Bulletin of the Massachusetts Archaeological Society, Vol. 5, No. 3

Massachusetts Archaeological Society

Follow this and additional works at: https://vc.bridgew.edu/bmas

Part of the Archaeological Anthropology Commons

Copyright
© 1944 Massachusetts Archaeological Society

This item is available as part of Virtual Commons, the open-access institutional repository of Bridgewater State University, Bridgewater, Massachusetts.
BULLETIN OF THE
MASSACHUSETTS ARCHAEOLOGICAL
SOCIETY

VOL. V
APRIL, 1944
NO. 3

APRIL, 1944

CONTENTS

SITE SYMPOSIUM

The Geographer as an Aid in Archaeological Problems. Ripley P. Bullen ........................................... 33
Geography as an Aid to the Archaeologist. W. Elmer Ekblaw ............................................................... 34
Site Characteristics in the Concord River Valley. Benjamin L. Smith ......................................................... 37
Comments on Interpreting the Past. Maurice Robbins ................................................................. 40
Materials Used for Chipped Implements. Ross Moffett .......................................................... 42
A Note on "The Pre-Iroquoian Occupations of New York State" Ripley P. Bullen ........................................ 48

PUBLISHED BY THE
MASSACHUSETTS ARCHAEOLOGICAL SOCIETY
BOSTON, MASSACHUSETTS

Douglas S. Byers, Editor, Box 71, Andover, Massachusetts
As archaeologists we are not merely studying arrowheads, knives, sinkers or plumasets, but human beings. We are interested in the rise and fall of the Indian civilizations. We want to know how and why the Indian became the kind of a man he did. This end product was the result of countless human experiments, countless human adaptations, countless human compromises. We are interested because some of the solutions he worked out, some of the answers he found to man's eternal problems may help us in the world of to-morrow. And even if these answers are not directly applicable, consideration of them will train us to tackle the problems of the future.

These problems fall under two broad headings: man's relation to his fellow man and man's relation to his physical environment, that is the climate, topography, physical resources, fauna and flora. This falls within the field of geography. Under this heading I am including for the purpose of this paper, climatology, pedology, paleobotany, economic geography, and any other subdivisions.

What does geography have to offer us as archaeologists and what do we have a right to expect from our sister discipline of geography? Geography is the original earth science. It deals chiefly with the surface of the earth and man's relationship to that surface. Archaeology might be considered a specialized subdivision of geography. In order to understand the Indian as he was, through the evidence of arrowheads, pits, hearths, and bones, it is necessary to know the physical environment in which he lived. This may have been quite different from that which obtains to-day. While it may be asking quite a lot, I think that we have a right to ask geography what the conditions were at different times in the past.

As an example, we would like to know more about conditions one, two, or three thousand years ago when the Fowiston Street Fishweir was built or when the sites at Grassy Island and Marion, now below mean sea level, were inhabited. And how long ago was it? At Faulkner Springs there is a question of a possible former river or surface of erosion. Is this evidence of certain conditions which were contemporaneous with the occupation of that site or not? What were the conditions during occupancy and what adaptations to the environment were made by the inhabitants? We can surmise a lot from their arrowheads, etc., but geography is needed to complete the picture.

I want to emphasize the point that in studying the Indian we must also study his environment and that this environment must be contemporaneous with him. In an early 19th century site in Ballardvale, which we are now excavating, we have found pottery under 15 inches of sterile soil. This is the result of slope wash but it is obvious that the surface conditions are different to-day than they were only 100 years ago.

There is also the question of special environmental areas. To what extent did their environment affect the way of life and culture of the Indians? As anthropologists we feel that the physical environment is limiting and imperative but not compulsive in its effects on a culture or a society. It determines the natural resources and climate but not how they are used or the form of culture. It is man's reaction to his environment which produces those results.

In the excavation of a site there are always problems in interpretation. Does frost action raise medium-sized rocks and allow chips to sink deeper, or the opposite, or is there no relative movement?

How long does it take dirt to accumulate on a given site? What are the processes of soil growth? Geography should have available for us the necessary techniques for the solution of this problem. In other words, when we find artifacts scattered through the soil to a depth of 15 inches, as at the Hoffmann Site in Ballardvale, does that represent occupation over a fairly long period of time? And if so, for how long? We realize that each site is a special study, but geography should be able to give us part of the answer.

Then, there is the question of different colored layers in the ground. We realize that the sod, and dark or humic layer immediately below it, are probably relatively recent in deposition, but are they laid down upon an old surface? A surface possibly used by the Indians. What about soil profiles and how would they be affected by original habit? We need to know a great deal more about how a site is built up, about how the dirt, in which we find the artifacts, accumulates.

There is another problem for which we look to geography for aid. That is in finding the source of materials used in manufacture. Due to the glacial drift, we are a little pessimistic, but there may be
certain materials whose source can be determined with reasonable certainty. Geography also has its part to play in working out trade routes, migration routes or those by which cultural elements were transmitted, and also in the delineation of tribal territories.

Our approach to the broader aspects of this most important part of our study is logically through our site survey. We would like to know the kinds of soils on which Indians lived, the relationship of the site to water, to exposure, to farming land, to food supplies, and other resources. Are there geographical factors which influenced the growth of one site as compared with another? Are there groups of similarly determined sites? These are most important points.

Mr. Ferguson has given us some very suggestive leads in this respect regarding the Worcester area. Jesse Brewer at Plymouth raised the question of summer and winter sites. We need more work of this nature. The third part of our symposium this afternoon is a further step in this direction.

Archaeology needs all the aids it can muster for the interpretation of the facts that its researches discover, for solution of the problems that its researches pose. Its sister sciences may supply some of the solutions to the problems, throw light on some of the dark and doubtful phenomena it reveals. Physics, chemistry, geology, soils science, botany, in fact, almost all the sciences have something with which to aid archaeology. Geography, like the rest, can readily provide a number of aids to archaeological research, some of them of major significance.

Geography is the science of place, its attributes and relationships. Among the attributes of place are climate, topography, soils, vegetation, wild life, and man in his diverse activities. Of these, climate and all its elements — seasonality, light, temperature, precipitation, winds, pressures and storms — and topography in all its phases, including relief, drainage, slope, exposure, are inalienable attributes of place; that is, no place can be divorced from them. The other attributes are not characteristic of every place. Climate, topography and soils have no power within themselves of changing their form or character, and can change only as extraneous forces act upon them. On the other hand, plants, animals, and man have the common power of adapting, or adjusting, themselves to other attributes of place and to one another. Plants are relatively immobile, whereas animals generally, and man in great measure, move freely, and relatively great distances. Man not only adjusts himself to other attributes of places he occupies, and travels more or less freely over the world, but does so consciously, and with definite purpose.

Environment is the sum total of attributes and relationships of place. Throughout the evolution of man's culture, man has constantly adjusted himself to his Environment. Culture may be geographically defined as the aggregate of man's adaptations, or adjustments, to Environment during his progress from animal savagery to modern civilization. Consequently the things that he has done, the things that he has made and used, the things that he has left for the archaeologist to uncover and explain, all bear the impress of the Environments in which he has lived, and express in some measure the adjustments that he has made to those Environments, that is to the climate, topography, soils, vegetation, wild life, and fellow-men of the lands that he inhabited.
The Environment naturally subdivides itself into two separate phases, the Site and the Situation. Site or natural location, includes all the relationships among the several attributes of any one place. Situation, or vicinal location, represents the aggregate of relationships between the attributes of any one place, and all other places. Man, in his cultural progress, has primarily adjusted himself to the Site of his home or territory; but secondarily he has also always adjusted himself in lesser or greater measure to his Situation, in lesser degree in the earlier stages of his cultural evolution, in ever greater degree as his culture progresses or advances. In the present complicated stage to which culture has achieved, man adjusts his activities and policies and way of living almost as closely to the attributes of places remote from his residence, as to the attributes of his home. His Situation almost dominates his Site.

Among primitive folk, Site is much more important than Situation. The climate, topography, soils, vegetation, and wild life of the place where primitive man lives, and from which he cannot, and does not, travel very far, constitutes the environment to which he makes almost all his adjustments. It is his local climate, his local terrane, his local soils, his local vegetation and animals, and his human neighbors, to which he adjusts his personal interests, his daily round of activities, his search for food and drink, the character of his dress, his home, his weapons, his tools. He knows nothing, or very little of conditions beyond his local horizon, the range of his daily movement. Only when his culture has advanced to include facilities for wider movement, easier means of travel, more effective methods of transport and communication, greater security of food supply, greater assurance of safety, and so on, is it necessary for him to make adjustments to his Situation, that is to consider his relationship to attributes of places other than his own particular place. It is this ever increasing interplay between Site and Situation, the ever more numerous interrelationships between the attributes of any one place and all other places, that makes geography increasingly valuable as culture gains breadth and depth, and expands to ever increasing number of places.

Since the archaeologist deals chiefly with artifactual materials and conditions surrounding their use and disposition, and since the materials represent in some degree the adjustment to their environment of the folk who fashioned and used them, the attributes of that environment, when ascertainable, may furnish the clue to the use of such materials, such artifacts, and help explain their role in the culture of the folk using them, and directly or indirectly aid in the interpretation of the culture itself. If the archaeologist knows fully the kind of climate under which a people lived, he can draw certain accurate inferences about their food, their dress, their habitation, their activities and their movements. If he knows well the kind of soils upon which they dwelt, he may come to certain definite beliefs concerning their agriculture, or their lack of it; or if he understands the genetic evolution of soils he may succeed in using soil horizons as a guide in chronological sequence. If he knows well the character of vegetation surrounding a people's home, he may logically use that knowledge in interpreting the significance of woven fibers, the contribution local plants make to food supply, the cover vegetation offers to game, and the kinds of game that frequent it. Knowledge of the wild life enables the archaeologist to make reasonable deductions regarding the hunting equipment and the food supply. Given some or all of this geographical knowledge, that is, knowledge of Environment, or place in its attributes and relationships, the archaeologist may reasonably and safely receive it as valuable aid to diagnosis of cultural stage and conditions of any people for which he uncovers artifactual material.

Almost every artifact bears some direct relation to the culture of a people, or its adjustment to Environment. It represents a material adaptation to some attribute, or attributes, of place. Its composition, its form, its size, the craftsmanship that it displays, its distinctive functional features, all these bear upon the adjustment to Environment and thus to culture. The large number of gouges that Mr. O.O. Ferguson found a few years ago at his excavation at Heard's Pond Site, taken in connection with the form and character of the gouges themselves, indicates that certain attributes of that Site led the Indians either to make many gouges there or to use them there. If they used them there, then surely some of the attributes of the Heard's Pond Site were favorable to that use. Was it a place where great trees grew that might easily be "dug out" into boats, and were the water conditions there favorable to the launching and use of such boats? Or was it a place where ice-fishing yielded good harvests of fish for food in seasons of precarious supply, and where gouges might have been necessary to dig holes through thick ice to get at the fish? Or are there attributes of the place that suggest other uses for the gouges? Merely as an illustration of the aid that geography might give the archaeologist, this is a modest example.

Another simple example of geographical aid to the archaeologist may be derived from the proximity of many important Indian sites to large swamps. Does the swamp possess attributes to which Indians might have adapted their residence? Could it have been customarily used as a sanctuary, or refuge, in time of peril? History indicates that in some cases it was so used. Or could it
have served as a reservoir of certain kinds of game — beaver, bear, deer, moose, or wild turkeys when game elsewhere was scarce or difficult to hunt, as in rigorous winters? Certain, it seems, that the proximity of a swamp held some advantage that induced the Indians to dwell near it.

The relationship of water to the Site of Indian settlement is obviously important, but in what wise? First of all, pure potable water easily available, must have been a primary prerequisite for Indian settlement. A spring, or small pool or stream, that might be safeguarded against pollution, would have sufficed many persons but the water could not have been carried far for the purpose, because the Indians possessed few satisfactory receptacles for bearing it. It would have had to be readily accessible. A spring or stream for drinking water alone would probably not have attracted a large settlement.

In addition there would have had to be a larger stream to supply some quantity of fish or shellfish for the larder, at least for certain difficult seasons of the year, if the settlement were to attain size. It seems hardly likely that any sizeable settlement would have been established, in a land where fish were generously abundant, in any place, where a goodly supply was not available. In many places fish could be depended upon as an emergency supply of food when all else failed.

As in all lands and among all peoples water has afforded protection, and a settlement in the bend of a stream, or between two lakes, could be more easily defended than a place open to attack from all sides. The largest settlements would probably have been those that had the advantage of such protection, certainly in time of internecine war. The place of many Indian settlements in New England are clearly such water-protected sites. And thus the role of water as a geographical factor to which the Indians adapted their settlements can be further expanded in several ways.

There are multitudes of other examples of the aid that geography may afford the archaeologist in the determination of territorial area and boundaries; in the location of Indian trails and portages, and explanation of their course and character; in the appraisal of the character and function of settlement sites, hunting and fishing camps, battlefields, and trading posts; in the food supply, the habitation, the weapons and tools of Indian groups; and in the density, distribution, and movements of population from time to time, and place to place. It is only one of such aids; history, geology, botany and other sciences afford others.

This brief paper is but a rather improvised, but compact, summary of the general thesis presented at the fall, 1943, meeting of our Society. The author hopes to consider certain elements in his theses at greater length and in greater detail in subsequent papers. He plans, and hopes, to present another paper at next fall's program on "The Role of Water in Algonquin Economy in New England".

NOTES BY THE EDITOR ON THIS NUMBER OF THE BULLETIN

It was felt that a program for the annual meeting held in Boston in October, 1943, devoted to one single subject might provoke thought, and perhaps bring forward some new ideas. The topic selected was geography and its relation to archaeology. Mr. Bullen introduced the discussion with his paper, "The Geographer as an Aid in Archaeological Problems", and was followed by Dr. Ekblaw with "Geography as an Aid to the Archaeologist". Mr. Smith has attempted to analyse sites in the Concord River Valley. Mr. Robbins then rose, during the discussion period, to deliver the remarks which follow.

Mr. Moffet's paper was not delivered at the meeting. It presents one aspect of the detail into which the archaeologist must go before he can be certain of one minute phase of man's activities. After the rocks which were used by man have been identified, it remains to ascertain the source from which those materials were derived. And can we be certain that the postulated source is the only one? For an example, some authors have written about a trade in felsite from quarries on Mt. Kineo to the coast of Maine, ignoring the fact that glacial ice once carried boulders of this very felsite into areas in which are found used tools made from "Kineo" felsite. Who but an eye-witness can truthfully say that the Indians journeyed hundreds of miles over rough country to the outcrop, instead of using the boulders?

We must first analyze our problems in a cold light, forebearing what may be a romantic hypothesis for a more humdrum one, before we will be ready to ask for aid from our sister sciences.
The following analysis of site characteristics was undertaken in an effort to determine whether or not it was possible to identify the recurrent geographical factors which might have influenced the original selection of Indian sites in the Concord River Valley.

Restrictions on the use of gasoline made it necessary to limit reconnaissance in the field, so the area under discussion is confined to that lying between Site M-23-133 on the Sudbury River at Saxonville and Site M-11-9 on the Concord River at Billerica, Massachusetts.

A list of the more important site characteristics was drawn up, and to it were applied the individual characteristics of several well known locations. The list was amplified and rearranged as new sites were studied and other characteristics emerged, until eventually a chart was worked out-a chart which may look complicated but which, with use, will prove to be quite simple. It is suggested that the list of characteristics be written across the top of a long sheet of paper ruled with horizontal and vertical lines, and that check marks be inserted in the proper columns as the characteristics of each studied site emerge. The resulting chart will contain some interesting information and should delight the heart of the statistician.

The headings at the top of the chart were arranged as follows:

First: The Site Number

Second: The type of Site (this was divided into three sub-headings):

<table>
<thead>
<tr>
<th>A. Villages - Totals studied (21)</th>
<th>B. Camps</th>
<th>C. Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>52</td>
<td>23</td>
</tr>
</tbody>
</table>

Trouble immediately began. It may properly be asked how one type of site was differentiated from another, and how the investigator, in view of the Indians' known proclivity for periodically moving their sites over varying distances, could be sure of the type of site with which he was dealing.

Since most of the sites in the valley were first uncovered by the plow and their extent thus quite accurately defined, and since well-documented collections from many sites are available for study, it seems apparent that the sites fall into three general classes:

A. Sites in excellent locations, covering large areas, with a record of having produced thousands of artifacts including all the local types. These have been called "villages."

B. Sites in good or fair locations, but covering much smaller areas, and producing much smaller numbers of artifacts, though well-diversified as to type. These have been called "camps."

C. Sites in locations obviously unsuitable for more than a few people, and which produce small numbers and a limited range of artifacts. These have been called "units."

This classification is flexible and can be modified by such supporting evidence as numbers of fireplaces, storage pits, the quantities of chips and spalls, and the "feel" of the site in general.

Third: The type of location. (This was broken down into three main headings:-

A. Ab-aqueous - Sites not on or near water.

B. Stream - Sites on flowing water: i.e. brooks, streams, rivers.

C. Pond - Sites on bodies of still water.

These basic descriptions were further refined by adding the following sub-characteristics which described the character of the land on which the site was located:

### A. Ab-aqueous:

<table>
<thead>
<tr>
<th>Villages</th>
<th>Camps</th>
<th>Units</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope</td>
<td>2</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Hilltop</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Knoll</td>
<td>1</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Flat</td>
<td>3</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Cave</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rockshelter</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Near swamp</td>
<td>8</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

### B. Stream:

<table>
<thead>
<tr>
<th>Stream edge</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elbow</td>
<td>2</td>
</tr>
<tr>
<td>Conflu</td>
<td>2</td>
</tr>
<tr>
<td>Island</td>
<td>1</td>
</tr>
<tr>
<td>Falls</td>
<td>2</td>
</tr>
<tr>
<td>Near swamp</td>
<td>5</td>
</tr>
</tbody>
</table>
Dr. W. Elmer Ekblaw in his address at the Site Symposium in Boston in October 1943 pointed out that the Indians often preferred to locate their sites near swamps which could be used as unfailing sources of food and also as refuge areas in time of danger. Such sites have been called "sanctuary sites." Since both the Sudbury River and the Concord River flow through much low land, there is a great deal of swamp and marsh land along their borders. For this reason the swamp factor may appear to be overemphasized in this area. Few sites have been noted which appear to have been true sanctuaries.

Fourth: The point of compass which the site faces.

<table>
<thead>
<tr>
<th>North</th>
<th>Northeast</th>
<th>East</th>
<th>Southeast</th>
<th>South</th>
<th>Southwest</th>
<th>West</th>
<th>Northwest</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>17</td>
<td>3</td>
<td>11</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

The compass points which the sites face are often difficult to determine, and the list above may not be too exact because many sites present curved faces and the exposure, therefore, covers an arc. However, since our object is to determine the relative importance of this characteristic, it was found advisable to include each compass point covered by each arc, and thus the points emerge in order of their preference.

Fifth: Slope of ground. This feature was subdivided into eight sub-characteristics as follows:

<table>
<thead>
<tr>
<th>Level ground</th>
<th>Bank</th>
<th>Gentle Slope</th>
<th>Steep slope</th>
<th>Knoll</th>
<th>Plateau</th>
<th>Hilltop</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>10</td>
<td>16</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Here it should be recorded that some of the larger sites were on ground which included as many as four of the above characteristics, and in order to arrive at the preferred slope of ground, each characteristic exhibited by each site was listed.

Sixth: Shelter from north winds. Protection was obtained by the following nearby geographical characteristics.

<table>
<thead>
<tr>
<th>Hill</th>
<th>Ridge</th>
<th>Knoll</th>
<th>Rising Ground</th>
<th>Woods</th>
<th>None Apparent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>

* Woods undoubtedly were an important form of shelter, but the existence of protection of definite sites by wooded areas in Indian times cannot be proved to-day.

Seventh: The underlying soil. This important factor was subdivided as follows:

<table>
<thead>
<tr>
<th>Sand</th>
<th>Sandy</th>
<th>Loamy</th>
<th>Loam</th>
<th>Gravel</th>
<th>Rocky</th>
<th>Ledge</th>
<th>None Apparent</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>14</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

* A complete system of pathways no doubt existed in aboriginal times, but unless they were recorded there is almost no proof of their existence to-day since all physical evidence has been destroyed.

Ninth: Water Supply. Water was obtained from the following sources.

<table>
<thead>
<tr>
<th>Spring</th>
<th>Brook</th>
<th>River</th>
<th>River (transients)</th>
<th>Guard (outpost)</th>
<th>Protection (Fort)</th>
<th>Sanctuary (Refuge)</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>13</td>
<td>13</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

This last classification is ethnological rather than geographical, but it has been added because, providing the uses shown are...
SITE CHARACTERISTICS IN THE CONCORD RIVER VALLEY

Conclusions: The foregoing study has developed many points which were not previously appreciated by those familiar with the region, and certain preconceived ideas were forced to undergo some radical changes. It may be of interest to comment on some of the highlights.

TYPE OF SITE: Some readers may take exception to the total of 21 villages shown, but we are discussing a twenty-mile stretch of river with eight large brook systems and much land in the drainage basin. The whole area is scattered with almost 150 sites of various sizes. Often a village site has one or more unit sites nearby, and there are often camp sites within a mile or two. It is felt by the writer that this classification is fairly accurate.

TYPE OF LOCATION: As would be expected in a river system, the edges of streams were the preferred site location; but of 96 sites studied, 33 were abaqueous, 57 were on streams, and 6 were on ponds. The order of preference was: Stream edges 47, abaqueous slopes 11, abaqueous flats 11, and abaqueous knolls 8. Six villages, 19 camps, and 6 units were set near swamps; but only one village and two camp sites really seem to have been refuge (or sanctuary) sites. The other 28 sites were just built near swampy places. All three of the "refuge" sites were situated well back from the river and behind ridges or hills. The abaqueous sites were located largely on the best of to-day's farm lands.

POINT OF COMPASS FACED: As explained earlier, many sites present a curved border which faces several points of the compass, and some of the unit sites on knolls face in all directions. However, each point faced by each site was listed, and the tabulations show the following directional preferences in order:

SLOPE OF GROUND: The preference of the Indians for particular types of sites is clearly shown by this table. The order of preference is: gentle slopes, knolls, level ground, banks, steep slopes, hilltops, and depressions appear to have been largely avoided except for special purposes. In justice to the "plateau," it might be said that there are very few in the valley, but all there are hab camp sites located on them.

SHELTER FROM NORTH WINDS: The geographical characteristics which afforded shelter from the cold winds are listed in the order in which the Indians used them; and since other factors may have had more weight in the selection of sites, it is thought that the Indians actually preferred these factors in the order in which they appear: i.e. Rising Ground, Hills, Ridges. There is a great difficulty here, for it appears that 11 villages, 25 camps, and 14 units show no apparent protection to-day. The explanation probably lies in the fact that many were backed up by deep forests which have since been cut away. It may be that the forest afforded all the protection necessary and that the other characteristics were largely incidental. We suspect this to be the case.

THE UNDERLYING SOIL: The observations shown here on the soil are based on the looks of the soil after the sites were plowed or otherwise opened. The characteristics are listed as follows: sandy 52, loamy 41, gravel 18, sand 12, loam 4, ledge 3. Presumably the soil has changed considerably under cultivation, but sandy soil, and sand and loam mixed were evidently much preferred since their porous character afforded excellent drainage.

COMMUNICATIONS: In a river-valley system the sites are predominantly located on the waterways, and the Concord River Valley proved to be no exception since 58 sites out of 96 studied were so located. Undoubtedly many sites were located on pathways which connected the whole system together; but there are no surface indications left which might give a clue to the path's existence. There are 24 sites which are so well separated from the others and so far from the water highways that they now appear to be isolated. Possibly they were originally located on pathways. Some 55 sites were situated so close to other sites that the intercommunication must have been quick and easy by foot or canoe. Only

acurate (which is often difficult to establish,) some interesting and enlightening information in fortification. A site has been classified as a "hunting-fishing" site if the facilities for both seemed good. Eight sites are called "farming" sites since they are located in that area called "The Great Fields" by the early settlers; the area is to-day considered to be the best farm land in the vicinity. According to the early records, Indian corn fields were located there. Seventeen sites are listed as "guard" or "outpost" sites because they were placed at strategic points near large sites and commanded the approaches to them. The very nature precludes their having been important sites if considered by themselves. One site is a fort and is so designated by historical records.

SITES: Seventeen "outpost" sites. According to the early records, Indian corn fields were located there. Seventeen sites are listed as "guard" or "outpost" sites because they were placed at strategic points near large sites and commanded the approaches to them. The very nature precludes their having been important sites if considered by themselves. One site is a fort and is so designated by historical records.
4 are situated on known and documented pathways — such as "The Connecticut Path."

WATER SUPPLY: It has been said that the Indians preferred to have a supplementary source of water which they were careful to keep clean. This may or may not have been true in the Concord Valley, but it is certain that many of the sites had available several sources of water. Of the 21 villages, 3 had three sources, 14 had two sources, and 4 had one source. Of the 52 camps 1 had three sources, 10 had 2 sources, 36 had 1 source, and 5 had no apparent source. Of the 23 units, none had 3 sources, 5 had 2 sources, 15 had 1 source, and 3 had no apparent source. Presumably some sites originally possessed nearby springs which have now dried up, but others are so situated that water was unquestionably brought to them. These were the site outposts or "sentinel sites" and their locations were selected for the broad view they afforded. As regards the larger sites, water could have been obtained from the following sources: brooks 58, the rivers 39, springs 20, ponds 7. But presumably, where several sources were available, only one was actually used for drinking water.

The papers presented at the October meeting and the discussion which they provoked demonstrated the progress which we have made, both individually and as an organization, since the inception of our Society in 1939. A number of interesting problems were suggested and trends of thought indicated which may well be considered and commented upon by all.

Progress can be made only by proposing problems through the medium of our publications or by presenting them as papers at our meetings together with our methods of solving them and the conclusions which we may have reached with the hope that ensuing discussions will either establish their validity or demonstrate their inherent weaknesses. The greatest deterrent to progress is a problem, a conclusion, or a method of solution withheld for fear of criticism. Our progress is due largely to the willingness, demonstrated by all, to subject their work to the test of discussion and to profit by the constructive criticisms thus solicited.

One of the greatest weaknesses apparent in archaeological literature, and in discussions of a similar character, is in the loose terminology made use of by amateur and professional alike. It can be eliminated by careful definition and painstaking adherence to defined terms. A more careful selection of terms in our writing and in our speech should be our constant endeavor as upon it depends the clearness with which our future work will be expressed and understood.

For example, we talked very glibly about Indian sites breaking them down into various subdivisions as village sites, camp sites, fishing or hunting stations, occasionally adding the adjective large or small to indicate size. Upon what do we base these terms? What are the characteristics which distinguish between a village and a camp site?

We can logically assume that there exist certain geographical points at which groups of primitives elected to dwell and that these sites were selected by them because of certain attributes pertaining to them which were considered desirable by the people who occupied them. At our October meeting we attempted to type these sites and to examine certain geographical attributes which we believed were among those desired...
by the prehistoric inhabitants of given sites.

Most of the sites entered upon the Society's records are predicated upon the recovery of artifacts from surfaces exposed by either natural or artificial forces rather than by controlled excavation for archaeological study. In the case of most of these sites, stone artifacts are our sole evidence of occupation; no information concerning hearths, pits, house floors, or other traits is available. The person reporting these sites and later discussing them refers to them as villages, or camps, large or small, according to some predetermined scale of values which bears no relation to any accepted basis for comparison. Inquiry has established the fact that many small camps are reported because an area exposed to examination happened to be small and no thought had been given to the possible bounds of the occupied area.

Many other problems might be proposed in this connection such as: are large sites the result of long periods of occupancy by a relatively small number of people or are they large because of a relatively large population. Does a relative density of artifacts bear any relation to the size of a given site? How many artifacts make a site? Except in the case of a previously undisturbed site excavated archaeologically how can one ever determine the total number of artifacts which have been recovered from the site by all persons since its abandonment by its original occupants?

I would like to suggest that we base our future terminology upon our absolute information. Sites would be classed as either excavated or surface hunted sites, their size expressed in some commonly expressed term of square measurement if known or assumed because of topographical limitations.

In our discussions concerning the various natural attributes which we considered to be sought by the primitives in the selection of sites we seemed intent upon evaluating these attributes from a single point of view. We were agreed that good drinking water was a prime requisite in all cases. This is a most logical and demonstrable fact. Allowing water to take number one position and proceeding to other requisites we should take into consideration the type of culture of the people seeking the site, allowing its probable requirements due weight in

setting up our relative values. An agricultural people seeking a site might list their desires as

1. water
2. available cleared land
3. protection against inclement weather
4. available fire wood
5. aquatic food supply (and possible fertilizer)
6. animal food supply

Now if the same agricultural group were in search of a winter camp their list might be altered as

1. water
2. available fire wood
3. protection against inclement weather
4. natural food supply

It becomes evident that not only does the economy of a people affect their site requirements but season of the year must also be taken into consideration. Further reflection will bring forth still more conditioning factors such as a condition of general political unrest which might introduce a desire for remoteness from large rivers or travelled routes.

Much has been made of a feature known as "exposure." Tabulations were presented of sites grouped according to this rather elusive attribute. Given a site located upon a definite incline, the boundaries of which coincide with those of the slope, a definite exposure exists and can be stated but how many sites are thus conveniently located? Are not the majority of sites either level so that the only possible exposure can be "heavenward" or so situated that several exposures exist on the same site?

It seems that if we can evolve a valid basis for describing sites together with the attributes which influenced their original selection we might reverse our reasoning and come to some conclusions concerning the economy and chronological position of the people who inhabited it. Or can we?
MATERIALS USED FOR CHIPPED IMPLEMENTS
Ross Moffett

Owing to a scarcity or rocks with a true flinty fracture and the consequent necessity, of the Indians, for using substitutes, the chipped artifacts of the New England coastal region have, in respect to their materials, a variety probably not found elsewhere. Considerable data on this subject has been collected by the writer, and the present paper has been written with the thought in mind that some of this information may be of interest to archaeologists. In treating of rocks whose composition is obscure to the naked eye, some matter of a technical nature is unavoidable. An attempt has been made, however, to keep this to a minimum, and, where the text and footnotes are not sufficiently explanatory, it is hoped that the figures will be of aid. Although the examined materials were found on the end of Cape Cod, mostly in the town of Truro, what is said should be generally applicable to the whole of eastern Massachusetts.

With few exceptions, the materials are included in five main rock categories, and these are listed below. The accompanying numerical percentage is based on a sorting, excluding three or four odd pieces, of a collection of over one thousand artifacts.

<table>
<thead>
<tr>
<th>Rock Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartz</td>
<td>52%</td>
</tr>
<tr>
<td>Felsites</td>
<td>38%</td>
</tr>
<tr>
<td>Quartzite</td>
<td>7%</td>
</tr>
<tr>
<td>Chert</td>
<td>2.6%</td>
</tr>
<tr>
<td>Slate</td>
<td>4%</td>
</tr>
</tbody>
</table>

Unless otherwise noted in the text below, all rocks mentioned apparently are of local origin.

Quartz

The common quartz pebbles, from which so many points were made, consist of an aggregate of coarse quartz crystals. Hand specimens of the rock are usually either milk white or colorless and translucent. The luster is vitreous. In some instances stainings of iron oxide have given the quartz a yellow granular appearance, or, again, due to other impurities, it may be gray or even glistening black. Quartz artifacts seldom show appreciable weathering effects, but rare exceptions containing iron pyrites sometimes present a dull gray crust.

Quartz is the hardest of the common rock-forming minerals, in the scale of hardness being exceeded only by emerald and diamond. It will readily scratch tool steel or glass. Brittleness and lack of cleavage are also characteristic, hence the material is easily chipped in any intended direction. Quartz is the most prevalent of vein-filling minerals. Schistose formations also frequently contain great lenses and knots of quartz, and probably a large proportion of the local quartz pebbles are a residue from the disintegration of such metamorphic rocks.

Felsites

The felsites constitute a group of fine grained, or aphanitic, rocks, of quartz-like hardness, which invariably contain small feldspar phenocrysts. When fresh, the felsites are usually dark in shade. The fracture is imperfectly conchoidal, and, as a rule, it is less smooth than that of chert. In regard to their mineral components, the felsites examined are much alike, and distinctions in variety are based on textural features. These in turn, inasmuch as they are original and not due to secondary change indicate the conditions under which consolidation of the rocks took place. Owing to the difficulty of exactly determining the groundmass minerals, there is some ambiguity as to the proper placing of these rocks, but, for the most part at least, they are probably soda-rhyolites (1) and represent those members of the granite family that have hardened on the surface or at no great depths. (2)

(1) F.F. Grout, "Petrography and Petrology", (1933) page 53. According to this reference, the terms given for the granite-rhyolite rocks having the textures of the felsites described in this paper are as follows: rhyolite porphyry or quartz porphyry -- banded rhyolite -- rhyolite tuff -- rhyolite breccia.

(2) G.H. Williams, "Journal of Geology", (1894) vol. 2, pages 1-31. This reference gives the general locations of the felsite outcrops in New England, which are: south of Boston, in Hingham and in the Blue Hills section -- north of Boston, in Lynn and other places in Essex County -- in a belt along the Maine coast from the Penobscot eastward to Canada -- in the Moosehead Lake region in the interior of Maine.
Porphyry texture

In this felsite the constituents of
the groundmass have an even distribution,
as against the banded or fragmented grounds
of other felsites. A light groundmass,
though it may be found, is rare, and,
commonly, the ground is dark greenish gray,
blackish brown, dark neutral gray, or black.
The rock weathers to a uniform, light, dull
gray, a fact which serves in identifying
the variety. Felsite of this type is
attributed to dykes, small bosses, and the
interiors of heavy lava flows.

If a chipping of the rock is ground
very thin and viewed under a microscope in
ordinary light, the essential materials of
the groundmass appear as a transparent
colorless mass in which are imbedded a cer­
tain amount, relatively small in total
volume, of accessories, such as opaque,
dust-like specks of magnetite, grains of
greenish or yellowish epidote, etc. (Fig.11)

Fig.11. Felsite, porphyry texture. X 50,
ordinary light. Small hexagon
within feldspar phenocryst is
apatite.

In polarized light between two nicol prisms
whose axes of light vibration make a right
angle (crossed nicols), the clear essential
portion of the ground is broken up into an
obscure aggregate of ill-defined forms,
indicating a confused intergrowth of over­
lapping and interpenetrating elements which
are crystalline but without geometric out­
lines (Fig.12). The individuals often
appear grouped in shadily, divergent, fanlike arrangements; in other cases, a gener­
al parallelism of thready fibres may extend
over considerable areas. It is found that the

Fig.12. Same field tinction position.

crypto-crystalline ground, as nearly as can
be determined with optical means, consists
largely, if not entirely, of some variety
of feldspar. The dark shades of the rock
observed in hand specimens are due to the
accessory minerals.

The feldspar phenocrysts, in rare ex­
amples, may be of a red orthoclase, but in
all other cases they are of the soda vari­
ety, albite, and the usual twinning bands
of plagioclase are seldom absent (Fig.13).
If the albite is pure, it is transparent
and colorless, and in hand specimens it may
easily be mistaken for quartz. Usually,
however, the feldspar is turbid from minute
inclusions of a light micaeous mineral, and,
then, it megascopically, or to the unaided eye
appears white and opaque. Quartz pheno­
cryysts, in double pyramids, may accompany
the feldspar, but in more than half of the
slides examined they are not present. If
the ground is greenish gray, glistening
flakes of black mica are sometimes to be
observed.

Banded or fluidal texture

The groundmass of this variety of felsite
is marked by flow lines, or bands of
alternating colors, which weave around phen­
cryysts and inclusions, suggestive of the
eddying of water in a stream. This flowing,
which is characteristic of rhyolitic lavas,
may be plainly seen on gray weathered sur­
faces (Fig.13). The fresh rock is either
deep red or dark gray, and a noticeable
feature, especially in red specimens, is the
presence of black, sub-angular or rounded
inclusions. The latter often give the rock
a conglomerate appearance. Additional in­
clusions consisting of a few small angular
fragments of felsite similar to the main
ground are usually to be found. The banding
is either very contorted or generally para­
allel, and in the last case the rock often
possesses a distinct structural cleavage
along planes perpendicular to the banding.

In typical thin sections, certain of the
bands, although transparent in ordinary
light, are almost opaque between crossed
MASSACHUSETTS ARCHAEOLOGICAL SOCIETY

nichols, signifying that some portions of an originally glassy lava have escaped crystallization (devitrification) (Fig. 13, insert). Other layers are entirely crystalline, and they may, to some extent, show the same confused overlapping of forms as in the porphyry texture. An interesting microscopic feature restricted to fluidal specimens, is a development of minute spherical aggregates of radiating crystalline fibres, spherulites. In some cases closely packed spherulites account for entire bands (Fig. 13, lower part of insert). Less common is a type of crystallization in which, save for a few isolated spherulites, the whole ground is made up of fibres elongated along the lines of flow.

The feldspar plenocrysts are the same as in the porphyries. No quartz plenocrysts were found, although small quartz grains, either alone or arranged in chains in the flow lines, are common as secondary products.

The black inclusions, already mentioned, consist, as a rule, of minute lath-shaped feldspars in a ground of magnetite dust. Early segregations in the magma probably explain inclusions of this type.

Tuff texture

Silicified and compacted volcanic dust, or ash, makes up the groundmass of this felsite. As originally deposited, the rhyolitic dust, ejected from the ancient New England volcanoes, consisted of minute glass fragments, resulting from the explosion, in the air, of innumerable small bubbles of lava. Megascopically the fresh rock is blackish brown or black, and, since it weathers evenly, it is with difficulty distinguishable from felsite having a porphyry texture. As artifact material it is, however, found in less variety (3).

Although the rock is now wholly crystalline, the original shapes of the glass fragments are often clearly preserved by lines of magnetite. This is best seen in thin sections in ordinary light (Fig. 14). The forms are characterized by the fact that their outlines are curved, in many cases resembling shards obtained from breaking any hollow, spherical, glass object. Sickle shapes and combinations of two or more sickle shapes are among the most common. The fragments vary in size, an average being about .15 mm in length. A minor feature of the groundmass, which may be of some significance, is the presence of a few clear patches having irregular outlines and bordered by concentrations of magnetite (Fig. 14, lower right). Such patches in themselves do not appear to be individual fragments, and it seems likely that they represent merely portions of the ground in which a secondary segregation of the magnetite has taken place.

Along with the glass fragments were ejected crystals of feldspar and quartz (Fig. 14, upper left), and these are included in the rock as phenocrysts. The feldspar is the usual albite.

Brecciated texture

In this division are included those felsites which, megascopically, appear to be composed largely of angular fragments. For convenience such felsites are here grouped together, although, as will be disclosed, they are not all basically the same. As regards fresh hand specimens, these rocks may seem to have homogeneous, dark red, gray or black grounds, or, again, they may show a mottling of blackish red and lighter more translucent red; in either case, however, weathering brings out a marked pattern of light fragments in a dark matrix. The individual fragments, as was noted by some early petrographers, often have a noticeable cherty or jaspery aspect (4).

From an examination of thin sections, the fragments were found to be of three distinct types, two of which occur together. The fragments with the matrices enclosing them are described below.

Type 1. To a great extent these fragments may be figuratively reassembled, and

Fig. 14. Felsite, tuff texture. X 50, ordinary light.

(3) One particular tuff is to be mentioned as being the best chipping material of all the felsites. The groundmass is jet black and, save for the phenocrysts, resembles black chert. This rock may often be recognized by its resistance to weathering, fresh black artifacts frequently being found on the surface.

(4) G.H. Williams, "Journal of Geology" (1894), vol.2, page 23.
all stages from cracks, to parting, to complete disassociation of pieces are observable in one specimen (Fig.15). The matrix or cement consists usually of a mixture of broken feldspar, magnetite, iron oxide, and the finely divided material of the larger fragments; in other cases it is a mosaic of fine quartz (deep red in weathered hand specimens) which in some places is no more than a thin veining. As an interpretation of this breccia, a mechanical break or faulting of felsitic rocks seems to be adequate.

Type 2. The fragments in this case have irregular or ragged outlines (Fig.16).

They are very clear and, between crossed nicols, show a minutely granular crystallization much like that found in chert, except that igneous feldspar phenocrysts are present. In the dark matrix, is included the opaque iron oxide, etc., along with phenocrysts, and what is probably some ill-defined ash material. These fragments, in their present condition at least, are the most puzzling features found in the felsites, and no definite interpretation of them or of the rock in which they predominate is here attempted. It may be suggested, however, that such fragments — if they are correctly called fragments — may have originated in the same way as the light patches in tuffs, and, therefore, the rock is possibly a tuff that, as a result of secondary modification, has lost its primary character.

Type 3. Bold curved outlines mark fragments of this kind. They are traversed by delicate dot-like flow lines as in obsidian, and one example presents a good series of typical perlitic cracks. Between crossed nicols the crystalline elements are seen to be generally elongated along the flow lines, so that each fragment, to some extent, behaves as one crystal. Fragments of this nature have been interpreted as pieces of obsidian which have become devitrified (5). Such fragments accompany those of type two, but they are not in sufficient numbers to constitute an important part of the rock.

The phenocrysts scattered throughout all of the breccias are of the twinned plagioclase found in other felsites.

Quartzite

Quartzite is a metamorphosed sandstone in which the cement between quartz sand grains is itself quartz (Fig.17); hence,

although other minerals are usually present as accessories, the rock is essentially pure quartz. If the sand originally contained a considerable number of feldspar grains, these are preserved, and the rock is then an arkose or arkoic quartzite. Quartzite may be identified by observing a characteristic granular luster, seen when light from a fractured surface is reflected to the eye at a wide angle. The extreme hardness and lack of phenocrysts should also be noted. Little weathering effects are shown by quartzite artifacts. While the fracture is somewhat rough, the rock, as a whole, is free from figures or faults, and, in lieu of flint, its use was widely distributed among stone age peoples.

For the most part the local quartzite artifacts are of medium to dark shades of yellow, brown or green. Bright red specimens are rare, but the Cape Indians sometimes

(5) G.H. Williams, "Bulletin Geological Society of America" (1891), vol.2. Detailed descriptions, with plates, of glass breccias composed of fragments of obsidian, from Vinal Haven, Maine and Sudbury, Canada.
used a dull, dark red, micaeous variety. Micaeous quartzite implements also may be dark gray or black.

**Chert***

By some petrographers the term chert is used to include all of the sedimentary rocks composed essentially of chaledonic silica (6). This meaning of the term is followed in this paper. Megascopically these rocks are characterized by a definite conchoidal fracture and a hardness equal to quartz. Unlike the felsites they carry no phenocrysts. In thin sections under high magnification they show a crystalline texture, usually granular (Fig. 18, insert).

Fig. 18. Dark coarse chert, local. X 225, ordinary light, insert with crossed nicols. Small scattered grains are epidote, grains in dotted outlines are quartz.

but which in some cases may be fibrous.

Special kinds of chert are as follows: In chaledony (7) the material is pure, and the rock is colorless or of light colors. It has a waxy luster and is translucent in thick sections. Flint is specifically the nodular rock contained in the chalk formations of western Europe, but the term may be used for like rocks found elsewhere. It is usually brown, gray or black and is translucent only in thin splinters. The fracture is very smooth, and, while dust like impurities are present, the rock contains no calcite or other accessory minerals in identifiable crystals. Jasper is yellow, brown, or red and is permeated with a considerable amount of iron oxide. It is smooth but more opaque than flint. In ordinary or coarse chert (sometimes called hornstone chert) the fracture is less smooth, and the luster is duller and more earthy than in other varieties. Contained in the rock are grains of minerals other than the essential chaledony. The most common of these are calcite (in minute but perfect crystals), quartz, and epidote, and their presence accounts for the dull luster and relative roughness of the fracture (Figs. 18 and 19).

**Local flint***

Not more than three or four Indian artifacts that qualify as flint are included in the Cape materials examined, and these probably represent importations. Some English flint was brought to the Cape in early days (likely as ship ballast), and from it there seems to have been a local manufacture of gun flints. Waste chippings as well as finished flints from this working may easily be mistaken for Indian products.

**Local jasper***

Most of the jasper specimens are deep red, although a fine dark brown or chocolate colored variety is not missing. The source of the jasper is open to question, and it too may have been imported. Some local pebbles and boulders contain fillings of red jasper, but, so far as observed, these are all too small to have served as artifact material.

**Local chert, coarse or hornstone***

The shades of this rock are usually dark and extend through blue, green, yellow, brown, and gray to black. Some examples show a faintly marked parallel banding, suggestive of bedding planes. While in hand specimens they closely resemble some of the cherts from the interior, a microscopic examination fails to disclose the crystals of calcite and other carbonates that characterize the latter rocks, indicating a different history for the local chert. Grains of epidote are, however, often plentiful, quartz and clear secondary feldspar are also to be recognized. Chippings, battered pebbles, and an occasional implement of this material are not uncommon from

---


(7) In composition chaledony is silicon dioxide and chemically the same as quartz. It differs from quartz in indices of refraction and in crystalline structure. Unlike quartz it is always crypto-crystalline, never in distinct geometric crystals.
Cape sites. The source is local, since pebbles of the rock, with some difficulty, are found on the beaches.

**Slate**

In artifacts this material may be determined by its softness, being easily scratched with a knife. Slate is metamorphosed clay or shale and composed of various common minerals, the individuals in many cases are too small to be identified with a microscope. Slate artifacts are usually greenish gray, due to the presence of minute grains of chlorite. The rock exhibits a pronounced cleavage induced by pressure. If the cleavage is absent the rock is an argillite.

**Miscellaneous Rocks**

**Unclassified felsites**

Because of metamorphic alterations the original textures of some felsites have become much obscured. Among such rocks may be mentioned a dark red variety, common as implement material, which weathers to a peculiar speckled gray, the speckling being due to many small knots and strings of a whitish epidote. Another common red felsite, which is somewhat coarse in structure, shows, under a microscope, considerable shearing effects and some evidence of an incipient metamorphic foliation. An arrowhead and several chippings of a felsite having an irregular but distinct pattern of brick red with black were taken from a Corn Hill shell heap. This rock has a jaspery appearance, and its igneous nature is revealed only in thin section.

**Unusual rocks**

A few pieces of a brick red rock containing cavities of pin-point size were found in the shell heap mentioned above. In hand specimens this appears to be some of the calcined clay, or jaspelite, that occurs in Saugus, examples of which are in the Peabody Institute in Salem. Another odd rock, in the shape of a broken spearpoint, consists of quartz sand grains in a brown cherty matrix. This specimen contains the imprint of a small shell fossil. A beautiful white rock, of which one piece was found, has a conchoidal fracture and resembles chalcedony. This material is quartz in which the individual crystals are of microscopic size.

**Additional Remarks on Local Pebbles**

Pebbles in great numbers are to be found throughout the glacial hills and on the beaches of the Cape end. Collectively they embrace a great variety of igneous and metamorphic rocks, but the common unmetamorphosed sedimentary rocks do not seem to be represented. After much search the writer is unable to report a pebble of limestone or of ordinary sandstone. The deposits vary slightly in their make up within a distance of a few miles, and on the whole, they differ from corresponding deposits on the mainland adjacent to the Cape and even from those of the east and west portion of the Cape itself. This is most noticeable in the relatively larger proportion of granite in the latter regions. As regards those rocks which are the immediate concern of this paper, with the exception of chert, they are all very plentiful on the end of the Cape, and the large quantities of felsites is to be especially noted.

**Literature**

On felsite and rhyolite


Alfred Harker, "Petrology for Students" (1908), chapters VII, XI and XIX.

Alfred Harker, "The Bala Volcanic Series of Caernarvonshire", (1889).


George O. Smith, "Geology of the Fox Islands, Maine", (1896).

See also references on felsites in footnotes.

On quartz, quartzite, chert, flint, etc.


Dake, "The Quartz Family Minerals" (McGraw Hill & Co.)


Provincetown, Massachusetts March 28, 1944
As this issue of the BULLETIN is going to press the long awaited "Pre-Iroquoian Occupations of New York State" by William A. Ritchie has come off the press. While there is no time for an exhaustive review, we wish to call the attention of the member to this book which sums up the archaeological work done by Mr. Ritchie and his associates over the past twenty years. It also draws into the same conceptual scheme previous work in that state, as well as much material from New England. As students of the archaeology of Massachusetts, we will wish to give much thought to the "Pre-Iroquoian Occupations of New York State".

We must not feel, however, that it has solved all our problems for us, nor that it is necessarily final for New York State. As more knowledge is gained, modification, as in other fields, is to be expected. We must remember that New York State is nearer the Ohio and Mississippi valleys, that influences proceeding from them into New England would be sifted in passing through New York, and that when they arrived in Massachusetts they would have to fight for their survival in a rather different environment.

It is general archaeological procedure to build up a culture history for each of several areas and then compare similar stages of the various areas to build up the history of the whole. This Ritchie has attempted to do for New York State; we have as yet no comparable body of data for Massachusetts.

Ritchie's scheme for New York State may be outlined as an Archaic Period, divided into an earlier Lamoka and a later Laurentian; an Intermediate Period of Vine Valley culture, with Hopewillian intrusive in the west and Coastal predominant in the southeast; and a Late Prehistoric Period with Owasco blending into Iroquoian while Late Coastal becomes Algonkian in the southeast.

In comparing our material with that from New York State we can, of course, pick out similar types, but in the present hazy state of our knowledge the associations do not appear to be either the same or as clear cut.

Ritchie has shown regional variations in New York State at various periods in time. This is particularly noticeable in respect to his Coastal aspect, which he shows as starting in the Archaic and extending into the Historic Periods along the Hudson River and the Atlantic shore. The somewhat similar material from Marion and Grassy Island may demonstrate the antiquity of this "aspect". We have Vine Valley and Owasco material in the Connecticut Valley. Owasco like pottery also comes from the shell heaps of Maine. Much Laurentian material is found in Massachusetts, but we must guard against using this category for material not found at Brewerton (the Laurentian type site) until the situation has been more clarified.

As Lamoka Lake is the oldest focus delineated by Ritchie, there will be a tendency to call our choppers, hoe-shaped choppers, mullers, trough-shaped mortars, celts, drills, and points "Lamoka" and so make them old. In this connection it must be pointed out that, while Ritchie and others put Lamoka into the "Archaic Pattern" as non-agricultural, many of these things might by others considered as evidence of agriculture. The presence at the Lamoka Lake component of hundreds of hearths, 380 refuse pits, 13 large ash or fire beds (up to 55 feet long, 10 feet wide, and 3 feet thick), 4 feet of midden and over 14,000 artifacts suggests a large and permanent population requiring a rather dependable food supply. The lack of charred corn is to be noted.

In recommending this book for the consideration of the members the reviewer has at random made the foregoing comments as suggestive of points to be considered in reading Ritchie's excellent book. We will remember from geography that Massachusetts is slightly more open for cultural influences on the north and south than it is to the west. We cannot expect, therefore, that Ritchie in New York has solved all our problems for us. We are glad he hasn't, as that would leave us nothing to do. He has, however, compiled a great amount of information, some of which is previously unpublished, and all of which has very important bearing on our work here. It behooves all of us to study this book carefully.

Due to the war it has had to be published by photolithography. However, the illustrations, of which there are some 160, have suffered but little in the process and I am sure we would all rather have it lithographed, than to have to wait for the end of the war for printing.

Andover, Massachusetts
April 20, 1944