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Massachusetts has a considerable number of so-called Indian forts, or earthworks. These usually consist of ditches with the dirt thrown out only on one side. Probably the most complicated one is at Millis but there are many simpler ones around Andover, Concord, and in the Connecticut Valley.

The origin and use of these ditches has caused some speculation in the past. They have been accredited to the Norsemen, Indians, or early Colonists. This paper will attempt to show, by means of modern archaeological methods not available to the earlier investigators, that some, and so by inference all, of these earthworks are post Indian in date of construction. Historical research will also be drawn upon to substantiate the archaeological evidence.

The first mention of these ditches in archaeological literature appears to be a few pages by Warren K. Moorehead in 1906 (1). He told of taking Charles C. Willoughby to the ditch near Haggett's Pond in West Andover and gave Willoughby's conclusion that it formed the remains of an Indian stockade. Willoughby in 1911 published on the Millis earthwork, mentioned the one near Andover, and gave a sketch of the one near Haggett's Pond (2). He also included information on several small fortifications reported by the explorers and early Colonists. In 1912 Moorehead published on the earthworks around Andover and concluded that they were all of Indian origin (3).

As "Fort Graham" in Ballardvale and the "Haggett's Pond Work" in West Andover were considered by Moorehead unquestionably Indian in origin, they were the ones singled out for excavation by the author. For their exact location, the reader is referred to Moorehead's monograph (4). It will be necessary to refer frequently to that publication and Moorehead's notations will be used throughout.

FORT GRAHAM

From Moorehead's plan of Fort Graham, (our Fig.1) it will be noticed that this earthwork is fairly extensive. The part investigated is around Sta. 4 and includes the "Pit" or "Circular Depression". Just to the north of Sta. 4 the ground slopes down. About 150 feet to the west of the same station it also slopes down, while to the east it gently rises to a high hill. The gully to the south is shown on the map. The result is like a peninsula, running nearly east and west. On this elevation, on both sides of the earthwork and surrounding the pit, is an Indian site, (W-12/43), which is being excavated by Arthur M. Hofmann of Ballardvale with the assistance of the author (5). As the earthwork approximately bisects the site, the ditch can be dated relative to the Indian occupation.

A trench, about three and one half feet wide, was dug through the ditch and the dirt thrown out from it near Sta. 4. Profile A, (Fig.2), shows the relationships found perpendicular to the ditch, while profile C shows them parallel to the ditch at the thickest part of the thrown out pile. Careful troweling discovered no post holes either in the mound or the bottom of the ditch.

For comparison, before discussing these profiles, it would seem advantageous to describe the usual nearby profiles. The tongue of land seems to be a kame composed of roughly stratified sands and gravels with an occasional, fairly good sized rock plus, probably, additional sand brought down by slope wash from the east.

Off the site, the normal profile consists of about 2½ inches of sod over 3 inches of brown humic stained sand. Next is a layer about 6 inches thick which with depth blends or fades from a light brown to a yellow brown. Underneath are yellow or white sands and gravels.

The situation on the site is similar, but the light brown layer has been replaced by a red brown layer which blends as before into the brown yellow. There also seems to be more variation in the thickness as the red brown may be from one to six inches and the yellow-brown from 2½ to 7 inches thick. The red-brown is the layer of Indian occupation, although the humus yields some Indian artifacts.

In profile A, (Fig.2), the outline of the original ditch is shown, cutting through the red-brown Indian layer and the yellow

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(2) Willoughby, 1911, pp. 566-576.
(3) Moorehead, 1912, pp. 150-154.
(5) This site has never been plowed. A report on its excavation will be published later.
brown layer into the white sand. During the years, it has been nearly filled with dark brown humic material consisting, presumably, of leaf mold mixed with sand. It is the stain from this material which caused the apparent lowering of the surface of the white sand directly below the bottom of the ditch. The bottom of the ditch at this point was 6 inches wide but on the other side of the test trench its width was 12 inches, which seems to be the intended width.

We have, therefore, a trench dug about 2 feet deep with sloping sides and varying in width from about 5 feet at the top to 1 foot at the bottom.

All of the dirt thrown out from the ditch was found under the present sod as a long mound on top of the old sod line on the west (downhill) side only. The western part of the old sod line at this point was black brown, containing a lot of charcoal; to the east, nearer the ditch it was dark brown. A few feet further to the west was a large Indian hearth (6) from which the charcoal probably came. Below the old sod line was the usual Indian site profile of red-brown blending into brown-yellow.

The yellow dirt of the mound contained a little charcoal, mostly near the top, fifteen angular rock fragments, three chips, and one piece of burnt bone. These must have been shoveled out with the yellow dirt when the ditch was dug as there was no disturbance. In some places, near the west edge of the mound, white, red, or brownish lenses, like individual shovel loads, could be distinguished.

(6) Hofmann, 1942.
FORTS, BOUNDARIES, OR HA-HAS?

PROFILES OF EARTHWORKS
A, B, C, & D - FORT GRAHAM
E - HAGGETT'S

FIG. 2
The yellow dirt rested unconformably upon the old sod line and near the bottom was mottled with small vertical cylinders, presumably where grass and bushes had been buried. The apparent great thickness of the old sod line is probably due to the fact that in digging the ditch the sod would be thrown out first. It contained eighteen angular fragments and burnt and unburnt bone.

The red brown layer under the old sod contained thirty-three angular rock fragments, some with red fire-stains, and a fair amount of charcoal. While the deposit was simple on the west wall of the trench, as shown in profile A, (Fig.2), it was complicated in the trench. A profile parallel with the ditch and through the center of the mound is given in C, Fig.2. Evidence of Indian occupation is apparent from the ash under the red brown layer. This disturbance may be the result of the construction of the hearth, (7) previously mentioned, just to the west.

In interpreting this evidence it seems clear that the ditch was dug some time after the abandonment of the site by the Indians. This is indicated by the small vertical cylinders found at the very bottom of the mound just over the old sod. Time enough for the accumulation of grass and small brush must have elapsed. The area here is too near the center of the Indian site to admit that much grass or brush was growing during Indian occupation. It is also to be noted that the present sod on top of the yellow dirt is thinner (1½ to 2 inches) than that shown (3 inches) for the surface east of the ditch (Profile A, Fig.2), or for the rest of the area. Nor does it have the brown humic layer found elsewhere. While thin sod would be expected on a mound, the substantial difference and the lack of a humic layer indicate that the yellow dirt was not deposited too long ago. The small amount of Indian material mixed in with the yellow dirt is what would be expected if a ditch were dug through an Indian site.

The presence of the clod of sod shown at the bottom of the yellow thrown-out dirt also argues for a post-Indian disturbance. Nearly all of the Indian site has been excavated and nothing remotely resembling a stone hoe, adze, celt, or gouge has been found. It would seem, therefore, that if the Indians had dug the ditch they would have had to use angular fragments of rocks, spear heads, knives, or digging sticks. While it might be possible to get a clod of sod with such tools it is not reasonable. As will be seen later, the shape of the clods which are a feature of these mounds, strongly suggests the use of metal shovels.

As a check, a trench was dug through the earthwork about 200 feet to the north, or about half way between Moorehead's Sta. 4 and Sta. 5, (Fig.1) and well off the area of the Indian site. This trench was only excavated through the mound and not through the ditch. The profile found is given as B in Fig. 2. As will be noticed from the old sod line, the land is sloping and the dirt is piled on the west or down hill side.

As would be expected, a distribution of strata similar to that found at the cut near Sta. 4 was found here with the exception of the evidence of Indian occupation which was absent. The thrown out dirt was light tan instead of yellow; under the buried sod line it was light brown fading to brown-yellow. As before, the present sod on top of the mound is thinner than the buried sod line, and the division between the thrown out dirt and the top of the buried sod is very irregular. The finding of this irregularity substantiates our contention that the Indian site must have had ground cover when the ditch was dug.

The pit or circular depression is shown on Moorehead's map just to the north-east of Sta. 4. It is entirely surrounded by the Indian site but on the north and south sides of the pit, or rather of the dirt thrown out from the pit, the site is very "thin" as the ground surface is beginning to slope rapidly. Moorehead says the pit was "something like forty feet in diameter and six or more feet in depth when we began its excavation." (8) Mr. Hofmann, who saw it as a youth, before Moorehead's work, says that it was much smaller than that. We measured the inside and found it now to be an oval about 18 feet east and west by about 25 feet north and south. Probably Moorehead measured the outsides of the thrown out dirt, which would give approximately the dimensions he reported.

With the exception of a small area on the south side, all of the thrown out dirt and the pit itself shows evidence of comparatively recent disturbance. Test pits indicated that this disturbance goes down to sterile sand. Assuming this to be the result of Moorehead's work of over thirty years ago, it is interesting to note that the soil here is less well developed than it is on the small undisturbed portion of the thrown out dirt to the south; which in turn is about the same as that on the mound accompanying the ditch, and less than that on the rest of the site.

A trench, about 30 inches wide, was dug through the small undisturbed portion of the thrown out dirt on the south side. A profile from this trench is given as D in Fig.2. It does not extend far into the pit because the side wall had been previously

(7) Hofmann, 1942.
Another disturbed area was found at the extreme outside edge of the thrown out dirt.

Again the same situation was found; yellow dirt lay on top of an old sod line, the contact between the two being marked by a wavy line. In places, this yellow dirt was somewhat white at the top, blending to red-brown at the bottom. (A reversal of the normal stratigraphy, which would be expected from such a deep hole.) There was some mot­tling at the bottom, indicating buried ground cover. A most interesting feature was the remains of clods near the bottom of the thrown out dirt, several of which are shown in the profile, D in Fig.2. Among these clods, and nowhere else in this thrown out dirt, twelve chips were found.

The old sod line was not quite as thick as in the other profiles, possibly because of the slope. On top of the old sod there was found one narrow triangular point, and in it, two chips and a charred nut.

Under the old sod there was the typical site profile of red brown blending into brown yellow. In the red brown layer one angular fragment of rock and a little charcoal was all that could possibly point to Indian occupation. As explained before, the ground begins to slope here and it is the edge of the Indian site.

The clods clearly indicated a rectangular shape, and it would seem that they must have been cut by metal shovels. They were from 5 to 8 inches long and 3 inches thick. The finding of chips only in direct association with the remains of sod near the bottom of the thrown-out dirt, seems to clearly indicate that this pit was dug after the Indian site had been abandoned (9).

HAGGETT’S POND WORK

Before discussing Fort Graham further it seems desirable to describe the excavation made in the Haggett’s Pond Work. It will be remembered that this is the one first mentioned in 1906 and considered the remains of an Indian stockade (10). The map (Fig.3) shows the relationship between it and the Indian site, M-12/17.

A trench, 15 inches wide, was cut through the earthwork at a point about 50 feet north of the south end (11). This was about 20 feet south of an old cut presumed to be the one made by Moorehead. A profile of this trench is shown as E, Fig.2. Troweling produced no post holes in either the ditch or the mound.

As at Fort Graham, a ditch had been about two feet deep but it seems to have been wider at the top than the one at Fort Graham. At the top the width was about 8 feet, at the bottom, about 1 foot; the west side was steeper than the east. The thrown out dirt was all piled on the east or lake side, and the present sod is much thinner than the buried sod line. There was no mottling or evidence of buried brush at the bottom of the mound. Old clods of sod or forest floor 10 inches across, were found near the bottom. Two are shown in the profile.

The dirt of the mound was grey towards the east, light tan in the center, and light brown to the west. The trench was partly filled with dark brown humic material. Considerable slope wash is indicated by the profile, which shows the light brown dirt overlying the dark brown in the eastern part of the ditch, irregularities in the west wall, and the deposit of yellow near the bottom.

The buried sod line was particularly thick and seemed to be divided into an upper and a lower part. The appearance was as though a forest floor had been buried by similar material from the first diggings of the ditch. The top contained charred bark, ashes, and charcoal. The latter appeared to be pine. There was also some unburnt wood which appeared to be cedar.

Underneath the old sod line was red yellow sand and gravel with yellow sand and gravel below. This was stained light brown under the ditch proper.

Two points which may have possible bearing on the reason for the construction of this ditch are to be noted from the profile; the grey-yellow color of the dirt in the eastern part of the mound, and the great difference in the thickness of the humic layer under the present sod at the east and west ends of the profile. The greyness presumably indicates surface fires relatively soon after the ditch had been dug. Small test holes were dug 10 feet further to both the east and the west to test the humic layer and it was found that to the east it is about 8 inches thick and moderately black brown to dark brown while to the west it is 9½ inches thick and dark brown.

To the west the present ground seems more uneven, has more ferns, less underbrush and no blueberry bushes; while to the east there are blueberry bushes. Oaks and birch

(9) A guess as to the use of the pit is hazardous. It may have been the vegetable storage pit of an early settler. There is an old cellar hole on lower land a short distance to the west.

(10) Moorehead, 1906.

(11) Miss E.R. Frazer very kindly gave permission for this excavation.
mixed, with an occasional pine, are found today on both sides of the ditch. While the evidence is not very conclusive, there is a suspicion that the land immediately to the west tends to be swampier. Moorehead noted a difference between the east and west sides 35 years ago but his interpretation is different. He reported large stumps to the east and none to the west. (12)

With one exception, absolutely no evidence of Indian material was found. The Indian site seems to end about 100 yards to the southwest of the ditch. The one exception was a crude, fully grooved, net sinker or grooved hammer, 2 7/8 by 2 3/4 by 2 1/4 inches. This was found in the dark brown humic material filling the ditch. Its relative position is shown in profile E, Fig. 2.

As this artifact was in the fill of the ditch, it must have reached its final location after the ditch was dug. Examination of the dirt around the roots of trees felled by the hurricane and from two small test holes between the trench and the Indian site gave no suggestion of Indian occupation. Moorehead, who also trenched the ditch, mentions no Indian material and there is no question but that he would have, if he had found any. As the ditch is between the Indian site and a brook running into the lake, the conclusion seems logical that this specimen represents a stray, lost on the surface, shovelled out when the ditch was dug, and then washed to its present location from the thrown out dirt.

Due to absence of other evidence of Indian occupation the author feels that this ditch is post-Indian and consequently dug by white settlers. The clods seem to bear this out, indicating, presumably, metal shovels. It also seems to be too far away from the Indian site to be considered the possible remains of a stockade, not to mention the fact that no post holes were found.

GENERAL CONSIDERATIONS

In spite of having presented the evidence from the excavations and concluding that both Fort Graham and the Haggett's Pond Work are post-Indian, it would seem profitable to follow the question of possible Indian origin a bit further.

The possibility that the ditches were

made by the Indians for driving game has been suggested. However, they do not seem to have either the arrangement or location to function in that manner.

It seems that Moorehead was misled in his conclusions because he found evidence of Indian occupation at Fort Graham in Ballardvale. However, he only found it between Sta. 1 and 2 (13) and around Sta. 4, or about one twenty-fifth of the total extent of the earthwork. Examination of the map of Fort Graham shown in Fig. 1 will indicate that the earthwork seems to surround low land (14) and has a total traceable length of over 5000 feet. That would represent quite an undertaking for the Indians. While two or three small sites are included in the area, there is no evidence of the heavy population which would be inferred if Indian construction were assumed.

In the twenty acres which Moorehead considered as suitable for Indian habitation within Fort Graham, excepting the sites referred to above, he reported only one arrowhead and a half dozen chips from many interest trenches and fifty test pits (15). Certainly not sufficient evidence to support the theory of Indian origin.

Willoughby discusses forts and palisaded spots known to be Indian from the accounts of the explorers or first settlers. The largest one reported for Massachusetts covered two acres while the rest are given as 40 or 50 feet across, and either square or round. Phillip's famous fort at South Kingston, Rhode Island, probably the largest built by the Indians in New England, is estimated as enclosing an area of only five acres (17). All of these are substantially smaller than the earthworks we are discussing. Also they are all spoken of as having palisades, of which no evidence has been found in the earthworks under discussion.

CONCLUSIONS

Having, we hope, demonstrated that these earthworks are post-Indian in date, and consequently made by the early settlers; it would seem desirable that possible explanations for their construction be presented. Various reasons have been suggested: flax rotating pits, fortifications during the French and Indian Wars, firebreaks, drainage ditches, boundary lines, and ha-has to restrict the wanderings of animals.

It seems to the author that no one simple reason will explain all these ditches. Due to their size and location the possibility of their being flax rotating pits or trenches from the Colonial Wars can be eliminated (18).

Of the other four possibilities—there may be more—it seems that different ones may, in different places, be the reason for construction. Each one, therefore, should be studied separately to determine its original use. It is not the purpose of this paper to exhaust the possibilities of each ditch. However, general comments will be made and specific conclusions given in certain cases.

Mr. Benjamin L. Smith of Concord assures the author that in Concord similar ditches have been maintained as firebreaks in certain places, such as around Waldon Pond and Sleepy Hollow Cemetery, where fires occur every year or so. It is to be noticed that these are places of special interest warranting special precaution. Mr. Emerson, retired chief of the Andover Fire Department is certain that such has not, at least for a very long time, been done in Andover. Nor is there any evidence in the town records (19). For many years—at least from 1722 to 1788—they mention appropriations for cleaning the fish courses so that it is not likely that one for cleaning firebreaks would have been omitted.

In favor of this theory it must be admitted that there was a great deal of valuable timber in Andover in the early days. The oaks were considered particularly fine for ship work (20) and the cedars for shingles. In fact it was necessary to get the

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(13) There is an Indian site between Sta. 1 and 2. It is across the gulley from site M-12/43 and may or may not be an extension of it.

(14) Moorehead, 1918, p.26, remarks "that these ditches are along the inside of the works strengthens the theory of the Indian origin." At Fort Graham the ditch is on the outside. See Moorehead, 1912, Fig. 3, opp. p.16, taken at Sta. 5 looking west. He continues "The ditch being towards these rocks and bluffs is an indication that the defenders had their camps east of the wall." But the enclosed area is to the west of Sta. 5, i.e. away from the rocks.

(15) Ibid., p.23.


(17) Willoughby, 1911, p.575.

(18) Bailey, 1880, p.172. In 1676 the Court ordered "that a fence of stockades, or stones, be built eight feet high from the Charles River to Concord River in Billerica, thence connecting by way of the large ponds with the Merrimack River. . . ." However, this was not done.

(19) Andover Town Records. These were searched, moderately carefully, from 1700 to 1830. In 1822 they voted not to have a "fire ward", and in 1830 not to buy a "fire engine".

(20) Bailey, 1880.
Cheever's permission to cut down a cedar tree (21). As certain "cedars" grow in swamps and some of the ditches tend to surround swamps the firebreak theory is plausible. However, they would not function as firebreaks unless maintained, and even then would only stop grass or small brush fires. Certain of them (Foster's Pond Work) could not possibly have served as firebreaks and the lack of local reference to them as such mitigates against this use in Andover.

As far as a general consideration goes, the possibility of their being drainage ditches is untenable as some go up and down hills. However, the one at Haggett's Pond seems to the author to be a drainage ditch (22). The difference in the vegetation and surface of the land east and west of the ditch has been mentioned earlier. It is also to be noticed that the eastern end of the cultivated field, where the Indian site is located, a hundred yards or so to the southwest, shows evidence by fungus growth, etc., of dampness. It seems likely that this ditch was dug to lower the water table of a small swampy area between the field and the ditch. In this connection it is to be noted that there is no indication of any corner at the southeast end of the ditch, contrary to Moorehead's statement on page 17. At this end, the trench obviously just starts (or ends) and there is not the slightest evidence, now at least, of a corner or continuation. At the northwest end there is the corner and extension as shown by Moorehead (Fig.3). In agreement with the drainage theory, the mound is on the east, or side away from the presumed swampy land, and to the north is a deep gulley into which the water from the northeast extension of the ditch would seep.

(22) The grey yellow of the eastern part of the mound might be used as an argument for a fireditch but the lack of continuation to the south and the corner at the north would not seem logical.
The earthwork at Fort Goldsmith (Fig. 4) is nothing more or less than the remnant of an old road, (23) cut into the side of a hill, as anyone who wishes to stop at Gould Road, between Andover and Reading, and look behind the pines will find out for himself. It begins only about 30 feet off the main road.

Ha-has are sunken fences used principally in England to restrict the range of cattle and sheep or to keep out deer. They were sunken so as not to obstruct the view. Apparently a classic ha-ha should have a fence either in the ditch or else along the mound. However, it can still be a ha-ha without the fence, one steep wall serving as the fence. No indication of fence post holes was found in the excavation but if rail fences were used, it would only be by luck that one would be found in a narrow test trench, or no posts might have been used, depending on the type of fence.

In the Andover Town Records there are a lot of references to the depredations of live stock, but no intimation there, or in the town history, of the use of ha-has, while the fence viewer was an early (1865) town officer (24). However, there is a definite possibility that some of the ditches may have been ha-has.

In the olden times, three kinds of land were spoken of; meadow, pasture, and till ing lands. The meadow lands were low, swamy and usually bordering on the streams or ponds. One feature that seems common to many of these ditches around Andover is that they tend to enclose low land. The mound is always on the water's side. That may be because the water side is the lower side and consequently the easier side for throwing or because that would be the correct way to dig a ha-ha to keep animals out of the meadows. From their geographical location the earthworks of Fort Graham, Fort Shawsheen, and Fort Benner would fit this hypothesis admirably.

In the Connecticut Valley, similar ditches are referred to by some as ha-has or sheep ditches. The author has seen some of these ditches and they appear to be similar to Fort Graham, Fort Shawsheen, and Fort Benner. For the Connecticut Valley, there is documentary evidence which seems to shed light upon these earthworks.

"Next to the intervales, the swamps were most sought after *** for hay," says Judd in his HISTORY OF HADLEY (25). He continues, "Hadley ordered, in 1669, that little Pansett fence should be made 'with ditch, posts, and two or three rails on the same. The broad ditch and high bank of earth thrown out of the ditch were an important part of the old common fence, they may still be seen on both sides of the river. The ditch was on the outside of the bank and rails, for the main object of the fence was to secure the meadows from domestic animals that roved in the woods on the outside." (26) "The old ditch which belonged to the Forty Acre fence, may still be traced in many places, on the plain, on banks, and hill sides." (27) "The people of Hadley fenced the common fields, school meadow and homelots, and for a century not many other lots. The fences were chiefly of two sorts, let, a fence was made of 3 rails with posts, about 4 feet high. 2d, a sufficient ditch was dug, and the earth was thrown upon one bank, and a line of posts with 2 or 3 rails was set upon this bank." (27) John Pynchon had four kinds of fences at Springfield and Suffield in the 17th century, "Including *** a ditch and dead hedge". "Some of his ditches exceeded 4 feet in width and 3 feet in depth, with a dead hedge on the bank." (29)

It is interesting to note that "The ditch fence was used many years after 1800," and that "Ditches were dug in the last century (18th Century) at 8 pence per rod, when labor was high. 2d, a sufficient ditch was dug, and the earth was thrown upon one bank, and a line of posts with 2 or 3 rails was set upon this bank." (27) John Pynchon had four kinds of fences at Springfield and Suffield in the 17th century, "Including *** a ditch and dead hedge". "Some of his ditches exceeded 4 feet in width and 3 feet in depth, with a dead hedge on the bank." (29)

A writer of 1848 says, "There is now a fence where the sheep pasture fence was, and the ditch of the old common fence still stretches up the mountain side. Most of the old sheep land is now in woodland." (31)

The above indicates that these ha-has were common in the Connecticut Valley in Colonial days. The similarity to many of the Andover earthworks in the location and description suggests a common purpose. It is logical to expect that as the meadow land was divided up, parts, at least, of these ha-has would become boundary lines, as is indicated in the preceding paragraph.

Such seems to be the case with Fort Graham (32). Referring to Moorehead's map reproduced in our Fig.1, it will be noticed

(23) Moorehead, 1912, pictures, Fig. 8 and 9, pp. 29-30, show this clearly.
(24) Judd, 1863, p. 292.
(25) Ibid., p. 41.
(26) Ibid., p. 200.
(27) Ibid., p. 439.
(28) Ibid., p. 439.
(29) Ibid., p. 439, footnote.
(30) Ibid., p. 440.
(31) Ibid., p. 298.
(32) Fort Graham, and Forts Benner and Shawsheen (Fig. 5) meet all the requirements of the Connecticut Valley type of ha-has.
that a stone wall approaches the earthwork from the southwest towards Sta. 6. Not shown on the map, however, is the fact that this wall continues past Sta. 6 towards the northeast, while another stone wall, following the earthwork from Sta. 7, continues past Sta. 6 towards the southeast. There is then, at Sta. 6, the corner of the earthwork, a crossing of two stone walls. The stone wall from Sta. 6 runs in the ditch, beside the ditch, or on the mound, depending on where one inspects it. It is clear that part of the way, at least, the earthwork and a boundary line coincide. A similar situation is suggested at Sta. 9 but the author has not examined it himself.

There are many more ditches in what might be called the "Foster's Pond Work" than are indicated by Moorehead's map (our Fig. 4). Three, of about the same length, coinciding with boundary lines, but there is no accompanying stone wall. One of these was the boundary in a deed recorded in Salem on April 25, 1825. Others were recorded later (33). It is to be noted that on Moorehead's plan the earthwork of the Foster's Pond Work is shown as coinciding with the boundary line between the land of Carter and Pearson. There is also another deed of the early 19th Century mentioning a line to a dry ditch, the latter being part of Fort Graham near Sta. 14. (34)

Moorehead mentions the Foster's Pond earthwork as being different from the others because the dirt was thrown out on the higher side (35). An examination fails to confirm this. Along the southern end of the earthwork, the land drops suddenly into a swamp. Only part of this steepness is the

(33) Miss Bessie Goldsmith of Andover has copies of some of these deeds. The 1825 one, from Amos Holt to Joseph Gowing, registered in Book 239, Leaf 48, reads in part as follows: "Thence north 12 west lay land as aforesaid four rods and one-half (4\(\frac{1}{2}\)) to a ditch by land of Jon Carter, and Asa Sheldon, "Thence Northerly and Easterly up said ditch as ditch is now dug, sixty-seven rods and three-tenths (67.3) to a stake in the corner of the ditch by land of John Russell."

(34) Arthur Hofmann, personal communication.
(35) Moorehead, 1912, p.43.
result of the ditch which is dug exactly at the edge of the swamp. It is not too clear, however, as to where the dirt was piled. Unquestionably the west wall towers up from the ditch but there is a suspicion of a mound just to the east, in the swamp, at the edge of the ditch. The difficulty is that dirt thrown out from the swamp would be muck and hard to locate. The top of the ground to the west would be a difficult throw. Following the ditch to the north, it becomes lost and then reappears, much smaller, and with the mound definitely on the swamp side. From an examination of this ditch there seems to be no possible use for it except as a boundary line, for which it is still being used today.

As the Millis earthwork is the most famous and complicated in Massachusetts, a few words should probably be included viewing it in the light of this investigation. Unfortunately, the author has not visited it himself. Willoughby did not specifically commit himself as to whether it was of Indian or white construction, but infers that it is Indian (36). Moorehead says, after looking at it, that "If they (the Millis earthworks) are of Indian origin, the ones near Andover certainly are." (37) From the illustrations they look similar but larger (38). From this we can assume that there is not much difference in their appearance, and the author would presume them to be post-Indian. Willoughby does not report any Indian material but Moorehead indicates some was found there (39).

Willoughby states that while the dirt is usually piled on the lower side, that some of the cross ditches vary in this respect, as will be noted from his plan and cross section (40). However, an examination of the model on exhibit at the Peabody Museum, Harvard University, Cambridge, Mass. and of the sketch on file there, indicates that while the side on which the dirt is piled varies, it is always on the lower side of any one ditch. It is also interesting to note that a photostat of a map of the land made in 1643 does not show any earthworks. There seems to be no reason for not assigning them to the work of the early settlers. Probably they are ha-has dividing the pastures on the hill for sheep grazing.

The evidence indicates that all the earthworks of this type in Massachusetts are the work of the early settlers and that they were built for various reasons but chiefly as ha-has or boundary lines.

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(36) Willoughby, 1911.
(38) Willoughby, 1911, Figs. 80-90, pp. 570-572.
(39) Moorehead, 1912, pp. 14 and 52.
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Fig. 8. Felsite flaking stones:— a. from Carver (surface find), b, c, from Nook Farm (M41/9) d-f, from work shop. Three pendants from work shop.
DIGGING AT INDIAN WORK SHOPS NEAR PLYMOUTH, MASS.

W.W. Whiting

I shall try to give some opinions which have formed in my mind during a seven-year, spare-time dig at two Indian work shops with my friend, Jess Brewer. The conclusions which I have arrived at could not have been formed without his help. I hope the archaeologists who read this article will make exceptions as I cannot use the forms to which they are accustomed, being only an amateur. Still, if there is some little thing in this paper which will help toward the general goal that we are all striving for, I shall feel well rewarded for my effort.

These two work shops probably have some connection with each other as they are only about one eighth of a mile apart. They are both located on a hill, overlooking a swamp with a brook running through the middle. This land is in the woods and is virgin territory, never having been cultivated by white men, consequently the material lies in the ground just as it was when the Indian left them there. The ground is covered with rooty turf about six inches thick; underneath the turf, there is pure white wood sand, as white as any beach sand. Many of the flakes and artifacts are just under the turf, some of them shattering as we take it off. Under the white sand, which runs about six to ten inches in depth, is the sub-soil, stained in some places from a dark brown to almost black. Any artifacts found in this formation take on this indelible color. Stones of a soft material are eaten into and rotted by this stain while the larger stones, down deep in the sub-soil are more or less preserved. We think it is caused by some acid reaction which has been coming for hundreds of years from rotting oak leaves and tree stumps.

The flakes in these work shops are of nearly every kind of material common to these parts with the best types of flint, jasper, felsite, porphyry, chert, white quartz, and many other kinds of stone. We find pockets of mostly secondary chips in some spots packed so closely that they are almost solid with nearly every kind of material represented. The larger flakes will be circled more around the outside which seems to show that they fly further, owing to more pressure being used in the chipping. It would almost seem that the Indian sat there making the arrow heads, wearing some kind of an apron, and when he stood up the chips which had fallen into his lap fell to the ground in a heap. If this should be a fact, why should there be flakes of so many different materials in the pile? We think the Indians could make arrow heads much faster than most people think they could. There is the argument that they could have brought some nearly completed arrow heads there and finished them at that time, but the evidence does not show that they did this, as the larger flakes were there lying all around the outside.

We find that these Indians broke quite a few arrow heads when they were nearing their completion, as we have found several which could be pieced back together. Our reason is the fact that the two parts would be found quite a distance apart, sometimes as much as eight feet. If the frost in the ground had broken them, they would be close together, and as the ground has never been disturbed, it seems to prove that the Indian craftmen broke them themselves, and then perhaps gave them a fling in disgust.

In all this digging at these work shops we have found many fine arrow heads of nearly every type common to this district, and also a few drills. Two flaking stones and a broken flaking stone found were to gether many years ago, and our belief is that many of these are cores. There were quite a few hundred broken arrow heads and rejects found during this period.

There was no shell or bone in these work shops, nor any of the black occupation dirt such as we find around the shell heaps in the permanent camps. We think that it was a very old site and the bone may have all deteriorated. We found very few clay pot sherds. Some that we did find were very thick, and tempered with gravel, some were not tempered at all. There were only two or three soapstone pot sherds and one other which had been made into a little paint pot. We found one very small pestle that had been broken, one old maul which had crumbled badly, and only three fire pits. There were two pendants and a half of a beautiful gorget which looked as if it, too, had been used for a pendant as the rough part of the broken edge had been rubbed. One of the pendants was found in a slight depression at the southerly end of the site which seemed to be a sort of trail leading to the swamp. We found many of the better arrow heads along this trail. The other pendant we took out at the extreme west side of the site, and the gorget at the east side. The few implements we got and the pendants were all found on the second work shop. The first work shop we dug yielded no implements.

In working seven years at these work shops and finding so few implements, it would seem to prove that practically all the implements were left in the permanent camps. But why were the three pendants here? I have a theory for this:
I think that Indians worked at trades and were specialists at certain things. Some made arrow heads, and others made axes and perhaps other implements. Mr. Cunningham, who lived at Sagamore, had quite a large collection of Indian artifacts. I would estimate about one to two thousand. He found all of these while surface hunting in the vicinity of his home. In his collection he had a number of axes all of the same type. I have three thousand, two hundred, and thirty artifacts cataloged in my collection, and I do not catalog the broken ones unless they are of a rare type. I found all of these myself, but I have never found a good axe. I mention these facts to show that I think there must have been an Indian or some Indians at Sagamore whose business it was to make axes, perhaps for a whole vicinity. The Indians at the two work shops must have been making nothing but arrow heads as there was such a lack of other implements; not even a partly made implement or a blank for an implement was found. Consequently I think that their business was making arrow heads for perhaps the whole section. They probably traded arrow heads for other things which they did not make. If these Indians were the arrow head makers, why would it not be appropriate for them to wear a badge or emblem to distinguish them. That is why I think the three pendants were there. I think they lost them off themselves while they were at work.

In Mr. Charles C. Willoughby's book "Antiquities of the New England Indians," he speaks of these stones or pendants as arrowmakers's stones, and he mentions that most of them show signs of use, as if they struck some hard material with them. These three which we found showed no signs of use and were made of slate which would not stand up in use against harder stone. Mr. Willoughby also speaks of Indians using so called plummets or sinkers for fish lures. The Indians smeared the stone with some kind of grease, and the fish swallowed the stone, and was caught in that manner. I have put my whole life into the rearing of trout and have done a lot of fishing for many kinds of fresh and salt water fish. I do not believe that a fish can be fooled in this way. Furthermore, there is nothing on the stone to make it stay inside the fish, the weight and strength of the fish being enough to dislodge it as it was pulled in. If Mr. Willoughby could be misinformed about fish lures why could he not be mistaken about arrowmakers' stones? Perhaps their occurrence in work shops led him to his theory. I cannot see any use for pendants in the art of making arrow heads.

In conclusion I wish to speak about three artifacts. I have termed them flaking stones and have reason for calling them that while digging test holes at the Nook Farm Camp Site, M41/9, I dug out a small shell pit. In it I found a fine bone flaking implement, and lying against it was one of these stone flakers. The three which I found at the work shop were also all together. I think the chisel-shaped end was the working end, and the other end was hafted in a short handle. The pointed end of some of these stones is not worked down carefully. During the digging which I have done at different camp sites in years back, I have found quite a few of these flaking stones, especially around where there were many ships. Some of the ones which I found showed more signs that they were made for hafting, as they were squared or rounded off at that end. I used to wonder what they were used for.

Perhaps some of the members who attended the Plymouth meeting will remember the exhibit from these work shops which we had on display in the Memorial Building. There were many other unusual things which we came across in this dig that I have not touched upon. However, I have tried to stress a few points in this article that I hope will be of some interest to others.

Plymouth, Mass.
September, 1942.

Fig.7. Bone flaker, stone flaker from shell pit on Nook Farm (M41/9).
Return to Plymouth

The day following, in our journey, HOBREMOK told me, of the private conference he had with MASSASSOWAT; and how he charged him perfectly [thoroughly] to acquaint me therewith: as I shewed before.

Which having done, he used many arguments himself, to move us thereunto.

That night, we lodged at Namasket [Middleborough]. And the day following, about the midway between it and home, we met two Indians; who told us that Captain STANDISH was, that day, gone to the Massachusetts.

But contrary winds again drove him back; so that we found him at home. Where the Indians of Paomet still was: being very importunate that the Captain should take the first opportunity of a fair wind, to go with him. But their secret and villainous purposes being through GOD'S mercy, now made known: the Governor caused Captain STANDISH to send him away, without any distaste or manifestation of anger, that we might effect and bring to pass that which should be thought most necessary.

Before this journey [to Bowams], we heard many complaints, both by the Indians, and some others of best desert amongst Master WESTON'S Colony, how exceedingly contrary winds had with some others of best desert amongst Master WESTON’S Colony, how exceedingly abased themselves, by undirect means to get victuals from the Indians who dwelt not far from them. Fetching them wood and water and all for a meal's meat. Whereas, in the mean time, they might with dilliance have gotten enough to have served them three or four times [over]. Others, by night, brake [through] the earth; and robbed the Indians' store; for which they had been publicly stocked [put in the stocks] and whipt: and yet there was there small amendment. This was about the end of February [1623]: at which time, they had spent all their bread and corn, not leaving any for seed; neither would the Indians lend, or sell them any more, upon any terms.

Hereupon they had thoughts to take it by violence; and to that [end], spiked up every entrance into their town [Wessagusset], it being well impaled save one: with a full resolution to proceed.

But some, more honestly minded, advised JOHN SANDERS, their Overseer, first to write to Plymouth; and if the Governor advised him thereunto, he might the better do it. This course was well liked; and an Indian was sent, with all speed, with a letter to our Governor; the contents whereof were to this effect:

That being in great want, and their people daily falling down; he intended to go to Munhiggen [Monhegan] where was a Plantation of Sir FERDINAND GORGES, to buy bread from the ships that came thither a fishing, with the first opportunity of wind: but he knew not how the Colony would be preserved till his return.

He had used all means, both to buy and borrow [corn] of [the] Indians, whom he knew to be stored, and [as] he thought, maliciously withheld it; and therefore was resolved to take it by violence; and only waited the return of the messenger, which he desired should be hastened.

Coveting advice therein: promising also to make restitution afterwards.

The Governor, upon the receipt thereof, asked the messenger, What store of corn they [the Boston Bay Indians] had? as if he had intended to buy of them.

Who answered, Very little more than that they reserved for seed; having already spared all they could.

Forthwith, the Governor [WILLIAM BRADFORD] and his Assistant [ISAAC ALLERTON] sent for many of us, to advise with them herein. Who, after serious consideration, no way approving of this intended course; the Governor answered his letter, and caused many of us to set our hands thereto the contents whereof were to this purpose:

We altogether disliked their intendment [purpose] as being against the law of GOD and Nature; shewing how it would cross [stop] the worthy ends and proceedings of the King's Majesty, and his honourable Council for this place [The Council for the Affairs of New England] both in respect of the peaceable enlarging of His Majesty's dominions, and also of the propagation of the knowledge and law of GOD, and the glad tidings of Salvation which, we, and they, were bound to seek: and not to use such means as would breed a dis­taste [dislike] in the savages against our persons and Professions: assuring them, their Master would incur much blame thereby; neither could they answer the same.

For our own parts, our case was almost the same with theirs; having but a small quantity of corn left and [we] were enforced to live on groundnuts, olims, muskels and
such other things as naturally the country afforded; and which did, and would, maintain strength, and were easy to be gotten. All which things they had in great abundance; yea, oysters also, which we wanted: and therefore necessity could not be said to constrain them therunto.

Moreover, that they should consider, if they proceeded therein, [that] all they could so get would maintain them but a small time; and then they must, perforce, seek their food abroad: which, having made the Indians their enemies, would be a very difficult thing for them. And therefore [it was] much better to begin a little the sooner, and so continue their peace: upon which course they might, with good conscience, desire and expect the blessing of God: whereas on the contrary, they could not.

Also that they should consider their own weakness, being most [ly] swelled and diseased in their bodies; and therefore the more unlike [ly] to make their party good against them [have the victory of the Boston Bay Indians]; and that they should not except help from us in that, or any [other] the like unlawful actions.

Lastly, that howsoever some of them might escape, yet the Principal Agents should expect no better than the Goal House; whencesoever any special Officers should be sent over by his Majesty, or his Council for New England; which we expected: and who would undoubtedly call them to account for the same.

These were the contents of the answer; which was directed to their whole Colony.

Another particular [private] letter, our Governor sent to JOHN SANDERS; shewing how dangerous it would be for him, above all others; [it] being he was their leader and Commander: and therefore, in friendly manner advised him to desist.

With these letters, we despatched the messenger.

Upon the receipt thereof, they altered their determination: resolving to shift as they could, till the return of JOHN SANDERS from Munhiggen [Monhegan].

Who, first coming to Plymouth, notwithstanding our own necessities, the Governor spared him some corn to carry [feed] them to Munhiggen. But not having sufficient for the ship's [the Swan] store: he [JOHN SANDERS] took a shallop; and leaving the others with instructions to oversee things till his return, set forward about the end of February [1623]. So that he knew not of this conspiracy of the Indians before his going: neither was it known to any of us, till our return from Sowams or Puckanokick.

At which time also, another Sachem, called WASSAPINEWAT, brother to OBTAKIEST the Sachem of the Yassachusets: who had formerly smarted for partaking with COUBATANT [or CORBITANT]: and fearing the like again, to purge himself, revealed the same thing.

Plymouth, Mass.
January, 1941.

According to the Secretary's records the following members of the Massachusetts Archaeological Society, Inc. are now serving in the Armed Forces.

Chester S. Chard
John D. Hoag
Ralph Hornblower
Henry Hornblower 2d
Bruce Howe

Dr. Henry F. Howe
Wensel W. Moberg
Dr. Hallam L. Movius
Dr. Harold H. Plough
Eugene C. Worman, Jr.

The following new members have joined the Society since the publication of the last Bulletin:

Mr. & Mrs. Watkins W. Roberts
Ralph A. Metcalf
Mrs. Grace M. Harriman