

**Article III. — THE CRANIA OF TRENTON, NEW JERSEY, AND THEIR BEARING UPON THE ANTIQUITY OF MAN IN THAT REGION.**

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PLATES I-XXII.

Attention to a possible antiquity of man in New Jersey was, according to Peter Kalm,<sup>1</sup> aroused among the occupants of the country as early as the beginning of the eighteenth century. Many of the inhabitants of Raccoon, in the then New Sweden, informed Kalm that when digging wells they found, at depths of from twenty to fifty feet below the surface, quantities of oyster, clam and mussel shells, reeds, logs, burnt wood, charcoal, "a great spoon," "such a trowel as the Indians make use of," etc., from which finds they concluded that man must have inhabited the region in remote times.

Neither these, nor any other finds of a similar nature that may have been made since, up to the middle of the past century, led to any systematic investigation of the subject. In the early part of the latter half of the nineteenth century, however, there arose in various parts of New Jersey an interest in collecting Indian implements. One of the noteworthy collections of this nature in the early fifties was that made by the Rev. Samuel Lockwood, who was the first to investigate the great shellheap at Keyport. Soon after, Mr. Michael Newbold, of Burlington County, N. J., started to form his collection. In 1872 Dr. Charles C. Abbott, of Trenton, began a systematic gathering of the numerous implements of stone found in and about Trenton and along the Delaware River,<sup>2</sup> and this may be said to mark the transition period from the empiric to scientific archæological work in the State and particularly in the Delaware Valley.

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<sup>1</sup> Kalm, Peter, *Travels into North America*, Warrington, MDCCLXX, v. I, pp. 353-359.

<sup>2</sup> Dr. Abbott's letter, February 21, 1901.

Dr. Abbott published a number of reports on his work, the most important of which are the 'Stone Age in New Jersey' (Smithsonian Report, 1877); the First and Second Reports on the 'Paleolithic Implements from the Glacial Drift, in the Valley of the Delaware River, near Trenton, N. J.' (1877-8), and his volume entitled 'Primitive Industry' (1881).<sup>1</sup> In these communications, particularly in the 'Second Report,' Dr. Abbott, besides describing the stone implements the manufacture of which can unquestionably be referred to the Lenape, points also to others of a somewhat different and inferior workmanship and found in different, lower deposits, particularly the Trenton glacial gravels, which implements he believes were made by "a still ruder race" than the Indians, a race that preceded the latter in that particular region.

The publications referred to aroused very much and prolonged interest as well as contention; they became the incentives of a thorough scientific research in the Delaware Valley, a research lasting to this date and still far, it may be hoped, from its conclusion. The motive power of the systematic archæological investigations about Trenton since 1878 has been Prof. F. W. Putnam. Professor Putnam conducted the research first for the Peabody Museum, then for the Columbian World's Fair of 1893, then again for the Peabody Museum, and since 1895 for the American Museum of Natural History. He has interested two patrons of American research in the work,—the Duke of Loubat and particularly Dr. Frederick E. Hyde. These gentlemen have generously for several years past supplied the funds for the exploration. Since 1890 Mr. Ernest Volk, Professor Putnam's carefully trained and painstaking assistant, has dug over, with a trowel, large portions of ground along the Delaware River south of Trenton.

Among the numerous and interesting results of Mr. Volk's work was the unearthing, from several burial places, of a considerable number of human skeletons, which are in the osteological collections of several Museums (Peabody

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<sup>1</sup> For other publications on the subject by Dr. Abbott, see Bibliography.

Museum, Cambridge; Field Columbian Museum, Chicago; University of Pennsylvania Museum, Philadelphia; and the American Museum of Natural History, New York City). Besides his regular work, Mr. Volk, and, independently of him, Dr. Abbott, who has never lost his keen interest in the archaeological problems of the Delaware Valley, have for many years watched the various public and railroad excavations, and the accidental finds made by others. Among the results of this watching has been the acquisition of three crania, a fragment of a frontal bone, parts of a parietal and of a temporal bone, a portion of an inferior maxilla, and a tooth. Some of these specimens rank with the most important archaeological finds from the Trenton region. The most recent discovery, and from its geological position and the circumstances relating to its finding a highly important one, is a cut piece of human femur. We shall return to these specimens later.

In 1898 I visited the locality of the finds and received a kind invitation from Professor Putnam to examine the human remains from Trenton in the collection of the American Museum of Natural History. In 1899 Dr. Frank Russell, of Cambridge, published in the '*American Naturalist*'<sup>1</sup> a paper on the 'Human Remains from the Trenton Gravels,' in which he gave measurements and some description of three of the Trenton crania preserved in the Peabody Museum. These crania Professor Putnam enabled me to compare with those now in the New York and Cambridge collections, and I shall be able to supplement somewhat the data of Dr. Russell, who worked under the great disadvantage of very limited material. Due to the courtesy of Dr. Geo. A. Dorsey, I am further able to include with my other measurements those of four relatively recent Lenape skulls, which were kindly sent to me for examination from the Field Columbian Museum in Chicago. The material thus gathered, though not all that could be wished for, will, I believe, prove not without value in the solution of the anthropological problems that have arisen, in consequence of other finds, about Trenton.

<sup>1</sup> Vol. XXXIII, February, 1899, pp. 143-155, with figs.

## DESCRIPTION OF THE FINDS OF HUMAN BONES IN THE DELAWARE VALLEY.

In the majority of the cases the only find made, or the only part of the find utilizable for description and measuring, on account of damage to or bad preservation of other bones, is the skull. In the description of these crania it is desirable in the first place to establish the prevalent cranial type of the region and in consequence of this I shall first enumerate Mr. Volk's numerous finds during his regular excavations. These finds were all made, as mentioned before, on the northeastern side of the Delaware River, south of Trenton. The country in this location consists partly of a terrace of glacial origin and partly of "low lands"; the terrace rises from forty to fifty feet above these latter.<sup>1</sup>

*The Terrace and Low Lands Finds* <sup>2</sup>.—Mr. Volk's attention to these parts was drawn in 1888, by the accidental ploughing up on the Lalor farm of parts of a human skeleton. The subsequent exploration of the field, the neighboring parts of the terrace, and the adjoining low lands, led to the unearthing of about one hundred burials.

The surface soil, both on the terrace and in the low lands, shows numerous signs of occupation by the Indians.

The graves on the terrace and in the low lands "varied in depth from a mere surface burial, where the body had apparently been laid down on the surface and the ground heaped over it, to that sunk three feet below the present surface."

Of the skeletons but a few were in a fair state of preservation; in the majority of instances the bones were partially and in some cases, particularly in one locality in the low lands, almost totally decayed. Very few objects were found with the skeletons.

*The Deep Burials at Abbott's Farm.* <sup>3</sup>—On April 21, 1899, Mr. Volk dug a deep trench on Dr. Abbott's farm, which is located on the terrace a little southeast of Trenton, adjoining

<sup>1</sup> See Atlas Sheet No. 8, Geological Survey of New Jersey.

<sup>2</sup> Locations indicated on the accompanying map (Fig. 1). The particulars as to the burials are mostly extracted from written reports by Mr. Ernest Volk to Prof. F. W. Putnam.

<sup>3</sup> See accompanying map (Fig. 1).



the low lands. At the depth of six feet from the surface, "beneath two feet of black soil and four feet of yellow loam and stratified sand," "neither of which layers showed any disturbance," were found two small lots of human bones. There were fragments of skulls and some long bones, most of the

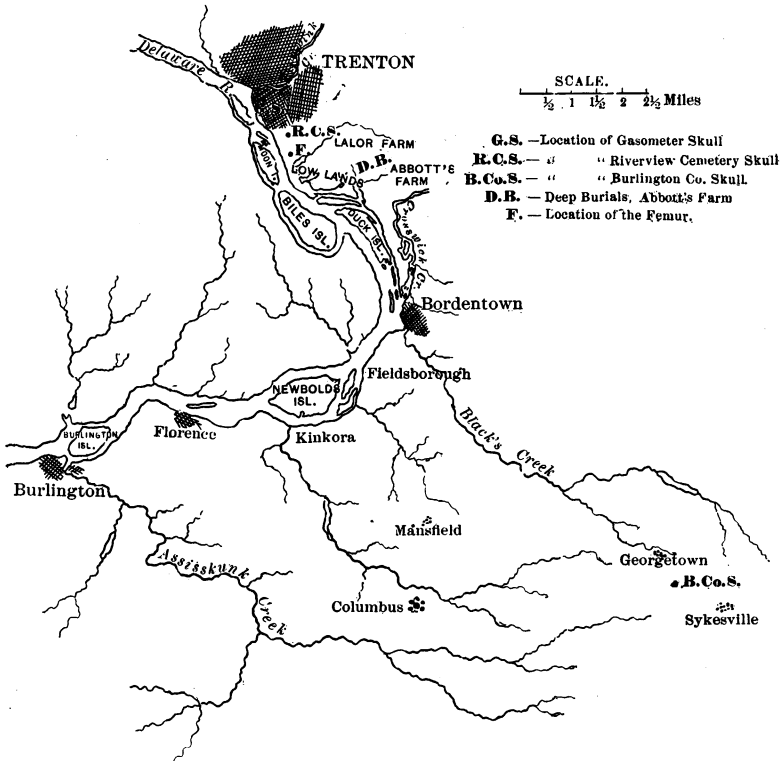


FIG. 1. Map showing the locations of the various finds of Indian Bones about Trenton.

pieces showing advanced disintegration. "The bones rested upon a stratum of whitish, clean, sharp sand, which is five inches above the bed of heavy boulders mixed with broken limonite, a stratum known as the Columbia gravel. A reddish layer of three inches in thickness formed the bed for the bones and partly covered the same." "An argillite implement was found near lot No. 1 of the bones"; and four

feet from the same lot of bones, six and a half feet below the surface, were found two conical pieces of a dark brown pigment. No other bones, stone implements, or pieces of pottery were found in the layers above the burials. The trench dug ran parallel with (and on the north side of) a little stream that has deepened its bed in the terrace to a depth of forty feet at the edge of the same.

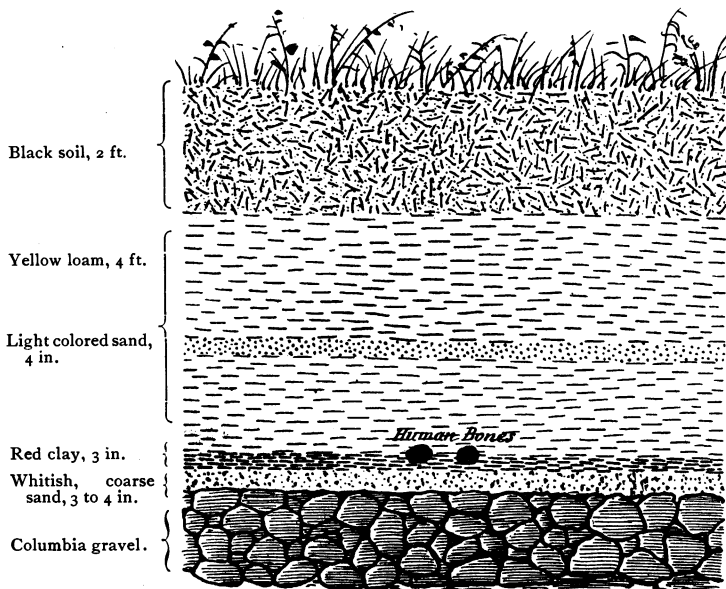


FIG. 2. Deep Burials at Abbott's Farm, discovered April 21, 1899. (Drawn by E. Volk on the date of the find.)

On April 28 Mr. Volk found another small lot of bones in the same trench. "Over these bones, but in no connection with them, there was noticed a little pit in the soil." "These bones were at a slightly less depth than those found April 21"; "they were surrounded by a reddish sandy soil." At slightly below the bottom of the pit was found an argillite implement.

*The Accidental Finds.*—The "Gasometer" Skull: This cranium<sup>1</sup> "was found in the excavation made for a gaso-

<sup>1</sup> Dr. Abbott's letter to me, Dec. 15, 1900.

meter on the northeast side of Warren St., Trenton." The find was made in 1879. Warren St. is situated near the bank of the Delaware (a little more than one square from the same), not far from the Assunpink Creek, and on rather low ground. "The excavation was of a circular form and deep. The material removed was mostly gravel, not distinctly strati-

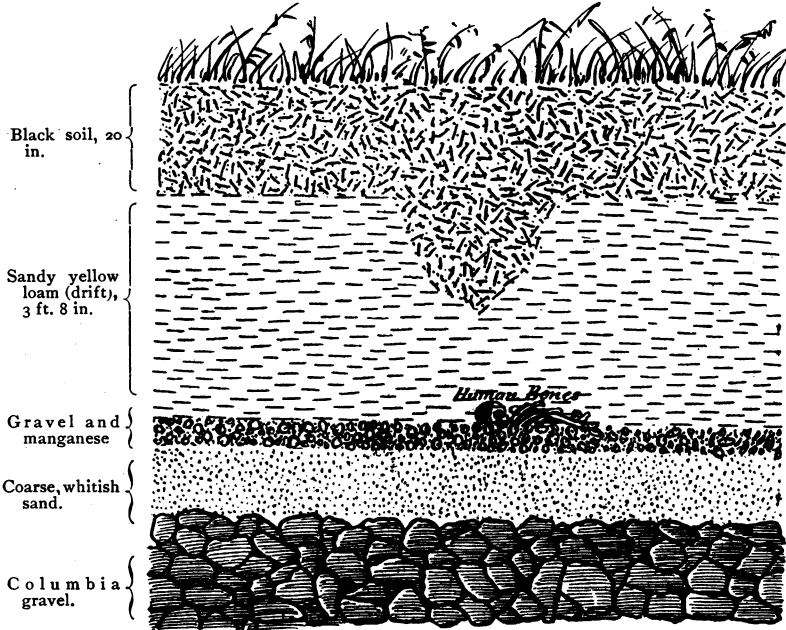


FIG. 3. Deep Burials at Abbott's Farm, discovered April 28, 1899. (Drawn by E. Volk on the date of the find.)

fied and coarser at the surface than beneath. The skull was found *in sand*, at the bottom of the excavation and not very far from the centre, about twelve feet from the surface." The skull was discovered by a laborer and a piece of it was accidentally cut off by his shovel. The specimen was taken by the foreman of the laborers and given to a druggist, from whom in turn it was obtained by Dr. Abbott, who gave it the same year to the Peabody Museum. "I took every means," Dr. Abbott proceeds, "to get correct details about the find;

and the history of the same as given to me by two individuals, without a knowledge on the part of one of the other's account, tallied in every particular." "When found the skull was tightly filled with sand."<sup>1</sup>

*The Burlington County Skull.*—Together with the "gasometer" specimen, Dr. Abbott gave in 1879 to the Peabody Museum a cranium found in the northern portion of Burlington County, New Jersey, about twelve and a half miles S.S.E. from Trenton. Dr. Abbott's detailed account of this find is as follows:<sup>2</sup> "The specimen was found by a man—name unknown—who gave it to Mr. Michael Newbold, an enthusiastic collector of Indian relics of his neighborhood." "Mr. Newbold, not liking to have so unattractive an object in his private museum, exchanged it for some stone implements and I procured it from the man with whom he made the trade. Having secured the specimen, I immediately visited Mr. Newbold and verified the statements made by the man from whom I got the skull. The specimen was not ploughed up. Mr. Newbold's information was to the effect that it had rolled out of the bank of a brook running through a field. The geology of the locality is cretaceous, and here the green sand marls and stratified clay and sand are overlaid by the 'southern-drift,' as the white pebbles and yellow sand are called. Over this is a rich alluvial deposit, but this is not a uniform covering, the gravel often being exposed for considerable areas. It was in this 'southern drift,' unassociated with other bones, that the skull was found." The field where the skull was found lay a little west or slightly southwest of Sykesville, in a region considerably more elevated (up to 205 feet<sup>3</sup>) than that about Trenton.

*The Riverview Cemetery Skull.*—This specimen, now also in the Peabody Museum, was procured in 1887 by Mr. Volk, whose account of the find is as follows:<sup>4</sup> "A man with whom I was acquainted, employed in digging graves in the Riverview Cemetery, told me of a skull he had found in a new plot, in

<sup>1</sup> Dr. Abbott's letter of Dec. 18, 1900.

<sup>2</sup> Letter of Feb. 11, 1901.

<sup>3</sup> See Sheet No. 12, Atlas Geological Survey of New Jersey.

<sup>4</sup> Mr. Volk's written report to Prof. F. W. Putnam, Feb., 1901.

which no burials had been made before. On my arrival at the cemetery he showed me the place; it was an elevated part of the ground and now there is one grave there. The man told me that when he dug that grave he struck with his spade, at the depth of about three feet, a human skull. There were no other bones there, but he noticed a few black lines in the soil." The workman gave the skull to Mr. Volk, who in turn gave it to the Peabody Museum. Upon examining the deposits as disclosed in the grave, Mr. Volk found "6 to 10 inches of black soil, about 18 inches of yellow drift, and then stratified sand and gravel. The skull, according to the information of the man who found it, was in the apparently undisturbed sand and gravel."

*Fragments.*—A human third molar, with its root artificially polished into a pyramidal form, a piece of a temporal bone, and a portion of a lower jaw, were found on different occasions between 1882 and 1885 by Dr. Abbott at various depths in the Trenton gravels, exposed by a railroad cut <sup>1</sup> and by removals of gravel for a road.

In 1895, Dr. Abbott found another fragment, a piece of a frontal bone. This lay "at a depth of about four feet in what is called 'Columbia gravel', and was not an intrusive object." <sup>2</sup>

Finally, in December, 1899, Mr. Volk, in watching a railroad excavation, found and photographed in situ, seven and a half feet from the surface, in a layer of sand underneath an overhanging layer of glacial gravel, a portion of a human femur. The bone shows cuts and perforations. The detailed archaeological data about this specimen, and my examination of the same have been reported upon <sup>3</sup> and will be published later.

A few days later, in the same cut, about 30 feet from the place where the femur was discovered, Mr. Volk found a piece of human parietal bone lying on the talus that had formed within a few days by the crumbling down of the gravel.<sup>4</sup>

<sup>1</sup> A report on the tooth by Abbott in Proc. Boston. Soc. of Nat. Hist., XXII, p. 96.

<sup>2</sup> Dr. Abbott's letter, Feb. 11, 1901.

<sup>3</sup> By Professor Putnam, before Section H., A. A. A. S., New Haven Meeting, Dec., 1899.

<sup>4</sup> From Mr. Volk's reports to Prof. Putnam.

Of the above enumerated fragments those found by Dr. Abbott are in the Peabody Museum, those found by Mr. Volk, in the American Museum of Natural History.

#### HISTORICAL REMARKS.

Before entering on a description of the above material, it will, I believe, be of advantage to give a brief survey of our knowledge concerning the inhabitants of the Delaware Valley and neighboring regions at and before the advent of whites.<sup>1</sup>

At the arrival of whites the entire region subsequently known as New Jersey belonged to the Lenape or Delaware Indians. The settlements of the nation extended "from the Mohicannituck (Hudson River) to beyond the Potomac," and "from the heads of the great rivers, "Susquehannah" and Delaware," to the Atlantic Ocean (Heckewelder). The neighboring tribes on the north (Mohegans, Narragansets, Pequots, etc.) as well as those on the south (Nanticokes, those of the Powhatan Confederacy, etc.), all acknowledged their relationship to the Delawares and were very probably branches of the same people. No ties, besides those of an early association and a joint migration eastward, seem to have existed between the Lenape and the Mengwe or Iroquois.

The Lenape in New Jersey were divided into three large families, or, as Brinton calls them, "sub-tribes," namely, the Minsis (the Wolf), the Unamis (the Turtle), and the Unalach-

<sup>1</sup> Literature consulted: Capt. John Smith's Works, 1608-1631, edit. Arber, Birmingham, 1884; Wm. Penn. Letters, 1683; G. Thomas, Hist. of New Jersey, London 1698; Thomas Campanius Holm, A Short Descript. of New Sweden, etc., orig. in Stockholm 1702, transl. by du Ponceau, Mem. of the Hist. Soc. of Penn., v. III, Phila. 1834; Acrelius T., A History of New Sweden, Stockholm 1759, Mem. Hist. Soc. Penn., v. XI, 1874; Sam. Smith, The Hist. of the Colony of Nova Caesaria or New Jersey, Burlington 1765; Peter Kalm, Travels into North America, London 1770-71; Loskiel G. H., Hist. of the Mission of the United Brethren among the Indians in N. A., London 1794; Geo. Chalmers, in Political Annals of the Present United Colonies etc., 1780 (cont. in N. Y. Hist. Soc. Collections, 1868); John Heckewelder, History, Manners and Customs of the Indian Nations who once inhabited Pennsylvania and the Neighboring States, Phila. 1819, Mem. Hist. Soc. Penn., v. XII, 1876; also MSS; James Grahame, The Hist. of the Rise and Progress of the United States of North America etc., London 1827 (new edits. 1836, 1845); Thos. F. Gordon, Hist. of New Jersey, Trenton 1834; J. Curtis Clay, Annals of the Swedes on the Delaware, Phila., 1835; Yates & Moulton's New York; Isaac Mickle, Reminiscences of Old Gloucester etc., Phila., 1845, Camden 1877; The Aborigines in New Jersey, A. Gifford, Proc. N. J. Hist. Soc., v. IV, Newark 1850, pp. 163-198; The Lenape and their Legends, D. G. Brinton, Phila., 1885, etc.; for further references see text.

tigos<sup>1</sup> (the Turkey); these families, it seems, were eventually subdivided into numerous smaller groups which bore distinct names.<sup>2</sup> The three parts of the tribe occupied special regions, but it has not been reported whether the boundaries of these regions were stable and definite. The Minsis, according to Heckewelder,<sup>3</sup> "had chosen to live back of the two other tribes and formed a kind of a bulwark for their protection." "They extended their settlements from the Minnisink, a place named after them, where they had their council seat and fire, quite up to the Hudson on the east, and to the west or southwest far beyond the "Susquehannah"; their northern boundaries were supposed originally to be the heads of the great rivers Susquehannah and Delaware, and their southern boundaries that ridge of hills known in New Jersey 'by the name of Muscanecun, and in Pennsylvania, by those of Lehigh, Cohnewago, etc.'" <sup>4</sup>

The respective territories of the Unamis and particularly that of the Unalachtigos are even less well defined than that of the Minsis. Generally speaking, the Unalachtigos occupied

<sup>1</sup> These designations are not translations of the terms in the parentheses, but "refer to the location of these sub-tribes on the Delaware River," Minsi (from *minhin*, to be scattered, and achsin, stone) meaning "people of the stony country" or "mountaineers"; Unami (from *nahen*, down-stream), means "people down the river"; and Unalachtigo (from *wunalawat*, to go towards, and *t'kow* or *t'kou*, wave) means "people who live near the ocean." Wolf, Turtle and Turkey are the totemic designations of the three sub-tribes. Brinton, *op. cit.*, p. 34.

<sup>2</sup> From the above three tribes sprang in course of time many others "who, having for their own convenience, chosen distant spots to settle on, and increasing in numbers, gave themselves names or received them from others." Heckewelder, *Hist. etc. of Indian Nations*, p. 53; see also p. 51, *ibid.*

<sup>3</sup> *Op. cit.* p. 52; see also H.'s MS., Communication to Dr. Miller, 1800, in the collections of the N. Y. Histor. Soc.

<sup>4</sup> Brinton (*op. cit.*, p. 37) is of the opinion, on what grounds not stated, that the extent of the territory of the Minsis as stated here is too great. In his words, "that at any time, as Heckewelder asserts, their (Minsi) territory extended up the Hudson as far as tide-water, and westward 'far beyond the Susquehannah,' is surely incorrect. Only after the beginning of the eighteenth century, when they had been long subject to the Iroquois, have we any historic evidence that they had a settlement on the last named river." It seems, however, that even if the presence of the Minsis on or beyond the Susquehannah may be open to contention, their presence along the Hudson is well established. Gifford (*The Aborigines of N. J.*, p. 180), states "the Minsi tribe extended as far on the west banks of Hudson as Tappan." Yates & Moulton (*Hist. of N. Y.*, v. I, p. 225), place the Minsis even further east, "from Long Island to and beyond Minnisink." According to Ruttenber (*Hist. of the Indian Tribes of Hudson's River*, p. 50), the territory of the Minsis "extended from the Katskill mountains to the head-waters of the Delaware and Susquehanna river, and was bounded on the east by the Hudson; their council-fire was lighted at Minisink (about 10 miles south of Maghackemek, New Jersey)." The Unamis (see p. 89 *et seq.*) joined the Minsis on the south somewhere about Stony Point. Going further than this, Ruttenber gives (p. 93 *et seq.*) the various subdivisions of the Minsis along the Hudson and their location (the Waoronecks about Dans-hammer; Waranawonkongs, from Katskills to Saugerties. Mamekotings, west of Shawangunk mountains; Wawarsinks, in the district of country which still bears the name; Katskills, north of Saugerties).

[January, 1902.]

a region nearer the sea and somewhat further south than the Unamis, and the territory of these latter lay between that of the Unalachtigos and that of the Minsis. The principal seat of the Unalachtigos was near where Wilmington now stands (Brinton). The Unami territory bordered the Raritan Bay with probably a part of the ocean further southward, the New York Bay and the lower part of the Hudson River, extending well into the present State of New Jersey.<sup>1</sup>

A number of the Lenape subdivisions were settled along the Delaware River and its affluents. This river was the favorite of the Delawares (Yates & Moulton), and was named by them the Lenape-Whittuck (or Whittituck), *i. e.*, the stream of the Lenape. To which of the three main portions of the tribe the various chieftaincies placed by different writers along the Delaware River belonged, has not been ascertained, but the probability is that most of those located between the Lehigh and Schuylkill Rivers were parts of the Unamis.

The numbers and names of the chieftaincies along the Delaware differ somewhat with different authors, and the locations given are, naturally, not as accurate as may be desired; nevertheless the data furnished by the different writers on the subject are not incompatible and enable us to obtain a fair idea of the native population in the Delaware Valley at the advent of the Europeans. The following list of chieftaincies, along and near the Delaware, from Cape May and the Delaware Peninsula to the northern limits of New Jersey, is constructed on the basis of the data furnished principally by John Smith, De Laet, Evelin, N. J. Vischer and N. Vischer's maps, Campanius, Acrelius, and Proud.<sup>2</sup>

<sup>1</sup> "When the Europeans first arrived at Yorck Island, the great Unami Chief of the Turtle tribe resided southward, across a large stream or bay, where Amboy now is" (Heckewelder MS., q. by Yates & Moulton, *Hist. of N. Y.*, p. 225). Ruttenber (*op. cit.*, p. 89 *et seq.*) gives the distribution of the subdivisions of the Unamis as follows: "The Navisinks or Neversinks, on the Highlands south of Sandy Hook; the Raritans, in the valley and along the river of that name; the Hackinsacks, in the valleys of the Hackinsack and Passaic Rivers, council fire at Communipaw; the Aquackanonks, on the site of Patterson, and probably in a portion of the centre of New Jersey; the Tappans, from the Hackinsack River to the Highlands on Hudson; and the Haverstraws, north of Tappans, up to the Stony Point."

<sup>2</sup> De Laet, *Novus Orbis*, Lib. III, 12, after T. Mickle, *Reminiscences of Old Gloucester, etc.*, Phila., 1845, p. 1; Evelin, in Beauchamps Plantagenet's *New Albion*, 1648, p. 20, also in Mickle, *op. cit.*, in Smith's *History of New Jersey*, 2d ed., and in Brinton's *Lenape*, pp. 41-42; maps of the Vischers (father and son), Amsterdam, 1656 and 1683; Reinier and Josua Ottens map (after N. Vischer), Amsterdam, 1740; Smith, Campanius, Acrelius, and Proud in works cited before.



*Indians along the Delaware Bay and River on the West.*<sup>1</sup>

Tockwoghs, over the central and upper portion of the Delaware Peninsula; John Smith, 1., Vischers's and Reinier's maps.

Kuscarawaogs, over the southern portion of the Delaware Peninsula, south of the Tockwoghs, John Smith, 1., over the lower (eastern) portion of the peninsula, Vischers's and Reinier's maps.

Atquanachukes, on the Delaware Peninsula, north of the Tockwoghs, John Smith, 1., to the north of the bend of the Delaware River below Philadelphia, Vischers's and Reinier's maps.

Minquas,<sup>2</sup> opposite Cohansey Creek; De Laet, 1.

Andastakas, on Christina Creek, Del., Acrelius, 1., Proud, 1.

Okahokis, on and between Ridley and Crum Creeks; Brinton (Lenape, p. 38), 1.

Sauwanoos, in Pennsylvania, in a little higher latitude than Philadelphia, Vischers's and Reinier's maps.

Neshaminics, in Buck's Co., Pennsylvania, Acrelius, 1.

Sasquesahanough, above and slightly to the south of Sauwanoos; Vischers's and Reinier's maps; about the Sasquesahanough River, northwest from the northern point of the Chesapeake Bay, John Smith.

Minquaas, above Sasquesahanough; Vischers's and Reinier's maps.

Konekatays, above Minquaas, a little south of Minsis; Vischers's and Reinier's maps.

*Indians along the Delaware Bay and River on the East.*

Kekemeches, a little above Cape May; Evelin, 1.

Sewaposees, Sewapois, on Maurice River; De Laet, 1., Vischers's and Reinier's maps.

Siconesses, about Cohansey Creek; De Laet, 1., Evelin, m.

Mandes, in Salem Co.; Proud, 1.

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<sup>1</sup> Abbreviations: m.=mentions but does not indicate location ; 1.=location given by the author.

<sup>2</sup> This name is a source of considerable confusion. The same term was applied to a branch of Indians further north, in Pennsylvania; and by an allied, if not the same term, Mengwe, the Lenape designated all the Iroquois.

Narraticons,<sup>1</sup> on the Raccoon Creek, De Laet, 1., apparently in Salem Co., Vischers's and Reinier's maps.

Ermomex, near Fort Nassau, Vischers's and Reinier's maps; Eriwoneck, on the Pensaukin Creek; Evelin, 1.; Arme-wamexes, on Timber Creek, De Laet, 1.; probably modifications of the same name.

Manteses, or Mantas, on Mantua Creek, Gloucester Co., De Laet, 1., Evelin, m., Proud, 1.

Asoroche, on Coopers Creek; Evelin, 1.

Schackamaxons, about Kensington, near Philadelphia; Proud, 1., Acrelius, m.

Kemkoekes, above Camden; Vischers's and Reinier's maps.

Mingoes, Acrelius, m.; Proud, m.; Mingnosees or Machoerentees, De Laet, m.; Maeroahkongs, De Laet, m.; possibly modifications of the same name; between Camden and Rankokas Creek.

Atrions, above the Mingoes, De Laet, m.; Axion, Evelin, 1., about Burlington; possibly modifications of the same name.

Amarongs, above Atrions; De Laet, m.

Rankokas (or Chichequaas, or Lamikas); Ramcocks; probably on the Rankokas Creek; De Laet, m.; Acrelius, m.; Evelin, 1. ("about four miles south of Burlington"), Proud, m.

Mantas<sup>2</sup>, about Burlington; Acrelius, m.; Campanius, m., Smith, 1.; Mattikongees, "above Atrions" (possibly the same with Mantas), De Laet, m.

Calcefars, above the "Axions," Evelin—possibly above Burlington.

Sanhicans, Sanhigans, near Trenton; N. Vischer's and Reinier's maps; De Laet, m.; Ruttenber, m.<sup>3</sup>

<sup>1</sup> Proud mentions "Narraticons" on the north side of the Raritan River.

<sup>2</sup> "The Mantas dwelt hard by Matiniconk" (Burlington Island), Brown's narrative in S. Smith's *Hist. of New Jersey*, pp. 100, 136. Campanius (*op. cit.*, p. 49) mentions that the part about Trakonick Creek is inhabited by the Manteese Indians, but it is uncertain to which creek and which branch of the Indians these names apply. For according to Brinton (Lenape, p. 45), "mante" and the allied terms are synonymous with Minsi and show an extension of the subtribe.

<sup>3</sup> The maps of Nicholas Vischer and Reinier-Ottens, place one branch of the Indians with the name of Sanhicans along and north of the Raritan, and another in the neighborhood of Trenton. On the map of N. J. Vischer of 1655 this latter branch of Sanhicans is not indicated. According to Acrelius, the Falls of Trenton were called, at the time of the purchase of the land by the Swedes, "Santican" by the Indians. Brinton believes (Lenape, p. 43) that the Sanhicans extend from near New York Bay to the Delaware shore at the Falls, and were undoubtedly Lenape.

Mosilians, at the Falls of the Delaware, Evelin; may have been identical with either the Sanhicans or Assunpinks.

Assinpinks, Assunpinks, probably on the Assunpink Creek, at or near Trenton; Acrelius, m.; Proud, m.; Calcefars, Mosilians (at the Falls), Evelin, 1.

Minnesinks, above the forks of the Delaware River; Acrelius, 1., Proud, 1.

As to the natives in the immediate vicinity of the Falls of the Delaware or on the site of the present town of Trenton, we find a further interesting note in Yates & Moulton (*Hist. of N. Y.*, p. 225), who quote from a Heckewelder manuscript.<sup>1</sup> The Delawares say, according to Heckewelder, that "Chichohacki" was "a place on the east side of the Delaware River above Philadelphia, at or near a great bend, where the white people have since built a town, which they call Trenton. Their old town was on a high bluff, which was always tumbling down; wherefore the town was called Chichohacki which is, the tumbling banks, or falling banks." Captain John Smith on his map (1609) located "Chikahokin" near where Wilmington now stands (Brinton). Loskiel<sup>2</sup> mentions that the Delawares lived "about Trenton," but does not enter into any particulars. The local historians of Trenton have thus far largely avoided the question as to the predecessors of the whites in that location.

Having shown the distribution of the Lenape in the Delaware Valley, including the region from which came the osteological material to be here described, it would be very desirable if, before proceeding with the description, we could adduce a few historical notes as to the length of the time the Lenape were settled in that valley, and as to any possible predecessors of the Lenape in that region.

The Lenape did not consider themselves autochthonous to the country in which they were found by the first Europeans; on the contrary, they preserved a comparatively clear tradition of a not very remote immigration of the tribe into those

<sup>1</sup> Heckewelder's Communication to Dr. Miller, 1800; among the MSS. of the New York Historical Society; see also Mickle, *Reminiscences of Old Gloucester*, p. 1.

<sup>2</sup> *Mission of the United Brethren among the Indians*, London 1794, I, p. 124.

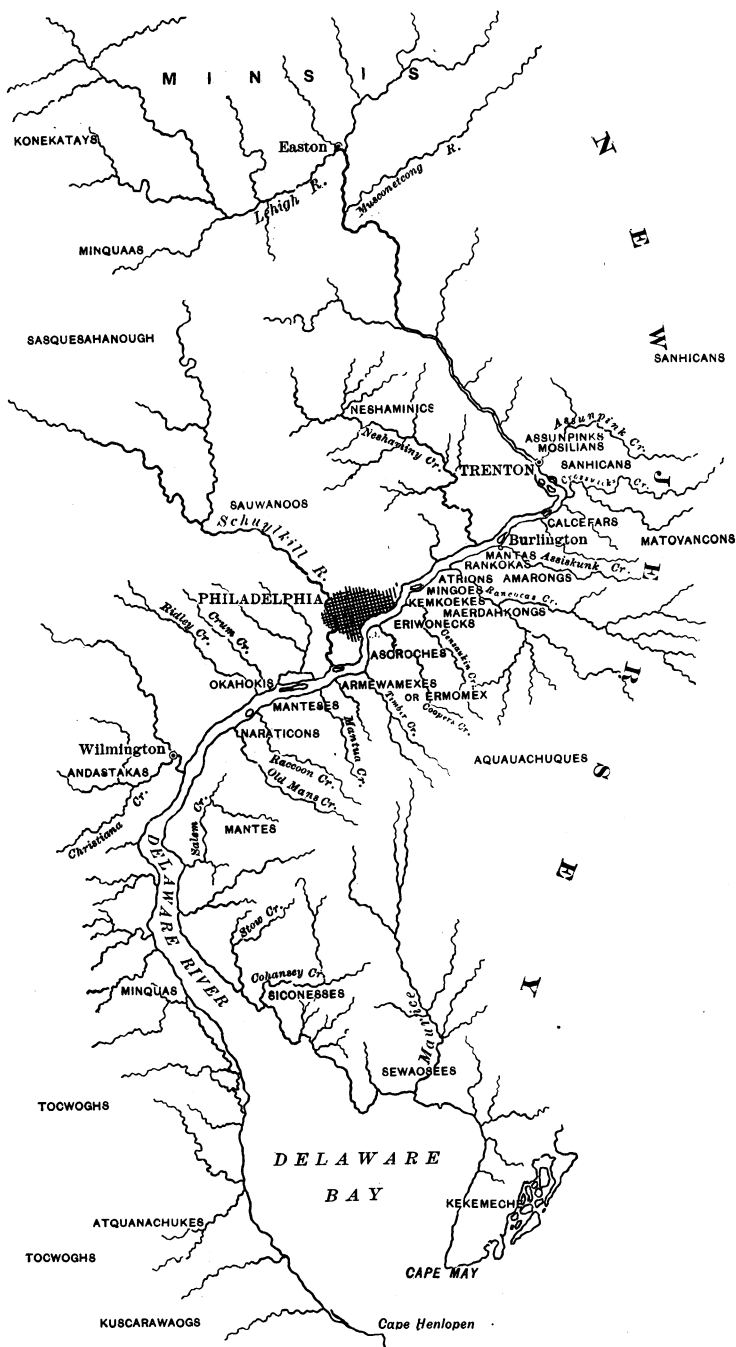


FIG. 4. Map showing the distribution of the Indians in the Valley of the Delaware River and the neighboring country on the arrival of the whites. (Drawn by the author.)

regions. Two separate and independent versions of this tradition were preserved to us by Heckewelder<sup>1</sup> and by Rafinesque, according to Brinton.<sup>2</sup> According to these traditions the Lenape lived originally in a distant country, west or northwest, and much beyond the "Namaesi Sipu."<sup>3</sup> From some cause they undertook a long migration eastward. A part of the tribe, together with the Mengwe, crossed the "Namaesi Sipu," conquered the "Alligevi," settled in towns to the east of the river, and for a long period occupied their and the adjacent country, the Lenape living to the south of the Mengwe. The Lenape hunters eventually discovered the Susquehanna, and then the ocean, the Delaware and Hudson Rivers. Returning, they reported the land to be without enemies, and emigration of a part of the tribe into the new-found territory soon followed. The absence of enemies or "snakes" is stated in both Heckewelder's narrative and Rafinesque's Wallam Olum; nor is there even the slightest allusion in either of the traditions of further Lenape history to any inhabitants of the country not enemies, or to any neighboring tribes. Furthermore, there is no sign that the Lenape language in New Jersey has undergone any marked modification, which would be very liable to happen had they joined some indigenous tribe. These circumstances make possible but one conclusion, which is, that the territory between the Susquehanna and Hudson and from the heads of these rivers to the sea, at the time of the Lenape emigration into the same, was not peopled.

The date of the arrival of the Lenape in the Delaware Valley can be grossly computed from the Wallam Olum, *i. e.*, from the number of chiefs reported in that record as having lived in the country from its occupation by the Lenape to the advent of the whites. According to H. C. Mercer,<sup>4</sup> "if we give twenty years to a chief's reign, the date of the first

<sup>1</sup> Hist., Manners and Customs of the Indian Nations, Phila., 1819, Mem. of the Hist. Soc. of Penn., XII, 1876, p. 47 *et seq.*

<sup>2</sup> C. S. Rafinesque MS., 1833; Brinton, The Lenâpé, Phila., 1885, p. 162 *et seq.*

<sup>3</sup> Generally, and to all appearances correctly, taken for Mississippi. Brinton, in his peculiar interpretation of the Wallam Olum of Rafinesque, thinks that the river meant by "Namaesi Sipu" may have been the St. Lawrence (*op. cit.*, p. 165), or even the Delaware (p. 37); it is difficult to discover anything in the legends as reported to justify any such opinion.

<sup>4</sup> An Ancient Argillite Quarry and Indian Village Site on the Delaware, p. 6.

coming of the Lenape would have been about 1387. This agrees fairly with what a Lenape told the Rev. Charles Beatty in 1767.<sup>1</sup> When counting beads on a wampum belt as years, according to tribal custom, he said that his people had come to the Delaware 370 years before, or in 1397." These data are scanty enough, nevertheless their agreement may be of some significance.

When the Lenape arrived in the Delaware Valley, they must have been in a more or less advanced stage of their arts and industries; they were the victors over the Alligewi, have occupied their country, and associated with the Mengwe. The Lenape have not evolved, though they may have improved, their arts and industries in New Jersey. Judging from this and the in no way extraordinary stage of culture of the tribe at the arrival of the Europeans, we ought to find in the Delaware Valley signs of a prolonged Indian industry of a fairly uniform character. If we take furthermore into consideration the uninhabited state of the country in which the Lenape arrived, and the absence of indications of any great racial admixture in the tribe during its migrations, we may also expect to find in the valley the remains of a fairly uniform physical type of people.

The questions arising from the actual finds concerning the native industry in the Delaware Valley belong to Archæology, and will be not here touched upon, nor allowed in any way to influence this paper.

As to the physical type of people in the valley, the above assumption is largely realized. The material at hand shows, with some exceptions, a considerable uniformity. The crania belonging to this prevalent type approach closely those of Lenape and may be safely considered as having belonged to individuals of that tribe.

But, among the specimens I have examined, there are at least two crania of a widely different type from any of the others. They are of a type which not only is unique in the regions ever occupied by the Lenape, but one of which I have

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<sup>1</sup> Charles Beatty, *Journal of a Two Months' Tour West of the Alleghany Mountains*. London, 1868, p. 27.

as yet found no counterpart among American crania. These skulls can not be considered as individual deviations from any of the known eastern types and must be kept apart for further identification. The specimens are the "Burlington County" and "Riverview" crania. They were found in locations twelve and a half miles apart, and the first was discovered twenty years before the second, in an accidental way, by a different individual. One of the skulls is that of a male, the other that of a female, both of adult, yet not very aged individuals, both well developed and free from conditions that might be the causes of pronounced deformity, and free from all artificial deformation. Both skulls are much alike in their distinctive features, which fact very much strengthens the probability of their belonging to a different racial type from that of the Lenape. These features will be shown in the measurements and descriptions.

#### DESCRIPTION AND MEASUREMENTS OF CRANIA.

##### *Description of the Lenape Skulls and Allied Specimens Collected by Mr. Volk (Pl. I-IX).*

The majority of the crania of these two series (considering the American and Peabody Museums' parts of the collection as one) are those of females. A considerable number of the specimens are in a more or less imperfect or fragmentary condition, nevertheless the material permits a fairly satisfactory description as well as a quite good series of measurements.

Almost all the crania from both sources are of a rather small or moderate size. Two of them (57785, 57793, Peabody Museum) show a slight artificial occipital compression, none any pathological deformity. The bones in the specimens collected by Mr. Volk are in various stages of preservation, but mostly very fragile; one calvarium shows some superficial fine scaling. On none of the skulls examined have there been found any stains of copper or pigment.

The majority of skulls of the two series here considered are distinctly of one clear type. Besides these there are several

crania among those collected by Mr. Volk (57783, '85, '87, '89, '93, Peabody Museum) which differ from the others mainly in the relative length and width. The crania of the prevalent type show a moderate to extreme dolichocephaly, while the exceptional specimens are moderately to quite markedly brachycephalic. It is an interesting circumstance that all these relatively short and broad skulls are those of males; another peculiar feature is their frequency in the region about Trenton. These facts make it probable that the brachycephalic skulls belong to Indians of a somewhat different physical type from that of the Algonquins which include the Lenape. Such a type, our collections show us, was common in prehistoric and possibly early historic times in the west and particularly the southwest of New Jersey. The frequency of the relatively short and broad male skulls about Trenton, unless accidental, may be the result of a fight in this location, one of the contending parties in which belonged to a brachycephalic people. It is not due to a local conquest, for in that case we should also find at least a certain proportion, if not a preponderance, of brachycephalic females. Marriages of strangers into a tribe or an adoption of captives will introduce new physical types, but in cases of that nature the new type remains usually an exception and a comparative rarity both among the living and skeletons. Further explorations about Trenton will undoubtedly aid us in deciding the question.

*Description of the Dolichocephalic Skulls.*—The crania of this type are generally of a fair height. The face and nasal aperture are comparatively narrow, the orbits small and *rather low*.

Not one of the skulls is above the average in weight or thickness.

All the crania show a pronounced alveolar and moderate facial prognathism.

The lower jaw, where preserved, is quite high, but not very angular or massive; the chin is usually moderately prominent.

The dental arches are generally regular, the teeth of medium size, ordinary form, and often more or less worn off. No



dental anomalies were found. The palates are mostly parabolic in form, regular, and quite, though never excessively, spacious.

The nasal aperture is generally pyriform, its lower border less sharp than in whites; in one of six female crania there are moderate prenasal gutters, in two, moderate fossæ. The spine is in the mean less pronounced than in the whites, but it varies; the nasal bridge is of ordinary width and but a moderate height, nasion depression in the females shallow, in the males submedium to quite marked.

The infraorbital fossæ are in some cases shallow, in others well pronounced. The malars are never very prominent, the zygomæ seldom more than moderately strong and expanded.

The orbits approach mostly the rectangular form; their borders are usually quite sharp. The interorbital septum varies from 2.2 to 2.4 cm. in the females; it measured 2.65 cm. in one of the male skulls.

The glabella is generally moderate, more or less convex. The supraorbital ridges are developed mainly, and in the females only, in their median portions, near the glabella; in this location they are usually fairly well marked in the female crania. They were very pronounced in one of the male specimens examined, and moderate to well developed in the others.

The forehead is generally of a moderate height and fairly well arched; where, however, the glabella and supraorbital ridges are more pronounced, the forehead tends more or less to slope backward. The diameter frontal minimum varied in the specimens measured by me from 8.2 to 9.5 cm., the diameter frontal maximum from 10.4 to 11.7 cm., the nasion-bregma arc from 11.4 to 13.4 cm. (or 33.7 to 37.3 per cent. of the total arc from nasion to opisthion).

The sagittal region shows mostly a slight, occasionally a marked elevation. The parietal bones in the females are rather small, but well defined; they are larger, but not very prominent, in the males. The temporal ridges pass mostly slightly under the middle of the parietal bones; in a few instances they reach the middle or slightly above.

The temporo-parietal regions of the dolichocephalic skulls are generally more or less flat; the occiput varies from a medium to a considerable prominence, the more prominent forms preponderating.

The bregma-lambda arc was found to measure from 11.3 to 13.3 cm., the lambda-opisthion arc from 10.2 to 11.9 cm. (respectively from 31.7 to 37.3, and from 28.9 to 31.9 per cent. of the total arc from nasion to opisthion).

The base could be well examined in only a few instances. The foramen magnum is generally of a moderate size (diameter antero-posterior, in 3 cases, 3.5–3.7 cm.; diameter lateral maximum, in 5 cases, 2.8–3.25 cm.). The plane of the foramen is somewhat less inclined forward than in the whites; prolonged forward, it is met, at right angles, by a line from the nasion, from 2.5 to 4.0 cm. below the same.<sup>1</sup> Of the two jugular foramina, one, mostly the right, is usually larger than the other. The styloids, where preserved (four cases), were generally more or less slender and ranging in length from 0.5 to 3.0 cm. The petrous portions are generally at or slightly below the level of the surrounding parts of the base, and not sunken within these as in whites. The middle lacerated foramina are of submedium to small size, never attaining the size common in whites.<sup>2</sup> The glenoid fossæ are generally well proportioned.

The sutures in most of the crania of this series show a rather simple serration. Obliteration, where it could well be observed, was distributed as follows:

Skull No. 225, Field Columbian Museum: synostosis in the coronal suture, on both sides but more on the left, below the crossing of the suture by the temporal ridges.

Skull No. 227, Field Columbian Museum: in most of the coronal and parts of the sagittal suture.

Skull No. 228, Field Columbian Museum: in coronal suture below the ridges; also in parts of the sagittal, lambdoid, and left temporo-occipital sutures.

Skull No. 2, collected by Volk, now in the American Museum

<sup>1</sup> In the whites, the plane reaches in most cases from 2.0 to 3.5 cm. below the nasion. See also Topinard, *Élem. d'Anthrop.*, 1885, p. 811 *et seq.*

<sup>2</sup> Concerning these characters see *Science*, Feb. 22, 1901, p. 309.

of Natural History : in whole coronal and the anterior half of sagittal suture; (lambdoid suture damaged).

Skull No. 6, collected by Volk, now in the American Museum of Natural History: in most of coronal, whole sagittal and superior two thirds of lambdoid suture.

Apparently the coronal suture participates in the ossification as early, if not earlier, than the sagittal, and in advance of the lambdoid suture.

The pterions are in all cases of the H form (spheno-parietal articulation), but mostly quite narrow.

Wormian bones are rather scarce. In four out of nine specimens that can be thoroughly examined for this purpose there are no Wormian bones at all: of the remaining, in No. 225 there are but two small Wormians in the lambdoid and one in the masto-squamous notch on the right side; in No. 226, one Wormian bone of a moderate size in lambda, one smaller in each temporo-occipital suture, and two small ones in the left squamo-mastoid angle; in No. 228, one small Wormian in each asterion; in 2, a small epipteric bone on the left side; and in 8 three small Wormians in the lambdoid suture.

The parietal foramina are both absent in 3 out of 9 cases where it is possible to examine for them; there is but one present in four cases, and both present in two instances. With one slight exception the foramina are all small. The retro-mastoid foramina, also, are in most of the skulls small.

*Notes on the Brachycephalic Skulls.*—All these crania show a good height, rather superior than inferior to that of the dolichocephals. Two of the specimens, as mentioned before, show a slight degree of occipital compression; the narrower Algonquin crania are generally free from this deformity. The occiput in the undeformed specimens is quite round, the temporo-parietal regions full. The facial parts are mostly broken and not fit for any comparison. Each of the better-preserved skulls shows one to several small to moderate-sized Wormians; No. 57793, Peabody Museum, has a large, rounded bregma bone (3.5 cm. x nearly 3.5 cm.). Thickness and weight of bones normal.

A comparison of the here described Lenape (Field Columbian

Museum) skulls and those of similar type collected by Volk, with crania from various localities in the States of New York and Massachusetts that have been occupied by tribes other than the Iroquois, shows a considerable general agreement among all in both the form and measurements. All these tribes belonged apparently to one and the same physical Indian type, characterized by dolichocephaly, rather a narrow face, mesoseme to microseme orbits, mesorhiny and meso- to prognathism). With additional material it ought to be easy to define this type precisely, and once clearly established we shall be able gradually to trace not only its whole distribution, but possibly also its earlier location on this continent. The admixture of the short-headed element was apparently small, except perhaps in the Trenton district, and can be quite easily separated. (For detail measurements of the skull see tables.)

*Description of the Bones from the "Deep Burials" on Dr. Abbott's Farm.*—The lot consists of parts of at least five skeletons; many of the bones are badly decayed and others are broken. There are six pieces of skulls, besides some smaller fragments, belonging probably to five crania. No one of the pieces is large enough to afford any measurements or any definite conception as to the original size or shape of the skulls. Three of the pieces appear to have belonged to masculine and rather broad crania; a fourth piece is a small, narrow parietal, that apparently formed a part of a relatively longer and narrower feminine skull; a fifth piece is a portion of a parietal which also may have belonged to a narrow skull; the sixth piece allows of no conjecture. Taking into consideration the small size of the pieces and the possibility of some warping, all further conclusions drawn from their appearance would be largely guesswork without much value. The majority of the pieces of the long bones show that these belonged to rather strong individuals of a good stature. The femora show a pronounced flattening of the shaft near the upper extremity, and in this as well as other characters they equal the Lenape femora (see Table of Measurements and Notes on Long Bones).

*The piece of frontal bone* which Dr. Abbott reported as found in the gravels, and which is now in the Peabody Museum (No. 47865), is well preserved, though apparently very largely devoid of organic matter. The bone shows a pronounced yellowish and reddish discoloration, such as was noticed on the fragment of parietal bone found by Volk on a recent talus of gravel, but on no other crania or bones described in this paper. The surfaces of the bone show a little scaling, but no injury; the borders of the fractures, however, are in places somewhat obtuse, and a part of the coronal border shows some rubbing, with a few remaining striæ. Morphologically the bone is not very instructive. It was certainly a small frontal, with a low and somewhat sloping forehead, but there are very similar frontal bones in some of our quite recent Indian crania. The supraorbital ridges were of a medium prominence and developed mainly near the glabella. Thickness of the bone varies from five to six millimeters, which is nothing unusual.

*The fragment of lower jaw* found by Dr. Abbott in the gravels in the railway cut shows an inclination to massiveness and a prominent chin. The piece of a temporal bone found by Dr. Abbott in the same location presents nothing extraordinary; the mastoid is of a medium size. Both these pieces show blunt edges and some minor injuries. The discoloration is darker than in the above-described portion of the frontal bone and more grayish than yellow.

*The tooth* found by Dr. Abbott "in the gravels" is an ordinary human third molar, of a moderate size and with two roots, almost wholly united. The enamel is not cracked or vitreous. The dentine is of a straw-yellowish color, sound, and showing a considerable polish. The roots were artificially bevelled into the form of a quadrilateral pyramid. If this tooth is ancient, it must have been embedded in some matrix exceedingly favorable for its preservation.

In finds of the nature of those just described, unless, as can hardly be expected with small pieces of bone, they present some very remarkable indication of zoölogical inferiority or superiority, somatology must of necessity take a

secondary place and be only supplementary to careful geological observations.

*Description of the "Gasometer" Skull* (No. 14635, Peabody Museum, Pl. X-XIII). — This specimen is remarkable on account of its small size, an unusual thickness of the bones composing its vault, and a number of characters indicating rather an inferior development. The cranium is that of a female in advanced adult life. The face and the left side are much injured, nevertheless it can be seen that the whole skull was symmetrical and without any deformity.

The surface of the skull shows a number of small depressions, such as could be produced by moderate knocks, and on the frontal and occipital bones some scaling off of the external layer of the bone has taken place. There are no scratches or larger contusions. The structures of the base are very well preserved with the exception of the basilar process, which is separated from the sphenoid by a fracture. There is no lower maxilla. Of the superior maxilla only portions of the walls of the antra remain: the nasal and malar bones are lost almost entirely. All the breaks are quite sharp and appear fresh. The cells of the ethmoid are largely exposed and their thin walls are well preserved. One of the cells is filled with gray earth, and traces of the same are found in other locations. On each temporal (above the zygoma root on the right, above and behind the mastoid on the left), and on the left parietal, near the parietal foramen, is found a small greenish spot, looking like a copper stain.

The remaining parts of the face show that this was not very high or broad. The orbits were of a high mesoseme or a low megaseme index and of an ordinary depth (4.3 cm.). The orbital borders are sharp. The interorbital distance is unusually great, namely 2.75 cm., or 28.8 per cent. of the diameter between the malo-frontal sutures on the orbital border. The nasal bones were apparently somewhat thickened. Nasion depression shallow. Naso-frontal suture in a state of advanced obliteration. Glabella moderate; supra-orbital ridges only near glabella, small.

The forehead is low, but not sloping, and uniformly con-

vex. The nasion-bregma arc measures 11.95 cm. (33.7 per cent. of the nasion-opisthion arc), the diameter frontal minimum 9.4 cm., the diameter frontal maximum near 11.3 cm.

The parietal and occipital bones show but moderate bulging. The temporal ridges are very well marked, more so than in any of the other crania examined. The upper boundary of the ridges reaches on each side nearly to the middle of the parietal. The occipital ridges and depressions are also unusually well marked for a female cranium. The pterions are in the form of a narrow H and are very near the posterior orbital walls (small extent of the frontal bone). Parietal foramina, one on each side, of ordinary size and location. Bregma-lambda arc 12.7, lambda-opisthion 10.85 cm. (respectively 35.8 and 30.6 per cent. of the whole arc from nasion to opisthion).

The temporal regions are quite flat. The zygomæ were apparently of a fair strength, though not massive. The mastoids are above the average in size and strength for a female, though not up to the average of those in males.

The sutures show an extremely simple serration, not equalled, though approached, in the other skulls examined. Most of the coronal and the whole sagittal suture are obliterated, but there are only traces of ossification in the lambdoid and temporo-occipital sutures, and none in the temporo-parietal and spheno-temporal articulations. There are no Wormian bones.

The thickness of the parietal bones ranges from 8.5 to 9.5 millimeters; the frontal bone is slightly thicker, the occipital bone, except in the median line, slightly thinner. Both the compact and cancellous layers are well preserved and seem to share proportionately in the thickening. There is no osteoporosis, nor any condensation of the bone. The weight of the skull is not excessive (15½ oz. or 432 grams).

The ventral surface of the skull shows but a few impressions of the brain convolutions; this feature is common in Indian crania. The anterior clinoids are stout; the sella turcica is quite large, but appears normal. Dorsum sellæ broken; on

[*January, 1902.*]

its base, in the middle, is a 7 mm. long and 4 mm. high, sharp elevation.

The base of the skull shows no deformity and its structures show but very little, if any, thickening, or effects of the same. All the foramina are rather submedium in size, a feature found not infrequently in individuals of small stature. The foramen magnum is of a regular, somewhat lozenge-shaped outline; its antero-posterior diameter is 3.2, maximum lateral diameter 2.55 centimeters. The plane of the foramen is somewhat more inclined backwards than in whites; a line from the nasion meets a prolongation of the plane forward, at right angle, 3.45 cm. below that point. The styloids, as well as the vaginal and spinous processes, are fairly well developed and preserved. Glenoid fossæ of ordinary dimensions. Petrous portions of the temporal bones are on a level with the surrounding parts, and the middle lacerated foramina are very small—both characters of an inferior cranial development. We find on each side an incomplete pterygo-spinous foramen. The pharyngeal tubercle is well marked. There is no sinking in of the base around the foramen magnum.

To diagnose the exact ethnic character of this specimen is a problem full of difficulties. In the first place, it is the cranium of a female, the sex in which the racial differences are generally less pronounced than they are in the males; in the second place, the skull can hardly be considered a normal one, which must of necessity add to the uncertainty of its classification. All that may be said positively is that in its general form, as well as in its main measurements and indices (*q.v.*), the "gasometer" skull approaches much more the crania of the Lenape than it does those from Burlington County and Riverview Cemetery; in fact it has nothing in common with these latter. The numerous exceptional characteristics which the "gasometer" skull shows, such as its low capacity, thick walls, small frontal region, large interorbital space, etc., are all well within the scope of individual variation and of themselves of but little racial significance. It seems to me equally impossible to positively declare that the skull either is or is not a Lenape skull; the main part of the



craniological evidence, however, favors more the former than the latter assumption. (Compare figs. 1 and 2, Pl. XXII.)

*Description of the Burlington County Skull* (No. 19513, Peabody Museum; Pl. XIV-XVII).—This cranium is that of a female, fully adult but not very advanced in age. The skull is very symmetrical, and in no way deformed or diseased. The bones are thin, but of considerable hardness. A slight warping causes a partial opening of the right coronal and temporo-sphenoidal sutures. The bones apparently retain some animal matter. Their surface has suffered a considerable scaling off, but as yet the diploë is not visible. The facial parts are much damaged, the superior maxilla being almost entirely absent. The mastoids are broken and the bone above them, particularly on the left side, shows numerous perforations; there is, however, no indication that these latter are pathological. The lower part of the occiput is damaged, and the sphenoid body broken across in front of the basilo-sphenoid articulation, but these injuries have not affected the form of the skull. There is no unnatural depression of the region about the foramen magnum. The right squama shows a small perforation, probably a recent injury; the bone exposed is almost throughout scaly. There are no scratches now visible on the surface of the skull, but such may have existed and disappeared with the outermost layer of the bones. There are no discolorations with the exception of a peculiar, narrow, regular band, lighter than the neighboring bone, that obliquely encircles the whole cranium. It seems that some narrow, firm band had been tightly applied to the head or skull and there left its impression.

The skull has very marked peculiarities of form, visible at the first sight. It is unusually low throughout its whole extent; the outlines of its planes are rounded, not angular; and the portion of the specimen behind a vertical plane passing through the auditory meati exceeds quite markedly the portion anterior to the same.

Of the face enough is left to show that it was very narrow, and the malars, both preserved, are even less prominent than

those which we find in an average white female skull. The orbits are megaseme, their borders quite sharp, their angles rounded; depth 4.0 cm. The nasal bridge, well preserved, is of a fair height, slightly concave in its upper half, and not very broad. Nasion depression moderate. Glabella large, of medium convexity. There are no supraorbital ridges proper, but we find an elevation on each side of and adjoining the glabella. The interorbital septum measures 2.4 cm. (24.6 per cent. of the line between the orbital ends of the malo-frontal sutures).

The forehead is very low, though not sloping. Diameter frontal minimum 9.3, frontal maximum 11.6 cm.; nasion-bregma arc 11.6 cm. (33.2 per cent. of the total arc from the nasion to opisthion).

The parietals show considerable, quite uniform convexity from above downward and slightly less so from before backward. The sagittal region is but very slightly elevated. The bregma-lambda arc measures 11.8 cm. (33.8 per cent. of the arc from the nasion to opisthion). There is only one parietal foramen (right), of moderate size. Temporal ridges were not high and are almost totally imperceptible.

The occipital region is quite full and not protruding; the right side is very little more prominent than the left. Occipital ridges and depressions very faint.

The temporal regions show a moderate bulging. The squamæ are low. The zygomæ are quite slender.

Pterions of H form, rather narrow.

The sutures show as yet no traces of ossification. Their serration is superior to that in any of the Lenape skulls. A distinct serration is seen in the posterior third of the temporo-parietal sutures, which is uncommon. There are no Wormian bones.

The base of the skull is rather flat. The foramen magnum is quite large, measuring 3.8 cm. in its antero-posterior and about 2.9 cm. in its maximum lateral diameter. The plane of the opening, if extended forward, would pass only about one centimeter beneath the nasion. The processes are low, the foramina of moderate size except the foramina ovale, which are smaller than average in female crania. The styloids are

broken; they were, particularly the left, very slender. The glenoid fossæ are of a fair depth, the right being slightly more spacious than the left.

The ventral surface of the skull shows but a few and shallow impressions of the convolutions; it is scaling off similarly to the outer surface. Thickness of the left parietal 3 to 4 millimeters.

The differences between this specimen and the various Lenape and eastern crania, as shown by the inspection, are even more plainly indicated by the principal measurements and indices (see tables). The most characteristic features of the specimen are its considerable breadth coupled with excessive narrowness of the face; its extremely small hight, which is visible even if we compare the auriculo-bregmatic instead of the basi-bregmatic hights, and which gives rise to very low hight-length and hight-breadth indices; and the megaseme character of its orbits. Differences of such a nature and so many in number are totally beyond the scope of individual variation. When found in a normal skull they can only represent racial features. In this case they effectually separate the Burlington County cranium from all those described before in this paper.

*Description of the Riverview Cemetery Skull* (No. 44280, Peabody Museum; Pl. XVIII-XXI).—The cranium is that of a male about fifty years of age. It is somewhat damaged, but fortunately enough is preserved of the face as well as the vault for almost all the more important measurements. The skull is normal with the following exceptions: there is a slight depression backward of the left lower portion of the face, and the angle between the plane of the posterior nares and the basilar process is somewhat more acute than usual; the left border of the foramen magnum is somewhat irregular; and on the left side the upper half of the border of the occipital is situated somewhat higher than that of the parietal bone. The left mastoid is also situated a little more posteriorly than the right, all of which shows some disturbance in the development of the inferior portion of the left side of the skull. These defects, however, have not been of a serious enough

character to affect the general conformation of the skull, and the vault as well as other parts are symmetrical.

The surface of the skull shows a large abrasion on the left parietal and several cuts, such as could be made with the edge of a not very sharp shovel, on the left parietal bone; a considerable and deep scaling, particularly over the frontal and left parietal regions; and two dark and greenish discolorations of oval shape about 2.0 cm. in the longer diameter, situated one on the left squama behind the pterion and one near the middle of the right squama and on the parietal bone adjoining. Both squamæ and the occipital bone show deficiencies caused by injuries.

Inspection as well as measurements show the Riverview skull to be very closely allied to that from Burlington County and with this to differ radically from all those described in this paper. The Riverview skull presents similar rounded outlines of its planes, similar low height, narrow face, and megaseme orbits, as that from Burlington County. The differences between the two are only slight and such as are commonly met with in the two sexes.<sup>1</sup>

The face in the Riverview skull is orthognathic, but this is undoubtedly due somewhat to the previously mentioned backward depression of the facial parts. The alveolar process, fairly well preserved, presents also but little slanting. The alveolar arch is regular and not massive; it is rather low (alveolar point to nasal border 1.85 cm.), but not very narrow (maximum external width 5.6 cm.). The alveoli of the second incisors and those of all the molars are largely obliterated. Judging from the size of the remaining alveoli, the teeth must have been of a rather submedium size; their number and position were normal. The palate is symmetrical and pre-

<sup>1</sup> The peculiar features of these crania were well recognized by Professor F. W. Putnam as early as 1888, and are also acknowledged by Dr. Russell in his paper on the Human Remains from the Trenton Gravels (pp. 148-150). Dr. Russell wrote under the difficulty of very insufficient material, which circumstance had undoubtedly influenced his final conclusions. Prof. Putnam's remarks, made after the presentation by Mr. Volk of the Riverview Cemetery specimen to the Peabody Museum, are as follows (Peab. Mus. Rep., v. IV, No. 2, 1888, p. 35): "This human skull (the Riverview specimen) is small, and of a remarkable form and agrees with two others (Burlington Co. and "Gasometer" skulls) which we have from New Jersey, one of which was certainly from the gravel. These three skulls are not of the Delaware Indian type and there is considerable evidence that they are crania of the palæolithic people of New Jersey."

sents nothing extraordinary; its length, from the alveolar point to the end of the spine (which is small) is 4.8 cm., its maximum width 4.1 cm., height, in front of the first molars, where the bone has suffered but little change, 1.45 cm. Posterior nares regular, slightly wider near the palate than above; height, in middle, 2.9, width, in middle, 2.6 cm.

The nasal aperture is regular, of a pyriform shape and with sharp borders; there are two small prenasal fossæ. The nasal index shows a low mesorhiny.

The suborbital fossæ are well marked. The molars are not massive and show no prominence, except directly above the just named fossæ.

The orbits are of moderate size and megaseme index; they approach the quadrangular shape; borders quite sharp, depth 4.4 cm., interorbital septum 2.65 cm. (27.5 per cent. of the line between the orbital ends of the malo-frontal sutures).

Nasal bridge slightly submedium in height, moderately wide. Glabella quite prominent, and the same is true of the ridges, which extend above the median halves of the orbits.

The forehead is low, but not sloping. Above the supraorbital ridges the frontal bone shows a moderate depression, which in the present state of the specimen is accentuated by the scaling of the outer table of the bone. Frontal eminences ordinary. There is a persistence of the metopic suture. Diameter frontal minimum, 9.6, diameter frontal maximum 12.6 cm.; nasion-bregma arc 12.1 cm. (32.1 per cent. of the total nasion-opisthion arc).

The parietal bones show nothing unusual. The eminences are not prominent. Temporal ridges low, scarcely traceable. No parietal foramen. Bregma-lambda arc 14.0 cm. (36.8 per cent. of the nasion-opisthion arc), showing a considerable antero-posterior development of the bones.

The occipital bone shows on the left side above the superior ridge a moderate bulging, which produces the before mentioned somewhat greater elevation of the superior half of the occipital over the adjoining parietal border on that side. The superior occipital ridge and inion elevation are well marked.

The temporal regions show a moderate bulging. The

squamæ are quite low. The zygomæ were apparently of only moderate strength. Styloids masculine, not very massive.

Base of the skull: The foramen magnum is, as already stated, slightly irregular; its size is moderate (diameter antero-posterior 3.65, diameter lateral maximum 3.2 cm.). There is no depression of the bones about the foramen. The plane of the foramen, prolonged forward, passes 1.2 cm. beneath the nasion. The posterior condyloid foramina are obliterated; the remaining openings in the base present nothing unusual. The processes, including the styloids, are all well developed. The petrous portions are but slightly sunken below the level of the surrounding parts, the middle lacerated foramina are smaller than in average whites. Glenoid fossæ fairly deep.

The sutures of the skull show a fine, not very deep serration. Obliteration is noticeable only in the sagittal suture, at vertex and about obelion, and at a point in front of the pterion, on the left side in the coronal suture. The pterions are of the H form, but quite narrow. There are no Wormian bones.

#### CONCLUSIONS.

Although the material reported upon in this paper is not all that could be desired, nevertheless the examination of the same has brought out quite clearly a number of points, which can be briefly summarized as follows:

1. The bulk of the crania and bones from the Delaware Valley and Trenton are those of the Lenape.

2. The racial identity of the bones from the deep burials on Abbott's farm is uncertain, but they approach in several ways the bones of the Lenape.

3. The Abbott gravel finds (fragments) give no indication as to their racial character.

4. The Burlington County skull and that from the River-view Cemetery at Trenton are both of a type which is totally different from that of the Lenape, or any other Indians from the East or elsewhere of which thus far we have any knowledge.

It is not my purpose to enter into a speculation as to the antiquity of these two skulls; the gathered facts permit,

nevertheless, a few simple logical deductions bearing upon this point. The skulls belong to another race than the Lenape or any of the eastern Indians,—of that there can be no possible doubt. They might be extraneous skulls, those of captives or visitors of the Lenape, but if we consider that supposition, we are totally unable to trace their descentance. Low crania occur only among the far distant Apache, but there the low height is associated with a strong, broad face and other distinguishing features. If not intrusive, the crania must be those of a people that preceded the Lenape in the Delaware Valley. This last hypothesis would be greatly strengthened by any succeeding finds of crania of a similar character.

Should the existence of a pre-Lenape race in New Jersey become established as a fact, then can be approached the problem of the antiquity of such a race, a problem almost wholly one of geology.

It may be added that all the crania described in this paper differ widely from those of the Eskimo (nor can I recollect a single important somatological fact, from my investigations or those of others, which would support the theory of a pre-historic occupation of any of the eastern States below the St. Lawrence River by the Eskimo). Both the Lenape and the Burlington County and Riverview skulls are also easily differentiated from any skulls of the whites. Low crania are found among the Basques, but there is not the slightest trace in history of any of these people ever having lived in the Delaware Valley.

The detail measurements of the various crania treated of in this paper will be found in the following tables; and in order to facilitate the study of the region from which came the skulls here described from an *archæological* standpoint, I append a special bibliography.

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LENAPE SKULL (No. 225, FIELD COLUMBIAN MUSEUM). ANTERIOR VIEW.





LENAPE SKULL (NO. 226, FIELD COLUMBIAN MUSEUM). ANTERIOR VIEW.







LENAPE SKULL (No. 226, FIELD COLUMBIAN MUSEUM). LATERAL VIEW.





LENAPE SKULL (No. 227, FIELD COLUMBIAN MUSEUM). LATERAL VIEW.





LATERAL VIEW OF A FEMALE SKULL FROM THE LOW LANDS, TRENTON (A. M. N. H.).





LATERAL VIEW OF A MALE (?) SKULL FROM THE LOW LANDS, TRENTON  
(AM. MUS. NAT. HIST.).







LENAPE SKULL (NO. 225, FIELD COLUMBIAN MUSEUM). SUPERIOR VIEW.





LENAPE SKULL (NO. 227, FIELD COLUMBIAN MUSEUM). SUPERIOR VIEW.





A PRONOUNCED DOLICHOCEPHALIC SKULL FROM THE LOW LANDS, TRENTON  
(AM. MUS. NAT. HIST.). SUPERIOR VIEW.

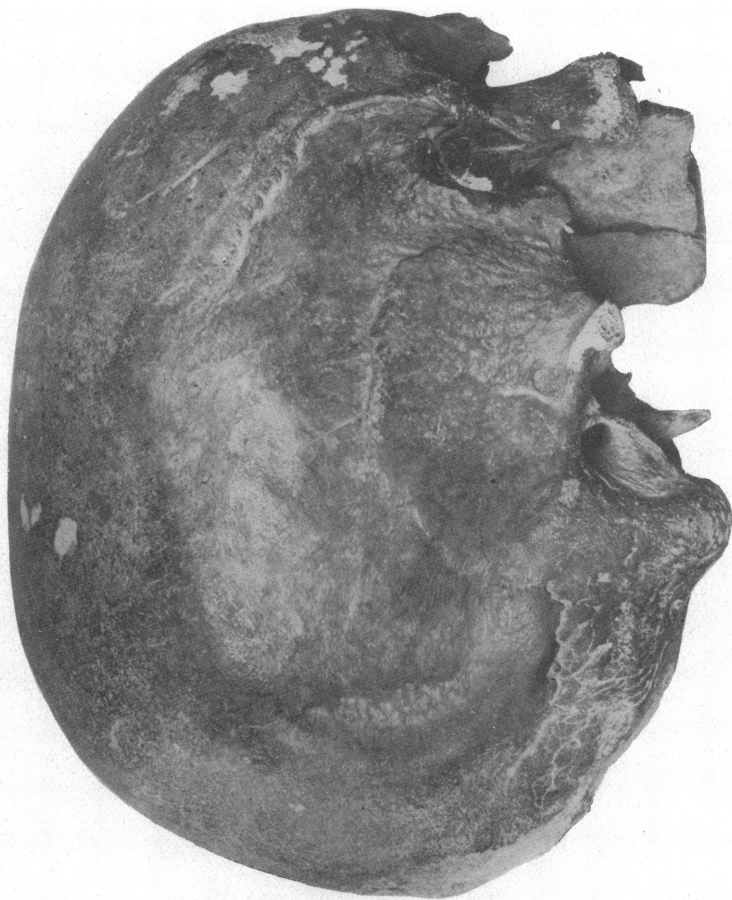




"GASOMETER" SKULL (PEABODY MUSEUM). ANTERIOR VIEW.







"GASOMETER" SKULL (PEABODY MUSEUM). LATERAL VIEW.

# MEASUREMENTS OF AND NOTES ON LONG BONES.

FEMORA											
	No.	Sex	Side	Length	Diam. antero-posterior at middle	Diam. lateral at middle	Diam. antero-posterior at upper flattening, middle	Diam. lateral do	Index of the upper flattening	Shape	Linea Aspera
I. Volk's Collection, the more superficial burials:	7.	Fem.	r.	45.1	2.55	2.35	2.05	3.15	65.1	nearly prismatic	quite marked
	do	do	l.	45.2	2.5	2.45	2.0	3.25	61.5	prismatic	do
	2.	do	r.	40.9	2.3	2.25	2.1	3.0	70.0	do	moderate
	do	do	l.	?	2.4	2.25	2.0	3.0	66.7	do	do
	5.	do	l.	?	2.5	2.45	2.25	3.3	68.2	nearly prismatic	do
	11.	Male	r.	?	?	2.35	2.25	3.2	70.3	do	quite marked
	Average:									67.0	
	a.	Male	r.	near 46.0	2.85	2.45	2.4	3.4	70.6	nearly prismatic	pronounced
	b.	do	r.	?	3.05	3.1	?	3.4	?	not well defined	moderate
	c.	do	r.	?	?	?	2.3	3.6	63.9	?	?
II. Do, the deep burials (Abbott's Farm):	c.	do	l.	?	?	?	2.2	3.7	59.2	prismatic	pronounced
	d.	do	r.	?	2.85	2.55	2.4	3.4	70.6	?	?
	e.	do	l.	?	?	?	2.65	3.45	76.8	nearly prismatic	moderate
	f.	?	r.	?	?	?	2.15	3.35	64.2	nearly round	do
	f.	?	l.	?	?	?	2.2	3.5	62.9		
	Average:									66.8	

TIBIÆ											
	No.	Sex	Side	Length	Diam. antero-posterior at middle	Diam. lateral, do	Index at middle	Diam. antero-posterior at nutr. foramen	Diam. lateral, do	Index at Nutritive Foramen	Shape
I.	7	Fem.	r.	36.4	2.6	1.7	65.4	3.05	1.8	59.0	Type 2 (prismatic, with posterior surface slanting outward)
	do	do	l.	?	2.85	1.75	61.4	3.1	1.75	56.5	2
	2	do	r.	?	2.55	1.8	70.6	3.15	2.05	65.1	shape indefinite
	do	do	l.	34.9	?	?	?	2.8	1.9	67.9	2
	5	do	r.	?	?	?	?	3.8	1.95	51.3	?
	11	Male	r.	?	3.1	1.7	54.8	3.4	1.8	52.9	near 2
	Average:									62.6	58.3
	a	?	l.	?	2.6	1.85	75.0	3.35	2.05	61.2	Type 2
	β	?	r.	?	?	?	?	?	?	?	2
	γ	Male	r.	?	3.25	2.15	66.2	?	?	?	4 (a ridge along the middle of the posterior surface)
II.											

HUMERI							
	No.	Sex	Side	Length	Diam. antero-posterior at middle	Diam. lateral do	Index at middle
I.	7	Fem.	r.	30.9	1.95	1.4	71.8
	do	do	l.	?	1.9	1.35	71.1
	2	do	r.	?	1.85	1.35	73.0
	do	do	l.	?	?	?	?
	11	Male	l.	?	1.9	1.35	71.1
Average:							71.7
II.	t.	?	r.	abt. 32.0	2.6	1.55	59.6
	u.	?	l.	?	2.25	1.35	68.9
	v.	Male	r.	?	2.4	1.6	66.7
	w.	do	r.	?	2.45	1.7	69.4
				not far from			
	x.	Fem.	l.	32.0	2.1	1.5	71.4
	y.	?	l.	?	?	?	?
	z.	?	l.	?	2.15	1.65	76.8
Average:							68.5

RADI					
	No.	Sex	Side	Length	Observations
II.					
	r.	?	l.	25.2	Bone slender



# CRANIAL MEASUREMENTS.

	No. 228 (Field Columbian M.) Lenape	CRANIA, MASCULINE, LENAPE AND ALLIED.										Tottenville, Staten Isl. No. 20-3192, A. M. N. H.	Tottenville, Staten Isl. 20-3246, A. M. N. H.	Croton-on-Hudson, 20-2335, A. M. N. H.	Crugers (near Croton) 20-2433, A. M. N. H.	Astoria, Long Island, Y. A. M. N. H.	PORT WASHINGTON, LONG ISL., A. M. N. H.						New York, No. 38962, Peabody Mus.	New York, No. 38963, Peabody Mus.	Minima of Preceding Measurements.	Maxima of Preceding Measurements.	The Riverview Cemetery Skull, No. 44280, Peabody Mus.
		Volk's Collection, Trenton No. 57783 Peabody Mus.	No. 57785 Peabody Mus.	No. 57786 Peabody Mus.	No. 57787 Peabody Mus.	No. 57788 Peabody Mus.	No. 57789 Peabody Mus.	No. 57791 Peabody Mus.	No. 57793 Peabody Mus.	Minimum	Maximum						A.	B.	C.	D.	E.	Average.					
Capacity (Flower's Method).....	abt. 1415 c.c.	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	bet. 1300 & 1400 c. c.
Diam. antero-posterior (glab.-occ.)	17.9	17.3	(17.3)	17.6	17.1	19.2	17.7	18.8	(17.3)	17.1	19.2	19.0	19.35	18.9	18.4	18.5	19.2	18.9	19.2	19.5	19.3	19.22	19.7	18.5	17.1	19.7	18.4
Diam. lateral maximum .....	13.4	14.5	(14.9)	13.9	abt. 14.0	14.2	abt. 14.6	13.9	(15.5)	13.9	14.6	13.4	14.1	13.4	14.3	13.7	13.8	13.2	13.1	14.2	13.0	13.46	14.2	13.9	13.0	14.6	14.6
Hight (basion-bregma).....	?	14.5	(14.8)	abt. 13.7	14.1	(quite high)	(q. high)	(q. high)	(q. high)	13.7	14.5	14.25	14.2	14.2	14.1	?	14.4	14.5	?	14.6	13.8	14.32	14.1	14.5	13.7	14.6	17.6
Cephalic Index.....	74.9	83.8	Slight occipital compression	79.0	81.9	74.0	82.5	73.9	Slight occipital flattening probable	73.9	83.8	70.5	72.9	70.9	77.7	74.1	71.9	69.8	68.2	72.8	67.4	70.0	72.1	75.1	67.4	83.8	79.3
Hight-length Index.....	?	83.8		77.8	82.5	?	?	?		77.8	83.8	75.0	73.4	75.1	76.6	?	75.0	76.7	?	74.9	71.5	74.5	71.6	78.4	71.5	83.8	63.0
Hight-breadth Index .....	?	100.0		98.6	107.1	?	?	?		98.6	107.	106.3	100.7	106.0	98.6	?	104.3	109.8	?	102.8	106.2	105.7	99.3	104.3	98.6	109.8	79.5
Nasion-alveon hight.....	?	abt. 7.2	?	?	?	?	?	?	?	—	—	7.6	?	7.15	7.1	?	7.5	7.1	7.3	8.4	?	7.57	?	7.8	7.1	8.4	6.9
Diam. bizygomatic max.....	?	14.4	?	?	?	?	?	?	?	—	—	14.0	?	13.9	14.1	?	14.3	13.5	?	14.5	?	14.1	?	14.7	13.5	14.7	(near 12.1)
Facial Index.....	?	50.0	?	?	?	?	?	?	?	—	—	54.3	?	51.4	50.4	?	52.4	52.6	?	57.9	?	54.3	?	52.1	50.0	57.9	(near 57.0)
Orbital hight, average .....	?	3.4	?	?	?	?	?	?	?	—	—	3.3	?	3.2	3.5	?	3.3	3.2	3.5	3.25	?	3.3	?	3.4	3.2	3.5	3.25
Orbital breadth .....	?	4.0	?	?	?	?	?	?	?	—	—	3.9	?	3.85	3.95	?	4.15	3.9	4.15	4.07	?	4.06	?	3.9	3.85	4.15	3.55
Orbital Index, " .....	?	85.0	?	?	?	?	?	?	?	—	?	84.6	?	83.1	88.6	?	79.5	82.1	84.3	79.9	?	81.4	?	87.2	79.5	88.6	91.6
Hight of Nasal Aperture.....	?	5.25	?	?	?	?	?	?	?	—	—	5.05	?	4.7	5.2	?	5.2	5.25	5.1	6.1	?	5.4	?	5.5	4.7	6.1	5.0
Breadth of " .....	?	2.65	?	?	?	?	?	?	?	—	—	2.6	?	3.0	2.85	?	2.75	2.25	2.2	2.65	?	2.46	?	2.75	2.2	3.0	2.4
Nasal Index .....	?	50.5	?	?	?	?	?	?	?	—	?	51.5	?	63.8	54.8	?	52.9	42.9	43.1	43.4	?	45.5	?	50.0	42.9	63.8	48.0
Basion-alveon line.....	?	10.1	?	?	?	?	?	?	?	—	—	10.5	?	10.6	10.2	?	10.6	11.0	?	10.3	?	10.6	?	10.85	10.1	11.0	7.9
Basion-nasion line.....	?	10.35	?	?	?	?	?	?	?	—	—	11.1	10.5	10.15	10.7	?	10.8	11.3	?	11.0	?	11.0	?	11.45	10.35	11.45	7.0
Gnathic Index (Flower).....	?	97.6	?	?	?	?	?	?	?	—	—	94.6	?	104.4	95.3	?	98.1	97.3	?	93.6	?	96.4	?	94.8	93.6	104.4	92.9



# CRANIAL MEASUREMENTS.

	Lenape, Field Columb. Mus.				CRANIA, FEMININE, LENAPE AND ALLIED																Port Washington, L. I., A. M. N. H.														"Gasometer" Skull, Trenton (No. 14,635, Peabody Mus.)	The Burlington Co. Skull, No. 19513, Peabody Museum																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	No. 225	No. 226	No. 227	Averages	Volk's Collection, Trenton, A. M. N. H.							Volk's Collection, Trenton, Peabody Mus.									New Jersey, No. 19512, Peabody Museum					West Chester, Penn., Delaware Valley (Russell)					No. 20-3149 Tottenville, Staten Isl. (A. M. N. H.)						No. 20-3136 do					No. 20-3132 (A. M. N. H.) Croton-on-Hudson					No. 20-3142 (A. M. N. H.) Croton-on-Hudson					New York, No. 14114, Peabody Museum					New York, No. 38964, Peabody Mus.					Four from Massachusetts (Peabody Museum), Average					Sixteen from Massachusetts (Russell), Average					Minima of Preceding Measurements					Maxima of Preceding Measurements																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
					No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	Average	No. 57784	No. 57790	No. 57794	No. 57795	No. 57797	Average																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									



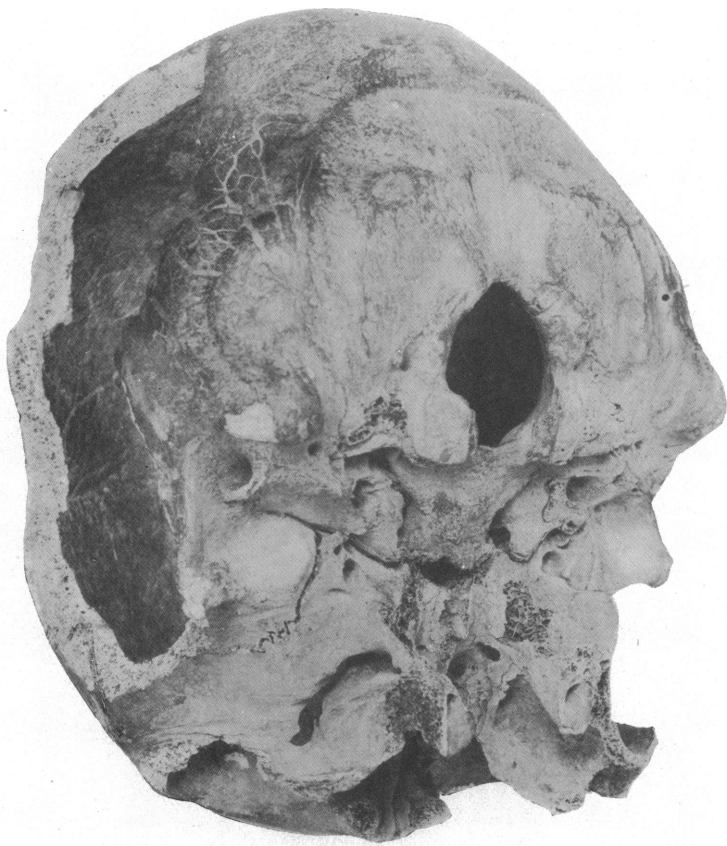






"GASOMETER" SKULL (PEABODY MUSEUM). SUPERIOR VIEW.





"GASOMETER" SKULL (PEABODY MUSEUM). VIEW OF THE BASE.





“RIVERVIEW CEMETERY” SKULL (PEABODY MUSEUM). ANTERIOR VIEW.





"RIVERVIEW CEMETERY" SKULL (PEABODY MUSEUM). LATERAL VIEW.







"RIVERVIEW CEMETERY" SKULL (PEABODY MUSEUM). SUPERIOR VIEW.





"BURLINGTON COUNTY" SKULL (PEABODY MUSEUM). POSTERIOR VIEW.





"BURLINGTON COUNTY" SKULL (PEABODY MUSEUM). ANTERIOR VIEW.





"BURLINGTON COUNTY" SKULL (PEABODY MUSEUM). LATERAL VIEW.







"BURLINGTON COUNTY" SKULL (PEABODY MUSEUM). SUPERIOR VIEW.





“RIVERVIEW CEMETERY” SKULL. POSTERIOR VIEW.



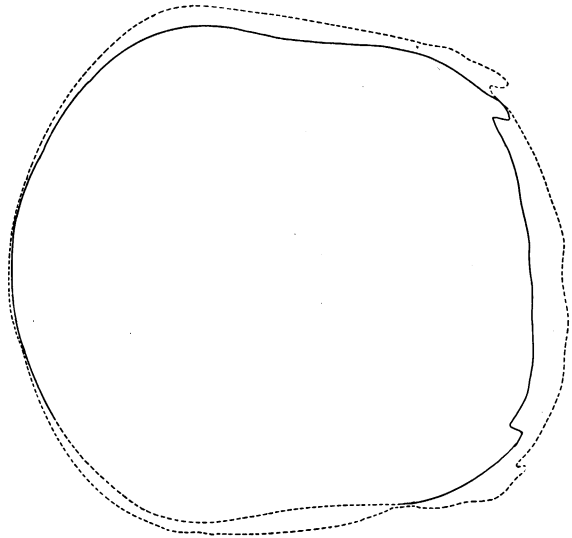


FIG. 1.—THE OUTLINES OF THE POSTERIOR NORMA OF THE "GASOMETER" (——) AND A LENAPE (.....) SKULL.

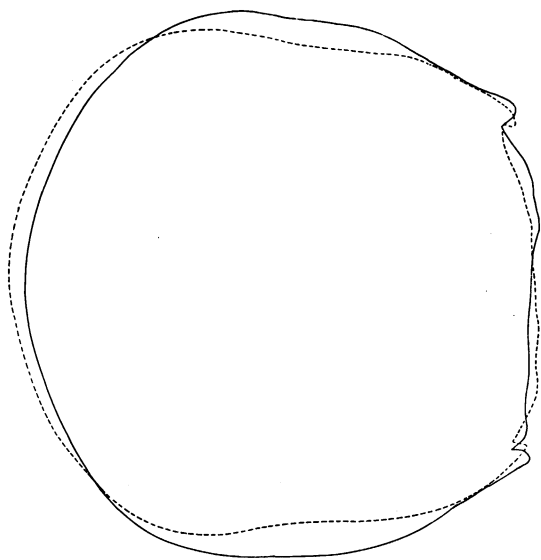


FIG. 2.—THE OUTLINES OF THE POSTERIOR NORMA OF THE "GASOMETER" (.....) AND THE "BURLINGTON COUNTY" (——) SKULL.

