ELEVENTH ANNUAL REPORT

OF THE TRUSTEES

OF THE

PEABODY MUSEUM

OF

AMERICAN ARCHAEOLOGY AND ETHNOLOGY,

PRESENTED TO THE PRESIDENT AND FELLOWS OF
HARVARD COLLEGE, SEPTEMBER 1878

VOl II NO 2

CAMBRIDGE
PRINTED BY ORDER OF THE TRUSTEES
1878.
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PEABODY MUSEUM

OF

AMERICAN ARCHAEOLOGY AND ETHNOLOGY

IN CONNECTION WITH

HARVARD UNIVERSITY

FOUNDED BY GEORGE PEABODY OCTOBER 8 1866

TRUSTEES

Robert C Winthrop, Boston 1866
Charles Francis Adams, Quincy, 1866
Francis Peabody, Salem, 1866, deceased, 1867
Stephen Salisbury, Worcester, 1866
Asa Gray Cambridge, 1866
Jeffreys Wyman, Cambridge, 1866, deceased, 1874
George Peabody Russell Salem, 1866, resigned, 1876
Henry Whipple, Salem, 1867 Successor to Francis Peabody, as
President of the Essex Institute
Thomas T Bowd, Boston, 1874 Successor to Jeffreys Wyman, as
President of the Boston Society of Natural History
Theodore Lyman, Brookline, 1876 Successor to George Peabody Rus-
sell by election

OFFICERS

Robert C Winthrop, Chairman 1866
Stephen Salisbury, President 1866
George Peabody Russell, Secretary, 1866-1873
Henry Whipple, Secretary, 1873
Jeffreys Wyman Curator of the Museum 1866-74
Asa Gray, Curator of the Museum, pro tempore, 1874-1875
Frederick W Putnam, Curator of the Museum, 1875
Lucien Carr, Assistant Curator of the Museum, 1877

(173)
ELEVENTH ANNUAL REPORT.

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE —

The Trustees of the Peabody Museum of American Archaeology and Ethnology herewith respectfully communicate to the President and Fellows of Harvard College, as their Eleventh Annual Report, the Reports of their Curator and Treasurer for the year ending in February last.

ROBERT C WINTHROP,
CHARLES FRANCIS ADAMS,
STEPHEN SALISBURY,
ASA GRAY,
HENRY WHEATLAND,
THOMAS T BOUVÉ,
THEODORE LYMAN

CAMBRIDGE,
SEPTEMBER 9, 1878

(175)
ABSTRACT FROM THE RECORDS.

MOnDAY, FEBRUARY 18, 1878 The Annual Meeting was held this day at noon in the Museum Building, Cambridge. Present Messrs Winthrop, Salisbury, Adams, Gray, Lyman and Wheatland, also the Curator, Mr F W Puitm.

Records of the last annual meeting and of the meetings held on Wednesday, April 11, Monday, July 23, and Monday, November 19, were read and approved.

The Chairman, Hon. Robert C. Winthrop, made a Communication containing many interesting facts respecting the conception and history of the Museum.

Report of the Treasurer was read, accepted and ordered to be printed.

Report of the Curator, with accompanying documents, was read, accepted, and ordered to be printed.

Hon. Stephen Salisbury resigned the office of Treasurer, which he has held since the organization of the Board, to take effect when a successor shall be chosen and qualified, or satisfactory arrangements made for the care and management of the funds.

The subject was referred to Messrs. Lyman and Salisbury to report thereupon at an adjournment of this meeting.

In answer to a question of Prof Gray, the Curator stated that very satisfactory returns had been made to the Museum by the Smithsonian Institution for the share taken by the Museum in the explorations conducted jointly by the two institutions.

The Building Committee were requested to prepare a description of the Museum Building for publication in the Annual Report.

The appropriations, recommended by the Curator for the year ensuing, were acted upon and adopted.

Voted, To adjourn to meet in the rooms of the Massachusetts Historical Society on the second Thursday in March, (March 14), at 1 P.M.

Henry Wheatland, Secretary
INTRODUCTORY REMARKS

OF

HON ROBERT C WINTHROP,

CHAIRMAN OF THE BOARD OF TRUSTEES

Our Annual Meeting, Gentlemen, has been postponed for several weeks in order to allow our Curator more leisure for preparing these apartments for our reception. We meet now, for the first time, in our permanent home, over the entrance to which — carved legibly on the free-stone block above the door — is the Inscriptio — Peabody Museum of American Archaeology and Ethnology."

We meet, too, by a somewhat fortunate, but certainly a most auspicious, coincidence of dates, on the birthday of our illustrious founder, Mr. Peabody was born at South Danvers, in this State, on the 18th of February, 1795, and would have been entering today, had he lived, on his 83d year.

I am unwilling that our meeting on this Anniversary, and in this new Hall, should pass off without a few informal words on my part, as the permanent Chairman of the Board, which seem to be due to the memory of Mr Peabody, if not due to myself, and which belong indeed to the history of this Institution. If our Museum shall fulfill its promise, and shall become, as I think it rapidly is becoming, one of the most interesting and important Scientific Departments of the University, a day may arrive, in some far distant future, when it shall itself be the subject of archaeological research, and when its small beginnings may furnish matter for careful investigation. Let me recall, then, some dates and facts which are probably within my own knowledge only, and which may at least serve to help some future inquirer.

REPORT PEABODY MUSEUM, II 12
It was on the 1st of June, 1866, as I find by my notes at the
time, that I first met Mr. Peabody, at his own request, at the Trem-
mont House in Boston, to consult with him on his proposed en-
dowment for Harvard University. On the 4th of June, three days
afterwards, Professor O. C. Marsh, of Yale College, and Mr.
George Peabody Russell, both of them nephews of our Founder,
called on me at the rooms of the Massachusetts Historical Society,
for further consultation on the subject. On the 17th of June
following, Mr. Peabody spent an hour with me at Brookline, solely
in reference to this plan for Harvard. At this interview he placed
in my hands a rough sketch of our Institution, and gave me per-
mission to consult confidentially with one or two of the friends of
the University in regard to it.

For this consultation I selected, before all others, the late President Walker, and I am not sure that I sought serious counsel of
any one else. Dr. Walker took the matter into consideration in
his calm, wise, common-sense way, and was ready, after a few
days, to pronounce a deliberate judgment. He saw, as I did, that
in confining his liberality to this one scientific object, Mr. Peabody
would disappoint not a few hopes and expectations at Cambridge.
There were peculiar needs there at that time. The Library was
greatly in need. The Museum of Comparative Zoology was not
less in need. The general finances of the University were sadly
deficient. Meantime, the idea of such an Institution as this had
never occurred to any one, and pre-historic science was too much
in its infancy to have enlisted any ardent votaries.

But Dr. Walker soon reached a conclusion, in his own mind, on
these and all other points of doubt. I remember how emphatically
he said to me, substantially, as the result of his deliberations —
"Mr. Winthrop, I have always been of opinion that when a gener-
ous man, like Mr. Peabody, proposes a great gift, we should ac-
cept it on his own terms, and not on ours. Even if we could
persuade him to change his plans, and endow some other branch of
the University, he would never take the same interest in it, or re-
garded it so much as his own. We had better take what he offers, and take it on his own terms, and for the object which he evidently has at heart. That object may not impress the College or the community, at first sight, as one of the highest interest or importance. There may be, and will be, as you say, disappointments in some quarters. But the branch of Science, to which this endowment is devoted, is one to which many minds in Europe are now eagerly turning, and with which not a few of the philosophical inquiries and theories of the hour are intimately associated. It will grow in interest from year to year. This Museum, too, will be the first of its kind in our country, and will have the best chance of securing those relics of our Indian tribes, which are now scattered in so many private collections. It is, moreover, precisely one of those institutions which must necessarily owe its foundation to private liberality. We could never hope to make it the subject of a public subscription or contribution. But if Mr. Peabody will make it his own, and endow it handsomely, and if we can get a safe, sound, accomplished person, like Jeflries Wyman, to take the charge of it, there can be no doubt of its ultimate success.

Dr. Walker, as you all know, was not a man of many words, and I may have amplified in some degree the views he expressed in our repeated comparisons of opinion. But such were his conclusions, and I should be wanting to his memory, if I did not place him foremost among those whose advice and counsel led to the unqualified acceptance of Mr. Peabody's offer, and to the establishment of this Museum.

On the 6th of July, I was able to communicate to Mr. Peabody, by letter, the result of our consultations. But it was not until the 24th of September that his plan was sufficiently matured to be communicated to others. On that day he met me again, at the Historical Rooms, together with his nephews, Prof. Marsh and Mr. Russell, and after arranging the details of our organization, I was authorized to call a meeting of the gentlemen designated as Trustees. On the 28th of September, a primary and provisional meet-
ing was, accordingly, held,—the late Francis Peabody, of Salem, Prof Asa Gray, Prof. Jeffries Wyman, Hon. Stephen Salisbury, and Mr. George Peabody Russell being in attendance, and making, with myself, all the Trustees, except Mr. Adams who was still in London.

On the 18th of October, Mr. Peabody signed the Instrument of Trust, which was published in the Boston Daily Advertiser of the next morning, and on the 3d of November, 1866, the first formal meeting of the Trustees was held. The Board was organized on that day, agreeably to the terms of the Instrument, and I then proceeded, with Mr. Salisbury and Mr. Francis Peabody to the office of Blake Brothers & Co., in State Street, where we received the Massachusetts Bonds for $150,000, counted them and sealed them up, and then deposited them temporarily in the safe of the Massachusetts Hospital Life Insurance Company. From that time to this our proceedings have been a matter of record.

I have referred to the early and emphatic suggestion by Dr. Walker, of Jeffries Wyman, as the man of all others for the Curator of our Museum, and I find that on the 1st of December, following our organization, Dr. Walker spent an hour with me in my library in earnest enforcement of this suggestion. It needed no enforcement, so far as I was personally concerned, and it soon proved that our whole Board was of one mind on that point. The Curatorship was unanimously assigned to Professor Wyman, who was also one of our Trustees, and he continued to discharge the duties of that office for the eight remaining years of his life.

His death, on the 4th of September, 1874, occurred while I was in Europe, and I cannot forget the deep sorrow with which I saw its announcement, accidentally, in a copy of Galignani’s Messenger, while I was passing a few days in Heidelberg. As my absence from home deprived me of the opportunity of uniting with the Trustees in paying him the just tribute which is upon our records, I may be pardoned for dwelling, for a moment longer, upon his signal and preeminent services to this Institution. My relations to
lum, as Chairman of the Board, brought me into very frequent consultation and correspondence with him in regard to the Museum. As we were living so near to each other, the oral consultations were more frequent than the correspondence, but I have brought with me here to-day a large number of his letters—all of them having reference to his labors in our behalf, and many of them containing interesting and important suggestions as to the work in which we were engaged. These letters, thirty-two in number, seem to me to belong to the history of our Institution, and I propose to deposit them in our archives. The earliest bears date, November 26, 1866, and the last, July 9, 1874—less than two months before his death. Some of them were written among the White Hills of New Hampshire, some of them in Florida, and some of them in Italy and France, while he was travelling abroad for his health. The last two—as well as a few of the earlier ones—were addressed to me while I, in my turn, was absent from my own country. They all alike bear witness to his devoted interest in this Institution and to his untiring labors in its behalf. If my own letters to him, of which I kept no copies, shall happen to have been preserved by himself or his family, they will show, in connection with his own, the measures which were taken for securing the Mortillet Collection, the Clement Collection, the Castellani Vases, the Cushing relics from Mexico, and the grand collection of Danish Flints of Mr. Wilmot J. Rose, all of which were obtained through my intervention, with his counsel and cooperation, for purposes of comparison with the pre-historic specimens of our own land. It may well be doubted whether those collections, or any others at all comparable to them, could have been secured at a later day, or under any other circumstances than those, of which we were so fortunately in the way of taking advantage, at the precise moment when they were obtained. We should seek for them in vain now, either at home or abroad.

No more patient persevering skilful and thoroughly scientific person could have been designated for the work of founding and
building up such a Museum as this than Jeffries Wyman, and his name deserves to be associated with that of Mr. Peabody himself, in the history of the rise and progress of the Institution. At some future day, it may be hoped that portraits of them both may adorn these walls. The modesty of Professor Wyman was as remarkable as his merits, and he was satisfied with accomplishing his work from day to day, and from year to year, without seeking to display his own labors in organizing and developing the Institution which had been committed to his charge. All the more ought we to take care that his name should be ever remembered, prominently and preeminently, in connection with this Museum, and should be inscribed on some appropriate part of its inner walls, as its first Curator, I had almost said, its creator. His personal qualities endeared him to all who knew him, and I count my own relations with him for eight years among the most valued privileges of my life.

Under his superintending care, the Institution was rapidly developed, while at the same time, the interest in this department of science, in Europe and in our own land, was steadily increasing year by year, as Dr. Walker predicted it would do. The marvelous discoveries of Dr. Schliemann—to name no other name—have given still a new and stronger impulse, of late, to the search for whatever may be found in mounds, or barrows, or bogs, or glacial drifts,—at the bottom of lakes, in caves or in shell heaps, as well as under the débris of ancient cities,—to throw light on the history of the past. And thus, at the end of ten years since our organization, Mr. Peabody's foundation is amply justified, and nobody, I think, would now desire it to have been any other than what it was.

In entering our new Hall, to-day, we do not forget our indebtedness to our Associate Trustee, Col. Lyman, and to our friend Prof. Alexander Agassiz, for their devoted attention to the erection of this building, from its inception to its completion. We do not fail, also, to remember gratefully the faithful services
of our Treasurer, Mr. Salisbury, under whose care the fund appropriated to this purpose by Mr. Peabody was accumulated, until it had reached the amount prescribed before the edifice should be undertaken.

Nor can we omit our acknowledgments of the diligent and untiring services of our present Curator, Prof. F. W. Putnam, and his Assistant, Mr. Lucien Carr, by whom the laborious work of transferring our collections to this new building, and arranging them in its various apartments, has been so satisfactorily and successfully performed, and under whose auspices so many valuable additions have been made to the Museum. Happily these gentlemen are all with us to enjoy their best reward in witnessing the grand consummation of their labors.

And now, Gentlemen, in taking possession this morning of a Building which we trust, is not only to outlast us all, but to be the scene of scientific labors and acquisitions in future and for distant generations, I may be permitted to invoke for the Institution not merely the favor of our fellowmen, but the blessing of God,—remembering those words of the great father of modern science, Lord Bacon, who would have had everything dedicated alike to "the relief of man's estate and to the glory of the Creator."

There are but few passages more striking among the voluminous writings of Bacon which are left to us, than the little "Student's Prayer," as he entitled it, which he seems to have composed while he was engaged on his "Novum Organum" and his "De Augmentis Scientiarum." After some formal opening phrases, he proceeds—

"This also we humbly and earnestly beg, that human things may not prejudice such as are Divine, neither that from the unlocking of the gates of sense, and the kindling of a greater natural light, anything of incredulity or intellectual night may arise in our minds towards the Divine Mysteries, but rather that by our mind thoroughly cleansed and purged from fancy and vanities, and yet subject and perfectly given to the Divine Oracles, there may be given unto Faith the things that are Faith's Amen."

Such words — these very words — might well be inscribed on the walls of every student's chamber, and of every hall of Modern Science. They breathe a spirit worthy of being devoutly cherished by all who deprecate any needless conflict, or wanton contention, between Science and Religion.

It was in this spirit, as I well know, that our illustrious Founder endowed this Institution. It was in this spirit, as I remember well, that President Walker advised its acceptance, and urged upon me the appointment of Jeffries Wyman as its Curator. It was in this spirit, as we can all bear witness, that the lamented Wyman himself pursued his work and prosecuted his investigations. And, certainly, it is in this spirit, that, having counselled and cooperated with them all, I shall maintain my relations to the Museum, agreeably to Mr. Peabody's assignment, as long as life and health shall enable me to watch over it. And may the blessing of God rest upon all our counsels and labors!
REPORT OF THE BUILDING COMMITTEE.

The Building Committee of the Peabody Museum herewith give, as their report, the following description of the Building, finished by the architect, with the accompanying photograph and drawings showing the elevation and interior arrangement.

Respectfully submitted,

Theodore Lyman,

Asa Gray,

Committee.

To

Theodore Lyman, Esq.,

Chairman of the Building Committee of the Peabody Museum
of Archeology and Ethnology, Cambridge

Dear Sir — The following is the description of the New Museum Building at Cambridge

The work was commenced early in July, 1876, the walls built and the roof finished about the middle of December, the work was then stopped and the building closed for the winter, the plastering, laying floors and finishing were done the following spring and summer.

The outside walls are built of dark red brick, laid in black mortar, with brown stone belts, window sills, caps and main cornice, with granite steps and underpinning.

The external dimensions are 87 ft from North to South and 44 ft from East to West. The First floor is about 5 ft above the ground, the main cornice 52 ft, the top of Mansard story at gutter about 61 ft, and the highest point of roof 72 ft. The view in this report, taken from a photograph will show the external appearance of the building.

There is a Basement Story 11 ft 6 in high. First and Second Stories each 22 ft 2 in., each having galleries 7 ft wide in rooms, and 5 ft wide in halls, and a Mansard story 11 ft high. The plans in this report will show the arrangement of the rooms.

The South Basement room is finished and fitted up as a work room, the North room is for fuel and storage, the Hall contains steam boiler of the Heating Apparatus, the floor over this being made of iron beams with (185)
brick arches turned between them. The Elevator runs in a brick shaft, from Basement to Attic, having an opening at each floor and gallery. The closets marked on plans are fitted with wash bowls and water closets, and in these closets runs a stand-pipe, with hose couplings at each floor and gallery.

The Vestibules between elevator and closets at each floor, have arched doorways in external brick walls, now closed up, but to be opened whenever an addition shall be put up on the West side.

The foundations are unusually strong, the bottom course of stone being about 7 ft wide. The brick walls of Basement being 2 ft 4 in thick, First Story walls, 2 ft thick, Second Story walls 1 ft 8 in thick, all being hollow walls, having a 4 in air space between the inner and outer walls. The walls of the Mansard story are 1 ft thick. All the inside partition walls are brick, built up to the roof boards. All the walls are plastered directly on the brick, leaving no spaces for the to draw through, or to lodge vitium.

The floor of First Story Hall is formed of iron beams and brick arches, and on these is laid a pavement of Baltimore red tiles 8 in sq, with a border of light colored New Brunswick free stone and Vermont green slate.

All the other floors are formed with girders 12X12 and 8X16 and floor joist 6X12 in all hard pine, the joints placed 5 ft apart, on these are laid 3 in white pine plank, matched, on this planking is spread a coat of lime, hair and sand, mortar and plaster of Paris, 1 in thick, the finished wood floors are laid over this Cherry in First and Second Stories and their galleries, and Hard Pine in Basement and Attic.

On the under side of the 8 in floor plank and all around the floor timbers, "furrings" half an inch thick are nailed, and on these lath are laid ½ in. apart to allow the plaster to pass freely between them and fill the space between the lath and plank or timber. The corners of the timbers of the First and Second Story timbers are moulded. The construction of these floors show panelled ceilings. The floors are perfectly sand, of wood and plaster, having no air spaces in them through which fire can draw, as shown in the following section showing construction of floors.

The roof timbers are placed about 4 ft apart, covered with 2 in thick white pine plank, matched, and fiured, lathed and plastered on under side in the same way as the ceilings.
On the Roof strips 1½ in. square, 3 ft 8 in. apart extending from the
ridge to gutters are nailed, the roof is covered with copper turned up
against the sides of these strips and capped with copper, this allows for
the expansion and contraction of the copper caused by changes of the
weather.

The Stairs from the First floor to the Attic are iron, from the Base-
ment to First floor stone steps built in between brick walls, from the
Attic to the floor above, the under side and partition at the side being
lathed and plastered in the same manner as the ceilings, and the space
under the steps filled with plaster.

All the inside doors are made of two thicknesses of board, with an air
space between them, covered on both sides and on the edges with sheet
iron.

The Building is heated by steam, and in addition to this, each of the
principal rooms has a large open fire place.

**STATEMENT OF THE COST OF THE BUILDING**

<table>
<thead>
<tr>
<th>Work</th>
<th>Contractor</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mason work</td>
<td>William C Poland &amp; Son</td>
<td>$27,900.00</td>
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<tr>
<td>Carpenter's work</td>
<td>Hancock &amp; Greely</td>
<td>10,462.79</td>
</tr>
<tr>
<td>Iron work</td>
<td>G W &amp; F Smith</td>
<td>4,220.30</td>
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<tr>
<td>Plastering</td>
<td>John Mack</td>
<td>2,642.50</td>
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<tr>
<td>Roofing</td>
<td>John Parquins Sons</td>
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<td>Elevator</td>
<td>F P Canfield</td>
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<tr>
<td>Plumbing</td>
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<td>Steam Heating</td>
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<td>Tablet and Lettering</td>
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<tr>
<td>Tiles</td>
<td></td>
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<td>Bells and Tubes</td>
<td>Seth W Fuller</td>
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<tr>
<td>Architect</td>
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**Total:** $53,297.15

The above contains, I think, all important points in regard to the build-
ing and its construction.

Very Truly Yours,

ROBERT H. SLACK,
Architect
SECOND FLOOR.

SECOND GALLERY
REPORT OF THE CURATOR.

To the Trustees of the Peabody Museum of American Archeology and Ethnology —

Gentlemen — With a deep feeling of satisfaction that the valuable collections forming the Museum, are at last placed in a building in every way suitable for their proper arrangement and safe keeping, and congratulating you on the accomplishment of so desirable an object, I have the honor to inform you briefly of the work done in connection with the Museum since the last annual meeting, which was held on the seventeenth of January, 1877.

During the months of June and July last, the collections were safely removed to the upper rooms of the present building. Recently the old cases, which were removed from Boylston Hall, have been placed for present use in some of the rooms, and certain portions of the Museum have been temporarily prepared for exhibition. As it was also found practicable to have the several rooms hereafter to be provided with cases, shelved in advance of the building of the cases, we are enabled to exhibit upon these shelves such articles as will not be injured by dust, while the present tables and drawers will enable the arrangement of the smaller and more delicate specimens to be carried towards completion, so that when the new cases are finished in each room they can soon after be filled with the specimens they are to accommodate. In this way, as will be readily understood, the collections will be so distributed that they can be used for study and comparison and, in part, exhibited.

Following this plan there have been temporarily arranged, in the northeastern room of the second story, the several collections illustrating the Ethnology and Archeology of Peru, Bolivia and Brazil and, in a more limited manner, some other portions of South America. There have thus been brought together, for the first time since their reception, the several large collections made by
Professor Hartt\(^1\) in the ancient shell heaps and burial mounds in Brazil, the articles received from the Thayer expedition conducted by the late Prof Agassiz, those presented by Miss Agassiz, Miss John Dixwell, and a few other contributors to the Brazilian collection. By the side of these are placed the mummies and the collection of pottery and other articles made by Mr. Alex Agassiz about Lake Titicaca, which, as they show marked differences from the coast Peruvians, have been separated from the collections made by the late Professor Louis Agassiz, and by Mr. Alex Agassiz at Ancon, Chancay, Pisagua and other places near the coast. These last and most extensive collections fill several cases in the room, while one corner is devoted to the articles illustrating some of the arts and customs of the present Indians of Peru, received from Mr. Alex Agassiz. The Blake collection, of which mention will be made, is also arranged in cases in this room, the whole forming a very important Archaeological and Ethnological collection in relation to South America. On the shelves in the gallery of this room have been arranged the vases, carvings in stone, and various other articles from Central America and Mexico, including the Cushing collection from Mexico, and several small lots from Central America. In this gallery also have been placed the large articles of the extensive collection from Alaska.

In the opposite room, in temporary cases and on shelves, are now displayed the important collection of pottery from the old mounds and graves of various parts of America north and east of Mexico, the large stone implements, pots and mortars from California and other places, with various articles made and used by the present Indians of North America. There are also temporarily arranged in this room, in several of the old cases, a selected portion of the New Jersey collection made by Dr. Abbott, including the interesting stone implements obtained from the gravel beds at Trenton. Other cases are filled with series of articles from the graves, mounds and caves of Ohio, Tennessee, Kentucky, Utah, etc., while two cases are devoted to an exhibition of the series of pipes from North America. The drawers under the cases

\(^1\)Since this report was put in type the sad news of the death of Prof C. F. Hartt, by yellow fever has reached us from Rio Janeiro. By his death science has lost a devoted worker, and the Museum one of its faithful friends. At the time of his death Prof Hartt was engaged in the performance of his duties as Director of the Geological Survey of Brazil.
contain arrowheads, spearpoints, knives, celts, small axes, and other specimens illustrative of the Stone Age of North America.

In the gallery of this room a temporary arrangement is made of the various large articles from the Pacific Islands, Africa and Asia.

For the present, the collection of pottery from Etruria, and the large articles from the Swiss Lakes and other European localities, are placed on the shelves in the first southern gallery, and it is proposed to reserve the room itself (the one in which you are now assembled) as a Trustees' room, library, general office and reception room. It is also the room best adapted to class instruction and other similar purposes.

The northeastern room on the first story, with its gallery, has been kept free of specimens in order to allow of its being the first to be furnished with the new cases. When this room is cased, it is then proposed to arrange a series of collections made by selecting, from all portions of the Museum, such articles as will illustrate the development of Man toward civilization, as shown by his inventions, arts and manufactures from remote times.

In such a series of collections it will be the object to show, as nearly as may be, the sequence of inventions, while in the several ethnological arrangements, in other rooms, all that relates to the past and present condition of each nation will be exhibited as far as possible.

In the northern room of the third story the osteological collection is in process of arrangement. This now consists of about seven hundred crania of various races of man, several perfect skeletons and many human bones from various places. Particularly rich is this collection in crania and bones of the North American Indians, of comparatively recent times, from California, Florida, New England, etc., of the Stone Grave race of Tennessee, of the mounds of Kentucky and Tennessee, of the Peruvians and Sandwich Islanders, also in crania from the ancient graves in Italy, being the collection presented by Col. Lyman; and, in addition, many important crania from other parts of the world. This collection also contains a very interesting series of bones illustrating diseases, malformations, etc.

The southern room of the upper story is the work room of the Curator, and will contain the articles received from the unpacking and general work room in the basement, preparatory to their final distribution to the cases, or during their special study.
From this hasty review of the contents and adaptation of the seven rooms and four galleries, which have been mentioned, to the various purposes of the Museum, a general idea of the building has been conveyed. It only remains to be stated that the building is heated, throughout, by steam, while open fire places for ventilation and special heating are in five of the rooms.

A special feature in the construction of the building, is the method by which it has been made fireproof by enclosing all the wood work, from the basement to the roof, in plaster and cement, the light wood floors of the rooms also being laid on plaster.

From the care that has been given, by the Building Committee and the Architect, to the important subject of cases, it is believed that these will, when completed, prove as perfect and durable as can be expected at a reasonable expense.

Much work on the collections has been accomplished during the year by Mr. Carr and myself, and for a few weeks we had the assistance of Mr. Lucien Carr, j r., who devoted himself to repainting broken pottery in a skillful manner, and to painting, very neatly, the catalogue numbers on several hundred articles. The time taken for this essential labor is very great and can be exemplified by the fact that an entry under one number in the catalogue often involves the painting or writing of the number, now made up of five figures, on one or two hundred specimens.

Among the objects that we have felt it important to accomplish, has been that of arranging and cataloguing the collections made by the former Curator during his examinations of the various shell heaps in Florida and New England, which, as I mentioned in my first report, have been kept in bulk, as Professor Wyman was about beginning their arrangement at the time of his death. I am glad to be able to state that after several weeks of our united labor, the Florida collection, consisting of many thousand articles, has been properly entered in the catalogue and is now arranged in drawers. The smaller collection from the shell heaps of New England will, we hope, be likewise arranged during the present year.

We are indebted for special assistance in the Museum, to Dr. C. C. Abbott, of Trenton, New Jersey, who, during a visit of several weeks in the past autumn, selected and arranged, in temporary cases, some from the large collection of stone implements he has, at various times, made for the Museum, including those received from
the Peabody Academy of Science at Salem and mentioned in the last report. To Dr. Abbott the Museum is also indebted for several lots of specimens which he collected during the year, as will be seen by the items in the list of Additions to the Museum.

To Mr. T. G. Cary, we are under obligations not only for the several articles he has personally presented to the Museum, but also for the interest he has induced others to take in its objects which has resulted in the addition of valuable specimens.

Mrs. John Dixwell, of Boston, has most liberally presented to the Museum a very interesting and valuable collection of weapons, ornaments, pottery, etc., from the Pacific Islands, Australia, Africa, India, China and North and South America. This collection was made, as opportunities offered, by her husband, Dr. Dixwell, and was finally presented to the Museum, in the name of Mrs. Dixwell, at the same time with several stone implements given by himself. Now that the rapid spread of commerce is causing the disuse of the rude weapons and ornaments of savage tribes, especially on the islands and sea coasts, it is yearly becoming more difficult to obtain such articles as those presented by Mrs. Dixwell, and as it will soon be impossible to secure similar articles of savage workmanship, a boon is conferred on science whenever a private collection of this character is placed in a public Museum.

To Mr. Percival L. Leverett, of Boston, we are under obligations for a valuable collection of coins and medals made several years since by Mr. William G. Hunter of Canton. This collection consists of coins and medals from China, Corea, Corin China, and Japan, dating from the second and third centuries B.C., to the present century.

Among the most important additions, during the year, is that of the well-known collection from Peru, made by John H. Blake, Esq., of Boston, about forty years ago. This collection for several years has been on deposit in the Warren Museum. From it has been derived the data of much that has been written on the interesting mummies of Peru and the articles associated with them. Morton studied the curios of this collection and he figures one of the mummied heads in his great work, while the two elongated skulls of children have not only been figured by Wilson but have been the subject of remarks and controversy by Wilson, Davis, Wyman and others. Many of the articles have been particularly described by Professor Wilson, in his "Prehistoric Man." Thus the collection
has a double value, and the care that should be given to its pres-
ervation cannot be overestimated. Mr. Blake has added to the
interest of this important collection by furnishing notes and
drawings which I herewith submit as a special paper to accom-
pany this report.

From the Imperial University of Tokio, Japan, we have re-
cieved a very interesting collection of fragments of pottery, a few
implements of bone, and other articles, from a shell heap at
Onomori, near Tokio. These articles were collected by Prof. E. S.
Morse and other gentlemen connected with the Imperial Univer-
sity, and are of special interest as being the first obtained from
the shell heaps of that country.

The Smithsonian Institution has presented to the Museum a very
interesting series of burial jars, and smaller vessels of pottery,
beads made of various substances, etc., all obtained from old burial
places on the Island of Omotepec, in Lake Nicaragua, by Dr.
Bransford, of the United States Navy, who has been making
extended explorations on the island, under the direction of the
Smithsonian Institution. There have, also, recently been received
from the Smithsonian Institution, eight large boxes of specimens
containing a valuable collection of articles from the burial places
and shell heaps of Southern California and the Islands off Santa
Barbara. These specimens, mentioned in detail in the list of ad-
ditions to the Museum, were in part collected at the joint expense
of the Museum and the Smithsonian Institution, and are in return
for the aid given by the Museum to the work of exploration con-
ducted by the Institution.

Among the specimens of peculiar interest, which have been re-
ceived during the year, are two human crania with a tibia and a
humens from Mr. Manly Hardy, of Brewer, Maine. These were
found in a shell heap on the coast of Maine, under such conditions
as to indicate cannibalism. Professor Wyman has fully estab-
lished the fact that the early inhabitants of Florida were cannibals,
as shown by the remains in the shell heaps there, and has, by his-
torical evidence, shown that the custom existed among the North-
ern Indians. Fragments of the human skeleton have also been
found sparingly in the shell heaps of Massachusetts, but this dis-
covery of human remains in the shell heaps by Mr. Hardy is, as
yet, the only evidence we have received of cannibalism among the
shell heap people of New England. With the statement that Mr
Hardy is to make further investigations of the deposits in question, in behalf of the Museum, to ascertain, if possible, that the position of the bones was not due to secondary burial, which their number suggests. I quote the following from his letter accompanying the gift of these interesting crania.

"Aug 31, 1877, I examined a shell heap near south end of Great Deer Isle, Penobscot Bay. This heap was about three feet in depth and extended from forty to fifty feet on the front or exposed side. We found a number of pieces of earthen vessels, all ornamented, the most having rows of deep cuts or grooves on them in parallel lines. One piece had two holes about an inch apart, evidently to fasten a handle by. We also found the corresponding piece, one of the holes in this being broken through the centre. I found by striking a circle which just corresponded with the curvature of these pieces that the diameter was exactly six inches. There were the bones of many kinds of sea fowl and fish, intermixed with numerous evidences of fires, also various sea shells and many shells of the common land snail, these last being found all through the entire extent examined. Some beautiful pieces of quartz were found, evidently brought from a long distance and used to strike fire, also a flint arrowhead and part of a bone needle. After digging some twenty feet horizontally, I found a human bone, a femur, and near by some twenty or thirty more bones of legs and arms, a sternum, and portions of a pelvis, but no vertebrae or ribs. The long bones nearly all lay in a slanting position, many of them broken, and the corresponding parts either missing or not near enough to them to be identified as belonging together. They had no more apparent connection with each other as the bones of skeletons, than any heap of bones among kitchen refuse would have, and were mixed with bones of moose and beaver, whose teeth were found in considerable numbers, and were mixed with ashes and remains of fires. Below all these I came to a lower human jaw lying upon the top of a skull, the jaw was lying teeth side up but contained but one tooth. In working carefully round the skull, which was placed crown up, I found another skull laid upon its side with the part which joined the neck pressed so close to the first that a knife blade could hardly be placed between them, on taking them out, the jaw fitted to the one on which it lay and this had but one tooth in the upper jaw. The under skull was without a lower jaw, neither could I find any near it. This skull had nine teeth in the upper jaw. These skulls rested on virgin, yellow earth, which showed no traces of fire or of ever being disturbed. A piece of granite projected on one side of the upright skull and the skull was hard against it. The second skull touched this one, and on the other was another rock. The two skulls being so closely wedged between the rocks that it was very difficult to remove them. Above them on one side, I saw several more long bones projecting from the shells, but not having time for more extended search I carefully reinterred all the bones exhumed except the
skulls and the bones sent you with them as specimens. I have been thus
minute in describing the exact position of things that they may afford
reasons for the conclusion which both myself and the Indian who assisted
me came to independently. His first remark after we had examined
everything was, "these people eat each other." No one, looking at the
bones as we found them, mixed with kitchen refuse, lying without any
connection, many of them broken and parts gone and especially the two
skulls underneath the whole, with the lower jaws detached from each and
placed in such a position as they never could have been if buried in con-
nection with the rest of the body, could come to any other conclusion."

For further information in relation to the Additions to the Mu-
seum during the past year, I must refer to the list annexed, which
contains a summary of the two thousand eight hundred and sixty
entries that have been made in the Museum catalogue during the year.

In regard to the Additions to the Library I must also refer to the
annexed list, as with the exception of the continued receipt of
several serials and other publications from the President of your
board, no special mention need be made of the addition of forty-
two volumes and eighty-one pamphlets to the small though impor-
tant reference library of the Museum.

The Special Explorations made under direction of the Museum
during the year, have resulted in more than ordinary success.

Dr. C. C. Abbott has continued his investigations in relation to
the stone implements found in the glacial deposits at Trenton,
New Jersey, and has been rewarded by the discovery of numerous
specimens of rude, but unquestionable implements made by man.
The notice of these implements of great antiquity, the oldest yet
found on the Atlantic coast, given in the last published report, has
carried considerable comment, and special interest in the locality,
by both archaeologists and geologists, and there is now no doubt
that the disputed points, as to the exact relation of the deposit to
the glacial period, will be carefully investigated. For a full state-
ment and discussion of the subject, I refer to the elaborate second
report by Dr. Abbott, hereto annexed.

Dr. Edward Palmer, acting under the special appropriation for
explorations made at the last annual meeting, has made a careful
examination of several mounds in Southern Utah, from which nu-
merous articles of pottery, bone and stone were obtained. The
notes and descriptions furnished by Dr. Palmer, show that most
of these mounds in Utah are in reality the remains of adobe or mud houses, and that in some instances new houses have been successively erected on the remains of the old. In other instances the mounds are formed by the decay of a collection of houses built in such a way as to form a nearly continuous wall about an area thus enclosed on the same principle as that suggested by the Hon.
Lewis Morgan in his discussion of the probable use of the great artificial embankments in the Ohio valley. The only difference being, that in Utah the walls of the houses formed the protection to the area enclosed while in Ohio, according to Mr. Morgan’s theory, an earth wall was first raised upon which houses were erected. It is evident that the latter method would give far greater protection to the inhabitants than the former. From the character of the articles found in these mounds in Utah, and especially from the pottery, we have some evidence that the people were the same as those who lived in the cliff houses of the Colorado region, and in the named Pueblos, and are probably represented at this time by the Moqui, Zuñi and allied tribes. These adobe houses of the plains of Utah may possibly have been temporary residences of some of these tribes during portions of the year, or they may have been the locations of out-lying bands until the mounds of other tribes forced the people to the cliffs for protection. In this connection it is of interest to note the discovery, by Dr. Palmer, of a skeleton in one of the mounds, and that the cranium, the measurements of which are given in another place, is remarkably broad and low. Dr. Palmer also had the fortune to discover a cave in Kane County, Utah, in which were two perfect vessels of the Ancient Pueblo type of pottery, one of which was filled with small coils of cord timely made from some kind of bark or strong vegetable fibre. In this cave was also discovered a unique article in the form of a spade, made by flattening a piece of horn and fixing it to a long handle of wood. At what Dr. Palmer believes to have been an old camp of the Pah Utes, in the mountains, he discovered several interesting articles, among which was a pair of shoes made of the fibre of the Yucca which, in shape, style of branding and several details, very closely resemble those made of the leaves of the Tipiha, which I had the good fortune to find, a few years ago, in a cave in Kentucky. Dr. Palmer also obtained a very instructive and important collection of articles made and used by the Pah Ute Indians, while the notes, which accompany
each article, stating the particular use to which it is put, the method of its manufacture, or the material from which it is made, etc., add materially to the value of the collection.

Mr. Paul Schumacher, who, probably, of all collectors has made the most extended and important investigations of the old shell heaps and burial places on the coast of Oregon and California, has, during nearly four months of the past year, devoted his attention to the Islands of San Clemente and Santa Catalina, acting under a special appropriation which you made for the purpose in July last. The returns from this exploration have been large, and many of the articles are of peculiar interest. These islands, when discovered by Cabrillo in 1542, were settled by numerous tribes similar to those of the mainland. About forty years ago, the remnants of these tribes were removed from the islands.

In connection with this collection I have the pleasure to state that the officers of the freight department of the Pacific Rail Road Company made liberal concessions for its transportation.

The collection secured by Mr. Schumacher from the shell mounds and burial places, consists of mortars and pestles, made from hard stone, cooking pots, small vessels, and other articles cut out of steatite, pipes, perforated stones of various sizes and material; a number of fine daggers, knives and arrowpoints, a single stone axe of same shape as those from the Atlantic coast, and very many other forms of implements, several interesting carvings in stone, various articles made of bone and shell, a great quantity of shell beads, about thirty human femurs in good condition, the perfect or nearly perfect skeletons of two or three individuals, and parts of many others. Besides the collection of articles of Indian manufacture, numerous things of European make, of which the Indians obtained possession, were found in the graves, particularly on the Island of Santa Catalina. Mr. Schumacher has given an account of the method of manufacture of several of the articles, which I here annex as a special paper, and has written as follows in regard to the investigations made for the Museum:

"Permit me to give you an outline of the results of my investigations of aboriginal remains, on the islands of San Clemente and Santa Catalina, off the coast of California, undertaken at the expense of the Peabody Museum, during the months of August to November of this year.

On San Clemente, where we had to work under great disadvantages, on account of the extreme dryness in this year of drought, and the lack of
drinkable water caused by the negligence of the captain of the schooner, our small party spent twenty-five days. The island, which is of volcanic formation, rose gradually from the ocean, attested by distinct sea-levels which are especially remarkable on the southwest side where they rise in well defined terraces to a plateau, increasing in number where the elevation is higher. On the formation such as caused intermediate watermarks it is barren, without any water in streams or springs. The plateau, on which some light sandy depressions and rising ground occur, is, at intervals towards the southeast end, intercepted by deep fissures or horizons in some of which water, derived from the rains in the winter, is stored in rock-cover basins, lasting even in dry seasons, but is so difficult of access, and for a stranger almost impossible to find, that no reliance can be placed on a water supply from this source. The southwestern shore is a rough coast which affords but few places in which a landing can be effected, while the northeastern or inner shore is high and abrupt, and although easily reached by boat, is only at a few places of practical access. For this reason we did not rely on a boat for transportation, but brought along with us pack-animals to move our collection to a convenient landing. As no feed could be found this season—the sheep, which overrun the island, dying rapidly—we always had to carry along on our expeditions, both feed and water for the pack animals.

The shell mounds are principally located on the plateau, on inches and such places of sandy nature whence the shores are easily accessible, but by far the best results were obtained on the extended dunes which enclose the northwestern end. The lower end of the dunes, where the shell deposits are especially abundant, it was noticed, is at the drainage of a large area, and I was informed that springs existed in early times on several places in the low depression, of which, however, none can be traced now, being likely covered by the encroaching sand. Similar favorable indications for a natural supply of water exists further towards the northwest and near an isthmus where a good landing can be made, especially in the northeast bight. Where ever the access is easy, we found the shell mound destitute of relics, and only on those distant from any landing place did we make valuable collections.

I did not notice any difference in the mode of burial on San Clemente from that observed at a previous time on San Nicolas Island, it being single graves occurring at short intervals in sand, without any other covering, or partitions. None were found in wrappings covered with asphaltum. As on San Nicolas, the greater portion of our collection was obtained on the surface of the shell mounds, and here too we found to our sorrow that the larger utensils, the well worked, and often rare articles were broken by vandals and scattered about. It is said it was done at the time of annexation of the last of the inhabitants to their missions, surely, it must be admitted the destruction was done with some design, for else nobody would have taken the trouble of doing the work so thoroughly.

About the southeast end, in the faces of steep declivities and along the
bluffs of basalt, many natural caves exist in the basaltic formation, some of which had served for abodes, as proved by the abundance of kitchen-middens which manifests itself for a long distance by light shining color. These caves, often difficult of access and requiring much exertion in reaching, are now the resort of sheep, where they, too, find protection against the scorching sun during the summer, and the rains in the winter. The caves added very little to our collection, nothing of which was of peculiar interest.

From here we sailed to Santa Catalina Island, where we arrived about the middle of the month of September, and remained two months.

We pitched our first camp at our old station, the Isthmus. This locality with its once populous rancheria, was prominently mentioned in the narratives of chroniclers, since the discovery in 1542. At our previous short visit the remains of the rancheria were readily found but this time we succeeded also in the discovery of the graves which contributed so largely to our treasure. We have also traced, I believe, the water source mentioned by Padre de la Ascensión, in Little Springs, located about two miles and a half to the southeast, by trail, no doubt the trail of old, which still leads past some sites of former huts.

The subject of the manufacture of pots, which I have followed up during several years past, was solved by the discovery of the quarries of potstone, at Little Springs, Pots Valley, and other localities, of tools and pots in all stages of finish. I consider this discovery the very interesting feature of the collection herein equalled by no one made on this coast. My observations thereon and the mode of manufacturing some other articles, I give in a special paper.

Some shell mounds succumbed to the encroaching ocean, as for instance at Little Harbor, on the southwestern shore where only the two ends remain, indicating the extensive area it formerly covered, another near the southeast end on the eastern shore, and one in front of the house of Mr. Whittley, have suffered by the action of the ocean, yet some interesting results were obtained, especially at the latter station. On this island, too, we found shell mounds in the interior, mostly located near springs, small streams, passes and localities in which pot-stone was quarried.

The remains are in the main like those found on the other island and the adjoining mainland, the people of which were no doubt of the same race and in close connection. In striking variance, however, is a grooved stone hatchet exhumed in Pots Valley, the only one thus far found on the California coast, to my knowledge.

I cannot account for the scarce occurrence of the cooking pots, on Santa Catalina where they were extensively manufactured, especially of the large ones so frequently found on the southern California coast. This singular fact seems to invite us to comparison with modern notions according to which the home manufacture is considered of less value than the foreign commodities received in return. The scarcity of stone knives is in part explained by the absence of the material of which they consist, and moreover by the adoption of knives made of bones, which we frequently found.
After the meeting of the American Association for the Advance-
ment of Science, at Nashville, I was enabled, by the kindness of
many friends, to make very extensive explorations among the
mounds and old buried places in Tennessee. A large earth mound,
twenty feet in height, by about one hundred and fifty in diameter,
was carefully opened. A large buried mound containing between
two and three hundred graves was completely explored and sev-
eral small groups of graves were also examined, all in the vicinity
of Nashville. At the same time Major Powell was engaged in
making equally extensive explorations in close proximity to my
own, so that we had the advantage of each other’s work.

The interest which was taken in my work by friends in Nash-
ville, and the great kindness and liberality with which I was every-
where welcomed, enabled me to accomplish very much more than
would otherwise have been possible during the month I had for the
investigations. It is with pleasure that I take this opportunity of
returning my thanks to the many who so kindly welcomed me and
gave me such generous help, and while it is impossible to mention
all by name, I must return my particular acknowledgments to
Governor Porter and to Colonel Gibbs, the Secretary of State and
acting Governor during most of the time of my stay in the state,
also to Dr. J. B. Lindsley, Mr. and Mrs. John M. Overton, the Rev.
Mr. Matthews, the Rev. Mr. Hargrove, Colonel Cochran, Prof.
Lupton, Colonel Morgan, Dr. Summers, General Thruston, Mr.
Edward Cross, and Mr. Edwin Curtis, to all of whom, as well as
to many other friends in Nashville, I was under great obligation.
To Miss Gertrude Bowling, the owner of the large estate upon
which much of my work and that of Major Powell was done we
were much indebted for the permission to make the extensive ex-
cavations which we there accomplished with a united force of about
fifty workmen during nearly two weeks. To the Proprietor of the
Maxwell House and to the Editors of the “Nashville American,”
I am indebted for many acts of kindness.

On leaving Nashville I made arrangements with Mr. Edwin Cur-
tiss to carry on the work for some time, and he visited several other
localities where he was permitted to make excavations, particularly
on the farm of Mr. Edmonson, to whom and to Mrs. Edmonson,
he was placed under particular obligations. Mr. Edmonson also
gave to the Museum, through Mr. Curtiss, a very large and fine
stone dagger, which was taken from one of the stone graves on
his place. The continued work of Mr. Curtis resulted in obtaining a large addition to the collection of articles, especially of pottery and of crania from the ancient graves. Leaving Nashville, I accepted the kind invitation of Miss Landsley, of Greenwood, to visit her and explore the very interesting group of mounds and earthworks on the Landsley estate. Here I was most hospitably entertained at the Greenwood Seminary, presided over by Miss Landsley, who gave me every facility in the prosecution of my work, and with the permission of her nephew, Dr. Samuel Crockett, the representative of the present proprietor of that portion of the old estate on which the mounds are located, I made, with the assistance of a large gang of negro workmen, very extensive explorations of the earthworks, during the following week. To Miss Henry Landsley, who was indefatigable in her efforts, and, with Miss Putnam, helped to oversee the workmen and take care of the numerous articles found, I am under great obligations. While to Dr. Crockett, Dr. Thompson, Professor Buchanan and several other residents, I was indebted for assistance and for specimens collected in the vicinity. To Professor Buchanan I owe the opportunity of presenting a careful plan of this interesting group of mounds, which will accompany the special report I am now preparing. It is sufficient in this place to allude to a few of the more important conclusions to which I am led by these explorations in Tennessee.

First The people who buried their dead in the singular stone graves in Tennessee, were intimately connected with, or were of the same nation as, those whose dead were buried in the mounds and cemeteries in Missouri, Arkansas and Illinois, and who made the pottery of which such a large amount has been taken from the burial places in those states. This is shown by the similarity of the crania, by the identity in material, patterns, and finish of the pottery, and by the shell carvings, etc.

Second This people sometimes buried the dead in cemeteries extending over large areas, and sometimes in mounds, but always, in this section of Tennessee, in graves made by placing slabs of stone so as to form a well made stone cist or coffin. The burial mounds are here formed by the accumulation of these stone graves in irregular tiers.

Third What have been called the graves of pygmies, as already shown by others, especially by Professor Jones, are simply
the graves of children, or of persons whose bones have been removed from a former grave and re-buried in a small grave.

Fourth The examination of the mounds at Greenwood, near Lebanon, which were inside an earth embankment enclosing an area of several acres, proves conclusively that in this case (and by inference in all other similar earthworks of which several have been described in the state), the earthwork with its ditch was the remnant of a protecting wall about a village, inside which the houses of the people were built, and then dead buried. Also that the large mounds similar to the one in this enclosure (which is 15 feet high by about 150 feet in diameter) were for some purpose other than that of burial, possibly connected with the religious rites or superstitions of the people, or the erection of a particular building, as shown by the fact that before this large mound was erected a very extensive fire had been built upon the surface, over which the mound was raised, while the remains of burnt bones and other evidences of a feast were apparent also from the remains of a stake of red cedar. Again, after the mound had been erected to the height of seven feet, another similar and extensive fire had existed, leaving the same evidences of burnt bones, etc., with the addition of burnt corn-cobs. The mound had then been completed, and my removal of probably about one-third of it did not reveal any evidence of its having been used for burial or for an ordinary dwelling, though it is very likely to have been the location of some important building, and the extensive fires, which had twice nearly covered its whole area, might have been owing to the destruction of such a building by fire.

Fifth. The houses of the people were circular in outline, from fifteen to forty feet in diameter, and probably made entirely of poles covered with mud, mats or skins, as their decay has left simply a ring of rich black earth, mixed with refuse consisting of bones, broken pottery, etc.

Sixth. In the Greenwood enclosure the children were always buried within the house, while the graves of the adults were together, forming a low mound.

Seventh. This nation, known as the Stone Grave people in Tennessee, and the Mound Builders in Missouri, were advanced in the primitive arts, and probably cultivated the land to some extent. Of all the people of America, east of the region of the Pueblo race of New Mexico, they were the fairest advanced in the ceramic
art, and were good workers in and carvers of stone and shell. Judging by their earthworks, they were not so numerous a people as the Mound Builders of the Ohio valley. Judged by their works in pottery, their carvings in shell and stone, and their chipped implements of stone, they were in a period of development corresponding with that of their neighbors on the Ohio. They did not burn then dead, as was undoubtedly the custom to some extent among the Ohio Mound Builders. They were workers in copper which they must have obtained by trade or by long excursions. They also had shells from the Gulf or southeastern coast, and used them very extensively in the manufacture of beads and ornaments. They also understood the method of perforating pearls, of which seven were found in the grave of a child. To their children they were evidently attached, as exemplified by the care with which they were buried within the house, and the value of the articles placed with them.

Eighth The Stone Grave people of Tennessee judging by the entire absence of articles of European make in the hundreds of graves that have been opened, never came in contact with the white man.

The people may have been the ancestors of some of the numerous Southern nations that existed at the time of the discovery of the country, as suggested by the similarity in the customs given in the early accounts of the Southern tribes having a similar geographical distribution, further than this there is nothing by which to prove the identity of the Stone Grave people with any of the Southern tribes known to history, though it is probable that in some of them their descendants existed.

In concluding this report I have the pleasure of presenting a second paper of the important series on the Ancient Mexicans, by Mr Bandelier.

Respectfully submitted,

F. W. Putnam,
Curator Peabody Museum

Cambridge, Mass., Feb 16 1878
Additions to the Museum


1877. Coat of chain armor from Japan — Collected by Mr. Joseph Hill, of Hugo, Japan, and presented by Mr. Thomas G. Cary, Cambridge, Mass.


1877. Fragments of chain from the banks of the Tennessee River near Chattanooga, Tenn. — Collected and presented by Mr. F. A. Straight, Chattanooga.

1879. An animal-shaped stone pan, usually called "Melate" from a grave in Chiriqui, Panama. This pan is perfectly horizontal, stands upon four animal-shaped legs, is 1.74m. high, and to it is attached the head and tail representing a panther. The head and tail which is carved over and joined to the right hind foot are all ornamented with geometrical figures and dots. The outside of the four upright sides of the pan or body of the animal is similarly ornamented. The pan itself is a parallelogram, 21.44m. long, 18.5 broad, and 20 deep at the centre. The sides are thin at the top, wide towards the base and gradually curve into the bottom which deepens towards the centre — Collected and presented by Commodore Foxhall A. Parker, U. S. Navy.

1880. Human head, carved from dolerite and covered with two coats of paint, the inner one red and the outer, black. The figure represents the head and neck of a man, and around it the skin of a puma or "American lion" is so arranged that the upper jaw of the animal rests on the forehead of the human face. A pendent hangs from the top of the head down to the shoulder just behind the left ear — Found in a cave near Acapulco by Dr. Stearn, about 1850, and presented by Commodore Foxhall A. Parker, U. S. Navy.


*This interesting sculpture has been described by the Curator in the Bulletin of the Essex Institute, for 1877.
11083—11193. A collection of coins and medals from China, Corea and Japan, but chiefly from the former country. They were issued at various dates and under different dynasties, ranging from the 3d century B.C. under the Han Dynasty, to that of Ta Sing in the year 1850 of the Christian era. The inscriptions on some of the Temple Medals are expressive, for instance, on one we find the legend "Drive off evil thoughts," on another "Peace and Tranquility, together enjoy."—Collected by William C Hunter of Canton, China, and presented by Mr. Percival L. Everett, Boston, Mass.

11194—11246 A collection of pottery from the mounds in southeastern Missouri, consisting of most of the well-known forms that have given to the pottery of that region its distinctive character. Many of these were figured and fully described in the Eighth Report of the Museum, to which the reader is referred.—By Purchase.

11247—11248 Rude stone implements and specimens of natural fracture from the gravel near Trenton, N. J.—Collected and presented by Dr. C. C. Abbott, Trenton, N. J.

11249—11250 Human cranium and bones found with it, probably Indian, from a grave at Peter's Falls, West Andover, Mass.—By Purchase.

11251 Photograph of the foot of a Chinese lady, artificially deformed.—Presented by Col. Thaddeus Lyman, Boston.

11252 Human cranium from a mound near Lynsville, Wisconsin—Collected by Judge Samuel Murdock and presented by Mr. B. W. Poinsett, Jamaica Plain, Mass.

11253—11261 A drum, models of bawulhas with one and three holes, parha of reindeer skin, fur coats, with and without hoods, boots of seal skin, a throwing stick and a spear, all from the Fishiloff Islands.—By Purchase.

11262—11263 A wooden mask from British Columbia, and stone arrowheads from Cotuit, Mass.—Presented by Mr. Holmes Hinckley, Boston, Mass.

11264—11266 Rude stone implements from the gravel of New Jersey—Collected and presented by Dr. C. C. Abbott, Trenton, N. J.


11268—11278 Hammerstone, muller, grooved stone axe and fragments of ornamental pottery from Cumberland Gap, Tennessee, pyrites and mica from an Indian grave, stone lined in Lee County, Va., collected by Mr. Charles B. Johnson, of Gibson's Station, Lee County, Virginia, burnt bones, flint chips and broken arrowheads and a hammerstone from Turner's Mound, Bell Co., Ky., fragment of a tube of steatite from Claiborne Co., Tennessee—Explorations of Mr. Lucien Cary, conducted for the Museum.

11279—11280 Rude stone implements from the New Jersey gravel—Collected and presented by Dr. C. C. Abbott, Trenton, N. J.

11281 Stone implement from Newburyport, Mass.—Collected and presented by Mr. Alfred Osgood, Newburyport.

11282 Photographs of the "Gass Tablets," the originals of which were
found by the Rev J. Gass in a mound near Davenport, Iowa—By Purchase.


11284—11291 Rude stone implements from the gravel, stone arrowheads, spearspoints, knives, drills, scrapers, sinkers, chips and unfinished implements from the surface near Trenton, N.J.—Collected and presented by Dr. C. C. Abbott, Trenton.

11322—11333 Stone arrowheads, spearspoints and knives, a perforated stone and a stone tube, probably a pipe, from Lawrence, Mass., a metal button found with cranium No. 11219, at Peter's Falls, West Andover, Mass., an Indian pipe made of wood from the Rocky Mountains—By Purchase.

11344—11357 Four human bones from Ancon Peru—Collected in 1875 by Mr. S. W. Garman and presented by Mr. Alexander Agassiz, Cambridge, Mass.

11358—11361 Catawba and human bones from Haunted Cave, Edmonson Co., Ky., from rock house near Hardinsburg, Ky., and from mound in Bell Co., Ky., fragments of pottery, stone flakes and arrowheads from the banks of the Ohio River—Collected by Prof. N. S. Shaffer and Leslie C. Cut, and deposited by the Kentucky Geological Survey, N. S. Shaffer, Director.

11382—11386 Fragments of cranium and pottery and shells from caves in Lee County, Virginia, and Claiborne County, Tennessee, fragment of copper band from a grave near Gibson's Station, Lee County, Va., collected by Mr. Charles B. Johnson of that place, fragment of cranium showing three fractures from Haunted Cave, Edmonson County, Ky., stone arrowhead and animal bones from a mound in Bell Co., Ky., a worked bone somewhat charred and a blunt arrowhead from near Pleasant Hill, Ky., collected by Miss Paulina Bryant of that place—Explorations of Mr. Leslie C. Cut conducted for the Museum.

11377—11378 Cherted Indian coin and a piece of the antler of a deer from the Ely mound, near Rose Hill, Lee Co., Va.—Collected by Mr. Wm. P. Bates and presented by the Rev. S. B. Campbell of that place.

11379—11383 Sketches of scenes in Tokyo, of wrestlers, fishes, birds, flowers and animals from Japan—Collected by Mr. Joseph Hego and presented by the Museum of Comparative Zoology, Cambridge, Mass.

11384—11387 Sketches of hawkings of foreigners and their customs, and of different subjects and scenes, some colored from Japan—Collected by Mr. Joseph Hego, of Hego, Japan and presented by Mr. Thomas G. Cary, Cambridge, Mass.

11388 Rude stone implement from the New Jersey gravel—By explorations conducted for the Museum by Dr. C. C. Abbott.

11390—11450 Earthen pots for cooking and fragments of pottery, plain and ornamented, some in color, stone drills, clubs, scrapers, arrowheads, spearspoints, disks, pestles and metates, hammer and stickstones, and rude stone axe with chips and unfinished implements also of stone.
chips and cotes of obsidian, and bone awls, from a mound near St
George, Utah, specimen of salt from mine one hundred miles south of
St George, worked by the Pai-Ute Indians, seeds and plants used as
food or medicine or in the domestic arts by the same Indians —Explora-
tions of D. E. Palmer, conducted for the Museum

11451 Fragment of a carved stone from Newburyport, Mass —Col-
lected and presented by Mr. Nathaniel Little of that place

11452 Skull of a Yankton Sioux Indian — Presented by the Army
Medical Museum, Washington

11453—11462 Hammerstones, flat, round, and oval, speare-points,
arrowheads and scrapers of stone from Reading, Penn — Collected and pre-
seated by Mr. A. F. Blinn, Reading Pa

11463—11465 Grooved stone axes and a stone knife from Maryland —
Collected and presented by Prof. Charles E. Monro, Annapolis, Md

11466 Photograph of stone implements — Presented by Mr. H. L. Ely,
Lebanon Co., Penn

11467 Photograph of a cranium imperfect, from a mound near Iowa
City, Iowa — Presented by Prof. Francis E. Nigh, St Louis, Mo

11468 Six grooved stone hammerstones from Oconto, Lake Superior —
Presented by Prof. Alexander Agassiz, Cambridge, Mass

11469—11484 Stone discs, one of them bi-concave and 86 mm thick;
hammerstones, oval and round, with and without finger pits, stone muller,
paste and celts, and one small grooved stone from Marion Co., Tenn.,
stone hoe and piece of hematite from Jackson Co., Alabama — By Pur-
chase

11485—11486 Stone pipe with animal head carved on it, and a carved
and perforated polished stone ornament from Bales' Mills, Lee County,
Va — Collected and presented by Mr. J. B. Bales, Bales' Mills, Va

11487—11502 — Fragments of pottery, bone awls, stone mullers, discs,
knives, arrowheads, and spearpoints of different patterns from Lee
County, Virginia — Collected and presented by Mr. Charles B. Johnson,
Gibson's Station, Lee County, Va.

11503—11515 — Grooved axes of stone and hematite, stone celts, disks,
hoes, scrapers, drills, spearpoints and arrowheads from Gasconade
County, Missouri — By Purchase

11516 Small earthen cone, perforated, found in Athens, Greece, near
the old wall — Collected and presented by Prof. Clement L. Smith,
Cambridge, Mass

11517—11611 Large oval flint implements found in a deposit with one
thousand others, while digging a cellar on Main St., Beardstown, Illinois,
and described by D. J. F. Snyder, in "Report of the Smithsonian Insti-
tution" for 1876, p. 488, rude stone implement from the gravel, grooved
stone axes, celts, pestles, hammerstones, round and oval, slickstones,
hoes, drills, knives, scrapers, arrowheads and spearpoints from the surface
near Trenton, N. J., fish spears from Crosswell's creek, Burlington Co.,
N. J., human face carved on stone from an Indian burial ground near
Vincentown, Ocean Co., N. J., rude flint implements from Jeffersonville,
Indira, collected by Mr. Orondo Honns, rude flint spearpoint, one of a deposit of forty, found three feet below the surface in Isle of Wight County, Va., in Mr. C. B. Havens, of that county — Presented by Dr. C. C. Amory of Trenton, New Jersey.

11612—11619 Rude and broken stone implements from Reading, Pa., Indian corn, a spindle ball of thread and a wooden implement from graves at Ancon, Peru — Presented by A. T. Blain of Reading, Pa.

11620—11623 Three grooved stone axes and a stone celts from Brookville, Indiana — Presented by Dr. John Dixwell, Boston, Mass.

11624—11629 Wai club snow shoes, necklace of beads and bear claws, an iron tomahawk, and a pipe of the modern Indians, sash from Mexico, necklace of beetles' wings from Brazil, clubs from Guiana, S. America, clubs, paddles, spears, shark's tooth dagger, stone axe mounted, the handle exquisitely carved, and other articles, also ornamented from South Sea Islands, boomerangs, and waddy from Australia, bow and iron pointed arrows from China, Ghoorka, 'kookery' from Hindostan, Malay Creese, wooden pillow, knob kerrie, necklace of beads, and needle with leather sheath of case, probably from Africa, water jar from the Western Islands, bow and wooden pointed arrows probably from the Pacific Islands.

—Presented by Miss John Dixwell, Boston, Mass.

11640—11649 Earthen burial vases and toys made of same pattern, earthen bowls and vases of different colored clay ornamented in colors, some with grotesque human faces, fragments of pottery, broken stone implements, and heads of shell, pottery and jade, etc, from Ometepe Island, Lake Nicaragua — Collected by Dr. Blansford, U. S. Navy, and presented by the Smithsonian Institution.

11692 Tappa Cloth from Filangan Island — Collected by Capt. J. S. Knowles, of San Francisco, and presented by Miss. Lucy Cane, Cambridge.

11693—11700 Eight earthen pots some in human form and others with animal and human heads only, from the burial places in southeastern Missouri — By Purchase.

11701 Bowl ornamented with red and black bands, made in the interior of Mexico, about ninety leagues from Atzapo — Presented by Prof. O. C. More, New Haven.

11702—11703 Stone arrowheads from Longwood, Jumquin County, Virginia — Collected by Miss Sarah Hoop, and presented by Mr. Hugh Thomas Douglas, Catlett's Station, Va.

11704—11709 Ponchos, scarf and blankets made from the fleece of the vicuna, alpaca and common sheep, by the modern Aymara Indians, near Puno, Peru — By Purchase.

11710—11713 Stone pipe on which is carved the likeness of an animal and human figures from Rockford, Illinois, collected by Mr. F. W. Krugell, of that place, polished slick stone, six stone celts, and five grooved stone axes, one of them very small and one highly polished, hammer stones grooved and plain, round and oval, with and withoutinger pits, stone mullers, pestles, spear points, scrapers, knives, arrowheads,
chips and cores and implements, of worked stones of unknown use, some perforated, an unflashed carved stone, bird shape, rude stone implements from the talus at the foot of the gravel bluff, fragments of pottery and two earthen pots of the same kind of clay and general style of workmanship as those found in the mounds of southeastern Missouri, all from Trenton, N J — From researches conducted for the Museum, by Dr C C Abbott.

11764—11770 Grooved stone axe, fragment of a pipestem of clay, stone arrowheads, speckpoints and broken and unflashed implements of same material from Trenton, N J — Collected and presented by Master Richard M Abbott of Trenton, N J.

11771—11793 Arrowhead and broken implements of stone, stone celts, disk, and worked stones, some polished, some grooved and others perforated, a piece of worked coal, fragments of pottery, columella of shell, bone implements, and a small stone pipe from the banks of the Tennessee River, arrowheads speckpoints and knives of flint from Cherokee Co, N C — By Purchase.

11794—11800 Discoidal stone from a mound near Carthage, Alabama, found in an earthen pot now preserved in the National Museum at Washington and a plummet-shaped implement also from a mound in Alabama — Collected and presented by Prof N T Lupton, of Nashville, Tenn.

11796 A small ball of hematite, from Tennessee — Presented by the Editors of the Nashville American.

11797—11800 Flint knife, perforated shell, and shell beads — Collected by Mr E Curtis, from a cave on the Cumberland River, and presented by Gen G P Thruston, Nashville, Tennessee.

11801 Ornamented shell disk with scalloped edges from Nashville, Tennessee — Collected and presented by Col J D Morgan of that city.

11802—11803 Fragment of pottery, and a speckpoint of flint from Falls of the Ohio — Collected and presented by R S Robinson, Esq., Fort Wayne, Indiana.

11804 Small implement of hematite, hemispherical in shape, Nashville, Tennessee, near Love Mound — Collected and presented by Mr Thomas B Bartol, Nashville.

11805—11807 Scalpel, speckpoint and knife of flint from Lebanon, Tennessee — Collected and presented by Mr Stephen Simms, Lebanon.

11808—11813 Earthen pot with two handles, animal bones, shell of Busycon, fragments of pottery and human femur from a cave near Rome, Tenn — Collected and presented by Dr J L Thompson, Lebanon, Tenn.

11814 Skull of a Comanche Indian — Presented by Dr T. O Summers, Nashville, Tenn.

11815—11816 Skull and a stone celt from Mr Overtone's Farm, six miles from Nashville, Tennessee — Presented by Mrs John M Overtone, of that city.

11817—11819 Shell disk arrowhead of flint, and a discoidal stone of quartz, from a stone grave on Mr Overtone's Farm, six miles from Nashville, Tenn — Collected and presented by Mr Edward Cross, Nashville.
11820—11822 Skull fragment of pottery and stone knife drill scraper and arrowheads from a field near Love Mound, near Nashville, Tenn.—Collected and presented by Major J. H. Cochran, Nashville, Tenn.

11824 Skull from stone graves on the site of Fort Zollicoffer, Nashville, Tenn.—Collected and presented by R. S. Robinson, Esq., Fort Wayne, Indiana.

11825—11828 Fragments of copper, shell, and pieces of pottery from stone graves on the site of Fort Zollicoffer, Nashville, Tenn.—Collected and presented by Mr. H. N. Rust, Chicago, Ill.

11829—12102 Collection of human remains, pottery, implements, and ornaments of stone, bone, shell, etc., from mounds and stone graves in Tennessee.—Explorations of the Curator, for the details of which see special report.

12108—12277 A collection of articles in use among the Pah Ute Indians, including hair brush, rabbit net and skins used in stretching it, a cradle board, water jar made of basket work and lined with pine gum, baskets of different shapes and patterns, some of them in the form of bowls are water tight and used in cooking others with fans attached are worn on the back and used in gathering seeds, hats and sandals of the same material, paint, bows and arrows with wooden, stone and iron points, metates and grinding stones, earthen cooking pots, a bed made of strips of juniper bark, spoon made of horn, and seeds and plants used as food or medicine. An earthen pot filled with strings, cooking stone, corn cobs, pine nuts and roasted agave, fragments of pottery, small earthen pig, small basket and a small shovel made from the horn of a mountain sheep and mounted on a long wooden handle from a cave near Johnson, Kane County, Utah. Earthen bowls of colored pottery and fragments and disks of the same, bone awl, red, white and yellow paint, shell ornament, arrowheads of chalcedony, obsidian cores and chips, animal and human bones, metate, plain earthen cooking pot, from mound near St. George, Southern Utah, earthen pots and bowls, said to have been found south of Santa Fe, New Mexico, purchased from Mrs. J. L. Bailey, Salt Lake City, also a collection from mounds at Paragonah and Payson, Utah.—Explorations of Dr. E. Palmer: conducted for the Museum.

12278 Stone celt from Davidson County, Tennessee.—Presented by Mrs. C. W. H. Gutschart, Nashville.

12279 Stone mask from Palenque, Yucatan.—Collected by Hon. J. R. Poinsett and presented by American Academy of Arts and Sciences, Boston.

"In his notes on this collection Dr. Palmer says "The Pah Ute Indians of today do not make my pottery. Some time since I persuaded an old squaw to reproduce from memory the cooking pot (Museum No. 914) such as was formerly manufactured and in use among them and I unwrked it to you. By comparing it with No. 1218 (of which it is aetable model in miniature) you will see how very inferior it is in quality and workmanship, thus showing how soon former arts are forgotten when once they have ceased to be of daily practice."
12280. An inscribed stone from near Quilhuanan, Peru — Collected and presented by Mr. Edward A. Fint, Boston
12281. Rude implement from the gravel on Decon's farm near Trenton, N. J. — Collected and presented by Dr. C. C. Abbott.
12282-12283. Clubs made of grooved stones, with handles attached, Modern Sioux Indian — Collected and presented by Mr. J. A. Allen, Cambridge, Mass.
12284. Fan from the Hawaiian Islands — Collected and presented by Mr. J. Q. A. Johnson of Cambridge, Mass.
12285-12286. Scrapers and broken implements of flint from Sedalia, Missouri — Collected by Mr. F. A. Sampson and presented by Dr. C. C. Abbott, Trenton, N. J.
12287-12294. Stone celts from Swanton, Vt., shell and copper heads from Highgate, Vt., collected by the late Prof. J. B. Perry, stone implements from Cevia, Brazil — Presented by the Museum of Comparative Zoology, Cambridge.
12295-12347. Skulls, earthen pot and stone pipe from Bell's Bend, Davidson Co., Tennessee, skulls and human and animal bones, earthen pots, dishes and jars, ornamented and plain, similar to those found in the mounds and burial places of southeastern Missouri, shell spoon, discoidal, sharpening and hammerstones, stone celts, arrowheads and spearpoints, burnt clay and charred bones from grave mounds on Miss Bowling's farm near Nashville, Tenn. — Collected by Mr. E. Currier in continuation of the explorations of the Curator for the Museum.
12348. Perforated stone-weight for digging suck from Central America — Presented by Mr. S. W. Garvan, of Cambridge.
12349-12354. Two skulls of Indians and other human bones, bone implement and animal bones from shellheap on Great Deer Isle, Maine. — Collected and presented by Mr. Manly Hardy, Brewer, Maine.
12355-12359. Photographs of arrowheads and bowls of stone from N. America, and of Indian picture writing, or rock inscriptions at Bellows Falls and Brattleboro — Presented by Prof. E. Hitchcock, Amherst, Mass.
12360-12388. Collection of typical pottery from the mounds in southeastern Missouri — By Purchase.
12389. Native copper from the Calumet and Hecla Mine, Lake Superior — Presented by Mr. Alexander Agassiz, of Cambridge.
12390-12796. A collection from the fresh-water shellheaps and mounds of Florida. This collection is of special interest as it is that upon which is based Professor J. Wymans important memoir upon the "Fresh-water Shellheaps of the St. John's River," to which the reader is referred. It was made almost entirely by himself during his visits to Florida in the years 1869-1875, and at the time of his death he was engaged in preparing it for entry in the catalogue of the Museum.
12797-12825. Cistana and human bones, shell and stone implements, earthen jars and vases from graves on T. F. Wilkinson's farm near Nashville, Tennessee — Collected by Mr. E. Currier in continuation of the explorations conducted for the Museum by the Curator.
12826 Flint dagger 234 mm long from a stone grave in a burial mound on Mt T E Wilkinson's farm on Mill Creek, nine miles from Nashville, Tenn. —Collected and presented by Mr JOHN B EDMONSON, Nashville.

12827—12861 Rude stone implements from the gravel, stone arrowheads, spearpoints, knives, scrapers, celts, grooved stone axes and round and oval hammer-stones from the surface, patinated stone ornaments, human face carved on stone and fragments of pottery, from the surface near Trenton, New Jersey —Explorations of Dr C C ABBOTT conducted for the Museum.

12862 Rude stone implements from a cave near Benat, Syria —Collected and presented by REV. S. W. SALERI, Andover, Mass.

12863 Human face in pottery from Gravina —Collected and presented by Mr S W GARMAN, Cambridge.

12864 Three photographs of Pelew Islanders —Presented by Prof CARL SIMPFE, Wurtzbug, Germany.

12865 Three photographs of palataline implements —Presented by Dr R P GRAY of Coles, Buntingford, Herts, England.


12867 Figure of grotesque animal from a temple outside of Pekin —Collected by Hon FRANCIS P KNIGHT of Pekin, and presented by Mr THOMAS G CARY, Cambridge.

12868 Fragment of an Indian belt, ornamented with copper from a grave at Harpswell, Maine —Collected and presented by Dr T R PARME.

12869 Double stone mortar from Taunton, Mass —Collected by Dr A. WARD of that place, and presented by Prof J B S JACKSON, Boston.

12870 Terracott a cup, from a grave on Mt T E WILKINSON's farm near Nashville, Tenn. —Collected by Mr T E CUMMINS, in continuation of explorations for the Museum, conducted by the Curator.

12871 Five photographs of skulls found in a mound near Urbana, Ohio —Collected and presented by THOMAS F MOSS, Cur. Sec. of the Central Ohio Scientific Association.

12872—12878 Stone arrowheads, knives, spearpoints and rude implements, also a broken stone cel. from Lancaster County, Pennsylvania, collected by Mr EDWARD HURST —Presented by Dr C C ABBOTT, Trenton, N. J.

12879—12888 Fragments of pottery stone knives, dolls, arrowheads and spearpoints from the banks of the Tee River, N. C. —Collected and presented by Mr W R CAMP, Brookline, Mass.

12889 Shell heads (Oblivilla lymbida) from California —Collected and presented by REV. S. BOWERS, and presented by Mr L A BARNES, West Chester, Pa.

12890—12891 Cases of human heads carved in stone, from Ohio and Greenup County, Kentucky, of a grooved axe from W. R. Virginia, of a bronze stone, from Indiana, and of a patinated and carved cylindrical stone found near Maysville, Ky —Presented by Dr H H HURL, of Cincinnati, Ohio.
12895—12944 A collection of earthen jars, vases, cups, bottles, etc., from the mounds and burial places in southeastern Missouri, also three specimens of similar workmanship from northeastern Arkansas—By Purchase

12945—13009 Tobacco from Japan, collected by Commodore Perry, fruits, vegetables, seeds, etc., used as food or medicine, or worn as ornaments by the Indians in Southern Utah, California New Mexico, Alaska and the Plains—Collected by Major J W Powlett, Dr. E. Palmer, Governor Army, General Ewing, Mr. V Cooney, Mr. L Stone Rev. S Bowers, Mr. J G Swan and Mr. J B Menneil—Presented by the Smithsonian Institution

13004—13012 Stone spearpoints, a sinker, celt, gouge and arrowheads of stone from Lynn and Ipswich, Mass., and a perforated stone implement from the latter place—By Purchase

13018 Earthen taza from near Cumae, Italy—Presented by Dr Ignazio Cesi, Capt, Italy

13014 Skull and lower jaw, the former showing bullet holes, from Tennessee—By Purchase

13015—13033 Bones of animals, implements of teeth and horn, and fragments of pottery, plain, cord marked, incised and punched and two specimens colored with pinabab from a shellheap in Japan—Collected by Prof L S Morse and Parry and presented by the Imperial University of Tokyo

13034 Malay dagger—Collected by Capt Charles S Hunington and presented by Henry W Daniell, Esq, Boston

13035 Cast of a carvings in stone representing a combination of an animal and human head and a beetle, from the original found near Canajoharie, New York—Presented by M A G Richmond of that place

13036 Cast of a "Phallus" found in a mound on Clinch River, East Tennessee—Presented by R. S. Robertson, Esq., Fort Wayne, Ind

13037—13115 A collection from an ancient cemetery on the Bay of Chacota, one and a half miles south of Arica, Peru, consisting of several "mummies," and the articles found buried with them. This collection was made in 1836 by Mr. John H Blake, of Boston Mass, and is elsewhere described in a special report by that gentleman—Presented by John H Blake, Esq., Boston

13116—13565 A number of human skeletons and a large and valuable collection of implements and ornaments of stone, bone and shell of native manufacture, also glass beads of different patterns, and implements and ornaments of horn, brass, etc., evidently obtained from Europeans, all from burial places on the Islands of San Clemente and Santa Catalina, off the southern coast of California—Explorations of Mr. Paul Schu- macher, conducted for the Museum

13566—13547. A similar collection from the Santa Barbara Islands and the main land, made by Messrs Schlemacher and Bowers, and also by Lt. Wheelers party—Partly in connection with the joint explorations conducted for the Museum and the Smithsonian Institutions—Received from the Smithsonian Institution
18348-18910 Plaster casts of the heads of sixty-three Indian and Mexican captives made by Mr. Clark Mills for the Museum in connection with the Smithsonian Institution

18911-18920 Arrowheads, mullers, hammer-stones, gouges, axes, celts, and plunger-shaped implements of stone, and fragments of pottery from Ohio, a carved stone, and fragments of pottery representing human faces from near Evansville, Indiana (the "Unsicker" collection) —Presented by the late Prof. Jefferson Wyman

18921-18925 Paper money, copper, silver and tin coins, used by the Russians in Alaska — By Purchase.

Additions to the Library

From the Hon. Robert C. Winthrop Popular Science Monthly from May, 1872 to April 1874 4 vols. 8vo North American Stone Implements, and Ancient Aboriginal Trade in North America 2 pamphlets, 8vo by Charles- Ray Mémoires de la Société Royale des Antiquaires du Nord Nouvelle série, 1875-1876 1 vol., 8vo Aarboger for Nordisk oldkunst og Historie udgivne af det Kongelige Nordiske Oldskibselskab Parts 1, 2, 3, 4 of 1875, and 1, 2, 3, 4 of 1876 Two vols., 8vo

From the Author Increase Allen Lapham—a Memorial read before the Wisconsin Natural History Society, by Charles Mann Pamphlet, 8vo, 21 pp

From the Academy of Natural Sciences, Davenport Iowa Lithographic copies of engraved stones, known as "the Gass Tablets" with an account of the circumstances under which the originals were found in a mound near Davenport Iowa

From the Society Sitzungsberichte der Akademie der Wissenschaften zu Köenigsberg in Prusia Zu Königburg in Pr. for the years 1874-1875 and 1875-1876 2 pamphlets, 12mo Preussische Steinergähte und sein Tafeln photographirt von Hermann Prothman, als Beitrag zur Archaologie altpreussens herausgegeben und erläutert von Dr. Georg Bugack Z. Z. vorsitzenden der Prüssischen Pamphlet, 11 pp., 8vo, with 5 plates

From the Author Prehistoric Wisconsin, and the Westphalian Medal — 1648, by Prof. James D. Butler Pamphlet, 8vo, 31 pp

From the Society Proceedings of the Literary and Philosophical Society of Liverpool, during the sixty-fifth session, 1875-76. No XXX 1 vol. 8vo pp. 302 London and Liverpool, 1876

From the Museum Noticia Historico-descriptiva del Museo Arqueológico Nacional publicada siendo director del mismo Dr. excmo, senor Don Antonio García Gutierrez Madrid, 1876 1 vol., 8vo, pp. 210

From Gen'l A. A. Humphrey, Chief of Engineers, U S Army Annual Report upon the Geographical Surveys west of the one hundredth Meridian, in California, Nevada, Utah, etc., etc., by George M. Wheeler, First Lieutenant of Engineers, U S Army 1 vol., 8vo, pp. 355 Washington, 1876

From the Department of the Interior Invertebrate Fossils by F. B. Meek,

From the Society Archivio per l'Antropologia e la Etologia, organo della Società Italiana di Antropologia e di Etologia pubblicato dal Dott. Paolo Mantegazza, Professore ordinario di Antropologia Nel R Instituto Superiore in Firenze Fascicoli 3 and 4, Vol VI, and Fascicoli 1, 2, 3 and 4, Vol VII


From Dr. Samuel A Green Report of a Medical Commission on the Sanitary Condition of Boston Pamphlet, 8vo, 199 pp, Boston, 1875

From the Author Stone Age of New Jersey, by Charles C Abbott, M D, Trenton, N J 1 vol, 8vo, 144 pp, with plates

From the Author Researches in Prehistoric and Protohistoric Comparative Philology Mythology and Archaeology, in connection with the Origin of Culture in America and the Accad di Sumerian Families, by Hyde Clarke Pamphlet, 8vo, pp 74 London, 1875

From the Museum Seventh Annual Report of the Trustees of the Metropolitan Museum of Art, New York 1877 Pamphlet, 8vo, 47 pp

From the Society Berichte Zu Anthropologie und Urgeschichte Bayerns, organ der Münchener Gesellschaft für Anthropologie, Ethnologie und Urgeschichte 1 Band, 1, 2, 3 u 4 Heft München, 1876-1877

From Dr. John Daniel of Boston Découverte d’un Squelette humain de l’Époque paleolithique dans les cavernes des Baoussé-Roussé dites Grottes de Menton par Émile Rivière Paris, 1875. Pamphlet, 4to, pp 64, photographic plates

From the Author The Rockford Tablet, by J D Moody, Mendota, III Pamphlet, 8vo, pp 5

From the Author Fugitive Essays, by Col Charles Whittelsey, of Cleveland, Ohio 40 pamphlets, 8vo

From Colonel Charles Whittelsey History of the 20th Ohio N V Infantry, from 1861 to 1865, by D W Wood Mount Vernon, Ohio Pamphlet, 8vo, 70 pp Tracts 1 to 26, read before the Western Reserve and Northern Ohio Historical Society, 1870-1877 1 vol, 8vo Proceedings of the Cleveland Academy of Natural Science, 1845 to 1859 1 vol, 8vo, pp 298. Published by a gentleman of Cleveland, 1874

From Count L F Pomtides Catalogo N 1 Raccolta degli Oggetti de cosi detti tempi preistorici compilato da Ignio Cocchi Firenze, 1872. Pamphlet, 8vo, pp 102, with IX Lithographic Plates

From the Author On some Fragments of Pottery from Vermont, by George II Perkins Pamphlet, 8vo, pp 11.


From the Author. Notes on Climate of the Botany of Formosa, and the Arrow Poison of the Amos. 2 pamphlets, 8vo, by Stuart Eldridge, M. D.

From the Trustees. Proceedings of the Trustees of the Peabody Education Fund at their annual Meeting in New York, Oct. 3d, 1877. Pamphlet, 8vo, 50 pp.


From the Author. Notice of an interesting relic of Mexican Sculpture, by F. W. Putnam Pamphlet.

From the Society. Baltische Studien, herausgegeben von der Gesellschaft für Pommerische Geschichte und Alterthumskunde Stettin 1877. 1 vol., 8vo, pp. 103.

MEASUREMENTS OF THE CRANIA RECEIVED DURING THE YEAR


Particular attention is called to the height of this skull and the development of the base of the occiput as it is a case in which the index of height falls to give anything like a correct idea of its form. To appreciate this thoroughly, its height should be compared with its width and not with its length or should be taken absolutely without any reference to the other dimensions. In this latter respect we find that it exceeds anything received during the year. The nearest approach to it is in No 11 857 from Tennessee, which is 152" high from a mound near Lynnvile, Wis.—Collected by Judge Samuel Murdock and presented by Prof. B. W. Putnam, Jamaica Plains.


No 12 241. Calvarium imperfect. Probably a male. Length 174. Breadth 150. Height 124. Width of Frontal 95. Index of breadth 862. Index of height 712. Several small Warren bones in the lamboidal suture. Contrast this skull with No 11 272 and it will be seen that in height and breadth it is at the other extreme. In that the height exceeds the breadth by 25", whilst in this, it is 26" less. Considered by itself, however, neither of the measurements in this skull is excessive, as we find crania from California that are lower, and others from Tennessee.

1 The measurements of the crania here recorded were taken by Miss Jinx Smith and Mr. Louis Ober, assistants in the Museum.
2 Capacity in cubic centimetres; other measurements in millimetres. Index of breadth or height in thousands of the long diameter.
3 This measurement is taken so as to give the last width of frontal between the temporal lines, and not that of its greatest width which is approximately covered by the width of the skull measured through the parietals.

(221)
that approach it closely in breadth. It is of interest to note that both of
these skulls are from mounds. From a mound in Utah—Exploration of
Dr. E. Palmer conducted for the Museum.

No. 12,248 Cranium of a modern young Pah Ute woman. Capacity 1,046 Length 166 Breadth 124 Width of Frontal 87
Index of breadth 746 Index of height 740 Twenty-four distinctly
marked Woman bones in the lambdoidal suture. From Utah—Exploration
of Dr. E. Palmer conducted for the Museum.

No. 12,349 Cranium of an Indian Adult male. Capacity 1,375 Length 187 Breadth 146 Height 139 Width of Frontal 94 Index of breadth
.748 Index of height 743. From a shellheap on Great Deer Isle, Maine
—Collected and presented by Mr. M. Hardy, Brewer, Maine.

No. 12,350 Cranium of an Indian Adult female. Capacity 1,182
Length 174 Breadth 132 Height 126 Width of Frontal 95 Index of breadth
.758 Index of height 724. From a shellheap on Great Deer
Isle, Maine—Collected and presented by Mr. M. Hardy, Brewer.

No. 13,014 Cranium of an Indian, imperfect. Adult male. Length
157 Breadth 142 Width of Frontal 91 Index of breadth 904
Frontal much depressed. Parieto-occipital portion slightly flattened.
Right half of the coronal suture closed. Several Woman bones
developed in the lambdoidal suture. Perforated in several places by buck shot.
Found under a pile of stones on Moccasin Point near Chattanooga, Tenn.
—By Purchase.

The tables following, give comparative measurements of the two most
important collections of Crania received during the year, and are of
interest as showing the marked difference between the Indians of the
coast of California, and the ancient peoples of the south-western states.

The first table is derived from the collection made for the Museum, at
the Santa Barbara Islands, by Mr. Paul Schmarre.

The second table contains the measurements of sixty-seven Crania from
the stone-graves of the moundbuilders of Tennessee, and were either col-
lected in person by the Curator, or by Mr. E. Curtiss, who continued the
exploration under his direction. This important series of Crania is,
further on, discussed, at length, by Mr. Curtiss.
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<th>Cap. 9.0</th>
<th>Cap. 9.9</th>
<th>Front. 9.0</th>
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San Clemente

Santa Catalina

Maximum: 1860
Minimum: 1070
Range: 850

*These figures refer to the number of crania measured.
| Number | Left 1st Molar | Right 1st Molar | Left 2nd Molar | Right 2nd Molar | Brow Height | Brow Index | Height | Index of Height | Width of Brow | Sex | Height | Width of Brow | Stone Grave Near Nashville, Tenn | Stone Grave Near Nashville | Stone Grave Near Nashville, Tenn | Found in Mound Between Two Stone Graves Near Nashville | Found in Mound Near Nashville | Near Lebanon, Tenn | Near Nashville, Tenn | In Mound Near Nashville | In Mound | In Mound |
|--------|----------------|----------------|----------------|----------------|-------------|------------|--------|----------------|---------------|-----|---------|---------------|--------------------------------|---------------------------|---------------------------|----------------------------------|--------------------------------|---------------------------|----------------|----------------|-----------------|

* These figures refer to the number of Crania measured.
SECOND REPORT ON THE PALEOLITHIC IMPLEMENTS FROM
THE GLACIAL DRIFT IN THE VALLEY OF THE DELA-
WARE RIVER NEAR TRENTON NEW JERSEY

BY CHARLES C. ABBOTT, M.D.

Having, in my previous report, given you the details of such
investigations as I was enabled to make, extending over a consid-
erable portion of the present year, this, my second communi-
cation will cover the continuance of the series of examinations of
the same and other localities, to the close of the year—my later
work being but a repetition of that of the past season, but with
far more definite results.

While it will be necessary, to avoid all obscurity of statement,
to refer frequently, to the previous report it is not to materially
modify, or wholly re-call any statement there made. Every addi-
tional fact obtained during the past summer and autumn, only
confirm, I believe, the opinion there expressed, that we have, in
the rudely fashioned instruments there described, considered with
reference to their surroundings, an unquestionable trace of inter-
glacial man along the Atlantic coast of America.

In my earlier report, brief mention only, was made of many
interesting features connected with the characteristic implements
from the gravel deposits, and of the deposits themselves, which
I am now able, after more systematic exploration, and the dis-
covcry of a large number of additional specimens, to enter upon
in considerable detail, and without unnecessary repetition—so
far as my earlier communication covers this subject—shall en-
deavor to demonstrate conclusively the artificial origin of the
specimens of chipped pebbles discovered, to determine the geo-
logical age of the deposit of gravel in which they be embedded,
to indicate the co-equal age of the deposit and the paleolithic
implements it contains, and finally, endeavor to point out the pro-
rable racial belongings of the people that made and used these
rudest forms of implements of stone.

REPORT PEABODY MUSEUM, II. 15
Although the more specialized forms of implements since found, clearly bespeak the human origin of all, I have thought it best, to refer again, in some detail, to the many indications that the chipped pebbles, or rude stone implements, that occur in these gravel deposits, have been artificially produced. The more marked features of these specimens have already been pointed out, and although they are but little above the ordinary refuse of a modern quarry, and often quite closely reproduced by the stone breaker, when fracturing rock for road-bed with a hammer, it must be borne in mind that these are artificial forces operating on the stone; and further, this absence of careful workmanship is not wanting in the more recent productions of the Indians, and from graves of the aborigines in Massachusetts, from the stone graves in Tennessee, as well as from surface "finds" in Missouri, are several specimens — now in the Peabody Museum — which are in all respects, except the mineral used, identical with the more specialized examples from the Delaware River gravels.

There is, in all the specimens that I have collected, a considerable amount of weathering of their surfaces, the degree of which, varies but slightly in the whole series, except where other mineral than argillite occurs, when the alteration of the surface is much less, as in a very characteristic pointed pebble of quartzite, which is quite unchanged. It has been suggested that these chipped surfaces might have been produced by frost action, and the specimens of supposed implements therefore, only productions of nature. Given a single fractured surface, which a sudden blow, or the ordinary action of frost, might readily produce, and no reference to any other productive agency is required, but when we consider that instead of one, there are twenty or forty planes of cleavage, all equally weathered, and collectively an implement, as we call then unquestioned neolithic counterparts, has been produced, and we fail to see how nature, by any known or imaginable force, could so fashion either an oval pebble or angular fragment of rock.

In my previous report, it will be noticed that of the three specimens figured, as found in the underlying gravels, one is of flint, and found nearer the surface, than the larger argillite implements, from greater depths. The fact that the former was at a depth that exceptional circumstances might inhume ordinary Indian relics, and being of a different mineral than the characteristic forms
of the gravel, might lead one to believe that this more artistically chipped flint spear-shaped implement, was an "intuitive" relic of Indian origin. The general character of this gravel-bed, even at this shallow depth—six feet from the surface—where the flint specimen occurred, was such as to convince me, at the time, that the specimen had not gotten there subsequently to the deposition of the gravel itself. I fortunately had, at the time, an exceptionally good opportunity of examining the locality, and was satisfied that the gravel here reached the surface as is quite frequently the case, throughout the whole area of southern New Jersey. Boulders of large size were upon the surface and the side of the excavation from which I extracted the specimen showed by the close packing of the pebbles of every size, constituting the mass, that it was not a re-sorted, but an undisturbed glacial deposit. Immediately above it, i.e., on the same horizon, but not directly over it, and continuously to the surface were numbers of large stones, several of them containing from six to ten cubic feet. In such a mass and at such a depth, it is scarcely possible a spear-point of the later Indians could have reached. The fact that the specimen is flint, and not argillite has no bearing on the question of its being other than a paleolithic implement, as much as in all well-known localities in Europe, where paleolithic flints occur, there have been found occasional specimens made of other minerals. In the Clement collection, in the Peabody Museum, there is one such specimen that is, in all respects, identical with many from the gravel deposits of central New Jersey. As already mentioned, other examples of rude implements, not of argillite, have been collected, which are less elaborately wrought, but evidently designedly fashioned. Furthermore, many more specialized forms have been found, four of which are here figured.

Before closing the subject of the evidently artificial character of these rude implements of stone, it may be well, also, to call attention to many specimens of "chipped pebbles" which cannot be considered as implements, much as there is no trace of design in their present shapes. They are, indeed, chipped over the greater portion of their surface, but have no well-defined point or cutting edges. These irregularly chipped masses, usually of smaller size than finished implements, bear no evidence of being crushed, although glacial action probably exposes fragments of rock or ice-encased pebbles more to such crushing force than to
any other, except the rubbing against denser mineral, that results in deeply incised strie,—the so-called glacial scratches. The lithological character of argillite is such, that a given mass of this mineral, if exposed to a crushing force, will not fracture in such a way, as to resemble in any degree, a chipped pebble, such as are here referred to. When associated with the finished forms, and the same general character of weathering and of chipping is noticed on both, one cannot but consider them as identical, in origin, and I have, myself, no hesitation in classing such designless forms, principally as broken specimens, others as "failures," and in some instances as refuse chips, being in all respects the same forms that we find are so characteristic of the localities where neolithic implements of chert and jasper have been made.

The results of my collecting having been partially anticipated in the preceding pages, I will only remark that the number of highly finished implements is quite large, and that one of the effects of a remarkably violent storm, to which I shall again refer as having a somewhat important bearing upon the question of the age and origin of drift implements, was to expose an entirely new surface on the several bluffs where I have been accustomed to find these rude forms of chipped implements, both in place and in the loose material at the bases of them. From both positions, I have, in all, gathered about sixty specimens 1

The general character of most of these is much the same as of those described in my previous report, but several have been met with which present certain peculiarities, the more interesting from the fact that they clearly demonstrate, I think, the artificial origin of them all.

Among the specimens of this character, to which I desire to call particular attention, are two, one of which is here figured. The other, not engraved, is a large, originally oval water-worn pebble, that has been carefully chipped at one end, and then discarded.

1The relative abundance of these implements is perhaps a matter of some importance, in its bearing on the question of their origin. Were they natural forms, the peculiar force that operated to produce them, so marvellously like ordinary Indian relics as many of them are, would scarcely have been limited to so few pebbles as in this case, unless future exploration shall discover at some distant point a locality where only chipped pebbles occur. I have made an effort to estimate the comparative abundance of these paleolithic implements in the gravel deposit forming the bluffs, eastern bank of the Delaware river, and as near as I can determine, it is about one ten thousandth of one per cent, or one in every million of pebbles. There certainly, as yet, has not been gathered enough of them, to materially affect this calculation
in consequence, I judge, of an unsatisfactory fracture occurring which prevented fashioning an implement of the desired size. We have, in this instance, an excellent example of an unfinished paleolithic implement, showing the method, in part, of manufacture, — in all essential features the same as the unfinished spear-points, that are found on the former sites of an arrow-maker's labors, and yet exhibiting in its unfinished state, the peculiarities, that mark the differences between the paleolithic and neolithic forms.

Figure 1 represents a second specimen of a portion of an argil-lite pebble, with a portion of the water-worn or weathered surface
constituting the greater part of the base, on one side of the
implement. The corresponding side is a uniform surface, but
is less smooth, and exhibits every indication of being much less
weathered, although it is much altered from a freshly fractured
surface.

This specimen measures scant four and one-fourth inches in
length. The base is, in width, a little less than one-half the
length. The chipped portion is a uniform decrease in the width
from the base, the flakes having been detached from both sides,
and the edges. The specimen terminates in quite a blunt point,
and does not appear to have been more acutely finished, than it
now is. In general outline, figure 1 quite closely resembles many
of the European flint implements from the river valleys, and bears
far more resemblance to many neolithic forms than do the majority
of the chipped flints from tertiary deposits lately described in de-
tail by M. Robineo.

This specimen was taken from the gravel, when in place, at the
bluff forming the east bank of the Delaware river at Trenton, at
a depth of seven feet from the surface.

Concurrentive specimens, as they may be designated because of
then more highly finished condition, have sparingly occurred also,
and in such positions that they cannot be considered, though
probably of the same age and origin as the rude forms, or typical
"tulite backs."

Figure 2 is an example of this more elaborately wrought form,
which is of dual interest in being so remarkably similar to the
European patterns of paleolithic implements, and as an excellent
example of a connecting link between the rude forms, such as
have been figured in my previous report, and the still better de-
signated specimens here figured. This spear-shaped, or pointed
implement is carefully shaped from an aiguilite pebble, and has well
defined sharp, if not cutting, edges. The base is rounded, and
preserves the natural surface of the pebble. The point is quite
acute, and the sides have been produced by chipping, so that a
comparatively uniform surface has been produced. The degree
of weathering is uniform, and so far as this can be trusted as a
guide, the specimen has had each flake removed at practically the
same time.

*Descrip de Alguns Silex E Quant Lascados en contrades nos camados dos terre
nos Trent e Quaternario M Carlos Robineo, Lisbon, 1877*
FIG 3

Palaeolithic Implement from the gravel Actual size Mus No 11329.
Figure 2 measures six inches in length, by from three to three and one-fourth inches in width, until near the point where the specimen suddenly narrows.

This interesting specimen, which was found at the bluff at Trenton, was in a narrow gorge, caused by running water which had not displaced the material forming the sides of the little chasm. It was nine feet from the surface, and overtopped by a large boulder. It bears considerable resemblance to certain chipped implements of jasper, porphyry and sandstone, which have been frequently found on the surface associated with ordinary Indian relics, and which the writer has supposed were mainly used as "teeth" for war-clubs. However this may be, such an implement as the one here described, might readily be mounted in a handle, or, having a blunt base, be held in the hand and wielded with terrible effect. Other examples of this form, both of argillite and other minerals, have been collected from the same locality.

Figure 3 represents a very artificial looking, and yet quite unique form of chipped stone implement. It certainly bears no resemblance to any common form of neolithic weapon or domestic implement. In general, its appearance is that of a rude spear, such as not unfrequently occur upon the surface, made of jasper and quartz, but the handle-like projection, which may or may not have been pointed originally, renders the matter of the probable use of the implement, as it is, a difficult subject to determine, but that the specimen is artificial, and designed for some definite purpose, I have no doubt.

This specimen measures four and five-eighths inches in length, and two inches in maximum width, exclusive of the projecting point or "handle" at one side. This projection is one and one-fourth inches in length. The chipping on this implement is quite well defined along the edges; and thus, of itself, gives evidence of artificial force having been operating in the production of the implement, for we do not find traces of secondary chipping, whereby zigzag lines are straightened, occurring among crushed or frost fractured pebbles.

This so far unique form was found on the same gravelly bluff from which the preceding were taken, but at a point two miles distant, down the river. The specimen was exposed after a landslide which occurred on Aug 24th, immediately after a violent storm of that date. A large mass of gravel was detached bodily,
leaving a fresh surface of the bluff, from which this specimen projected. The depth from the surface was about eight feet, but could not be accurately determined at the time.

Figure 4 represents a very carefully chipped argillite implement that bears a marked resemblance to many of the European specimens of palaeolithic implements. The specimen measures four
and one-half inches in length, and a little less than two and one-half inches in its greatest width. In the chipping, this specimen varies somewhat from a typical turtle back, in that the under, or flatter side, is somewhat chipped, especially along the edges, which throughout their entire length, exhibit traces of secondary chipping, whereby the edges were made more nearly straight. The general outline is that of a spear or lance-head, rather than an indefinitely shaped "chipped implement," as many of them are.
There is in this instance a well defined point, and broad straight base, giving a general contour quite similar to certain Jasper and slate "hoe-blades," as this pattern of neolithic implements is sometimes called.

This specimen, figure 4, was taken from the bluff facing the river but two miles further south than the exposure near Trenton from which most of the specimens have been gathered. It was discovered in a perpendicular exposure of the bluff immediately after the detachment of a large mass of material, in a surface that had but the day before been exposed and had not begun to crumble. The specimen was twenty-one feet from the surface of the ground, and within a foot of the triassic clays that are here exposed. Directly over it, and in contact, was a boulder of large size probably weighing one hundred pounds, while at a distance of five feet above, was a second much larger boulder.

The character of the mass, which was that of the bluff as exposed on the bank of the river near Trenton, was such as to render it impossible that this specimen of a clearly artificially chipped pebble could have reached this position subsequently to the deposition of the containing bed.

One feature of them all, and of those especially from the deeper gravels, needs to be briefly referred to, this is the worn condition of the edges of the several surfaces produced by the detachment of the flakes. There are, especially in fig. 4, no well defined outlines of a single facet, although each separate flake can be traced on the surface of the implement. This partial wearing away of the lines of separation of the several chips removed, does not occur in any marked degree in such Jasper specimens as approach fig. 4 in general character of shape, size and chipping. Whether the result of use previous to being lost or discarded, or of wear by long exposure to the shifting movements of sand and gravel, one cannot determine, but of itself, it seems to closely connect these partly worn, yet clearly artificial forms, with rolled pebbles, which in outline only suggest the possibility of having once been chipped implements.

The four specimens of paleolithic implements, as we believe them to be, that are here figured, are so clearly of designed and not accidental shapes, that it seems unnecessary to give further illustrations, or additional reasons for demonstrating that they were fashioned by man.
A series of visits to several widely separated points, where the configuration of the country was such as to give excellent opportunities for examining deep sections of the gravels and the underlying beds of clay—cretaceous, or earlier—has enabled me to determine that above these clays there may be traced the unmodified drift, or such as is exposed on the east bank of the Delaware river at Trenton, N. J., a stratified drift of small pebbles and sand in alternating layers, covering limited areas, and of variable depth; and overlying the greater portion of these a soil—loess—also of variable depth, but seldom more than from three to four feet in depth. In this unmodified drift, which, like the underlying clay also, crops out occasionally upon the surface; in, but not of, the stratified gravels, and also not uncommon to the loess or surface soil, are numbers of large boulders of different rock, varying in size and weight, but of such dimensions that to the agency of floating ice alone, can the transporting force be attributed.

In my previous report, I have given sufficiently detailed description of the principal exposure of the unstratified mixed deposit, that I have maintained to be the débris accumulated at the foot of the glacier, the variations in its character from boulder clays, being such as are readily explained by the fact of its being a subaqueous deposit, and I will here, therefore, refer only to one feature of the pebbles, determined by my subsequent studies of their character. Before doing so, however, I desire briefly to refer to a publication issued subsequently to my original draft of this report. In the Annual Report for 1877, of Prof Cook, State Geologist of New Jersey, we find an excellent map, and a detailed account of the glacial drift covering the northern portion of the state, consisting of unstratified boulder clay and ice-scratched, angular pebbles. Where the débris of the ancient glacier ceases to be of this character, Prof. Cook considers the glacier terminated, and all the material lying to the southward is a modified deposit due exclusively to water action. In this, as our preceding report shows, we do not wholly concur; and offer here, in some detail, our reasons for connecting more closely, than Dr. Cook has done, the phenomena of the depositions of the northern and southern gravels.

Of the great glacier itself, Dr. Cook remarks, in the report alluded to, "even in New Jersey, it covered the tops of the highest mountains.

This immense mass of ice had a slow movement from the north...
towards the south, in which it scraped or tore off the earth and rocks from the rocky mass under it, grinding, grooving and smoothing down the rocky surface, and pushing forward, tumbling and rounding the fragments of stone and rock, and finally leaving them at the southern edge of the glacier, or wherever breaks in it may have allowed the loose materials to rest.

The terminal or southern edge of the drift is well and very plainly marked by a line of hillocks of mixed clay, sand, gravel, rounded stones and boulders of large size.

Of its extent, geographically considered, he further remarks of it, as "beginning on the eastern side of the State on the north side of the Raritan, at Perth Amboy, the line of Short Hills extending from that place to the First Mountain, and passing just north of Metuchen, Plainfield and Scotch Plains, marks the southern edge of the drift.

From there, it extends to the Delaware below Belvedere. The portion near the Delaware shows the gravel and boulders very plainly, but it appears to have been washed and otherwise modified by floods or great bodies of water descending in that valley. The whole line of this moraine is remarkably plain and well defined.

Across New Jersey the line is not exactly east and west, but appears to deviate towards the north, the deviation being greater somewhat in proportion as the ground is more elevated.

The hillocks of stones, gravel and earth, which together made this long chain, have every appearance of piles of débris which have been thrown down without order, and without the presence of water to sort or arrange the various materials.

Nowhere, as here described, does the terminal moraine of the great glacier approach the bluff at Trenton nearer than forty miles, but this distance is really of little moment, in connection with the subject of man's presence here during the maximum severity of glacial conditions in North America. With the existence of a glacier filling the entire valley of the Delaware, forty miles northward, and extending across the state to the Atlantic coast, there must necessarily have been a widely different physical condition of the entire territory extending southward. Much of this area, now constituting the southern, low-lying portion of the state,

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2 Quarterly Jour of Sci. Jan, 1878 London
low-lying and submerged areas, there would be spread out a vast amount of material, by the agency of sub-glacial torrents, consisting of the true glacial débris, borne still farther southward by the currents caused by the melting of the glacier at and near its base. Such swift-flowing currents might readily, through long periods of time, being charged with sand and small pebbles, wear away much of the ice-scratching that is so characteristic of the pebbles in the higher northern drift, but to such sub-glacial rivers we cannot well refer the enormous boulders scattered promiscuously through the gravel bluff, as seen at Trenton; but rather to the more powerful agency of floating masses of ice detached from the glacier as it existed farther to the north.

This bluff at Trenton, Dr. Cook considers as “modified” in post-glacial times. He remarks:

“The beds of stratified drift, at various places in the valley of the Delaware, south of the line of glacial drift, bear marks of having originated from the action of water. The boulders and cobble stones are all water worn and round, and are not scratched or streaked. They have all come from places farther north in the valley and have been moved and deposited by powerful currents. There are to be seen in the railroad cuts near Trenton, where the exposure of this kind of drift is very fine, boulders of granite, from the rock near, of red sandstone from the country just north, of trap from Lambertville, of altered shales from the near trap, of conglomerate from New Milford, of magnesian limestone from the valleys of Warren county, of conglomerates from the Blue Mountain, and of cherty and fossiliferous limestones from the Delaware valley north of the Water Gap. The gravel consists largely of quartz, but it contains numerous fragments of red shale, and black slate.”

The above description is not wholly applicable to the bluff forming the east bank of the river, but is the locally modified drift to which I have frequently referred in the preceding pages of this report. In the exposure of stratified gravels “in the railroad cuts,” I have as yet found but few specimens that may be considered as “probably artificial,” as already mentioned. On comparing the materials forming these two exposures of the river bank and the railroad cutting, a marked difference in the degree of angularity, the size and position of the large boulders is readily seen, and indicates an additional and subsequent agitation and
redeposition of the stratified gravels, and it is well here to mention, that Dr. Cook has, since the issue of his report for 1877, informed me, that he has met with boulders in this same road cutting, clearly showing glacial scratches upon their surfaces.

Assuming that no extension of the ice sheet covered any inland portion of the state south of the limits described by Prof. Cook, we have in the territory southward much elevated ground that would afford safe harbor for the glacial people that dwelt here, and an area of sufficient extent to sustain a considerable fauna of even large mammals. This is indeed an important consideration, for it is doubtful if the fauna was solely one of fish and birds, these people could have withstood the rigors of a glacial climate. Furthermore, it was from such an area of elevated ground, free, at least for portions of every year, from snow and ice, that the stone would be gathered, from which they made the rude implements, which continually being lost or discarded, were carried by the floods of the period, and finally lost, in part in the gravels, as we now find them. During the gradual distillation of the gravels in the southern section of the state, which, as we know, were largely altered by water action, be the causes what they may, they were doubtlessly violent in action and of long duration, and it is strange that a single pebble should escape being shown of every vestige of the ice-scratches, that once doubtlessly covered them all, but any agency capable of producing such effects must have been in connection with some such phenomenon as the melting of the great glacier, with the several characteristic features that would be associated with the gradual cessation of glacial conditions. As we have already pointed out, there is much of this stratified gravel, covering areas of various extent within the territory covered by our researches, but it is of very different character, as compared with the boulder and gravel deposits, to which we now particularly refer.

There is other evidence of a close connection between the boulder clays of the upper Delaware valley, and the coarse, unstratified gravels at Trenton, to which we will refer in another portion of this report.

This connecting link, as it were, was doubtlessly a prolongation of the ice-sheet, extending down, and nearly filling, the present valley until it met the open sea, where the present bluff at Trenton now forms the eastern bank of the river.
In commenting on the physical character of this deposit mention was made of the absence of ice-scratches on the pebbles and boulders forming the mass of glacial débris, from which the majority of the rude implements were taken; and Prof. Shaler\(^4\) also remarked on this circumstance, in his report on the age of the gravel beds from which the specimens here described have been obtained. In my previous report I endeavored to explain their absence by the probable circumstances of their accumulation where now found, and Prof. Shaler agrees with me, as to the deposition of this gravel “in the sea near the foot of the retreating ice-sheet.”

Subsequent examinations of thousands of pebbles in this same deposit and at other localities where it outcrops, has resulted in finding a few pebbles, and I believe one stone implement that clearly exhibit ice-scratches, and besides many angular pebbles, there are others that are smooth but not polished and have a limited portion of their surface beautifully planed off and as polished as glass, which latter feature appears to be the work of moving ice passing over these interesting specimens when in some retaining matrix.

It may be well here to consider how far the material caught up by the last glacier that occupied the present valley of the Delaware, transported pebbles of an earlier day; for it must be borne in mind, that the masses of pebbles of any glacial deposit are not the exclusive production of the glacier; not fragments of rocks in place, that were broken away and rolled and crushed until every angle was obliterated. For ante-dating glacial conditions, there were smooth water-worn pebbles in abundance. Prof. Shaler\(^5\) mentions the implements described in this and my earlier report, as “made in a region where water-worn pebbles greatly abounded as they now do all along our shores.” The upper valley of the Delaware doubtlessly abounded in such pebbles in pre-glacial times, and such loose material scattered over the level surfaces of the rocks we can easily conceive as being transported by a glacier one or more hundred miles, and yet escape any scratching.

\(^4\) Tenth Annual Rep. Peabody Museum, p 44.

whatever. To this subject we will refer again, with reference to the associated implements.

This additional determination of characteristic features of the mass constituting the bluff forming the eastern bank of the Delaware river at Trenton, N. J., is of much importance in its bearing on the question of the age of the deposit, as it seems to be confirmation of the opinion previously expressed, that the deposit is intimately associated with the glacial epoch, is, indeed, one of its phenomena, and the contained implements, undeniably of the same age, demonstrate the presence of inter-glacial man upon the Atlantic coast of our continent, a point in geological time so distant that we are scarcely able to realize it. Like indications of such vast antiquity are not wanting elsewhere, and Mr. Pengelly has lately remarked of the traces of human occupancy of Kent's Cavern, England that "in the present state of the evidence he is compelled to believe that the earliest men of Kent's Hole were inter-glacial if not pre-glacial." 

I have already briefly referred to stratified gravels as a characteristic feature of the geology of the surface of this low lying portion of the state. Their structure is such it seems probable that subsequent to the retirement of the last glacier there has been a protracted period characterized by extensive floods, with powerful currents and at various localities, dependent wholly upon the contour of the country at the time which was by no means regular or level, the glacial drift proper has been carried away and redeposited in its present condition.

In such stratified gravels I have not been successful in finding the characteristic forms of paleolithic implements such as occur in the drift as exposed on the river bank. A few doubtful specimens have been met with, and a few that may probably be accepted as of artificial origin, but I am led to believe that the violence of these post-glacial floods, in re assorting the drift, has well nigh destroyed every vestige of artificially chipped surfaces and edges. Where the original deposits were comparatively undisturbed the implements scattered through the mass were preserved as we now find them.

I have endeavored to show that the only objection to the gravel deposit forming the river bank being unaltered glacial drift, the

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"Nature, No 107 Aug 10th, 1877, p 323
Report Peabody Museum, II 16"
comparative absence of ice-scratches, may be explained away by
its being a subaqueous deposit, and in considering the limited
areas of undoubtedly stratified and reassorted gravel, the probable
character of the force operating to produce this re-arrangement
must be carefully considered in connection with the condition of
the supposed stone implements found within its mass. In the un-
modified drift we have seen that the contained implements are
unworn to any significant degree, but those that have as yet oc-
curred in this stratified gravel, are so rolled and worn that it
becomes perhaps, a question whether they are implements or nat-
ural forms. If they are artificial the hypothesis formed for these
implements of the unmodified drift8 is strengthened by the condi-
tion of such specimens as have unquestionably undergone the de-
structive action of long exposure to abrasive contact with sand
and pebbles in connection with strong currents of water.

So far as I have been able to trace the course and extent of
these stratified gravels, they do not appear to have been formed
by any, *geologically considered* protracted flow of water but rather
by comparatively local floods, which having spent their force upon
the drift for a definite time flowing in a given direction, have had
their currents diverted, and then, if less powerful from any cause,
only the less resisting material has been moved from such of the
original deposits as were washed by the newly made stream.

So very limited are the areas covered by many of these tracts of
clearly stratified materials, that it is possible many of them are
explicable by reference to peculiar local conditions of the once
existent glacier, and are not, in reality, a post-glacial phenomenon,
and finally, it must be borne in mind that the material of these
stratified gravels is sand and small pebbles, with rarely a small
boulder of a cubic foot in dimension, but in no instance, do the
massive boulders, weighing several tons, occur as a constituent of
these stratified deposits, although the latter may occasionally sur-
round such an one, as where the stratum is of little depth, but
even such an occurrence is unusual. Where the large boulders
occur, even upon the surface, there is the drift as we find it on the
river bank, unless they clearly are, as we will see quite frequently
happens, a feature of the surface soil itself.

Again, local disturbance of the surface as by unusually violent

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8 Tenth Annual Report, Peabody Museum, p 47
action of water, such as sudden overflows caused by storms, may have the effect of transporting material from various strata of widely different character and in this way may we account for the occurrence of paleolithic implements in positions to which they are really foreign and it is only to be wondered at that there is really so little commingling of the two forms. As an instance of this, I may mention, in detail, the following occurrence.

On the afternoon of Friday, August 24th, 1877, there occurred a remarkable rainstorm, over a limited area in this state, of but three hours' duration, but during which time it is estimated that over eight inches of rain fell. The surface of the country in many places was quite altered, and the small spring brooks were suddenly converted into streams of great bulk. When such brooks flowed ordinarily between high banks, the confined waters carried away vast quantities of surface soil and gravel, depositing them on lower levels or transporting them to the river.

The details of this unusually severe storm direct our attention to the effects produced upon the surface whereby unquestionable specimens of paleolithic implements are brought to positions that we may call abnormal. In one extensive deposit of débris of every description that was violently torn from the uplands and spread over an expanse of meadow, after passing through a narrow gorge on the water's farm where there occurs an outcropping of the gravel of the river bluff, I found too very characteristic specimens of these implements, associated with fragments of pottery and a small grooved axe. Now these several specimens doubtless were widely separated previously to their last localizing in the meadow. Inasmuch as an occurrence of this character had the effect of thus commingling the two forms of paleolithic and neolithic implements, it can scarcely be urged that the fact of finding isolated specimens on the surface of the country can effect the question of the geological age of the specimens, seeing that they are, as a class, characteristic of the gravel and not of the surface, where their presence is exceptional, nor can it be held explanatory of their presence in the older gravels, even if admitted to be of vastly greater antiquity than ordinary Indian relics. No such occurrence as that we have related could imitate these implements to such great depths as have been recorded of many specimens in the Museum, and associated them so intimately with boulders of such large dimensions as those with which they are found.
violent flood, even of long duration, would have the effect of spreading over a large area a comparatively shallow deposit of gravel, and at or near the surface, as newly made, on the abatement of the water, transported implements might occur, as we have seen in this case, but they would not be illumined to a depth of thirty and forty feet in a boulder-bearing bed of gravel, miles in width. On the other hand, in a stratum of fine sand and pebbles washed from unmodified drift, we can readily see how an implement from the latter might become incorporated with the former rearranged deposit.

In this connection, I have endeavored to determine the transporting power of water, unmanned by ice, in connection with the movement of boulders even of small dimensions, and so far as I could determine, where there was no precipitous descent in the river bed, the ordinary freshets in the river seldom, and the currents never carry other material than sand any important distance. The pebbles and small boulders are gently moved by the water, when they roll down from the banks into the stream, until they are fitted into some hollow, and there afterwards they appear to remain. It would seem to require a combination of circumstances, such as the unloading of gravel beds, and a violence or rapidity of flow, in connection with sudden descent, to move stones of one or two pounds in weight, for any important distance. I am inclined to believe the unaided transporting power of water, so far as moving the pebbles upon a river bed is concerned, is really quite limited.

We are now brought to consider, in its connection with the contained paleolithic implements, the surface soils, that at varying depths over the both the unmodified drift, as I have claimed it to be, and the clearly stratiﬁed gravel. This surface soil, as to its origin, constitution and great variation in character, opens up an extensive ﬁeld of inquiry, which in great measure is beyond the scope of my report, but the fact existing that paleolithic implements occur in it, renders it necessary to determine their relationship to those of the underlying gravels.

In studying the surface soils covering the drift, to which attention has been more particularly drawn, I will, at ﬁrst, brieﬂy quote from Prof. Cook's Geology of New Jersey, as to the general character of these deposits. He states, "there is a remarkable
degree of uniformity in the surface of the country. The inequalities of the surface are almost entirely caused by denudation. The streams, unlike those of the northern part of the state, have no apparent connection with the geological structure of the country. They are simply channels worn in the surface of the ground, following the lines of most rapid descent to tide water. "Of the soils," he remarks, "it is a loam varying from light sandy to sandy, gravelly and clayey, susceptible of high degree of improvement."

Whatever the particular character, and whatever its origin, it is evident that this soil is a sedimentary deposit, originally a fine sand, latterly increased in bulk, by aerial denudation of the broken drift rocks that outcrop through it, and the constantly added decomposed vegetable matter. The main agency in originally distributing this, the major portion of the soil, appears to have been the comparatively quiet waters that immediately followed the abatement of extreme glacial conditions.

This product of rock destruction, from the grinding action of the ice, throughout the whole extent of the northern hilly portions of the state was brought down in large quantities, and its depth, as originally deposited, was probably quite uniform. We see now that this uniformity of depth is wanting, as explained by the remarks of Prof. Cook, and the inequality of the land, which is a comparatively modern feature, becomes more pronounced every century.

To the contained paleolithic implements I need scarcely more than allude, as I have, in my previous report, expressed my belief as to their origin in connection with their surroundings. Just as there is abundant evidence of the presence of man dwelling at the foot of the great glacier that occupied the valley of the Delaware, when boulders, gravel, and coarse sand were being deposited in vast quantities in the open sea, in which the southern terminus of the ice ended, so, as the glacier gradually left the valley of the present river, melting rapidly, the flood of waters, flowing southward, were sitched with sand and mud, which, as the waters spread, and flowed more quietly, settled on the bottom of the then shallow sea, and here also, have we traces of this same race, who, as before, continued to lose in the depths of the once deeper and now shallow waters, those implements of stone which tell the story of their sojourn here.

Still another important feature remains to be considered in con-
nection with the surface soils I refer to the numbers of immense boulders, which are not only embedded in them, but are geologically, of them, i.e., synchronously deposited. There are, I think, many facts confirmatory of this view, and their importance as bearing upon the question of the age of the implements found upon the surface, is great.

One question will certainly be asked of these surface boulders — may not the material originally surrounding them have been removed by means inadequate to alter their positions, and were they not deposited prior to the accumulation of soil which partly or wholly covered them? I am convinced that in many instances, such is not the case, for several reasons.

Take the boulders of a given area, and it will be found that there is no regularity whatever in their positions, wherever met with. The long axes of their diameters point in all directions. In one instance an irregularly cylindrical boulder, measuring seven feet in length and about nine in circumference at the larger end, rested nearly perpendicularly in the soil, which was three feet in depth below the buried end, while two others in the same area of about one hundred acres, of nearly the same shape but smaller, were in somewhat similar positions. Had the soil been removed subsequently to their deposition these upright stones must have fallen over and assumed horizontal positions. Examinations of flattened boulders, also, have shown that there was in many cases a considerable depth of soil beneath them, and thus separating them from the underlying gravels. In other instances, they have been noted as embedded in soil that overlaid the plastic clays, from which the earlier drift had been removed, or on which it had not, from some cause, accumulated.

The surface soils we have seen contain nothing but sand in so minute condition that it could well be carried by gently moving waters. In such a deposit these boulders occur, and it is evident, that while apparently belonging to it they could not have reached their present positions by the same agency that deposited the soil itself, but it is a marked feature of the earth immediately surrounding every boulder that there is a small quantity of little pebbles, and that as the distances increase between the positions of any two the proportion of gravel also decreases, and considerable areas, often several acres in extent, do not have a pebble of any size upon them.
I have therefore concluded, as in part already stated, that the soil itself was very slowly deposited from comparatively quiet waters, on which occasionally drifted an ice-rift from some distant glacier, and here and there an embedded boulder loosened from its mass sank to the bottom of the shallow sea, carrying with it more or less of such finer material as had originally been gathered up by the ice at the time. This would explain the presence of the pebbles mingled with the soil, as well as the larger boulders, and, if we admit the existence of inter-glacial man, would fully meet the difficulties of assigning an earlier origin to the surface-found rude implements than that of post-glacial times.

While to base the assertion of a paleolithic man having dwelt on our shores during so remote a period upon the presence of implements of a paleolithic character in our surface soils would certainly be hazardous in the extreme, it does appear probable that they do really confirm the alleged antiquity of similar implements occurring in the earlier accumulations known as "drift".

Arguing thus, it might reasonably be claimed that these rude fashioned implements should be met with in the northern hilly portions of the state, where boulder clay and stratified pebbles occur in abundance as glacial drift. Careful search in favorable localities, however, has failed as yet to bring to light unquestionable specimens, although several chipped pebbles had been met with elsewhere would probably have been so classed. This fact, at first glance, seems to render doubtful the claims of glacial age asserted of the specimens found at Trenton, but this possible absence of implements in the boulder clays, I think, may be explained by the fact already referred to, that the implements at Trenton were made during the prevalence of the ice-sheet, which at the time rendered the upper Delaware valley uninhabitable by a people dwelling at the foot of this glacier, where there was doubtless some uncovered land, and there are abundant indications to show that this gravelly bluff and all the country south and east of it, was then the bottom of a shallow sea.

Prof. Dana* has referred to this very point at Trenton as seacoast during the cretaceous period remarking of the Delaware river, that it "emptied into the Atlantic at Trenton, and the regions of the Delaware and Chesapeake bays, were out at sea".

*Manual of Geol 2nd Ed., p 478
Not did the coast line materially change in much later times. Of the Miocene period, the same authority states,10 "there was no Delaware or Chesapeake bay," and again, upon the same page remarks, "the Atlantic Tertiary region must have remained submerged until after the miocene era." When finally it did emerge, which was undoubtedly in Pliocene times, when, as Prof Dana states11 "the continent * * * * had at least its present breadth along the larger part of the Atlantic coast, if not a still greater eastward extension," it is safe to infer man first appeared on our eastern shores. Prof Marsh12 has remarked that "the evidence, as it stands to-day, although not conclusive, seems to place the first appearance of man in this country in the Pliocene, and the best proof of this has been found on the Pacific coast." Granting this, the evidence of his presence on the Atlantic coast is fairly inferential, when, if in the chipped pebbles described in the present report, we have traces of an inter-glacial man, for we can scarcely conceive of a race originating de novo, or migrating voluntarily to the foot of a glacier, but that this early race should withstand the maximum rigor of a change to glacial conditions we know is wholly practicable, but whatever the changes that may have occurred in climate, in distribution of land and water and of elevation or depression of the former, at the close of the tertiary and dawn of the quaternary periods, it is evident that the present low lying southern section of the state was beneath and not above the sea when the great glaciers occupied the valleys and overtopped the mountains that flank the Delaware.

Having, as clearly as it lies in my power to do, described in then several aspects the containing beds from which the relics here described have been taken, and having endeavored to fix the date of deposition of these, as well as demonstrate the artificial character of the implements, it is desirable to show what relationship the latter bear to the deposits containing them. Are they really of co-equal age, or are they intrusive objects?

In considering the relationship of these indely fashioned stone implements to the beds containing them, and the place of the latter in the geological history of the globe, it must first be borne in mind, that the many changes which have been shown as having

10Ibid, p 522
11 Ib p 522
12Proceedings American Assoc for Advance Science Address at Nashville Aug, 1877
occurred in the past, were all periods of long duration and the changes of climate and of depression and elevation of the dry land, were all gradual occurrences, and none of such violence as to render the globe, the while, uninhabitable by man. The severity of the glacial climate itself, it is known, but partially destroyed, though it largely displaced animal and vegetable life, and if the displacement of mammals is a clearly ascertained fact, it is quite safe to include man, if he then also existed here, as we have endeavored to show was probably the case.

Although there is no reason geologically, why man should not have occupied our Atlantic coast during the Pliocene period it is not to be assumed that he did, but it remains for the archaeologist to demonstrate his former presence clearly, if any indications have been discovered that seem to be indicative of such early occupancy by man of America. In the implements from the gravel we certainly have nothing indicative of this, for, as has been clearly shown, I think, the facts, as yet gathered are indicative of an inter-glacial, and not a pre-glacial age. Even this may be questioned, and the suggestion made that the contained implements are of a later origin than the original deposition of the containing bed, and that during some material change which the deposit, originally glacial, has undergone, these implements have become embedded. To prove that such was not the case, I desire to call attention to certain features of the gravel beds as we now find them. I have frequently referred to the abundance of massive boulders that are everywhere scattered promiscuously through the deposit and are also very characteristic of the subsequently deposited surface soils. If it is maintained that this gravel deposit was originally a mass of stratified boulders, pebbles, sand and clay, which water has subsequently wholly changed in character and rearranged then such water action must necessarily have so loosened up the mass, in the general overturning of every pebble until the re-scratches were obliterated, that the boulders, many weighing twenty tons or more, would have settled to the very bottom of the disturbed moraine, and if, during this supposed process of rearrangement, which however gradual and gentle in its movement must have had the above effect, then the most chipped implements which became embedded in the mass, would have more surely have undergone a grinding and crushing action that would have obliterated every trace of artificiality, than in the small percentage of chance of
escaping destruction if caught up and carried for miles by the moving glacier. Again, if the gravel, where it now lies, has been deposited by simple water action, which, considering the contained boulders, is inconceivable, subsequently to the retreatment of the glacier and during this later transportation, the pebbles have become smooth and oval, and synchronously with such assumed post-glacial action, the paleolithic implements have been lost, then they should also have undergone a like alteration of their surfaces, ending in the complete obliteration of the characteristic features of artificial chipping, but I have already pointed out, that where such post-glacial redeposition and stratification have been effected, there I have not been able to discover any implements that were free from all doubt as to age and origin, and the fact of their occurrence on the surface, especially in fields, where there is an outcrop of the gravel, has this bearing upon the question of the co-equal age of the deeper lying specimens and the containing bed, that if a given deposit of unmolded drift—a terminal moraine—or such a formation as is exposed on the banks of the river, yields, at various depths at that point, a number of chipped pebbles, it is at such a position as an extensive level outcrop of the same deposit, that we should expect to find the same forms, and as the outcropping is of longer duration than the occupancy of the latter races formerly dwelling in the country, traces of these also will unavoidably be mingled with the older forms. Had the paleolithic implements been found only upon the surface, although much weathered and otherwise evincing indications of greater age, there would be no positive proof of an earlier origin than the ordinary Indian relics, except that, even in such a position as a gravelly field, they are usually met with at greater depths, i.e. a foot or more below the surface, than are the neolithic forms.

When under the impression that the Indians were a paleolithic people when they first occupied the Atlantic coast of North America, and that these rude implements were to be ascribed to them, I remarked of these rude forms, that "just in proportion as these relics—stone implements generally—are rude in manufacture and primitive in type, they are more deeply embedded in the soil," and I have since had no reason to modify this statement, otherwise than to remark that those of the gravel are of uniform

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character, and do not vary according to their depths, but instead of their being traces of the Indian. I am convinced that they had a pre-Indian origin. In our references to the boulders found upon the surface, I have shown how many of these paleolithic implements may have become incorporated with the surface soil, and long antedated its deposition, in their conditions as chipped implements. My remarks on the age of the surface boulders indirectly referred to the age of accompanying relics and have an obvious bearing upon the question of the co-equal age of the gravel and its accompanying implements.

Finally, if the same age is ascribed to these paleolithic implements and the ordinary Indian relics, then as already asked, how could the one series become embedded, often to great depths, and not representatives of any class of weapons, domestic utensils and ornaments?

What seems to me a most conclusive argument in favor of the views herein expressed, is that while the paleolithic implements are characteristic of the gravel, and neolithic implements of the surface, it is quite natural to find the former as we find its containing bed frequently cropping out upon the surface, while we never find this same soil a feature of great depths, nor do the relics of the Indian that now dot its surface, ever occur in such inexplicable positions. We can easily imagine an earthquake creating a deep chasm or crack in the surface, and immerging a comparatively modern implement, but there are no traces of such cataclysmic action here, and if such an event had occurred, there would be other evidences than the commingling of objects from the surface with the underlying deposits, but such are wanting, and the same objection still holds of such violent occurrences only immemorial paleolithic forms, unless, indeed, these are held to be the original forms of the later varied patterns of stone implements. This, however, is scarcely compatible with the universally accepted conclusion of the Asiatic origin of the so-called American Indian. If not advanced beyond the production of such primitive implements, they would scarcely have reached our Atlantic coast, having entered the country on the Pacific side.

Perhaps it is a wise caution that is exercised in but provisionally admitting the great antiquity of American man, but were these rude implements not attributed to an inter-glacial people then co-equal age with the containing beds would never have been ques-
tioned, and yet we are not in possession of facts that even seem to dispute the asserted antiquity of the American races.

Having determined that the rude forms of stone implements such as we have here described indicate the former occupancy of our shores by a race long disappeared, and that the date of that occupancy extends as far back, at least, as the closing of the glacial period, I desire to conclude my report on this subject with a few remarks on what I am led to believe are the racial belongings of this early race.

A careful study of the relationship of the implements characteristic of the gravel, to the better known traces of the Red-man—the ordinary Indian arrowheads, spears and axes—has shown that it is highly improbable that the Indians of our country were the primal occupants, but rather that they were preceded by a stillruder race. This conclusion is based not only upon the character of the relics themselves, but upon the fact, as I consider it safe to assert, that the character of the country was greatly different at the time these implements were made and used than now.

As to the ordinary stone implements, it may be mentioned that those found upon the surface are all in accordance with what we know of the Indians, who, while occupants of the Atlantic coast of North America were dwellers in a densely wooded country, with the distribution of land and water as it now is; but are not these paleolithic implements wholly out of place in like positions? One cannot conceive of any use for a "turtle back celt," or for some of its modifications such as are seen in the limited range of patterns of the older forms. These rude implements of themselves, when recognized as artificially shaped, suggest uses, to which only a people living in a country of vastly different character, and with a different fauna, could put them. A marked variation in the physical condition of this country, both as to distribution of land and water, and climate, with concomitant differences of fauna and flora, we have seen, obtained during the glacial epoch, and to this period, and not to the—geologically speaking—recent times, must we ascribe these rudely fashioned implements, which by their presence in the drift gravels give us a faint glimpse of the primal race that occupied our shores.

When also, we consider that the several conditions of glacial times were largely those of Greenland and Arctic America, and that there is unbroken land communication between the desolate
regions of the latter, and our own more favored land and, more important than all, that there now dwells in this ice-clad country a race which, not only in the distant past, but until recently (if they do not now) used stone implements of the rudest patterns, it is natural to infer that the traces of a people found here, under circumstances that demonstrate a like condition of the country during their occupancy, are really traces of the same people.

Having carefully studied the characteristic arts and habits of the modern Eskimo, and compared them with the existent traces of the people of Aquitaine, Prof. Dawkins\(^4\) finds so great a similarity, that he concludes that "these facts can hardly be more coincident, caused by both peoples leading a savage life under similar circumstances they afford reasons for the belief that the Eskimos of North America are connected by blood with the paleolithic cave-dwellers of Europe," and again, "the conclusion * * * seems inevitable that so far as we have any evidence of the race to which the dwellers in the Dordogne belong, that evidence points only in the direction of the Eskimo."

This conclusion of Prof. Dawkins is of peculiar interest in that it is evidence that the Eskimo, now strictly a boreal race, once spread over a vastly more extended range of territory, and as a race of such antiquity, as shown by the investigations of archaeologists in Europe that it is easy to realize, that, at one time, they dwelt as far south in America as New Jersey.

In his excellent article on the Tribes of the Extreme Northwest, Mr. Dall\(^5\) remarks, "my own impression agrees with that of Dr. Rink, that the Inuit were once inhabitants of the interior of America, that they were forced to the west and north by the pressure of tribes of Indians from the south," and again, "there are many facts in American ethnology which tend to show that originally, the Inuit of the east coast had much the same distribution as the walrus, namely, as far south as New Jersey." The conclusion reached by Dr. Rink, to which Mr. Dall refers, is that the "Eskimo appear to have been the last wave of an aboriginal American race, which has spread over the continent from more eastern regions, following principally the rivers and water-courses,

\(^4\) Cave Hunting by W. Boyd Dawkins, p. 158 London 1874.

and continually yielding to the pressure of the tribes behind them, until they have, at last, peopled the sea-coast”

These several quotations refer wholly to post-glacial forced migrations of a pre-Indian people that were dispossessed of their territory by the incursive race, and the result of my own investigations may be held, I think, a preface to this then later history, wherein I venture to date their occupancy of the country as far back as during, if not prior to, the last great geological change—the great ice age.

Considering the purport of the remarks quoted above, from several competent workers in widely different fields, and who, yet, come to the same conclusions, if it still be objected that the characteristic implements of the gravel are also found upon the surface, I will but add that this is precisely in accordance with what must necessarily be the case, if the above conclusions of Mr. Dall and Dr. Bink be correct, that the Eskimos were displaced by the pressure of tribes of Indians from the south.” Such displacement must have occurred after the glacial epoch, and therefore the Eskimos, being the occupants of the country at the time of their contact with another race, may have been the fashioners and users of these surface-found paleolithic relics, in part, which, like those from the deeper gravels, are all well worn and decayed upon their surfaces by long exposure, and thereby give evidence of their antiquity.

When we come to examine a full series of ordinary surface-found arrowpoints, as we gather them by the scores from our fields, and occasionally find associated with them, a rude implement of the type of those found in the gravel beds, we are naturally led to draw some comparisons between the two widely different forms. The arrowheads, and others which from their size may be considered as spear or lance-heads, are of two quite different types, being those made of jasper, chert, quartz, and rarely of argillite, of a dozen different patterns, and those of argillite of a nearly uniform pattern and of larger sizes, as a rule, all greatly weathered, and varying notably from the arrowpoints of other minerals, in being of much course workmanship, and in this respect, seeming to be a natural outgrowth of the skill once exercised only in producing the primitive forms of the glacial drift. If it be claimed that these rude arrowpoints of argillite, now so weathered and

10 Tales of the Eskimo, London, 1875
worn cannot be distinguished from ordinary Indian arrowheads. I reply that there is abundant evidence that the Eskimo had the bow in use, in times as far back as the close of the glacial epoch in North America, and furthermore, there is evidence that while occupancy of the Atlantic coast by the Eskimo was greatly prolonged, the advent of the Indian was not so very far distant, comparatively speaking. In such a case, there must as necessarily be a commingling of traces of the Eskimo, or post-glacial relics of the earlier race and the more recent Indian relics, just as I have shown there was a commingling from inter-glacial to post-glacial times, of the presence, along the Atlantic coast, of paleolithic man.

Finally, as bearing upon the subject of the post-glacial occupancy of the country, by a pre-Indian people, I desire to give in some detail, the conclusions reached after a visit to the rock shelter at Chickies Lancaster Co., Penn., discovered by Prof. S. S. Halde-

man, who kindly accompanied me and at the same time laid open for my study at leisure, the extensive collection of stone implements he has gathered not only from the rock-shelter but the neighborhood generally. A careful examination of the specimens from this rock-retreat shows a marked mingling of the two forms of implements, which I think is to be accounted for by there having been a forcible displacement of the earlier race, or by re-occupancy by the Indians, at a comparatively short interval after the voluntary retirement of the last occupants. The result also of careful study of the stone implements from the neighborhood, and more particularly of the islands in the Susquehanna river, is the discovery of several specimens of such rude forms as characterize the gravel beds at and near Trenton New Jersey.

Since the above was written, I have received the following letter from Prof. Haldeeman, accompanied by a number of very interesting specimens.

My dear Sir—

There is a group of small islands in the Susquehanna about a mile below Brumbaugh, Lancaster Co., Penn. One of these islands is named Moore's, another Forge Is. Yesterday, in company with Hon. H. H. Wiley I visited Moore's Is., of several acres in extent, formerly cultivated, but a flood a few years ago, swept off the cultivable surface, leaving a mixture of sand, gravel and clay upon this denuded surface and around the eroding banks (five to six feet high). I found the objects sent herewith, including a few found previously by Mr. Wiley, at the same
locality. I shall not attempt to decide whether the gravel is drift, or
ordinary river accumulation, but a flood like that which removed the
arable land, would not transport gravel above the river bottom, and the
probabilities are against an ice freshet being the transporter.

Hoping that you will find the specimens interesting, I remain

Yours truly,

S S HALDEMAN

Chichas Pa., 27th Sept., 1877

Two of the specimens referred to, in the above letter, are quite
rudely chipped "hoe-shaped" implements, similar to others in his
collection from neighboring localities, but not common to the
Delaware River gravel bluff, from which I have taken but one
specimen. These from the Susquehanna, and one from near Trent-
ton, just referred to, somewhat resemble the "rudely chipped flint
axes" of Scandihavia, as they are designated by Prof Nilsson,
but are not exclusively chipped upon one end, the edge extending
down one or both sides. Those forwarded by Prof Haldeman,
been upon their surfaces every mark of the weathering so char-
acteristic not only of the one similar specimen but of all the im-
plements, found in the bluff facing the Delaware River, and it
should be remarked that this weathering occurs in this instance in
specimens of a different rock, and one of denser texture. The
accompanying arrowpoints are of the same material, and all of
equally rude workmanship, but their size is such as to render the
use of the bow a certainty, and as we cannot safely dissociate
the two forms, it is probable that we have in the series traces of a
pre-Indian people, which I believe to be the Eskimo. But it is
evident, from Prof Haldeman's letter, that the basis of the island
may be glacial drift, and the surface soil, which lately concealed
this deposit, may be a deposit of same character as the soils that
I have described as overlying the Delaware valley gravels. In
such a case, the under inter-glacial and better finished post-glacial
forms may here be associated by the freshet referred to, which,
while washing away the soil, left a portion of the gravel and ordi-
nary arrowheads upon the now denuded surface. If such be the
case we have in the Susquehanna valley, also, traces of inter-
glacial man, if not, we have, at least, indications of the presence
of a post-glacial people, which, as I believe, occupied the valley
of the Delaware for untold centuries prior to the advent of the
Indian
In conclusion, I re-affirm my conviction, that in the specimens of artificially chipped pebbles, from the essentially unmodified débris of the terminal moraine in Central New Jersey, and in others found upon the surface (which, however, are in part only of more recent origin), it is shown that the occupancy of this portion of our continent by man extends back into the history of our globe, in all probability to even an earlier date than the great ice age, and that the maximum severity of the climate during that epoch displaced but did not destroy him, and that subsequently he tenanted our sea-coast and river valleys, until a stronger and more warlike race drove him from our shores.

Note — It may be desirable here to add that as the final proof of the above report was passing through the author's hands, he received a letter from Mr. Thomas Belt, dated Grant, Colorado, June 29, 1878, in which he states that he has "made a discovery that may throw some light not only on the question of man's existence in the Glacial Period, but on that of his physical structure. I have found a small human skull in undisturbed loess, in a railway cutting, about two miles from Denver, near the water-shed between the South Platte and Clear Creek. All the strata are covered with a drift deposit of granitic and quartzose pebbles, overlaid by a sandy and calcareous loam closely resembling the Diluvial clay and the loess of Europe. It was in this upper part of the drift series that I found the skull. Just the tip of it was visible in the cutting about three and one-half feet from the surface."
THE METHOD OF MANUFACTURE OF SEVERAL ARTICLES BY
THE FORMER INDIANS OF SOUTHERN CALIFORNIA

BY PAUL SCHMILLER.

I THE STONE POT, OR OLLA

In my investigations among the remains of the aborigines of
the Pacific coast south of San Francisco, I was always rewarded
by finding the olla,1 one of the most beautiful utensils of genuine
aboriginal workmanship. The pot is usually of globular form with
a narrow opening on the top, sometimes pear-shaped, and others of
the Mexican form with a wide opening. Illustrations of the main

1 Olla. Mexican pronunciation oya from the Latin olia pot

Fig. 1

Cooking Pot of Steatite, Dos Pueblos Cal. P. M. No. 9202. 4 inches diameter.

types are found in Bancroft's "Native Races of the Pacific States" Vol. IV, page 693, from my own drawings, and in Rao's "Archae-
The stone of which this utensil for culinary purposes, and some other articles of our Indians, were worked out, has been well known and in use for like purposes since the classic times of Theophrastus and Pliny. The Magnesian stone (\textit{\nuo\textgreek{w}h\textgreek{w}c\text{o}w} τ\textgreek{w}k\textgreek{p}\textgreek{o}c),
and the kind quarried at Siphnus and Comum—the *lapis ollrens* of a later period—of which, in ancient times, vessels were hollowed out in the turning lathe, and carved, coincide in nature and composition with the pot-stone of our Indians. The stone is statutite, and is usually of a greenish gray color, sometimes showing hexagonal prisms in stellated groups, with pearly lustre and greasy touch, especially when reduced to powder. It changes in some portions of the same ledge into a more flaky and micaceous character, while in neighboring deposits on Santa Catalina Island, it exists crystallized in stellated groups of well-developed hexagonal needles of glistening apple color, which are easily detached from the weathered surface. The living rock is not as bright or shining as are the fragments of pots that have been exposed to heat, it loses its greasy character the more a utensil has thus been in use, and the color is changed to a bright metallic lead color. Some years ago I showed a potsherd, the color of which had thus been changed by fire, to a mineralogist, who pronounced it Magnesian mica.

The first information I gained of the locality of quarries of pot-stone, or where pots were made, was from a venerable Spanish lady while examining in Nipomo rancho, San Luis Obispo county, in the spring of 1874. She recollected a narrative of her mother, according to which the Indians had brought *ollars* in canoe-loads from the islands in Santa Barbara channel to the mainland, which they exchanged for such necessities as the islanders were in want of. Two years later, in Santa Barbara county, I received similar information from an old Mexican, then my guide. While making researches among the islands, at the joint expense of the Smithsonian Institution and the Peabody Museum,1 I gained the assurance, during my short stay on Santa Catalina, that the stone exists in certain places on that island, but did not then succeed in finding the quarries. But during my last expedition to that locality, in behalf of the Peabody Museum, and of which an outline is given in my prefixed letter, I made the discovery, found pits and quarries, the tools used and unfinished articles. I noticed that the softer stone, usually obtained in pits, which is of a more micaceous character, was used for pots, while the close-grained rock of darker

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1 Re-issues in the Kjakkenmoldings of the coast of Oregon, and of the Santa Barbara Islands and the adjacent mainland. 'Hayden's Geog. and Geol. Survey, Bulletin Vol III, No 1'
color, serpentine was mainly used for the weights of digging sticks, cups, pipes, ornaments, etc.

While in camp at Little Springs, my attention was first arrested by a small mound of silvery hue, which same hue also extended over the adjoining ground. The mound is in front of a large outcropping rock of potstone, which I found to be an impressive witness of the tedious labors of the aborigines, it being entirely covered with marks where pot-forms had been worked out or left in various stages, some even were only begun and abandoned, while others were nearly worked out in rough outlines but still united with the living rock. At the foot of the bluff is a burrow in which and among the débris forming the mound, many potsherds, a broken pot of which the outside had already been well worked, and even the hollow started, and a pot-form as broken from the mother rock, were brought to light, with many tools of hard slate in shape of chisels, and scrapers of quartz.

From the Little Springs we followed the canyon to the northward, and crossed the pass, easy of access from this side, into Pots Valley. It is a wide hollow canyon in which potstone, silicious slate and “float”-quartz are found abundantly. The potstone is found especially below the small spring, which makes out near the base of a very conspicuous, isolated, large rock, which stands nearly in the centre of the valley; while the slate, of which the chisels are made, crops out boldly, higher up, near the pass. Several hundred yards below the spring at the ravine to the right, going down, is found a pit, and the ledge of potstone close by forms a face in the ravine, which shows the same marks of the chisel as at Little Springs. About eight distinct marks cover the lower face, while others are obliterated by subsequent mining. One, having only been commenced, shows the outlines of a pot-form in a circle worked to a depth of only an inch, and measures sixteen inches in diameter. Between this place and the second ravine about fifty yards to the northward, is another pit of larger dimension—about fifteen feet in diameter and still five feet deep—where, too, among the débris, potsherds and quantities of slate fragments and quartz are found, some of which had evidently been used in working the mine, and making the pots. Besides these places there are many more pits in the valley, and a quarry especially prominent about four hundred yards to the eastward from Pots Valley boat landing, close to the steep ocean shore. In
fact, on entering the cañon by the pass, as we did, when the grand rock near the spring, the lesser cliffs and the scattered boulders can be over-seen, I was struck, on examining the locality through a field-glass, by the discovery of so many silver-hued mounds, the débris of pits, the rock quarries and open workshops, so that I believed I had found the main factory of the ollus of the California aborigines. Even those not interested in aboriginal remains cannot fail to notice the manufacturing propensities of the people that formerly roamed here, and the locality was appropriately named.

In examining the slate quarry I found

the rock had been first broken into accidental shape and size, and such pieces best adapted for chisels were then selected and tumbled.
The scrapers, usually made of milky quartz, found in abundance all over the island, are sometimes quite well chipped, but often only simple flakes.

I will mention here that we detected among the chisel-marks on the living rock, as also on several potsherds, distinct signs of metallic tools having been used. These were probably of iron and like those which we frequently found in the burying-ground on the Isthmus.

Figure 3 illustrates a chisel of slate, half its natural size, and figure 4 a scraper made of quartz, of natural size. Figure 5 represents a part of the bluff near the boat landing.

[Image: Ledge of Steatite, Santa Catalina Island, showing the method of detaching and shaping the pots.]

and will give a better idea of how the rough work of detaching the rock was carried on.

After the pot-form had been worked out, it was broken from the living rock by working under it and by the gradual pressure of the chisel around the base. The detached pot-boulder was next rounded into proper form, it was then hollowed out until a certain thickness of the pot was reached, and finally, carefully finished with the scraper. As the thickness of the olla increases towards the bottom—it usually thickens from about half an inch at the rim
to one and a half at the bottom—it requires skill to attain this evenly. No mechanical apparatus was used for this purpose (as shown by certain irregularities in the form of the pot) but simply the touch of both hands in antiposition, one guiding outside the already finished surface while the other worked inside towards the guiding hand. In this wise, with some practical experience, a greater accuracy is attainable than at first might be supposed, especially if the work proceeds from a known thickness to which reference can be taken, which is here the case as it progressed from the rim.

A new pot is without polish, and has only the smooth surface imparted by the scraper, while those which had been in use attained frequently a polished surface by wear, which the soft and greasy nature of the potstone is inclined to adopt.

II The Mortar.

On the southwestern shore, near the southeast end of San Clemente Island, where a fair landing exists, we found a station prominently located on a shallow dune, about a mile below what is known as Chinese Point. To this place large numbers of beach-worn boulders of basalt of different sizes were brought, mostly such as were suitable for the manufacture of mortars which were here largely made. Some of the rocks were broken in the rough state, in the attempt to split off a section of the globular mass, to make a flat surface on which to begin the excavation, others, of a more convenient semi-circular form, bore marks of the chisel as, in one instance, a circle outlining the intended size of the basin, some broke in the hands of the worker while working out the basin, and one, we found, was abandoned on account of a flaw in the rock. The work of shaping the stone was first done with the hammer, consisting of a piece of hard rock, generally of quartz, of about a pound in weight, with sharp edges and points. Persistent and well directed blows with such a hammer, applied either directly with the hand or attached to a handle, will detach even large pieces with sufficient accuracy to give a rough form, if the tendency of cleavage is properly taken into consideration, while the more exact form, and a smoother surface is worked in the way the serrated hammer of the modern stone cutter is directed, vertically against the face. The basalt rock, al-
though very hard, is of a crumbling nature and will granulate easily under a pointed hammer. We found, therefore, but few chisels in the workshops of Clemente Island, and these were evidently applied more for working out the basin, when the hammer could not conveniently be used. When the mortar is made of sandstone which, instead of being brittle like the basalt, is soft and more adhesive or tough, I believe the chisel was used to a greater extent, and this is indicated by the sharper peck-marks.

Judging the progress of work by the advance of a single stroke of the hammer or chisel, I am of the opinion, a neat mortar of common dimensions—twelve inches in diameter—should not have required more than a week’s work, and for a pot even less time should have been consumed by a skilled worker, not allowing for the detachment of the pot-form from the living rock which must have nearly doubled the time.

III. Weights for Digging-sticks.

These implements,—as are so many others that have a hole, a notch, or other means of fastening a line,—are often considered as sinkers. One of the less frequent types of net sinkers, indeed, resembles the weight for a digging-stick but yet there is as much difference between the two as between a mortar and an olla. The sinker is of a different material, is coarsely finished, the hole is much smaller, and narrower in the middle, and is hardly ever drilled, or finished by drilling, but simply pecked. My first impression, on finding these perforated stones, was that they were the heads of war-clubs, to which those of a pear-shape especially seem to answer. By examining a large number of fragments, however, I found most of the stone-rings had been broken in two, parallel with the hole, which could not be caused by the side pressure of the club, but by a wedge-like action against the inner sides. The suggestion that these stones were weights for digging-sticks, such as are still in use among the Hottentots, I received from an aged half-breed, while working on Santa Cruz Island, two years ago, and I have since become convinced that such was their use. If we examine a stone-ring which has done some service, we find the hole shows a polish and fine stone running lengthwise, and wear on one end of the ring imparted by the hand while in use and
in carrying the digging-stick where it naturally would rest, with its projecting stone weight, against the hand. I found some of the weights thus deeply worn, and by mounting one on a proper stick it fitted nicely to the grasped hand. I also noticed a specimen, among the many sent to the Peabody Museum, in which the hole had been enlarged in full width but in one direction only — making an elliptic hole — worn by the digging-stick while worked, when its own weight could only act against the sides of the stick corresponding to the flattened ends of the wooden spade. There were two methods by which the hole in the stone was made, both of

Fig 6

Weight for Digging-stick from Santa Cruz Island  P M No. 9296  Nat size

which are illustrated by numerous specimens in the collection. In one instance the weight, — almost exclusively of steatite, but occasionally of a harder stone, — was first roughly worked into the desired ball or a more flattened disk, the hole was then chiselled from both sides until it met, it was then drilled out to an equal width throughout, and the weight was finally finished by working the outside in a symmetrical form. The more elaborate weights, however, were finished in outline before the hole was bored. The hole
was made, no doubt, with a flint point, the striae are deep and the width of an unfinished hole decreases towards the centre. A drilling apparatus might have been used for the streaks of the drill are well defined and in full circle, which could hardly be attained.

Fig 7

Weight for Digging-stick from San Nicholas Island

by turning the borer simply between the hands. Figures 6 and 7 represent two common forms of these weights.

Among the weights for digging-sticks we find many of small sizes and inferior make, which could not have been of any practical use for this purpose and often deviating so much in form as to make it doubtful if they were designed as weights. The same deviation from the practical size we find sometimes among mortars—not meaning the paint-cups—the pestles and frequently among the comoles (the flat stone plates for baking tortillas) which were formerly extensively in use, judging by the many specimens col-
IV Pipes.

Very little need be said of the manufacture of this article which has been, in the form common on this coast, a mysterious thing to many, and was usually classed among the nondescripts of the medicine-man, whereby, it was thought, he practised deception to sick believers. The pipe is a funnel-shaped tube like a thick, enlarged, modern cigar-holder, with an opening usually over an inch in diameter at the large end, and narrowing to one-third of an inch towards the other, which has a corresponding decreased thickness.

The hole was drilled from both ends, but only to a short distance from the smaller, and the mouth of the pipe was then enlarged by scraping parallel with the longer axis. For a mouth-piece, which protrudes about an inch, a piece of a wing, or leg-bone, of some bird, was inserted and tightly secured with asphaltum. The pipe was usually made of steatite and is sometimes neatly finished.

The Klamaths of the present day use a pipe of similar form to those found in the graves, and still smoke the native tobacco, *Nicotiana quadrivalvis*, which I found to be a sickening narcotic. It amused me to see an Indian bending back his head to bring the pipe in a vertical position, so as not to lose any tobacco, while taking a long draught which he inhales, the longer to enjoy the short opportunity, as the pipe must be passed on.
CAVE DWELLINGS IN UTAH

BY DR. EDWARD PALMER

About eighty-four miles east from St George, at Johnson, Kane Co., Utah, there is an exposure of soft sandstone in which are many natural caverns

Owing to the rapid decay of the rock, the openings of many of these caves have been closed by the fall of the roof, and much labor would be required for their proper exploration. Many of those that are still of easy access are now used by the Pah Utes as storehouses for their seeds, corn and other articles. Such as were so used could not be explored without the risk of bringing trouble to the settlers on the return of the Indians. Another difficulty in exploration was owing to the sheep and goats which resort to the caves for shelter, the cave from which the articles were obtained having the floor covered to the depth of two or three feet by the droppings of these animals.

The cave explored was located about two and a half miles from Johnson. It was ten feet high, thirty feet wide at its mouth, and extended about the same distance into the cliff.

"Water is convenient to these caves, and they were evidently used as habitations in ancient times, and even by the present Indians when planting or gathering crops from the adjacent land.

The cave explored had already been partially examined by Mr. H. A. Martin, who stated that he had found "two balls of yellow yarn, and a piece of cloth about the thickness of flannel, also two pieces of wood, each about twelve inches long, flat on one side and rounded on the other, with rounded and smooth edges."

On page 199 I have given a general statement of the explorations of Dr. Palmer in Southern Utah. Among the notes accompanying the specimens are many of interest and value, but as they would require Dr. Palmer's revision to prepare them for publication, and as he has already published similar observations in connection with his papers in the U. S. Agricultural Report and in the American Naturalist, I have thought it advisable at this time simply to abstract from the notes such as relate to the articles found in a cave, as they are of special Ethnological interest — F. W. P.
The articles obtained from the débris on the floor of the cave, which was removed to the depth of two or three feet, after cleaning away the droppings of the animals, were as follows —

A fine specimen of an earthen cooking pot (Mus. No 12,132) covered with a baking stone (12,131), and filled with one hundred and nineteen small coils of strong and well preserved string (12,133), probably made of the fibre of *Apocyphium cannabinum*, and such as are used by the present Indians for various purposes. Each piece of string is between seven and eight feet in length.

This pot is not of Pah Ute make but probably of Moqui origin, and like those found in the mounds in Utah and in the rums of the cliff houses. The small slab of stone protecting the contents of the pot shows signs of contact with fire, and was probably used to bake the thin water-like bread, in the same manner as the Moqui Indians do at this time.

Another vessel of pottery (12,140) was also found at a depth of about three feet. This is shaped like a small jug, with a handle on one side extending downwards from the lip of the jug. It is of smooth and reddish clay, well made and symmetrical, four inches high, and about the same diameter through the centre, bottom rounded, mouth one and a half inches in diameter. Over this vessel, and protecting it, was about half of a bowl (12,141) of the characteristic shape and style of ornamentation of the Ancient Pueblo pottery.

Fragments of other vessels (12,139) of the same colored pottery as the bowl were also found.

Wooden Tongs (12,135), fastened by a band, from the leaf of some *Yucca*. Similar tongs to these are used by the Apache Indians in gathering the fruit of the cactus. The Indians hold the fruit in the tongs in one hand, and with the other brush off the slender spines with a bunch of grass.

Tongs like these are also used to take any hot article from the fire, and are particularly serviceable in transferring heated stones from the fire to the baskets in which food is cooked by their heat.

Hair brush (12,277) This brush is made of the stems of grass

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7 This vessel, which is seven and one half inches in diameter and seven and three-fourths inches high, is of the peculiar form made by coiling the strip of clay from the bottom to the top, and leaving the edge of the coil projecting on the outside, like the clapboards on a house, while carefully uniting and smoothing them on the inside. A large vessel of this character has been figured by Mr. Howel's plate II fig. 1, from the Mancos-Creston houses. Bull U S Geol Geog Surv Vol II No 1, 1876.—F W P.
Fig 1

Shovel with blade of horn from a cave in Utah (12149)  Blade 14 inches long, 5 inches wide  Handle 3 feet long
tied with fibres of a species of Agave, and is like those used by the Moqui, Pah Utes, Navajos and Apaches.

Fragment of roasted leaf of a species of Agave (12,136). The leaves of the Agave are used by the present Indians as an article of food.

Pine cone (12,137) The seeds of cones of this species are used by the Indians for food, and this was probably carried to the cave for that purpose.

Several Corn cobs (12,138)

A small Basket (12,113) similar to those made by the Moqui Indians, and unlike those made by the Pah Utes.

All the articles above mentioned were found in the débris of the floor of the cave as stated, and are well preserved, owing to the dryness of the cave.

Perhaps the most interesting thing obtained was a shovel (12,142) which was found under large rocks, covered by débris, and evidently had been long buried in the cave. Figure 1 represents a front and back view of the blade, showing the method of its attachment to the long wooden handle. The blade is made of the horn of a mountain sheep, the horn evidently having been steamed and flattened, the pointed end being the portion fastened to the handle by sinews. The blade is five inches wide, fourteen long, and not quite one-fourth of an inch thick. The wooden handle is five feet long and of a nearly equal diameter of one and one-fourth inches throughout.

Altogether the implement is a very handy one for use in a light soil, and would prove of great service in planting, cutting up weeds, ditching, etc. Several old Indians of different tribes have told me of such implements having been used for agricultural purposes before they obtained iron tools. They stated that the blades were made of horn, bone, or stone, and, by the outline they would draw on the ground, they showed that the general shape of the shovels they described was like this interesting and probably unique specimen. On showing this implement to some old Pah Utes, they said at once that it was of Moqui make, and was used to make ditches and plant corn.

The general shape of the blade of this shovel is very much like that of the large stone implements which have generally been called "hoes," and it is probable that while some of these implements may have been mounted for use as hoes, others were allowed to handle, similar to this blade of horn, and used as shovels. — F W P