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AN ACCOUNT OF SOME KJÆKKENMÆDDINGS, OR
SHELL-HEAPS, IN MAINE AND MASSACHUSETTS.

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Crouch's Cove, Casco Bay, Maine.

ANY one who would take the trouble on going to a strange city, to examine the rubbish in its suburbs and streets, and carefully collect and compare the fragments of pottery, pieces of cloth, of paper, cordage, the bones of different animals used as food, worked pieces of stone, wood, bone, or metal, might gain some insight into the

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modes of life of the inhabitants, and form a fair conception of the progress they had made in the arts of civilization. Even after a city has become a ruin, and centuries have passed by, such examinations have been attended with fruitful results. A savage tribe, dwelling for a long period on one and the same place, would inevitably leave vestiges of the manner in which they lived, though these would, of course, be fewer in kinds just in proportion as the people were nearer to a primeval condition.

The former dwelling-places of the Aborigines of the United States are nowhere more plainly indicated than along the seaboard, where some of the tribes passed a portion, at least, of each year, in hunting and fishing; some no doubt living there permanently, while others, it appears, made visits only at stated periods.* The clam, the quahog, the scallop, and the oyster, entered largely into their food, and the castaway shells of these, piled up in many years, have not only become monuments of their sea-shore life, but have largely aided in the preservation of the bones of the animals on which they fed, and also of some of the more perishable implements used in their rude arts.

The shell-heaps on the Atlantic coast long since attracted notice. Dr. C. T. Jackson, and afterwards Professor Chadbourne, visited the remarkable one at Damariscotta, in Maine; Sir Charles Lyell has particularly described another on St. Simon's Island, in Georgia,† and quite recently Mr. Charles Rau, of New York, has given a full and instructive account of the examination of another at Keyport, New Jersey.‡ We have ourselves

*"Quand les sauvages vont a la mer pour y passer quelques mois a la chasse des canards, des outards, et des autres oiseaux qui s'y trouve en quantite," etc. Lettres du P. Sebastian Rasles a Narantsook ce 25 Oct., 1722. Lettres Edifiantes, Paris, 1838.

† Second Visit to the United States. New York, 1849. Vol. I. p. 252.

‡ Smithsonian Report, 1864, p. 370.

examined two on the sea-coast of East Florida, and still others in considerable numbers on the banks of the upper St. John's, in the same State. These last-mentioned heaps consist wholly of the shells of fresh-water species. We may have something to say of them hereafter, but at present shall only speak of such as were visited on the coast of Maine and Massachusetts during the summer and autumn of the year just past. Of the localities where these are situated, and of the structure of the heaps, we shall speak as briefly as possible; but shall enter somewhat fully into details, in connection with the implements and the remains of animals found in them. It is to be understood, however, that the heaps here described are only a very small portion of those to be seen along the coast of these two States, and which offer an ample reward to any who will take the trouble to examine them.

Frenchman's Bay. Mount Desert is the largest of the islands on the indented coast of Maine, and forms the western shore of Frenchman's Bay. Many shell-heaps are scattered over this and the adjoining islands and the main land. Williamson,* without particularly designating them, mentions the existence of several from one to two acres in extent, and states that "a heavy growth of trees was found upon them by the first settlers." We have examined two. The first of these is in Gouldsboro', on the main land, and near the water's edge on the eastern shore of the bay. It is said to cover an acre of land, but being under cultivation was examined only near its border, where a pit was sunk showing a deposit of clamshells about two feet in thickness. Among these were found the bones of several animals, including those of the

* History of the State of Maine. Hallowell, 1832. Vol. I. p. 80.

deer, elk, and beaver, but no implements of any kind. Stone implements have, however, been found by those who have cultivated the soil of this neighborhood.

A more complete examination was made of a second deposit on one of two small islands, neither of which are named, about a mile west of the place just mentioned.* This heap is seen on a bank, at a height of about six feet above the high-water mark, varies in thickness from a few inches to about three feet, and extends along the shore about two hundred and fifty feet, and from thirty to forty feet inland. A section through the heap at its thickest part showed that it belonged to two different periods, indicated by two distinct layers of shells. The lowest, a foot in thickness, consisted of the shells of the clam, whelk, and mussel, all much decomposed, and mixed with earth. Above this was a layer of dark vegetable mould, mixed with earth and gravel, and from six to eight inches in thickness. Above this was a second layer of shells, of the same species as those just mentioned, but in a much better state of preservation, and with less intermixture of earth; this deposit was in turn covered by another layer of earth and mould, and these now sustain a growth of forest trees, but none of them of large size. From the state of things just described, it would seem that the place had been reoccupied, after having been once abandoned long enough for a vegetable mould to be formed, and a layer of earth from some neighboring source to be deposited over it. Charcoal was found in considerable quantity, scattered among the shells, and the remains of an old fireplace were uncovered. The bones of animals, and the various kinds of implements (Pl. 14, figs. 3, 4,

*The two heaps were examined in company with Dr. Calvin Ellis, Messrs. John L. Hayes, William A. Hayes, and R. E. Fitz, to whom the writer is indebted for valuable specimens found by them.

5; Pl. 15, figs. 10, 11) obtained during the excavations, will be described in another page.

Crouch's Cove. This is situated on Goose Island, in Casco Bay, about fifteen miles north-east of Portland. The whole island is at present covered with a growth of spruce trees (*Abies nigra*), excepting a narrow strip on the seaward side, and on this, at the southerly end of the island, are several shell-heaps of different sizes. The longest of these is about one hundred and fifty feet in length, forty in width, and varying in thickness from a few inches to nearly three feet. Considerable portions have been washed away, and the contents scattered along the shore. The shells are mostly deposited evenly, but here and there are raised into small knolls, and all are covered with turf. This deposit has been carefully examined by Mr. C. B. Fuller, of Portland, by whom large collections have been made, and a portion of which were unfortunately destroyed by the great fire of 1866. Mr. Edward S. Morse has more recently made a partial examination, and obtained many valuable specimens, which will be mentioned farther on.

Our examinations* were begun on the bank and carried inland, until about 375 square feet of surface, and more than 700 cubic feet of material had been moved. Mr. Morse has given the following account of the shells found in this, and some of the smaller deposits near by. He enumerates the following species: "Common Clam (*Mya arenaria*), Quahog (*Venus mercenaria*), Large Scallop (*Pecten tenuicostatus*), Large Mussel (*Mytilus modiolus*), Cockle (*Purpura lapillus*), Beach Snail (*Natica heros*), Whelk (*Buccinum undatum*), Periwinkle (*Littorina lito-*

*The excavations were made by Rev. J. A. Swan, and Messrs. E. S. Morse, F. W. Putnam, Horace Mann, Edwin Bicknell, and the writer. The sketch of the locality was made by Mr. Joseph P. Thompson.

ralis); and also the following, for which there are no common names: *Nassa obsoleta*, *Natica triseriata*, and *Macoma fusca*. The following land snails were also met with: *Helix albolabris*, *Sayii*, *alternata*, *lineata*, *striatella*, *indentata*, *multidentata*, *Zua lubricoides*, and *Succinea Totteniana*."

"The heaps were almost entirely composed of the shells of the common clam, which appeared longer and rougher in texture than that now dug near by. In some of the heaps the shells of the quahog were abundant, and marked for their size and solidity. This species, though no longer found in the same cove with the heaps, may be had in the neighborhood of Goose Island, but localities in which it lives are quite rare north of Cape Cod. The common mussel, whelk, cockle, and scallop, were probably used as food, while the other species were doubtless carried there by accident. The presence of so many species of land snails would seem to indicate that the island was once covered with hard-wood trees, among which these animals alone flourish. The occurrence of the little snail, *Zua lubricoides*, is inconsistent with the view that it is an introduced species."

The shells were deposited in two different layers, very much as on the island in Frenchman's Bay already described. The older was separated from the more recent deposit by a thin stratum of earth, extending through the largest portion of the heaps. Pieces of charcoal were scattered everywhere among the shells, but in some places the larger quantity and the blackened earth showed where fires had been made. The number of the fragments of the bones of edible animals was quite large, belonging to no less than fifteen species. Besides these, many bones of other species, bone implements (Pl. 14, figs. 1, 2; Pl. 15, figs.

6, 7, 8, 9, 12, 13), and pieces of bone from which portions had been sawed off were found; no implements of stone were exhumed, though Mr. Swan found a small pestle, and Mr. Morse a chisel lying on the surface near the shore.

A third deposit was examined at *Eagle Hill*, in Ipswich, Massachusetts, situated on the borders of a creek, by which easy access is had to the sea-shore. The whole neighboring region consists of a series of low hills of gravel, some of them covered with boulders, but entirely destitute of forest trees. A few basswood trees (*Tilia Americana*) have been known to exist there within a few years, but otherwise those hills do not appear to have been wooded within the memory or traditions of the present inhabitants. Several shell-heaps are reported to exist in the neighborhood, but the only one examined was on the easterly side of the hill mentioned above. This consists of several disconnected deposits of shells, which are in part spread out into a uniform layer, but in a few instances form small knolls from eight to ten feet in diameter. Near the water's edge the shells are exposed by the washing away of the bank, but elsewhere are covered with mould and turf, and, in some places, even on the knolls, with a layer of gravel. In the more even portions, this last may have been washed down from the slopes above, but such could not have been the case with the knolls, for the tendency would have been to denudation rather than to covering up. The shells, forming these deposits, are almost exclusively those of the common clam, which are still found here in great quantities, and yield a considerable revenue to those engaged in digging them. Large piles of recently dug shells may be seen along the neighboring shore, and noticeably contrast with those from the Indian shell-heaps, in being thinner and

less rough in their texture. Shells of the oyster and the *Macra* were found, but few in number. Somewhat extensive excavations* yielded bones of the deer, beaver, dog, birds, among these the bones of the turkey, and of fish; but only a single implement of stone, which was spherical in shape, with a groove around the middle of it. This was found by Mr. Putnam just beneath the surface. Some of the bones showed distinct marks of cutting instruments, and a few pieces of wrought bone were found, three of which are represented in Pl. 15, figs. 15, 16, 17. Two distinct fireplaces, indicated by hard-wood charcoal, ashes, and blackened earth were found, resting on the earth and beneath the shells.

In the town of *Salisbury*, Massachusetts, a series of heaps thirteen in all, quite near together, consisted exclusively of the shell of the clam. They are about a mile from the left bank of the Merrimack River, near its mouth, and surrounded by a series of sand-downs, some wooded, others naked; these last constantly changing from the action of the wind. They vary in size from about twenty to more than one hundred feet in diameter, but the shells form a layer of only a few inches, and are largely mixed with sand. After a careful search, in company with Mr. Alfred Osgood, of Newburyport, we failed to find in most of them any of the works of man, except only a few flakes or "chips" of flint; but on two, both near together, large quantities of chips were scattered over the surface, and more than five pounds were picked up. Besides these, several arrow-heads and fragments of pots, made of burned clay mixed with coarse sand, were found. No bones of animals, which might have served for food, were noticed, though carefully looked for. In previous years,

* Made by Messrs. E. S. Morse, F. W. Putnam, C. Cooke, and the writer.

large numbers of stone implements of various kinds have been carried away; but as the place is in the neighborhood of a large town, and is frequently visited by those in search of such relics, they are now nearly exhausted.

Cotuit Port is in the town of Barnstable, on the south side of Cape Cod, and on the northern shore of a narrow bay. It is quite near to the sea, but protected from it by a narrow spit of land, which forms a natural breakwater across the bay at its mouth. Within the distance of a few miles, a large number of shell-heaps are met with, and have been estimated to cover hundreds of acres, sometimes having a thickness of between one and two feet, and at others of only a few inches. Oysters were formerly found in the bay in much larger quantities than at present, and doubtless formed one of the chief attractions which drew the Indians to this place. Our examinations were confined chiefly to one of the larger deposits, about a mile to the eastward of the village, situated on a sloping surface with a pleasant southerly exposure. Excavations by four persons during a whole day were made near the shore, and at various points inland, and brought to light the shells of the oyster, clam, scallop, and quahog, in large numbers, but quite unequally distributed; the clam being plentiful in some places, the quahog in others, and the scallop in others, while the oyster abounded everywhere.

Two species of *Pyrula*, viz. : *P. carica* and *P. canaliculata* were found, the first in considerable numbers. Neither of these species was found in any of the other heaps. Dr. Gould states that they are not known to exist north of Cape Cod. The largest specimen of the *P. carica* was about seven inches in length, a portion of the spire having been broken off, and this, according to Dr.

Gould, is their maximum size on the Coast of Massachusetts. It is, however, in remarkable contrast with a shell of the same species from one of the shell-heaps in Florida, which measured nearly fourteen inches in length.

Of the remains of vertebrates, the bones of the deer were the most abundant; but those of the seal, the fox, the mink, of birds, including those of a duck and the wild turkey, of turtle and of fish were found. During a former examination of this locality by Mr. George G. Lowell and Dr. Algernon Coolidge, a canine of a bear and a part of the skull of a cat was obtained. No stone implements, but a few worked pieces of bone were dug up, and also some fragments from which portions had been sawed off. The tine of a deer's antler, from which the tip had been sawed off, is represented on Pl. 15, fig. 14. About two-thirds of the metatarsal bone of the great toe from a human foot was found, in company with the bones of the animals already mentioned, and is the only portion of the skeleton of man which we have discovered while examining the heaps here described. The writer would express his obligations to Mr. George G. Lowell for the opportunity of examining the locality at Cotuit Port, and for the gift of valuable specimens.

Age. Shell-heaps have become intimately associated with the question of the age of the human race, a question which has passed out of the domain of the written, into that of geological history. It can only be satisfactorily answered by following the method of the geologist, when he attempts to determine the period when a given animal existed in former geological times, viz., by a careful comparison of the remains of such animal with those of existing species, and by an accurate study of the geological and other physical conditions under which they are found.

In Denmark, such methods applied to the *Kjækkenmøddings*, or refuse-heaps, have yielded results of great importance to archæology, and have shown that some of these heaps at least, as in Seeland along the Isefjord, date back to a period when their geological surroundings were somewhat different from what they now are, when the shores were less raised above the sea, and the oysters, of the shells of which the heaps are made up, had not yet retreated to where the fresher waters of the Baltic, at the present time, mingle with the ocean in the Kategatt.

The shell-heaps we have here described yield nothing which indicates as high an antiquity as those of the old world. The materials of them present some variety in the degree of decomposition which has resulted from time and exposure, the lower layers being much more disintegrated and friable, the shells in fact falling to pieces, while those of the upper ones generally preserve their original firmness. That there was a difference in time in which these layers were deposited, is further indicated by the fact, that, in two of the heaps, a stratum of earth is interposed between the earlier and later deposits, as if the locality had been abandoned as a camping place, and then after a prolonged absence of the natives had been reoccupied. Each heap, too, is covered with a deposit of earth and vegetable mould, of variable thickness, and in some cases, as at Frenchman's Bay, supporting a growth of forest trees, though these were nowhere of such size as to indicate that they had lived a century. Mr. Morse has called attention to the abundance of *Helices*, or land snails, which were exhumed at Crouch's Cove, and to the fact that these require a hard-wood growth for subsistence, while at present the island, on which this cove is situated, is covered with spruces. It is also noticeable

that there has been in all the localities, except at Salisbury, a disintegration of the shores, the sea undermining and destroying the deposits. There can be no doubt that these were once much more extensive than now, and that the water has worked its way into their places. Lastly, these deposits contain the remains of animals, as of the elk, not known at present to exist to the eastward of the Alleghany Mountains; of the wild turkey, now virtually extinct in New England; and of the great auk, which, unless it still live on some of the small islands to the north of Newfoundland, has receded almost, if not quite, to the arctic regions.

All these circumstances are certainly signs of the lapse of time. Nevertheless, in the absence of any positive data as to how long a period is necessary for the accumulation of vegetable mould, or for the washing of earth from the slopes above on to the heaps below, or for the rate of decomposition of shells in a given time, or of the rate of the denudations of the shores; and in view, too, of the fact that the animals represented in the heaps, but now no longer met with in the regions of them, have all disappeared within the historic period of this continent, it will be readily admitted that proof of great age or "high antiquity" is not found in any or all the circumstances which have been mentioned above.

On the other hand, it may be safely said that there is nothing in the condition of these heaps which is inconsistent with the hypothesis that they were begun many centuries ago. The examinations at Crouch's Cove, Eagle Hill, and Cotuit Port were sufficiently extended to enable us to obtain a fair representation of the objects they contain; but in no case was there found, nor have we been able to learn, that there had been previously found a

single article which could be regarded as having been made by, or derived from the white man, nor did we obtain any evidence that these particular heaps had been materially added to since the European has occupied these shores. Had intercourse with Europeans been once fairly established, it were a reasonable presumption that we should have found at least a glass bead, a fragment of earthenware, or an instrument of some sort indicative of the fact, especially when we bear in mind that it would be in just such places, where the savages collected around their fires and seething-pots to cook and eat, that such objects might be expected to be broken or lost. Finally, if the statements of Williamson on the authority of Johnson be correct, viz., that "a heavy growth of trees was found on them" (the deposits of clam-shells near Mount Desert) "by the first settlers," we have something like satisfactory evidence that their age could not have been less than between three or four centuries.

Remains of Animals. Human remains have not been found in the shell-heaps of Denmark, except in the case of casual burials, as of a shipwrecked sailor, or of burials from some other unusual occurrence, and these are of a modern date. The same absence of human remains marks the shell-heaps we are describing, with a single exception. At Cotuit Port an unequivocal metatarsal bone from the great toe of the human foot was discovered. No other bones were found with it, except those of animals. It was so deeply buried, and its appearance was such, that no doubt exists that it was of the same age as the heap itself; we have therefore assigned it a place in the following table, which gives a list of the species of animals uncovered and identified by their bones, or shells, in the different heaps, and shows their relative distribution through them.

Kinds of Animals found in the Shell-heaps.		Mount Desert.	Crouch's Cove.	Eagle Hill.	Cotuit Port.
1	Man,				*
2	Elk (<i>Cervus Canadensis</i>),	*			
3	Moose (<i>Alce Americanus</i>),	*	*		
4	Caribou (<i>Rangifer Caribou</i>),		*		?
5	Deer (<i>Cervus Virginianus</i>),	*	*	*	*
6	Bear (<i>Ursus Americanus</i>),		*		*
7	Wolf (<i>Canis occidentalis</i>),	*			
8	Dog (<i>Canis</i>),	*		*	*
9	Fox (<i>Vulpes fulvus</i>),				*
10	Cat (<i>Felis</i>),				*
11	Otter (<i>Lutra Canadensis</i>),		*		
12	Mink (<i>Putorius vison</i>),		*		*
13	Sable (<i>Mustella Americana</i>),		*		
14	Skunk (<i>Mephitis mephitis</i>),				*
15	Seal (<i>Phoca vitulina</i>),	*	*		*
16	Beaver (<i>Castor Canadensis</i>),	*	*	*	
17	Woodchuck (<i>Arctomys monax</i>),	*			
18	Great Auk (<i>Alca impennis</i>),	*	*		
19	Razor-bill (<i>Alca torda</i>),	*			
20	Ducks (three species),	*	*		
21	Wild Turkey (<i>Meleagris gallopavo</i>),			*	*
22	Heron (<i>Ardea herodias</i>),		*		
23	Tortoise (two species),				*
24	Shark,				*
25	Cod (<i>Morrhua Americana</i>),	*	*	*	
26	Goose-fish (<i>Lophius Americanus</i>),		*		
27	Whelk (<i>Buccinum undatum</i>),	*	*		
28	<i>Pyrula carica</i> ,				*
29	<i>Pyrula canaliculata</i> ,				*
30	Oyster (<i>Ostrea edulis</i>),	*	*	*	*
31	Clam (<i>Mya arenaria</i>),	*	*	*	*
32	Quahog (<i>Venus mercenaria</i>),		*	*	*
33	Mussel (<i>Mytilus edulis</i>),	*	*	*	*
34	Scallop (<i>Pecten tenuicostatus</i> and <i>P. Islandicus</i>),		*		*
35	Hen-clam (<i>Mactra</i>),		*		

Besides the species of shells mentioned above, and which may be regarded as having been used for food, there were also found species from the following genera, probably accidentally introduced, viz.: *Tritonium*, *Littorina*, *Nassa Zua* and *Purpura*; seven species of *Helix*; three species of *Natica*.

A glance at the above table shows what a great variety of animals was brought to these places by the Indians.

Some were hunted as articles of food, others for their skin, and still others for both. Precisely where the line is to be drawn between those which are and are not edible, or what animal an Indian would absolutely refuse to eat, it is impossible to say. Although the kinds of meat used were in the main palatable, the natives certainly did not hesitate to make use of some which do not commend themselves to the taste of civilized people. Josselyn, who, of all the earlier writers, has given the most complete account of the animals found on the coast of New England, states that "the Indians, when weary with travelling, will take them (the rattlesnakes) up with their bare hands, laying hold with one hand behind their head, with the other taking hold of their tail, and with their teeth tear off the skin of their backs, and feed upon them alive, which, they say, refresheth them."*

The bones of the deer and birds outnumber those of all the other kinds. The condition in which they are found bears a striking resemblance to that of the bones from the shell-heaps of Scotland, the Orkneys, and Denmark. Nearly all the fragments from the *deer* were those of the long bones, which in the living animal are either covered by the largest amount of flesh, or contain the most marrow. Not one of them was whole, all having been broken up for the double purpose of extracting the marrow, a custom almost world wide among savages, and often practised by hunters, and of accommodating them to the size of the vessel in which they were cooked. Even the phalanges of the toes were treated in the same way.

The bones of the *bear*, though much less numerous, were similarly broken up, and in two instances had been carbonized by contact with the fire. Among the speci-

*New England's Rarities Discovered. London, 1672. p. 39.

mens collected by Mr. Morse in his first visit to Crouch's Cove, was the last molar from the lower jaw. The crown was somewhat worn, but the ridges were not all effaced; it was of small size, measuring 0.55 inch in length, and 0.46 in breadth. The average size of eight specimens of the same molar in the black bear was, length 0.60 inch, breadth 0.47, while that of two specimens from the polar bear was, length 0.54 inch, breadth 0.45. The tooth from the shell-heaps, therefore, as regards size, more closely resembles the last-mentioned species, as it does also in the shape of the crown,—but it would be unsafe, from a single specimen of the molar in question, to attempt to identify them. The former existence of the polar bear, on the coast of Maine, is rendered quite probable by the fact that the tusk of a walrus has actually been found at Gardiner.* Sir Charles Lyell obtained a portion of the cranium of another at Gay Head, Martha's Vineyard.† It was found by a fisherman who supposed that it had fallen from a cretaceous bed in the cliff above. Perhaps it may have been of a more recent date, and a contemporary of the Great Auk.

The presence of the bones of the *dog* might be accounted for on the score of its being a domesticated animal, but the fact that they were not only found mingled with those of the edible kinds, but like them were broken up, suggests the probability of their having been used as food. We have not seen it mentioned, however, by any of the earlier writers, that such was the case along the coast, though it appears to have been otherwise with regard to some of the interior tribes as the Hurons. With them, game being scarce, "venison was a luxury found only at

*Observations on the Glacial Phenomena of Labrador and Maine. By A. S. Packard, jr. Mem. Bost. Soc. Nat. Hist. Vol. I. p. 246.

†Travels in North America. New York, 1845. Vol. I. p. 205.

feasts, and dog flesh was in high esteem."* We have not found any marks of cutting instruments, as was the case with the bones found by Steenstrup in the shell-heaps of Denmark, and from which circumstance he inferred that dogs were eaten. In fact, they have served as food in so many parts of the world, that the use of their flesh anywhere ought not to be considered an improbability.

A whole left half of the lower jaw of a *wolf* was found at Mount Desert, measuring 7.5 inches in length, making a strong contrast in size, with a similar half from a dog found at Crouch's Cove. This was more curved, and had a length of a little less than five inches.

The bones of *birds*, like those of the deer, were almost without exception broken, but in quite a different manner. In the latter it was the shaft that was shattered, the ends often remaining uninjured; while in the birds the shaft was whole, and the ends not only broken off, but nowhere to be found. It is not to be supposed that they were so broken off for the extraction of the marrow, since those containing only air were treated in the same way. Steenstrup having observed the same fact in the remains from the Danish shell-heaps, suspected that they were mutilated by dogs, and accordingly by way of experiment, having kept some of these animals on short diet, gave them various bird bones to eat. He found, as he had anticipated, that they ate the ends, rejecting the shaft. He explains their choice by the greater sponginess, and easier digestibility of the former as compared with the dense middle portion of the latter. No doubt an additional inducement was found in the remains of flesh, tendon, and ligament, which would usually remain adherent to the ends, after the portions ordinarily eaten

* Parkman. *Jesuits in America*. Boston, 1857. p. 30.

had been removed. On looking over the specimens of our collections, marks of teeth of animals were frequently noticed, some of them of such size as might be made by dogs, but others by a much smaller animal, as a cat or mink.

Of the remains of birds, by far the most interesting are those of the Great Auk (*Alca impennis*), which formerly had a much wider geographical distribution than now, for having followed the glaciers in their retreat, at present it is confined to the arctic and subarctic regions. In Europe it formerly existed, as appears from the evidence of the shell-heaps, on the shores of Scotland, the Orkneys, and it has recently died out in Iceland. In the United States we have the authority of Steenstrup and Prof. Baird for its former existence as far south as Cape Cod. There can be but little doubt that the last survivors lingered till after the arrival of the Europeans. The description of the "Wobble," by Josslyn, as far as it goes, applies to the Great Auk, "an ill-shaped bird, having no long feathers in their pinions which is the reason they cannot fly; not much unlike a penguin."*

There are various traditions along the sea-coast of its having been seen at a much later date. Audubon, however, in his voyage to Labrador saw none in the Straits of Belle Isle, but was told that they still bred on an island north of Newfoundland.

The remains of the Great Auk in the shell-heaps of Maine, were in sufficient numbers to show that it must have been common, since seven specimens of the humerus alone were found, besides fragments of the cranium, jaws, and sternum. The specimens of humerus differed remarkably in condition from the same bone of other birds

* New England's Rarities Discovered, p. 11.

found with them, in not being mutilated; for of the seven specimens, four were whole, and the fifth had lost but one end, while of the humeri of the other kinds, scarce one was whole enough to enable one to identify the species. They seem not to have been attractive to the dogs. They are characterized by their much flattened shape, thick walls, narrow cavity, and the absence of an opening for the entrance of air. Well-preserved specimens of the coracoid bone were also found entire.

The catalogue we have given of the animals found in the shell-heaps shows that the elements of variety in food certainly existed, especially if we add to these the maize, beans, squashes, and various kinds of roots Indians are known to have used. From the testimony of eye-witnesses, soon after the settlement of the country, it appears that while sometimes the Indian contented himself with maize roasted, or with this and beans made into a pottage, he often, when the necessary materials were at hand, made what might well be called a hodge-podge. Gookin gives a full account of the manner in which this was concocted. In a word, it consisted of a mixture of fish and flesh of all sorts. "Shad, eels, alewives," "venison, beaver, bear's flesh, moose, otters, raccoons, or any kind that they take in hunting," are cut into pieces, bones and all, and stewed together. "Also they mix with said pottage several sorts of roots, as Jerusalem artichokes, and ground nuts, and other roots, and pompions, and squashes, and also several sorts of nuts or masts, as oak-acorns, chesnuts, walnuts. These, husked and dried and powdered, they thicken their pottage therewith."*

Father Rasles† expresses his disgust at their style of

* Historical Collection of the Indians of New England, in Collections of Massachusetts History Society. Boston, 1792. p. 150.

† Lettres Edifiantes et Curieuses. Vol. I. p. 670.

cooking and eating, and Wood evidently had a poor stomach for "their unoat-mealed broth, made thick with fishes, fowles, and beasts, boyled all together, some remaining raw, the rest converted by overmuch seething to a loathed mash, not half so good as Irish boniclapper."* When visiting the English, if offered food, Wood informs us they ate but little, "but at home they will eat till their bellies stand forth ready to split with fullness."*

Works of Art. *Pottery* is poorly represented, only small fragments having been found. Like those from other parts of the United States, the pots were made of clay, with or without the admixture of pounded shells, and were imperfectly burned so that the walls are both friable and porous. The ornamentation, when it exists, is of the rudest kind (Pl. 14, fig. 18), consisting of indentations or tracings with a single point, or, as in some cases, with a series of points on one and the same instrument. Both at Crouch's Cove and Cotuit Port, specimens were found in which the lines in the surface had been formed by impressing an evenly twisted cord into the soft clay (Pl. 14, fig. 19), the cord being laid on in various positions. This kind of ornamentation has a special interest, since there is evidence of its having been made use of in widely distant places. We have found similar specimens on the banks of the St. John's in Florida; there are others from Illinois, presented to the Peabody Museum by J. P. Pearson, Esq., of Newburyport, and others have been noticed in the ancient barrows of England.† This kind of ornament has given rise to the belief that the pots were moulded in nets, which were removed after the vessel was finished. All the specimens we have seen are wanting in

* *New England's Discovered Rarities.* London, 1635. p. 59.

† *Prehistoric Times*, by John Lubbock, 1865. p. 113.

any indication of a regular mesh, or of the existence of knots where the cords crossed, which, if they existed, as they must have in a net, could not have failed to be represented.

Implements. It is somewhat remarkable that with the exception of the shell-heaps at Salisbury, all of those here described yielded so few articles made of stone. At Mount Desert only two arrow-heads were found, at Crouch's Cove Mr. Swann found a pestle, and Mr. Morse a rude chisel, both picked up on the shore, but probably washed out from among the shells. At Eagle Hill, Mr. Putnam found a spherical stone with a groove around it, but at Cotuit Port not a single piece of worked stone was discovered. In regions adjoining the different shell deposits, especially at Cotuit Port, an abundance of stone implements have been found, and those who have preceded us have occasionally obtained some from the heaps. In the Danish heaps, they seem to have been quite common, and Mr. Rau found them so at Keyport.

Implements of *bone*, on the other hand, are quite abundant, as were also fragments of bone showing the marks of the instruments by which pieces had been detached, and of such there was a considerable variety. Some of the bones were cut across by making a groove around the circumference, as one would cut a notch in a stick, and breaking the rest; and others, as the metatarsal bones of the elk and deer, were split lengthwise, by making a groove on each side nearly to the marrow cavity, and completing the division by fracture. The roughly striated surface of the groove, and its undulating course indicate a piece of stone, and not a saw, as the instrument with which the work was done. We have found by experiment that this mode of working bone does not prove so great a labor

as it might at first sight seem to be, and with care have succeeded in splitting in two, lengthwise, in the course of an hour, a piece of human ulna seven inches long, by means of a flint "chip" held in the hand. This, of course, involves a large expenditure of time, but it must be remembered that an Indian's time was not valued. The work is rendered very much easier by keeping both the instrument and bone wet. It has been objected to the opinion, that certain implements from the European heaps were used as saws, that having wedge-shaped edges they would soon become "choked" or "jammed." Practically this does not happen, for we have uniformly found that the roughness of the sides of the flint is sufficient to widen the groove as fast as the edge deepens it.

Implements of bone made by the Indians dwelling in New England have rarely been mentioned, and are seldom seen in collections, but if one may judge from the number of specimens we have obtained, must have been in quite common use. The inhabitants of the North-west Coast, and the Esquimaux, are largely dependent upon this material, and Messrs. Squier and Davis found a few bone instruments in the mounds of Ohio. The accompanying figures, drawn by Mr. Morse, represent the forms of the more important ones discovered in the different heaps, which form the subject of this paper. Except the first, which is reduced one-half, linear measurement, all are represented of the natural size. We are unable to assign any uses for the larger part of them, and of the others can only offer a conjecture.

EXPLANATIONS OF PLATES 14 AND 15.

Fig. 1. This instrument is ten inches long, two inches and a half broad at the top, and one at the point. It is made of one of the branches of the antler of the moose or elk. The breadth of the upper

Fig. 1.

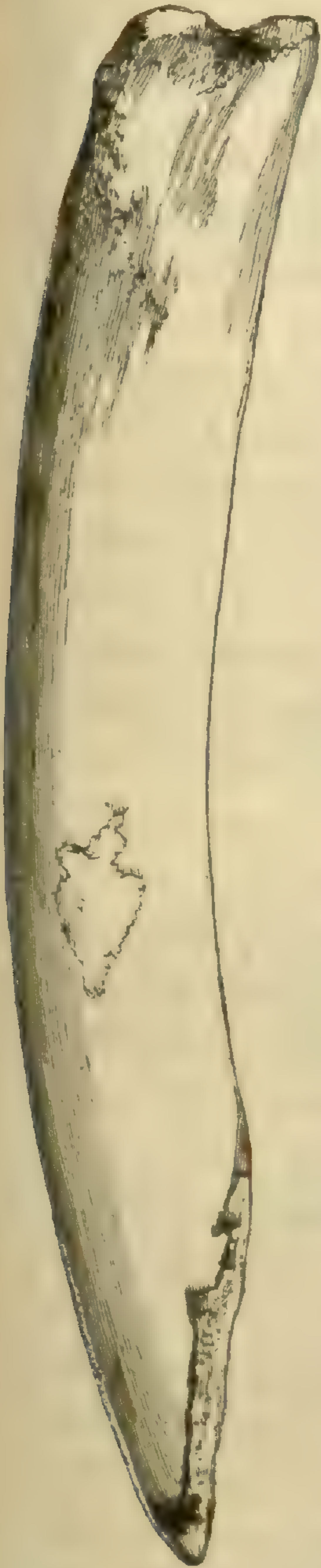


Fig. 4.



Fig. 5.



Fig. 3.



Fig. 2.



Fig. 2 a.



Fig. 18.



Fig. 19.

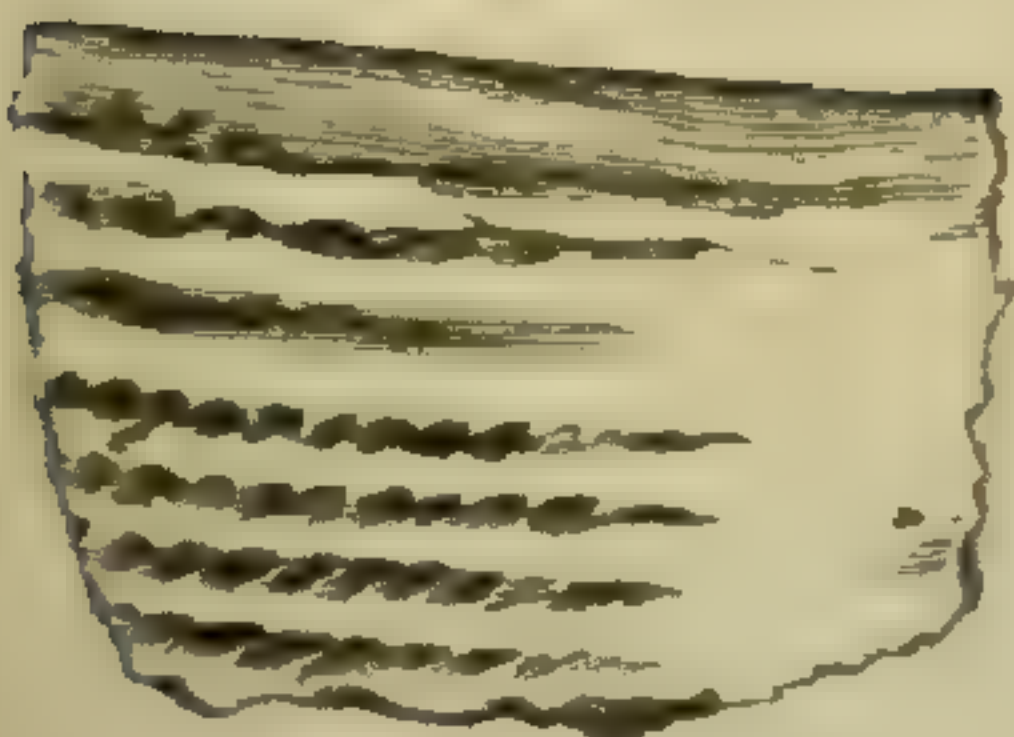


Fig. 9.



Fig. 10.



Fig. 8.



Fig. 11.



Fig. 14.



FIG. 7.



Fig. 16.



Fig. 15.

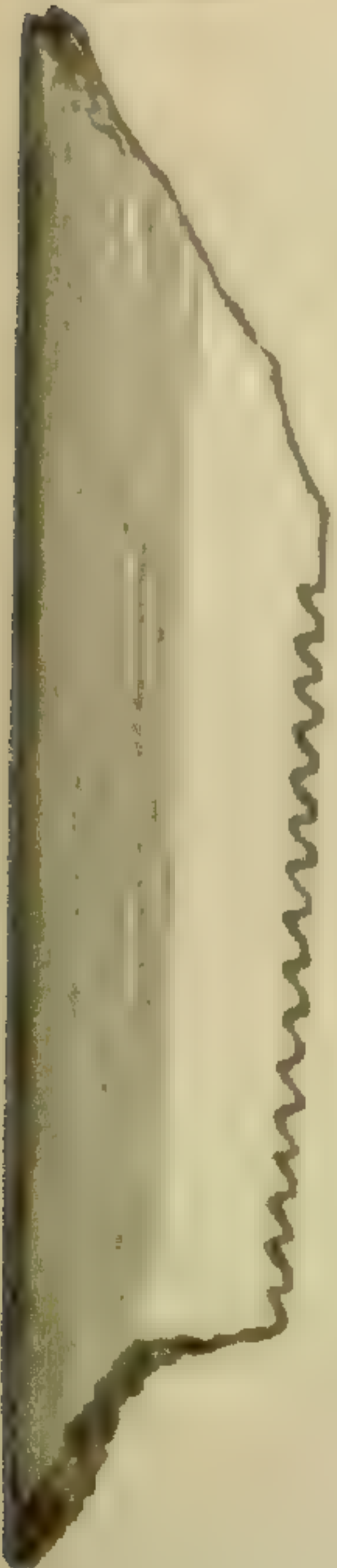


Fig. 13.



Fig. 12.



Fig. 17. 17a.



Fig. 6.



portion is not seen in the figure, as the piece is represented as seen edgewise. It is obliquely truncated at the lower end, so as to give it a chisel-shaped edge, and shows the effect of having been hacked by some dull tool. Attached to a handle it might be used to dig with, or might serve for the purpose of a head-breaker, or "casse-tête," as described by Father Rasles.* From Frenchman's Bay.

Fig. 2. A flat-pointed instrument, $3\frac{3}{4}$ inches long, and $1\frac{1}{4}$ wide. This is made of the dense exterior portion of an antler, and at the lower end has a thin sharp edge as in Fig. 2 a. From Crouch's Cove.

Fig. 3. A piece of one of the branches of the antler of a deer, from which the tip has been cut off. The sides near the pointed end have been worked down so as to present four faces, two of the angles uniting them being quite acute. The detached piece having a deep notch would be provided with two points or barbs, and would be adapted to serve as the point of an arrow. Such points were used by the aborigines, and we are informed by Winslow, that when the Pilgrims were making their first explorations on the shore at Cape Cod, previously to landing at Plymouth, some of the arrows shot at them had the kind of point just described.† From Cotuit Port.

Fig. 4. An artificially pointed fragment. From Crouch's Cove.

Fig. 5. An artificially pointed fragment of bone, suitable for the purpose of an awl. From Crouch's Cove.

Fig. 6. A fragment of a bone of a bird, obliquely truncated and artificially sharpened. From Crouch's Cove.

Fig. 7. One of the lower incisors of a beaver, ground to a thin, sharp edge, which last is formed by the enamel on the inner, or flat side of the tooth. From Crouch's Cove.

Fig. 8. A well wrought and polished spindle-shaped instrument, the lower end of which is flattened, and has a sharp edge; the upper portion is rounded with the end broken off, but appears to have been worked to a sharp point. From Frenchman's Bay.

Fig. 9. A slender piece of bone, smoothly wrought and pointed. From Frenchman's Bay.

Figs. 10 and 12, from Frenchman's Bay, and 11 and 13, from Crouch's Cove, are all made of flattened pieces, each being cut from the walls of one of the long bones, and showing the cancellated structure on one of the sides.

Fig. 15. From Eagle Hill; the serrated edge is quite sharp, but from this the bone rapidly increases to one-third of an inch in thickness, so as to render it wholly unsuitable to be used as a saw.

* Lettres Edifiantes et Curieuses. Paris, 1838. Vol. I. p. 670.

† Young's Chronicles of the Pilgrims. Boston, 1841. p. 158.

Figs. 16 and 17 are flat, scraped very thin, as seen in 17*a*; one of them is made from the bone of a bird. From Eagle Hill.

The specimens represented by the figures just enumerated, together with other wrought pieces more or less mutilated, and collections of the bones and shells from each of the heaps, are preserved in the Peabody Museum of Archæology and Ethnology at Cambridge, and in the Ethnological Department of the Essex Institute in Salem. Of these specimens, those represented in Figs. 6, 7, 11, 13 and 14, were from the Rev. J. A. Swan; Figs. 1, 9, 12 from Mr. William A. Hayes; Figs. 2 and 4 from Mr. Horace Mann; Figs. 10 and 17 from Mr. F. W. Putnam; Fig. 15 from Mr. E. S. Morse, and Figs. 3, 5, 8, 10, from the writer.



JKJOEKKENMOEDDING

THE CHICKADEE.

BY AUGUSTUS FOWLER.

THE Chickadee (*Parus atricapillus*) is a common resident, familiar alike in the woods and the dwellings of man. He fears not the storms of winter nor the heats of summer. Cautious yet bold, cunning though seemingly simple, he averts all suspicion of the whereabouts of his nesting-place, and, when discovered, scolds the intruder. Ever on the alert, the hawk cannot make him his prey, nor the smooth gliding snake surprise him in his nest. In times of incubation when danger approaches, the male,