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SHELL MOUND AT OLD ENTERPRISE. See p. 19.
WYMAN's Memoir on the Fresh Water Shell Mounds of Florida.

PEABODY ACADEMY OF SCIENCE.

—FOURTH MEMOIR.—

FRESH-WATER SHELL MOUNDS

OF THE

ST. JOHN'S RIVER, FLORIDA.

BY

JEFFRIES WYMAN.



SALEM, MASS.

PUBLISHED BY THE PEABODY ACADEMY OF SCIENCE.

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PROFESSOR JEFFRIES WYMAN DIED SUDDENLY, OF HEMORRHAGE
FROM THE LUNGS, AT BETHLEHEM, NEW HAMPSHIRE, 4th SEPTEMBER,
1874.

A few pages only of this work were then printed. It has been
carried through the press by friendly hands, especially by the valuable
aid of Mr. F. W. PUTNAM, the successor of Professor WYMAN
in the Curatorship of the Peabody Museum of American Archæology
and Ethnology at Cambridge, who has bestowed much time and attention
in comparing the plates with their originals in the Museum,
and in verifying, wherever possible, the measurements.

M. W.

CAMBRIDGE, MASS.,
Nov. 1, 1875.

JEFFRIES WYMAN

DIED 4TH SEPTEMBER, 1874.

The wisest man could ask no more of Fate
Than to be simple, modest, manly, true,
Safe from the Many, honored by the Few;
Nothing to count in World, or Church, or State,
But inwardly in secret to be great;
To feel mysterious Nature ever new,
To touch, if not to grasp, her endless clew,
And learn by each discovery how to wait;
To widen knowledge and escape the praise;
Wisely to teach, because more wise to learn;
To toil for Science, not to draw men's gaze,
But for her lore of self-denial stern;
That such a man could spring from our decays
Fans the soul's nobler faith until it burn.

J. R. L.

CONTENTS.

	PAGE
EDITORIAL NOTE,	iii
SONNET BY JAMES RUSSELL LOWELL,	iv
LIST OF ILLUSTRATIONS,	vii
INTRODUCTORY REMARKS,	3
 I. THE ST. JOHN'S,	 4
II. GENERAL DESCRIPTION OF THE MOUNDS. WITH MAP,	8
III. PREVIOUS NOTICES OF THE MOUNDS,	14
IV. DESCRIPTION OF SOME OF THE MORE IMPORTANT MOUNDS,	15
List of Shell Mounds on the St. John's River,	44
V. PRIMITIVE MAN AND IMPLEMENTS,	45
Stone Implements,	49
Bone Implements,	51
Pottery,	52
Shell Implements,	56
Drinking Shells,	57
Perforated Shells,	58
Ornaments,	58
Absence of Pipes and of Metals,	59
VI. HUMAN REMAINS IN THE SHELL HEAPS OF THE ST. JOHN'S RIVER.	
CANNIBALISM,	60
Flattened Tibiæ,	65
Cannibalism,	67
Notes on Cannibalism,	72
VII. REMAINS OF ANIMALS IN THE SHELL MOUNDS,	78
Extinct Animals,	81
VIII. AGE OF THE SHELL MOUNDS,	81
IX. THE SUCCESSIVE INHABITANTS OF THE FLORIDA PENINSULAR,	85
X. CONCLUSIONS,	86
INDEX,	89

ILLUSTRATIONS.

PLATE I.

FRONTISPIECE.—Shell Mound at Old Enterprise (from a photograph),	PAGE 19
--	------------

PLATE II.

IMPLEMENTS OF STONE. NATURAL SIZE.

FIG.		
1.	Celt from Orange Bluff,	49
2.	" " Shell fields at Hawkinsville,	49
3.	Rude Flint Implement from Blue Spring,	50
4.	" " " " Huntoon Island,	50
5.	Arrowhead from Lake Beresford,	50
6.	" " the St. John's,	50
7.	A worked flint from beneath the Shell Mound at Horse Landing,	50

PLATE III.

IMPLEMENTS OF BONE. NATURAL SIZE.

1. Awl made from a splinter of bone. From Huntton Island,	51
2. " " " " " " " " " " " "	51
3. " " " metatarsal bone of deer. (By error in text this is referred to as fig. 5). From Old Town,	52
4. " fragment with well polished surface. From Old Town, in mud of the creek,	52
5. " well made and somewhat ornamented. From Shell field at Wekiva,	52
6. " made from a splinter of bone. From below Hawkinsville,	52
7. A broken implement with a projecting base. From Old Town,	52
8. Probably the base of a broken awl, made from a metatarsal bone of a deer. From Old Town,	52
9. Awl made from a splinter of bone. From Blue Spring,	52

PLATE IV.

WORKED BONES. HUMAN TIBIA. ALL BUT FIG. 7 OF NATURAL SIZE.

1. Piece of the radius of a deer, showing method of cutting. From Old Town,	52
2. A worked bone, not referred to in the text. From Osceola Mound,	
3. A small Mammalian bone, sawed and broken. From Horse Landing,	52
4. Lower end of radius of bear, sawed from shaft. From Old Town,	51
5. Ornament made from the phalanx, probably of a deer, with holes drilled. From Horse Landing,	52, 59
6. Olecranon of a deer, sawed and cut. From Mound above Blue Spring,	51
7. A flat Tibia from the River Rouge Mound, Michigan. About $\frac{1}{4}$ natural size,	66

PLATE V.

POTTERY. NATURAL SIZE.

1.	Small Cup.	From Lake Beresford,	.	.	.	.	.	.	.	53
2.	" Vase.	From Mound at Huntoon Island,	.	.	.	.	.	.	.	53
3.	Fragment showing the simple form of ornamentation,	.	.	.	.	.	.	.	.	53
4.	" " " " " "	" " " " " "	.	.	.	.	.	.	.	53
5.	" " " " " "	" " " " " "	.	.	.	.	.	.	.	53
6.	Beginning of a coil of clay.	From Alexander's Spring,	.	.	.	.	.	.	.	54

PLATE VI.

POTTERY AND AN IMPLEMENT OF SHELL. NATURAL SIZE.

1. Fragment showing ornamentation by simple tracing and impressions with a point.
From Old Enterprise, 53
2. Fragment of stamped pottery, 53
3. " " " " From Old Town, 53
4. " " " " From St. John's Bluff, 54
5. Implement made of the spire of *Busycon perversa*. From Mound at Volusia, 57

PLATE VII.

ARTICLES OF SHELL. ALL BUT FIG. 3 OF NATURAL SIZE.

1. Chisel-shaped Implement made from *Busycon*. From the St. John's, 56
2. " " " " " " " From Huntoon Island, 56
3. " " " " " " " Half natural size. From Enterprise, 56
4. " " " " " " *Strombus gigas*. From Hawkinsville, 57
5. A Cutting Implement made from the rostrum of *Busycon*, 57
6. A perforated disk of Shell. From the St. John's, 59

PLATE VIII.

ARTICLES OF SHELL. ALL BUT FIG. 2 OF NATURAL SIZE.

1. Chisel-shaped Implement made from *Strombus gigas*. From Mound at Enterprise, 56
2. Perforated Shell of *Busycon carica*. Half natural size. From Lake Harney, 58
3. Ornament of Shell from Mound at Watson's Landing, 59
4. " " " " Burial Mound at Black Hammock, 59
5. Perforated Shell of *Unio*. From Wekiva, 58

PLATE IX.

SECTIONS OF HUMAN TIBIÆ. NATURAL SIZE.

- 1-8. From White race, recent, 66
9. " an Indian grave in Haverhill, Massachusetts, 66
10. " a Mound in East Tennessee, 66
11. " " " " Kentucky, 66
- 12, 13. " " " at Cedar Keys, East Florida, 66
- 13 a. " 3½ inches lower down, but from the same tibia as fig. 13, 66
14. " a Mound on the St. John's River, Florida, 66
- 15-22. " various places in Florida, 66
23. " the River Rouge Mound, Michigan, 66

THE WOOD CUT IN THE TEXT represents a Section of the Shell Mound at Osceola
and the position of the Human remains described on page 33

MAP OF THE ST. JOHN'S RIVER, showing the location of a large number of Shell
Mounds; see page 8 and following, 10

FRESH-WATER SHELL MOUNDS

OF THE

ST. JOHN'S RIVER.

THE following descriptions relate almost exclusively to the "shell mounds" and "shell fields" on the banks of the St. John's River in East Florida, which, as far as at present known, were the dwelling places of the earliest inhabitants of the region through which this river flows. The first examination of them by the writer was in 1860, when collections were made at Lake Harney, Black Hammock near Lake Jessup, and at Enterprise. In 1867 the same localities were revisited and a short account of them, of which this memoir is in some respects a reprint, was published in the "American Naturalist" (Vol. II, Nos. 8 and 9), and another in the "Annual Report of the Peabody Museum of American Archaeology and Ethnology" (printed in 1868).¹ Since these notices were published he has had opportunities for further exploration, the results of which are the correction of some errors and the more extended account of the mounds now given. This is, however, still very incomplete, and is offered simply as a record of what he has observed and a contribution to the knowledge of these ancient relics of a race which has long since passed away.

Unfortunately, history gives us but little or no assistance in tracing these antiquities to their origin. For two centuries following the arrival of the French and Spaniards they are only incidentally noticed, and were considered as of natural and not artificial origin. A century ago the Bartrams, father and son, ascended the St. John's River, and mentioned them somewhat particularly in the published accounts of their travels, but neither of them appears to have understood their true nature, and no one since their time has studied them. All we have to say, therefore, with regard to their distribution, their structure, and the objects found in them, is based almost exclusively upon our own personal observations. The collections we have

¹ In this last it was stated that "the shell heaps we are now to describe were visited during the months of February and March, 1867." This was in reality the second visit, when they had just been revisited. The first examination was, as stated above, in 1860, while travelling in company with G. A. Peabody, Esq., of Salem, and George H. Dunscomb, Esq., of Canada, and when a large amount of materials now in the Museum at Cambridge was collected.

made are quite large, comprising many hundreds of objects, and are preserved in the Peabody Museum of American Archaeology and Ethnology at Harvard College.

The writer, in many ways, has had the assistance of his friend and traveling companion on the St. John's, G. A. Peabody, Esq., of Salem, for which he gladly and gratefully acknowledges his obligations. With these acknowledgments are associated the pleasant memories of the several winters we have passed together in camp, in a region of unfailing interest and where climate and natural beauty of river and forest, and the abundance of animal and plant life, offer endless attractions.

*

I. THE ST. JOHN'S.

The Il-la-ka,² Rivière de Mai,³ Rio de San Matheo,⁴ Rio de San Juan,⁵ the St. John's, as it has been successively called by the Indians, French, Spaniards, and the later inhabitants of Florida, and on the banks of which are to be seen the ancient dwelling places of man, described in the following pages, requires a brief notice, since it may be presumed to have had some influence on the habits of the aborigines.

This river drains the eastern portion of the northern half of the peninsula, and is comprised between 27° 30' and 29° 45' of north latitude, traverses a nearly level sandy region, but follows a very winding course and has an extreme length of about three hundred miles. The general direction of the river is somewhat to the west of north, but in its lowest portion, where it enters the Atlantic, it is easterly. As high as Palatka, a hundred miles from its mouth, it has grand proportions, widening into sheets of water from two to three miles across, and in some places opening stretches long enough to give a water horizon. Above Palatka it steadily narrows till its breadth at Lake Monroe is reduced to less than two hundred feet, and its shores at the same time gradually sink to the level of the water. It traverses three large lakes, viz. : Lake George, Lake Monroe and Lake Harney, the first having an extreme length of eighteen, and a breadth of from seven to eight miles, and the others somewhat less than half of these dimensions. Besides these lakes, which may be considered enlargements of the river, are several which enter it laterally, as Dunn's Lake, Lake Dexter, Lake Beresford, Lake Jessup and the Salt Lakes, all of considerable size, and, with those before mentioned, seeming to justify the alleged meaning of the Indian

² The name as given in the text is probably correct, and was believed to be so by the late Buckingham Smith. Dr. Daniel G. Brinton, who is well known for his knowledge of the Indian languages, has called my attention to the following statement by Mr. Smith. He says "I once asked Pitchflyn, an educated Choctaw chief, 'the meaning of a certain ancient name of the St. John's River. Having corrected my pronunciation of it to Il-la-ka, he answered me slowly, 'it hath its own way, is alone contrary to every other.'" (Memoir of Hernando Escalante de Fontaneda, note to p. 38.) If this be correct, the popularly received meaning of the name, "a river of many lakes," is erroneous.

³ Ternaux Campan's Floride, p. 257.

⁴ Ibid, p. 34. Sparks' Life of Jean Ribault, Library of American Biography, p. 16.

⁵ De Brahm, Manuscript Survey of Florida, Georgia and South Carolina, in the Library of Harvard College, 1754.

name for the St. John's, just referred to. The head waters are in Lakes Washington, Winder and Poinsett, and the adjoining swamps south of these, to which must be added the swamps between the lakes just mentioned and Lake Harney, all of which together have an area of several hundred square miles, and form great reservoirs in which the summer rains are collected.

These head waters are separated by low land rising but little above their level from an extensive chain of lakes which have an outlet southwards into the Kissimmee and thence into the great lake of Oke-chobee. When the river is at its highest level, just after the rainy season, it is said that the sources of the two rivers flowing north and south, viz., the St. John's and the Kissimmee, come so near together as almost to communicate. Col. F. L. Dancey informs me that he has "but little doubt that in certain stages the water flows from Lake Washington into the Everglades, that is, reverses its course, and information obtained by Prof. J. W. P. Jenks of Brown University, who has recently made an excursion from Fort Capron to Lake Oke-chobee, confirms this view. This fact will help to show how nearly level are the valleys of the two rivers above mentioned.

Although a tide is perceptible as high as Lake George the waters of the St. John's are fresh enough for drinking purposes as low down as Hibernia about fifty miles from its mouth.

One of the most remarkable features of the St. John's is the slight difference of level there is between its head waters and the Atlantic ocean. Col. F. L. Dancey, whose knowledge of the physical features of the river is based on extensive personal observation, informs me that in running a level from Lake Harney, two hundred and twenty miles from the mouth, to Indian River on the sea-coast, he found the waters of the former during the stage of the St. John's, at the time the level was made, only six feet higher than the latter. In the ordinary condition of the water, he states, that its height would be four, and at Lake Washington five, feet above Indian River.⁶

So little is that portion of the peninsula of Florida, drained by the St. John's, raised above the level of the sea, that were the land depressed ten or twelve feet below low water mark, the ocean would reassert its sway over the largest part of it, leaving above water narrow ridges along the coast and low islands inland. As it is, extensive areas are under water throughout the year, and the surface is made up of an immense number of lakes, ponds, creeks, lagoons and swamps, combined with open prairies, large tracts of pine barren, hammocks of mixed forest growths, chaparrals of saw palmetto, thick jungles and wet lands overgrown with tall reeds or rank grass.

The scenery of the St. John's presents striking contrasts. The first objects which attract the eye of the traveller as he enters its mouth are the waters breaking roughly over the shoals and sand bars; these passed, there opens a dreary view of drifting sands. As he ascends he is impressed with

⁶ Indian River is a narrow inlet or lagoon parallel to the coast and separated from the sea by a low sand ridge. Its level is but a little different from that of the sea.

its magnitude, but the low flat pine-clad shores are extremely monotonous. In the upper and narrower portions, especially above Lake George, the scene changes. Instead of the pines there are thick and luxuriant growths of forest trees, oaks, ashes, elms, cedars, maples, willows, gums, hiccories, magnolias, cypresses, bays, etc., some bearded with trailing moss, others studded with mistletoes and orchids, and still others hung with thick tangles of lianas. Tall and stately palms stand out singly, chief figures in the landscape, spread into broad groves, or cover the narrow dykes which border the river. To these must be added the smaller creeping vines which richly clothe the banks, and the luxuriant water plants which line the shores, or, in detached masses, form floating islands, which from time to time are carried down by the current, all together, giving to the views which are offered in the constant windings a half tropical look.⁷

To the northern traveller equally striking features in the upper shores are the long stretches of swamps overgrown with trees, in which half wild cattle maintain a scanty subsistence by browsing, and which are only interrupted at intervals of many miles with bluffs or shell mounds.

If to the features just briefly noticed we add the larger wild animals which the traveller formerly could, or still may, perchance, see living along the shores or in the hammocks, including the buffalo, the deer, the bear, the puma and the wild cat, the wolf, the fox, the wandering otter, the beaver,⁸ the raccoon, the opossum and the many smaller mammals, large flocks of water fowl, the white and great blue herons and their allied species in large numbers standing along the shores, the wary turkey with his brilliant plumage, the roseate spoonbill sometimes seen, and the flamingo, once a rare visitor,⁹ but now no longer found, the wood ibis, the whooping crane whose resonant notes are heard far and wide, the stupid and unwary courlan disturbing sleep with its night-long cry,¹⁰ the loathsome buzzard circling at times gracefully among nobler birds, or oftener, and truer to its nature, quarrelling with its kind as it gluts itself over disgusting food; the snake bird of strange make and habits,¹¹ the fish hawk whose massive nest of

⁷ Of the Okla-wa-ha (which Buckingham Smith says is Chata and means "waters many") the largest of the tributaries of the St. John's, we shall have nothing to say, as none of the shell heaps we have visited are to be found on this attractive river.

⁸ See Bartram Travels, p. 281.

⁹ The flamingo, *Phœnicopterus ruber* Lin., mentioned above, Bartram says is seen about the point of Florida; rarely as far north as St. Augustine (Travels, p. 296). Nuttall says "solitary individuals are observed even in the Middle States." Ornithol., Water Birds, p. 72.

¹⁰ *Aramus scolopaceus* Vieill. (*Tantalus pictus* of Bartram), and "called by an Indian name *Ephouskyca* which signifies in our language the crying bird" (Travels, p. 147). Nuttall describes it as "very shy and carefully hiding itself, but when aware of being discovered it starts rapidly to a great elevation." They are well known to be quite the reverse, and seem to have little or no fear of man, unless in places where they have been frequently shot at. We have approached them in a boat near enough to touch them with an oar, and have watched them for several minutes without their being alarmed.

¹¹ The snake bird, *Plotus ankinga* Lin., is one of the most remarkable, both in structure and habits, of the birds found on the river. Formerly before the influx of strangers and the senseless use of the shot-gun and rifle from the steamboats had so largely reduced their numbers they were among the birds most frequently seen. They had the habit of collecting in large numbers on the trees with their wings half opened to the air, and if alarmed they either flew away into the adjoining woods or quite as frequently dropped into the water as if suddenly struck with paralysis, or as Bartram says "as if dead," seeming to have no control of either wings or legs. When they reappear it is only with the head above the surface, or perhaps, thrust up between some leaves of water plants keenly eyeing the intruder and then quickly vanishing again. They

sticks and moss crown many a dead and shattered cypress,¹² the bald eagle soaring in the upper atmosphere, or robbing in mid air the fish hawk of its prize,¹³ the migratory birds collecting in thousands for their journey northwards, the alligator lazily drifting with the current, or lying in his muddy wallow basking in the sun, all as they were in the days of the early explorers, or even in the time of the Bartrams, the natural features of the St. John's must have made it one of the most beautiful and remarkable of American rivers.¹⁴

It was in the same region too, that, in earlier but far remote times, an ox, a horse, an elephant and a mastodon, all many centuries since extinct, grazed upon the plains or browsed among the trees.

The river has its annual rise and fall, which occurs with great regularity. The rain charts, constructed from observations made under the direction of Prof. Henry of the Smithsonian Institution,¹⁵ show that the peninsula of Florida is the region in which the rainfall is heaviest, east of the Rocky Mountains, and further that in the peninsula itself the curves of the greatest

live chiefly on fish, which they pursue under water, the bream being, according to our observations, their favorite food, and the large numbers of these sometimes found in their stomachs show a most voracious appetite.

The long neck and pointed bill remind one of the herons, and the webbed foot with pointed claws of the cormorant. On the other hand they have a long and conspicuously spreading tail, and in flight they carry the neck outstretched. They often mount high up in the air, and soar after the manner of the hawks and vultures, though less gracefully and with more frequent strokes of the wings. We have seen the buzzards, snake birds and the wood ibis all soaring together at a great height. Their rude nests of sticks, once seen on the trees overhanging the river, are now chiefly confined to the more retired creeks and lagoons, whither the constant persecution of the traveller has driven them.

We have in another place described a remarkable case of parasitism in the brain of these birds. Nearly every individual is infested with a thread worm (*Filaria ankingæ* Wyman), always found in one place, and in this only, viz., on the top of the brain, but inside of the membranes, between the cerebrum and cerebellum. The stomach also has an unusual complication, having a separate chamber for secreting the gastric juices, which opens directly into the gizzard, without any connection whatever with the œsophagus, and a curious valvular arrangement between the gizzard and intestines, consisting of slender fibres of epithelium directed towards the cavity of this organ. It seems to act as a strainer which would prevent all but the finest particles from passing through.

¹² The nests of these birds make a distinct feature in the landscape, though the number of them is fast becoming less, as year by year they are driven from the river-banks to quieter and safer places. They almost without exception build upon dead cypress trees, the highest being the favorite ones, and have too, the curious habit, the reason of which is best known to themselves, of collecting the materials of their nests from distant places, when they could easily be had within a few rods of the tree on which they breed. A pair building near Old Town, crossed the river near our camp several times a day and flying a considerable distance beyond, returned with moss or sticks trailing behind them. We saw one of them break with a sharp crack a dead branch from the tree on which it stood, and carry it off for building material. The sticks of the nest alone form a large mass, serving as a foundation, but when the nest is finished are so completely covered with moss as to be almost out of sight. If not interfered with, the same nests are occupied for several, and we are credibly informed, many successive years. The homestead each year, being more or less repaired and furnished anew. Even in spite of annoyance they often stand by their nest for years. A short distance below Old Town on the left bank of the river is a conspicuous nest, at least four years old which has not been abandoned, notwithstanding the occupants have been shot at, every time a steamboat passed, by the would-be-sportsmen who crowd the decks.

¹³ We have more than once seen this well known exploit of the bald eagle, teasing the fish-hawk with a series of attacks, followed up in quick succession, till it dropped its fairly captured prey, but which the pirate caught with wonderful adroitness before it reached the water. In one of its swoops which we witnessed it descended from a considerable height, making a graceful curve, and its rapidly increasing motion through the air was attended with a rushing roaring sound, which we can compare with nothing so well as that of a rocket. One who has heard this sound can easily imagine that the more timid quadrupeds and birds would be so startled as to become for a time immovable, and thus easily snatched away.

¹⁴ See Section on the animals of the mounds.

¹⁵ Tables and Results of the Precipitation of Rain and Snow in the United States. Collected by the Smithsonian Institution, and discussed under the direction of Joseph Henry. By Charles A. Schott. Washington, 1872.

rain encroach upon the head waters of the St. John's, though still more upon those of the rivers flowing south into Lake Oke-chobee, and west into the Gulf of Mexico. The maximum rainfall is in June, July and August, when it amounts, along the head waters, to about twenty inches for the three months, and the least is in December, January and February, when it does not exceed six inches for the same period. During the rainy season the reservoirs of the St. John's, consisting of the combined lakes and swamps already noticed, as well as those of the Okla-wa-ha, in the aggregate having a surface of many hundreds of square miles, in a small way resemble the two great reservoirs of the Nile, and receive immense quantities of water, which are gradually discharged through these two rivers, and in consequence of the slight difference of level there is between the river and its shores a somewhat extensive inundation takes place in its middle portion.

The high level of the river is maintained for a time by the steady outflow from the reservoirs, but in the course of the spring the water recedes leaving behind deposits of mud, remnants of aquatic plants, and various kinds of drift material, all of which help to prepare the way to convert the swamps into dry land.

During the period of the overflow there undoubtedly exists, what in earlier, but not very remote, times, and before the land had reached its present elevation, was the ordinary condition, when many of what are now merely lagoons and creeks were channels of the river forming an intricate network, and when areas, which are now dry through a part, were under water through the whole, of the year.

It was during the annual rise that the river-dykes, consisting of sand and sediment, were built up between the river and the adjoining swamps and which sometimes served as natural foundations for the shell mounds.

II. GENERAL DESCRIPTIONS OF THE MOUNDS.

The part of the river in which we are especially interested is comprised between Forrester's Point a few miles below Palatka and the Salt Lakes, for it is between these places that nearly all of the fresh water shell heaps are to be seen, and very much the largest portion is within still narrower limits, viz.: between Lake George and Lake Harney. (See map, where the shell heaps are indicated by black dots.) Many are within the range of the annual inundation, and when this prevails become islands; but in the rear of some, as the great mound on Huntoon Island, Bartram's Mound, and others, there are extensive swamps wet throughout the year. These former dwelling places of the Indians have been the last to become occupied by the settlers, but the hunter has always found them suitable for his purpose. There are in this region many creeks and lagoons, which with the river afford easy communication by water in many directions, and game, such as that sought by the Indians, has been very abundant here until within quite recent times. It is in this same region, too, that the species of shell fish of

which the mounds are made are to be had now in the greatest numbers. In the days of the earliest occupants the same conditions may be presumed to have existed and to have enabled the aborigines to sustain life with the least effort.

The shell deposits on the river are entirely different as to their characteristics from the mounds of the sea-coast. The last extend around the shores of the whole peninsula of Florida and in certain places, as at Turtle Mound, Charlotte Harbor and Cedar Keys, are of gigantic proportions. They are composed exclusively of marine species, mostly of oysters on the Atlantic, but on the Gulf coast of several species belonging to different genera, as *Ostrea*, *Busycon*, *Strombus*, *Fasciolaria*, *Cardium*,¹⁶ etc.

The mounds of the river, on the contrary, consist exclusively of fresh-water species, viz.: *Ampullaria depressa* Say, *Paludina multilineata* Say and *Unio Buckleyi* Lea.¹⁷ The *Paludina* forms by far the largest portion of every mound, and with a few *Unios* the whole of some. Either of the above mentioned species, however, instead of being promiscuously mingled with the rest, as is generally the case, may be found forming considerable deposits by themselves, without the admixture of the others, as if at certain times they had been exclusively used for food. At Old Town we have seen large deposits of *Ampullariæ* alone in one part, and of *Unios* in another. Other shells, as *Melaniæ* and *Helices*, are occasionally found, but are too small and too few to justify the supposition that their presence was other than accidental.

As far as known to the writer the fresh-water shell mounds on other rivers of the United States, understanding by the word shell mound a dwelling place, consist almost exclusively of *Unios*. Those of the St. John's are therefore peculiar, and are the only, or certainly the chief, instances in which the *Ampullarias* and *Paludinas* just mentioned have become to so large an extent articles of food.¹⁸ There is not a single mound on the St. John's composed exclusively of *Unios*.

¹⁶ These coast mounds have received but little notice from early writers, and it has not been consistent with our plan of exploration to examine them. The earliest mention of them which we have seen is in the Narrative of Cabeza de Vaca, who, in describing the Indians of the west coast of Florida, says, "the houses are of mats set up on masses of oyster shells, which they sleep upon, and in skins should they accidentally possess them." Translation by Buckingham Smith. Washington, 1851. p. 49.

Jonathan Dickenson was shipwrecked in the Gulf of Florida near St. Lucia in 1699, and in the narrative of his subsequent journey to St. Augustine notices the shell mounds along the coast. In one place he records, "I removed with my wife . . . to an Indian house that stood on a hill of oyster shells." p. 41. Again, "I then saw a house on another oyster hill that the water was not got over yet." He had moved to the first mentioned mound to escape an unusually high tide. Nothing, however, is said leading one to suppose that they were built by man. In more recent times Dr. Daniel G. Brinton has described some of them, and shown that they were not only dwelling places, but are true shell heaps, being the remnants of the food of the natives. See *Floridian Peninsula*, p. 166. The writer has also given some account of them in the "Third Annual Report of the Peabody Museum of American Archaeology and Ethnology," printed 1870, p. 8.

¹⁷ Mr. J. G. Anthony, the eminent conchologist, has kindly verified these for me.

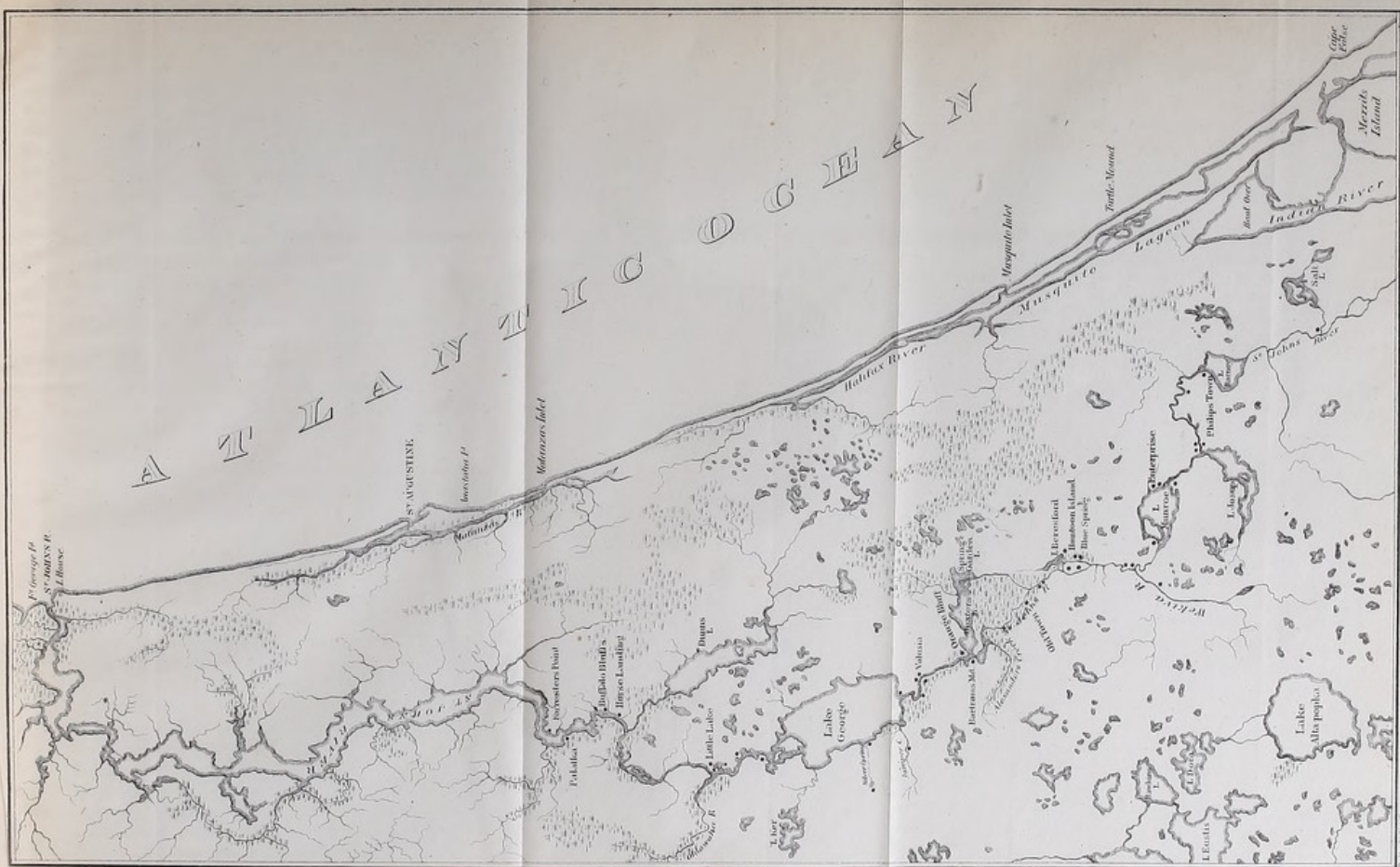
¹⁸ The only apparent exception to this which we have seen is in the recent valuable and instructive work on the "Antiquities of Southern Indians," by C. C. Jones, Esq., who states that on Stalling's Island in the Savannah River, more than two hundred miles from its mouth, is an extensive mound "formed to a large extent of the mussel, clam and snail shells of this fresh-water stream." p. 197. This, however, is a burial mound, and assuming that the snail shells were *Paludinas*, it only shows that these were largely used as materials for its construction; or possibly the burial mound was made of the materials of a shell heap.

Prof. C. A. White found that the shells of the mounds on the Mississippi, examined by him, were exclusively *Unios*, though these were of eleven species. Report of Meeting of Am. Assoc. for Adv. of Science, at Portland, 1873.

The mounds are, or until quite recently were, all covered with dense forest growths, the most common trees being the oaks and palmettoes, with many shrubs and vines, and less frequently bays, hiccories, gums and magnolias. The wild orange groves are confined almost exclusively to these mounds, though some are destitute of them. They may be seen at Blue Spring, Huntoon Island, Old Town, Bryson's Mound, Bartram's Mound, Orange Bluff and Silver Spring on Lake George. The grove at this last place is the most extensive of any on the river, notwithstanding the fact that thousands of trees have been carried away. When seen in their natural condition they grow in compact masses, are often overrun with tangled vines, forming impenetrable jungles, where the sunlight scarcely reaches the ground. Bartram, a century ago, found the orange trees, as appears from his constant references to them, as abundant as now, but offers no opinion as to their origin. They have been supposed to be indigenous, but although we have no historical evidence on the subject, there are good reasons for believing that such is not the case. Mr. G. R. Fairbanks, who has carefully investigated the matter, has observed that they are mostly confined to the best camping places on the river, and these are the shell heaps. In addition it does not appear that they are described or referred to in any of the Spanish records, and the same is true of the French. Had either the French or Spaniards found them there on their first arrival, it is presumed that they would have mentioned them, since they so particularly mention other fruits. Mr. Fairbanks believes them to be the Seville orange run wild. The fact that they are so seldom seen elsewhere than on the shell heaps is an indication that they were artificially distributed. The Indians, no doubt, have done something towards extending them.

The mounds are in almost every case built on the banks of the river, resting either on one of the ridges of sand and river mud already mentioned, or on land slightly raised. They are often placed at the union of the river with a lagoon or creek, as at Old Town, Bartram's Mound, Possum Bluff, etc., or at the outlet of a lake, as at Lakes Harney, Jessup, Beresford and Dexter. Such places gave the natives ready access in canoes to large areas for hunting and fishing, as well as for bringing together the different species of shells of which the mounds are made up. A few, instead of being directly on the banks of the river, are separated from it by swamps bearing large forest trees, or by marshes covered with low shrubs, reeds or rank grass, but all of these mounds were once by the water-side, the river having changed its channel, and thus allowed the collection of water plants and the mud necessary for their growth and the subsequent formation of swamps.

The most of the mounds are in the form of long ridges parallel to the shore, though a few, as Bartram's and Bryson's Mounds, are, or were before the current encroached upon them, nearly circular. The limits of all are sharply defined, and at a few feet from the base shells cease to be found. Rising somewhat abruptly from their foundations, they are mostly surmounted with a nearly level area.



The "shell fields" differ from the mounds in having their materials more evenly distributed and in a comparatively thin layer, varying from a few inches to two or three feet in thickness. The distinction is, however, arbitrary. They were used by the later Indians, and are by the present inhabitants, for cultivation. Bartram states that the shell mounds too were so used by the "former Florida Indians," though he makes no mention of seeing any of either kind under cultivation at the time of his visit. If one may conclude from the absence of any mention of them, the Bartrams met with very few Indians on the banks of the river anywhere, their dwelling places being inland, where there were larger areas of dry land, and where their agricultural pursuits could be carried on more advantageously. They were mostly beyond the western, which he calls the "Indian side" of the river. The mounds are, as in Bartram's time, particularly well suited for camping purposes, and are still the most desirable ones which the river affords.

From the facts brought together in the following pages, but especially from the presence of fire places, ashes, calcined shells, charcoal and implements, together with the bones of edible animals and occasionally those of man, found at various depths from top to bottom, and the absence of everything which might have been made by the white man, it seems certain that these mounds were the accumulations by, and the dwelling places of, the earliest Indian inhabitants, during the successive stages of their formation, and for reasons which will be given hereafter, some of them, perhaps all, were completed and had been abandoned before the white man landed on the shores of Florida.

Any one who for the first time views the larger ones, sometimes covering several acres, as at Old Enterprise, Huntoon Island, Orange Bluff and Silver Spring on Lake George, rising to the height of fifteen, twenty or twenty-five feet, might well be excused for doubting that such immense quantities of small shells could have been brought together by human labor, aided only by such appliances as the builders of these mounds may be supposed to have possessed. It is, however, absolutely impossible that such quantities of shells and such combinations of objects could have been the result of natural causes. It is impossible too to escape the conviction that these deposits of shells, and the remains of the various animals they enclose, were collected in any other way than as the refuse portions of articles of food. If the object of the Indians had been merely to construct a mound, materials for this in all cases could be had, as with the burial mounds, by scraping together the sand from the neighborhood, and which, even if brought from a considerable distance, would involve far less time and labor than the slow gathering of shells from beneath the waters of creeks and lagoons. Of the suitability of these shells for food, there need be no doubt, as the Indian is nowhere very fastidious as to what he eats, and the "cracker" of the present day does not hesitate at times to use them.

The remains of animals and the works of man are quite unequally dis-

tributed through the different deposits. In some, as at Huntoon Island, on the creek of the same name, at Osceola mound, Horse-landing, and the mound near and above Blue Spring, they are found in very small numbers, pottery not being present at all, while at the bluff at Old Enterprise, at King Philipstown, Huntoon Island on the St. John's, Black Hammock and Old Town, they are relatively more common, and there is pottery in addition.

In many of the mounds the lower layers, especially such as are within the range of the annual rise and fall of the water, have become more or less consolidated, and in some, to the extent of forming a conglomerate of rock-like hardness.¹⁹ Instances of this change may be seen at Blue Spring, in the bluff at Hawkinsville, Osceola mound, the mound just below Volusia, and at Horse-landing, and are in fact the result of the lime washed from the shells above by percolating water, and the subsequent deposit of it in the lower layers. These last have, in addition, deposited in their interstices river mud, brought by the water during the overflow, and which has no doubt had some influence in the process of consolidation.

It does not appear from our examinations that consolidation is necessarily an indication of the greater age of the mounds in which it is found, since pottery is often met with embedded in the conglomerate.

In making excavations without a previous clew to where the different objects are most likely to be found, it is obvious that all discovery of them is a matter of luck. Every excavation is begun at random, and there can be no certainty that what we have brought to light fairly represents the character of the mound unless the excavations are made in many places, or what is better still, unless the river by its destructive effects has made, as it often has, large sections, which enable one to examine the deeper as well as the more superficial parts over a large surface. In the larger number of cases we have had the benefit of both of these means.

We have found no other source from which these vast accumulations of shells could have been obtained, than the river, creeks, ponds and lagoons, chiefly the last two. At the present time the three species which have been mentioned can be easily gathered from these sources, either from the bottoms, or, except the *Unios*, picked from the leaves of aquatic plants. We have nowhere met with large geological deposits of them which might have served as a mine of supply. The largest numbers of shells which we saw were in the Wekiva River, Juniper Creek, Alexander's Spring Creek, and in the lagoon above, and in the large bay below Bartram's Mound. The bottom in all of these, wherever left exposed by the aquatic plants, was seen to be covered with them. The dead shells were in great profusion. Living *Ampullariæ* and *Paludinæ* may be seen feeding on the plants growing from the bottom, and the *Unios* ploughing their way through the sand and mud. The *Ampullariæ* come to the air in February and deposit their eggs, and for this purpose crawling up the stems of reeds and other plants to the

¹⁹ Similar consolidations of the shell heaps of Brazil have been observed by Prof. C. F. Hartt.

height of two feet above the surface, and at such times could be readily obtained. The Unios are the least abundant of the three species and are sometimes associated with the two others, but are also living on separate beds. But even with such resources as these it seems impossible that an adequate supply could be obtained for rearing such vast structures as those at Silver Spring, on Lake George, at Orange Bluff and on Huntoon Island, unless it is assumed, the supply being the same as now, that the building of the mounds extended through very long periods of time and were the result of very slow accumulation, or that the shells existed formerly in much greater quantities than now. Neither supposition is improbable.

The first of these views is sustained by the fact that the area of the mounds was such as to afford dwelling places only to a very small number of inhabitants, especially if we suppose these led a hunter's life, and that in consequence the consumption of shell fish and the accumulation of shells was comparatively slow.

That the shells were more abundant formerly than now is not improbable, as this would agree with what has been observed in other places. It is well known that animal and vegetable life in certain localities is for a period extremely prolific, and then gradually becomes less and less so. The oyster beds from which the vast accumulations at Damariscotta, Maine, were obtained have wholly died out.

Col. Dancey describes a large mound on Crystal River, on the Gulf coast of Florida, which as far as examined by him was composed of oyster shells, though "there are no oysters growing at this time within four or five miles of it." It is most probable that at the time the mound was built oysters were abundant in its immediate neighborhood, but, as at Damariscotta, have in the course of years gradually disappeared. (See Brinton, *Floridian Peninsula*, p. 179.)

The disappearance of the oyster from the shores of Denmark along the region of the ancient Kjoekenmoedings is well known. Here there are two natural causes which have exerted a combined influence, the freshening of the water and the ravages of the starfish. At Cotuit Port, Cape Cod, there are very extensive shell heaps, made by Indians, consisting almost exclusively of oysters, and of unusual size. The original oyster beds in the neighborhood from which they were obtained have entirely disappeared since the shell heaps were formed, but it is uncertain whether from natural or artificial conditions. I am informed by George G. Lowell, Esq., that between 1770 and 1780 they began to reappear again in large numbers, had become abundant, but in the early part of the present century again began to decrease and again became practically extinct. Within the last ten years the beds have been artificially restocked. The causes which led to the disappearance during the present century are unknown, but possibly the starfish may have been one of them. The shell-fish of the St. John's may have undergone analogous but less complete changes.

In some of the Swiss lakes, certain edible plants, as the "water chestnut,"

Trapa natans, were very abundant, as their remains show, in the days of the lake dwellings, but are now no longer found.

It is worthy of notice that the oysters of the shell mounds at Damariscotta and Cotuit Port, referred to above, were of remarkable size, those of the former surpassing any now found on the shores of the Eastern States. In some of the shell mounds of the St. John's, especially at Old Town, we have found the *Ampullariæ* and *Paludinæ* much larger than their living representatives. The average size of the aperture in twenty large *Ampullariæ* from the mounds was, breadth, 34.4^{mm}, and length, 53.9^{mm}, while in the largest living shells we have found the aperture did not exceed 30^{mm} in breadth and 48^{mm} in length, which would seem to indicate a greater vital activity in former days.

III. PREVIOUS NOTICES OF THE MOUNDS.

As already intimated we have found no distinct notices of these mounds previously to the visits of the Bartrams, father and son, a century ago. Both were botanists, and ascended the river to points above Lake George, and have published accounts of their travels undertaken for the study of the flora of the country.

John Bartram and his son William first ascended the St. John's in 1765. The former published an account of the journey and makes frequent mention of the shell mounds or bluffs and often camped upon them. His descriptions of them are, however, not sufficiently complete to enable one to identify more than two or three. He speaks of the abundance of pottery scattered about upon and within them, but offers no explanation of their origin, unless a single expression may be considered as such, and which leads us to infer that he supposed them of natural formation. Describing Mount Hope, a shell mound "twenty-five" feet high and at the lower end of what is now called Little Lake George, he says, "the west wind hath a long and full stroke against this mound, which perhaps raised it to that height."²⁰

Dr. William Bartram, the son, again ascended the river nine years later, in 1774, as far as Lake Beresford, and published a most interesting volume relating to his travels here and in other parts of Florida, in Georgia and the Carolinas. He describes the mounds much more fully and, as will be seen in the following topographical accounts, several of them can after the lapse of a century be identified. He notices everywhere the presence of pottery, and, in his description of Charlottia, states that he "saw many fragments of earthen-ware of the ancient inhabitants, and bones of animals amongst the shells, and mixed with the earth to a great depth."²¹ He does not, however, seem to have inferred, as one would naturally suppose from these facts he would, that the mounds were artificial, for, in another part of his narrative,

²⁰ A Description of East Florida. A Journal upon a Journey from St. Augustine up the River St. John's as far as the Lakes. 4to. London, 1766. p. 6.

²¹ Travels through North and South Carolina, Georgia, East and West Florida. Philadelphia, 1791. p. 94.

he says he cannot pretend to conjecture the cause of them, "unless one may suppose that those high hills which we call bluffs, on the banks of this great river and its lakes, and which support those magnificent groves of high forests, and are generally composed of shell and sand, were thrown up to their present height by the winds and waves, when the bed of the river was nearer the level of the present surface of the earth; but then, to rest on such a supposition would be admitting that the waters were heretofore in greater quantities than at this time, or that their present channels and receptacles are worn deeper into the earth."²²

Darby, a more recent writer on Florida, speaks of them as having a rocky structure, and as nothing is said to the contrary, it is presumed he considered them as being naturally formed.²³

Count Pourtalés visited Doctor's Island and the shell mound at Old Enterprise, both on Lake Monroe, in 1848, when he obtained from the former some ancient remains of man, and from the latter pottery and the bones of animals. He has not published an account of his observations on this shell mound, but informs me that he then came to the conclusion that it was artificial, and as far as the writer has been able to ascertain, this was the first recognition of its true nature.

Dr. Daniel G. Brinton, who travelled in Florida in 1856-57, visited the St. John's, the Atlantic and Gulf Shores of the peninsula, and called attention to the mounds on the river as well as those on the sea-coast. The latter he conclusively showed to be the works of man, but the former he supposed to be natural formations and "not to be mistaken for those of artificial construction."²⁴ The writer's own first impressions coincided with those of Dr. Brinton in believing them to be natural deposits.

Our first critical examination of them was made in 1860, when those at Salt Creek, Lake Harney, Spear's Landing, Doctor's Island and Old Enterprise were explored and satisfactory evidence collected, showing that they were the dwelling places of man during the period of their building, and that the collections of shells are analogous to those of ordinary shell heaps.²⁵ This view has been amply confirmed by repeated examinations in these and other places, made in 1867, 1871-1874.

IV. DESCRIPTION OF SOME OF THE MORE IMPORTANT MOUNDS.

We give in this section an account of the larger and more interesting mounds, leaving undescribed several which have only been seen in passing or have not been particularly examined. At the end of the section is a complete list of the whole series, which will show their distribution and

²² Ibid, p. 165.

²³ William Darby, "Memoir on the Geography, Natural and Civil History of Florida." Philadelphia, 1821. p. 9.

²⁴ Floridian Peninsula, p. 180.

²⁵ See "Proceedings of Boston Soc. Nat. History," April 17, 1867; "First Annual Report of the Peabody Museum of American Archæology and Ethnology," 1868, p. 14, and "An Account of the Fresh-Water Shell Heaps of the St. John's River, East Florida," Amer. Naturalist, Vol. II, Nos. 8 and 9. 1868.

frequency; their position is also shown on the map and is indicated by black dots. It is quite probable that in the many changes which have been made in the channel of the river during several centuries some of the mounds have been entirely destroyed, for there can now be seen many gradations from those where destruction has just begun to others in which it is nearly complete. The evidence of these changes is obvious in many places, and it is by the supposition that such has been the case that some of the differences between portions of the river, as described so recently as the time of Bartram and the actual condition, may perhaps be explained.

The most southerly of any of the deposits of shells we have seen are two, both comparatively insignificant, both on the right bank of Salt or Moccasin Creek near its union with the St. John's, and near the water's edge. The higher is known as *Possum Bluff*, the other is a shell field, sloping towards the water, and has been under cultivation. In both, fragments of pottery and of the bones of animals were dug up in considerable quantities.

By means of the creek and the Salt Lakes discharging through it, the communication between the St. John's and the sea-shore is comparatively easy, the head of the lakes being only five miles from Indian River, and it is by this route, no doubt, that the natives on the river kept up intercourse with those of the coast. Half-way between the lakes and the coast is a large sand mound, on the top of which we exhumed an Indian skeleton buried only a foot beneath the surface, and near which was a piece of coquina cut in the form of a turtle. At the depth of six feet pieces of charcoal and decayed bones were discovered but no implements.

King Philipstown is on the left bank of the river somewhat less than a mile below the outlet of Lake Harney. It bears the name of a Seminole who lived here and became celebrated during the wars with the Indians as "one of the most active and mischievous of chiefs." Until within a few years this was in a wild state but has been converted into an orange grove and is otherwise under cultivation. In the rear of the shell heap is a small burial mound not over twelve feet high and around this is a trench, from which the sand used in its construction was taken.

Its situation is favorable both for hunting and fishing; the river is here sixty or seventy yards wide; opposite is the mouth of Deep Creek, rising far to the eastward, which pours into the St. John's an excellent quality of water; to the rear and westward are open prairies and pine lands, and in the distance, to the north, is Lake Harney. The river contains an abundance of fish, but generally of a poor quality, except in the month of February, when vast numbers of shad pass on their way to Lake Harney, two hundred miles from the mouth, to spawn. While we were encamped here, the splashing of the water by shoals of these fish could be heard at all hours, from evening twilight to early dawn.

The shell mound is about four hundred and fifty feet in length, and from a hundred to a hundred and twenty in breadth. It stretches nearly at right angles to the river, borders a lagoon on the south, and on the north merges

into cultivated fields, over which its materials have become somewhat scattered. Its greatest height is about eight feet. Fragments of pots may be picked up anywhere on the surface, and, with these, bones of various edible animals. Excavations were made at many points, from a few inches to several feet in depth, to ascertain if similar objects were buried in its interior. The most unequivocal evidence that this mound, while in the process of formation, was occupied by the aborigines, was obtained from a pit between four and five feet in diameter, and from five to six feet deep, which was dug near the centre. Not only were fragments of pots and bones found at all depths, but at a depth of three feet the remains of an old fireplace were uncovered, consisting of a horizontal layer of charcoal, beneath which were perfectly calcined shells, and, near these, others more or less blackened with heat. Still farther off were fragments of the bones of deer, of birds, turtle and fish, all just as they would naturally have been left around a fire, where cooking had been for some time carried on. In addition it may be mentioned as a matter of negative evidence, that not a single article was discovered which could have been attributed to the white man. Several excavations made in other portions of the mound yielded similar results.

Black Hammock. One of the larger shell heaps on the St. John's is to be seen here. It is situated on the borders of a large lagoon, on the left bank of the river just above the outlet of Lake Jessup, and seven miles above Lake Monroe. Besides the principal deposit of shells, there are two smaller ones. At the westerly end is the first, a few inches thick, extending one hundred and fifty feet along the shore, and some thirty or forty feet inland. This is separated from the rest by a small watercourse, the outlet of a morass. The shore then takes a northerly direction for about two hundred feet, and consists entirely of sand; at the point where the shore again takes an east and west direction is a second but smaller deposit, extending only a few feet to the eastward. One hundred and eighty feet from the point just mentioned is a small burial mound, and a little more than a hundred feet from this begins the largest of the heaps, which measures about nine hundred feet in length on the river side, and has a breadth varying from one hundred to one hundred and fifty feet. It has been largely washed away by the river, and sections, in some places from three to four feet in thickness, are exposed. It is not improbable that originally this and the smaller deposits were continuous, the intervening portion having been destroyed. If so, the mound must have been of great size. It is intersected by a small stream near the centre, and is bordered by another at its easterly end, both outlets of small morasses in the rear of the mound.

That the Indians confined their encampments, or at all events their cooking, almost entirely to these mounds, is proved by the fact that fragments of pots were picked up in large numbers along the shore wherever the shells are seen in the bank, and, not elsewhere though careful search

was made for them. To make the evidence of the human origin of the whole deposit complete, pits were sunk at different points. One of these, about four feet in diameter, was dug entirely through the shells, into the sand beneath, which was reached at the depth of four feet and three inches. Seventy-five fragments of pots, and six pieces of the bones of the deer, thirteen of turtles, and two of the alligator were thrown out. These were scattered through the whole thickness of the shell deposit, but not a single specimen was found after the sand was reached. In a second pit of similar size, ninety-seven pieces of pots, six fragments of the bones of the deer, eleven of the turtle, and nine of the alligator were found. The shells forming these heaps are chiefly *Paludinas*, though *Unios* and *Ampullarias* are met with.

A large shell field and a burial mound are to be seen at Spear's Landing, on the left bank of the river, five or six miles above Lake Monroe, and a smaller field at Buzzards Roost, on the same side and near the entrance to the lake.

Rock Island (formerly called Doctor's Island) is one of the three ancient dwelling places on the northern shore of Lake Monroe. It was on this island, as already stated, that Count Pourtalés, in 1848, discovered some human bones imbedded in sandstone. These bones have frequently been referred to by various writers on the antiquity of man, but unfortunately under a misconception of their age and of the deposit which enclosed them²⁶.

As now seen (1874), there is, on the lake shore of this island, a deposit of shells nearly six hundred feet long, seldom more than a foot thick and in some places fifteen feet wide. Underlying this is a layer of sandstone five hundred and fifty feet long, and in its thickest part measuring from three to four feet. This formation appears to be due to the lime from the decomposing shells dissolved by the rains and then deposited in the form of a carbonate, and acting as a cement to the sand.

The storms and the waves, in the high stages of the water, have washed away the shells, for the most part loose, so that a considerable portion of the shell heap has been destroyed, leaving the more resisting sandstone exposed. This, too, has been acted upon and is now much honeycombed, and, having been undermined, is broken up into loose blocks. It was from a portion of this sandstone that Count Pourtalés obtained the remains above referred to.

In our recent visit to this place (1874) we were fortunate enough to find several portions of a human skeleton imbedded in the same sandstone, and which had been partially exposed by the weather.

²⁶ See Nott and Gliddon, *Types of Mankind*, 8th edition, p. 352. These bones were stated to have come from the coral reefs of Florida, and an age of ten thousand years is assigned to them. The account given of them by Count Pourtalés (*American Naturalist*, Vol. ii, p. 443) is as follows:—"The human jaw and other bones found in Florida by myself, in 1848, were not in a coral formation, but in a fresh water sandstone, on the shore of Lake Monroe, associated with fresh-water shells, of species still living in the lake (*Paludina Ampullaria*, etc.). No date can be assigned to the formation of that deposit, at least from present observations." In the fourth edition of the *Antiquity of Man*, 1873, Sir Charles Lyell partially corrects the error referred to above, but describes the bluff on Lake Monroe, in which Count Pourtalés discovered the human bones, as a coral reef instead of being a fresh-water sandstone.

These remains cannot properly be said to belong to the shell heap, as they are in the sandstone underlying it. Their position is such as to justify the conclusion that the body was buried in a way common among the aborigines, the legs and arms being folded and the whole lying on one side. The burial was no doubt older than the shell heap. If a grave had been dug through the latter, in filling it up, the shells and sand would have been largely mingled, which was not the case. Count Pourtalés saw nothing to indicate great age in the sandstone deposit.

The chief parts were a temporal bone, a part of the base of the skull, some cervical vertebræ, a shattered left femur, the patella, tibia and fibula of the same side. The bones were in the position of extreme flexion and the patella was in its place, the knees being near the head. A portion of the right femur, fragments of the bones of the forearm, of the scapula and other parts were found, but all more or less injured by exposure. The bones have lost their organic matter, and, where broken, show that all cavities, even the smallest ones of the cancellated structure, are filled with fine sand, which has become consolidated with the bony tissue. No portions of the bones of the face were found, which fact is consistent with the supposition that the bones noticed here by Count Pourtalés may have been a part of the same skeleton as the one we are describing.

Bones of the deer broken up, fragments of the bones of the alligator, of the soft shelled turtle (*Trionyx*), and shells of *Busycon carica*, were found imbedded in the sandstone in different places, and a chisel made of shell was found where it had been washed out from the shell heap.

Old Enterprise is the second and the most important of the dwelling places on Lake Monroe. As seen from the water it forms a bluff from eighteen to twenty feet high, and is one of the most conspicuous objects on the northern shore. It measures at its base one hundred and thirty feet in width, or, if we add the shell deposit between it and the outlet of the spring on the western side, and which may be considered an extension of it, a hundred and sixty feet. When visited by the writer in 1860, the height of the front above the water was fifteen feet. On the top was a plateau, which was still higher, and on this a hotel and several outbuildings.²⁷ This elevated portion of the mound extends back nearly at right angles to the shore one hundred and forty feet, where it ends, somewhat abruptly, but is succeeded by a low ridge which extends three hundred feet farther inland, giving the entire length of the deposit in a north and south direction four hundred and forty feet. On the eastern side of the principal mound, or portion first mentioned, is an irregular ridge joining it at a right angle and about two hundred and thirty feet in length. At the most northerly end of the whole deposit, the shells spread out into a thin layer, covering an undulating surface.

The bluff on the lake has for a long period been undergoing destruction

²⁷ Through the kindness of Count Pourtalés we have a drawing, made by him, of the bluff as it appeared when seen from the lake in 1848.

by the waves, during great storms which have occurred from time to time, and its materials have been distributed along the shore to the eastward, forming a beach wall sixteen hundred feet in length, generally from forty to fifty feet wide, and from three to four high in the thickest portion, which, as is usual in such walls, is on the rear side. The mass thus carried off from this mound is therefore enormous, and such as would, at first sight, seem to be improbable. The evidence is complete that the fact is as stated, for the materials are the same as those of the mound, and all the pottery, fragments of bones, etc., found in the beach wall are waterworn,²⁸ having been first washed into the lake and subsequently thrown up on the shore. That not only the mound but the adjoining shores are receding from their original position is obvious from the fact that a group of twelve palmetto trees may be seen standing in the water eight or ten feet from the shore, their roots completely denuded of earth, and still other trees have been undermined and fallen. The trunk of the palmetto now (1874) prostrate, as seen in the foreground of the accompanying plate, was erect and on firm land in 1860, at the time of our first visit. Of this and of the houses we have a sketch made at that time.

In consequence of the undermining of the front and the looseness of the materials, which are generally neither compact nor stratified, excavations were easily made. They were continued through several days; many cart-loads of material were moved, and collections made, of whatever objects were mingled with the shells, from all depths below the surface.

Excavations made in the rear of the principal ridge did not yield the same nor so decisive results as this. The shells consisted almost exclusively of *Paludinas*; they were much more compact and the objects found in them were fewer. In certain directions there were appearances of somewhat extensive removals of material, but whether by the Indian or white man, we could not learn.

The bones of animals obtained during the excavations, chiefly at the bluff, consist of those of the deer, which are in large numbers, opossum, rabbit, alligator, two species of turtle, cat fish and gar. Besides these a few fragments of human bones were found mingled with the shells, and at one point several portions of the skeleton, also in fragments, near together. As the place where these were discovered had been washed by the waves of the lake, it is probable that other pieces had been carried away. A few inches above this last deposit large masses of charcoal were discovered.

Pottery was found in considerable quantities, mostly ornamented with tracings in straight lines; but few of the pieces were stamped. Palmetto fibre was largely used, mixed with the clay, in the making of the vessels.

A few hundred yards to the westward of Old Enterprise, which name applies only to the bluff just described and its immediate surroundings, is

²⁸ This washing away and redistribution of the materials of mounds, as will be seen farther on, have been observed in other places.

an "old field," where a thin deposit of shells extends along the shore about three hundred feet, and is distributed uniformly over the surface behind. Excavations made in many places as well as examinations of the shore-edge gave the same kind of result as at the bluff.

The third deposit of shells is near the outlet of, but just within, the lake. This is now under cultivation, and was not examined.

Between Lake Monroe and Blue Spring are four shell mounds or shell fields. One of these, about seven miles below the lake, consists of a stratum of consolidated shells covered by loose ones. Near it is a small conical mound of sand, and at the top of this the bones of three or four human skeletons were dug up, which had been buried about a foot below the surface. These burials were of recent date, as shown by the fact that an iron knife and glass beads were found near the skeletons. A trench carried from the outer edge of the base to the centre of the mound and below the level of the ground on which it was built, brought to light only a few fragments of pottery, but no other objects of any kind made by man, nor any human remains. It is presumed, therefore, that it was not originally made for burial purposes, but used for such only in later times by the modern intruding Seminole.

Another and very interesting mound, somewhat over a mile above Blue Spring, is one hundred and eighty feet long, eleven high, and has a breadth of thirty-seven feet in the widest part. In the rear is a large open prairie; to the south is the entrance to a lagoon, now mostly closed by water plants and an island; to the north is an extensive meadow. The condition of the front of the mound is such as to show unequivocally that the river once ran close upon its base, and undermined it, so that considerably more than half has been washed away by the current, a portion of the rear or landward slope alone remaining. The channel of the river, however, no longer runs at its base, but is removed several hundred feet distant, leaving the mound at the bottom of a deep bay, where the still water has allowed a great abundance of aquatic plants to take root and form a barrier between it and the river. A deposit of mud is taking place here, and an island is already begun, which is out of water during the low stages of the river. We have thus a double movement of the current, first towards the mound, undermining and destroying it, and then receding. The mound is covered with palmettoes and a few live oaks. One of these last, on the top, has a diameter of over three feet, and may be presumed to be about two centuries old. A second oak, three feet, two inches in diameter, is growing upon the front, or river side slope of the mound, its roots taking hold from the top to the water's edge. This unquestionably began to grow after the river had nearly, or quite, completed the undermining of the mound, and as its age may be estimated at two hundred years, this period at least must have elapsed while the change of the channel and the silting up of the bay were going on.

In its general aspect this mound has not the appearance of very great

age, unless it be that the shells have an older look than is common in the other mounds, but is nevertheless quite destitute of pottery. On looking over the whole surface, including the river front, where the shells are fully exposed to the extent of several hundred square feet, and where examination can be easily made, not a single piece of pottery was seen. Excavations made at the top, middle, and lowest part of the front, in which many cart loads of material were moved, gave the same result. The following indications of the presence of man, were, however, discovered, viz.: three fireplaces, at different depths, with coal, ashes, and calcined shells, a bone awl and the ulna of a deer from which a piece had been sawed. The bones of deer and birds, of the hard and soft shelled turtle and of fish were also found, those of the larger animals being broken up in the usual way.

Near the southern end of the mound and in the rear of it, is a small shell field, completely overgrown with turf, and its presence only ascertained by making excavations or by the shells contained in the roots of overturned trees. This, although closely adjoining, is of a different age from the mound just described, since, in addition to the more numerous bones of animals, pottery was found in considerable quantities.

Wekiva Shell fields. This is on the right bank of the Wekiva River, between six and seven miles from its junction with the St. John's. The deposit has the form of a segment of a circle, is two hundred and twenty-five feet long, one hundred and ten broad and about six high. The deposit of shells is about four feet thick near the water, where it forms an abrupt slope, the former bank of the river, but towards the land becomes thinner where the shells have been scattered by cultivation. The superficial portion consists largely of a black loam about eight inches thick, which near the front is more or less mixed with shells. Beneath the layer just mentioned, in the two large excavations made, each four feet wide and eight feet long and extending through the whole deposit, the material consisted exclusively of shells, with little or no earthy matter intermixed. Ampullarias existed in unusually large numbers, about equalling in quantity the Paludinas. Unios were only sparingly found.

The remains of the following animals were discovered. Bones of three species of turtles, two species of fish, two species of birds, and of the opossum, rabbit, deer, bear and raccoon. The bones of the bear were found near an old fire-place and were partially burned.

There were large quantities of pottery, some of it stamped in squares, and one piece traced with parallel lines.

In addition to the above were a sawed piece of the shell of Strombus, an awl made of bone, several shell chisels, a valve of a Unio, with a round hole drilled through it, and a rude arrowhead. A few fragments of marine shells, viz., Cardium and Strombus, were picked up on the surface.

Just below the preceding deposit, and separated from it by a small "run," is a second shell field covering a larger surface, but the shells making a

thin layer only three or four inches thick. An abundance of fragments of pottery was strewn over the surface, and some chisels made of shell were found.

Blue Spring. The "springs" of Florida are rightly classed among its wonders. At Silver Spring on Lake George, at a spring of the same name on the Oklawaha, at the head of Juniper Creek and Alexander's Creek and at numerous springs on the western or gulf coast, large volumes of water are seen rising abruptly from the ground, forming what may be called, without exaggeration, rivers. Among the most beautiful of these is Blue Spring on the right bank of the St. John's, twenty-four miles below Lake Monroe and which discharges its waters through an outlet about a third of a mile in length. The source or "boil" is in a circular basin between seventy and seventy-five feet in diameter, with walls from fifteen to eighteen feet high and nearly vertical. It has a crater-like appearance, as if the water had suddenly forced its way from below, loosening and carrying off the earth and at the same time cutting a channel to the river.²⁹ The water rises with great force and the outflow is such that a swift current is maintained, though the outlet of the basin at the boil is not less than sixty feet wide and five feet deep. The water has a decidedly bluish tinge, a hydrosulphurous odor, and, as in all the other springs, is wonderfully transparent allowing very small objects to be easily seen at the depth of many feet. It contains salts of lime in solution which it deposits on the plants as a white incrustation, and on the shore forms nodules either of lime or lime and sand.³⁰ The basin just described is the only one now in active condition, but there are others which have become dry or nearly so. On the left bank and at about one-third of the distance from the boil to the entrance of the creek into the St. John's is a channel twenty feet wide. Following this we are led to four distinct basins, two of which are quite dry, one still contains water, and the fourth has a moderate outflow.³¹ In the banks of both the boil and the creek deposits of oyster and other marine shells are seen in several places.³² Fragments of these are scattered along the bed of the creek from its source nearly to its mouth, and with them fragments of the bones of extinct animals. A few rods from the bank, on the opposite side of the

²⁹ That this supposition is not improbable is indicated by the fact that at Sanford on Lake Monroe, as the writer has been informed, a spring actually appeared in this way in 1872.

³⁰ The accumulation of branches of trees at the bottom of the basin added to the force with which the water rises made it difficult to ascertain the depth with accuracy. We found it by sounding to be about twenty-five feet. The temperature of this water in March, 1872, was but little above that of the river, this last was 71.6° F. while that of the spring was 75.2°. This difference becomes less as the season advances and the waters of the river become heated by the sun.

³¹ About fifty feet from where this side-channel enters the creek, it branches, the right division subdivides and one of the portions ends in a single crater-like basin and is dry, while the other ends in two basins near together from one of which there is a slight outflow. The left of the principal branches runs parallel with the creek and ends also in two basins or one basin partially double. This branch widens somewhat near the head and at this point discharges water, which at the time we saw it ran freely.

At the time Bartram visited this place, he says, after describing the chief source of the spring, "a delightful stream of cool salubrious water issues from the ridge, meandering along, and enters the creek just below the basin." As the channel described is the only one that enters the creek there can be no doubt that it is the one to which Bartram refers. In the century which has passed since his visit the outflow has greatly diminished and the water is no longer suitable for drinking.

³² Similar deposits exist in other places, and have been uncovered in sinking wells, and may be seen about fourteen miles above on the right bank of the river.

creek, but not connected with it, is another basin, more shallow than the others, from which a channel leads to the river. This basin is now quite dry.

Near the mouth of the creek and just above it is a large lagoon. This with the river and Huntoon Creek, the entrance to which is but a short distance above, make extensive communications by water, which in earlier days could not have failed to give great facilities for hunting.

Shell heaps consisting almost exclusively of *Paludinas* exist on both sides of the mouth of the creek. That on the left bank is much the largest, and forms an extensive mound. It is a hundred feet broad towards the river and about two feet and a half thick. It extends back from the shore about five hundred feet and rising for a short distance as it recedes. At one hundred and fifty feet from the water its height is from twelve to thirteen feet. Still farther back on sand knolls are three or four small shell fields, and south of these, on the low land towards the lagoon and separated from it by a thicket, is another thin deposit in which were found many fragments of human bones mingled with those of animals.

Here again the river bank has been rapidly destroyed, and more than thirty feet of the shell mound, as I am informed by the proprietor, L. P. Thursby, Esq., has been carried off in a few years.³³

Directly opposite to the mound above described, and on the right bank of the creek, is a shell field about ninety feet wide on the river, and can be traced inland over one hundred and sixty feet, narrowing to a point. The shells have their greatest depth at the river side where they are about eighteen inches thick, and gradually become more scanty as they recede from it.

Both banks have been considerably encroached upon by the current, and the creek has been steadily widened, as is shown by the large number of trees which have been undermined and have fallen into the water. The shells on the two sides have the appearance of the same age, and on both, consolidated shells underlie the more superficial deposits. While there is nothing to show positively which is the older, the spring and creek or the shell deposits, the appearances are perfectly consistent with the supposition that the eruption of the water and the cutting of the channel are the more recent of the two, a view in accordance with the fact of a recent eruption, already mentioned, as happening at Sanford.

Reference has already been made to the presence of human bones in one of the small shell fields. A more complete collection was made on the left bank of the creek near the mouth, consisting of fragments from nearly all parts of the skeleton. They were about two feet below the surface, and were broken up in a manner which indicated a methodical and intentional division of the different parts. A single fragment of a human femur was found among the shells on the right bank.

The remains of animals found at Blue Spring do not differ materially

³³The writer discovered here at the water's edge, in 1873, a human skeleton, recently buried, the grave without doubt having been originally at some distance from the shore.

from those obtained in other places. The body of a large broken vertebra, measuring four inches in its transverse diameter, and probably Cetacean, was found in one of the shell fields. It has lost its organic matter, is adhesive to the tongue, and, unlike the bones of extinct animals* found in the mounds, is not mineralized. Bones of the deer, opossum, hard and soft turtle, and alligator are the most common. Chisels made of the shells of *Busyon* and *Strombus*, also shells of *Busyon carica* with the beak ground off and a hole drilled in the base were found in considerable numbers. Stone arrowpoints are not infrequent. Fragments of pottery are abundant, some of them, with the bones of animals, were found imbedded in the consolidated shells.

The writer is indebted to the proprietor, L. P. Thursby, Esq., and to members of his family for various articles found and presented by them.

There are two other considerable mounds in the neighborhood of Blue Spring. The larger of these is reached by following the edge of the swamp, which meets the river a quarter of a mile below, in a northerly direction and towards Lake Beresford. Its length is estimated at four hundred feet, and its breadth measures from one hundred to one hundred and fifty feet. The easterly end is the highest, and rises thirteen to fourteen feet quite abruptly; the southwesterly portion slopes gradually to the general level. It is completely overgrown with forest trees, and is separated from the river by a narrow belt of cypress and a marsh several hundred feet in width. There are many large trees growing upon the mound, but the oldest and the one which gives the most decisive indication of age is a prostrate live oak lying on the crest, from which the bark, outer layers of wood and all the branches except the largest have wholly disappeared. The trunk, eight feet from the roots, measures fifteen feet and four inches in circumference, and is estimated to have been over three hundred years old at the time of its fall. This mound consists almost exclusively of *Paludinas*, and has on its surface many of the so-called graves. Excavations made in many places, and much searching of materials drawn up by the roots of overturned trees, have resulted in the discovery of pieces of earthen vessels, the bones of edible animals, etc., but only in small numbers. Some of these were obtained from an excavation three feet deep made upon the spot where stood the ancient tree just described.

Palmetto Shell Mound. Following the borders of the marsh and hammock for a half mile in a northerly direction from the mound just described, a circular grove of palmettoes is reached, separated from the woods by an open space about one hundred and twenty feet wide. This grove covers a low oval mound of shells, which measures a hundred feet in its long and eighty in its short diameter, and is two feet nine inches high. As is obvious (in 1873) from the marks on the trees, it was covered to the depth of nearly three feet during the high water in 1871.

Excavations were made in two different parts, each having an area of several square yards. One of them was carried through the whole thickness

to the base, where the shells were cemented into a compact mass. Fragments of pottery and bones of the deer and turtle were found in the superficial portions; also a drinking vessel made of the shell of *Busycon*, and a rude stone implement. In the deeper layer pieces of pottery and some bones were discovered but in smaller quantities.

The most interesting discovery was that of many fragments of a human skeleton completely imbedded in the shells. Associated with these were fragments of pottery and a few bones of deer and turtle.³⁴

The mound is now separated from the river by a marsh for the distance of about four hundred feet, bordered near the river by a thick growth of willows. This is a continuation of the same marsh seen in front of the mound just previously described.

At the head of Lake Beresford, on its eastern shore, are two shell fields, the longer and more southerly one covering several acres, and in some places eighteen inches thick. This has been for many years more or less under cultivation, but we found here pieces of flint, stone arrowheads, wrought shells, and an abundance of fragments of earthen vessels. A small earthen vessel, entire, was given me by the proprietor who dug it up while planting a tree.

Huntoon Island is said to comprise several hundred acres, but only a small portion is dry, the rest being swamp or meadow land. It is bounded on the east by the St. John's, and on the west by Huntoon creek and a long lagoon into which this creek discharges three miles above the union of the lagoon with the river. For reasons given in another place this lagoon, which has just been mentioned, may be considered the ancient channel of the St. John's. At the point where Huntoon Creek enters this lagoon is the remnant of a small shell field, and a second was found a quarter of a mile higher up. Both show signs of having been largely destroyed; from each, pottery, bones of animals, worked bones and shell tools were obtained, and from the heap last mentioned an arrowhead.

Leaving the first mentioned shell field and following the edge of the swamp in a northwesterly direction for about a quarter of a mile, a large and conspicuous mound is reached.

This mound is in the form of a narrow ridge five hundred feet in length, its greatest height is thirteen feet, and measured over the crest near the middle has a breadth of from a hundred to a hundred and twenty-five feet, becoming narrower at the ends. Its sides are very abrupt at its southerly and middle portion, but at the northerly end they slope more gradually to the level of the ground on the easterly and to the swamp on the westerly side. The surface is almost everywhere broken with knolls and hollows, the result of the former uprooting of trees by storms. It is covered by a forest growth, and among the trees are several live oaks of good size one of them measuring ten feet six inches in circumference. Between the mound and the river is a very extensive swamp, several hundred yards in breadth,

³⁴ See section on human remains found in the mounds, and on cannibalism.

which forms a part of the northern end of the island extending from Huntoon Creek to the river. In this swamp are to be seen well grown trees, and among them several large cypresses, one, now overthrown, measuring eight feet six inches in circumference, at a distance of twenty-five feet from its root, where its trunk ceases to be conical. Its age may be estimated at from two hundred and fifty to three hundred years.

Excavations, made in several places, yielded but a few objects which indicated the presence of man during its construction. Two pieces of worked bone were found in one excavation, and also the bones of the deer, of the opossum, of two species of turtle (*Emys Floridana* and *Trionyx ferox*), of the gar pike (*Lepidosteus*) and other fishes. In another place a large number of fragments of the bones of the alligator were obtained, and near by were some charcoal, ashes, and calcined shells, suggesting the probability that this animal had served for a repast. In another place were found calcined shells, bones of a deer, alligator, gar pike and turtle; also a broken bone tool, probably an awl.

The most remarkable discovery was that of some human bones; they were about a foot below the surface, and were broken up in the same way as those of animals used for food. These human bones, from their diminutive size, evidently belonged to a dwarf.³⁵ Among the shells from the roots of an overturned tree, seventy-five feet from the preceding, was found a human astragalus somewhat under the ordinary size.

In making the different excavations, several old fire-places were uncovered, consisting of charcoal, ashes and calcined shells. In some cases the lime from the shells served as a cement by which they were firmly consolidated into masses weighing two or three hundred pounds.

No pottery was found in the deep excavations of this mound though a few pieces were discovered in the superficial portions, imbedded in the vegetable loam.

A few hundred feet above its union with Huntoon Creek the St. John's passes between two mounds. That on the left bank, on Huntoon Island, is of gigantic size, covers several acres, and consists of two ridges both parallel to the river. That nearest the river is over six hundred feet in length, and rises from twelve to fourteen feet in the highest parts; much has been washed away, leaving an abrupt slope towards the water, mostly exposed to examination, but here and there covered with recently fallen trees. The lower or western end of this ridge ends in an abrupt bluff facing a bay or lagoon lying between it and the mouth of Huntoon Creek. The upper or easterly end slopes gradually into a very large lagoon, now overgrown with water plants and willows. About one hundred feet in the rear of this ridge, and separated from it by a deep valley is a second, of much larger size. This at its eastern or upper end rises to the height of at least twenty-five feet, by measurement, and were it not for the trees would command a very extensive view, including Lake Beresford, and a

³⁵ See section on remains of man found in the mounds.

long stretch of the river as well as of recently formed swamps. On the landward side the ridge slopes to a level plain and the valley between the two ridges, at either extremity, ends in a swamp. Both ridges are overgrown with palmettoes, various hard wood trees and a few cedars. A grove of wild orange trees exists in both. This may be the mound referred to by Bartram (Travels, p. 40); though, when taken as a whole, it does not correspond with his description. He calls it "a delightful little bluff, consisting chiefly of shells and covered with a dark grove of Red Cedar, *Xanthoxylon* and Myrtle." The mound, however, as stated above, is not "little;" it is of unusual size. Red cedars now grow upon it though in comparatively small numbers, but were very abundant a few years ago, before they were cut down for commercial purposes. If his description could be applied simply to the part where he landed and passed the night, the discrepancy would be largely met. But if any mound beside that we have just noticed existed in Bartram's time, no traces of it remain.

In the rear of the eastern end of the inner ridge are two conical mounds, the larger twenty-five feet high and both made of a mixture of sand and shells, and probably derived from the mound itself, though there is in them a somewhat larger mixture of sand, or perhaps of sand and swamp mud. Both were probably burial mounds, but from inability to procure the necessary labor we did not fully explore them. An excavation made on the top of the smaller, to the depth of five feet, brought up only small fragments of human bones and pieces of earthen vessels. More extensive excavations were made in the larger mound. A trench from four to six feet wide was dug from one of the sides to the apex, gradually ascending, and to a depth varying from two to four feet. All the objects discovered were buried within two feet of the surface. Lower than this there were only *Paludinas* and *Ampullarias* mixed with earth.

The bones found in the superficial portions were mostly human and were all found in two small deposits a few feet apart. As far as the fragments of human bone, over fifty, could be determined, they all belonged to a single individual not adult. The third molars were not protruded, neither was the epiphysis of the upper end of the humerus united with the shaft, nor was the epiphysis of the inner condyle. The largest number of pieces belonged to the arms and legs, though there were a few fragments of cranium, ribs and pelvis. The most striking fact is that they had evidently been intentionally broken. No such breakage happens to bones which have been buried in the ordinary way. The upper part of one humerus was crushed into small fragments and the same is true of some of the other bones. At the same time it is worthy of notice, the fragments were only slightly displaced and are now cemented together, showing exactly the extent of mechanical injury. All the bones without exception were more or less broken. As they were so near the surface it is not to be supposed that they were crushed by the weight of the materials over them, and from the fact that the fragments in some cases were so near together, they must have been

retained in position by some of the soft parts still adhering to them at the time they were covered up.

The other pieces found with them were a few bones belonging to the hard shelled turtles and some fragments of the bones of a deer.

An explanation of the presence of the human bones under the above circumstances can only be conjectured, but if the views we shall give farther on, with regard to the existence of cannibalism among the early inhabitants of Florida, are correct, we have here an instance in which this habit has probably been practised. The condition of the bones is quite like that of human bones found in several of the shell heaps, under circumstances of which cannibalism is the most natural explanation.

The mound on the right bank is smaller, not over six feet high and consists of a low ridge running parallel with the river and of about the same length as that on the opposite side. Behind it the surface is undulating, from irregular deposits of shells, and in the rear of the lower end is a small detached mound. Below the mound is a recently formed meadow, and in the rear swamp land covered with trees.

The lower portion of this mound has been largely destroyed and the destruction is still going on. At the upper end the destruction has ceased in consequence of a change in the course of the river so that the current strikes the opposite bank. The signs that it once flowed against the right bank at the part we are describing are unmistakable, especially the abrupt bank and the prostrate trees which have been undermined. A new swamp, in some places fifty feet wide, has been formed between the mound and the present channel. The mound is covered with palmettoes, oaks and oranges. A live oak growing on the top of this shell heap, measured thirteen feet in circumference and is estimated to be over two hundred and fifty years old.

Objects similar to those met with in the mound on the opposite side were found in this but in much smaller numbers.

In the rear of the upper end of the shell mound is a conical mound of sand about fourteen feet high and thirty or forty in diameter at the base. Excavations were made on the summit of this and fragments of human bones found. No implements accompanied them. These remains are presumed to be derived from comparatively recent burials. We had not the means of carrying the excavations to the base; possibly the mound is of the same nature as that described on page 21.

Of all the mounds we have examined none have yielded more abundantly fragments of earthen vessels and bones of animals than the one on the left bank described above. The front washed by the river gives a large surface for inspection, much larger than could be had from mere excavation. The pick can be struck into but few portions of this front without turning out either a bone, a piece of charcoal, or a fragment of pottery, and it is a matter of indifference whether the uppermost or lowermost parts are examined.

The fragments of bones, dug from the mound at different depths, belong

to man, deer, opossum, otter, raccoon, turkey, and two other species of birds not determined, hard and soft shelled turtles, alligator, cat fish, and a species of *Umbrina*. Charcoal, shell-chisels made of *Busycon*, and a tool made of the spire of *Busycon perversa* were also found. Not a single arrowhead, chip, or stone instrument of any kind was obtained by excavation. A stone chisel of a flattened conical shape, found in the superficial portion, was evidently a modern importation. Pottery exists in large quantities, some of the fragments indicating vessels of fourteen and fifteen inches in diameter.

The river at this place deserves especial notice, for apparently we have here the result of considerable changes. Its width between the two mounds is not far from fifty yards and is much narrower than just above or below; its depth as shown by several soundings is about eighteen feet. The current is rapid and has for a long time been carrying away the shores on either side. In recent times, since the steamboats have become so numerous, the destruction has been on a large scale, particularly on the left bank, where the current is the strongest. We have already called attention to the fact that the river has receded from the upper part of the mound on the northerly shore, and that a narrow strip of swamp has already formed, while the lower part is still disappearing.

We cannot suppose that these changes have gone on, even at a slower rate than now, without being led to the conclusion that a few centuries ago the river must have been quite insufficient to carry its present volume of water. Taking all the appearances together it would seem as if the river had either cut a new or at least had widened an old channel. This supposition is supported by the fact that the lagoon above noticed, into which Huntoon Creek discharges, excepting for its slow current has all the appearance of a river, and was probably mistaken by Bartram, as it has been by many others, for the main channel. In addition, its course is continuous with that of the river, while the portion of the river between the mounds and now forming the channel joins that below at nearly a right angle, and but for its more rapid current would be naturally supposed, by one visiting it for the first time, to be merely a tributary. Secondly the lagoon which has a length of at least five or six miles, though more or less contracted at several points, has still a current flowing through a swamp into its upper or blind end, where it approaches the river. If we suppose that in former times there existed a free communication with the St. John's at this part, the two streams, viz., the lagoon and Huntoon Creek, would have been fully equal to carrying all, or the larger portion of the water of the river. The physical features of this region are perfectly consistent with the theory that the river once discharged, chiefly, if not wholly, through the channels just described, but as the new one became enlarged, the older ones were more or less obstructed by vegetable growths and the consequent extension of the shores. There is nothing, however, to indicate whether the river formed this new channel by cutting its way through

the land between the mounds, or by the enlargement of a water-course already existing.

*Hawkinsville.*³⁶ There exist here both a shell bluff and a shell field. The former is much the more ancient, and the consolidation of the shells has formed a solid rock. It is from six to seven feet high on the front; the following structure is well shown in the section made by the water.

I. At the base there is a stratum of sand with a slight mixture of clay, which, being more rapidly removed than the harder portions above, leaves them projecting.

II. A stratum of sandstone, which has been hardened by the deposit of lime contained in the water percolated from above.

III. A stratum of shells and sand consolidated by the same means as the preceding and about eighteen inches thick.

IV. A superficial layer of loose shells eighteen inches in the thickest part and extending inland about twenty feet, but becoming thinner as it recedes from the shore.

Large blocks of the conglomerate are broken off from time to time by the undermining action of the river, and the whole bluff will, at no very distant period, be destroyed.

The remains of animals are found very sparingly, and consist of the bones of turtles and fishes. We have found charcoal but neither pottery nor implements in the more solid portion, and some doubt may reasonably be entertained whether this is of artificial origin. A somewhat less complete consolidation exists at Blue Spring, where there can be no doubt about the artificial origin of the deposits. The conglomerate is equally solid, and the shells have mostly lost their forms, having been more or less broken into small fragments.

Adjoining the bluff is a large shell field, which the proprietor informs me covers about twenty acres. The shells are generally deposited in a thin layer, and in some places have a thickness of about eighteen inches. It extends from the bluff just described, southward along the shores of a lagoon which was probably once the channel of the river. Pottery, the bones of animals, and implements, especially of shells, are found here in great abundance. A few stone implements have also been found. Fragments of the teeth of mastodon and elephant were met with. Human bones in fragments were also picked up by the writer; Judge Bryson, the proprietor, informed me that he had dug them up in considerable numbers. These last were much broken and scattered, and had in no respect the appearance of having been buried.

Bryson's Mound is on the right bank of the river a half mile below Hawkinsville. It is one of the smaller mounds, has a circular form, excepting on the river side where it has been partly destroyed, and is covered with a grove of orange trees. The land in the rear is dry, except in the

³⁶ Formerly called Osceola, but changed to its present name because the postmasters could not distinguish between Osceola and Oscala, a town in Marion Co.

high stages of the river. This mound yielded the usual objects, including pottery, met with in the other mounds.

Pacataligo.³⁷ An eighth of a mile below the preceding, on the left bank, is the remnant of a mound, the lower portion of which consists of consolidated shells four feet thick, of a rocky hardness like that at Hawkinsville, with a level and smooth upper surface. On it rests a layer of loose shells not more than from one to two feet thick. This last was obviously deposited much later than the mass beneath, the separation of the solid and loose shells being abrupt. Among the loose shells, besides the ordinary objects already noticed in other places, were human bones which will be described further on.

In the rear of the mound just referred to, separated from it by a water-course and a narrow strip of swampy land, is a shell deposit of large size, covering several acres, and having the form of a mound in some parts and of a shell field in others. This appears to have had its communication with the water not on the river, from which it is cut off by the water-course and shell mound just referred to, but in an ancient lagoon connecting with the river above it and now converted into a swamp and thickly overgrown with cypress and other trees, all of which are of more recent formation than the mound itself. It is along the borders of this swamp that the deposit has its greatest height. The few excavations made here yielded the usual results.

Osceola Mound. This is in the bottom of a bay, formed by the bending of the river, on the left bank, a mile below Hawkinsville. It has a north and south direction, and is merely a remnant of the mound which once existed; the landward slope alone has escaped the destructive action of the river, as shown in the accompanying section, Fig. 1. It closely resembles the mound next above Blue Spring, already described. It is two hundred and fifty feet long and, at about a hundred feet from its upper or southerly end, thirteen feet high and thirty wide, diminishing in dimensions towards either end. At present it is covered with shrubs, cabbage and saw palmettoes. The section made by the river through its whole length completely reveals its structure, and makes its examination easy.

Its structure is best seen where the mound is highest. It rests on a stratum of sand, partly under water; above this is a second stratum three feet thick, composed of shells, with a mixture of sand and river mud, well consolidated; and this, when undermined by the washing out of the sand beneath, splits off in large blocks. Above this is a deposit of loose shells eight feet thick, which with the vegetable mould completes the mound. The upper deposit of shells consists almost exclusively of *Paludinas*, with here and there thin deposits of *Ampullarias* and *Unios*. An old fireplace was discovered eight feet below the surface, just where the loose shells rest on the consolidated shells and mud, and near the limit of the annual overflow. At the northerly end of the mound begins a river dike consisting of sand and mud, in which may be seen a layer of shells four feet beneath

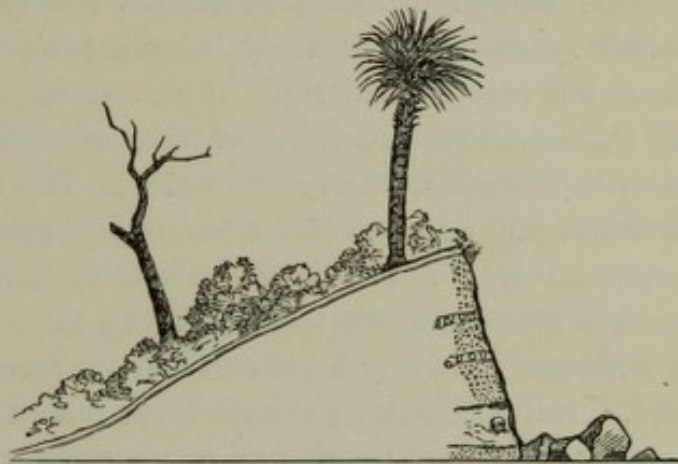
³⁷ This name was formerly applied to a place in the neighborhood.

the surface. These were washed from the mound during the overflows, and subsequently covered by successive deposits.

The bones of animals were found in small numbers and belonged almost exclusively to the deer, two species of turtle, and two of fish. The most careful search made at many different times and in many places failed to bring to light a single piece of pottery.

The most interesting discovery was that of parts of two human skeletons, the bones of which were mingled. These were found in the stratum of consolidated shells and mud (the place is indicated by a skull in the section, Fig. 1), at a depth of nine feet below the surface; it will be described further on.³⁸ The two temporal bones and some other parts of the cranium of a child were found a little lower down in the same layer with the skeletons just mentioned and sixteen feet from them.

Fig. 1.



Section of Shell Mound.

Three-quarters of a mile below the preceding is a much larger mound, but it was not particularly examined. It is a short distance from the river and separated from it by a river dike and a narrow strip of swampy land, which is of more recent formation than the mound itself. This last is several hundred feet long, but narrow. There are orange and other trees growing upon it, and among them live oaks more than two feet in diameter. From a few superficial excavations, fragments of the bones of animals, pottery and a wrought shell (*Busycon*) were found.

Alexander's Mound. Descending Spring Garden Creek from the St. John's and entering the second lagoon on the right bank, and then ascending this about two miles, a large mound is seen a few rods from the shore on the eastern side. It is several hundred feet long, two hundred feet wide, from eight to ten feet high, and separated from the lagoon by a swamp overgrown with trees. In the rear of this mound, but closely adjoining it, is a second and much smaller one. Many live oaks are growing upon the principal mound, the four largest measuring respectively fifteen, sixteen and eighteen feet in circumference. The age of the largest is estimated at three hundred and seventy-five years.

Pottery and implements made of shell were obtained from excavations in this mound.

Old Town. This name is applied to the site of an ancient Indian dwelling place, five miles below Hawkinsville; it is very pleasantly situated on

³⁸ See Section on human remains and cannibalism.

the left bank of the river at its union with a lagoon (see map). The river at this point is two hundred and thirty-five feet wide, and the lagoon is between two and three miles long. The mound is one of the larger kind, nearly nine hundred feet in length, and varies from one to two hundred feet in breadth, when measured across the top. Of a crescentic shape, the body of the crescent faces the river; the horn pointing to the southeast, which is the longer, borders the lagoon, and that to the northwest projects into a swamp. In the rear, or on the landward side, is a low, wet surface, which is completely under water during the high stages of the river, so that the mound at such times becomes an island. Still further inland the ground is somewhat higher and covered with pines and palmetto scrub.

This mound probably maintains nearly its original form, except in the middle portion and that adjoining it towards the lagoon, where, manifestly, there has been considerable destruction. The highest part is near the base of the northwestern horn of the crescent and toward the river, where it rises thirteen feet above the water. The central part is not more than half as high, but just beyond this, on the southeastern horn and on the rear or landward side, it rises quite abruptly to the height of twelve feet, with a gradual slope towards the river. In the hollow formed by the whole mound is embraced a nearly level surface, the greatest width of which is a hundred feet, terminating in an abrupt bank from two to four feet high.

Except over a small area supporting a grove of wild orange trees, the mound is now (1872) covered with a thick growth of palmettoes, among which there are a few live oaks, cedars and other trees. There can be no doubt that, originally, the river, lagoon and land supplied an abundance of game; this, and the easy communication with distant parts by water, maintained a hunter's life with great ease.

Signs of the presence of man during the construction of the mound are found in all parts, though quite unequally distributed. From among the shells drawn up between the roots of an overturned tree on the crest, eighty-five pieces were collected, viz., sixty pieces of pottery, ten pieces of the bones of the deer, eight of alligator, five of turtle, one of raccoon and one stone arrowhead. An excavation at the base of the mound near its middle on the river side, ten feet square and extending six feet below the surface, yielded two broken implements made of bone, two pieces of bone showing the marks of a tool, a small broken *Strombus*, charcoal and several pieces of pottery; the latter were made of clay and a mixture of clay and palmetto fibre. These objects were for the most part imbedded in a mixture of shells and river mud, and were deposited during the early days of the mound, when it was still low enough to be covered during the annual overflow.

On the rear slope of the southwestern portion, four fragments of human bones, were exhumed, viz., a piece each of a humerus, thigh bone, radius and tibia, in company with fragments of pottery and the bones of the deer and turtle. A piece of a caudal vertebra of an alligator from the same

place showed the mark of a cutting tool. A fragment of the molar tooth of an extinct horse was also found at the same place.

Two excavations were made on the level portion embraced by the hollow of the crescent; from one of these were obtained thirteen pieces of pottery, three of bones of deer and three of a turtle. One of the fragments of deer bone had been sawed for the purpose of detaching the olecranon. From the second excavation eleven pieces of pottery, a piece of turtle bone, and three fragments of a human tibia were thrown out.

Three-quarters of a mile in a southerly direction from Old Town, and on the line of union between the pines and the swamps bordering the lagoon, is a small circular deposit of shells fifty-feet in diameter and between two and three feet high. It contains pottery and the bones of animals, and corresponds with some of the larger mounds in their early periods of formation. The annual overflow covers it.

Four and a half miles below Old Town and on the left bank of the river is a dome-shaped mound twelve feet high, covered with a dense grove of orange and other trees. No excavations were made here, but its similarity to the others was shown in parts where it had been washed by the river.

Bartram's Mound, also known as *Little Orange mound*, is on the left bank; it forms a well marked bluff a short distance above the mouth of Lake Dexter (see map). This is one of the mounds on which the younger Bartram camped in 1774, during his second ascent of the river, and was the scene of the adventure with the alligators which he so graphically describes.³⁹ Standing on the summit, the river is seen to the northeast and below, and also the mouth of Lake Dexter, while the view of the lake itself to the eastward is cut off by a sharp point covered with trees; a small portion of the river above the mound is seen to the south, and a large lagoon to the southwest. The entrance to this last is divided into two by a small island. A swamp in the rear of the mound connects a large bay below, or to the northwest, not seen from the mound, with the lagoon above; consequently, except in dry seasons, it is an island. It has a half circular form, measures a hundred and thirty-nine feet from front to rear, and eleven feet in height at its highest point, which is towards the river. This mound was evidently built on the edge of a swamp, a part of which still lies between it and the dry land, and has been about half

³⁹ Travels, p. 119. "This promontory is a peninsula containing about three acres of high ground, and is one entire orange grove, with a few live oaks, magnolias and palms. Upon doubling the point, I arrived at the landing, which is a circular harbour, at the foot of the bluff, the top of which is about twelve feet high; and back of it is a large cypress swamp, that spreads each way, the right wing forming the west coast of the little lake, and the left stretching up the river many miles and encompassing a vast space of low grassy marshes. From this promontory looking eastward across the river we behold a landscape of low country, unparalleled as I think; on the left is the east coast of the little lake, which I had just passed, and from the orange bluff at the lower end, the high forests begin and increase in breadth from the shore of the lake, making a circular sweep to the right, and contain many hundred thousand acres of meadow, and this grand sweep of high forests encircles, as I apprehend, twenty miles of these green fields, interspersed with hammocks or islets of evergreen trees, where the sovereign magnolia and lordly palm stand conspicuous. The islets are high shelly knolls, on the sides of creeks or branches of the river, which wind about and drain off the superabundant waters that cover these meadows during the winter season." Travels, p. 116.

This description still applies to the surroundings of the mound, with this exception, that the meadows, or "the vast space of low grassy marshes," are now overgrown with willows.

destroyed by the action of the water. At the base, on the river side, the shells form a stratum of firm conglomerate, which encloses bones of fish and other animals and fragments of pottery, though all are in small numbers. In the higher portions of the mound they are more abundant.

In addition to the objects usually found in the shell mounds we discovered, at a depth of about eighteen inches from the surface, a collection of fragments of human bones. These were broken up in the same manner as the bones of edible animals and consisted of pieces of the skull, arms and legs. It was evidently no burial. No traces of fire were found in their immediate neighborhood, though some of the pieces had the appearance of having been subjected to its action. Others were cemented together by calcareous deposits derived from percolated water charged with lime.

In reading Bartram's descriptions of his journey from this mound to Lake Beresford he says that on the night of the second day after leaving the mound, "I began to be anxious for a camping place, and it was quite dark before I came up to a bluff which I had in view a long time, over a very extensive point of meadows." (Travels, p. 138.) "It was covered by orange groves, oaks and palms," and "was a high perpendicular bluff, fronting more than one hundred yards on the river," and "back of it from the river were open pine forests and savannahs." He then says I found I had taken up my lodgings on the border of an ancient burying ground; sepulchres or tumuli of the Yemassee, who were here slain by the Creeks, having driven them into this point, between the doubling of the river, where few of them escaped the fury of the conquerors. These graves occupied the whole grove, consisting of two or three acres of ground. There were nearly thirty of these cemeteries of the dead, nearly all of equal size and form. They were oblong, twenty feet in length, ten or twelve feet in width and three or four feet high, now overgrown with orange trees and shrubs, composing dark and solemn shades." We find no place on the river which at the present time corresponds with this description, between the two points above indicated. Were it still in existence, it is too large and conspicuous an object to have been overlooked in the many excursions we have made over this same portion of the river, especially when looking carefully for it. We do not find that anything of the sort is known to the hunters and others living on the river. Bartram's description is too explicit to admit of any doubt being raised as to what he saw. We have only two suggestions to offer, either that the bluff with the cemetery he describes has been washed away in the changes of the river, or that the channel has receded from it and a swamp overgrown with trees formed so as to conceal it from view. In the latter case it is hardly supposable that it should not be known to the hunters.

On the southern angle of the deep bay before referred to, and northwest from the preceding, is a much more extensive mound, forming a high ridge along the waterside, six hundred feet in length, from sixty to seventy feet

wide, and covered with a very dense growth of forest and wild orange trees. At its eastern end it recedes from the shore, turning inland. The steep and broken slope towards the bay indicates that this mound was at one time washed by the river, though the channel has now moved several hundred yards towards Lake Dexter; a dense vegetation has already extended into the bay, and forest trees have sprung up along the shore and on the slope of the mound. A great abundance of pottery was found here, a hundred and twenty pieces having been thrown out in making a few small excavations along the slope towards the river, where the mound could be examined at different depths below the summit.

Orange Bluff is one of the largest of the mounds. It is a short distance below the mouth of Lake Dexter on the right bank of the river. Mr. S. T. Carr, the proprietor, informs me that it covers seventeen acres. It consists of a high rounded shell mound rising twenty feet above the river, on which his house stands, and a long ridge extending in a southerly direction, nearly parallel with the river. On the ridge are several live oaks of large size. There are two burial mounds connected with it. We examined the upper portion of one of these and found several human skeletons. Others had been previously dug up. As far as our observations went there were no implements buried with them, and there were evidently two distinct sets of bones of different dates, the first having been broken up in preparing a place for the second, which were whole. Mr. Carr informed me that in digging for a cistern he had found the remains of an ancient fire-place and some stone implements, two of which he was kind enough to give me. The mound and the ridge are both covered with a grove of orange trees and are otherwise under cultivation.

We obtained by excavation several fragments of pottery and some stone implements.

There are several mounds between Orange Bluff and Lake George. The first of these is on an island in the middle of the river about two miles below the bluff; the southern half of it is covered by a shell field which has been for a long time under cultivation, and is especially rich in fragments of pottery.

A short distance below the preceding and on the left bank of the river is a somewhat remarkable mound, and is the one, of all those examined, where the evidence of human agency in its construction is the least satisfactory. It is from one hundred and fifty to two hundred feet in length, and from ten to twelve feet high, rising very abruptly from the swamp in the rear, as if at a former time it had been undermined on that side. Owing to the action of the water the face towards the river is nearly vertical, showing a good section through its whole length. A series of excavations for military purposes were made on the summit during the rebellion, so that the opportunities for examination were unusually good. The only unequivocal traces of human agency were a few pieces of pottery found near the surface, but which cannot be said to belong to the mound as they may have been brought

there. The contrast in this respect with Huntoon Island on the river, Old Enterprise and other mounds was very striking. The mound is composed almost exclusively of *Paludinas* and, in the lower portions, of these mixed with sand, forming a solid conglomerate. In this last we saw fragments of the bones of the deer, which had been broken in the same manner as the bones from the other shell heaps. Taken by itself, in view of the absence of human implements, we should hardly feel justified in saying that it was made by man, though in its general features it resembles his work.

At *Fort Butler*, on the left bank, is a somewhat extensive mound, and at *Volusia*, opposite to it on the right bank, are two others. One of these, and near which are the few houses forming the village, is a deposit of shells along the shore, and a little farther back a mound rising about twenty feet above the level of the river. The appearance of great size in the last is, however, largely due to the sand hills on which it rests. During the war of the rebellion a fort was here thrown up, the parapet of which was made exclusively of shells. A short distance below *Volusia*, and on the same side of the river, is an abrupt bank of consolidated shells, the origin of which is unequivocal.

The last mound on this part of the *St. John's* is a small island on the right bank, just where the river enters *Lake George*. This is without doubt the camping place described by *Bartram*, "a shelly promontory, the east cape of the river on that side of the lake," but the "little round island about a half mile in the lake" has wholly disappeared. The "grove of live oaks, palm, magnolia, and orange trees which grow amongst the shelly hills and low ridges" have all been cleared away for the purposes of cultivation, and the place is no longer what *Bartram* described it, an "*Elisium*."

In digging over the surface fragments of the bones of animals and of pottery in large quantities were uncovered. We saw considerable numbers of human bones, which had been placed by the occupants of the island around the roots of the orange trees to fertilize them, but saw none dug up.

Juniper Creek. This is the creek described by the younger *Bartram*,⁴⁰ and has its source in *Six Mile Springs*, so called from the distance between these and the shores of the lake. As at *Blue Spring*, we have here a river rising suddenly from the ground, the water emerging with great force. The Creek enters *Lake George* a few miles from its southern end at the western side of a deep bay. A small shell mound, rising three feet above the creek, is seen on the right bank, about two miles from its mouth. In addition to the ordinary objects found in mounds, several pieces of rudely worked stones were dug up and also a few stone chips.

Silver Spring Creek is several miles north of the preceding, on the same shore, and has upon its banks the most gigantic deposits of shells met with on the waters of the *St. John's*. There are two distinct portions; one

⁴⁰ *Travels*, p. 160.

forming an amphitheatre which surrounds the source or "boil," and which is the *Williams Spring* of John Bartram,⁴¹ and the other occupying the right bank of the creek at its mouth, as well as the shore of the lake. The two together are said to cover an area of twenty acres. The one last mentioned is much the larger and consists of three portions forming as many sides of a hollow square. The first extending along the shore of the creek, near the mouth of which it has a height of from twenty to twenty-five feet by measurement; the second is on the shore of the lake, and measures from a hundred and fifty to two hundred feet in width, and the third extends inland at nearly right angles to this. Between these ridges is a deep valley, in which the shells are entirely wanting or are only sparingly found.

There is another and very extensive deposit of shells, which at first sight might seem to be a part of the main mound, but strictly speaking is not, though continuous with and derived from it. It forms a beach wall several hundred feet in length, measures from seventy-five to a hundred feet in breadth and is about three feet high in the thickest part. It makes a barrier or dike between the lake and the swamp adjoining the more southerly portion of the mound, and against the base of which the waters of the lake formerly broke. This dike has been made at the expense of the lake-shore portion of the mound, which has been destroyed by the action of the water under the influence of the winds from across the lake. This is placed beyond a doubt by the following considerations.

1. The original mound has an abrupt front towards the lake, and its materials have been largely removed; some of these are still seen at the water's edge.

2. The ridge along the shore and back of it has all the appearance of a beach wall, with here and there most obvious signs that the waters of the lake have washed the top of the dike.

3. The materials found in the dike are the same as those of the mound, and the pieces of pottery mingled with them are water worn, like those on the beach, though picked up or dug out seventy-five feet from the water's edge.

4. The older trees on that part of the dike nearest the mound which have been overturned show the existence of a thick deposit of shells *above* their roots, while those at the opposite and last formed end have the shells wholly *beneath* them, and are covered only by vegetable mould; or in other words, while considerable deposits have been made since the first trees began to grow, none have been made since the beginning of the growth of the second.

It follows from this last statement that the deposits take place only after considerable intervals and that these intervals show that the destruction and deposit must have been the work of a long series of years.

Similar displacements and redistribution of the shell mounds have been observed by the writer elsewhere, especially at Old Enterprise [where, as

⁴¹ See Journal, pp. 22 and 23.

already described, the beach wall extends sixteen hundred feet eastward from the bluff], at Cedar Keys, along the shore of Goose Bay (Way Key), and at the mouth of Manatee River, near the entrance of Tampa Bay. In all these places there is the same evidence of destruction and redistribution of the materials as has just been given.

The mound at the mouth of Silver Spring Creek was examined in many places on the shore front by simple inspection and by frequent excavations, and yielded an abundance of pottery and other evidence of man's agency. It is unnecessary to describe them in detail.

Among the many objects of interest here the ancient live oaks are worthy of especial notice. Of the four largest, two measure fifteen feet in circumference, one nineteen, and one, the Giant, twenty-seven feet at the height of five feet from the ground; but we shall refer to these again.

Leaving Lake George by the western channel a conspicuous shell mound is seen on the left bank, not far from the lower end of Drayton's Island. It is from four to five feet high, and consists of consolidated shells; the younger Bartram describes it as "Rocky Point, the west cape or promontory as we enter the river descending towards Mt. Royal," and "which seem an aggregate composition or concrete sand, shells, and calcareous cement, of a dark grey or dusky colour; this stone is hard and firm enough for buildings and serves very well for light hand-mill stones."⁴² We saw this only in passing, but did not critically examine it.

On the right bank of the river, nearly opposite and somewhat below *Fort Gates*, where there is a shell field, is the well known Mount Royal. The Bartrams both visited this in 1764, when "all appeared wild and savage," but on the second visit of the younger Bartram, nine years later, the orange groves, palms and oaks had been "cleared away to make room for planting ground."⁴³ A shell bank from five to six feet high forms the shore, and extends a short distance inland. Several hundred feet in the rear of this is the Mount, a sand mound used for burials and very symmetrical in shape. From this leads the "avenue" or "grand highway" which Bartram describes and subsequent writers make much of, but which is now completely overgrown with forest trees. It ends in a pond which now, as in the day of Bartram, is "bordered with various flowering shrubs and plants."

At the lower end of Little Lake George on the right bank and about six miles below the preceding is a well defined shell mound, standing up boldly on the shore and is conspicuous through the whole length of the lake. It is about twenty feet high; it is the Mount Hope of the elder Bartram, and is especially noticed by the younger.⁴⁴ Its destruction by the water is going on rapidly and a very obvious change was made by the storm of August, 1871. It is situated in the recently made town of Beecher.

At Welaka, a mile lower down, is a shell field but it offers nothing worthy of especial notice.

⁴² *Travels*, p. 168.

⁴³ *Ibid*, 98.

⁴⁴ *Travels*, p. 98.

Horse Landing is on the right bank of the river, sixteen miles above Palatka and as at present seen (1872) is a half oval structure, rising abruptly on all sides, that towards the water being nearly vertical. It measures three hundred and seventy-five feet in length, one hundred and seventy-five feet in width, is fifteen feet high near the eastern and twelve near the western end, where it descends into a swamp. The eastern and middle portions are built upon a deposit of sand, which last rises above the ordinary level of the river. This mound has been largely destroyed by the undermining action of the current, causing the detachment of large masses and leaving complete sections exposed, which afford good opportunities for examination. The lowest part of the shell deposit has become, through the percolation of water charged with lime, consolidated into a hard stratum. The deposits of shells made at different times give to the entire section an irregularly stratified appearance, which is still further increased by the occasional intermixture of sand, so that the whole might easily be mistaken for a true geological formation. Although the three species of shells are generally indiscriminately mixed, in some places a single species is found in large quantities, as if at a certain time it had been exclusively used for food by the builders.

Implements and the fragments of the bones of edible animals are very sparingly found in this deposit. One can, however, easily trace the sites of ancient fire-places by black streaks, the result of the mixture of charcoal with shells, the shells having been blackened by the action of fire, or in some cases completely calcined. Around these places fragments of bone were detected. The objects taken from the mound showing the action of the human hand are a piece of antler, sawed and broken, a fragment of a bone awl, a bone drilled apparently for an ornament, a fragment of a tooth which has been artificially shaped, a triangular chisel made of shell, a piece of flint which had been used as a hammer, and a flint flake. Just at the line where the shells of the mound become mixed with the sand on which it rests, Mr. Peabody discovered, projecting from the sand, an unequivocal piece of chipped flint, which seems to be a rude attempt at an arrowhead. This had been recently in part exposed by the action of the river, and great pains were taken to make sure that the sand in which it still remained had not been disturbed. It is therefore believed to have occupied the original position it had when the mound was begun, and may be taken as evidence of the presence of man from the very foundation of this structure.

A few pieces of pottery were found either on the surface or in the vegetable mould, but after repeated and careful examination, at different depths from the top to the bottom and along the whole front, not a single piece was detected in the interior of the mound. The presence of pottery on the surface is no doubt to be ascribed to the later inhabitants, and in view of these facts it is concluded, as in the case of some of the other mounds already described, that the art of pottery was unknown to the builders.

In addition to the above objects may be mentioned fragments of marine

shells, especially of *Busycon*, which were probably brought from the seashore for the purpose of making implements. Fragments of the bones of extinct animals, which had become perfectly mineralized, were found here, and with them the tooth of an extinct horse and a fragment of a tooth of an elephant.

At *Buffalo Bluffs* (see map) is a shell heap which is quite large and is also interesting for its close proximity to a deposit of marine shells. The latter forms a stratum consisting of both entire and broken specimens imbedded in finely broken fragments of the same material. Above this, forming a deposit parallel to it, is a stratum of sand from two to three feet thick, which in turn is covered by a stratum of fresh-water shells, chiefly *Paludinas*, with which are mixed the usual objects found in the shell heaps, but none of which are to be seen in the stratum of marine shells below. Geologically speaking only three feet of sand separate these two strata, but one was deposited when the sea covered the peninsula of Florida, and the other after the salt water and the species which lived in it had disappeared and in the course of time had been replaced by fresh water and the species now living. The lower or marine stratum rests on consolidated sand mixed with shells. This is the only place which in general corresponds with *Charlotia* described by Bartram, and there is one important particular in which the correspondence is precise. He describes *Charlotia* as "situated on a high bluff." "The upper stratum of the earth consists entirely of several species of fresh-water cochleæ," "the second of marine shells,"⁴⁵ "and the third, or lower stratum, which is a little above the common level of the river, was horizontal masses of pretty hard rock, composed almost entirely of the above shell, generally whole, and lying in every direction, petrified or cemented together with fine white sand, and these rocks were bedded in a stratum of clay."⁴⁶ It was here that he "saw many fragments of the earthenware of the ancient inhabitants and bones of animals amongst the shells and mixed with the earth to a great depth."⁴⁷

At *Murphy's Island*, a few miles below, on the right bank, is a large shell mound and near it to the south is a conical burial mound of sand, quite conspicuous from the river.

Palatka.⁴⁸ The shore here runs nearly north and south. At the northerly end of the town is a gently inclined plain, sloping towards the water and ending in a low bank not more than three feet high. Over this surface are to be seen here and there a few *Paludinas*. Walking along the shore towards the southerly end we find the bank increasing in height until it reaches an elevation of from ten to twelve feet, where may be seen underlying the vegetable mould, a layer of shells from eighteen inches to two feet thick. It extends southwards as far as a small stream, which enters the river above or at the southerly end of the town. Fragments of pottery,

⁴⁵ Travels, p. 93. ⁴⁶ Ibid. p. 94. ⁴⁷ Ibid. p. 94.

⁴⁸ *Wakwak palatka*, "cow swimming." See Smith's translation of the Memoir of Fontaneda, p. 38. Unless "cow" refers to the Buffalo this must be a modern Indian name.

and the bones of animals and a few scattered human bones were obtained from these deposits. Count Pourtalés in 1848 also found parts of the human skeleton at this place.

When the younger Bartram ascended the river he found here an Indian village, "of eight or ten habitations in a row or street, fronting the water and about fifty yards distant from it." He saw women hoeing corn and large tracts of land planted "with corn, battatas (sweet potatoes), beans, pampions, squashes, melons, tobacco, etc., abundantly sufficient for the inhabitants of the village."⁴⁹

Forrester's Point is five miles below Palatka and on the right bank. Near its most westerly part is a bluff about ten feet high, having a very level surface, overgrown with live oaks and commanding an outlook towards the river. It is covered with a layer of *Paludinas*, with which are mingled fragments of pottery, to the depth of from twelve to eighteen inches. A large live oak between two and three feet in diameter, now lying in the water, indicates the extent to which the shore and with it the shell deposit have been destroyed in comparatively recent times. We suppose this to be the mound referred to by the elder Bartram. It is the most northerly of the river mounds that we have seen, and its distance from the most southerly at Moccason Creek is about one hundred and fifty miles.

⁴⁹Travels, p. 93. From Bartram's description it will be seen that these Indians were not living on the shell heap, which was a fourth of a mile south of them, but at the northerly portion of the present town where the "bank retiring gradually from the water" may still be seen. There is nothing to connect them with the shell heaps, but on the contrary it is clear they were leading an agricultural life.

LIST OF SHELL MOUNDS ON THE ST. JOHN'S RIVER: THE POSITION OF MANY OF THEM IS INDICATED ON THE MAP BY BLACK DOTS.

1. Possum Bluff, on right bank of Moccason Creek.
2. King Philipstown, on right bank of the St. John's.
3. Two mounds on lagoon near Bear Hammock, right bank.
4. Black Hammock, left bank, near the mouth of Lake Jessup.
5. Spear's Landing, left bank.
6. Buzzard's Roost, left bank, near Lake Monroe.
7. Doctor's Island, right shore of Lake Monroe, above Old Enterprise.
8. Old Enterprise, right shore of Lake Monroe.
9. Mellonville, left shore of Lake Monroe.
10. Outlet of Lake Monroe, right bank.
11. Shell field on right bank, six miles below Lake Monroe.
12. Shell mound, ten miles below Lake Monroe. There is a burial mound connected with it.
13. Shell mound on the Wekiva, about six miles from the mouth, right bank.
14. Mound one mile above Blue Spring, right bank.
15. Blue Spring, right bank.
16. Mound on the edge of the swamp, a mile north of Blue Spring.
17. Mound on the same, two miles from Blue Spring.
18. Mound on Huntoon Island and on the river, left bank.
19. Mound opposite preceding, on right bank.
20. Mound on Huntoon Island, near Huntoon Creek.
21. Hawkinsville, left bank, bluff and shell field.
22. Bryson's Mound, half a mile below Hawkinsville, right bank.
23. Pocataligo between Osceola Mound and Hawkinsville, left bank.
24. Osceola Mound, left bank.
25. Alexander's Mound. Lagoon on Spring Garden Creek, left bank.
26. Old Town, left bank.
27. Small mound on edge of swamp and in the rear of Old Town.
28. Mound six miles above Lake Dexter, left bank.
29. Bartram's Mound, opposite the mouth of Lake Dexter, left bank.
30. Mound below preceding and at entrance of bay, left bank.
31. Orange Bluff, below mouth of Lake Dexter and on right bank.
32. High Bluff, left bank, above Volusia.
33. Island in the river, shell field.
34. Two mounds, right bank, between Lake Dexter and Volusia.
35. Fort Butler, left bank.
36. Volusia, two shell bluffs.
37. Ropes Island, right bank, at entrance to Lake George.
38. Juniper Creek, right shore of Lake George.
39. Silver Springs, left shore of Lake George.
40. Mound on left bank, western outlet of Lake George.
41. Mount Royal, right bank of the St. John's.
42. Mount Hope, right bank, now Beecher.
43. Welaka, right bank.
44. Horse Landing, right bank.
45. Buffalo Bluffs, right bank.
46. Murphy's Island, right bank.
47. Palatka, left bank.
48. Forrester's Point, right bank.

V. PRIMITIVE MAN AND IMPLEMENTS.

The steady progress of discovery justifies the inference that man, in the earliest periods of his existence of which we have knowledge, was at the best a savage, enjoying the advantage of a few rude inventions. According to the theory of evolution, which has the merit of being based upon and not being inconsistent with observed analogies and processes of nature, he must have gone through a period when he was passing out of the animal into the human state when he was not yet provided with tools of any sort, and when he lived simply the life of a brute.

No proofs, however, of man in this earliest stage, have as yet been found, and the term "primitive man," if intended to be strictly applied, is at present a misnomer. The earliest traces thus far discovered do not reveal to us his beginning. This is still hidden in that mysterious past out of which he has emerged and into which neither science nor exploration has as yet penetrated. The ancient remains found in California, brought to the notice of the scientific world by Prof. J. D. Whitney, and referred by him to the tertiary period, exhibit man as a maker of instruments for grinding grain, and of other implements of stone, and as far as an imperfect skull goes, essentially the same in his anatomical features as now. Or should these instances be set aside, as some geologists, waiting for further discoveries, are inclined to do,⁵⁰ we still have remains from the gravels of the Somme in France, as well as the Ouse and other localities in England. Some of these last, Mr. Evans believes, date back to the time when the Needles of the Isle of Wight were connected with the main land, the sea of Solent was the mouth of a river and Britain was probably still a peninsula.⁵¹ The time since these conditions existed may not, he says, be estimated by years, but unquestionably extends back an immense period beyond that covered by history. The abundance of flint implements belonging to the gravels, above referred to, shows that man was then and there far from being primitive.

If the theory of evolution be true and man ever was in a transitional or strictly primitive state without tools or implements, it will be obvious that all the knowledge we can ever expect to have of him in this condition must come through the remains of his own body older than his inventions, which will carry us back still farther towards, if not to, his starting point, as the geologist is carried back in time to the early period of the existence of animals. Even with regard to these, geology fails to reveal to us their actual beginning. Possibly the early remains of man may never be known, for during the revolutions which have taken place on the surface of the earth and the inroads which the sea has made upon the land, if a suggestion of

⁵⁰ The ample evidence collected by Prof. Whitney, but not yet published, substantiates the opinion given above with regard to age. The omission of the Calaveras skull would not weaken the evidence as to the existence of man in the tertiary period in California.

⁵¹ *Ancient Stone Implements of Great Britain*, 1872, pp. 556, 604.

Cuvier may be accepted, "the places where he [man] dwelt may have been utterly destroyed and his bones buried at the bottom of the existing seas."⁵²

It is almost certain that his bones, if simply left on the surface, would, like those of land animals generally, be soon entirely destroyed, either by the effects of the weather or their consumption for food by wild animals. Nothing can be more striking than the complete destruction of the bones of the birds and reptiles, some of gigantic size, which once thronged the shores in the valley of the Connecticut River. Were it not for the preservation of their seemingly more perishable footprints, the mere knowledge that they once lived would not now exist. The same is doubtless true of other kinds whose habitat was inland, and whole races of mammals and birds may have once existed of which no traces whatever remain, and this too within comparatively recent times. Keeping these considerations in view, it seems not at all improbable that the same fate may have befallen the remains of the earliest man.

As the ease with which food can be procured determines the habitat of animals, so also it determines that of man, and this naturally brings him to the shores of seas, lakes and rivers where it can be had with the greatest ease. It is hardly conceivable that he could, under any circumstances, at once have entered upon an agricultural or hunter life, since these both require expedients and inventions which long experience and education alone can give. Without tools or inventions of any sort, life in the forest, it would seem, would be for him almost impossible. Be this as it may, the wide geographical distribution of shell heaps shows how generally man has been attracted by the kind of food the shores yield, including not only shellfish, but fish and game, and the extent to which they have supplied his wants in his early periods. They are found at intervals along the whole Atlantic coast of the United States from the Bay of Fundy to the Gulf of Mexico, on the shores of California and northward to Behring's Sea, in Central America, the Gulf of Guayaquil, on the coast of Brazil, Patagonia and Terra del Fuego, on the shores of England, Scotland, Ireland, France and Denmark, in the Malay Peninsula, in Australia and Tasmania, and will doubtless be discovered in still other parts of the world.

Besides those just mentioned other shell heaps have been found on the interior rivers of this continent, especially the Mississippi and its tributaries. Atwater, who was the pioneer in inquiries relating to them, described the mounds of mussel shells on the banks of the Muskingum⁵³ containing various articles of human make, and Le Sueur and Say explored a mound at New Harmony, Indiana, as early as 1826.⁵⁴ Since then Dr. D. G. Brinton⁵⁵, Dr. Cox, Generals Humphreys and Abbot,⁵⁶ and Prof.

⁵² Discours sur les Revolutions de la surface du Globe, Oss. Foss., 4me edition, Paris, 1834, T. I, p. 217.

⁵³ Archæologia Americana, Vol. I, p. 226.

⁵⁴ Foster. Prehistoric Man.

⁵⁵ Smithsonian Report. 1896. p. 356.

⁵⁶ Report upon the Physics and Hydraulics of the Mississippi River. p. 89.

C. A. White⁵⁷ have described many other localities in the great Mississippi Valley where they exist in large numbers, and show how generally the habit of eating shell-fish prevailed in that region. In addition, to the fresh-water shell heaps of the St. John's, which are here described, we have examined a well defined shell heap on the shores of the Concord, in Massachusetts, consisting of *Unio complanatus*, living specimens of which can be had from the river near by. This shell heap contains charcoal and pieces of worked bone and stone.⁵⁸ It had previously been visited by the late H. D. Thoreau, who regarded it as an ancient Indian dwelling place, though he published no account of it. Quite recently Prof. Hartt, of Cornell University, has explored some of the interior fresh-water shell mounds of Brazil, which are very extensive; selections from which are preserved in the collections of Peabody Museum at Cambridge.

The study of the works of man from the oldest shell heaps, the only records left of the progress their builders had made, tends to show that he was as far advanced at least as are the miserable creatures the traveller meets with now in the Straits of Magellan, or as are the Dyaks of Borneo, the Australians, or the Andaman Islanders.⁵⁹ In other words we have the life of man manifested now in a condition apparently as primitive and no more advanced toward civilization than in the earliest prehistoric periods which have thus far been studied.

The only records we have of the earliest inhabitants of the St. John's are the shell mounds and the comparatively few implements they contain.⁶⁰ Judging from these of the progress the natives had made, it is clear that they too had passed out of the primitive stage, had become hunters, had made some progress in the useful arts, and however rude their implements they were such as could only have been the result of long continued efforts. They have left no signs of having learned the art of agriculture, but their tools, if they had any, may have been of a perishable nature. In the oldest mounds no pottery has been discovered, the builders of them no doubt having been ignorant of it. Though implements of wrought shell, bone and stone are met with, they are not numerous, and those of stone from the interior of the mounds are quite rare.

The bones of animals obtained by hunting on land are in comparatively small numbers, so that as far as indications go, the older natives subsisted chiefly on fish and shell-fish. This is strikingly the case at the mound on Huntoon Creek, Osceola Mound, the mound next above Blue Spring and at Horse Landing.

⁵⁷ Congrès International d' Anthropologie et d' Archeologie Prehistorique à Bologne, 1871. p. 379. Meeting of the American Association for the Advancement of Science, at Portland, 1873.

⁵⁸ Proceedings of the Boston Society of Natural History, Vol. XI, p. 243.

⁵⁹ Sir John Lubbock, *Origin of Civilization*, London, 1870. p. 5. Dalton in Moore's notices of the Indian Army. p. 49. Keppel's Expedition to Borneo. Vol. II. p. 10.

⁶⁰ We leave out of consideration the burial mounds, which may possibly be as old as the shell heaps, because they have not thus far been satisfactorily examined and proved to be so. Nearly all the explorations of them have been confined to the superficial portions where there are mixed burials of an earlier, though perhaps not of the earliest, and the later inhabitants. The only mound which we have had an opportunity to examine quite to its base had only recent burials on the top, but none whatever lower down. In its general appearance it exactly resembled the others.

Whether the inhabitants who built and dwelt upon the older shell heaps, or even on the later ones, were the same people the first explorers found occupying the shores of the St. John's is uncertain. The Indians, who lived in Florida later, had no traditions with regard to those who preceded them in remote times, nor is it to be expected they should have, for they were not descendants of the original inhabitants, but were comparatively recent immigrants themselves. The early explorers make no reference whatever to the shell mounds on the river, though they could hardly have failed to do so if these had continued to be occupied as dwelling places, and the fresh-water shells were still used to any considerable extent as articles of food. They distinctly state that the natives live by hunting and agriculture, describe the details of carrying on these operations, the preparation of dried meats, and mention the different articles, animal and vegetable, used, their mode of collecting food in granaries, and of preparing them, but nothing is said of the shell-fish. The inference is that the shell mounds had already ceased to be occupied as dwelling places, and that the natives had outlived the mode of life which gave rise to them, or had been replaced by others of different habits.

This conclusion is consistent with the fact that trees, as will be seen farther on, are now growing upon some of the mounds, which are older than the discovery of America.

Unfortunately, we have no satisfactory means of making a comparison between the older and later inhabitants derived from parts of the human skeleton. There is an abundance of crania and bones taken from the burial mounds, but, as we have already intimated, it is hardly safe to assume that these represent the earliest dwellers on the St. John's. The bones from Osceola Mound, already referred to, and to be described farther on, and those from Rock Island in Lake Monroe, are the only ones we have met with which can be claimed to be unequivocally contemporaneous with the earliest shell heaps. The skull from the first of these places has anatomical peculiarities which differ from those of the skulls of the burial mounds, but as there is but one it may be exceptional.

The relation of the older to the later inhabitants, that is, of those dwelling on the St. John's, centuries before and at the time of the first explorations, must remain for the present a matter of doubt. We need more complete explorations of the burial mounds than have as yet been made, and more complete anatomical comparisons of the crania and bones.

Before treating of the remains of man which have been detected in the shell heaps we will describe the tools and implements which have been discovered in exploring them. The kinds are few and of necessity give an imperfect idea of the progress in the useful arts, since it must be taken for granted that many articles made of perishable materials have also been in use but have been completely destroyed by natural causes.

Stone Implements.

These were seldom met with in making excavations in the shell mounds. Nearly all we have seen were either picked up on the surface or on the adjoining land or shores, or were buried at a depth of a few inches only. We give figures of some of the principal kinds which we have found and which were without doubt contemporaneous with the building of the mounds, and made by the earliest occupants of the peninsula of Florida. The others belong to the Creek and other Indian tribes which began to migrate from South Carolina and Georgia more than a century ago, and eventually overrun a large part of East Florida, subduing the natives they found there, viz., the Mikasukies, and established the nation, afterwards too well known, of the Seminoles. They naturally carried with them the stone implements they used in their old homes where the supply of material for making them was abundant, but wholly wanting in their new abode.

That the builders of the mounds were, from the beginning, acquainted with the use of stone implements, is shown by the fact that a wrought piece of chert was found at Horse Landing, one of the oldest mounds, in the lowest stratum, and chips and more or less rudely made implements from the older part of the mounds in other places. The condition of these, and their scarcity, show a lack of skill in their manufacture and that they were not in common use.

Those found upon the surface, on the contrary, are well wrought and correspond with such as are found in Georgia and the neighboring states.

The different stone implements from the mounds proper may be classed as flakes or chips, hammerstones, arrowheads and rather rude pieces resembling somewhat the celts of the St. Acheul pattern.

1. Chips are not common and were generally found separately or only a few together, but in no instance in collections indicating a place for the manufacture of arrowheads or other implements.

2. A hammerstone, made of a prism-shaped piece of chert, was found at Horse Landing, and measures 127^{mm} long, 40 thick and 60 wide. It had been considerably used, the edges being much chipped, battered and rounded.

3. The celts of the St. Acheul pattern are simply repetitions of the form met with, though not very often, in other parts of the United States, and also in the drift, and ancient caves and rock shelters of Europe. The largest we have is of an oval shape, slightly pointed, 125^{mm} long by 70 wide, with somewhat sharp edges and thick in the middle. This was found in the shell fields at Hawkinsville. A smaller specimen from the same place is represented on Plate II, fig 2. We have others from Orange Bluff and Juniper Creek, one of the largest (Plate II, fig. 1), from Orange Bluff, is 118^{mm} long, 66 wide and 30 thick. Three from Old Enterprise are somewhat thinner with sharper edges. They were picked up by Mr. Peabody

on the shore near by, so that there is no proof of the period to which they belong, and their nicer finish would indicate a modern date.

4. Of two stone chisels, one made of fine granite was found at Huntoon Island on the river, and the other of quartzite sandstone at Old Town, and are of the same shape, viz., a flattened cone, and are well ground and smoothed, the base forming the cutting edge. These forms are common in the southern states, and are of course importations.⁶¹ They were both found near the surface.

5. The distinction between arrowheads and spear points is not always easy, as the forms are very often the same, and it thus becomes merely a question of size. Three patterns of spear points have been noticed; one with a triangular body, slightly convex edges, and a tang or stem at the base, the second with notches and no tang, and the third having a tang, with a body long, slender and pointed, instead of broad and triangular.

6. The several patterns of arrowheads may be grouped as follows; triangular heads with a straight base, with a notched base, with a stem or tang, and with notches on the sides. A peculiar form found on the St. John's River is shown on Plate II, fig 6. There are also leaf shaped pieces which may be arrowheads, long and slender pointed, and lastly, irregular arrowheads. Among these last are two unsymmetrical pieces, as in Plate II, fig. 5, from Lake Beresford, in which the tang is to one side, without a projection or barb above it. Such as these are to be seen in the collections of the Smithsonian Institution and in the Clement collection from the Swiss Lake-dwellings.⁶²

Many of the forms of implements above described correspond with figures given by Mr. Jones in his *Indian Antiquities*; they were doubtless imported either from Georgia or the adjoining States, and it is for this reason that we have introduced them.

On Plate II, fig. 7, is represented a piece of worked flint which has an especial interest as it is probably the oldest implement in our collection. This was found, by Mr. Peabody, just beneath the shell mound at Horse Landing, where it had been exposed by the action of the river but not detached from its resting place. It bears unequivocal marks of the human hand, and, though an unfinished instrument, may have been possibly an attempt at an arrowhead.

An unusual form of stone implement was found on the shell field at Hawkinsville; it is thin and slightly concave on one side, and convex on the other, and measures 59^{mm} in breadth, and 69^{mm} in length.

Two rude implements of flint are figured on Plate II. Figure 3 is from Blue Spring; Fig. 4, from the Creek on Huntoon Island.

⁶¹ See Jones' *Antiquities of the Southern Indians*. p. 278, pl. XI, figs. 1, 3, 5, 6.

⁶² The recent explorations of Major Powell, among the Pah Ute Indians, have shown that many of the objects commonly classed as arrowheads and spear points are used as knives. Large numbers of these obtained by him, and now in the Smithsonian Institution are mounted in handles of wood. Among them are to be seen some of the unsymmetrical form above referred to, which are evidently made for knives. There are other forms which may be mounted in handles for the same purpose, or attached to shafts and used as arrow and spear points.

A nodule of flint, weighing several pounds, from which pieces had been chipped, was found at Salt Lake, but was probably used by the later Indians for the making of gun-flints.

Not a single grooved axe has been discovered either in or upon any of the mounds.

Implements of Bone.

Pieces of bone showing the marks of tools, and bone implements are found in considerable numbers, but are of very few kinds. The former have mostly been sawed in the way commonly practised among the Indians, that is by cutting a groove more or less deep, either lengthwise or around the piece of bone, so as to weaken it, and then breaking the rest. Bones from which pieces are cut for making tools are treated in this way. We have not found tools made of human bones, but it is not improbable that these were used for such purposes, as the sawed human thigh bone found at Osceola Mound naturally suggests.⁶³

There are but few varieties in the kinds of bone tools, and these are represented in Plate III. Of the awls, one, fig. 5, is very nicely finished, is 116^{mm} long, and somewhat ornamented at the larger end. Several fragments, supposed to be parts of a similar tool, have been found. Figs. 1, 2, 6, and 9, represent awls made of splinters of bone, with no other change than sharpening of the pointed end or ends. These closely resemble the form of awl so common in the remains from the Swiss Lakes, and may be considered as the most simple and probably the first form of the bone awl.

The chief instances of the bones of animals showing the work of the human hand are enumerated in the following list.

1. A piece of the antler of a deer partly divided by a cutting instrument and then broken. The marks are very nearly the same as those seen on pieces of antler found in Swiss Lake-dwellings. From Blue Spring.

2. A piece of antler with a groove cut around the whole circumference. Found by Dr. H. P. Bowditch, at Old Enterprise.

3. Lower end of the radius of a bear (Plate IV, fig. 4,) which had been sawed from the shaft of this bone. Old Town.

4. Two specimens of the olecranon of a deer from which a piece had been sawed. One of these (Plate IV, fig. 6,) was from the mound next above Blue Spring. The ulna of this animal, among Indians generally, was a favorite bone for making different kinds of pointed instruments, especially awls. The shaft is well adapted to this purpose, as the more slender portion has no medullary or spongy substance, and the articular portion serves to make a very convenient handle. There are implements in the Peabody Museum, one made of the ulna of the moose, and another of the bear, both from shell heaps in New England. Among the remains from the Swiss

⁶³ A human upper arm bone found by Mr. Elliot Cabot in a coast shell heap in Ipswich, Mass., had been ground and scraped probably for the purpose of making a tool. The wrought end was broken, leaving the nature of the implement uncertain. The specimen is preserved in the Peabody Museum at Cambridge. Peter Martyn states that the Caribs used human bones to point their arrows and spears, these being their substitutes for iron. Dec. I, Lib. II, folio 2, A.

Lake-dwellings, awls, daggers, etc., are made from the same bone of the different species of deer, and of the smaller animals.

5. Fragment of the pelvis of a deer which has been scraped by a rough instrument.

6. A part of the humerus of an alligator cut partly through and broken; the surface has been ground or scraped.

7. A piece of the radius of a deer treated in the same way as the preceding. (Plate IV, fig. 1). From Old Town.

8. Metatarsal bone of a deer, sawed and broken.

9, 10, 11. Splinters of bone rounded and sharpened at one end, forming awls, which closely resemble tools found in the Swiss Lake-dwellings. These may be considered as one of the primitive forms of this tool. (Plate III, figs. 1, 2, 6, and 9).

12. A broken tool cut from the metatarsal bone of a deer. The upper end is ground square, the edges rounded, but the point has been broken off. Probably an awl. (Plate III, fig. 8). From Old Town.

13. A small mammalian bone, sawed and broken. (Plate IV, fig. 3). From Horse Landing.

14, 15, 16. Points of broken awls made of the metatarsal bones of deer. (Plate III, fig. 5).

17. Fragment of an awl, the surface well polished. (Plate III, fig. 4).

18. A broken implement provided with a small projection at the base, as if to fit into a socket. (Plate III, fig. 7). From Old Town.

19. An ornament made of the phalanx of an animal, probably deer. (Plate IV, fig. 5). This has a hole drilled at each end into the cavity of the bone, as if for the passage of a cord. From Horse Landing.

20, 21. Two fragments of the lower jaw of an alligator, showing the marks of a cutting instrument.

22. A piece of an antler of a deer, the larger end of which had been smoothed and polished, though now somewhat defaced by decay, and around which is cut a small groove.

23. A well-finished awl, with the head somewhat ornamented. (Plate III, fig. 5). From the shell field on the Wekiva.

To the above should be added several pieces of bones of the deer sawn lengthwise, for the purpose of detaching materials for making tools. Nearly all were from the metatarsal or metacarpal bones.

Pottery.

When the Europeans first came to America the art of pottery was nearly universally practised. A few tribes only were destitute of it. Some of the natives of the north-west coast, like the Chinooks, made water-tight baskets which answered the same purpose as pottery, and were used both for holding water and for cooking, in the latter case heated stones taking the place of the direct action of fire. Neither the Patagonians nor

Fuegians had earthen vessels of any kind. East of the Rocky Mountains the use of pottery has been presumed to be universal. On the St. John's, as has already been stated, in some of the more ancient mounds, as at Horse Landing, Osceola mound, the mound above Blue Spring and others, no evidence of pottery has been detected even after the most careful search. The same is true of the bluff at Hawkinsville, though an abundance of it is found in the adjoining shell field. In many of the mounds, as will be seen from the accompanying table, it is abundant though almost invariably in fragments. The only whole vessels we have seen are a small cup (Plate V, fig. 1,) found at Lake Beresford, and a miniature vase, perhaps a toy (Plate V, fig. 2,) found in the mound at Huntoon Island, on the river.

The style of pottery is always rude, as is also that of the ornaments upon it. In many cases the surfaces are not well smoothed, the curves are not true, and the thickness is not uniform. As far as we have been able to form an idea of them from the fragments, the chief forms of the vessels are the following: a large deep bowl-shaped vessel with either a rounded or flat bottom; a shallow and dish-shaped vessel; a deep vessel with diverging straight sides and flat bottom, and an oval-shaped vessel with a pointed bottom. The mouth of the vase is generally flaring, is seldom contracted; we have seen no instance in which there were signs of a neck, and only one in which there was anything like a turned lip. This was from Bartram's mound, and was found on the surface where it had been thrown out in digging up an orange tree. The depth of the hole from which it came was such that it must have been superficial, and may have been brought there by the more recent inhabitants. This view is confirmed by the fact that the stamped ornaments were of a different pattern from anything found elsewhere in the mounds, consisting of a series of short parallel ridges instead of squares. The simplest ornaments are the rough tracings on the soft clay with a pointed instrument, a stick or a bone, or the simple impression of the point of one of these, or of the apex of the spine of a shell; as in a specimen from Old Enterprise (Plate VI, fig. 1). The traced figures are the rudest and would naturally be the earliest ornaments, but on some of the vessels the lines are evenly drawn and at equal distances from each other. Specimens of these are seen in Plate V, figs. 3, and 4, and an improvement in the use of the tracing tool is shown in fig. 5, of the same plate.

The next step in the progress of the art, and by which it was made much less laborious, was the substitution of the stamp for the tracing point. The former is easily reproduced by making a cast of the surface of the vessel in gutta-percha. It has essentially but a single pattern (Plate VI, figs. 2 and 3), the figure being made by a series of straight grooves crossing each other at right angles, leaving projecting squares, or obliquely leaving lozenge-shaped projections. The impression of course gives the squares depressed, and the grooves are represented by ridges. The former vary much in size, some measuring eight or nine millimetres on a side, and others not more

than two. In one case the face of the stamp had simply parallel grooves and ridges. The stamp, whatever its shape, was applied successively to different parts of the surface when this was still soft, the impression last made often overlapping and partially obliterating or confusing a previous one. It is worthy of notice that ornamented vases were not universal. In some of the mounds, as at Huntoon Island, they were almost entirely wanting, of more than a hundred pieces only six being stamped, while at Old Town, a few miles distant, the majority of the fragments were ornamented.

From what has already been said of the rudeness of the vessels it is obvious that they were nearly all made by hand, and we have seen no indications that they were moulded on the surface of gourds, as was the practice in other parts of the United States. We have three instances, however, of vases which had been moulded on the inside of a basket. One was a fragment from the shell field on the Wekiva, showing a basket of a very coarse texture; the second was from Silver Spring, Lake George, in which the texture was fine and close, the material apparently being grass, and the third quite similar to it was from Blue Spring.

In this last case if the earthen vessel had flaring or simply upright sides, the basket could be easily detached by inverting and pulling down the edges so as to turn it inside out. The shrinking of the vessel in drying would favor this as well as the flexible nature of the basket. The same moulds could under these circumstances be used many times. In the first case the destruction of the basket in the burning of the vessel would be necessary.⁶⁴ We have found indications that some, at least, of the vessels were made by coiling up long cylinders of clay, and afterwards pressing and welding them together. The beginning of a coil is seen in Plate V, fig. 6. We have occasionally seen cracks in the surface taking a spiral direction around the vessel, and in other cases grooves having a similar course, where the welding of the coils was incomplete, and still others where the fracture has followed the line of welding, the vessel breaking into spiral fragments with bevelled edges.

A comparison of the pottery from the shell heaps of the St. John's with that from other parts of Florida, shows the important fact that they have but little similarity. No cord marked pottery has been found anywhere in the fresh-water mounds, though common at St. John's Bluff, at Fernandina, St. Augustine, and other coast mounds. Plate VI, fig. 4, represents a piece of an earthen vessel found by the writer at St. John's Bluff, which has

⁶⁴ In reference to Le Moyne's figures, it may be stated that they are not altogether trustworthy. They are said to have been drawn in England from memory. The circumstances of his escape, after the tragedy at Fort Carolina, would naturally preclude the possibility of his carrying his drawings with him if he had any. All the baskets which he represents as used by the Indians are obviously drawn from European models, especially the larger ones in which they carry their heavier burdens. These closely resemble the baskets seen in the streets of Paris on the backs of chiffonniers and others, or in the vineyards, where they are used for collecting grapes. There are others which have the form of common hand baskets. The views of the mouths of the rivers are obviously purely imaginary. The same may be said of the method of killing alligators. At all events, that an alligator near the water should voluntarily open his mouth and allow the trunk of a tree borne by six men to be thrust down his throat, as represented in Pl. 26, will not readily be believed by those familiar with the habits of this animal at the present time.

much more complicated figures stamped upon it than anything from the mounds which we are describing. We seek in vain among the objects from these for anything comparable with the ornaments described and figured by Schoolcraft as coming from Florida, or with the still more complex ornaments which we found in the burial places at Cedar Keys. This is sufficient to show that the art of pottery on the river was in a very rude state when compared with that of other places, and those not far distant. This, with other facts to which we have called attention, leads to the conclusion that they are the work of two different peoples, with one of which the art of pottery had advanced to the production of comely forms and handsome ornaments, and with the other had not passed out of its ruder stage. It is hardly possible that those producing such widely different results in art should have been one and the same. They have, however, a similarity in this respect, that the pottery of the coast mounds is often stamped in squares like that from the St. John's.

Except in a few instances all the pottery is made of pure clay. We do not find an admixture either of sand, or, notwithstanding the abundance of material for the purpose, of pounded shells, so commonly used in other parts of the United States. Very fine sand was present in a few pieces, but we suppose this to have been a natural mixture, as we have seen the same thing in the clay beds occasionally exposed on the banks of the river.

LOCALITY.	MATERIALS.			SURFACE.				
	Clay.	Clay and Sand.	Clay and Veg. fibre	Plain.	Traced.	Plain Stamped.	Complex Stamped.	Marked with Cord.
Lake Harney,	103	0	0	8	2	90	0	0
Burial Mound, do.,	38	0	2	32	1	7	0	0
Watson's Landing,	62	0	15	67	0	10	0	0
Black Hammock,	210	0	0	142	0	68	0	0
Old Enterprise,	23	2	92	64	50	3	0	0
Old Town,	126	0	13	60	1	78	0	0
St. John's Bluff,	27	28	0	14	1	16	18	12
Total number of pieces,	592	30	122	387	55	272	18	12

In several localities, as will be seen by the table, the natives added to the clay vegetable fibre derived from the palmetto tree. This appears to have been charred in the burning, thus making the vessel quite porous, each fibre leaving in its place, or around it as it shrunk from heat, a small canal. In finishing the vessel, however, after it had been formed of fibre and clay, the surfaces within and without were covered with a thin layer or "skimming" of clay alone, thus counteracting in a measure the porousness resulting from the burning of the fibre. The only places at which this use of vegetable

fibre was noticed were Old Town, Old Enterprise, Watson's Landing, as given in the table, and at Silver Spring on Lake George, and Palatka. This may, perhaps, be explained by the fact that the different communities had their own makers, each adopting a more or less peculiar style.

For the purpose of comparison we have included in the table an enumeration of the pottery obtained from St. John's Bluff, where the shell heap is made up of marine species, and from the Burial Mound at Lake Harney.

Implements made of Shell.

If we exclude the stone implements, which are mostly confined to the surface and are of comparatively modern date, those made of shell are, by far, the ones most commonly found. These are all made from marine species, and almost exclusively of *Strombus gigas* and of two species of *Busycon*, viz., *B. carica* and *B. perversa*, all found abundantly on the Atlantic and Gulf coasts, and commonly known as "conchs." The traffic in these shells must have been very large, especially in *B. perversa*, since the objects made from them found their way not only through the interior of Florida, but up the Mississippi and its tributaries, and also to the Great Lakes.⁶⁵ From the identity of the make and pattern of the drinking vessels found in the tumuli of the interior states, as in East Tennessee, with those in use in Florida, it is probable that these were all made here, or on the shores of the Gulf of Mexico.

The different articles made of shell, found in and about the mounds on the St. John's, may be described as chisels, gouges, drinking shells, and shells of an unknown use, having the beak ground off and a hole drilled in the base. (Plate VIII, fig. 2, one-half natural size.)

The most common implements made of shell are the two kinds of chisel-shaped tools cut from the two species of *Busycon*. The first are generally nearly triangular, varying somewhat in size, but commonly about one hundred millimetres long and fifty wide at the base, gradually tapering to a rounded point above, and seldom exceeding eight millimetres in thickness. The sides are smooth and, though sometimes cut square, are generally rounded, and the base is ground, on the concave side only, to a bevelled edge, which is quite sharp. (Plate VII, figs. 1 and 2, natural size, and fig. 3, one-half natural size.) The second kind, cut from *Strombus gigas*, are much more massive, the larger ones measuring one hundred and thirty millimetres in length, from sixty to seventy in breadth, and having a thickness of twenty-five millimetres. (Plate VIII, fig. 1.) They are usually cut from the part adjoining the lip of the shell and parallel to it. The cutting portion has in all a bevel on each side, the two bevels forming with each other a rather blunt angle. We have a single miniature specimen of this second

⁶⁵ If the number found in a few mounds in East Tennessee may be considered as an index, the manufacture of these vessels, as well as of the large beads made of the columella of *Busycon* and *Fasciolaria*, and smaller ones from other sources, must have been on an immense scale.

kind from the shell field at Hawkinsville, which is only seventy millimetres long by twenty-five wide. (Plate VII, fig. 4.)

Those cut from the *Busycon carica*, when held with the bevelled edge upwards, are remarkably well adapted to the hand, the upper surface fitting the thumb accurately and the under having a groove into which the bent forefinger is received as it supports the tool.⁶⁶

Another tool made of the rostrum of a *Busycon*, with the two ends obliquely ground, is represented on Plate VII, fig. 5. Another form of tool made from the spire of *Busycon perversa*, ground at the end to form a cutting edge, is shown on Plate VI, fig. 5.

The use of these implements must be in a great measure a matter of conjecture. It is quite clear as regards those first described that the material of which they are made, and the lightness of the tools, make them unsuitable for any work which requires the use of much force, but they could be used for fleshing skins and for some purposes as gouges. The longer and stouter kind is suited for the same purpose as the stone chisel, though much less effective, and might be used for fraying wood. Neither of the kinds showed marks of wear from use, though some of the larger ones had their edges broken. Le Moyne states that at the time of his voyage to the St. John's, shells were used as tools for cutting wood in the manufacture of the spades and hoes with which they tilled the ground. Cabeza de Vaca makes a similar statement with regard to the Indians near the Gulf of Mexico.⁶⁷

Drinking Shells.

These are made from the *Busycon perversa*, from which the interior whorls are removed, the mouth enlarged, and the broken edges ground smooth. The beak answers, or might answer, the purpose of either a handle or a spout. Le Moyne describes and figures shell cups as if they were in common use, at the time of the arrival of the French, in councils, feasts and burials. The famous "black drink" was taken from them, as shown in his plate XXIX, and in plate XIX they are shown deposited on the graves of the recent dead. Le Moyne's figures being drawn from memory are, as might be expected, exceedingly inaccurate, that representing the cup resembling somewhat a Nautilus, an animal not found on the coast, and wholly unlike the *Busycon*.

We have found none of these vessels buried in the mounds except at a very slight depth. A large specimen, which had been ploughed or dug up, was found lying upon the surface at Blue Spring, and a second was obtained

⁶⁶Analogous instruments made of shell have been found in great abundance in Barbadoes, two of which, the gift of Rev. Greville J. Chester, and others presented by Mr. L. Agassiz, who obtained them at the same island during the voyage of the *Hassler*, are in the Peabody Museum of American Archaeology and Ethnology at Cambridge. As they have not been found in the other W. I. islands they are supposed to be of local origin. See *Flint Chips*, by Edward T. Stevens, p. 235, and Wilson's "Prehistoric Man," Vol. I, pp. 208 and 209, fig. 6. Their forms are somewhat different. They are made of a thicker shell, are more pointed at the top, and their edges much rounded.

⁶⁷The Narrative of Cabeza de Vaca, translated by Buckingham Smith, pp. 49 and 54.

from the creek leading from it. Fragments of the shell of which they are made are not uncommon, even in the oldest parts of the mounds, but show no sign of having been wrought or in any way utilized.⁶⁸ These vessels must, therefore, be considered of later origin, and perhaps belonging to the Indians found at the time Florida was first visited.

Perforated Shells.

We give this name to wrought specimens of *Busycon carica*, the use of which is not apparent. These shells are smaller, but very much thicker and heavier, proportionally, than the other species of which we have just been speaking. They are converted into an instrument by grinding off the beak obliquely, and by drilling a hole through the base of the shell in the last turn, and not far from the aperture or mouth (Plate VIII, fig. 2, half natural size). The hole is generally of an oval form, rather roughly made, but with the edges generally rounded and smoothed. At first sight it looks as if it might have been intended for a wind instrument, but the perforation is so near the mouth, that all the advantage which might be gained by the reverberation of the air through the windings of the shell would be lost. In many of them there is on the edge of the mouth near the base a half oval or half circular notch. These instruments are frequently found, but most commonly in the more recent layers of the mound, and the larger number of those we have were picked up near the surface. We suppose them, therefore, to have been in more common use in later than in earlier times. In a few instances the edge of the perforation is left rough, and might be supposed to have been made for the purpose of passing in an instrument for detaching the animal from the columella of the shell, but the ground or smoothed edges of the others indicates a different explanation.

Under this heading we also refer to the valve of a *Unio* with a round hole drilled through it, found at Wekiva as mentioned on p. 22. (Plate VIII, fig. 5.)

Ornaments.

Le Moyne's figures lead us to suppose that in his time ornaments were very profusely used. To take a single example in plate XIV, representing Ontina's men going into battle; of the three foremost figures, one has an ear ring, the second a dumb-bell-shaped ear ornament, and the third a bird's claw passed through the lobe of the ear. They have strings of beads over the shoulders and on the arms and legs. Oval disks, like small shields, hang upon the breast of one of them, and two have smaller, but somewhat similar, ornaments hanging in large numbers by strings from a belt around the waist, and one has them on the arms and legs. In other

⁶⁸While examining a large coast shell field, in company with the late Buckingham Smith, near St. Augustine, we found one of these vessels lying on the surface. On the Gulf Coast, the vessels are abundant in the burial mounds, from which there are specimens in the Peabody Museum at Cambridge.

plates similar ornaments are more or less frequently figured. It would seem that some, at least, of the above mentioned objects would have been preserved if they were made of shell, bone, or any other material not easily perishable, and were in use among the builders of the mounds in as great numbers as represented by Le Moyne.

It is, however, deserving of especial notice that as far as the mounds are concerned ornaments are almost everywhere absent. Only two pieces which could be fairly considered as such have been found. One was obtained at Horse Landing, midway between the top and the base, and is made of a hollow bone, apparently one of the phalanges of a mammal, the outer surface of which has been ground off, and the ends perforated for the passage of a cord. (Plate IV, fig. 5.) A second is from the mound just below Bartram's, and consists of a segment of a broken ring, made of shell, which when entire was about two inches in diameter. A third is represented on Plate VIII, fig. 4, also made from shell, but this was taken from a small burial mound at Black Hammock, and was associated with glass beads and an iron fish spear, and therefore may be supposed to be of recent date. A similar article of shell, but this had not been ground down and perforated, however, was found in the Mound at Watson's Landing, and is represented on Plate VIII, fig. 3. A disk of shell 18^{mm} in diameter and 5^{mm} thick, with a hole drilled through the centre was found on the St. John's. (Plate VII, fig. 6.)

Absence of Pipes and of Metals.

No traces of pipes have been found anywhere. Had they been used by the builders, it is hardly possible, in the many excavations which have been made, and the large facilities for examination offered by the undermining action of the river, that some evidence of them should not have been detected. Elsewhere pipes are certainly not uncommon in the ancient dwelling places.⁶⁹ They were certainly in use at the time of the arrival of the French, and Le Moyne in the "Brevis Narratio," while showing on plate xx the manner of treating the sick, introduces in the background a man smoking a pipe, and states in the explanation of the plate that the smoke is discharged through the mouth and nostrils, by which process the "humours are drawn out."

Hawkins⁷⁰ also describes the use of the pipe by the natives at the time he visited the St. John's River in 1665.

"The Floridians when they travell have a kinde of herbe dried, which with a cane and an earthen cup in the end, with fire and dried herbs put together, do suck from the cane the smoke thereof, which smoke satisfieth their hunger, and therewith they live four or five days without meat or drinke, and these all the Frenchmen used for this purpose: yet do hold

⁶⁹ See Jones' *Antiquities of the Southern Indians*, p. 200.

⁷⁰ Hawkins, "*Hakluyt's Voyages*," folio edit., p. 541.

opinion withall that it causeth water and fleame to void from their stomachs."

This absence of the pipe, in connection with the absence of pottery and ornaments, are facts in favor of the suggestion already made, that the builders of the shell mounds might be a different people from those found by the French in Florida.⁷¹

Implements made of copper, gold, silver or other metals have not been discovered.

VI. HUMAN REMAINS IN THE SHELL HEAPS OF THE ST. JOHN'S RIVER, EAST FLORIDA. CANNIBALISM.

After repeated examinations of the more important shell heaps on the St. John's, we have failed to find any evidence that they were used for the burial of the dead, or for any other purpose than dwelling places.⁷² Human bones have, however, been discovered in them, from time to time, under peculiar circumstances, and as their presence opens questions of much interest, it will be desirable to describe in detail each of the instances in which they have been detected, especially where the bones have been found in considerable numbers.

1. The first which came under the notice of the writer was at *Old Enterprise*, on Lake Monroe, in 1861, a few rods above the high bluff and near the shore of the lake. The deposit of shells where the bones were found is about four feet thick, and has been much washed away by the waves during the great storms. While making an excavation near the roots of a large palmetto tree, which had been partially uncovered by the action of the water, human bones were found about two feet below the surface. A foot above them, where a fire had been made, were ashes and large pieces of oak charcoal. The bones were not burned, however, and did not appear to have been connected with the fire in any way. They were broken into pieces a few inches long, just as was the case with the bones of the deer from the same deposit, or from the adjoining bluff, and like them had lost their organic matter, were incrustated with lime, and had become cemented together, so as in all respects to have the appearance of the same age as the bones of the animals associated with them.

The fragments consisted of the head of a femur broken off just below the lesser trochanter, two fragments of the shaft of this bone, one fragment each of the shaft of the tibia, fibula and humerus, a part of a scapula, including the glenoid portion, two metatarsal bones, and one phalanx of a

⁷¹ Prof. C. A. White has examined the fresh-water shell heaps of the Mississippi Valley, and in a communication to the American Association for the Advancement of Science, has noticed the absence of pipes in those deposits.

⁷² Possibly this may not be true of Ropes Island at the head of Lake George, where human bones were dug up in planting an orange grove. But there was nothing to show whether they were of an ancient or recent burial, nor is it quite certain that they came from the mound.

thumb. It is quite probable that there were originally a larger number of pieces, and that many had been carried away by the action of the water in its encroachments on the shore.

2. Two important and more complete discoveries were made in the neighborhood of *Blue Spring*, though the localities were somewhat over two miles apart.

One of these was on the left bank of the creek through which the spring discharges, and about thirty feet from its union with the river. The bones were found about two feet below the surface, imbedded in the shells, and represented a large part of the bones of the skeleton. They were nearly all more or less broken, and were scattered about without any definite order. Many fragments of the skull, however, were found near together. Besides the pieces of the cranium, there were fragments of the following bones: viz., the lower jaw, right and left clavicle, right humerus, right and left scapula, ulna of both sides, right radius, right and left femur, right tibia, the two patellæ, upper end of the sternum, one fragment of pelvis, many fragments of ribs and a few bones of hands and feet. The humerus, radius and tibia of the left side were not found.

3. The other collection is from a low oval mound, in the swamp or meadow, two miles in a northerly direction from *Blue Spring*. Here, again, portions of many parts of the skeleton were present. Notwithstanding careful search beyond the limits where the bones were discovered, not a single piece of the head was found. Of eleven vertebræ found, all except one (the fifth lumbar), had their arches detached, as if for removing the spinal cord. The right innominate bone was broken into four pieces; of the left only one large piece, including the acetabulum, and a few small pieces remained. The right femur was broken into three and the left into five pieces; the left radius and left ulna each into three pieces, the left humerus into two, but the head of it was missing. All the bones of the right arm and right leg below the knee were missing. There were many fragments of ribs. The different pieces were scattered about over a surface of four or five square yards and promiscuously mingled. The bones had not been previously disturbed. They have lost all their organic matter, and when struck against each other have a decided ring.

Near these remains were found some fragments of a large earthen vessel, apparently capable of holding several gallons, and varying from a half to three-quarters of an inch in thickness.

4. A small collection of human bones was found in a shell field a few hundred feet south of the mouth of the creek at *Blue Spring*, and near the river. They consist of fragments of the humerus, tibia, lower jaw, scapula and ulna, broken in the same manner as those just described, and also bones of the hands and feet. As the field in which they were discovered had been ploughed, it is uncertain to what extent the breaking of them may have been accidental. The appearances were the same as in the bones already described. There were no signs of a burial place.

5. Many fragments of an imperfect human skeleton were found in the mound on *Huntoon Island*, and near Huntoon creek. They were covered with shells to the depth of eighteen inches, and though the place was completely explored, only the following were discovered, viz.: fragments of a skull, an imperfect lower jaw, pieces of the right and left thigh bones, a piece of an upper arm bone, some fragments of the fore-arm and leg, and a few joints of fingers and toes. The bones were all of a diminutive size, evidently those of a dwarf. Basing an estimate on the proportions of the thigh bones to the whole skeleton, the individual is supposed to have been about three feet and a half high. The angles and articular process of the lower jaw were broken off and the molar teeth had nearly all disappeared during life, and their alveoli had been absorbed. These facts indicate an individual which was, at the least, adult. Forty feet from the place where these bones were found, a large tree had been overturned, and among the shells carried up by the roots, was found a human ankle bone (an astragalus), but a careful search brought to light nothing else, in this direction, belonging to man.

6. A single fragment of a human upper jaw of the right side, was found in the large shell heap on the same island and near the river buried to the depth of six or seven feet, and could have been deposited there only at the time the mound was built. An upper arm bone, whole, parts of the lower jaw, and a few fragments of other bones, were discovered in the débris at the base of the same mound where it had been undermined, but the precise place from where they had fallen is uncertain.

7. In the remnant of a mound, three-quarters of a mile below *Hawkinsville* and on the left bank, human bones were found, about a foot deep, in a layer of shells not more than two feet thick. They appeared to be of the same age as the shells in which they were imbedded, and were all broken, and much scattered, a proof that they had not been buried. A second deposit was found twenty-five feet from the preceding, the bones were somewhat incrustated with lime, and were more decomposed. There were from the first locality seven fragments of cranium, two of the left humerus, two of the left clavicle, one of the right ulna, one fragment each of the right and left tibia and several small pieces of other bones. The shore where both these sets were found had been undermined, and it is probable that many pieces had been washed away.

8. Excavations made on the side of *Bartram's Mound* near the river, and where it had been undermined, brought to light numerous pieces of human bones all belonging to one skeleton. There were eighteen fragments of cranium, the right half of the lower jaw, the teeth of which had nearly all been lost and their alveoli absorbed, and thirty fragments of other bones including those of a femur, humerus, radius, tibia, fibula, and a patella. All of these appeared to have been covered for a long time, had lost nearly all of their organic matter and were encrusted with a thin layer of calcareous deposit. It is quite likely that here too some of the bones originally

deposited had been washed away by the river, as the mound at this point had been largely destroyed. In several instances the cranial bones were broken into small fragments and were irregularly cemented together by the deposit of lime.

9. A large block of consolidated shells split from the front of *Osceola Mound* left exposed a portion of a human skull. In detaching this other bones were brought to view and excavations were continued until no further traces could be discovered. The chief part of the bones were removed in a mass of conglomerate, and subsequently exposed by chiselling away the matrix, but from which they have not been wholly detached. The organic matter has entirely disappeared and the matrix adheres so firmly to the bones that it is very difficult to separate it without at the same time breaking off pieces of bony structure.

Of all the human remains we have met with in the shell mounds these last are the most interesting, both on account of their greater age and of their being almost the only ones which can, with any certainty, be referred to the earliest period of the mounds. *Osceola mound* is one of the series destitute of pottery, and the materials of which, as also the mound as a whole, have undergone great changes.

There are certainly bones from two individuals, mingled. Two thigh bones, which are mates, lie side by side, but in reversed positions, the upper part of one corresponding with the lower of the other. The articular portions are gone. Parts of at least two others were found, one of which was removed nearly whole. Of the other there are two cylindrical portions, one 55^{mm} and the other 90^{mm} long. The exposed ends of the shorter one show the interesting fact that the bone had been artificially divided, by cutting a groove around the circumference of the bone and thus weakening it and then breaking the remainder. This is a common method of dividing bones used by Indians. The broken surface, and the marks of the cutting instrument, are quite obvious. In the longer piece these marks are present but less distinct. As further evidence of the presence of bones from two individuals we have the lower ends of two upper arm bones, both from the right side and of different sizes, and both cemented together. There are three tibiae, two of which are decidedly flattened and belonged to the same individual, the third having more nearly the triangular section, but only slightly flattened.

Besides the above there are fragments of a scapula, pelvis, humerus, radius, tibia, ribs, tarsal and carpal bones and phalanges. There are but few pieces of ribs, and but a single vertebra has been recognized.

The different bones were artificially broken in a few cases only, and contrasted very strongly, in this respect, with those previously noticed.

We have met with but a single other instance where human bones have shown signs of having been wrought by the aborigines. This was in the coast shell heap at Ipswich, Massachusetts, where Mr. Eliot Cabot discovered a human upper arm bone, which, as shown by the lines and marks on

the surface had been ground or scraped. The nature of this instrument found is uncertain, as the end has been broken off. It is preserved in the Peabody Museum.

10. At *Huntoon Island*, and in the rear of the shell mound on the St. John's, are two conical mounds, and are supposed to be burial mounds, one fifteen and the other twenty-five feet high. Excavations carried to the depth of six feet, but arrested at this depth on account of our inability to get the necessary labor, did not, however, reveal any evidence of burial in either of them. A collection of human bones was obtained from the top of the larger of them at the depth of about a foot below the surface, which in all respects correspond with those previously described. They were scattered over an area of several square yards and belonged to a young individual, as shown by the size of the bones and the condition of the epiphyses. Each of the long bones was broken into two or more, and the skull into many fragments. Pieces were found from all the principal divisions of the skeleton. There can be no doubt that the bones were intentionally broken, as the upper ends of two humeri show precisely similar marks of violence. In each case the bone is broken off an inch below the head, by an instrument which crushed the bone, the fragments of which, flattened down, are retained in apposition, not having been originally completely separated. The bones are all incrustated with a calcareous deposit, which in some cases cements the fragments, and in others the smaller bones, as of the hands, together. Their condition is similar to that of the bones from Bartram's Mound already described.

The above are the chief instances of the presence of human remains in the shell mounds which have fallen under our notice. They are not supposed to be the only ones which existed, for all but one were chance discoveries. In all but a single instance there was nothing to direct attention to one place rather than another in making excavations, and as these were begun at random it is all but certain that many others escaped detection.

They have a two-fold interest, viz. : as bearing upon the subject of cannibalism, and in connection with certain anatomical peculiarities.

A few words may be added to the description of the bones found at *Osceola Mound*, the ninth locality noticed above, and of those from the sandstone on Rock Island. They would not require especial attention were it not that we have but little knowledge of the anatomical characteristics of the earliest inhabitants. The skull is the only one which can be referred, without doubt, to the earliest period of the shell heaps, though there is no certainty that it may not be exceptional, and therefore not characteristic of the race. The length is 188^{mm}, and the breadth 132^{mm}, the latter being 0.70 of the former. It is somewhat distorted, the left temporal region being crushed in, as if by the blow of a heavy instrument, and the occiput fractured and somewhat protruded. The head is, therefore, longer than it was originally. The cavity of the skull is filled with consolidated shells, and among these are the frag-

ments of the side of the cranium, which had been driven in. The orbits are quadrangular with a transverse diameter of 36^{mm} and a vertical of 31^{mm}.

This skull, though of a different type from those of the burial mounds, has no remarkable features. It differs from the others in the following particulars: it is longer, the frontal sinuses, superciliary ridges, and the outer angular processes are strongly pronounced. In the skulls from the burial mounds these are feeble, and the cranium instead of being low, as in the *Osceola Mound* skull, is high and in addition it has a well rounded forehead and a more vertical occiput.

Of the three tibiæ from the same mound as the skull, two, as already stated, belonged to the same individual, and were decidedly flattened. The third was somewhat so, but still preserved its triangular section. The fore and aft diameter being taken as 1.00, that from side to side in the two different individuals was 0.59 and 0.64 respectively. The tibia from the sandstone on Rock Island, Lake Munroe, was only slightly flattened, the diameter from side to side being 0.70 of the fore and aft. The flattening in either of the above cases is not extreme, but taken in connection with a similar but greater deviation from the ordinary form observed in the bones of the American Indian from other localities, and in those of the prehistoric races of the old world, it has interest since it is a peculiarity of savage people.

Flattened Tibiæ.

The first instances of this peculiarity which came to our notice among the American aborigines were obtained during the excursions to the St. John's in 1860, when they were found in the burial mounds at Black Hammock, King Philip's Town and Spear's Landing, and subsequently others were obtained at Cedar Keys on the Gulf coast. We have also found flattening existing in bones obtained from mounds in Kentucky, in those from Labrador, from Michigan, from California, from the Aleutian Islands, and quite recently we have received a flattened tibia from the banks of the Merrimack in Massachusetts. The largest amount of flattening we have seen was in a bone found by Mr. Gillman in a mound on River Rouge, Michigan, the transverse being only 0.48 of the fore and aft diameter, showing a much greater variation from the usual shape than in that from Cro-Magnon.⁷³ Mr. Gillman's later observations on mounds on the St. Clair River and in other places in Michigan, show that flattening was very general in that region, and in some instances greater than that just mentioned, and on the whole more

⁷³ The measurements of this same tibia, given by Pruner Bey (see *Reliquiæ Aquitanicæ*, by Lartet and Christy, p. 83,) differ very materially from those of Broca. According to the former, the transverse diameter is 18^{mm}, and the antero-posterior 47^{mm}. The transverse would therefore be but little more than 0.38 of the antero-posterior. Broca says (*Reliquiæ Aquitanicæ*, pp. 103 and 104), "we find the antero-posterior diameter to be 54^{mm} at the upper part of the fragment, 45^{mm} at the middle, and 31^{mm} below; the three corresponding transverse diameters are respectively 37, 27, 27^{mm}." These measurements would make the transverse diameter in the first case a little more than 0.68, in the second about 0.60, and in the third 0.88 of the fore and aft diameters. If Broca's measurements are correct, it is impossible that any part of the bone would have given those of Pruner Bey.

complete than elsewhere.⁷⁴ A tibia from the River Rouge Mound, and now in the Peabody Museum, is figured on Plate IV, fig 7, of one-quarter size. The extreme length of this tibia is 15·6 inches. A section of the same is given on Plate IX, fig 23.

In some cases there is, in addition to the flattening, a rounding of the angles of the bone, so that the transverse section becomes more or less oval, as will be seen by reference to the figures in Plate IX, but this is not frequent. It will be observed, however, that both the peculiarities exist in very different degrees, as the several sections given on the plate show. As far as our own observations go, the flattening of the tibia cannot be considered as forming a race character among the Indians. After examining large collections of tibiae we do not find that marked flattening exists in more than about thirty per cent. of the cases examined. On Plate IX we give sections of eight tibiae taken from recent skeletons of the white race, figs. 1-8, and fifteen taken from ancient bones of North American Indians, including the Moundbuilders. Of these fig. 9 is from an Indian grave in Haverhill, Mass.; fig. 10 is from a mound in East Tennessee; fig. 11 is from a mound in Kentucky; figs. 12 and 13 are from a mound at Cedar Keys, East Florida; fig. 13*a* is a section cut three and one-half inches lower down, but from the same tibia as fig. 13; fig. 14 is from a mound on the St. John's River, Fla.; figs. 15-22 are from tibiae found in various places in Florida; and fig. 23 is from the River Rouge Mound in Michigan.

Attention has been called by different observers to these two deviations from the normal form, on account of the existence of somewhat similar peculiarities in the apes. The transverse section of the tibia in the Chimpanzee, Gorilla and Orang, shows that it is flatter from side to side than is usual in man, and that its angles are more rounded, and consequently that its section approaches an oval form. The flattening, however, in the instances we have examined, does not reduce the transverse to less than 0·57 of the fore and aft diameter, while in the tibia from River Rouge Mound, already referred to, it is only 0·48. On the other hand, among the white race the flattening is occasionally as great as in the Gorilla, or the Chimpanzee. It is not the flattening of the human tibia so much as the rounding of its angles and the bending of the shaft forwards which gives it its ape-like features, consequently the sharp edged, or "sabre-shaped" tibia from Cro-Magnon, and the tibia from the River Rouge Mound, which are characterized simply by flattening, are not, strictly speaking, ape-like.

The markings on the surface which are peculiar to, and characteristic of, the human tibia, viz., where the interosseous ligament and the popliteal muscles are attached, however great the flattening or the rounding may be, remain unchanged. Other characteristics of the human tibia are equally persistent, and we have not seen a single instance in which an anatomist

⁷⁴ See Fourth and Sixth Annual Reports of the Peabody Museum of American Archaeology and Ethnology; 1871, p. 21; 1873, p. 13. [Mr. Gillman has since published extended accounts of the tibiae found in the Michigan mounds. See the Report of the Smithsonian Institution for 1873, and the American Naturalist for 1875. Ed.]

would not recognize the bone as human at sight. In fact, the tibia is as strictly human as is the most distorted cranium of a Peruvian or a flat-head Indian. It does not approach a lower form as that of an ape, but has a deformity such as might grow out of lateral pressure.

The sections given in the plate, with the exception of fig. 13a, were all made on the same level, just below the opening for the nutrient artery which is indicated by a small circle, and show how great is the variation in the form of the tibia. In fact, it may be considered the most inconstant in its shape of any of the bones of the body. This irregularity is manifested in the constant changing of the proportion of the sides and angles, or even in the disappearance of the angles altogether. In some cases its section is oval, in others three sided, and in still others four sided. The variations in the transverse sections, even in the white race, is considerable, so that an examination of many specimens is necessary to enable us to determine the form which is characteristic. The discovery of a single bone from a race not previously examined would, therefore, have but little significance.

The proportion of the transverse to the fore and aft diameter in whites as compared with Indians, comprising Moundbuilders, is as follows. The fore and aft diameter being taken as 1.00, the transverse in twelve whites was 0.70, in twelve from the mounds of Florida 0.64, in seven from mounds in Kentucky 0.63, in two from Osceola Mound 0.59, three from the mound on the St. Clair River 0.60, five from the mound on River Rouge 0.53, in an Aleutian Islander 0.56, in an Eskimo 0.60, in a Californian 0.53, in a tibia from the Merrimack River 0.60, in a Peruvian 0.50, in a Gorilla (male) 0.57, Gorilla (female) 0.71, Chimpanzee 0.65.

We know of nothing, however, in the habits of the Indians which would explain this flattening. The habit of squatting, so common with them, has been suggested, but the fact of the flattening being limited to less than half of the whole number, would seem to contraindicate this explanation. There are no reasons for supposing that the flattening is artificial.

Cannibalism.

It would perhaps be going too far to say that the presence of human bones under the circumstances previously described, amounted to absolute proof of cannibalism. The testimony of eye witnesses would be the only sure evidence of it. There is, however, nothing with regard to them which is inconsistent with this practice, nor does any other explanation occur to us which so well accounts for their presence.⁷⁵

⁷⁵A statement of Le Moyne would at first sight seem to suggest another explanation. The natives when first seen by the French had the habit of dismembering the bodies of their slain enemies and carrying off the scalps and limbs as trophies. His plate xvi represents a celebration in which these are hung up on stakes and around which a ceremony is going on. While such a custom might account for the presence of human bones in the shell heaps, it would not for the fragmentary condition in which these are found, nor for the systematic manner in which all the bones of the limbs as well as of the other parts of the skeleton, are broken up. In addition it may be stated that for reasons we have given elsewhere there is some doubt whether the Indians who built the shell mounds were the same as those found when the Europeans arrived in Florida, and consequently a practice prevailing among the latter might not exist among the former.

If there were any eye-witnesses of cannibalism among the Europeans who explored Florida in the earliest days of its history, they have left no records of the fact. In later times Jonathan Dickenson, a Pennsylvania quaker, who was wrecked on the coast near St. Lucia in 1699, in the narrative of his sufferings, calls the inhabitants cannibals, but nowhere saw human flesh eaten by them. The most direct statement he makes is as follows: "at this town, about a twelve month before, a parcel of Dutch men were killed, who having been cast away on the Bohemia [Bahama] Shoals, they, in a flatt which they built, escaped hither and were devoured by these cannibals, as we understand by the Spaniards."⁷⁶ I am indebted to Dr. C. F. Winslow for a statement in the records of Nantucket that Capt. Christopher Hussey "was cast away on the Florida coast and devoured by cannibals." This event was also in the latter part of the seventeenth century.⁷⁷

The reasons derived from our own observations for believing that the ancient inhabitants of the St. John's were cannibals may be stated as follows:

1. The bones, an account of which we have given, were not deposited in the shell heap at an ordinary burial of a dead body. In this case after the decay of the flesh there would have remained a certain order in the position of the parts of the skeleton, especially in the pelvis, the long bones of the limbs, the vertebral column and the head. The bones would be entire as in other burials. In the cases here described, they were, on the contrary, scattered in a disorderly manner, broken into many fragments, and often some important portions were missing, as the head at one of the mounds near Blue Spring, the bones of an arm and leg at the other, and in other mounds a still larger number of bones. The fractures as well as the disorder in which the bones were found evidently existed at the time they were covered up, as is shown by the condition of the broken ends, which had the same discoloration as the natural surfaces.

2. The bones were broken as in the case of those of edible animals, as the deer, alligator, etc. This would be necessary to reduce the parts to a size corresponding with the vessels in which they were cooked, or suitable for roasting, or even for eating raw.

3. The breaking up of the bones had a certain amount of method; the heads of the humerus and femur were detached as if to avoid the trouble, or from ignorance as to the way, of disarticulating the joints. The shafts of these bones, as also those of the fore arm and leg, were regularly broken through the middle. The olecranon process of the ulna was in some cases detached in the same manner as the corresponding part in the deer.

4. There is no evidence that the bones were broken up while lying exposed upon the ground by wild animals, as the wolves and bears. If they were thus broken one might reasonably expect to find the marks of teeth, but after a careful examination of hundreds of pieces they have not been

⁷⁶ God's Protecting Providence, Man's Direct Help and Defence, etc., p. 60, 8vo. London, 1700.

⁷⁷ See doings of the Nantucket Historico-genealogical Society, in Nantucket Inquirer and Mirror. Nov. 22, 1873.

seen in a single instance. As a general rule dogs, and the same is true of wolves, gnaw chiefly the ends of the bones, which are of a soft and spongy texture, leaving the shaft, which is solid and unyielding, almost intact, or at any rate to the last. This is the case even with the bones of birds, which are so much smaller. In the bones from the mounds the spongy ends show no marks of teeth and are well preserved though detached from the shaft.

The reasons we have here given are strengthened by the fact that cannibalism prevailed largely in both North and South America, and that the natives of America were led to it by the same motives as were those of other parts of the world. In general this practice may be said to commend itself to the savage mind from the following considerations :—

With some it was a matter of choice, depending upon a liking for human flesh as an article of food, as with the Fijians, who had not even the excuse growing out of a scarcity, for food of all kinds existed with them in greatest abundance. With others, and these are by far the most numerous, it was practised as an act of vengeance or triumph over a fallen foe, and with still others it may be said to have been of the nature of a superstitious rite or ceremony, as with the ancient Mexicans, the Miamis, and others. To the above should be added the pressure of extreme hunger, which drives both savage and civilized man to this terrible alternative.

Of starvation nothing need be said, except that it is not improbable that the idea of eating human flesh as ordinary food, may perhaps, have had its origin in eating it as a necessity. Once tasted and found to be good, as all cannibals aver that it is, under the influence of savage instincts and passions, the conversion of an enemy's flesh into meat to eat, would be very natural.

Of course the above motives, excluding the last, may be more or less combined, and a savage by eating his enemy may get his revenge and satisfy his appetite at the same time. Or, as with the New Zealander, who loves human flesh as a choice food, and who also eats it under the superstitious belief that he thus not only incorporates the body of his enemy with his own, but absorbs also his enemy's soul, so that ever after the two are one. To the victors this had an especial significance, for believing in a future state and the presence of his enemy there, if he eats him in this life he makes sure of it that there will be no trouble with him hereafter, for he possesses him body and soul already.

In the cannibalism as practised in the two Americas, one recognizes the same motives and tendencies, and often combined with them, in addition, a degree of cruelty to their victims unsurpassed in other parts of the world.

The degraded and brutal inhabitants of Terra del Fuego, in their fearful struggle for existence, with the elements on the one hand, and savage foes and scarcity of food on the other, would seem to be almost naturally led to the practice of eating human flesh. Capt. Fitzroy has given a sad picture of these poor, wretched creatures, living on the very verge of regions just capable of sustaining life. They habitually eat their prisoners of war, and in severe winters, when snow and ice cut off their usual supply of food, the

old women are sacrificed without hesitation. Having choked and smothered them over a dense smoke, they eat them to the last scrap. The life of the dog, however, is spared under these circumstances, as he can render efficient aid in hunting, which the old women cannot.⁷⁸

Of the prevalence of cannibalism in Guiana, there is evidence from various sources. The histories printed by De Bry⁷⁹ are full of particulars of the manner in which the bodies of victims are prepared, cooked and eaten. Pizarro and his companions, in their first but fruitless attempts to reach Peru from Panama, came suddenly upon an Indian village, when the inhabitants instantly fled leaving human flesh cooking before the fire.⁸⁰ We have the authority of Humboldt for its existence on the Orinoco at the time he travelled there.⁸¹ Brett found what he was undoubtedly correct in considering the remains of a cannibal feast in an ancient shell-heap.⁸² The Mexicans practised cannibalism on a most extensive scale on certain occasions. A prisoner was delivered to the warrior who had taken him in battle, and by him, after being dressed, was served at an entertainment of his friends. "This," says Prescott, "was not the coarse repast of famished cannibals, but a banquet teeming with delicious beverages and delicate viands, prepared with art and attended by both sexes, who conducted themselves with all the decorum of civilized life."⁸³

There were other kinds of victims. As is well known, human sacrifices formed a very important part of the religion of the ancient Mexicans. Their war god was constantly honored with them, and the companions of Cortez saw large piles of the skulls of those who had been sacrificed. On such occasions, after the heart had been cut with an obsidian knife from the living victim, it was offered to the sun and then to the god; the body was thrown down the *teocalli* and afterwards divided and eaten. The native allies of the Spaniards in the siege of Mexico, ate the bodies of their dead enemy.⁸⁴ In the city of Mexico itself, as the siege was prolonged and food became scarce, the number of victims first sacrificed to propitiate the god of war in hope of relief, and then served out as food to the starving people, was very large. These sacrifices were often made in the sight of the Spaniards, who sometimes recognized the lighter skin of their countrymen as they wound their way up to the sacrificial stone to be in turn distributed as food among the besieged.⁸⁵

Of all the American cannibals, the Caribs undoubtedly had a stronger love for human flesh than any others, and not only ate their enemies taken in battle as a matter of revenge as well as gratification, but, like the Fijians, even fattened their prisoners for the cook-house that they might make better

⁷⁸ Voyage of Adventure and Beagle. Vol. ii, pp. 183 and 189.

⁷⁹ See De Bry's narratives — Brazil, Voyage of Joannes Stadius, Hesus, pp. 71, 81, 89, 126 and 127; also voyage of Joannes Lerus, Burgundus, p. 213.

⁸⁰ Prescott, History of the Conquest of Peru. London, Bentley, 1854. p. 96.

⁸¹ Personal Narrative. Bohn's edition. Vol. ii, pp. 354, 411-415.

⁸² Rev. J. G. Wood. Uncivilized Races in All Countries of the World. London, 1870. Vol. ii, p. 602.

⁸³ Prescott, History of the Conquest of Mexico. Philadelphia, 1874. Vol. i, p. 81.

⁸⁴ Ibid., Vol. iii, p. 132.

⁸⁵ Ibid., p. 153.

and more palatable food.⁸⁶ It was also practised among the Iroquois, Algonquins, Miamis and Kickapoos;⁸⁷ it existed in Louisiana,⁸⁸ Illinois, and on the northwest coast. The most precise narratives we have of this practice are, however, to be found among the 'relations' of the Jesuits, who were often eye-witnesses of the feasts of human flesh held by the Iroquois and Algonquin tribes.

One shudders with horror at the prolonged tortures which preceded death and the feast among these savage people. Every device cruelty could suggest was practised. Long before death, sometimes days, torture began. Burning brands were applied to the naked skin, nails were bitten from the fingers, and flesh from the limbs, gashes were cut in the arms and legs and hot brands thrust into them; the scalp was stripped from the head and live coals and hot ashes poured upon the bleeding surface. Women and children joined in these fiendish atrocities, and when at length the victim yielded up his life, his heart, if he were brave, was ripped from his body, cut in pieces, broiled, and given to the young men under the belief that it would increase their courage; they drank his blood, thinking it would make them more wary, and finally his body was divided limb from limb, roasted or thrown into the seething pot, and hands and feet, arms and legs, head and trunk, were all stewed into a horrid mess, and eaten amidst yells, songs and dances.⁸⁹

Much more might be added but enough has been said for our purpose, viz. : to show that cannibalism being so common in other parts of America, there would be no improbability of its existence in Florida. We have entered more into details than we otherwise should because the subject of American cannibalism has not received the attention it deserves. Mr. Francis Parkman is almost the only one who has taken the trouble to call attention to the documentary evidence which exists bearing upon it, and I am largely indebted to his writings and to himself personally for references to original statements.

⁸⁶ Peter Martyn. Decade i, L. I., folio 2, A.

⁸⁷ See notes of Hon. Lewis Cass to Ontwa the Son of the Forest, a poem by Henry Whiting. New York, 1822, p. 129.

⁸⁸ Father Hennepin. Description de la Louisiane, Paris, 1688. pp. 65, 68, 69.

⁸⁹ For a justification of this picture of savagery the reader is referred to La Potherie, Hist. de l'Amerique. Paris, 1722, p. 23. Relation of Barthelemy de Vimont. 1642, p. 46. Relation of Jean Brebeuf, July, 1636, p. 121. Relation of Francois Joseph Le Mercier. June, 1637, p. 118. Relation of Vimont. 1644, p. 41.

Notes on Cannibalism.

To supply a more complete and circumstantial conception of the practice of cannibalism in the two Americas, we give below extracts from various authorities, who were either eye-witnesses or cognizant of what they describe. Other citations might be added, but would be unnecessary for our purpose. The whole subject of cannibalism is one of great interest, and if treated in the broad manner of which we find illustrations in the writings of Humboldt, would add a very important chapter to the history of the habits of savage and even of civilized peoples. The Discourse of Vogt before the International Archæological Congress at Bologna in 1871, on Cannibalism and Human Sacrifices, contains many suggestions which deserve elaboration.

"In Vol. IV of the *Nation*," p. 300, convincing proof was adduced that the Tonkawas and Camanches of Texas were, even down to that date (1867), in the habit of eating each other, and if they ever have the chance nowadays they doubtless may still do so. The Tonkawas, it should be observed, thought broiled Camanche a great delicacy, and Col. James Bowie, the inventor of the bowie knife, who once partook of it on request, declared himself of the same opinion." (*Nation*, Vol. XIX, No. 471, July 9, 1874, p. 26).

Adair in describing the manner in which the Indians cut up and carry off the flesh of their slain enemies, says:—

"If a stranger saw them thus loaded with human flesh, without proper information, he might conclude them to be voracious cannibals, according to the shameful accounts of our Spanish historians." (*Hist. of American Indians*, p. 387.)

Laskiel admits that the Indians were cannibals, but only on rare occasions:—

"It may indeed have been a custom now and then with some, and some converted Indians have of their own accord confessed to our missionaries that they had done it, but it is not general. The Delawares and Iroquois never do it. Formerly they have been known in the height of their fury to tear an enemy's heart out of his body and devour it raw, but at present this is seldom or never practiced." (*Hist. of the Missions of the United Brethren among the N. American Indians*. London, 1794, p. 152.)

Cannibalism among the Fuegians.—"From the concurring testimony obtained from them at various times and by many different persons, it is proved that they eat human flesh upon particular occasions, viz.: when excited by revenge or extremely pressed by hunger. Almost always at war with the adjoining tribes, they seldom meet but a hostile encounter is the result; and then those who are vanquished and taken, if not already dead, are killed and eaten by the conquerors. The arms and breast are eaten by the women; the men eat the legs; and the trunk is thrown into the sea. During a severe winter, when a hard frost and deep snow prevent their obtaining food as usual, and famine is staring them in the face, extreme hunger impels them to lay violent hands on the oldest women of their party, hold her head over a thick smoke, made by burning green wood, and pinching her throat choke her. They then devour every particle of the flesh, not excepting the trunk, as in the former case. When asked why the dogs are not eaten? he said 'Dog catch iappo' (iappo means otter). York told me that they always eat enemies whom they killed in battle; and I have no doubt he told me the truth." (*Fitzroy. Narrative of the Surveying Voyages of the Adventure and Beagle*. Vol. II, p. 183).

"Mr. Low had a Fuegian boy on board the *Adesna*, who learned to speak English very tolerably, during eighteen months that he stayed on board as a pilot and interpreter. This boy, whose name among the sealers was Bob, was one of the Chonos tribe and had never been south of Magalhaens Strait before he embarked with Mr. Low. He said that in cases of extreme distress, caused by hunger, human flesh was eaten, and that when they had recourse to such food, the oldest women invariably suffered. The poor creatures escaped to the woods, if possible, at such a time, but were soon found and brought back by force. They were killed by suffocation, their heads being held over a thick smoke of a fire made of green wood, and their throats squeezed by the merciless hands of their own relations. This boy imitated the piercing cries of the miserable victims whom he had seen sacrificed. He also mentioned that the breasts, belly, hands, and feet were most liked. When first questioned on this subject, he showed no reluctance in answering any questions

about it; but after a time perceiving how much shocked his English companions were at the story, and how much disgust it excited among the crew of the vessel, he refused to talk of it again." (Ibid, p. 189.)

Cannibalism in Brazil.—Joannes Stadius was taken prisoner by the natives, with whom he remained nine months, and reports what he saw of the habits of the people, and among other things their cannibal customs.—In Chapter xv, p. 71, is represented the method of killing with a club, the cutting up and cooking of a victim, and essentially the same is repeated in Chapters xliii, xlix. In this plate an Indian is seen cutting open the trunk of a dead body on the back, with what appears to be a stone knife, a feat quite impossible without the aid of other instruments.

"When an enemy is brought home the women beat him with rods, paint him of an ashy color, cut off his eyebrows and dance around him in a circle (lest he should run away they tie him to a woman who takes charge of him. If she becomes pregnant from him, the child is reared until it becomes an adult, and when convenient they kill and eat him). When all is ready, the time for killing him is fixed, and those from the neighboring towns are invited to be present at the solemnity. All the guests being assembled the chief addresses them in these words: 'Come friends, and joyfully celebrate with us this feast, and eat the body of one of your enemies.' The prisoner is killed by a blow of a club on the back of the head, and delivered with so much force that the brain is scattered about. The limbs and head are cut off and divided among the guests; the trunk opened and the viscera removed and all are thrown into a large pot and cooked. The women eat the intestines; and the brain, tongue and the integuments of the head are given to the children." See plates on pp. 124, 125, 126, 127, 128, which illustrate the different stages of the preparation, cooking and eating the different parts of the victim.

Joannes Lerus Burgundus, also a traveller in Brazil, gives an account of somewhat similar experiences. On p. 179 is represented the method of preparing and cooking human flesh. The "roasting pieces" are laid out on a wooden frame, called *bou can*, over a fire. In Chapter xiv, p. 211, is given a full account of the customs which precede, and the method of killing the victim, and the division, roasting and distribution of his different parts.

The plates illustrating the narratives above referred to are of no value except in a very general way, since the same figures are used to show what two different persons saw and experienced in two different voyages. The publisher, with an eye to economy, making the same plates do double service. Le Moynes' plates illustrating the experiences of the French in Florida, have at least the merit of being drawn from memory, but in the above case the artist never saw what he delineated.

Cannibalism on the Orinoco.—Javita, an Indian captain, attended Humboldt in his herborizations, and gave him much information, which Humboldt says was the more useful as the missionaries "have great confidence in his veracity." "He assured us that in his youth he had seen almost all the Indian tribes that inhabit the vast regions between the upper Orinoco, Rio Negro, the Invida, and the Jupura, eat human flesh. The Daricavaanas, the Puchirinavis, and the Manitivitanos, appeared to him to be the greatest cannibals among them. He believes that this abominable practice is with them the effect of a system of vengeance; they eat only enemies who are made prisoners in battle. The instances where, by a refinement of cruelty, the Indian eats his nearest relations, his wife or an unfaithful mistress, are extremely rare." (Personal Narrative. Bohn's edition. Vol. ii, p. 354.)

"We had a fugitive Indian from the Guaisia in our canoe, who had become sufficiently civilized in a few weeks to be useful to us in placing the instruments necessary for our observations at night. He was no less mild than intelligent, and we had some desire of taking him into our service. What was our horror when talking to him by means of an interpreter, we learned 'that the flesh of the Mairmonde monkeys (*Ateles belzebuth*) though blacker appeared to him to have the taste of human flesh.' He told us 'that his relations (that is the people of his tribe) preferred the inside of the hand in man as in bears.' This assertion was accompanied with gestures of savage gratification. We enquired of this young man so calm, so affectionate in the little services which he rendered us, whether he sometimes felt a desire to eat a Cheruvichahena? He answered, without discomposure, that, living in the mission he would only eat what he saw was eaten by the Padres." (Ibid, p. 415.)

"On seeing the natives devour the arm or leg of a roasted monkey it is difficult to believe that this habit of eating animals so closely resembling man in their physical organization, has, to a certain degree, contributed to diminish the horror of cannibalism among these people. Roasted monkeys, particularly those which have very round heads, display a hideous resemblance to a child; and consequently Europeans who are obliged to feed on them prefer separating the head and the hands, and serve up only the rest of the animal at their tables." (Ibid, p. 448.)

Cannibalism among the Caribs — In an insurrection of slaves in the Colony of Berbice, the Indians were employed by the Governor to fight against the rebel negroes, "many of whom they killed, as appeared by the number of hands which they brought away, and for which they received a considerable reward. But an adherence to truth obliges me to inform you of a circumstance relative to this expedition, which I am persuaded you will read with disgust; this is that they eat the bodies of the negroes whom they killed on this occasion." (An Essay on the Natural History of Guiana, in several letters from a gentleman of the Medical Faculty, Edward Bancroft, during his residence in that country. London, 1769, pp. 259-260.)

"They castrate the boys, whom they capture, as we do pigs and chickens, in order that they may become fat and tender, and having become fat and large they eat them. When adults come into their hands they are killed and divided; the intestines and extreme parts of the limbs are eaten fresh, but the limbs themselves are salted (as we do hams) and kept for a future time." (Peter Martyn. Decade I, L. i, folio 2, A.)

"Quos pueros capiunt, ut nos pullos gallinaceos aut porcos quos ad obesitatem volumus pinguiore et tenuiores, educare, castrant; grandiores et pingues effectos comedunt." (Ibid. Dec. I. Lib. ii, fol. 2, A.)

"In their kitchens some portions of human flesh were found cooking in the same pot with that of geese and parrots, and other portions were attached to spits." "The head of a youth, recently killed, hung from a beam, the blood still dripping." (Ibid.)

"Searching in the interior of their houses it was ascertained that the bones of the human arm and leg were used in making spears and arrows; the bones were used because they have no iron." (Ibid. Dec. XI. Lib. ii, folio 3, D.)

Cannibalism among the Saulteurs. — "The Saulteurs treat the vanquished with the most horrible barbarity. It is then that they are cannibals by virtue; for though we see sometimes among them cases of anthropophagy, they have such a horror of it that he who has committed this act is no longer sure of his life. They hold it a sacred duty to put him to death on the first favourable occasion. But during war they make a glory of cannibalism. The feast of victory is often composed of human flesh. One sees a trait of this barbarity in the names they give to their principal enemies; as for instance, the Sioux, whom they call *Wanak*." "In their great war parties, after the victory, the Saulteurs build a great fire, then plant all around spits laden with thighs, heads, hearts, &c., of their enemies, after which they return home." (Rev. G. A. Balcourt, in Minnesota Historical Collections, Vol. I, p. 235. See also the account of the battle of Lake Pokegama, as narrated by an eye-witness. By Rev. E. D. Neill, Ibid, p. 181.)

Cannibalism among the Miamis and Kickapoos.—The Hon. Lewis Cass, at one time superintendent of Indian affairs, has recorded some of his own observations with regard to the habits of the Aborigines, and has given an account of cannibalism as it existed among the Miamis and Kickapoos.⁹⁰ These shared with the more eastern tribes the love of cruelty to their enemies, the defiant endurance of pain and protracted suffering at the stake, as well as the savage habit we have just mentioned. Cannibalism assumed with them, however, a distinct phase, differing from the practice as already described, in delegating the eating of human flesh to certain individuals of the tribe who formed a distinct society. Its members belonged to one family called *Ows-e-won-za*, having the bear for a totem. The whole number was from fifteen to twenty, including both men and women, and were known as man-eaters. The members became such by inheritance in the male line, and "had no choice but to in-

⁹⁰ See notes to *Ontwa, the Son of the Forest*, a Poem (by Henry Whiting, author of *Sannillac*). New York, 1822, p. 129.

herit its atrocious privileges." Under ordinary circumstances the death of a chief or a distinguished warrior was revenged by the sacrifice of a prisoner by fire or other mode of death. But in the event of the killed having been held in unusually high regard, or the circumstances of his death calling for an especial demonstration, a prisoner was placed in the hands of this cannibal society. Once in their possession his face was painted black and there was no reversal of his sentence.

In 1780, an American captive was sacrificed at Fort Wayne. Ten men and three women, members of the society conducted the ceremony. Every effort was made to save the life of the victim; but neither entreaties, the presents of valuable goods, nor even of spirits availed. "The prisoner was killed, his body was carried to a retired camp, cut up and boiled. It was then eaten by the members of the society."

Cannibalism among the Iroquois and other Northeastern tribes. — Schoolcraft relates the following tradition with regard to cannibalism⁹¹ among the Iroquois. Having made some Chippewa prisoners, a party of the latter followed them and discovered their camp near the mouth of the St. Mary, where it enters Lake Superior, when they were in the midst of the feast. "The Iroquois warriors formed a circle around a pot containing the boiled flesh of the Chippewa prisoners, slowly moving to the beat of a drum. Each warrior held a spear-club before him and occasionally thrusting it into the pot took out bits of the flesh; they then shouted with one voice, in a tone of fearless defiance."

"When a prisoner is to be put to death they tie him to a stake, where a large fire is lighted, and in this are heated instruments of iron, which they pass over the surface of the body from head to foot, as one applies a brush in painting. If the prisoner is brave he sings in the midst of his torments, rails at his executioners, reproaching them with ignorance in the art of torturing with fire. But if he sheds tears or shows signs of pain, they laugh at him as being unmanly, and tell him that a warrior ought never to groan, and that tears belong to women. After he has been well broiled they detach his scalp, but leave it hanging down his back and throw upon his head hot sand to staunch the blood. They untie him, drive him with stones towards the west, where they believe souls go after death, and cut off pieces of flesh to broil." See plate representing the prisoner at the stake. (La Potherie. *Hist. de l'Amerique, Septentrionale*. Paris, 1722. T. II, p. 23.)

"The Iroquois surprised a village of Illinois and carried off eleven hundred women and children. Some of the fathers of the latter followed the track of these savages for the purpose of surprising them; they found in a camp, the carcasses of their children whom these cannibals had eaten, and who did not care for other food than the flesh of these unfortunate victims. An Illinois by chance came upon the river St. Joseph, where he found the Iroquois having a grand feast of human flesh, and saw his own son roasting by a slow fire. What a horrible sight for a father!⁹² he became furious, stabbed the man who was turning the spit, striking right and left wounded many others, and then escaped to the fort of the Miamis who gave him an asylum." (Ibid, pp. 145-6. See p. 297.)

A band of Iroquois surprised an Algonquin encampment, "seizing some by the hair and others by the middle of the body; others aroused by the noise were massacred in their attempts to defend themselves. The battle was soon over, for the Iroquois finding these poor creatures overcome with sleep or fear, choked with stout cords men, women and children, and in less than an hour became masters of their lives, their small treasures and their cabins. Finding themselves victorious they prepare a supper in the house of the vanquished; some bring wood and others search for water; the large kettles are hung over the fire; the shambles are not far off. They dismember those they have just slain, cut them in pieces and throw feet, legs, hands and arms into the pot, and boil them with a satisfaction as great as the heaviness of heart of the poor captives whose lives were spared, and saw their compatriots served at a feast by these (Loups garroux) were wolves. The women and the children among the prisoners wept bitterly, and the wolf devils enjoyed their mournful cries. Supper ready, the wolves devoured their prey, one seizing upon a thigh, another the chest; some suck the marrow from the bones, while others open the head and extract the brain. In a word, they devour human flesh with as good an appetite and as much pleasure as a hunter eats of a boar or a deer." (Relation of Barthelemy de Vimont. 1642, p. 42.)

⁹¹ Note to Sannillac, a Poem by Henry Whiting. Boston, 1831, p. 134.

⁹² *Adventures de Sr. C. le Bean*. Amsterdam, 1738. T. II, p. 116.

"On the 2d of September we learned that they had brought to the town of Onnentirati an Iroquois prisoner, and had got ready to put him to death. After subjecting him to the most terrible torments by burning, cutting, pinching, they compelled him to mount a scaffold six to seven feet high, three or four of the savages following; they fastened him to a cross-beam, but in such a manner that he could turn round; they now burned him more cruelly than ever, leaving no part of his body to which they did not sooner or later apply fire; when one of his executioners began to press him closely with fire, in attempting to avoid this he fell into the hands of another who gave him no better reception. From time to time they obtained fresh brands and forced them all-lighted into his throat, thrust them into his fundament, burnt his eyes, applied red hot axes to his shoulders, or hung them from his neck; these were turned sometimes on the back, sometimes on the chest, according to the postures taken to escape the weight of this burden; if he attempted to crouch or sit, some one passed a firebrand beneath the scaffold, which compelled him to rise instantly. At the same time we were there praying God with all our heart that his life might be taken as soon as possible. They pressed him so closely on all sides, that he finally ceased to breathe; water was poured into his mouth and the chiefs exclaimed that he had breathed a little, but he remained with the mouth open and almost without motion. For fear that he would not die otherwise (than by the knife) one cut off a foot, another a hand, and at the same time a third cut his head from his shoulders, which he threw among the crowd to be carried to the chief Ondesone that he might eat it; as for the trunk, it remained at Arontaen, where they feasted off of it on the same day." (Relation of Francois Joseph Le Mercier. 21st of June, 1637, p. 118.)

"Ascending the St. Lawrence they arrived at Tadoussac on the 18th of June, when the savages had recently returned from a fight with the Iroquois, having taken nine prisoners, of which those from Quebec had six and from Tadoussac three. Mons. Emery, of Caën, saw them and wished to save the life of the youngest; I pleaded for the three, but was told that large presents would be necessary, and these I did not have. When we arrived at the huts of the savages, made of poles roughly covered with bark (the top is left uncovered to admit light and allow the escape of smoke) we entered that of the chief which was extended; there were three fires five or six feet apart. We sat about on the ground which was covered with the branches of the fir, for there were no other seats. The prisoners were seated near each other, the oldest being about 60, the second about 30, and the third was a boy of 15 or 16 years old. They began to sing to show that they did not fear death though a cruel one. Their song seemed to me very disagreeable; the cadence ended always with these reiterated utterances, oh! oh! oh! ah! ah! ah! hem! hem! hem! &c. After having sung for some time, they danced, one after the other, the oldest rising first, and began to walk the length of the cabin quite naked, except, as I have said, a piece of skin which covered what nature has concealed. They stamped the earth in walking, singing incessantly. This was the whole dance during which all the other savages who were in the cabin clapped their hands, struck their thighs, and grunted a-ha a-ha, and when the prisoner stopped they cried, o-ho! o-ho! &c.; one sitting down another took up the dance. Mons. Emery of Caën asked when they would be put to death? They answered to-morrow. I saw three stakes of wood prepared where they were to be executed, but news came from Quebec that peace with the Iroquois had been declared, and that it would be necessary perhaps to surrender the prisoners, and so their death was delayed. There is no cruelty like that they inflict on their enemies. As soon as they are taken they tear off their nails with their teeth. I saw the fingers of these poor wretches who excited my pity, and a large wound in the arm of one. I was told it was from the bite of his captor. Another had lost a part of a finger and I asked him if it was the effect of fire, for I thought it was a burn; he made a sign that it had been bitten off. I noticed the cruelty of even the girls and the women, while these poor prisoners danced, for as they passed near the fire they blew and forced the flames over them to burn them. When they put them to death they fasten them to a post when the girls as well as the men apply flaming firebrands to the most sensitive parts, the sides, the thighs, the chest and other directions; they remove the scalp and throw heated sand on the naked skull; they pierce the arms at the wrist with pointed sticks and tear out the tendons. In brief they make them suffer all that cruelty and the devil can inspire. Finally, as a last catastrophe, they eat them almost raw." (Relation of Father Paul le Jenne, of the Society of Jesus. April, 1632, p. 5.)

He describes the death of the prisoners at Quebec as follows: "One of them had already

been killed under the direction of his drunken keeper. The nails were torn off with their teeth as soon as taken; their fingers were cut off on the day of their execution, then the arms were tied together at the wrists with a cord, and two men opposite to each other drew it as tight as possible, so that it cut the flesh and crushed the bones of these poor wretches, who groaned horribly. Having the hands thus disposed of they tied them to posts, and the girls and women gave presents to the men in order that they might push the torments of their poor victims to the utmost. I was not present at this execution, for I could not bear such diabolical cruelty, but those who were present told me, as soon as we arrived, that they had never seen anything like it. You could have seen these raging, shouting, howling women, like so many furies, apply fire to the most sensitive parts, pricking them with awls, biting them with their naked teeth, and slitting their flesh with knives, in short doing everything which rage could suggest to a woman. They threw upon them fire, burning ashes and heated sand, and when the victims uttered cries the others shouted still louder in order that the groans of the sufferers might not be heard nor the tormentors touched with compassion. They cut the top of the forehead with a knife, removed the skin, and threw hot sand on the naked head. Some of the savages, by way of bravado, wore these skins still covered with hair and moustaches; more than two hundred awl holes in these skins, in fine they practised upon them every cruelty which I have described in relating what I saw at Tadussac, and others which I do not now remember. When the Indians were told that their cruelties were horrible and unworthy of men, they replied, you do not dare to let your enemies live, when the Iroquois capture us they treat us still worse, and that is the reason why we treat them as badly as possible."

"They put to death an Iroquois chief, a strong and brave man; he sang during his torments and when they told him he must die, he said joyfully, go on I am content, I have captured many mountaineers, my friends will take others and avenge my death. He then gave an account of his prowess, bid adieu to his parents, friends and the allies of his nation, and to Captain Flamand, who traded for skins in the country of the Iroquois near the North Sea. After they had cut off his fingers, broken the bones of his arms, torn the skin from his head and had burned and roasted him on all sides, they untied him, when this unfortunate creature ran directly to the river to assuage his pains; they recaptured him, subjected him to the fire again. He was wholly blackened, naked, broiled, the fat running from his body, and with all this he fled once more, but was again taken and burned a third time; he finally died amidst his torments." (Paul le Jeune. *Ibid*, p. 11.)

"The enemy (Iroquois) landed their prisoners and seizing the body of the one they had killed, tore the heart from the chest, scalped him, cut off the lips and the fleshy parts of the thighs, and boiled and ate them in the presence of their companions." (Relation de Barthelemy de Vimont. 1644, p. 41.)

An Iroquois prisoner "stabbed with a knife his Huron captor, severely wounding the lung, a part of which protruded from the wound; this the surgeon cut off, and having thrown it on the ground, strange to say a Huron picked it up, broiled it and gave it to the wounded man to eat, who swallowed it, singing at the same time." (Relation de Barthelemy de Vimont. 1644, p. 47.)

"When they get possession of some of their enemies they treat them with all imaginable cruelty. Five or six days are sometimes consumed in glutting their rage, and in burning them with a slow fire; not being content to see their skin broiled they open the legs, the thighs, the arms and the most fleshy parts and thrust into them burning brands or hatchets heated red hot; sometimes in the midst of their torments they oblige them to sing, and those who have the courage do it, hurling thousands of imprecations against those who torment them; on the day of his death the victim must endure still more if he has strength; sometimes, when the pot in which the poor wretch is to be boiled is on the fire, he must still sing with all his might. This inhumanity is wholly intolerable, and so some do not willingly join in these fatal feasts. Having at last murdered him, if he was brave, they tear out his heart, broil it on the coals and distribute it in pieces to the young, for they believe this will give them courage. Others make an incision in the neck and allow the blood to flow, which they say, has this virtue, that when mingled with their own, they can never be surprised by the enemy, but will always be aware of his approaches however secret they may be. They put [the flesh] in pieces into the boiler, and although at other feasts the head, whether of a bear, a dog, a deer, or a large fish, falls to the share of the chief; in this case

it was given to the greatest boor (malotru) meanest male present of the crowd; in truth some do not taste of the head, nor of the rest of the body except with horror. Others eat human flesh with a relish, and I have heard savages in our cabin speak with gusto of the flesh of an Iroquois, and praise its goodness in the same terms as they would the flesh of a deer or an elk." (Relation de Jean Brebeuf. July, 1636, p. 121.)

VII. REMAINS OF ANIMALS IN THE SHELL MOUNDS.

We have mentioned, on a previous page, some of the more conspicuous animals, noticed by travellers and naturalists, which formerly inhabited or still live on the shores of the St. John's. The explorations of the shell heaps show to what extent these and other species were used as food by the earliest inhabitants. The accompanying table, based upon the pieces of bone found in the mounds, gives a complete list of the species recognized, the most of which are supposed to have been eaten; followed from side to side it shows the mounds in which the remains of one and the same animal have been detected, and from above downwards the different kinds of animals found in one and the same mound.

NAMES OF SPECIES FOUND IN THE MOUND.	King Philipstown.	Watson's Landing.	Black Hammock.	Old Enterprise.	Blue Spring.	Wekiva River.	Huntoon Island.	Huntoon Creek.	Osceola Mound.	Old Town.	Bartram's Mound.	Horse Landing.
Bear, <i>Ursus Americanus</i> , . . .						*	*			*		
Raccoon, <i>Procyon lotor</i> , . . .				*		*	*			*		*
Hare, <i>Lepus</i> ,				*			*		*	*		
Deer, <i>Cervus Virginianus</i> , . . .	*	*	*	*	*	*	*	*	*	*	*	*
Otter, <i>Lutra Canadensis</i> , . . .							*					
Opossum, <i>Didelphys Virginiana</i> ,		*		*	*	*	*			*		
Turkey, <i>Meleagris gallopavo</i> , . .							*					
Birds (species not determined) .	*	*				*	*		*	*	*	*
Alligator, <i>Alligator Mississippiensis</i> ,		*	*		*	*	*	*	*	*	*	
Hard-shelled Turtle, <i>Emys Floridana</i> ,	*	*	*	*	*	*	*	*	*	*	*	*
Soft-shelled Turtle, <i>Trionyx ferox</i> ,	*	*	*	*		*	*	*	*	*	*	*
Box Turtle, <i>Cistudo Carolina</i> , .	*	*	*			*	*	*	*	*	*	*
Gopher, <i>Testudo polyphemus</i> , . .						*	*					
Catfish, <i>Pimelodus</i> ,	*					*	*			*		
Gar-pike, <i>Lepidosteus</i> ,	*		*			*	*	*		*	*	*
Whiting, <i>Umbrina</i> ,	*			*	*	*	*		*	*		*
Fish (species not determined), .	*						*		*	*		

The bones are not found however in equal numbers, for while some species are abundant there are others which are represented by a very few pieces, as the bear and the wild turkey, or even by a single piece, leaving the explanation of its presence somewhat doubtful.

As the table shows, the species most commonly met with, that is in the largest number of mounds, are the deer, the hard and soft-shelled turtles, the alligator, gar-pike, cat-fish, and a species of whiting (*Umbrina*), and these, it may be stated, are also the most frequent in the individual mounds. The cat-fish are still frequently eaten by the whites as well as the blacks, and are somewhat esteemed, but the gar-pikes, though eaten, are generally regarded as of the most inferior quality. The alligator is still sometimes eaten, but according to the testimony of the shell heaps was very extensively used by the Indians, and according to Le Moyne was still used when the French came. "Libenter vescunt crocodilorum carne, quae profecto candida et nitida est, eamque saepius edissimus nisi moschum nimium redolere nobis visa fuisset."⁹³ We know from personal experience that this objection is valid. Two of the species of turtle, viz., the soft and hard-shelled are much esteemed at the present time, and the great abundance of their bones shows that they were also much esteemed by the Indians. The bones of the hard-shelled species being more numerous than those of all the other animals. Neither of the two is easy to capture, as they are both very wary in their habits. When they come to the surface to bask in the sun they select places directly over or very near the water, the hard-shelled turtle more commonly resting on a log or steep bank, and the other invariably on the beds of aquatic plants. Both disappear on the slightest alarm. How they were captured by the Indians is wholly unknown. In the breeding season, when they are however most desirable for food, both species are compelled to wander from the shores to deposit their eggs, which they bury in the earth. At such times their retreat is easily cut off, and it is probable that then the natives had their principal harvest. Large numbers are still annually taken in this way. Some of the wild animals, especially the otter, improve the same opportunities of obtaining food as the empty shells of the hard-shelled species, often seen in the woods, testify.

In view of the abundance of edible animals on the St. John's it is remarkable that so few were much used, and of those used, that the remains of some, as of the bear and the wild turkey, should be seen in such small numbers.

The *Cistudo Carolina*, or box turtle, is quite common, but we are not aware of its having been used for food in more recent times. Its shell, containing seeds and with the valves of the sternum closed, served as a

⁹³ The condition of the bones is not precisely that found in the shell heaps of the old world. They are mostly broken but comparatively few are split. The largest animals which supplied food to the natives, and the only ones in fact in which the breaking of the bones would be necessary, were the deer and alligator. The largest of the bones of the deer, viz.: the humerus, radius, femur and tibia are usually broken in two and somewhat shattered, as if broken by a blow from a blunt instrument. There is no centre of radiation, nor any sign of the direct action of an instrument on any particular part, as so commonly described to be the case in the bones from prehistoric deposits in Europe. The object of breaking the bone would seem to be rather to reduce the size of the masses to be cooked, to the capacity of the vessel which was to hold them.

After a careful examination we have failed to detect the marks of the teeth of animals, except in a single instance where a bone bore the triangular imprint of those of the opossum. Several pieces show the effect of a cutting instrument used in disarticulating the joints, and others have evidently been scraped, probably to detach the food.

rattle for the Seminoles, and was sometimes attached to their dresses during their dances.

The bones of the bear were found but three times, comprising in all only five pieces, and one of these was a radius which had been sawed in two, apparently for the purpose of making a tool. The others were probably remnants of food. The bones of the wild turkey are very rare, having been found in one mound only, that on Huntton Island, near the river. The bones of the opossum, rabbit and raccoon though found in several mounds, are represented by a very few pieces, notwithstanding these animals existed in great abundance.

The entire absence of the remains of certain other species which might be expected to be occasionally found, is worthy of notice. The buffalo was an inhabitant of Florida, and it could have been no other than this animal which the French met with in their ill-fated retreat from Fort Caroline.⁹⁴ The wolf has been quite common until recent times, but is now nearly exterminated. The puma, though much less common than the wolf, was in earlier times, and is now, occasionally killed, and the wild cat is still a pest to the settlers.

We are not aware of any evidence leading to the supposition that the natives of the St. John's ever possessed the dog as a domesticated animal. In his list of animals, Le Moyne mentions "*canes sylvestres*," whatever they were, but we have failed to find a single bone belonging to the common dog. This is the reverse of what is seen in the shell heaps of New England, where the bones of this animal are quite numerous, and are broken up as if used for food, and it is a matter of history that they were so used. We have found no traces of the beaver, though there is evidence that it once lived within the limits of the peninsula.⁹⁵

⁹⁴ De Challeux, the carpenter of Ribout's expedition, says, "near the break of day we saw a great beast, like a deer, at fifty paces from us, who had a great head, eyes flaming, the ears hanging, and the huger parts elevated. It seemed to us monstrous because of its gleaming eyes, wonderfully large, but it did not come near to us to do us any harm." There is no other animal which corresponds with this description but the buffalo, though that animal is as unlike "a deer" as possible.

"The bison appears to have ranged in considerable numbers through middle Florida a hundred and fifty years ago. It was considered in 1718 that the Spanish garrison at Fort San Marco, on a failure of stores, might subsist on the meat of the buffalo."—Buckingham Smith, in a note to his translation of the Memoir of Fontaneda, p. 50.

"The buffalo is found in the savannahs, or natural meadows of the interior parts."—Stow, p. 19. See also Prof. Spencer F. Baird, *Pacific Railroad Reports*, vol. VIII, p. 681.

⁹⁵ The following is Le Moyne's list of animals said to be seen by the French: "*Quadrupedes istic vulgationes sunt Cervi, Cervue, Hinnuli, Damae, Ursi, Leopardi, Lupicervani, Lynces, Luporum varia genera, Sylvestres canes, Lepores, Cuniculi; Aves Gallopavones, Perdices, Psittaci, Accipitres, Falcones, Aesalones, Ardeae, Grues, Ciconiae, Auseres sylvestres, Anates, Corvi aquatici, Ardeolae albae, rubrae, nigrae, et cinereae, et aquatice quamplurimae Tanta est crocodilorum frequentia ut homines natentes saepenum ab illi appetantur; serpentina varia genera, et animalis quoddam genus non multum ab Africanis leonibus diversum.*"—*De Bry. Americanae Historiae. Secunda Pars*, p. 3.

Roberts mentions the goat and the beaver as found in Florida. The former could only have been an introduced animal. See "*An Account of the First Discovery and Natural History of Florida.*" 1763, p. 4.

Bartram states that "there are yet a few beavers in East Florida and Georgia, but they abound most in the North of Georgia and in West Florida, near the mountains."—*Travels*, p. 281.

Le Moyne also describes the arming of the points of the arrows used at the time of his visit, as follows: "*Promucrone Sagittum sunt piscium dentes, et lapides affabre adaptati.*"—*Pars II.* p. 3.

In *Virginia Richly Valued by the Description of the main land of Florida, her nearest Neighbor*, nearly the same description is found. "Some [of the arrows] they arm in the point with the sharpe bone of a fish, like a chisel, and in others they fasten certain stones, like diamants."—*Force's Hist. Tracts*, Vol. IV, p. 22.

We have found in several places masses of feces, which have been well preserved. As they contain fragments of fish bones, we suppose them to be those of the otter to which they correspond in size.

Remains of Extinct Animals.

These have been met with in several mounds, and are represented by small fragments of bones and teeth. Their condition is, however, very different from that of the other animals of which we have been speaking. The latter are in all cases exceedingly brittle, adhesive to the tongue, from the loss of their organic matter without this having been replaced by anything to give them solidity, while the former, from having been exposed to entirely different conditions before being deposited in the shell heaps, have become harder than natural, through the interstitial deposit of mineral matter. Bones of extinct animals, in the same condition as these of which we are speaking, are found in other parts of the state, and sometimes in large numbers. Mr. Wilkie James, to whom we are indebted for specimens, obtained them on his plantation near Gainesville, where they were turned up by the plough, and we have found them at Charlotte Harbor and in various places on the Gulf Coast. From other facts which have come to our notice, we believe that similar remains are widely scattered through the peninsula, and in one instance a considerable portion of a Mastodon was discovered.

At Horse Landing we found an entire molar tooth from the lower jaw of a Horse, fragments of the ribs of a Manatee at Huntoon Island, and the broken tooth of an Ox and a fragment of the molar of a Horse at Old Town. A fragment of the tooth of a Mastodon was found in the shell fields at Hawkinsville, by Mr. Peabody, and in the same field the writer found a piece of an Elephant's tooth, and still another fragment belonging to the same animal at Horse Landing; beside these we have found many fragments not determined. Thus we have remains of extinct animals from four different mounds, the extreme ones being nearly a hundred miles apart. We have no explanation to offer as to the way in which these fossils were mingled with the shells, whether by accident or design. Possibly they may have been scooped up from the bottoms of the creeks with the shells taken for food, or they may have been carried there from distant parts by the Indians as have some of the marine shells. It is certain they do not belong to the same age as the shells and bones of the mounds.

VIII. AGE OF THE SHELL MOUNDS.

No satisfactory data have been found for determining, with any degree of accuracy, the age of the shell heaps. The appearance of great age which some of them have, as those at Horse Landing, Osceola Mound, Huntoon

Island on the creek, is an important fact. The same may be said of the circumstance that the bones imbedded in them had lost their organic matter, were incrustated with calcareous deposits, and in some instances forming, with the shells, a solid conglomerate. The organic matter of bones is, under such circumstances, slowly destroyed, as is shown by the fact that it is still largely present in those of some extinct animals, but unless the surrounding conditions in the two cases are the same, a close comparison cannot be made.

The most decisive measure of the age is derived from the trees found upon the tops of the mounds. These give us, however, only a minimum age, for they may not have begun to grow till long, perhaps centuries, after the mounds were completed. The live oaks (*Quercus virens*) are not only long lived, attaining an age of several centuries, but their wood is the most durable of all the forest trees of the United States, and their trunks remain erect many years after the death of the tree. As an illustration of the slowness with which they decay, the dead trees now existing at Lake Beresford may be cited; a large clearing, made here in the last century, was allowed to run wild. A new set of trees, among them large numbers of live oaks grew, which we are informed, were in turn killed by girdling in 1850, when the present clearing was made. The trunks of nearly all of these, at the end of twenty-four years, are still standing (1874), the wood as yet but little affected by decay, and will, in the ordinary course of things, require many years more to complete their destruction. In estimating the age of a dead trunk lying on the ground, and which has fallen from natural causes, we must add something, therefore, to the time indicated by the number of rings, especially in the case of the larger trees.

One of these ancient trees, which had fallen from the effects of age, lies upon the top of the shell mound in the woods near Blue Spring. That it had been dead for a long time is shown by the fact that its bark, sap-wood, and all the small and most of the larger branches have decayed and wholly disappeared. It now measures five feet and six inches in diameter six feet from the roots. From what has been stated above it may reasonably be supposed that it had been dead much more than a quarter, perhaps nearer a half of a century. Fragments of pottery were found in the shells contained between the upturned roots of this tree, and in sinking a pit in the place formerly covered by the trunk when upright; others were found at the depth of from two to three feet.

We had neither the tools nor the aid to make a section of this huge trunk for the purpose of counting the annual rings, but in estimating its age have used an average derived from observations made on sections of other trees. Through the kindness of Commodore Rodgers, U. S. Navy, we have received a finely polished section of a live oak a century and a quarter old, and have made many other sections from trees of different ages. From these we have come to the conclusion that in the larger and older trees, such as are not less than five feet in diameter, the average number of rings

to the inch is twelve, and upon this all our estimates are based. The following table gives the locality and size of some of the larger oaks we have found growing upon different shell mounds, and which are believed to have begun to grow after the mounds were completed. The age of each tree is deduced from the average just referred to.

Measurements of Live Oaks on Shell Mounds.

No.	LOCALITY.	Circumference.	Age.
I	Silver Springs; Lake George.	ft. in. 15 2	Years. 360
II	" "	15 3	366
III	" "	19	480
IV	" " "The Giant."	27	666
V	Spring Garden Creek.	15	360
VI	" " "	15 2	330
VII	" " "	16	380
VIII	" " "	18	448
IX	Orange Bluff.	15	360
X	" "	15	360
XI	" "	16	380
XII	" "	18	448
XIII	Blue Springs; Mound in Woods.	15 6	362

It will be seen, from the estimates we have made, that several of the mounds are certainly older than the discovery of America, and all of them than the first explorations of the St. John's by the Spaniards, or, in other words, that the mounds were substantially as complete then, as now. We have already called attention to the fact that neither the Spaniards nor the French mention the mounds, at the time of their first arrival, which they could hardly have failed to do if they were still used as dwelling places, and the shell fish still used as food; it is reasonable to infer, therefore, that the Indians had even then abandoned the mode of life which led to the formation of the shell heaps.

The extent to which mounds have been destroyed by the river is an indication of age, but for the want of sufficient data the time required for this is not capable of being accurately ascertained. The extent of the destruction varies greatly in different places. There are some mounds in which it has scarcely begun, and others where it is nearly complete, the landward slope alone remaining, as at Osceola Mound and the mound next above Blue Spring on the right bank. Not only has this effect been produced in former times, but in the latter the river has receded here from the foot of the mound, and the channel is now several hundred feet distant, leaving a bay of still water where sediment has been deposited, the old channel filled up,

and aquatic plants are growing in large numbers. In other places, as the mound near the creek on Huntton Island, a large swamp several hundred feet in width, overgrown with cypress trees, has formed since the river receded from the base. One of the cypress trees, which had been overthrown by the wind, measured eight feet six inches in circumference twenty-five feet from the ground. The cypress is of slow growth. Taking the average from observations made on sections of this and other trees, its age is estimated at three hundred and forty years. To this must be added the time required for the river to find its new channel, the growth of water plants, the silting up of the old channel with river mud and rubbish, and finally the preparation of the land for the growth of the cypress trees.

The following table shows the rate of growth at different ages of a cypress tree, as shown by the thickness of the annular rings, taken in a series of twenty each, beginning at the centre. From a sawed trunk at Hibernia.

No. of Series.	No. of Rings.	Thickness of twenty Rings.	No. of Series.	No. of Rings.	Thickness of twenty Rings.
1	20	2 inches.	6	20	$\frac{3}{4}$ inches.
2	20	$1\frac{7}{8}$ "	7	20	$\frac{1}{2}$ "
3	20	$1\frac{7}{8}$ "	8	20	$\frac{3}{8}$ "
4	20	1 "	9	20	$\frac{3}{8}$ "
5	20	1 "			

The process of the formation of swamps is undoubtedly very much slower than that of the destruction of the mounds, and is dependent upon the following circumstances. First, the river must change its course so that the channel may recede to the opposite side. Second, this change of the channel is followed by a gradually slower current and finally by still water, on the shore that it has left. Third, comes a deposit of mud and other sediment, by which the water is made gradually more shoal. Fourth, aquatic plants take root and serve to entangle floating materials, so that in the course of time the whole space is filled to the surface and prepared for the growth of rank grass, cypress, willow and other trees. The cypress and the willow are generally the pioneer trees, and play the same part that mangroves do on the seashore. The pioneer plant in this process, is the yellow water lily, which may be seen everywhere near the banks, in the places corresponding with the least current or of still water. These are in the bays and just below the points of land. Once fairly established, they serve to entrap floating plants like the wild lettuce, *Pistia*, and the *Hydrocotyle interrupta*, and rubbish of all kinds, which, with the river mud, build up to the surface and thus prepare the way for dry land.

We have already called attention to the fact, that at Old Enterprise and Silver Spring, Lake George, the mounds have not only been largely under-

mined by the waves from across the lakes on which they are built, but that the débris, after a longer or shorter sojourn in the lake, have been distributed along the shores, so as to form very extensive beaches or sea walls. That this process is necessarily slow is obvious from the circumstance that the base of these mounds is reached by the waves, so as to produce a decided effect upon them only during the great storms which occur at intervals of several years, and at periods of many years of sufficient magnitude to add materially to the height of the beach just referred to. As we have already stated, the beach wall, at Old Enterprise, is sixteen hundred feet long, forty to fifty wide, and from three to four high in the thickest part.

Taking into account these circumstances, viz., the age of the trees, the extent of the destruction of the mounds and the distribution of their materials along the shore, the changes in the channel of the river, the formation of new land and the extension of plants and trees over it, however impossible it may be to measure the time which has passed while all this has been going on, we cannot escape the conviction that many centuries must have been required, and the assumption of a thousand years at least would not be unreasonable. This of course would give them a very moderate age when compared with relics which can be referred to the earliest prehistoric times; but, on the other hand, there is no proof that we have not assumed a period altogether too small.

IX. OF THE SUCCESSIVE INHABITANTS OF THE FLORIDA PENINSULA.

Much uncertainty exists as to the precise aboriginal tribes and their distribution at the time of the first explorations, but three divisions can be distinctly recognized, viz., the Ais on the eastern coast, the Cobooras on the southwestern, and the Temuncas in the northern part of the peninsula.

In later years the Mikasaukies were in possession of the soil, when an immigration took place from Georgia. The Creeks or Muscogulges, disaffected with their chiefs, gradually settled in the northern part of the peninsula of Florida. They soon came in collision with the Mikasaukies, overcame them, and then the two were gradually amalgamated. With the invaders came a certain number of runaway negro slaves, and from their union with the Indians came the mixed race known as Siminoles, or Seminoples, or Seminolies; and were known by this name in the time of Bartram. The meaning of this name is said by Geddings, to be runaway.

The peninsula, if tradition and history can be depended upon, has been occupied by at least three successive races. First, by the Caribs, who in their southern movement passed through Florida to the Leucayes, or Broken Islands, and thence through the windward or Caribbean Islands to the continent of South America. Second, by the people found there by the French and Spaniards; and lastly, by the Seminoles.

The proof of the Carib occupation of Florida is somewhat uncertain, and

is probably incapable of demonstration, for tradition may be untrue, and they were not a people to leave enduring monuments. There are, however, two facts mentioned in the preceding pages which, though insignificant as proofs, are consistent with the belief that Florida, for a time at least, was the dwelling place of the Caribs, viz., cannibalism and the utilization of human bones.

X. CONCLUSIONS.

The general conclusions to which we have been led by the study of the ancient shell heaps of the St. John's River, are as follows :

1. The shell heaps are the work of man.
2. They are composed of the bones and shells of animals used as food.
3. They contain fire places, and various tools and implements made of stone, bone, or shell; the stone implements are of great rarity in the mounds proper, though not unfrequent on the surface; the former are exceedingly rude, the latter are skilfully wrought as well as more abundant, and are believed to have been introduced by Indians migrating from the north, and are not therefore the work of the builders.
4. Fragments of pottery exist in the later but not in the oldest mounds. The pottery was in all cases of a rude kind.
5. The mounds contain human bones, broken up in the same manner as the bones of edible animals, and are believed to be the remains of cannibal feasts.
6. They contain fragments of the bones and teeth of extinct animals, as the Mastodon, Elephant, Horse, Ox, Turtles, Manatee and a Cetacean. These have undergone changes which show that they were not contemporaneous with the builders of the mounds.
7. The mounds have undergone more or less destructive changes by the action of the river, and in some cases have been separated from the river by the shifting of the channel, in consequence of which swamps have been formed between the mound and the receding shore.
8. Though the absolute age of the mounds cannot be determined, a minimum age of several hundred years has been approximately ascertained, justifying the conclusion that some of them were essentially finished two or three centuries before the arrival of the white man, as shown by the age of the trees growing upon them. Other, but not exact, signs of age, are to be found in the changes of the channel since the mounds were built, the greater or less destruction of the mounds by the river, the growth of swamps and the consolidation of the shells through the agency of percolated water charged with lime.

9. Only a single skull of the builders has been found; this differs from the skulls of the burial mounds in being longer, with the ridges and processes more pronounced. There are bones from other parts of the body from two individuals, in both of which there was the flattening of the tibia. A second collection of human bones was found embedded in sandstone, under a shell heap at Rock Island, Lake Monroe. Only a part of the skull was found; the tibiæ were flattened, but no other peculiarities were observed.

10. Whether the builders of the mounds were the same people as those found there by the Spaniards and the French, is uncertain. The absence of pipes in all and of pottery in some of the mounds, and the extreme rarity of ornaments, are consistent with the conclusion that they were a different people. To these may be added the negative fact, that no indications have been found that they practised agriculture.

INDEX.

- Abbot, Gen., shell mounds of Mississippi Valley, 46.
 Age, minimum, of the shell mounds, 83, 85.
 — of live oaks growing on shell mounds, 82.
 — of the shell mounds, 81.
 Ais formerly inhabited Florida, 85.
 Aleutian Islander, tibia of, 65, 67.
 Alexander's Creek, 23.
 — Mound, 33.
 Alligator, bones of, in sandstone, 19.
 — humerus of, cut and ground, 52.
 — lower jaw of, showing marks of a cutting instrument, 52.
 Algonquins, cannibalism among the, 71.
 American Naturalist, 3, 15, 18.
 Ampullaria depressa, 9.
 Ampullariæ, eggs of, 12.
 Andaman Islanders, 47.
 Animal remains in the shell mounds of Florida:—
 Alligator, 20, 25, 27, 30, 34, 52, 78, 79.
 Alligator Mississippiensis, 78.
 Bear, 22, 51, 78, 80.
 Birds, 17, 22, 30, 78.
 Cat fish, 20, 30.
 Cervus Virginianus, 78.
 Cetacean, 25.
 Cistudo Carolina, 78.
 Deer, 17, 19, 20, 22, 25, 26, 27, 29, 30, 33, 34, 38, 51, 52, 78, 79.
 Didelphys Virginiana, 78.
 Emys Floridana, 27, 78.
 Extinct species, 31, 35, 42, 81.
 Fish, 17, 22, 31, 33, 36, 78, 79.
 Gar-pike, 20, 27, 78, 79.
 Hare, 78.
 Lepidosteus, 27, 78.
 Lepus, 78.
 Lutra Canadensis, 78.
 Marine shells, 22, 42.
 Meleagris gallopavo, 78.
 Opossum, 20, 22, 25, 30, 78, 80.
 Otter, 30, 78, 81.
 Pimelodus, 78.
 Procyon lotor, 78.
 Rabbit, 20, 22, 80.
 Raccoon, 22, 30, 34, 78, 80.
 Testudo polyphemus, 78.
 Trionyx ferox, 27, 78.
 Turkey, 30, 78, 80.
 Turtles, 17, 20, 22, 25, 26, 27, 29, 30, 31, 33, 34, 35, 78, 79.
 Umbrina, 30, 78.
 Ursus Americanus, 78.
 Whiting, 78.
 Animals, condition of bones of, in the shell mounds, 79.
 — extinct, 7, 23, 31, 35, 42, 81.
 — formerly inhabiting Florida, 80.
 — list of remains of, in the shell mounds, 78.
 — of the St. John's, 6.
 Anthony, J. G., 9.
 Antler of deer cut and broken, 51.
 — of deer grooved, 51.
 Aramus scolopaceus, note on, 6.
 Arrowheads, 49, 50.
 Arrows pointed with stone and bone used by Indians of Florida, 80.
 Atlantic Coast of United States, shell heaps of, 46.
 Atwater first described shell mounds on the Muskingum, 46.
 Australia, shell heaps of, 46.
 Awls made of bone, 51.
 — made of metatarsal bones of deer, 52.
 Axes of stone, none in shell mounds of Florida, 51.
 Bald eagle, note on, 7.
 Barbadoes, implements of shell from, 57.
 Bartram, notices of mounds by, 14.
 Bartram's Mound, 35, 78.
 Bartrams, mounds visited by the, 28, 35, 38, 40, 43.
 Bay of Fundy, shell heaps on, 46.
 Bear, radius of, sawed off, 51.
 — ulna of, made into an implement, 51.
 Beaver, absence of bones in shell mounds of Fla., 80.
 — formerly inhabited Florida, 80.
 Beecher, town of, 40.
 Behring's Sea, shell heaps of, 46.
 Black Hammock, 12, 17, 55, 78.
 — character of pottery from, 55.
 Blue Spring, 12, 21, 23, 24, 25, 78, 82, 83.
 Bone implements, 22, 27, 34, 35, 41, 47, 51, 52.
 — cut in a peculiar manner, 52.
 — from New England shell heaps, 51.
 Bone, ornament of, 52, 59.
 — splinters of, forming primitive tools, 52.
 Bones, condition of, in shell mounds, 79.
 — manner of breaking, 79.
 — manner of sawing, 51.
 — marks of a cutting instrument on, 79.
 — not marked by teeth of animals, 79.
 Boston Society of Nat. Hist., Proceedings of, 15, 47.
 Bowditch, Dr. H. P., 51.
 Box Turtle, shell of, used as a rattle, 79.
 Brazil, cannibalism among the Indians of, 73.
 — shell heaps of, 46, 47.
 Brinton, Dr. D. G., 4.
 — notice of mounds by, 15.
 — shell mounds of Miss. Valley, 46.
 Bryson, Judge, 31.
 Bryson's Mound, 31.
 Buffalo, absence of bones of, in the shell mounds, 80.
 — Bluffs, 42.
 — formerly inhabited Florida, 80.
 Burial ground described by Bartram has disappeared, 36.
 — mound at Lake Harney, character of pottery from, 55.
 — mounds, 16, 17, 18, 21, 28, 29, 37, 40, 42, 55.
 — of Florida, flattened tibiae from, 65.
 — of the St. John's, 47.
 — places, shell heaps not used as, 60.
 Busyon, 9.
 — beads made of, 56.
 — chisels made from shells of, 56.
 — rostrum of, made into a cutting tool, 57.

- Busycon, carica, 56.
 ————— implements made of, 56.
 ————— hand chisel made of shell of, 57.
 ————— in sandstone, 19.
 ————— perforated shells of, 58.
 ————— perversa, implements made of, 56.
 ————— drinking vessels made of, 57.
 ————— ground at the end to form a cutting edge, 57.
 Buzzards Roost, 18.
 Cabot, Elliot, carved human bone from Ipswich shell heap, 51, 63.
 Calaveras skull, 45.
 California, flattened tibia from, 65.
 ————— man in the Tertiary of, 45.
 ————— shell heaps in, 46.
 Californian, tibia of, 67.
 Camanches, cannibalism among the, 72.
 Canada, cannibalism among the Indians of, 76, 77.
 Cannibalism, 29, 60, 67.
 ————— accounts of, relating to Florida, 68.
 ————— among the North American Indians, 72.
 ————— in Brazil, 73.
 ————— in North and South America, 69.
 ————— notes on, 72.
 ————— object of, 69.
 Cannibals, evidences of, among the ancient inhabitants on the St. John's River, 68.
 Cardium, 9.
 Caribs, cannibalism of, 70, 74.
 ————— the early occupants of Florida, 85.
 ————— the evidence of their occupation of Florida, 86.
 ————— use of human bones for implements by, 51.
 Carr, S. T., 37.
 Carving in coquina representing a turtle, 16.
 Cedar Keys, 40, 55.
 ————— mound, 9.
 Celts, 49.
 Central America, shell heaps in, 46.
 Channel of a creek through a mound, 24.
 Charcoal from Concord shell heap, 47.
 Charlotta, 42.
 Charlotte Harbor mound, 9.
 Chert and rude implements from oldest mounds, 49.
 Chimpanzee, tibia of, 66, 67.
 Chinooks, water tight baskets of, 52.
 Chips of flint, 49.
 Chisels made of shells, 56.
 ————— of stone, 50.
 Cobooras formerly inhabited Florida, 85.
 Conch shells, implements made of, 56.
 Conclusions derived from a study of the shell mounds of Florida, 85.
 Concord, Mass., shell heaps at, 47.
 Connecticut River Valley, destruction of remains of former animals of, 46.
 Consolidation of lower layers of shell mounds, 12.
 Cox, Dr. E. T., shell mounds of Mississippi Valley, 46.
 Creek Indians, migration of, to Florida, 49.
 Creeks formerly inhabited Florida, 85.
 Cro-Magnon, flattened tibia from, 65.
 Crying bird, note on, 6.
 Cuvier, theory of, regarding early remains of man, 46.
 Cypress trees, growth of, 84.
 Dancy, Col. F. L., 5, 13.
 Darby, Wm., notice of the mounds by, 15.
 De Brahm, manuscript survey of Florida, 1754, 4.
 Deep Creek, 16.
 Deer, antler of, smoothed and polished, 52.
 ————— awls made of metatarsal bones of, 52.
 Deer, metatarsal of, sawed and broken, 52.
 ————— olecranon of, sawed, 51.
 ————— pelvis of, scraped, 52.
 ————— radius of, ground or scraped, 52.
 ————— sawed bones of, 52.
 ————— ulna of, used for making pointed instruments, 51.
 Delawares, cannibalism among the, 72.
 Denmark, shell heaps of, 46.
 Dickenson, J., mention of cannibals by, 68.
 Dismemberment of the slain by the Florida Indians, 67.
 Doctor's Island, 18.
 Dog, absence of bones of, in the shell mounds, 80.
 Drayton's Island, 40.
 Drinking shells from coast mounds, 58.
 ————— from mounds on the St. John's, 57.
 ————— vessels made of shells, 56, 57.
 Dunn's Lake, 4.
 Dunscomb, G. H., 3.
 Dwarf, bones of, in shell mound on Huntoon Island, 27.
 Dwelling places of early inhabitants, 3.
 Dyaks of Borneo, 47.
 Earliest inhabitants on the St. John's, 47.
 Elephant, teeth of, from shell mounds, 31, 42.
 ————— teeth of, from Hawkinsville, 81.
 ————— teeth of, from Horse Landing, 81.
 England, shell heaps of, 46.
 Eskimo, tibia of, 67.
 Europe, ancient remains of man in, 45.
 Evans, John, 45.
 Everglades, 5.
 Evolution applied to man, 45.
 Extermination of oysters and other mollusks in particular localities, 13.
 Extinct animals, 7, 23, 31, 35, 42, 81.
 ————— from various places in Florida, 81.
 ————— remains of, in shell mounds, 81.
 Fairbanks, G. R., 10.
 Fasciolaria, 9.
 ————— beads made of, 56.
 Fijians, cannibalism of, 69.
 Fire place, ancient, 37.
 Fish hawk, nest of, 7.
 Flakes, 49.
 Flattened human tibiae, 65.
 ————— tibiae not ape-like, 66.
 ————— not a race character, 66.
 Flint nodule, 51.
 Flint, worked, from beneath mound at Horse Landing, 50.
 Florida, manuscript survey of in 1754, 4.
 ————— Peninsular, slight elevation of, 5.
 ————— Peninsular, successive inhabitants of, 85.
 ————— springs of, 23.
 Food of early man, 46.
 Forrester's Point, 43.
 Fort Butler, 38.
 Fort Gates, 40.
 France, shell heaps of, 46.
 Fuegians, cannibalism of, 69, 72.
 ————— without earthen vessels, 53.
 Geological conditions at Buffalo Bluffs, 42.
 Gillman, Henry, flattened tibiae found by, 65, 66.
 Goose Bay, 40.
 Gorilla, tibia of, 66, 67.
 Gouges made of shells, 56.
 Growth of cypress trees, 84.
 ————— of live oaks, 82.
 Guayaquil, shell heaps on Gulf of, 46.
 Guiana, Cannibalism in, 70.

- Gulf of Guayaquil, shell heaps on, 46.
 ——— Mexico, shell heaps on, 46.
- Hammerstones, 49.
- Hartt, Prof. C. F., shell heaps of Brazil, 47.
- Hawkinsville, 31, 32, 81.
- Helices, 9.
- Horse, extinct, lower jaw of, from Horse Landing, 81.
 ——— teeth of, from shell mounds, 35, 42.
 ——— tooth of, from Old Town, 81.
 ——— Landing, 12, 41, 78, 81.
- Human arm bone made into a tool, 51.
 ——— bones at Huntoon Creek, 24.
 ——— correction of errors regarding those found in Florida, 18.
 ——— from Bartram's Mound, 62.
 ——— from Blue Spring Mounds, 61.
 ——— from Hawkinsville Mound, 62.
 ——— from Huntoon Island Mound, 62, 64.
 ——— from Old Enterprise Mound, 60.
 ——— from Osceola Mound, 38, 63, 64.
 ——— from Ropes Island, 60.
 ——— in sandstone, 18, 19, 64.
 ——— in shell mounds, 20, 24, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 43.
 ——— intentionally broken, 28.
 ——— near Volusia, 38.
 ——— of a dwarf from Huntoon Island, 27.
 ——— position of, in Osceola Mound, 33.
 ——— remains from the St. John's, 48.
 ——— in the shell heaps of the St. John's, 60.
 ——— skeleton from burial mound, 16.
 ——— thigh bone sawed, 51.
- Humphreys, Gen., shell mounds of Miss. Valley, 46.
- Huntoon Creek, 24, 26, 27, 30, 47, 78.
 ——— Island, 11, 12, 13, 26, 27, 78, 80, 81.
- Hussey, Capt. C., devoured by cannibals on the Florida coast, 68.
- Illinois, cannibalism among the Indians of, 71.
- Implements of bone, 22, 27, 34, 35, 41, 47, 51.
 ——— bone from the Swiss Lakes, 51.
 ——— metal not found in the shell mounds, 60.
 ——— shell, 19, 22, 23, 25, 26, 30, 33, 47, 56, 57.
 ——— shell from Barbadoes, 57.
 ——— stone, 22, 25, 26, 30, 31, 34, 37, 38, 41, 47, 49.
- Indian River, 5.
- Indians, art of making pottery among, 52.
 ——— cannibalism among, 72.
 ——— former, of Florida, 85.
 ——— found by the French and Spaniards in Florida not the earliest inhabitants, 85.
 ——— of Florida dismembered their enemies, 67.
 ——— of the St. John's, 48.
 ———, Manner of life of, 48.
 ——— recent, of the St. John's, not the descendants of the early race, 48.
 ——— seen by Bartram at Palatka, 43.
 ——— tortures by, 71.
- Inhabitants of the Florida Peninsular, 85.
- Ipswich, Mass., shell heap, tool made from human arm bone from, 51, 63.
- Ireland, shell heaps of, 46.
- Iroquois, cannibalism among the, 71, 72, 75.
- James, Wilkie, extinct animals found by, 81.
- Jenks, Prof. J. W. P., 5.
- Jesuits, cannibalism witnessed by the, 71.
- Jones, Antiquities of Georgia, 50.
- Juniper Creek, 12, 23, 38.
- Kentucky, flattened tibiae from, 65.
- Kickapoos, cannibalism among the, 71, 74.
- King Phillipstown, 12, 16, 78.
- Kissimmee River, 5.
- Knives of the Pah Ute Indians, 50.
- Labrador, flattened tibia from, 65.
- Lake Beresford, 4, 25, 26, 82.
 ——— Dexter, 4, 35, 37.
 ——— George, 4, 5, 11, 13, 23, 37, 38, 40, 84.
 ——— Harney, 4, 5, 16.
 ———, character of pottery from, 55.
 ——— Jessup, 4, 17.
 ——— Monroe, 4, 17, 18, 19, 21.
 ——— Okechobee, 5.
 ——— Poinsett, 5.
 ——— Washington, 5.
 ——— Winder, 5.
- Le Moyne, statement of, regarding articles of shell, 57.
- Le Moyne's figures criticised, 54, 57.
- Le Sueur, shell mounds at New Harmony, 46.
- Little Lake George, 40.
 ——— Orange Mound, 35.
- Live oaks growing on shell mounds, age of, 82.
 ——— growth of, 82.
 ——— measurements and age of, 83.
- Living shells abundant in some places, 12.
- Louisiana, cannibalism among the Indians of, 71.
- Lyell, Sir Charles, 18.
- Magellan, inhabitants of Straits of, 47.
- Malay Peninsular, Shell heaps of, 46.
- Man, agricultural and hunter life a late development, 46.
 ——— ancient remains of, in California, 45.
 ——— ancient remains of, in Europe, 45.
 ——— earliest traces of, 45.
 ——— food of early, 46.
 ——— of the shell heaps, condition of, 47.
 ——— primitive, 45.
 ——— primitive, no proofs of, 45.
 ——— remains of earliest, destroyed, 46.
- Manatee, ribs of, from Huntoon Island, 81.
 ——— River, 40.
- Marine deposit of shells, 42.
 ——— shells, 22, 81.
 ——— articles made of, in mounds from the Gulf to the Great Lakes, 56.
 ——— deposits of, on the St. John's, 23.
 ——— implements made of, 53.
- Mastodon, teeth of, from shell mounds, 31.
 ——— tooth of, from Hawkinsville, 81.
- Melania, 9.
- Merrimack River, flattened tibiae from, 65.
- Metals, absence of, in shell mounds of the St. John's, 60.
- Mexicans, cannibalism of, 69, 70.
- Mexico, shell heaps on Gulf of, 46.
- Miamis, cannibalism of, 69, 71, 74.
- Michigan, flattened tibiae from, 65, 66.
- Mikasankies formerly inhabited Florida, 85.
- Mikasukies overrun by the Creeks, 49.
- Mississippi Valley, shell heaps in, 46, 47.
- Moccasin Creek, 16, 43.
- Mollusks, see "shells."
- Moose, ulna of, made into an implement, 51.
- Mount Hope, 40.
 ——— Royal, 40.
- Murphy's Island, 42.
- Muscogulges formerly inhabited Florida, 85.
- Muskingum, shell mounds of, 46.

- Negro slaves mixing with the Indians of Florida, 85.
 New England shell heaps, bone implements from, 51.
 New Zealanders, cannibalism of, 69.
 North America, cannibalism in, 69.
 Northwest coast, cannibalism on the, 71.
 Nott and Gliddon, 18.
- Oklawaha River, 6, 23.
 Old Enterprise, 11, 12, 19, 39, 78, 84.
 ———— beach wall at, 85.
 ———— character of pottery from, 55.
 Old Town, 9, 10, 12, 33, 78.
 ———— character of pottery from, 55.
 Orang, tibia of, 63.
 Orange Bluff, 37, 83.
 ———— groves on the mounds, 10.
 ————, origin of, 10.
 Orinoco, cannibalism on the, 70, 73.
 Ornamented awl made of bone, 52.
 Ornaments, 58.
 ———— absence of, in the shell mounds, 59.
 ———— of bone, 52, 59.
 ———— of shell, 22, 34, 56, 58, 59.
 Oscala, 31.
 Osceola, 31.
 ———— Mound, 12, 32, 78, 81, 83.
 Ostrea, 9.
 Ox, extinct, tooth of, from Old Town, 81.
 Oysters, extermination of, 13.
- Pacataligo, 32.
 Pah Ute Indians, stone knives of, 50.
 Palatka, 4, 41, 42.
 Palmetto shell mound, 25.
 Paludina multilinea, 9.
 Parkman, Francis, on cannibalism in America, 71.
 Patagonia, shell heaps of, 46.
 Patagonians without earthen vessels, 53.
 Peabody, G. A., 3, 4, 41, 49, 50.
 ———— Museum of Archaeology and Ethnology, 3, 9, 15, 47.
 Perforated shells, 58.
 Peru, cannibalism in, 70.
 Peruvian, tibia of, 67.
 Pipes, absence of, in shell mounds, 59, 60.
 ———— of the Florida Indians described by Hawkins, 59.
 ———— use of, mentioned by Le Moyne, 59.
 Plotus anHINGA, note on, 6.
 ———— parasite in brain of, 7.
 Possum Bluff, 16.
 Pottery, 17, 18, 20, 23, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 40, 41, 42, 43, 52, 53, 54, 55, 61, 82.
 ———— absent in some shell mounds, 12, 22, 27, 33, 41, 47, 53.
 ———— cord marked, not found, 54, 55.
 ———— development of art of ornamentation, 53.
 ———— difference between that from the St. John's and the Coast mounds, 55.
 ———— earliest style of ornamentation, 53.
 ———— made by hand, 54.
 ———— made of cylinders of clay, 54.
 ———— manufacture of, nearly universal among the Indians, 52.
 ———— moulded in baskets, 54.
 ———— moulded on gourds, 54.
 ———— of pure clay, 55.
 ———— of the coast mounds, 54.
 ———— ornamented vases not universal, 54.
 ———— palmetto fibre mixed with the clay, 20, 34, 55.
 ———— perfect vessels found, 53.
- Pottery, plain, 55.
 ———— shape of the vessels, 53.
 ———— stamped ornamentation, 20, 22, 53.
 ———— style and ornamentation, 53.
 ———— traced ornamentation, 20, 22, 53.
 Pourtales, Count L. F., discovery of human bones in sandstone by, 18, 19, 43.
 ———— recognized the shell mounds as artificial, 15.
 Primitive Man, 45.
 ———— no proofs of, 45.
 Puma, absence of bones of, in the shell mounds, 80.
- Quercus virens, 82.
- Rainfall on the St. John's, 8.
 Rattle made of shell of box turtle, 79.
 River action on the shell mounds, 83.
 ———— bank destroyed, 24.
 ———— Rouge Mound, flattened tibiae from, 65.
 Rock Island, 18, 64.
 Rocky Point, 40.
 Rodgers, Commodore, section of live oak from, 82.
 Route from the St. John's to Indian River, 16.
- Salt Creek, 16.
 ———— Lakes, 4, 16.
 Saulteurs, cannibalism among the, 74.
 Say, shell mound at New Harmony, 46.
 Scotland, shell heaps of, 46.
 Seminoles, 49, 85.
 ———— rattle used by, 80.
 Seminoles, 85.
 Shell fields, Fort Gates, 40.
 ———— Hawkinsville, 31, 49, 50, 57.
 ———— Huntoon Island, 26.
 ———— Lake Beresford, 26, 50, 53, 82.
 ———— on the St. John's, 11, 21, 22, 24.
 ———— Spear's Landing, 18.
 ———— Wekiva, 22, 52, 54, 58, 78.
 ———— Welaka, 40.
- Shell heaps, distribution of, throughout the world, 46.
 Shell mounds are refuse heaps, 11.
 ———— first described by Atwater, 46.
 ———— first examined by the Author, 3.
 ———— general description of, 8.
 ———— implements of stone, shell and bone, from, 19, 22, 23, 25, 26, 27, 30, 31, 33, 34, 35, 37, 38, 41, 47, 49, 51, 56, 57, 58.
 ———— in Brazil, 12.
 ———— of oysters, 13, 14.
 ———— of the coast of Florida, 9.
 ———— of the Miss. Valley, 46.
 ———— of unios in United States, 9.
- Shell mounds on the St. John's:—
 Age of, 81, 83, 85.
 Alexander's, 33.
 Bartram's, 35, 53, 59, 62, 78.
 Beach walls made by washings of, 20, 39, 40, 85.
 Black Hammock, 12, 17, 55, 59, 78.
 Blue Spring, 12, 24, 25, 47, 50, 51, 53, 57, 61, 78, 82, 83.
 Bryson's, 31.
 Buffalo Bluffs, 42.
 By what people made, 48, 60.
 Conclusions derived from study of, 86.
 Consolidation of lower layers, 12, 24, 31, 32, 36, 40, 41.
 Cut through by a creek, 24.
 Description of the more important, 8, 15.
 Destroyed by action of the river, 83.
 Differ from those of the coast, 9.
 Distinct periods of formation, 32.
 Dwelling places of earliest inhabitants, 3, 11.

Shell mounds on the St. John's (continued):—

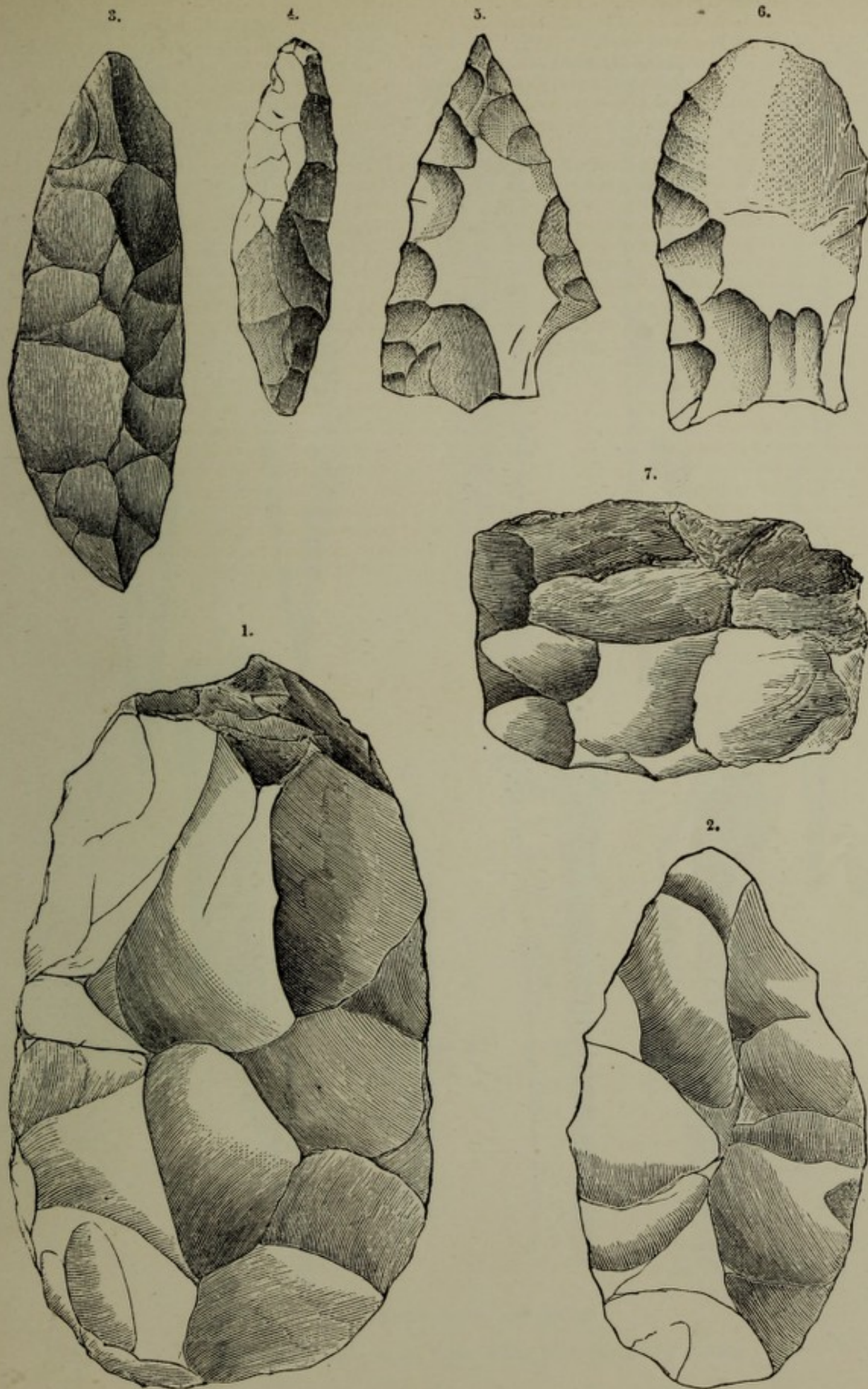
- Evidences of cannibalism, 29, 60, 67.
- Extinct animals in, 31, 81.
- Few references to, in history, 3.
- Fire places and charcoal found in, 17, 20, 22, 27, 29, 30, 31, 32, 34, 41, 47.
- First recognized as artificial, 15.
- Forest growth on, 10, 21, 25, 28, 29, 33, 34, 37, 40, 43, 48.
- Forrester's Point, 43.
- Fort Butler, 38.
- Fort Gates, 40.
- Hawkinsville, 31, 53, 62, 81.
- Horse Landing, 12, 41, 47, 49, 50, 52, 53, 59, 78, 81.
- Human bones in, 27, 28, 30, 31, 32, 33, 34, 35, 36, 43, 48, 60, 64.
- Huntoon Creek, 24, 26, 27, 30, 47, 50, 78.
- Huntoon Island, 11, 12, 13, 26, 27, 50, 53, 54, 62, 64, 78, 81, 84.
- Implements found in, 19, 22, 23, 25, 26, 27, 30, 31, 33, 34, 35, 37, 38, 41, 47, 49, 51, 53, 57, 58.
- Juniper Creek, 38, 49.
- King Phillipstown, 12, 16, 78.
- Lake George, 11, 13, 54, 55, 84.
- List of, 44.
- List of animal remains found in, 78.
- Little Orange, 35.
- Live oaks growing on, age of, 82.
- Location of, 8, 10.
- Map of, 8.
- Most southern location of, 16.
- Murphy's Island, 42.
- Near Blue Springs, 21.
- Not formed by recent Indians, 48, 60.
- Not used as burial places, 60.
- Old Enterprise, 11, 12, 19, 49, 51, 55, 56, 60, 78, 84.
- Old Town, 9, 12, 33, 50, 51, 52, 54, 55, 56, 78.
- Orange Bluff, 11, 13, 37, 49, 83.
- Orange Groves on, 10, 34.
- Ornaments found in, 22, 34, 52, 56, 58, 59.
- Osceola, 12, 32, 47, 51, 53, 63, 64, 67, 78, 81, 83.
- Pacataligo, 32.
- Palatka, 42, 53.
- Palmetto, 25.
- Position of, 10.
- Pottery in, 17, 18, 23, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 40, 41, 42, 43, 52, 53, 54, 55, 61, 82.
- Possum Bluff, 16.
- Previous notices of, 14.
- Remains of animals in, 17, 19, 20, 22, 25, 26, 27, 29, 30, 31, 33, 34, 35, 36, 38, 42.
- Result of a slow accumulation, 13.
- Rock Island, 18.
- Section of, 33.
- Shells found in, 9.
- Silver Springs, 11, 13, 38, 54, 56, 83, 84.
- Spring Garden Creek, 83.
- Stratification of, 31, 32, 41.
- Supposed to be natural deposits, 15.
- Volusia, 38.
- Watson's Landing, 55, 56, 59, 78.
- Were dwelling places, 3.
- When first examined by Author, 15.
- Works of man not found in all, 11.
- Shell, ornaments made of, 22, 34, 56, 58, 59.
- tools, use of, 57.
- Shells as drinking cups, 57, 58.
- former abundance of, 13.
- found in the Coast mounds, 9.
- found in the River mounds, 9.
- implements of, 19, 22, 23, 25, 26, 30, 33, 47, 56, 57.
- living, abundance of, 12.

- Shells of various species more abundant formerly, 13.
- perforated, 58.
- with holes, use unknown, 56.
- Silver Spring, 11, 13, 23, 83, 84.
- — — — Creek, 38.
- Siminoles, meaning of the name, 85.
- — — — origin of the, 85.
- — — — their late origin, 85.
- Six Mile Spring, 38.
- Skull, human, from Osceola Mound, description of, 64.
- Snake bird, note on, 6.
- — — — parasite in brain of, 7.
- South America, cannibalism in, 69.
- Spear points, 50.
- Spear's Landing, 18.
- Spring Garden Creek, 33, 83.
- Springs of Florida, and their formation, 23.
- St. Acheul pattern of celts, 49.
- St. John's Bluff, character of pottery from, 55.
- — — — River, ancient inhabitants cannibals, 68.
- — — — animals of, 6.
- — — — annual rise and fall of, 7, 8, 12.
- — — — burial mounds on, 47.
- — — — changes of channel of, 21, 26, 29, 30.
- — — — description of, 4.
- — — — dikes formed on, 8.
- — — — earliest inhabitants on, 47.
- — — — deposits of marine shells on, 23.
- — — — fresh water to Hibernia, 5.
- — — — headwaters of, 5.
- — — — Indians of, 48.
- — — — level of, 5.
- — — — names of, 4.
- — — — rainfall on, 8.
- — — — reversed course of, 5.
- — — — scenery of, 5, 6.
- — — — tide water of, 5.
- — — — vegetation of, 6.
- Stone axes, none in shell mounds of Florida, 51.
- — — — implements, 22, 25, 26, 30, 31, 34, 37, 38, 41, 47, 49.
- — — — from Concord shell heaps, 47.
- — — — from the lowest parts of the shell mounds, 49.
- — — — from the surface of the shell mounds, 49.
- Straits of Magellan, inhabitants of, 47.
- Stratification of mounds, 31, 32, 41.
- Strombus, 9, 34.
- — — — gigas, chisels made from shells of, 56.
- — — — implements made of, 56.
- Swamps, formation of, on the St. John's, 84.
- Swiss Lakes, disappearance of "water chestnut" from, 13.
- — — — implements of bone from, 51.

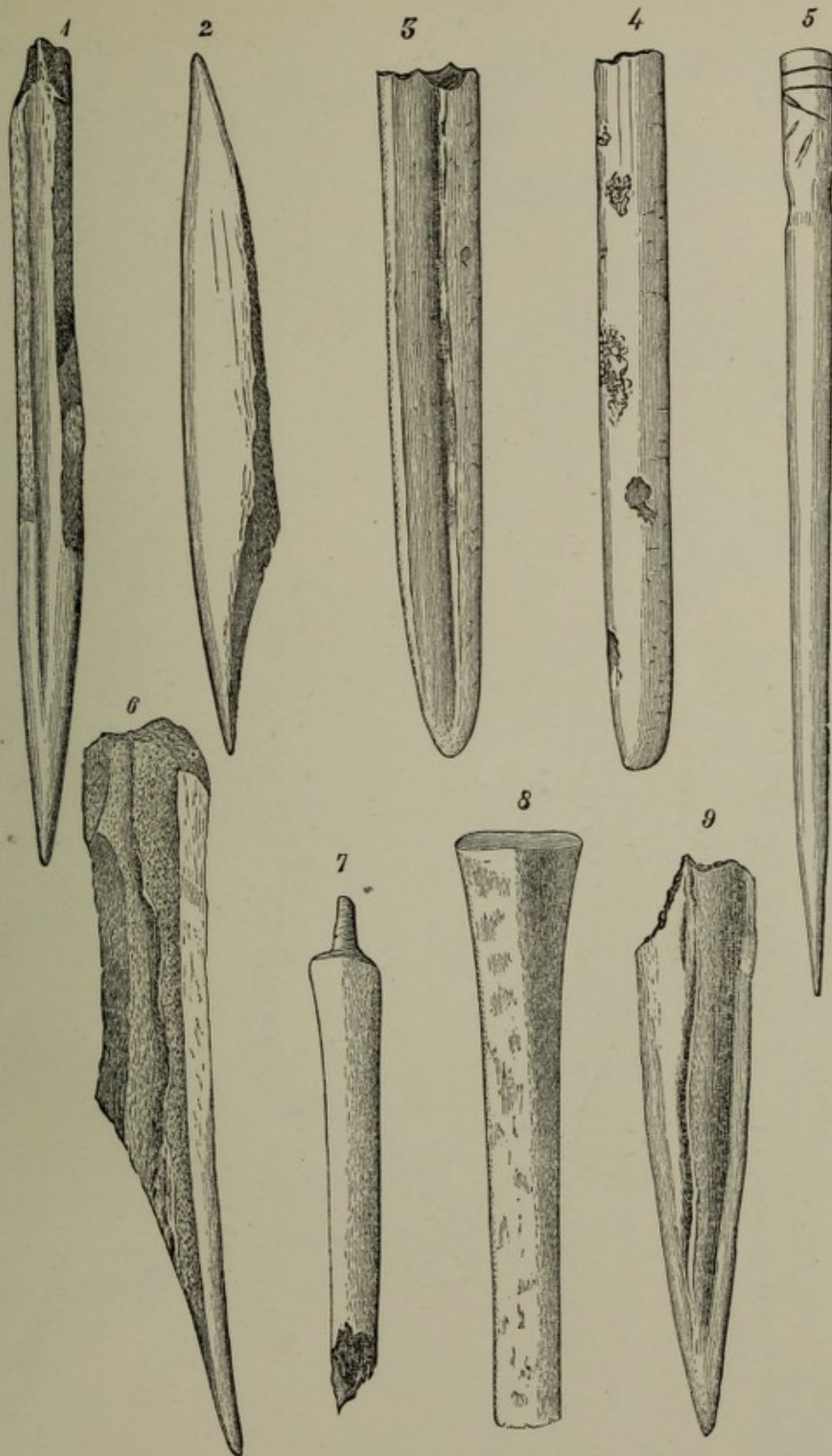
- Tampa Bay, 40.
- Tasmania, shell heaps of, 46.
- Temuncas formerly inhabited Florida, 85.
- Terra del Fuego, shell heaps of, 46.
- Tertiary of California, remains of man in, 45.
- Texas, cannibalism of the Indians of, 72.
- Thoreau, H. D., shell heaps at Concord, Mass., 47.
- Thursby, L. P., 25.
- Tibia, flattened, 65.
- — — — its cause not known, 67.
- — — — not ape-like, 66.
- — — — human, flattened, from burial mound in Florida, 65.
- — — — flattened, from River Rouge mound, 65, 66.

- Tibia, human, flattened, from various localities, 65.
 ——— flattening of, not a race character, 66.
 ——— from Florida, 66, 67.
 ——— from Haverhill, Mass., 66, 67.
 ——— from mound at Cedar Keys, 66.
 ——— from mound in East Tennessee, 66.
 ——— from mound in Kentucky, 66, 67.
 ——— from mound on St. Clair River, 67.
 ——— from mound on St. John's River, 66.
 ——— from Osceola Mound, 65, 67.
 ——— from River Rouge mound, 66.
 ——— from sandstone on Rock Island, 65.
 ——— of North American Indians, 65, 66.
 ——— of the Moundbuilders, 66, 67.
 ——— of the white race, 66, 67.
 ——— proportions of diameters of, in different races, 67.
 ——— rounding of angles of, 66.
 ——— sections of, 67.
 ——— of a Californian, 67.
 ——— of a Peruvian, 67.
 ——— of an Aleutian Islander, 67.
 ——— of an Eskimo, 67.
 ——— of the Chimpanzee, 66, 67.
 ——— of the Gorilla, 66, 67.
 ——— of the Orang, 66.
 Tonkawas, cannibalism among the, 72.
 Trees on the shell mounds, 82.
 Trionyx, bones of, in sandstone, 19.
 Turtle carved in coquina, 16.
 ——— Mound, 9.
 ——— shell of, used as a rattle, 79.
 Unio Buckleyi, 9.
 ——— complanatus forming shell heaps at Concord, Mass., 47.
 ——— shell of, with a hole drilled, 58.
 Vaca, Cabeza de, statement regarding articles of shell, 57.
 Vegetation of the St. John's, 6.
 Vogt on cannibalism, 72.
 Volusia, 38.
 Watson's Landing, character of pottery from, 55, 56.
 ——— remains of animals from, 78.
 Way Key, 40.
 Wekiva, 22.
 ——— River 12, 22, 78.
 Welaka, 40.
 White, Prof. C. A., shell mounds of unios, 9.
 ——— ——— ——— shell mounds of Miss. Valley, 47.
 Whitney, Prof. J. D., on remains of man in Cal., 45.
 Wild Cat, absence of bones of, in the shell mounds, 80.
 Williams Spring, 39.
 Winslow, Dr. C. F., 68.
 Wolf, absence of bones of, in shell mounds, 80.
 Worked bones from Concord shell heaps, 47.



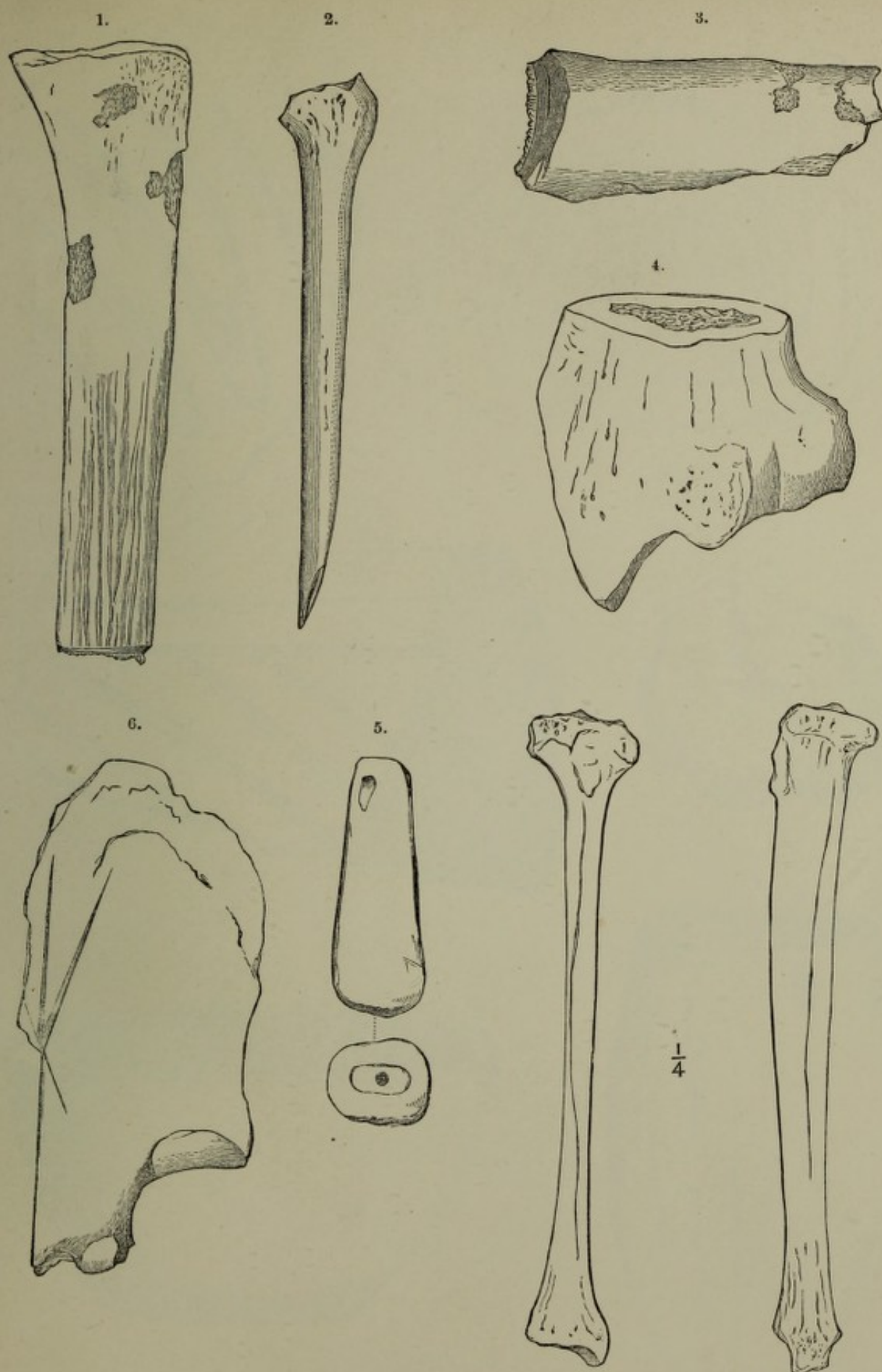


IMPLEMENTS OF STONE.



IMPLEMENTS OF BONE.

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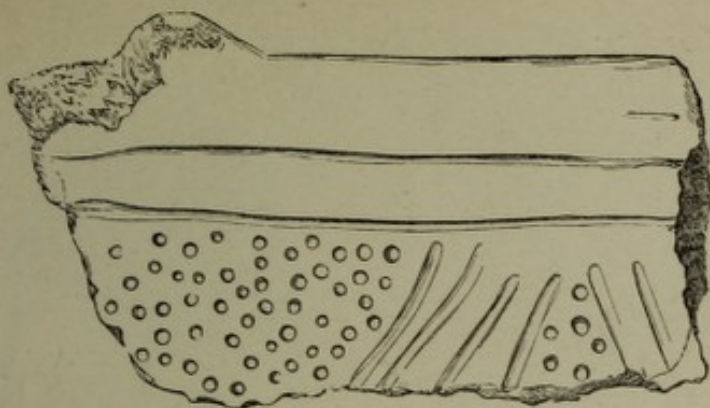
WORKED BONES AND HUMAN TIBIA.



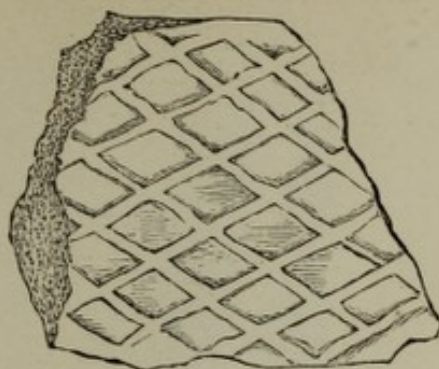
POTTERY.

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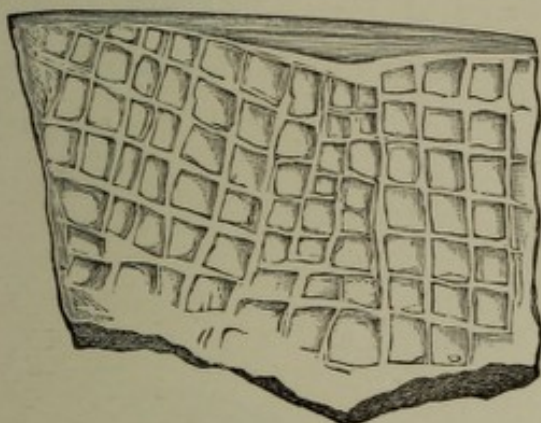
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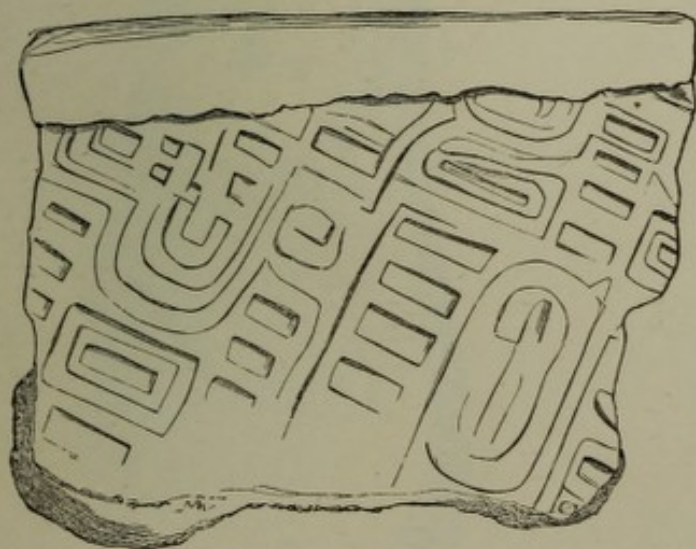
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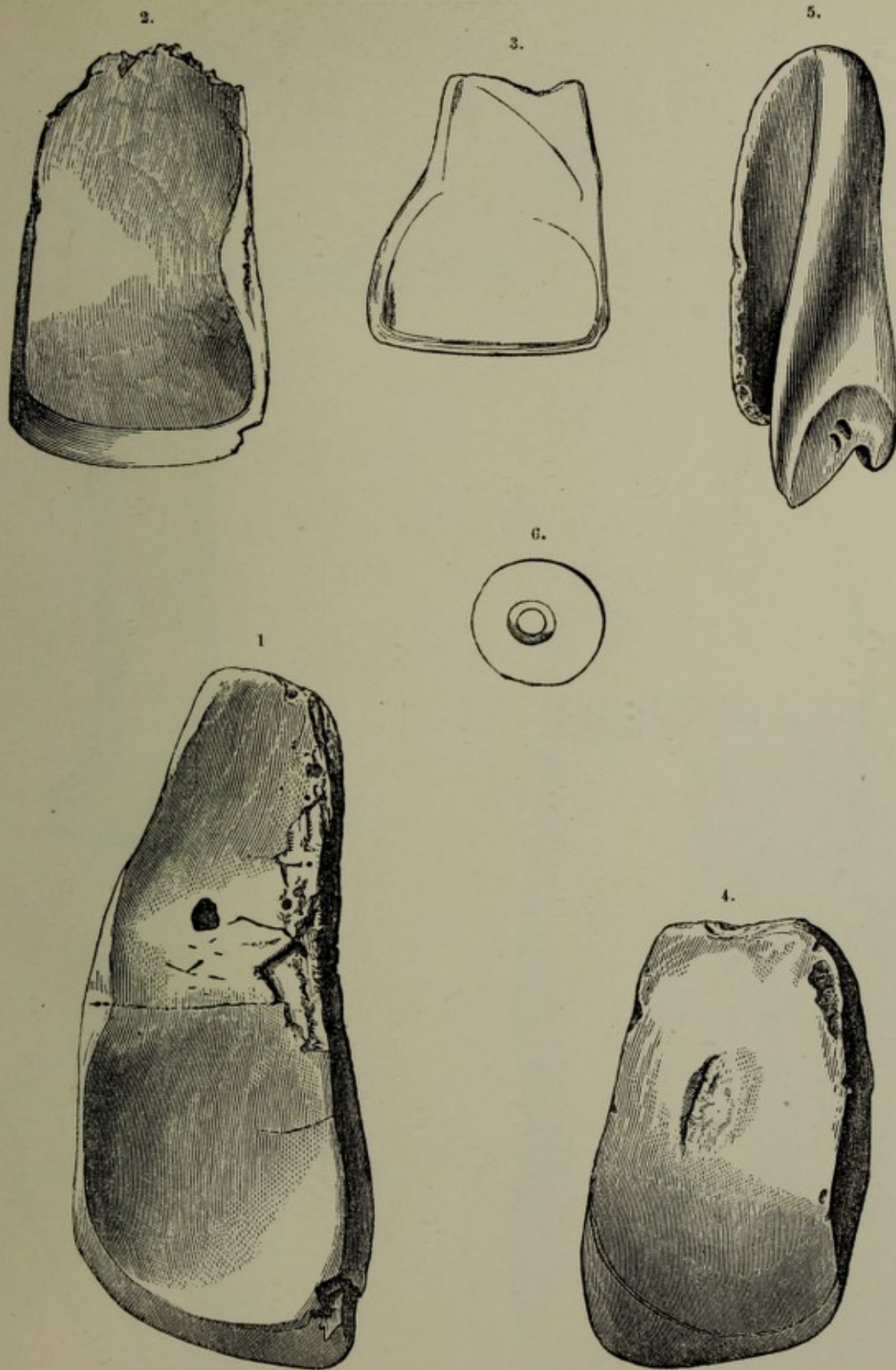


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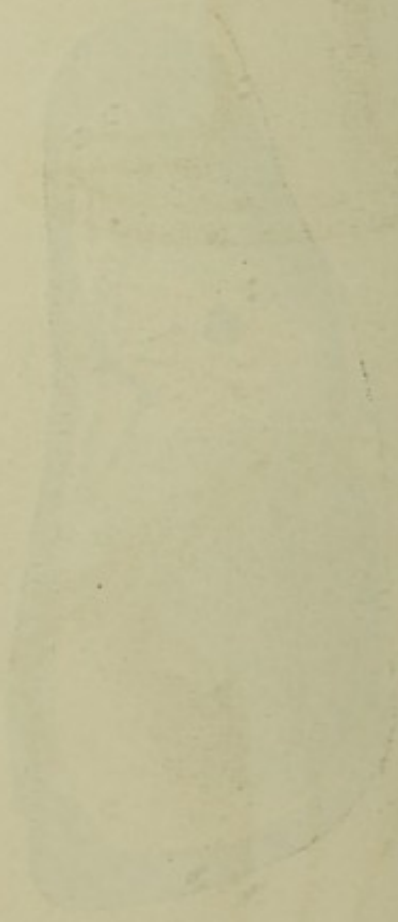
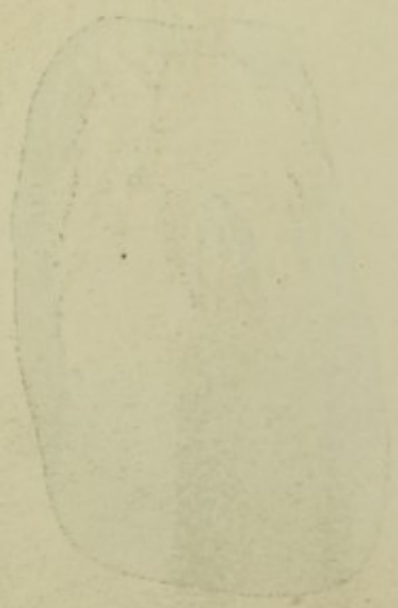
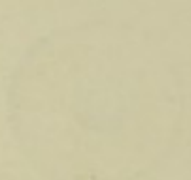
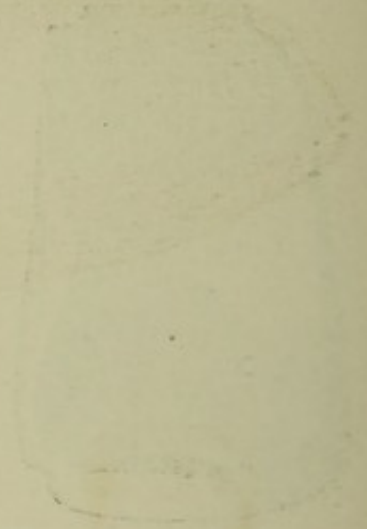
POTTERY AND IMPLEMENT OF SHELL.

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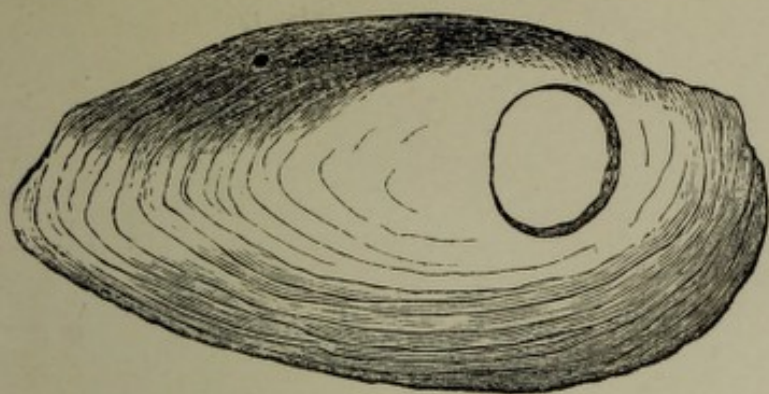


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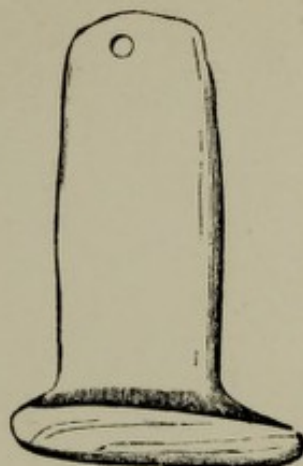
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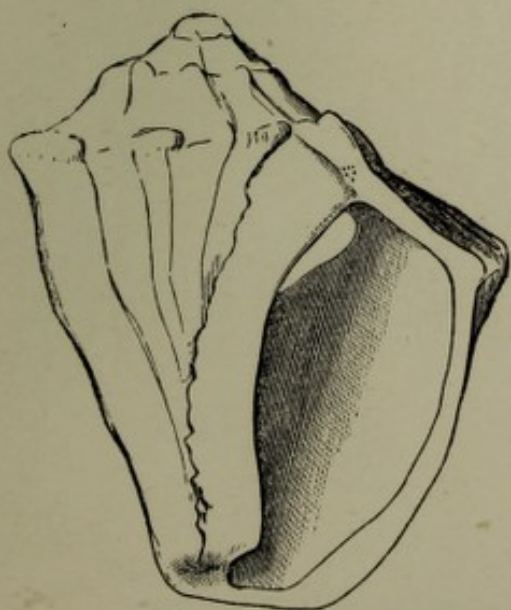
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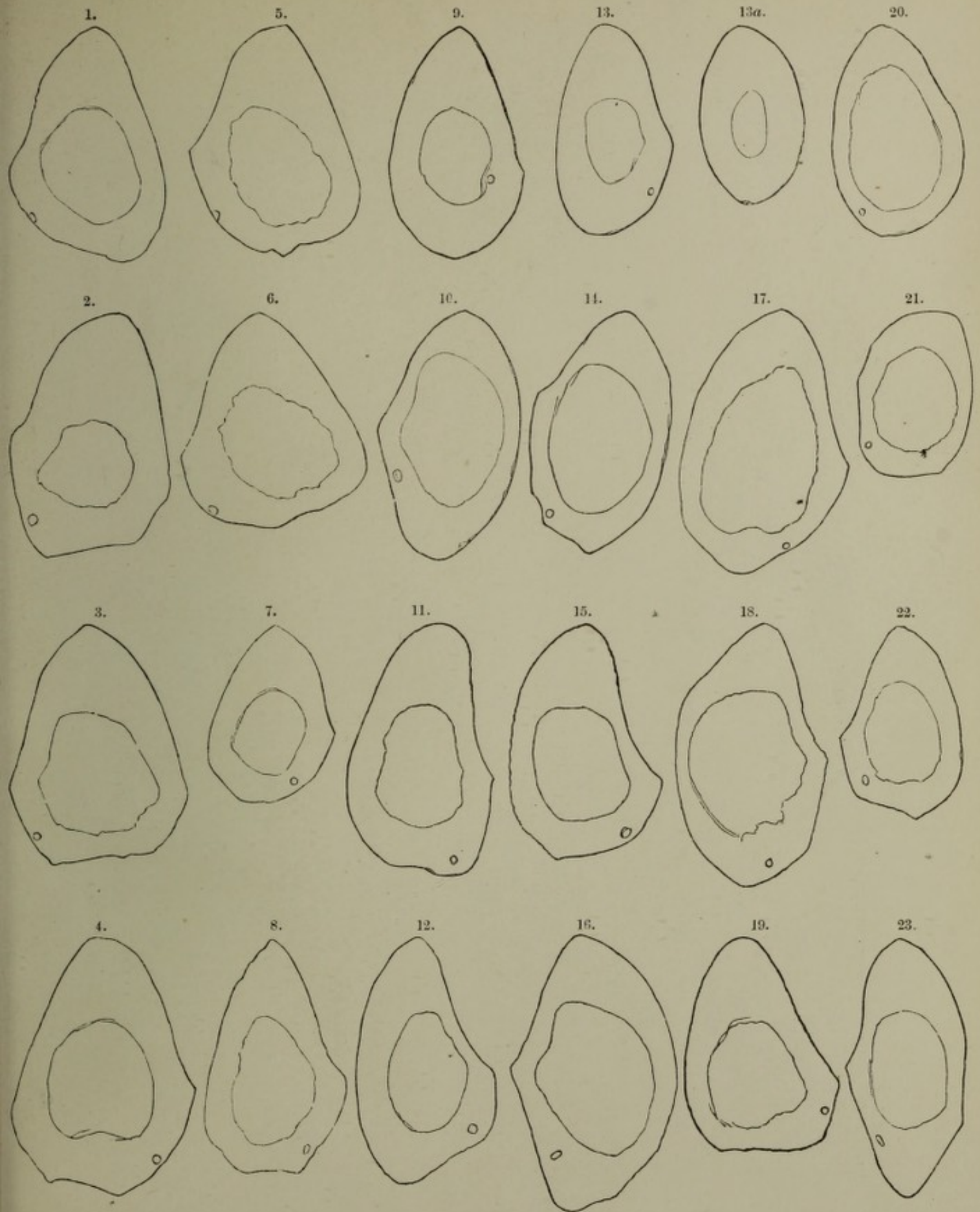
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ARTICLES OF SHELL.



SECTIONS OF TIBIÆ.

Figs. 1-8, White Race, recent. Figs. 9-23, North American Indians and Moundbuilders.

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