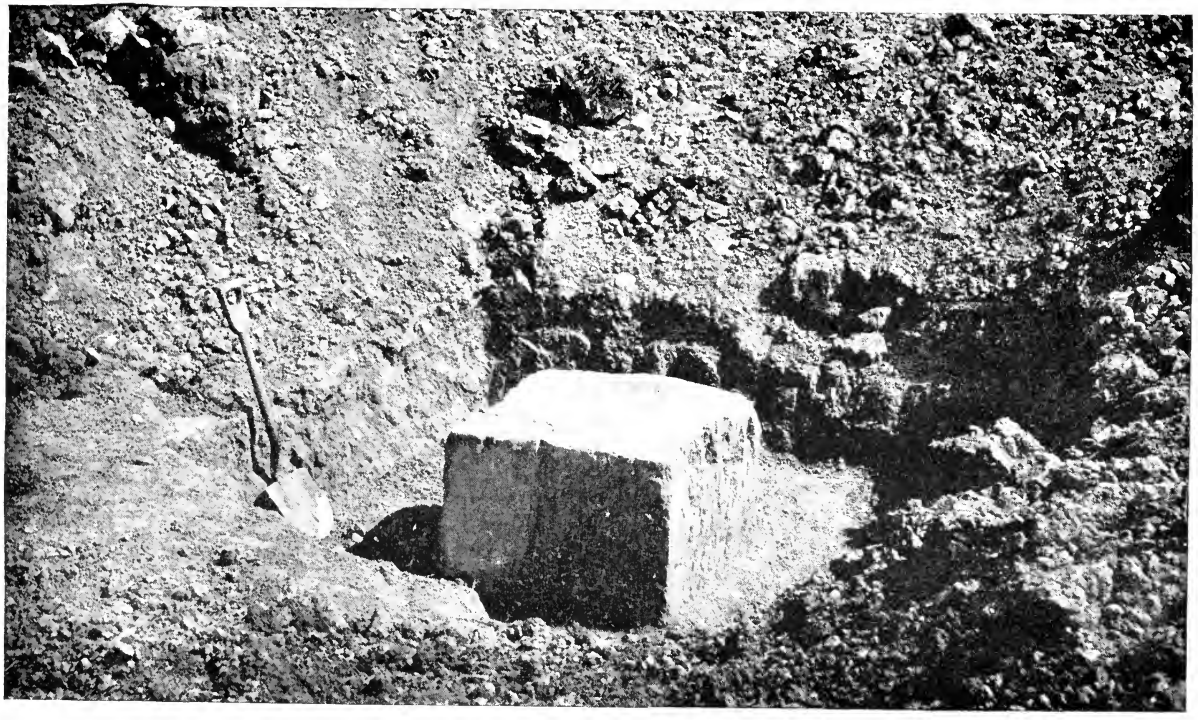

FIG. XXXVII.—Altar from mound 18, Hopewell's Group. See page 193.

despatch the morning after the discovery (November 17, 1891), from which we copy the following:

"If the number of implements is evidence of the esteem in which a prehistoric man is held by the people, he was certainly the most important Cacique of the Scioto Valley. At his head were imitation elk horns, neatly made of wood and covered with sheet-copper, rolled into cylindrical form over the prongs. The antlers were twenty-two inches high and nineteen inches across from prong to prong. They fitted into a crown of copper, bent to fit the head from occipital to upper jaw. Copper plates were upon the breast and stomach; also on the back. The copper preserved the bones and a few of the sinews. It also preserved traces of cloth similar to coffee-sacking in texture, interwoven among the threads of which were nine hundred beautiful pearl beads, bear teeth split and cut, and hundreds of other beads both pearl and shell. Copper spool-shaped objects and other implements covered the remains. A pipe of granite and a spear-head of agate were near the right shoulder. The pipe was of very fine workmanship and highly polished."

The bear teeth and tusks in Figure XL. exhibit cut and sawed ends. Several of them have bone plugs inserted in perforations.

We should be pleased to refer to boulder outlines representing panthers, skeletons, the interesting construction, etc., of this mound, but, as before said, the notes taken this summer are not our property.

The strong mixture of the two races, brachycephalic and dolicocephalic, as exhibited on several of the mounds on Messrs. Hopewell's farm, was to us at first inexplicable. But as excavations brought to light new finds we could come but to 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 the Tennessee, also controlled the Scioto and Miami settlements. The few long-heads present were undoubtedly subservient to the short-heads.

CHAPTER XVI.

CONCLUSIONS.

We labor under considerable difficulty in making our conclusions, for what may be perfectly clear to the explorer may not be so apparent to the reader.

We ask, therefore, most careful attention on his part while we make an explanation which must necessarily be long, because of the great mass of material that is to be considered.

It has been demonstrated that tribes did not occupy the northern portion of the State for any great length of time. The hilly regions do not contain sufficient evidences of early man's presence to enter into these conclusions. It follows, therefore, that our arguments deal entirely with the large river valleys.

The field work shows that both the brachycephalic and dolicocephalic races intermingled largely in all the valleys save the Muskingum, and from this various complications arise.

The reports of the Madisonville Historical Society and those of Dr. Metz and Professor Putman have proved the predominance of the short-headed stock in that great cemetery. Our own observations lead to a similar conclusion in regard to Fort Ancient.

In the Scioto valley, at Hopewell's Earthwork and other parts of Ohio and the Miami valley, Dr. Cresson has noted a large predominance of the brachycephali over the dolicocephali, the osteological affinitives of these people 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 this people.

In the Muskingum valley, as was observed in Chapter III., the mounds contain the crania of the long-headed stock. The other valleys of Ohio inhabited by the short-heads were just as fertile and attractive to primitive man as the Muskingum. Why, then, did not one race or the other occupy the whole valley? An examination will reveal the reason.

The long-heads established toward the east in the Muskingum valley were too strong to be dislodged by the short-heads, an offshoot of whom we have already stated had probably advanced from the south and southwest, through Tennessee and Kentucky into the valleys of the Miami and Scioto, and they, in their turn, were too powerful in the west to be driven back by their enemies from the land which they had taken possession of.

The long-heads were the more combative of the two, because they established small villages in Clermont and Clinton counties, but twenty-five to forty miles from Fort Ancient, the great fortress of the short-heads. Had the short-heads entered a vigorous campaign against the long-heads in the Mus-

FIG. XXXVIII.—Stone bowl from mound 23, Hopewell's Group. See pages 186 and 188.

kingum valley, they might have crushed the latter and taken possession of the area which they occupied. They were probably the more timid of the two, for throughout their territory are numerous fortifications, while in the Muskingum valley there is but one, and that is the magnificent work upon the site of the present city of Marietta. Undoubtedly the few scattered villages of long-heads were composed of the rougher element of the nation, the fierce fighters, the relentless foes of the more peaceful short-heads.

We would say that the presence of dolicocephalic skulls at Hopewell's Earthwork, Fort Ancient, or at Madisonville indicates the adoption and gradual absorption of the former people captured by the short-head stock. It is possible that the crania of the long-headed type which we found near the short-heads were those of slaves, placed thus to indicate their vassalage. It is more than probable that they did not enter the tribe of their enemies of their own free will. We never find them buried with ornaments or implements, as we do those of the short-heads in the same mound. There are so few skeletons of the dolicocephali found at Fort Ancient and at Hopewell's Earthwork that we are inclined to the opinion that their attacks were generally repulsed.

Nothing more than the upper status of savagery was attained by any race or tribe living within the limits of the present State of Ohio. All statements to the contrary are misrepresentations. If we go by field testimony alone (not to omit the reports of

early travellers among North American tribes), we can assign primitive man high attainments in but few things, and these indicate neither civilization nor an approach toward it.

First, he excelled in building earthen fortifications and in the interment of his dead; second, he made surprisingly long journeys for mica, copper, lead, shells, and other foreign substances to be used as tools and ornaments; third, he was an adept in the chase and in war; fourth, he chipped flint and made carvings on bone, stone, and slate exceedingly well, when we consider the primitive tools he employed; fifth, a few of the more skilful men of his tribe made fairly good representations of animals, birds, and human figures in stone.

This sums up, in brief, all that he seemed capable of, which we in our day can consider remarkable. On the other hand, he failed to grasp the idea of communication by written characters, the use of metal (except in the cold state), the cutting of stone or the making of brick for building purposes, and the construction of permanent homes. Ideas of transportation, other than upon his own back or in frail canoes, or the use of coal, which was so abundant about him, and which he frequently made into pendants and ornaments, and a thousand other things which civilized beings enjoy, were utterly beyond his comprehension. Instead of living peacefully in villages and improving a country unequalled in natural resources, of which he was the sole possessor, he spent his time in petty warfare, or in savage worship, and in the observance of the gross-

est superstitions. He possessed no knowledge of surgery or the setting of bones, unless we accept as evidence two neatly knitted bones found at Fosters', which by some extra effort he may have accomplished. But, while admitting these two specimens to be actually and carefully set with splints, we have scores of femora, humeri, and other bones from Fort Ancient and Oregonia which are worn flat against unnatural sockets, formed after the bones had been displaced. We have broken fibulæ and tibiæ which had never been reset. They were bent like a bow, and nature alone had aided them in coming together.

It has been the mistake of many writers upon the antiquities of Ohio, to accept as evidence of the civilization of these peoples the mere fact that they could build circular and square embankments and great fortifications. Any school-boy knows that he can form a perfect circle by taking hold of the hands of his comrades and placing one of their number at ten feet from the line to observe that the rest keep properly stretched out. The boy at one end acts as a pivot, the others swinging in a circle, while the boy at the end farthest from the pivot marks upon the ground with a stick as far out from the line as he can reach. Four hundred men, placed in four lines of one hundred each, can easily mark a square which will be but two or three feet out of geometric proportions.

We mention these facts to call the attention of the reader to some things to which many persons give undue prominence.

Our study of primitive man leads us to a belief in two tribes of savages, not two tribes of semi-civilized people. The impression usually conveyed by the term "Mound Builders" will not stand in the light of modern science. While it is more or less of a disappointment to many not to be able to place primitive man in Ohio on an equality with the status of Mexican or South American tribes, yet it is a gratification to know that the vexatious question concerning his movements and every-day life has been very nearly settled. There is a fascination in studying him even as a savage and investigating the numerous remains which attest his occupancy of this territory.

This volume has been written in the field while the facts given in the preceding pages are fresh in memory. It is testimony noted down while uncovering the relics of a people long since departed which has suggested to us the use to which he put implements, how primitive man made his burials, his peculiar sacrifices upon clay altars, the singular head-dresses of copper which he sometimes placed over distinguished leaders of his tribe, yet we regret there is no means of ascertaining his language. Dr. D. G. Brinton, the distinguished American ethnologist, in his admirable book *The American Race*, has given archæologists an idea of the languages of all Indian tribes of historic times. Would that he could give us the language of the two races that it has been our purpose to describe. This can never be, however, for that delicate mechanism which aided them to communicate one with the other is now silent.

With the exception of the languages of the brachycephalic and dolicocephalic races we understand their movements quite clearly. During the long ages spent in occupation of beautiful Ohio they constructed earthworks, erected their villages, buried their dead amidst pomp and ceremony, travelled from one part of the State to another, stoically resisting the attacks of their enemies. Where they lived and enjoyed savage pleasures, indulged in barbaric pursuits and semi-religious festivals, the Shawnee Indian afterward erected towns and villages. Close upon his heels followed the white settlers. Then was instituted a real civilization in the Ohio valley.

CHAPTER XVII.

CRANIA AND SKELETONS WITH TABLE OF MEASUREMENTS.

During the summer of 1891 a large and interesting osteological collection excavated from the mounds of the Miami and Scioto valleys by Mr. Moorehead, of the World's Columbian Archæological Survey, was stored at the camp on the North Fork of Paint Creek, near Anderson, Ohio. This material, together with that which was daily accumulating from the explorations in progress at the Hopewell Earthworks, was awaiting shipment to Chicago. A thorough study of such a large number of crania and skeletons would necessarily occupy an indefinite period, even if ample time could be devoted to it, but our duties in connection with the archæological explorations, which are still in progress for the World's Columbian Exposition, make it impossible to give any more than a *résumé* of the subject, taken in spare moments from notes made in the field. In this connection it may be well to mention that the study of osteology and craniology has, with a few exceptions, been neglected by archæologists in this country, which fact has been severely criticised by European students. To omit, therefore, even a brief consideration of the subject would be inconsistent, and oblige the readers of this work to remain uninformed as to the anatomical

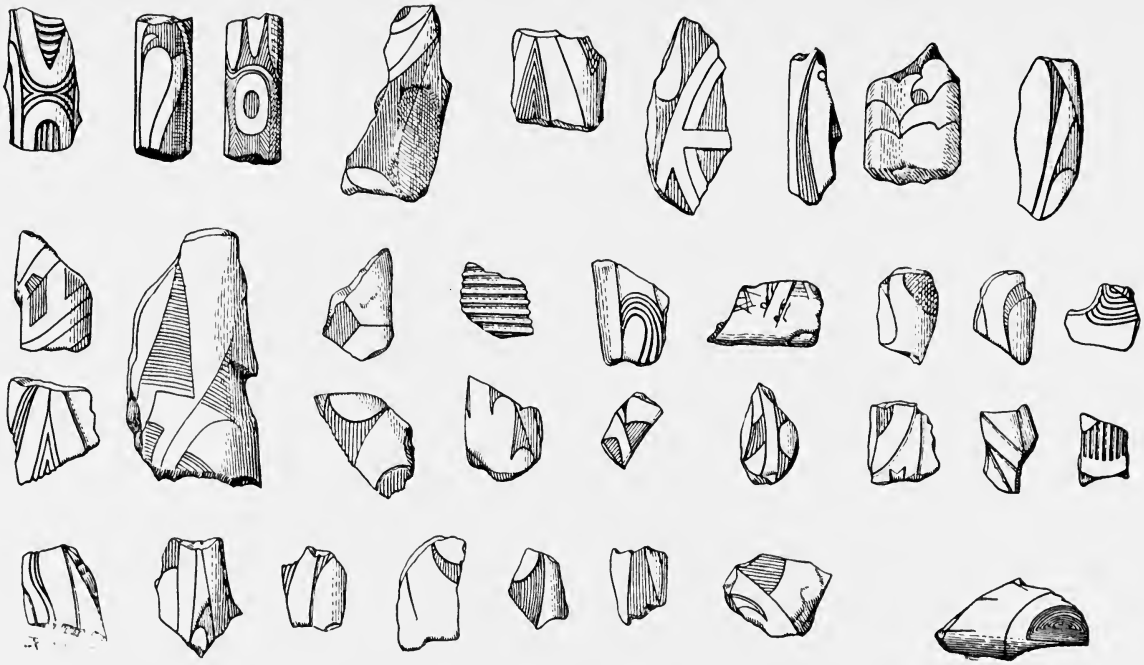

FIG. XXXIX.—Thirty-four carved bones from Village Site, Hopewell's Group. See page 193.

characteristics of the people whose remains were excavated from the various earthworks and mounds referred to in the preceding pages.

During a visit to Washington made a couple of years ago, Dr. Thomas Wilson, Curator of Prehistoric Anthropology at the Smithsonian Institution, courteously allowed us to examine the crania and skeletons of the mound collection deposited temporarily in that museum by Mr. Moorehead. A portion of this material had been excavated from stone graves within Fort Ancient and the stone heaps which lie upon the terraces without its walls. The other part came from various village sites on the bottoms of the Little Miami River which are covered by alluvial deposits, and from various other portions of the State of Ohio. Notes taken at that time have greatly aided in the preparation of this chapter. During the residence of the archæological survey at Chillicothe various archæological collections were placed at our disposal for examination, and much valuable information obtained. This disposition to aid investigation was not only apparent at that place, but in all parts of the State which it was necessary to visit in order to obtain the necessary data for comparison.

It is difficult to classify the crania found throughout the mound-building and stone-grave areas of the State of Ohio (Fig. XLV.). The same variations in form and capacity are to be remarked in them as among those of the Mississippi and Cumberland valleys, and types as wide apart as those of the Caucasian and Ethiopian are not uncommon. Still

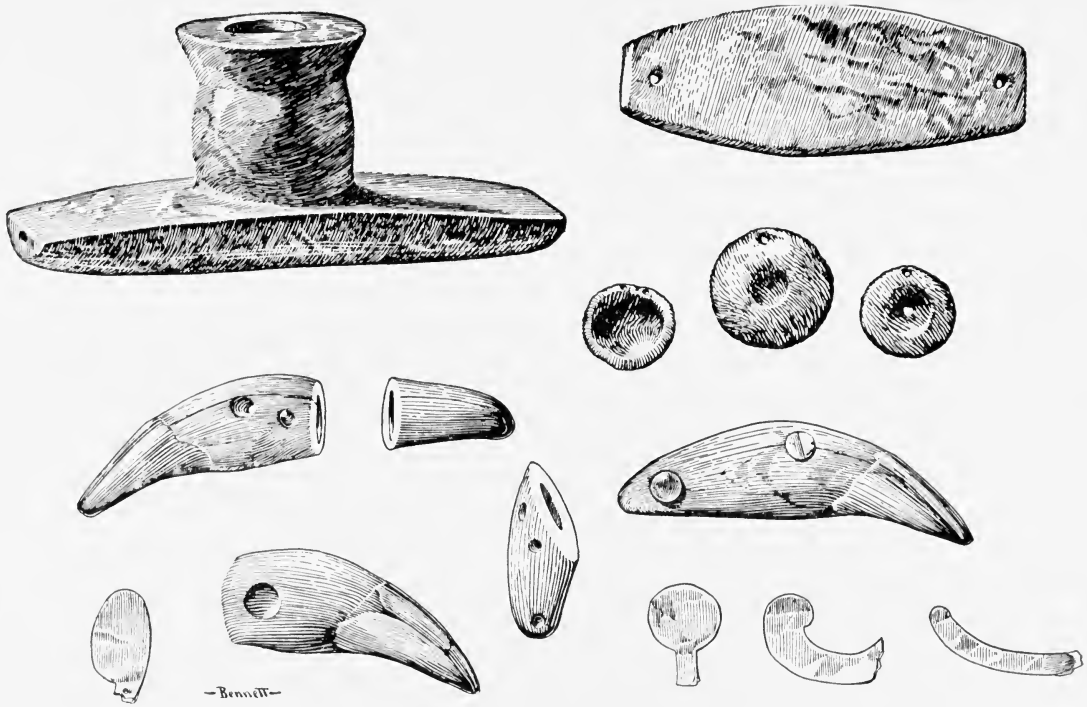

FIG. XL.—Valuable objects from the mounds of the Hopewell Group. See page 195.

if we may judge from the careful investigations of Professor Putnam, Dr. Metz, Mr. Fowke, Messrs. Moorehead and Cresson in the Big and Little Miami valleys, and that of the Scioto, and other portions of Ohio, the predominant type of the crania excavated is brachycephalic (Fig. XLVII.). Traces of these short-headed people are to be found in Peru, Central America, Mexico, New Mexico, and Arizona, and may be traced across from the south and west until we find them intermingled with the long-headed peoples of localities east of the Mississippi—their burials extending even as far as the Atlantic coast. These migrations of the brachycephali seem to have been more hotly contested at some points than at others by the people whom they finally encountered and absorbed in Ohio, Kentucky, and Tennessee. At Fort Ancient the struggle seems to have been a bitter one, as indicated by Mr. Moorehead's description of the condition of the osteological material from the Middle Fort. No friendly relations seem to have existed. The long-heads (Fig. XLVI.) were evidently the attacking people, who beseiged the earthwork and were buried apart outside of its walls under the stone heaps. At Hopewell's Earthwork, farther to the eastward, the burials do not indicate this marked separation, for we find both types intermingled together, the short-headed greatly predominating, the other people in fact almost absorbed by them. This same predominance of the short-heads over the dolicocephalic type is also to be remarked at Madisonville cemetery, southwest of Fort Ancient, and at Hopewell's Earthwork.

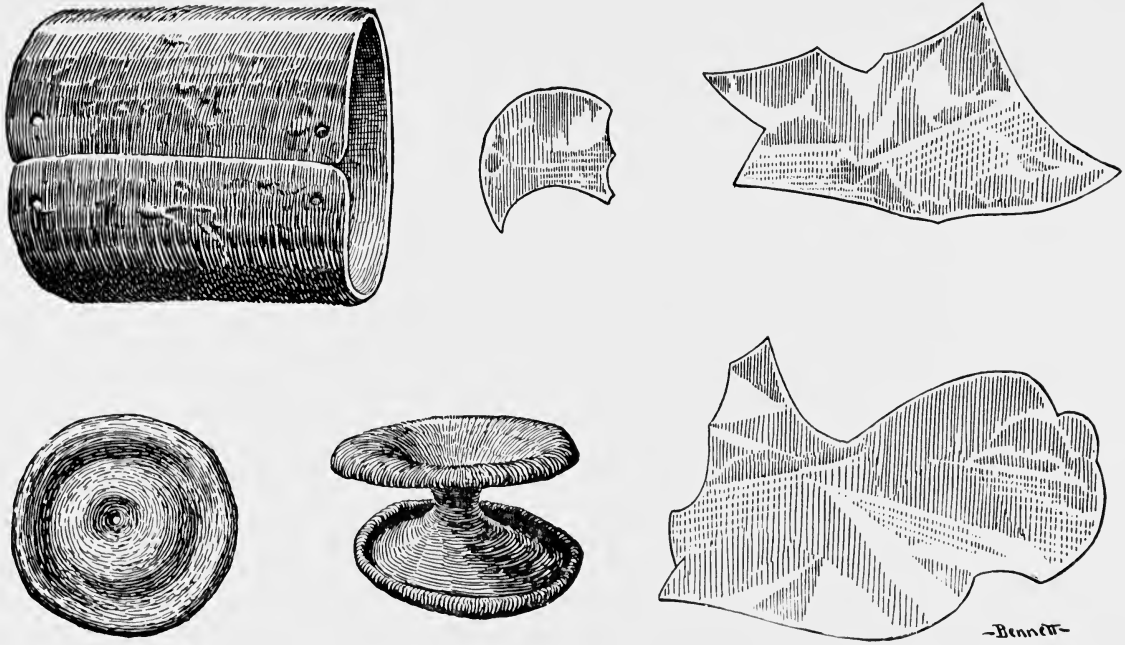

FIG. XLI.—Copper objects and mica ornaments from mound No. 20. The copper band at the upper left hand corner surrounded the wrist of skeleton 176. See page 189.

At the aboriginal cemetery near Madisonville, twelve hundred crania out of fourteen hundred were classed as brachycephalic. Further references might be made to the short-headed people in other groups of mounds and cemeteries of Ohio, but as we are considering the osteological material from certain specified localities already referred to, we shall confine our remarks to it alone.

The general characteristics of the brachycephalic skulls in the collections of which we speak are not unlike those of the stone-grave people of Tennessee. In fact their modes of burial at Fort Ancient, Oregonia, and at Hopewell's Earthworks on the North Fork of Paint Creek are similar, as indicated in Chapter VIII. An examination of several thousand stone graves in Tennessee has also led us to the same conclusions, especially since abundant opportunities have been afforded for comparison while superintending work in different parts of Ohio.

The crania of the brachycephalic type in the various Ohio collections that we have examined are short, round, and in some cases quite heavy (Fig. XLVII.). A skull excavated at Hopewell's Earthworks, Ross County, Ohio, weighed thirty-three and a half ounces. The frontal bones retreat somewhat toward the parietals, which are full and moderately elevated.

The face is a little shorter perhaps than the average mesaticephali and dolicocephali who are found at times intermingled in their burials, and has large and prominent cheek-bones. The brows in the crania before us are nearly straight, the superciliary

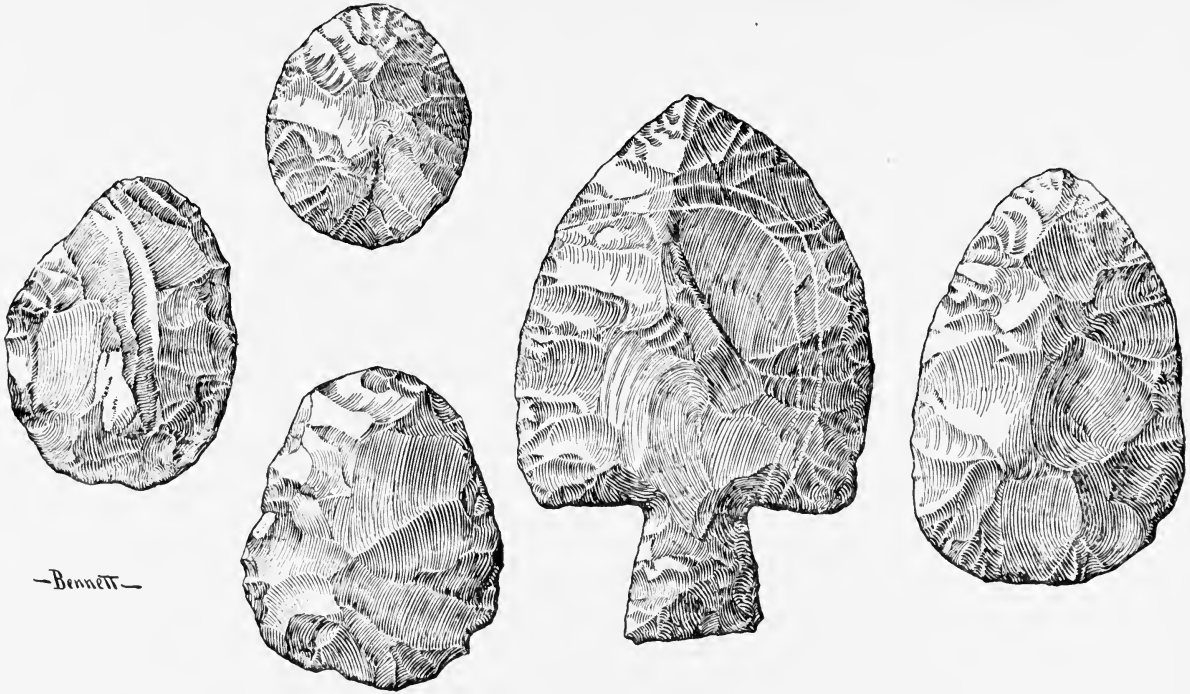

FIG. XLII.—Flint disks from mound No. 2, Hopewell's Group. The only "shouldered" implement of the *cache*, $\frac{1}{4}$ size. See pages 190 and 192.

ridges heavy, and the orbits open and square. The supranasal depression in most cases is not strongly marked and in some of the crania does not exist.

The nasal spine in front of the ethmoidal notch projects downwards and forwards, and is generally well developed (Fig. XLIX., A), but exceptions are to be noted in which the spine is short and blunt. The nasal bone is oblong, and varies in size with different individuals. The concavity from above downward, of the outer surface, in two cases before us, is greatly exaggerated, amounting to a positive deformity (see illustration, Fig. XLIX., B). It cannot be attributed to the distortion of earth pressure, as the specimens referred to were taken from stone graves where the slabs of stone at the side and above prevented direct contact of the earth with the bones.

The jaws are heavy and at times prognathic, with marked projection of the mental protuberance. Prognathism is not a constant feature of this collection. The dental foramen varies in its position to the right and left of a line drawn perpendicularly through the centre of the second bicuspid tooth. The external oblique line is strongly developed with marked inclination of the ridge upward and backward. The tubercles for the attachment of the genio-hyo-glossi muscles in some cases are quite long, while those below for the genio-hyoideus are scarcely perceptible. Sometimes but one side of the tubercles is developed. At times the tubercles for the attachment of the muscles just referred to are almost imperceptible.

The occipital bone is trapezoidal in form and

somewhat curved upon itself. Both it and the parietals, which articulate at the superior border, are at times found flattened into one plane, this being advanced well forward. Various forms of distortion seem to have been produced without any special tendency to design in moulding that particular portion of the head, but rather from strapping to a cradle-board during infancy. This is suggested by the fact that the occipital bone is flattened, in some cases, from its superior angle well back toward

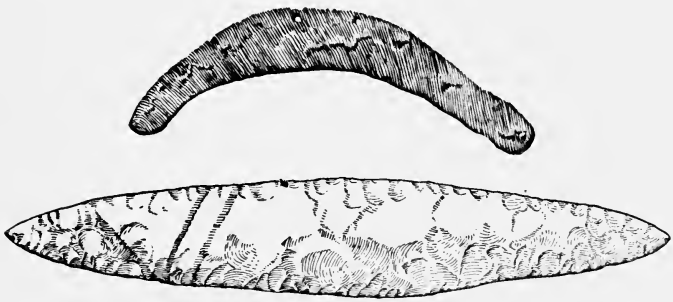

FIG. XLIII.—Fourteen inch flint dagger from Taylor's mound, Oregonia, and copper crescent, mound No. 20, Hopewell's Group. See pages 102 and 189.

the attachment of the ligamentum nuchæ, or it may be centred somewhat toward the superior angle of the bone.

To say that the cranium is flattened posteriorly in all cases is too sweeping an assertion, and to avoid confusion in future research it may be suggested that the exact position on the lateral region of the skull be indicated. Where force has been applied to both the frontal and occipital bones at the same time, the distortion is of course more easily recog-

nized. "Accidental flattening of the head," as we shall designate it, is not so common among the specimens that we have examined from the Great and Little Miami and Scioto valleys, as in those found among the stone graves and mounds of Tennessee and Kentucky. In some cases, however, distortion by accidental flattening is so great as to interfere with accurate measurements of the skull. Post-mortem compression, too, must be considered, as it modifies the original form of the skull, and both it and accidental flattening may increase its width. We have had the opportunity of excavating with our own hand various skeletons and crania from the lower levels of large mounds at the Hopewell Earthworks. The superincumbent masses of earth comprising the structures measured respectively twenty-two feet and twelve feet. Above the bones, in both instances, were masses of pebbles cemented together by the percolation of water from above through layers of earth and clay impregnated with ferrous oxide, forming a hard concrete. This was so hard as to almost defy the picks of our workmen. It might naturally be supposed that this stout covering would protect the skeletons buried beneath, yet so hard was the pressure from above that in the majority of cases the bones were flattened, and, to use the expression of the foreman of the laborers employed in excavating, "the bones looked as if they had been drawn between iron rollers." This gives us a good example of the pliability of the bones of the skeletons when directly exposed to earth pressure. Where the interments are protected by coverings as in the

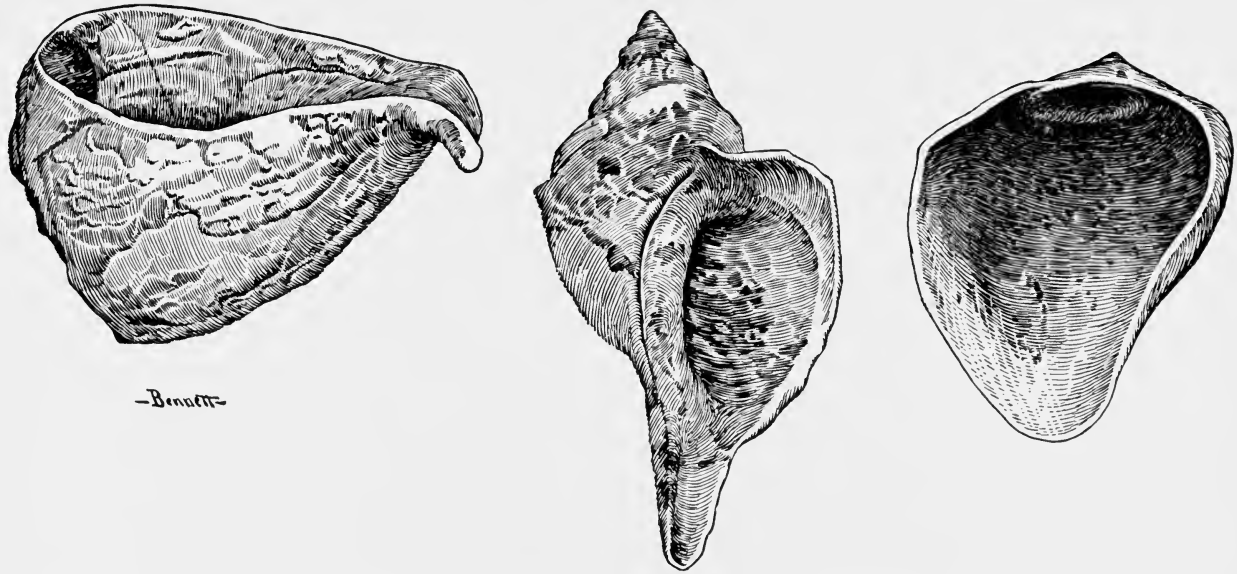

FIG. XLIV.—Large Busycon sea-shells, Hopewell's Group. See pages 186 and 188.

stone grave, its effects are seldom perceptible. The effects of earth pressure cannot be too carefully considered, especially in material from earth mounds where clay predominates in the structure. As a general thing we have remarked less distortion in osseous material excavated from gravel pits and mounds in which this material is in direct contact with the bones.

For convenience in the classification of crania where accidental flattening has occurred, the method adopted by Mr. Lucien Carr, Assistant Curator of the Peabody Museum, Harvard University, is undoubtedly the best. He has established, to use his own words, "A purely arbitrary fourth class of flattened skulls, to which is relegated all those having an index of .900 and over." [1]

Resuming our description of the principal features of the brachycephalic skull, it may be said that the squamous portion of the temporal bone is slightly thicker than in the European, and the zygoma slightly heavier and more prominent. The post-glenoid process is well marked. The mastoid portion of the temporal bone is heavy in many cases, but not sufficiently marked to distinguish those in the skulls before us, from those of the dolicocephali and mesaticephali of the regions which we are considering. The digastric fossa is deeply marked, also the groove for the occipital artery. The *fossa sigmoidea* is very broad and deep in the specimens which are being excavated at Hopewell's Earthworks, much

[1] *Eleventh Annual Report of the Peabody Museum*, 1878, vol. ii., No. 2, p. 371.

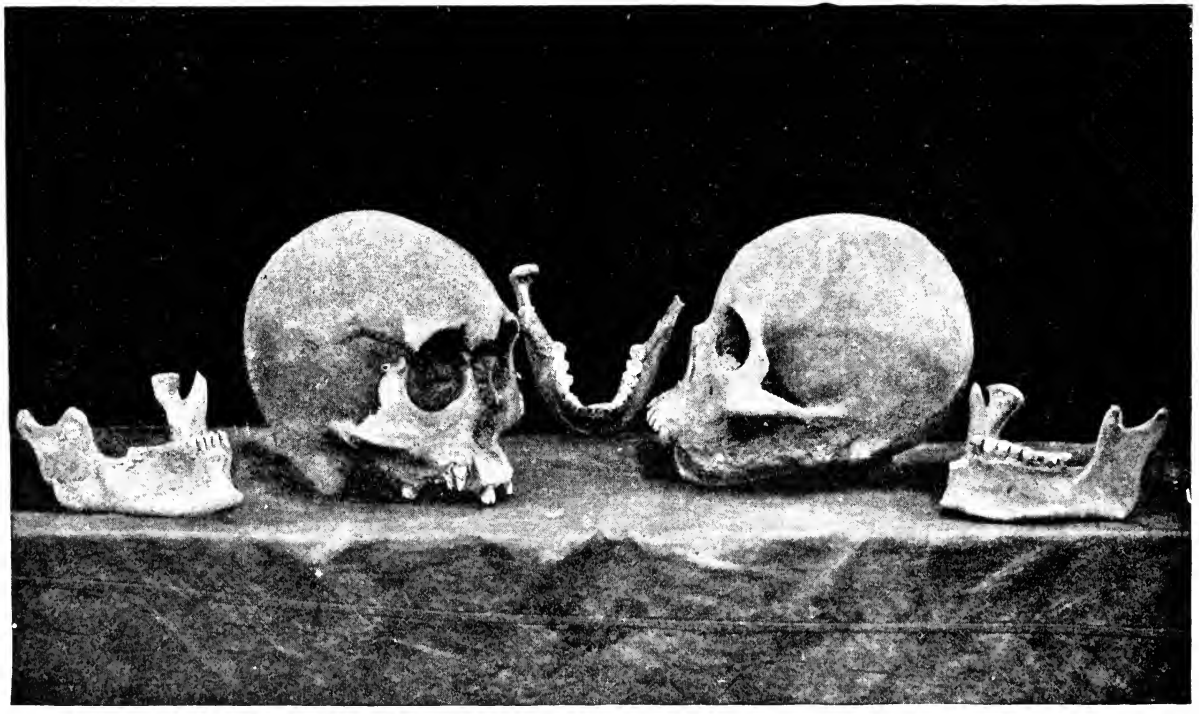

FIG. XLV.—Two skulls and three lower jaws. Typical mound crania, from Hopewell's, Ross Co. See page 206.

more so we think than in the European, but situated as we are in the field, without the necessary means of comparison with specimens from other localities, it is impossible to speak with exactitude.

The surfaces, spines, and processes, for muscular attachment, upon the bases of the crania are well developed.

The pneumatic spine of Hyrtl was observed in three crania.

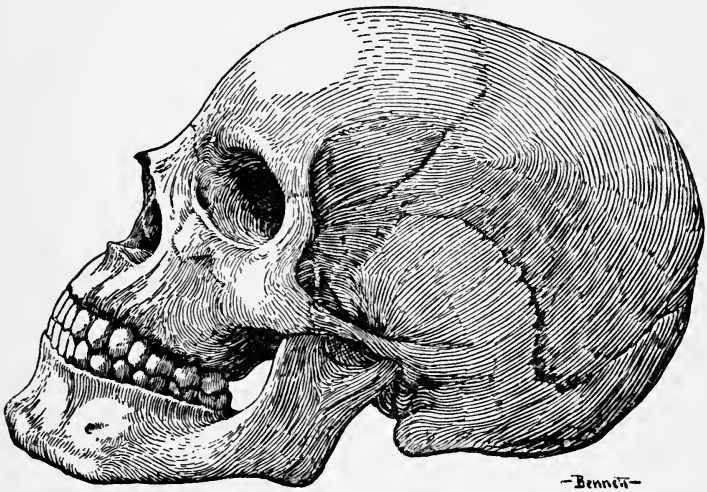

FIG. XLVI.—Skull from Hopewell's Group. See page 223.

Large Wormian bones are to be noticed in many of the brachycephalic skulls corresponding to numbers three, four, and five of Broca's scale, and in seven crania epactal bones are found complicated with a multitude of minute Wormian bones. These bones seem to predominate among the brachycephali of the collection now before us.

The incomplete *os incæ* of Anoutchine was found

in two, and the true quadrate bone in four crania. The *ossa apicis* of Virchow is to be remarked in five of the Scioto valley skulls and three of those from Fort Ancient.

In eight of the brachycephalic skulls the squamosal suture was closed. In sixteen the sagittal

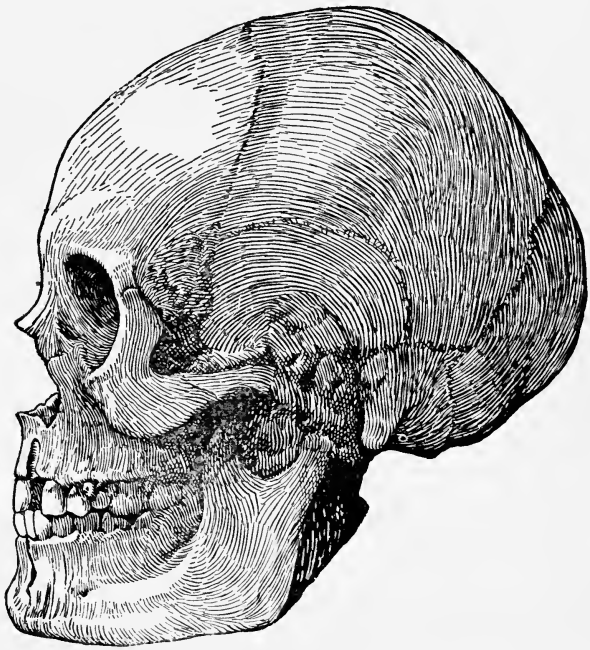

FIG. XLVII.—Skull, side view, Fort Ancient, stone grave. See pages 208 and 223.

suture was closed. In ten specimens the coronal and sagittal sutures were both obliterated. Three had the coronal and sagittal sutures partly obliterated, while in seven the coronal, sagittal, and lambdoidal were entirely closed.

We shall speak next of the mesaticephalic crania,

having begun with that of the short-headed people, because they predominate so largely over the dolicocephali in the collections before us from the Little Miami and Scioto valleys.

Mesaticephalic Crania.

The bones of these skulls are not so heavy as in the brachycephalic type, and the posterior parietals less sloping. The forehead is retreating, with heavy superciliary ridges. The glabella is not prominent, and with but few nasal depressions. The occiput is, as a general thing, heavier and raised higher than the alveolar plane of the dolicocephali with which they have been compared. The mastoid processes of the temporal bone are narrower and shorter, and not so well developed as in the long skulls. Neither are the planes and processes of attachment on their bases so well marked as in the two other types under consideration.

The sutures are like those of the short-headed people in character, and the Wormian bones not so well developed, seldom measuring over number three of Broca's scale. The majority of the males are platyrhine, the females and children mesorhine.

Dolicocephalic Crania.

The bones of the skull are not heavy. Viewed in front, the skull presents an oval with the large end extending well behind, caused by a somewhat narrow bulging occiput. The forehead is generally high and narrow, with strongly marked superciliary

ridges. Posterior condyloid and mastoid equilibrium are noticeable features of a few of the crania, but, as a general thing, ordinary equilibrium occurs most frequently. At the OPHYRON the outline of

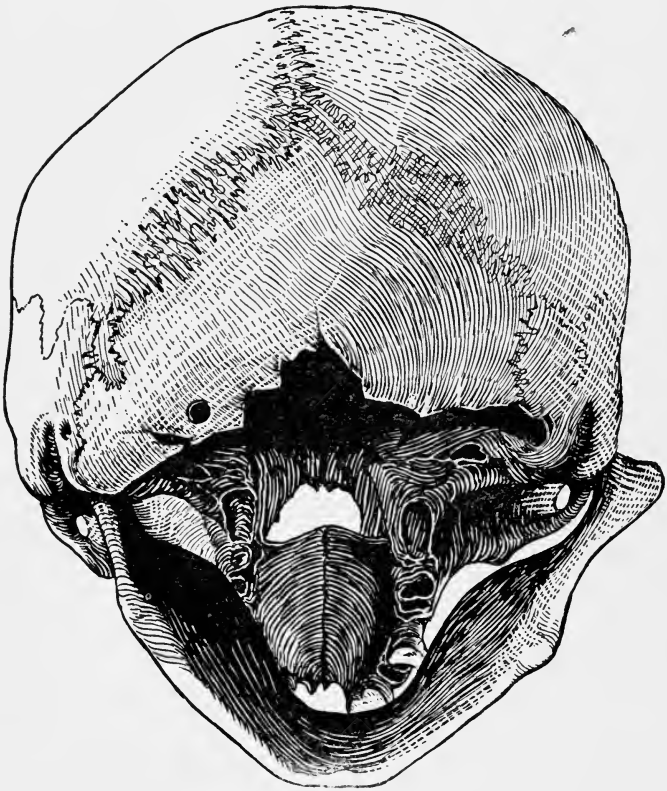

FIG. XLVIII.—Perforated skull, Hopewell's Group. Occipital perforation.
See page 234.

the carinated ridge is somewhat narrow, gradually widening as it approaches the bregma. Above the obelion a bifurcation in the specimen before us is apparent, disappearing upon the parietal bone, and

in other cases diverging somewhat toward the lambdoid suture. The outline of the majority of the Scioto valley dolicocephali is somewhat retreating, more marked in this respect than those of Fort Ancient and Oregonia.

The mastoid process is long, full, and broad, with its posterior border directed obliquely downward and forward. Following an imaginary line upward and backward, we arrive at the posterior part of the temporal ridge on the side of the head. It is well developed and prominent, curving well forward over or above the parietal eminences, its highest point generally extending back of the coronal suture. The styloid process in two of the crania, one specimen excavated from a stone grave at Fort Ancient by Mr. Moorehead, and another excavated by Dr. Cresson at Foster's, measured four and a half and five centimetres respectively (Fig. LII., B).

The diameter of maximum breadth ends, in some of these crania, at a point a little below half-way between the parietal eminences and the squamous suture. It is, in most cases, to the rear of the auriculo-bregmatic line.

There is no constant relation, so far as we are able to discover, between the capacity of these crania and the size of the foramen magnum.

The coronal and sagittal sutures and the lambdoid increase in complexity posteriorly with few exceptions. The sutures are quite frequently opened in those crania from the Scioto valley, but not so much as at Fort Ancient and Oregonia. The sutures varied in complexity from two to five of Broca's scale.

The "ptérion in H" of Broca was remarked in eight out of one hundred skulls. The internasal sutures were remarked closed in eight out of thirty crania from the Little Miami, Scioto, and Ohio valleys.

The number of Wormian bones in the dolicocephalic crania are fewer in number than in those of the two other types already spoken of.

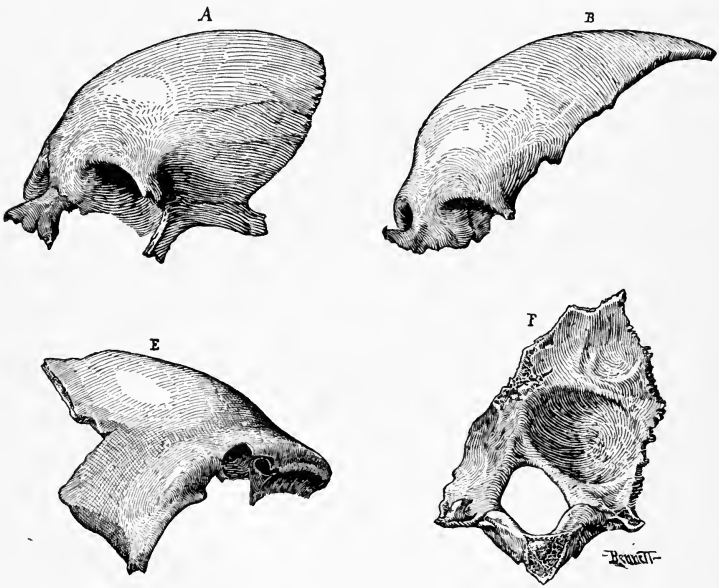

FIG. XLIX.—Fragments of crania showing low facial angles. Hopewell's Group. See pages 212 and 232.

The nasal bones are long and of medium width.

The crania from Foster's are blunt along the lower border of the nasal aperture. The nasal spine is usually blunt in the majority of crania from the Scioto valley in the collection before us.

At Hopewell's Earthworks sixty-nine skeletons

were excavated, and of these, so far as we were able to determine, thirty were brachycephalic (Fig. XLVII.), ten dolicocephalic (Fig. XLVI.), four mesaticephalic, and the remainder were so injured by the great length of time which had elapsed since their burial, and the distortions of earth-pressure, that it was impossible to determine their classification. Fifty other crania were examined in the Moorehead and various other private collections. Of this latter number forty were brachycephalic, twelve dolicocephalic, and six mesaticephalic. This gives us from the valleys of the Big and Little Miami, the Scioto, and the Ohio a total of seventy brachycephalic, twenty-two dolicocephalic, and ten mesaticephalic, a total of one hundred and two crania.

In determining age, sex, and dentition, the methods of Broca, Topinard, and Flower were used.

In thirty males and five females from the Hopewell Earthworks (Scioto valley), the males were from eighteen to seventy years old, the females, seventeen to forty-five years, and children eight to fifteen years old.

In thirteen crania from Foster's we have eleven males, from twenty to seventy-five years of age; two females, eighteen and thirty-nine years respectively.

The male crania from Oregonia range from twenty to eighty years, females eighteen to forty-five, children eleven to sixteen years.

At Fort Ancient, we are informed by Mr. Moorehead, that the males range from about eighteen to seventy-five years of age, the females from about

twenty-one to forty-eight years, and the children from eight to fifteen years.

Dentition.—The lower jaw in the three types of crania which we have just briefly noted is somewhat prognathic and heavy, but exceptions are quite frequent. The direction of the front teeth is in many instances slightly oblique, ranging from this to vertical. The chin projects, in some cases, about two millimetres, the height in front being greater than that of the last molar; but in some cases the lower jaws from Fort Ancient, Foster's, and the valleys of the Scioto and Ohio are slightly retreating, their height in front measuring about the same as at the first molar. We note a recession in a single case of one and a half millimetres approaching somewhat the jaw of La Naulette.

The teeth of the dolicocephalic skulls in the specimens before us are larger than the brachycephalic. They correspond in wear to the first and second degree of Broca. The roots of several molar teeth from the lower jaw, measured to the base of the crown, give one and a half centimetres. From the end of the shortest root to the top of the crown, although much worn, gives two centimetres. Curvature at the end of the roots in the molars, bicuspids, and incisors of both upper and lower jaws was remarked in a great many of the teeth from the Hopewell Earthworks. These peculiarities were also remarked in teeth excavated from the aboriginal cemetery on Burton's farm, Foster's. Also in those from Oregonia, in the same valley, not many miles distant from the last mentioned place.

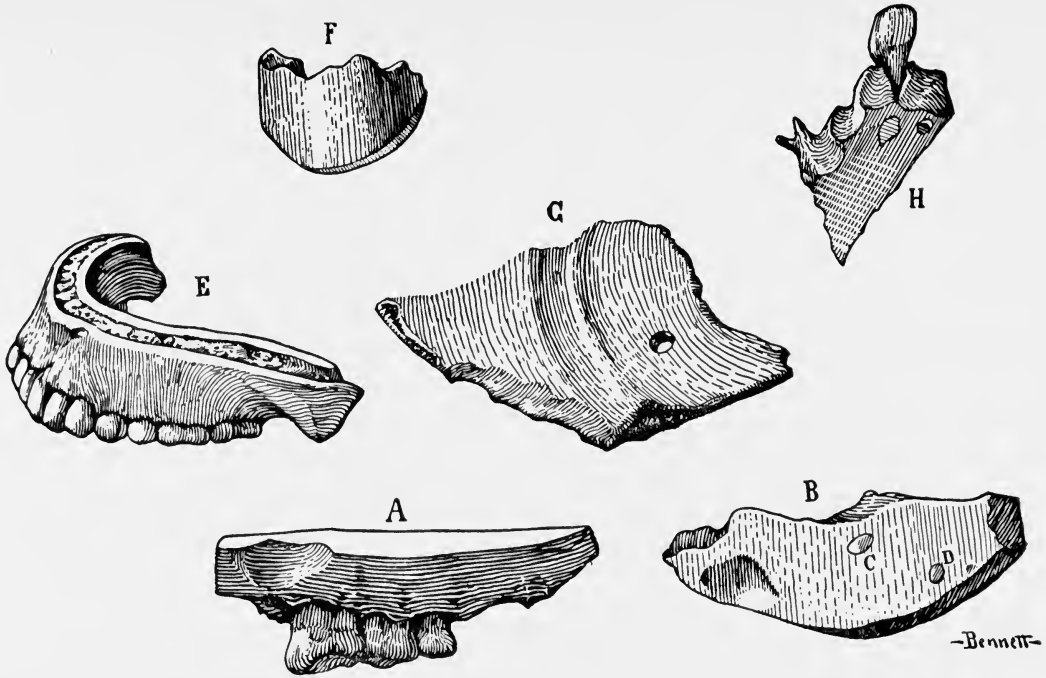

FIG. L.—Cut human jaws and perforated cranial bones. Hopewell's Group. See page 227.

The teeth of the brachycephalic people of the Miami valley in the specimens before us are shorter, and in wear correspond to the first, second, and third degrees of Broca and Topinard; the second degree being marked in eighteen out of thirty teeth from the upper and lower jaws. The third degree of Broca was remarked in five out of thirty crania. Five of these were from the superior maxillary and three from the inferior maxillary bones. The dental indices of all the crania examined may be classed as mesodont according to the formula of Flower, $\frac{d \times 100}{B.\ N.} = d.$

The forms of the alveolar arches, considered according to the aspects of Broca, were as follows: hyperbolic and parabolic. Parallelism and convergence were noted in a few cases, which, according to Broca and Topinard, is rare.

A supernumerary tooth was noticed in one instance at the inner side of the lower jaw alongside of the second bicuspid.

The consolidation of the roots of many of the teeth of the upper and lower jaws was noticeable in specimens at the Hopewell Earthworks, and in various other localities of Ohio. We are informed, however, by those who have made a special study of dentition, that this is not uncommon among European and Ethiopian races.

In this connection, while considering the dentition of the upper and lower jaws, it will be interesting to mention a peculiar habit of the people who erected the tumuli at Hopewell's farm, that of placing alongside of their dead, ornaments made of the superior

and inferior maxillary bones. In mounds Numbers Eighteen, Twenty-three, and Three at the above mentioned earthwork, the upper jaw was found placed alongside of the left humerus about four inches below the articulation of the glenoid process of the scapula. The specimens in question (Fig. L., A, B, E, H) had been in two cases cut across the alveoli a little below the level of the incisors and bicuspids, and in another instance just above. The work of cutting across the bone and teeth had evidently been done by some sharp instrument, probably of metal. It has been suggested that the specimens had been sawed across and then ground down, but the incisions are so sharp, and the marks of the instrument with cutting edge so plain, that we deem this to be impossible. A fragment of a jaw from an aboriginal cemetery on Burton's farm, which we explored in the latter part of August, 1891, has two round perforations, which extend entirely through the bone, one of these below the coronoid process and the other a little in front of the dental foramen. Since then another specimen of this kind has been discovered with two perforations on either side, just above the mental process of the lower jaw. It was found at Hopewell's Earthworks in mound Number Three. The specimen in question has been forwarded to Chicago, where it will be exhibited at the World's Columbian Exposition. The other specimen of a perforated inferior maxillary is in our own possession. The total number of these specimens discovered is three incised superior maxillary bones and two perforated inferior maxillary bones, one

from the Scioto valley and the other from that of the Little Miami.

The bones of the brachycephalic peoples that we have examined from various parts of Ohio indicate that they were strongly built, their height averaging about five feet four to five feet six inches, basing our calculations upon the length of the femur (Fig. LII.), as .275 of the height of the skeleton. The largest skeleton of the brachycephali discovered measured six feet one inch.

The height of the dolicocephali examined averaged about five feet two inches.

The humeri of the male skeletons are strong and frequently twisted, especially those from Foster's, Oregonia, and Fort Ancient. At Hopewell's Earthworks, the frequency of perforation of the olecranon (Fig. LI.) is remarkable. Variations are to be noticed in the shape of these perforations. In some, the bones of both sides are perforated, others on one side only; perforations of the left side predominating. Sixteen perforated humeri out of fifty-four skeletons that were fit for examination give us a percentage of 34¼. Of these fourteen humeri, eleven were of males and four of females; one of a child. The humeri of three skeletons were perforated on both sides; two on the right side, and the remainder on the left side. At Hopewell's, the majority of perforations of the humerus were observed on the skeletons of the short-headed people. It is not impossible, as suggested by learned authorities on the subject, that perforations of this kind were produced by impact of the coronoid or olecranon processes of

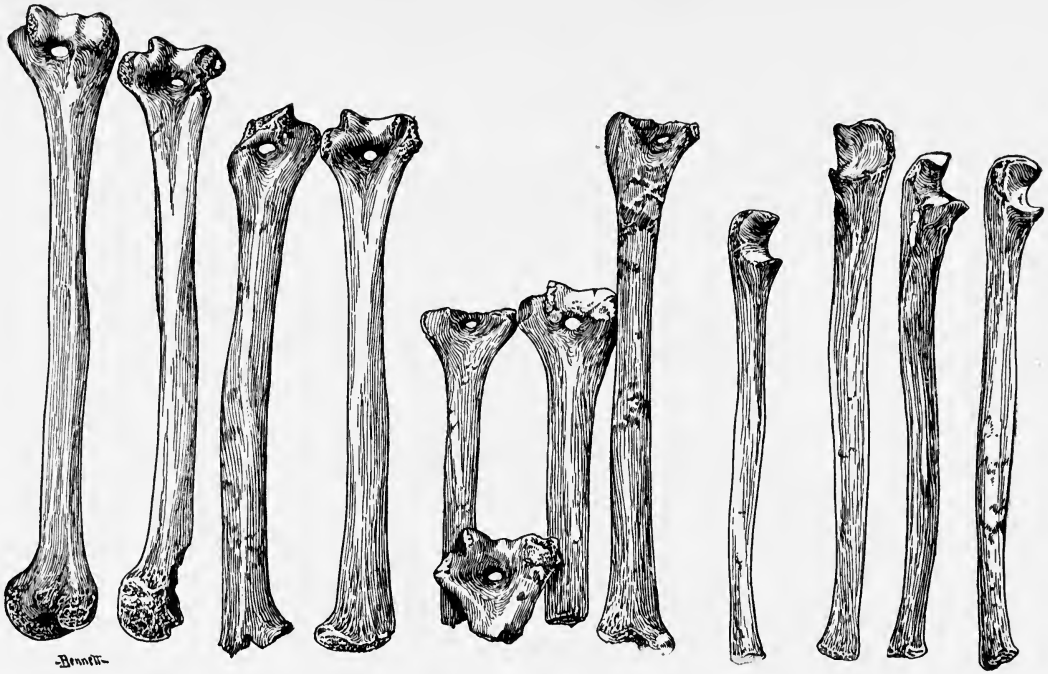

FIG. LI.—Perforated humeri and a few ulnæ. Hopewell's Group. See page 228.

the ulna. In one case, especially, from mound Number Thirty-five, Hopewell's Earthworks, it has been suggested that the sharp elongated spine of the latter process (olecranon) had produced it, as it projects much farther into the opening than in some other specimens of this collection. It would be safer, however, to consider that it may be caused by a deficiency of bone structure in the olecranon fossa, for it is wanting in some of the mammalia, and evidently not produced by continued extension of the forearm.

Incurvation of the upper portion of the ulna is to be remarked in eleven specimens.

The femur (Fig. LII.), in the male skeleton of the long- and short-headed people, is generally thick and strong and the linea aspera carinated.

Channelled fibulæ, with enlarged grooves, and the *femur à colonne*, are to be remarked in several cases at Fort Ancient.

Platycnemism is to be remarked in numerous cases. Of one hundred tibiæ from the various localities mentioned in this chapter, when compared with those of Europeans, eighteen were flattened and ten bent. The flattest tibiæ, in the majority of cases, were on the left side.

The tibiæ, when compared with those of Europeans, were found to exceed the latter in length in many cases; a distinct majority being noticed among those of the stone-grave people of Fort Ancient, and those of the tumuli at Hopewell's Group.

Fracture of the humerus was noted in two cases at Hopewell's Earthwork, and of the radius and ulna in three specimens from Foster's. The injuries of

the bones, from the latter place, had been quite skilfully treated. Figure LIV., A and B shows the two fractures.

An anterior dislocation of the head of the right humerus from a mound in the Scioto valley had

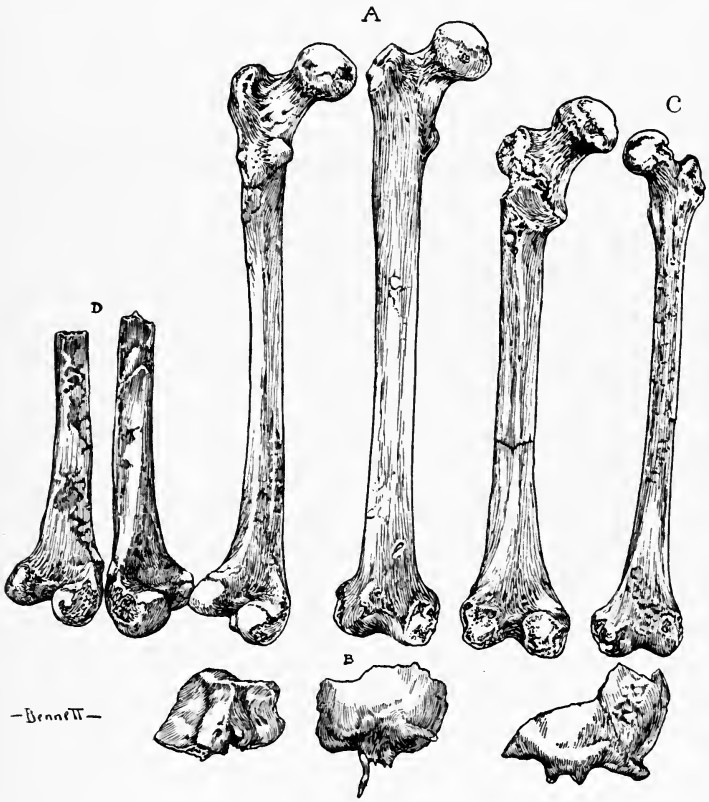

FIG. LII.—Skulls and femura, fragmentary. Hopewell's. See pages 221 and 228.

evidently baffled the skill of the medicine-man, who did not succeed in resetting it (Fig. LIV., E). The glenoid cavity has been absorbed and a new cavity

for articulation been formed on the inner side of the neck of the scapula, extending from the attachment of the triceps muscle to within one centimetre of the coracoid process. A new formation of bone is to be remarked upon the anterior surface of the head of the humerus, consisting of a plate of bone three and a half centimetres long, and as many broad. Its surface is convex and fits into the new articular cavity. The motion of the arm must have been somewhat limited.

Certain occipital bones in our collection from the Little Miami, Muskingum, Scioto, and Ohio valleys, we think, present anomalies of the cerebral surface. It is impossible to obtain material for comparison with European races, situated as we are at present in the exploration camp at North Fork of Paint Creek, yet some of the peculiarities are so marked that a short description may be interesting to the archæologist. There is an abnormal enlargement of the cerebral and cerebellar fossæ in several cases (see Fig. XLIX., F), sometimes on one side of the crucial ridge and sometimes on the other. Out of the six occipital bones in our collection, enlargements of the fossæ which receive the posterior lobes of the cerebrum are to be noticed on the left side and one on the right. The two inferior fossæ, which receive the hemispheres of the cerebellum, are enlarged, viz.: three on the left of the occipital sinus and one on its right side. The sinuses between the four fossæ named are frequently distorted, and the internal occipital protuberance, which is generally poorly developed, is placed to one side or the other, the

corresponding fossæ on the opposite side being reduced in size, and in some cases almost obliterated. Corresponding slight protuberances on the exterior surface of the occipital bone generally mark the site of the depressions within; in some cases, however, there is scarcely any indication, the superior and inferior curved lines being quite broad and thick, and the occipital protuberance for the attachment of the *ligamentum nuchæ* enlarged. It is true that the two inferior fossæ of the internal surface of the occipital, in the normal condition, are the largest of the four to be found in this bone, but marked changes in depth and size in either of these fossæ, or in those that support the posterior lobes of the cerebrum, together with the distortion of the sinuses, are certainly interesting. Whether it is due to cradle pressure, as suggested by a professional friend in Cincinnati, we are not prepared to say. The anomaly has been found in specimens from several parts of Ohio, widely separated, as already mentioned, and it would be valuable to know what number and type of crania there are in museums possessing the same peculiarities. It can, of course, be studied best in disarticulated or broken skulls. Certain it is, that the endocranial surface of the skulls of our aboriginal people ought to be more seriously compared with those of other races, and any differences that may exist, however slight, should be carefully noted.

The peculiar American characteristics of the occipital bone, somewhat flattened externally and internally, presenting the "Aymarian depression,"

has been observed in quite a number of cases in crania excavated from the mounds and graves of the Big and Little Miami valleys, the Scioto, and in the crania before us from different portions of Ohio.

. . . . . .

Crania excavated from different portions of the mound areas of the United States have been noted in which incisions have been made in various regions of the skull. A cranium found in an interment at Hopewell's Earthwork, placed alongside of the skeleton of a brachycephalic type, upon examination was found to have been perforated (Fig. XLVIII.) through the occipital bone, at a distance of about a centimetre and a half to the left-hand side of the foramen magnum. The incision was quite small, perhaps three millimetres in width, and was evidently *post mortem* in character. This peculiarity of perforating the different bones of the skull with small incisions, to which reference has already been made in this chapter, is interesting, and, so far as we are aware, peculiar to the aborigines who built Hopewell's Earthwork in the Scioto valley.

The collection of bones which we have been considering has, of course, as among other races, indications of morbid changes due to forms of inflammation, such as periostitis, osteitis, caries, exostosis, sclerosis, etc. We have also noticed several cases of curvature of the tibiæ (Fig. LIII.) approaching, somewhat, to the degree shown in the illustrations of Fournier, and designated by this distinguished specialist "Lame-de-Sabre." Another pair of tibiæ excavated from the lower level of mound Number Twenty-three, Hopewell's

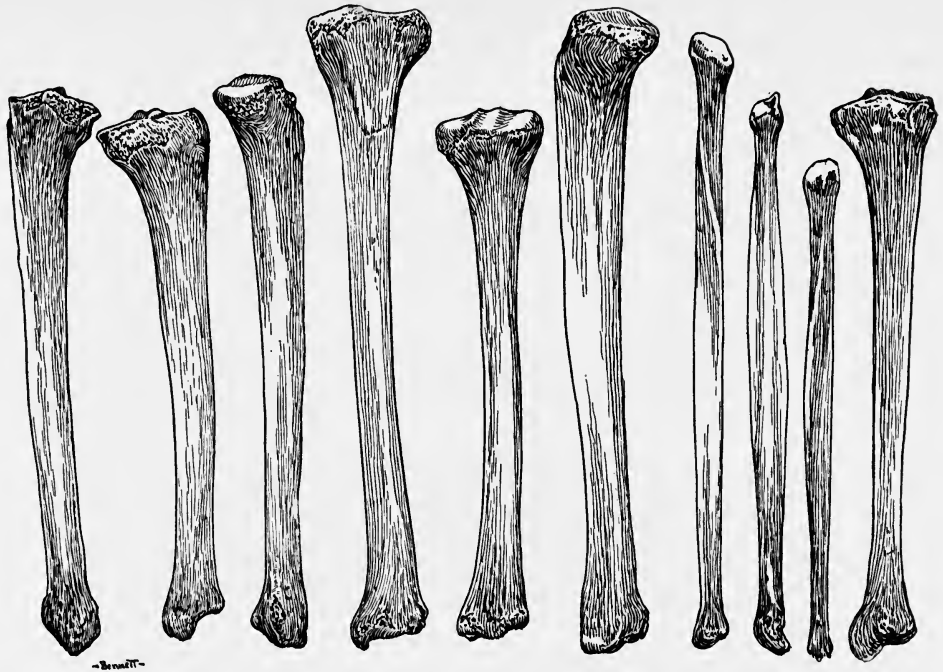

FIG. LIII.—Fibulæ and tibiæ from Hopewell's Group. See page 234.

Earthwork, indicate a diseased condition of the bone. These were forwarded to Chicago and it was impossible to examine them, except in a superficial manner, in the short time that elapsed between their exhumation and their shipment west. We hesitate to say that any of the remains of the people before us show indications of specific affections. There is an absence of gummatous and nodular lesions of the various sizes and conditions which is peculiar to bone syphilis. Neither are the larger lesions, which are found in laminated and eburnated conditions, present. The osseous material which we have examined from Fort Ancient, Oregonia, and the Scioto valley mounds, is remarkably free from syphilitic indications. We have to note, however, some exceptions in the southern portion of the valley of the Little Miami, where there is a slight suggestion of specific taint in the bones, namely, the fragments of a skull found at the Madisonville cemetery, and portions of crania from an aboriginal burying-place on Burton's farm, near Maineville, Ohio. The fragments from Madisonville cemetery are those of a left parietal, probably that of a female. It was excavated during a visit made to the spot in the summer of 1890, from the Peabody Museum camp at the Turner group of mounds, not far distant from Batavia Junction. Certain degenerations in the cerebral surface of this bone may be the result of gummatous involvement. The indications, however, require comparison with other material, which at present it is impossible to obtain. The two frontal bones from Burton's farm have small nodes of bone on their exterior sur-

faces and certain indications of the cerebral surface which may or may not be specific, but well merit the careful study of a specialist. One of the most thorough articles yet written upon pre-Columbian syphilis in America[1] is that of Professor Hyde of

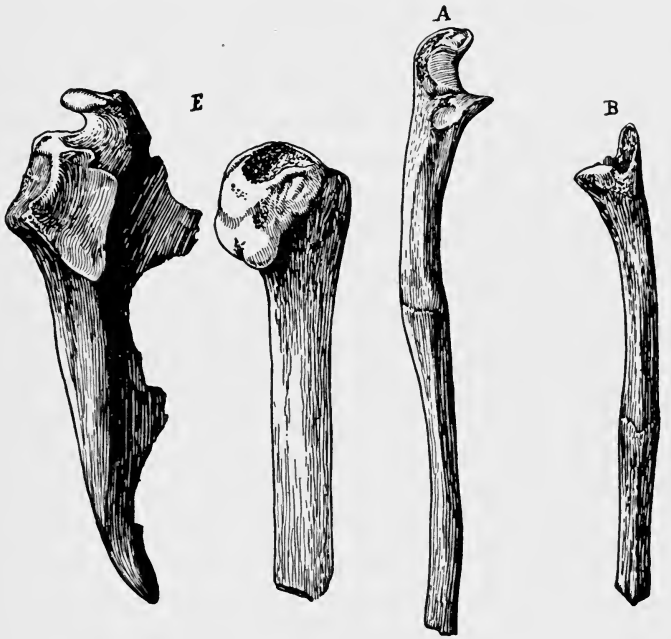

FIG. LIV.—Fracture of head of humerus, and of the ulnæ. See page 231.

Chicago. Those of our readers, especially the anthropologists, who may be interested upon the subject, will do well to read this carefully prepared contribution to science.

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[1] See the *American Journal of the Medical Sciences* for August, 1891, edited by Edward P. Davis, A.M., M.D., Philadelphia.

Exostoses of the external auditory meatus are to be remarked in seven out of fifty skulls examined. The cerebral surfaces of several of the crania suggest that inflammatory action may have caused certain indications that are present, but this cannot well be determined on account of the decayed condition of the bone.

Ankylosis of axis and the third cervical vertebra is to be noticed in a single instance, and partial osteo-arthritis of the spinal column in two cases.

One case of marked indentation of the skull is to be seen in a cranium from Foster's, Ohio. It is in the angle formed by the interparietal and occipito-parietal sutures. The inner table of the skull had only been slightly injured, repair having taken place.

The average capacity of twenty-five crania, given in the table at the end of this chapter, is 1319 c. c., even below the average of the much flattened skulls with an index at or over .900, quoted by Mr. Carr from Dr. Jones' collection,[1] standing between three of the series of Mr. Carr's measurements of stone-grave crania, viz.:

1341^{30} c. c., 1335^{18} c. c., and 1284^{15} c. c. (the latter average probably female). The maximum capacity, it will be seen by reference to the table, is 1600 c. c., the minimum capacity is 1118 c. c., and the range is 482. The mean capacity of the whole is therefore less than that of the American Indian, or 1376 c. c.,

[1] Eleventh *Ann. Rep. Peabody Museum*, vol. ii., No. 2, page 378.

[2] These small figures denote the number of crania measured in Carr's tables. See pp. 368–373 (*ibid.*).

and greater than that of the ancient Peruvian, which is only 1250 c. c.

The rest of the crania referred to in this chapter, from Ohio, numbering one hundred and two specimens, are in such a condition, from the effects of earth pressure and long burial, that the exactitude of measurements is out of the question.

The majority of the crania are microcephalic.

Nine of the twenty-five skulls are platyrhine, six are leptorhine, and six mesorhine.

The range of the cephalic index is .121, or .774 to .895. The average of the index of breadth is .837. The total of skulls with an index above .800 is twenty-one. Those with an index between .750 and .800 are four in number.

Conclusions.

The skeletons of the brachycephalic people in the collections examined from the Great and Little Miami valleys, and those of the Scioto and Ohio, suggest that they were strong and well built, and in stature slightly superior to the dolicocephali.

No skeletons of gigantic size were discovered, and there is but little doubt that the progenitors of the American race were in height subject to the same variations in stature which are to be remarked among our recent tribes.

In anatomical peculiarities, the people of the Scioto, Ohio, and Great and Little Miami valleys closely resemble those of the stone-grave people of Tennessee, and are in all probability but a prolonga-

tion of that short-headed stock northward into the localities named.

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, these at times being replaced by a flat plane similar to that shown in Fig. XLIX., E, running backward somewhat horizontally, and then losing itself in the rest of the frontal bone as it mounts toward the parietals. The sketch given is a faithful reproduction of the fragment of a cranium now in our possession from mound Number Three.

We cannot overlook the fact that the crania and skeletons examined by us, many of them excavated by our own hands, approach, somewhat, the negro in their anatomical characteristics. They are those of an inferior race with strong meso- and brachy-cephalic affinities. None of the characteristics of the Mongolian or of Mongoloid types are present in any of the Ohio crania which we have examined. They are evidently those of a people whose racial type was created and fixed on the American continent—in other words, the American Race.

MEASUREMENTS OF CRANIA FROM MOUNDS AND STONE GRAVES OF OHIO,[1] .780–800+.

Number.	Capacity.	Length.	Breadth.	Height.	Index of Breadth.	Index of Height.	Nasal Index.	Width of Orbit.	Height of Orbit.	Width of Frontal.	Where From.
1	1150	158	137	135	.860	.891	.56	37	35	87	Little Miami Valley
2	1300	164	133	126	.835	.769	.52	41	38	90	"
3	1385	167	132	141	.774	.815	.42	41	34	98	"
4	1390	170	139	133	.815	.783	.52	43	33	92	"
5	1210	168	122	142	.812	.780	.57	40	31	96	"
6	1600	170	147	140	.895	.802	.48	37	37	86	"
7	1490	169	135	132	.820	.763	.52	39	32	84	Great Miami Valley
8	1210	162	129	130	.835	.784	.54	38	38	87	"
9	1500	170	145	140	.865	.810	.48	38	31	84	"
10	1335	160	146	147	.825	.839	.45	37	37	89	"
11	1250	169	135	128	.840	.894	.60	43	37	84	"
12	1490	165	148	137	.889	.802	.54	38	32	91	"
13	1125	175	133	130	.805	.763	.59	42	37	86	"
14	1330	159	140	137	.890	.867	.45	37	31	90	"
15	1215	167	135	129	.812	.827	.60	40	38	91	Scioto Valley
16	1345	175	132	127	.880	.790	.45	40	32	94	"
17	1483	176	139	135	.789	.775	.49	38	32	93	"
18	1210	178	143	130	.865	.825	.50	42	36	97	"
19	1118	162	145	136	.882	.845	.60	37	31	92	"
20	1450	175	134	138	.757	.779	.45	42	38	90	"
21	1290	166	135	130	.800	.789	.48	39	34	91	Ohio Valley
22	1360	169	142	137	.840	.811	.59	35	37	90	"
23	1147	162	143	131	.880	.845	.49	38	31	83	"
24	1330	157	141	138	.885	.865	.44	41	37	92	"
25	1275	162	134	130	.787	.778	.49	39	32	84	"
Average,	1319	167	137	134	.837	.811	.51	39	34	89	Total of Brachycephalic skulls = 21.
Maximum,	1600	178	148	147	.895	.894	.60	43	38		Mesaticephalic = 4.
Minimum,	1118	157	122	126	.774	.763	.42	35	31		
Range,	482	21	26	21	.121	.231	.18	8	7		

[1] The measures of capacity are in cubic centimetres taken with selected peas. The other measurements are in millimetres and decimals.

INDEX.