EVIDENCE OF EARLY TUNDRA CULTURES IN NORTHERN ALASKA

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The material on which this report is based was collected by the writer during the summers of 1950 and 1951 while making a reconnaissance of the archaeology in parts of the Endicott Mountains. Prior to this, Dr. Helge Larsen of the Danish National Museum and the University of Alaska had visited briefly with the Nunamiut of Anaktuvuk Pass (68° 15′ N., 151° 30′ W.) and returned with ethnographic information that confirmed a belief that this region supports a population of Eskimos with a cultural background distinguishable in some ways from that of coastal groups. It appeared to him that these Nunamiut preserved elements of the earlier Ipiutak complex. He and Dr. Froelich Rainey had earlier hypothesized such an inland group, but supposed they were all now living on the Arctic coast and for the most part absorbed into the coast population (Larsen and Rainey, 1948).

Larsen's interest and that of the present writer were drawn to the region by the observations of Dr. Laurence Irving, who has spent a great deal of time at Anaktuvuk Pass during the last few years doing field work in physiology, and has had occasion to live and work with the Nunamiut. It was he who, among scientists, was the first to identify the mountain valleys of the Arctic as being uniquely suitable to people dependent on hunting. This fact and the presence in Anaktuvuk Pass of a relatively isolated group of Inland Eskimos were responsible for my decision to make the first trip there in 1950.[1]

GEOGRAPHY

The archaeology of the North Slope (referring to the country between the summit of the Brooks Range and the Coastal Plain) has received little attention thus far. We are at present concerned primarily with the material that precedes horizons that are considered the earliest of Eskimo pre-history, and it is perhaps remarkable that the bulk of the meager archaeological writings bearing on the region refer to this older material. (Thompson, 1948; Solecki, 1950 a, b; 1951; Irving,

[1]In 1950 the U. S. Public Health Service very kindly made it possible for me to accompany my father, Laurence Irving, to Anaktuvuk Pass for the initial reconnaissance by making some of its facilities available to me. In 1951 the field work was supported by a grant-in-aid from the Arctic Institute of North America and the Office of Naval Research, and again the Public Health Service contributed the use of its facilities.

My gratitude extends to these persons for their advice and assistance: Mr. Simon Paneak, Dr. Ivar Skarland, Dr. Louis Giddings, and my father, Dr. Laurence Irving, and to the community at Anaktuvuk Pass.

Work on the collections was done in the University of Alaska Museum.

1951; etc.). The observation that in Anaktuvuk Pass the old remains of a distinctive microlithic genre outnumber those that are more recent thus seems to be borne out in the bibliography of the whole area. The geography of a region that produces archaeology of this sort deserves analysis. It has already been given introductory treatment by Solecki (1950), and Rausch has given us a study of the faunal relationships with some pertinent data on the modern Eskimo inhabitants, the Nunamiut (1951). The writer now proposes to discuss the mountain valleys and certain of their peculiarities that are of importance to both ethnology and archaeology.

The locality with which we are immediately concerned lies between west longitudes 151° and 155°. To the north and south it is bounded approximately by the rather abrupt termination of the mountain range and the edge of the spruce forest. The northern limit of trees is in the neighborhood of 2,000 feet above sea level in the larger valleys and follows the mountains some fifteen to forty miles south of the divide. On the south slopes of smaller tributary valleys the spruce occasionally extend another thousand feet higher.

The area appears large on the map, but much of it is taken up with rugged mountains (to the north, block lifted dolomites and limestones; to the south, metamorphic rocks) unsuitable for any aboriginal activity but sheep hunting, and hence of limited concern to archaeologists. The habitable portions of the range are the glacial valleys, especially those that lead to passes between the Koyukuk and Colville watersheds. On the north side these are characteristically straight, level, and steep sided, with most of the relief provided by small glacial and aeolean surface features. Their length to the edge of the mountains varies from twenty to sixty miles, the distance increasing as one moves from east to west.

Those valleys reported to have been used frequently by the Nunamiut are Kanayut, Anaktuvuk, Chandler, Okogmilaga, Okpikruak, and Killik—names referring to the northward flowing streams. The writer has examined parts of the Anaktuvuk and Killik Valleys for sites, and has flown over a portion of the intervening country. The few southern valleys which the writer saw are marked by the presence of high terraces and dense growths of willows along their course within the mountains. Topographic relief is greater on the south side of the range than on the north, and the valleys here are often V-shaped and winding rather than straight and broad as they are to the north.

The weather may be rather severe in winter, with temperatures as low as -50° F. accompanied occasionally by high winds. Snowfall is light. (If it were not, there might well be active glaciers here, for snow fields often last throughout the summer on the valley floors). Ice in the lakes is usually gone by the second week in June and begins to form again late in September. Snow may fall during any month of the year, but it is uncommon in July. During a six or seven week period in June, July and August the weather is generally mild and occasionally quite warm (70° - 80° F.), although there is commonly a heavy frost in

shaded localities at "night". The time of greatest precipitation is probably August, when most of it takes the form of rain. Mosquitoes are not so troublesome as in the country to the north or south because of the dry conditions and fairly constant wind.

Rausch (1951) identifies three biotic divisions on the basis of their floral communities: a) The Arctic Slope Foothills (wet arctic tundra); b) Arctic Mountains (dry alpine tundra); and c) South Slope of Brooks Range (spruce forest). He remarks that, "The occurence of three main biotic divisions within a relatively short distance makes this region unusually interesting from a faunal standpoint". (Presumably he includes men in his fauna, the more since they are one of the few species that can effectively use the resources of all three divisions at the same time). It can be stated fairly that the dry alpine tundra between the tree-line and a point near the edge of the mountains is by far the most easily exploited of these divisions. For this reason it is the "home" of the modern Nunamiut. We can expect to find here if anywhere in the region, archaeological remains of some of the earliest inland hunters that ventured into North America.

The basic ecological difference between the spruce forest and the dry tundra affecting primitive hunting cultures is the presence of spruce trees in one division and their complete absence in the other. In addition, certain plants and particularly a few mammals, such as black bears, beaver, snowshoe rabbits, and a number of other small fur bearers, are found in the forest but not in the open country. On the other hand most of the types common to the dry tundra show up occasionally if not often in the forest. Thus, the variety among mammals may be greater in the wooded region than in the treeless zone, but as will be shown later, food is not as a rule so readily available in such quantities in the former as in the latter.

The fact that there are few major streams with salmon runs worth fishing north of the tree-line is also significant, although perhaps its inclusion as an ecological "principle" could be questioned. (The Kobuk and Noatak are notable exceptions in Alaska).

The points of distinction between the dry and the wet tundra are less clear. Probably the difference results from better drainage and occasional extremely localized climatic situations in the mountains. These conditions favor the growth of willows to a height of 10 or 15 feet, and various plant communities adapted to relatively dry localities (represented by *Ledum, Rhodedendron, Empetrum, Vaccinium,* and on the rocky slopes and some moraines, *Dryas*—Rausch, 1951). These plants occur sporadically in the foot hills, especially near river courses, but are in no sense representative of the division. The wet tundra penetrates the valleys, and hummocky grass and edge meadows cover large parts of the valley floor. It is the high incidence of dry areas and their characteristic plants that distinguishes the division, rather than the absence of wet tundra.

Included in the dry flora are plants useful for fuel (*Salix* and *Cassiope*) and as producers of berries (*Vaccinium*). But more important

than the mere presence of these plants is the fact that they permit a variety of small game (squirrels, ptarmigan, migratory birds) to exist in a concentration not to be found in the wet region.

However, small game plays a minor role in the diet of the Nunamiut (albeit, at times along with fish a critical one) and sufficient fuel can be found in many places outside the mountains. The cardinal advantage of the mountain valleys is good big game hunting, and this results from two facts: first, they are treeless, flat, and surrounded by good points of vantage so that virtually all the game passing through can be detected and pursued or driven; second, the rugged mountains tend to restrict passage between the spruce forest and the tundra to routes through the valleys. Caribou (*Rangifer arcticus stonei*) frequently, and perhaps as a rule, migrate north or south and therefore often pass through the main valleys in large numbers—often enough, that is, for the Nunamiut to make this semi-annual migration the basis of their economy. Thus, aboriginal hunters can resort to the course which, according to Giddings (1952 b), is their preference and the only sensible thing to do, that is, to wait for animals to come to them rather than to chase them aimlessly about the country.

In addition to the migrant caribou there are, of course, the relatively sedentary sheep (*Ovis dalli dalli*), which do not occur outside the mountains. Grizzly bears (*Ursus richardsoni*) are probably more plentiful here than to the north, and so are moose (*Alces americana gigas*). It is clear that the population density of game animals averages much higher in the mountain valleys than on the wet tundra and that the animals are more easily hunted here than in the spruce forest or in the open rolling country to the north.

Other factors contribute to the suitability of this region. Beyond the treeline the light snowfall is drifted and packed hard by the wind, and often patches of ground are swept bare. Travelling is much easier for men and animals in these conditions than in the deep, soft snow of the forest, and good grazing is easier to find and to reach.

The dry tundra, then, offers many of the resources and advantages of both the spruce forest and the wet tundra, and some of its own besides. It is treeless and thus provides good visibility for hunting, but shelter and fuel can readily be found. A variety of animals can be hunted within a relatively small radius, and when for some reason there is no game in an area, the hunters and even whole families and communities can range widely in search of food over the hard-packed snow and bare ground. Moreover, both the forest and the wet tundra are within a couple of days' travel from any point in this part of the mountains, so that many resources peculiar to them are also available. Finally, where herding animals provide the *piece de resistance* of the aboriginal menu, mass hunting techniques can be postulated as inevitable, and we can expect to find that the people customarily lived and hunted together in small communities rather than as single families.

In view of the foregoing, and also the fact that mineral soil deposition and ground cover make sites easy to find, it is not surprising that

there are a fairly large number and wide variety of archaeological remains in collections from the valleys of the Brooks Range. We find that where similar conditions prevail, as in parts of the country west of the Colville drainage, sites and chipping stations are similarly common (Thompson, 1948; Solecki, 1950).

Two further comments bear significantly on the archaeology that is to be presented here. First, the Arctic, and particularly those portions of it not adjacent to the coast or large lakes and rivers, affords a uniquely limited selection of food production methods. Virtually the only one feasible in the area with which we are concerned is the hunting of large grazing animals—currently, caribou, sheep and moose, supplemental at critical periods by fish and small game. Second, these conditions have probably held since glacial times. Thus, if suitable sites occur here, we have a chance to study practitioners of this essentially paleolithic economy in a number of stages of cultural development during a long period of time.

CHOROGRAPHY

Since the balance of this paper will be devoted to material that comes from around Anaktuvuk Pass, the principal features of this valley need describing. It is about 18 miles from the summit to the edge of the mountains, where the relief between the valley floor and adjacent heights changes from three thousand feet and more to less than a thousand. Within these limits there seem to be two centers of aboriginal, and contemporary, activity. One is around the confluence of Anaktuvuk and Kangomovik Creeks. At Kangomovik there is a dense growth of willows, some of which are 15 feet high. Two large valleys, one from Anaktuvuk Pass and the other from a pass at the head of the Anaktiktok, come together here; two smaller ones, Kangomovik and Anivik, debouch nearby and contribute to local zoological activity. Caribou and sheep hunting is often good here, and in times of summer scarcity there are enough nearby creeks with fish in them to feed a number of families. The fact that no sites comparable to those of the lower valley were found is perhaps merely because I spent less time here. (Contact Creek, which joins with Inukpasugaruk to form the John River, is another important modern campsite, but it is on the other side of the summit; the locality has so far produced no artifacts and hence is beyond the range of the present discussion).

Tuluak Lake is the other focal point. Since it is fed by a spring, part of it remains open throughout the winter, and provides an opportunity to catch lake trout and grayling. The surrounding topography makes it a suitable terminus for caribou drives. The lake is unique in the valley in being deep and relatively stable. Both conditions result from its having been formed by the filling of a depression in the moraine.

Willows grow in the vicinity of the spring and on Tuluak Creek at the lower end of the lake, and there is dry ground suitable for campsites all around the lake. (However, according to the Nunamiut, two generations ago the nearest source of wood was five miles away).

All things considered, the lake is one of the most favorable spots in the valley for summer or winter camps, a fact that is borne out by the number of relatively recent sites around its edges. Solifluction may have obliterated many older deposits. That such deposits were made seems more than likely when one considers the abundant flint chips and early implement types that have been found on the knolls immediately south of the lake. A somewhat questionable report attributes three old-looking implements to the recent houses at the lake's edge (Pl. 2, 13-15).

Imaigenik, a locality less than two miles away and on the other side of the river, deserves separate mention. The name is taken from a large lake that, according to legend, had been drained by a woman who cut out a channel to the river in order to attract grayling at its mouth. (This is a device still used occasionally with the same results.) A recent camp was located around the edge of the old lake and on a dry, fairly level plain nearby. It is an unusual situation since there is an unobstructed view to both sides of the valley from the campsite. However, there is otherwise nothing obviously advantageous about the location. It seems to be mainly no more than a pleasant place for a summer camp in a locality generally good for hunting and fishing.

The site designated as Imaigenik is just a few yards north of the location of the last tent of the 1950 summer camp.

IKAIGENIK

The site is located on an inactive sand dune 30 feet above the river and 10 feet above the adjacent level ground. The dune is covered mainly by the sparse *Dryas*-dominated vegetation characteristic of well-drained knolls and hill tops. Small wind-eroded pockets about a foot deep cover approximately half the surface area of the southern third of the knoll. A great deal of sloughing into the river is taking place, so the east side is largely bare and drops at an angle of 60° to the water.

The sand is unstratified except where a variable but thin layer of soil has begun to form. Particles range in size from the finest silt to moderately coarse grains of quartz. Permafrost was encountered at a depth of five feet during the second week in August; down to that level no other significant pedological features were noted in the one deep test pit.

All but three of the implements and a great majority of the flint chips were found on the surface in the hollows of the dune. Also exposed on the surface were bones and boiling rocks cracked by heat. These were often but not invariably found near chips and implements.

The site was first noticed by Suzie Paneak in 1937 or thereabouts and was brought to my attention in 1950, when it was discovered that I might be interested in such things.

In some places the rocks and bones are thickly concentrated a few inches below the surface. Although their areal distribution is approximately that of the flints and although a number of test pits were dug, in only one instance were flint implements or chips found with the bones below the surface. In this case, the polyhedral core and

two fragmentary side blades were found in a bone-rock-charcoal matrix eleven inches below an arbitrarily set ground level. The material of the matrix was formed in a number of connected lenses and was the undisturbed remainder of a hearth. A number of flint chips were found elsewhere in and near the hearth.

There is no question of the excavated implements having come from anywhere but the hearth. In all three cases the artifact came from the middle of a compact bed of charcoal and charred bone at least three inches thick. There is a possibility that the hearth material is more recent than the artifacts and was deposited on them while, during some alteration of the contour of the dune, the flints lay on the surface. This, however, seems unlikely.

The bones and boiling rocks are much the same throughout the site. The question of whether or not all of them were originally associated with the implements is not particularly important. The nagging doubt is the one that attaches to the association of the bone-bearing hearth and the three implements found in it. The following facts suggest contemporaneous deposition:

The bones that were ground for grease, both those in the hearth and those found elsewhere on the site, are in much larger fragments than those used by the modern Eskimo. Nowhere on the site were there found any cultural remains or features, except the bones and boiling rocks, which do not fit the specifications of the prevailing flint industry better than those of any other. In other words, if the Imaigenik flint knappers didn't leave these bones, rocks, and charcoal behind, who else did?

What it amounts to is that the two items in question were found associated *in situ,* and while there is nothing to indicate that they are not of contemporaneous deposition, there is a certain amount of evidence to the effect that they are. Still, since we are dealing with a sand dune, which is a notoriously unreliable piece of chorography, we must accept the association with reservations (or, if one prefer it, reserve acceptance until more reliable evidence is found).

DESCRIPTIONS

The implements found number seventy-six, and can be grouped in six categories:

1. Lamellar flakes and a core.
2. Small bifacially chipped side blades.
3. Burins and burin spalls.
4. Large bifacially chipped blades of uncertain form.
5. Flakes retouched for use, as knives or scrapers.
6. Scrapers of various types.

All are of cryptocrystalline quartz—black ,grey, or green chert, flint, or obsidian. There are no implements or flakes of other materials, except for the fragmentary cooking rocks or heaters, most of which are igneous stream-worn glacial boulders. Quite possibly these were selected on the basis of shape and material in the hope of getting the rocks least susceptible to heat-fracture.

A large number of chips were found. These are almost invariably quite small and probably were removed during the later stages of manufacture. Some of the materials represented were known to the Nunamiut only from sources far to the west between the Killik and the Etivluk. Others are found

locally. No source of obsidian was known to the local Eskimos, though they do have a name for the clear variety. It appears that a lot of flint working was done at this site but that much of the material came from some distance away.

Most of the implements with secondary chipping show only the scars of fine pressure flaking. Some of the larger broken blades of group 4 are not made with any great care, but there is no evidence of the rough work found at some of the other sites in the region. The only direct or indirect percussion flaking that has been identified is seen on the prepared core and its derivatives, on primary flakes, and on burins. Consistently excellent workmanship is one of the outstanding characteristics of the material.

GROUP 1

Implements that will be described in this group number 29. One is a prepared polyhedral core, (Pl. 1, 10) 23 are lamellar flakes, (Pl. 1, 9) and the remaining five were probably struck from prepared cores but are irregular in shape.

A group of 18 of the lamellar flakes conforms to Watanabe's specifications for Mongolian-type lames (Okada, 1951). The remaining five have been trimmed on one edge by the removal of a single longitudinal flake, in the manner of striking off a burin spall. Two others, included in the group measured, were also trimmed in this way, but since the spall removed failed to extend the full length of the blade, the original width could still be determined.

The measurements and derived figures given here are intended for a descriptive supplement. It is doubtful that they have much significance for comparison without extensive supporting observations.

TABLE 1

	Imaigenik I, 18 Specimens	U. of Alaska Campus Site, 19 Specimens[2]
width	5 to 14 mm.	4 to 9 mm.
average	7.5 mm.	5.8 mm.
thickness	1 to 3.5 mm.	1 to 2.5 mm.
average	2 mm.	1.7 mm.
w/t index	17 to 37	20 to 45
average	27	31
	Hokkaido, Obihiro, 18 Specimens	North China, Linnsi, Jehol Providence, 150 Specimens[3]
width	4 to 7 mm.	4 to 12 mm.
average	———	———
thickness	1 to 3 mm.	1 to 4 mm.
average	———	———
w/t index	———	———
average	31	28

[2]Measured at the University of Alaska Museum. The opportunity is used to present data on this material which have not hitherto been published. For fuller treatment see Nelson, 1937, and Rainey, 1939.

[3]From Watanabe's data presented in English by Okada, 1951. Figures from the North China group have been used by Watanabe as criteria fixing the limits of Mongolian-type lamellar flakes.

The close matrical similarity of all the groups listed may have some significance, but probably none that is not readily apparent without resorting to this device. As will be shown, the cores are more susceptible of analysis and comparison than are the flakes. In this case it should be noted, however, that the rather small difference between the Imaigenik and Campus Site figures might be attributed to differences in the types of core from which they came. The fluted surface of the Imaigenik core is much wider at the striking platform than either the average or the largest specimen from the Campus Site. The greater curvature of the surface from which the lamelles come, in the case of the Campus Site cores, accounts for the fact that many of them are narrower and relatively thicker than those from Imaigenik.

Many of the Imagenik flakes have had the section with the percussion bulb at the proximal end broken off, presumably to remove irregularities and facilitate hafting. Several of these broken ends have been included with the lamelles.

Most of the flakes show signs of wear on one or both edges. This may conceivably result from their having been eroded by wind-driven sand while they lay on the ground. The Campus Site specimens do not as a rule show this characteristic; all were recovered from below the surface of the ground. One small Imaigenik lamelle has very fine regular serrations made on the edge. Those that have had the backs trimmed might be regarded as micro-burins (Giddings, 1951).

In measurement and appearance the Imaigenik core is readily distinguishable from any of the Campus Site specimens. It is 18 mm. wide at the juncture of the striking platform and the fluted surface, which forms an angle slightly less than 90°[4]. The largest of the Campus Site cores is 15 mm. wide, and the average of 28 is 9 mm. The fluted surface of the Arctic specimen is 29 mm. long, whereas the average of the Campus Site is 21 mm. (One each of the Campus cores is 29, 28, and 27 mm. long, however).

It is apparent that there are marked differences between the prismatic flake technique of Imaigenik and that of the Campus Site. It may be that refinements in descriptive techniques will premit valid comparisons to be made throughout this wide-spread industry in North America, and that this will prove useful in identifying and correlating otherwise enigmatic finds. One hopes for such data particularly from the large blades and cores reported from the Aleutians (Laughlin, 1951) and North Slope (Solecki, 1950 a), and from Canadian and Greenland material.

GROUP 2

As in the case of the lamellar flakes, most of the thirteen microlithic bifacially chipped side blades have been broken (Pl. 1, 1-6). The two that are intact measure 24 x 8 x 2 mm. and 15 x 5.5 x 2.5 mm. Another, for which the length can be estimated, is 10 mm. wide, 2 mm. thick, and probably was 26 mm. long. The average maximum width of all thirteen is 7.8 mm., a figure that is certainly too small because probably half of the specimens are end fragments that do not exhibit the greatest width. The likely figure is between 8 and 8.5 mm., about that of the lamellar flakes. Probably none are over 30 mm. in length. The average thickness is 2.2 mm.; again the figure is a trifle low. The range is very small—1.5 to 3.5 mm.

It is possible that all the blades are derived from lamellar flakes, but there is no conclusive evidence of this in the specimens at hand. Five of them are somewhat plano-convex in cross section, and one of these has no secondary chipping on part of the plane surface.

[4]On first inspection the angle appeared to be much less, and thus brought to mind the small cores with angles of 30-45° mentioned by Meldgaard from West Greenland (1952). The marked convexity of the flake scars and striking platform gives the erroneous appearance of an acute angle between the two surfaces where they meet.

Seven specimens are tapered at the ends so that the cutting edge is convex whereas the back is straight. The rest are tapered but both edges curve evenly. Most of the cutting edges are slightly serrated, but generally less so than the back edges where the blades have been resharpened, showing that the serrations were probably not produced intentionally.

On eight of the nine blades and fragments large enough to permit examination the majority of the flaking scars extend from one edge to the other. The ninth piece is so narrow that the width-thickness index (curvature of the surface) may have made this style of flaking impossible. The four remaining fragments all have had long, narrow spalls removed.

In a few cases not all of the flake scars are parallel, but this is not the rule. The scars leave the edge from which they originate at an angle of 70° to 80°. Where supplementary flaking has been done on the same surface from the opposing edge, the scars are generally parallel to those made first. This technique will henceforth be referred to as "diagonal flaking".

GROUP 3

Seven burins (Pl. 1, 12-15), and thirteen burin spalls (Pl. 1, 7, 8) make up a significant portion of the collection. Six of the former are angle burins and one is of the chisel type. Three of the angle burins have been trimmed on both sides. One may have been salvaged from a broken point or blade; another is a double ended burin. The remaining four, including two very small ones, have had varying amounts of shaping done on a convex face. There is no evidence of grinding on any of the pieces of this group.

GROUP 4

Four implements have been placed in this category mainly because they are not susceptible of clear description. The remaining one is a knife blade (Pl. 1, 11) more closely related to these than to any others in method of manufacture.

The knife blade, made from a thin flake with only a minimum of retouching beyond what was needed to give it shape, is 25 x 18 mm. Several long scars regularly spaced give the strongly curved cutting edge a serrated appearance. The manner of hafting cannot be determined.

The rest of the pieces in this category serve mainly to show that blade and point types in this collection are not restricted to microliths. All show evidence of pressure flaking. One, a small fragment 14 mm. wide by 4 mm. thick, is markedly plano-convex in cross section. The flat side has some scars that extend from edge to edge.

GROUP 5

Several retouched flakes have been identified, but the number is rather smaller than one might expect; only five seem to have performed some scraping function.

GROUP 6

The six implements that have been shaped to serve as scrapers can be segregated into four distinct types. One is a relatively large flake (40 x 18 mm.), one edge of which has been trimmed to a bevel varying from 30° to 60° (Pl. 1, 19). Part of the edge is trimmed from one side and part from the other, so that the working edge of the slightly curved flake is in a single plane. This fact and the irregular outline of the edge suggest that it was used on skins. The single plane edge is more convenient for skin working, and the irregularity of the edge makes it unsuitable for working in bone or wood.

A second type of scraper, of which there are two, consists of a small thick flake (5 to 7 mm.) with several concave working surfaces produced by the removal of percussion flakes and pressure trimmed. It is similar to both the Aurignacian "spokeshaves" (Sollas, 1924, p. 354) and Ipiutak notched scrapers (Larsen and Rainey, 1948, Pl. 20).

Two thumbnail end scrapers, (Pl. 1, 16, 17) one of them 20 mm. x 20 mm., the other broken but about the same size, are pressure retouched on all adges. The angle between the planes of the beveled working edges is about 60° in both cases.

The final type (Pl. 1, 18) is taken to be a keeled scraper of the sort described by Giddings. It is chipped only on the strongly convex surface; where this surface meets the unworked face the angle is from 40° to 70°. The entire edge is divided into four sections by the ends and by two projections, one on either side. One of these edges, on the end from which the tip is broken off, has been sharpened several times. None of the other edges show evidence of other than the original shaping. This may indicate that the implement was end-hafted and used by a left-handed man (see plate).

DISCUSSION

In searching for closely related sites and material in current literature we can eliminate the great bulk of those reported from the American Arctic because they lack burins, lamellar flakes, and/or small diagonally flaked side-blades, types that are in the majority here. That leaves three well-described collections with which to make comparisons: the West Greenland Paleo-Eskimo (Meldgaard, 1952), the Pearyland Dorset (Knuth, 1952), and the Denbigh Flint Complex (Giddings, 1951). The first two can be disregarded for the present because the few side blades illustrated are quite unlike those from Anaktuvuk, so there remains only the Denbigh Flint Complex to consider. Here we find the resemblance to be remarkably close. The parallel, diagonal flaking of the microlithic side blades is of comparable excellence in both sites; the burins from Imaigenik can all be duplicated in the Denbigh collection; and the lamellar flakes and parent core from the Anaktuvuk site are of the same type as those in the Denbigh group. These facts establish a close relationship between Imaigenik and the Denbigh Flint Complex. With our present knowledge of the typology of these industries, it would be difficult, if not impossible, to distinguish and retrieve the Imaigenik specimens if they should accidentally get mixed with the Denbigh collection. For present purposes the two sites represent the same flint industry, though other aspects of culture may have been different.

It is noteworthy though not in any way improbable that we should find material belonging to the Denbigh Flint Complex four hundred miles inland from this type site on the coast at Iyatayet. The inland country is quite suitable for occupancy and has been used by bearers of related cultures as well. There is no question that the culture which produced these implements was well established here.

This is by no means an exhaustive examination of relationships. The plan is to orient this collection and then proceed to a description of additional material which will permit some extension of the boundaries of comparison. Industries that contain similar implements have been reported from many sites throughout the Arctic (Knuth, 1952; Collins, 1953; Harp, 1953). The fact of immediate significance is the identification of the Imaigenik tools with the Denbigh Flint Complex. It should also be noted that the site found by Robert Hackman not far from Imaigenik (Solecki and Hackman, 1951) produced cores, prismatic flakes, side blades and burins that bear a similarly close resemblance to implements of this complex.

TULUAK

1

This site is located almost directly across the river from Imaigenik. It consists of thin layers of culture material of several ages distributed along the northern edge of a bluff, 40 feet above the river, overlooking a series of low terraces. The bluff is of morainic material, and is probably an esker. There is a small pond at its base, the shore lines of which indicate that it was formerly twice as large and 10 feet deeper. Some time before the pond was formed the course of the river ran next to the bluff. It is the writer's opinion that an ice dam, effective during the recession of the glacier, caused the formation of a broad, shallow lake which covered the esker. That some of the sediments overlying the moraine are of lacustrine origin is quite evident, and an ice dam seems the most convenient explanation.

Tuluak Lake, currently favored by the Eskimos as the site of winter camps, is less than a mile to the northeast. The small knobs to the southeast along the edge of the esker have been used recently as places to wait for caribou moving north, and the quantity of flint chips found here indicates that they were so used in earlier times. The great majority of chips from this locality are of the sort that are characteristic of older sites in the area—small, weathered, and of a variety of fine materials.

The esker is covered by layers of mixed sand, silt, and clay to an undetermined depth, topped by a layer of sod and humus that rarely exceeds 3 inches in thickness. The vegetation is dominated by *Dryas* in the drier spots and tends toward grasses, sedges, and dwarf willows where the drainage is poorer. The floral community appears to be in an early stage of development. This fact is borne out by an examination of the soil profiles, which show the visible effects of leaching only to a depth of about 15 inches, suggesting that the present surface of the ground is of recent origin. The upper level of permafrost was found to be at depths of 25 to 35 inches in the middle of August.

A part of the recent sediments, probably all of the sandy upper stratum, are wind deposited. The effects of wind erosion are evident on the south sides of most of the knolls.

STRATIGRAPHY

Six test pits were dug in what seemed to be the most productive portion of the site. Only two of these were at all rewarding—in the rest there were culture deposits, but in most cases few artifacts or none at all were recovered.

The thin deposits of cultural material have been altered by frost action, and most of the organic matter has been decomposed. However, in test 5 and some others an easily discernible layer of sterile sand

separates the uppermost level, which is recent, from that below it which is apparently much older. On the basis of stratigraphy no finer distinctions can be made. Freezing and thawing have caused such distortion in the strata that in places they lie in recumbent folds, and occasional pieces of bone were found in a vertical position 20 inches below the nearest culture layer.

The sediments directly below the recent deposits consist of sand discolored by vegetable residue. They extend to an average depth of 10 inches below the surface. Below this, but not readily distinguishable from it, is darker colored sand, generally more compacted and ranging in thickness from 5 to 12 inches. There is considerable relief to the contact between this layer of sand and the grey sandy clay beneath it. The contact zone is often marked by discontinuous layers of variegated clay, the description and detailed explanation of which would require the attention of a micro-geologist. It is certain that at no time did the surface of the ground follow such an intricate pattern.

The layer of gray sandy clay extends to an unknown depth. Occasional banding was seen, and lobes of different colored clay were found at all depths. The writer believes these sediments to be water deposited but is not prepared to discuss the matter in greater detail. In any case, they overlie the till which is the basis for most of the topography in the valley, and are therefore unquestionably post-glacial. (In the case of test pit 1, at the edge of the bluff, erosion has removed all of the clay and part of the sand, so that the sand and culture material lie directly over the till).

RECENT MATERIAL

All of the test pits gave substantially the same results. The top layer, which extends from the surface to a maximum depth of 8 inches, is characterized by occasional gray flint chips, caribou bones cut with a saw, brass cartridge cases (WCF . . . 44), an oval stone net sinker with two opposing side notches, and, lying on the surface, several sled shoes of spruce. On the surface there were also the remains of Nunamiut spring and summer camps. It would seem that the period the layer represents does not extend very far backward in time, but it is impossible to set a limiting date.

The principal items of interest to come from the surface are the spruce sled shoes. I heard before finding any that the Nunamiut would use such shoes, generally made of green wood, when better ones were not available. Shoes of spruce are said to slide more easily on dry snow than those of bone or antler, but they wear out quickly. Most of the fragments found were a little more than 2.5 cm. wide and from 0.6 to 1.3 cm. in thickness. All were short, broken sections, and all had drilled holes 5 cm. in diameter at irregular intervals along the middle. They were probably attached to the runners by means of wooden pegs. The use of such perishable shoes might be adduced to help explain the absence of evidence of sleds in sites where it might be expected.

OLDER MATERIAL[5]

The culture level next below the one just described as recent is separated from it by the first layer of sand and part of the second. It consists of a dark line from ½ to 1 inch thick formed by bits of charcoal, bone fragments, flint chips, and other culture debris. It is the source of most of the artifacts recovered and is probably the layer in which all except the recent ones were deposited. It is discontinuous in places and has been sharply folded by frost action.

The total period of occupation must have been short. However, it cannot be said with absolute certainty that the artifacts represent a single period of occupation. Implements, chips and particularly bones were frequently found at some distance from the culture layer; since the samples are so small, homogeneity cannot be proved or disproved. Therefore, we must at the outset regard the collection as a unit that may possibly contain a mixture of cultural elements.

DESCRIPTIONS

The 28 implements from the lower stratum segregate into the following groups:

1. Artifacts of organic material.
2. Small bifacially chipped side blades.
3. Small bifacially chipped points.
4. Bifacially chipped "rare" types.
5. Implements with only a minimum of shaping and retouching.
6. A burin spall.
7. Scrapers.

GROUP 1

Two pieces of worked antler coming from test 5 are the only specimens of organic material. Both are fairly well preserved but fragmentary. One is 8.5 x 1.5 cm.; the other is 3.5 x 0.2 cm. There is no indication as to their probable use. With reference to preservation, it should be noted that organic matter (primarily bone) was recovered in much better condition from the lower levels than from near the surface. This may mean that soil deposition was relatively rapid at the time the older material was laid down.

GROUP 2

Numerically, the most important implements are bifacially chipped side blades, of which there are 11 (Plate, 3, 4, 6, 7, 9, 11-13). Their common features are their small size and the evidence of skill in their manufacture. Otherwise they are rather heterogeneous. All but 2 (9, 13) are fragmentary.

Two blades display fairly creditable diagonal flaking (11, 12), and one has diagonal flaking of a sort on one surface (4). It is possible that some of the fragments that were too small to be examined thoroughly also bore some diagonal flaking. Serrate edges occur rather frequently (5 specimens). Some (3) are plano-convex in cross section. Most of the blades were crescentic in form.

It is evident that a typology cannot be made for this series; the description of common features must suffice. The technique of manufacture seems to be consistent enough to dispel, in the case of the side blades, the likelihood of intrusives.

[5]It should be noted that, while this collection is very small, 28 artifacts, I think it is sufficiently distinctive to warrant analytical and comparative treatment. This results partly from there being an impressive lack of published material dealing with flint types of this genre, but also partly from the clearly definable nature of many of the types with which we have to deal. If a few of the observations anticipate some that are forthcoming from Dr. J. L. Giddings, it is largely because they were first suggested to me by him. This, of course, does not mean he is liable for all of them.

GROUP 3

Next among the bifacially chipped implements are the proximal fragments of two end blades—presumably arrow points (Pl. 1, 18). Both are diagonally flaked, although only on one side in the case of the smaller. Both have square bases. The sides of the smaller converge toward the base.

GROUP 4

Three other bifacially chipped implements complete the list in this category. One is a drill (Pl. 1, 14). In form it is quite similar to Ipiutak type I (Larsen and Rainey, 1948), with a broad base and slender point, the end of which has been broken off. However, it is but 2.2 cm. long, too short to have been used effectively without being hafted and much smaller than the Ipiutak specimens. Borers of a similar sort are encountered in Danish and other European Mesolithic collections (Mathiassen, 1948).

The next is a roughly oval piece of flint (Pl. 1, 15), the use of which has not been determined. Although all of the edges have been carefully retouched (on one face only), they don't show any sign of having been used. It resembles an Ipiutak rare form described as a "thick oval blade" (Larsen and Rainey, 1948, Pl. 20, 21).

The last is a square piece of flint (Pl. 1, 2), very thin and flaked on both sides, with some of the flakes on one side extending from one edge to the other. The slight concavity on one edge seems to have been produced intentionally. Its purpose is unknown. It may be related to the "scale-shaped piece of flint" figured by Meldgaard in his West Greenland Paleo-Eskimo material (1952, p. 223), which he compares with late Paleolithic and Neolithic specimens.

GROUP 5

This is a series of simply-made implements chipped usually on only one face and, in most cases, only at the edges.

One, a diminutive arrow point (Pl. 1, 10), is 2.15 cm. long. The distal end would be triangular. The broad stem, marked by small shoulders, converges slightly to a square base. Flaking scars are visible at the edges, but otherwise it retains the shape of the spall as it was taken from the core.

A pair of edged tools that may be regarded as knife blades are also quite simply made (Pl. 1, 16, 17). Both are broken, with only the distal portions remaining. One, more expertly made than the other, is symmetrical, with sides curving to a sharp point. One face is completely covered with flaking scars; the others show scars extending only a short distance in from the edges. The second conforms in type to the first but shows less care given to the flaking. On both, the edges are somewhat serrated, probably intentionally so.

The remainder of the artifacts in this class are two fragments with the edges slightly rounded by chipping. Their original form and use is purely a matter of conjecture.

Unifacially retouched implements occur frequently in Dorset material (Harp, 1953).

GROUP 6

One burin spall only was found during excavations (Pl. 1, 5). The fact that no burins were found in place, and no other spalls, does not require us to regard this as intrusive, in such a small collection. Both appear to be characteristic of the material found nearby on the surface.

GROUP 7

Several small scrapers complete the enumeration of artifacts, except for some doubtful fragmentary pieces. The majority of these are small retouched flakes, probably used for working in bone and wood. One (Pl. 1, 18) is an end scraper broken along the longitudinal axis, of which the right half was found. It is a thick flake nearly 4 cm. long, retouched only at the working edge. It would be suitable for hafting but has not been shaped for it.

DISCUSSION

It is immediately apparent that the Tuluak material is not to be compared with any of the Neo-Eskimo flint industries. The small size of the specimens and some specific characteristics such as diagonal flaking, probable evidence of burins, and the importance of side blades suggest some relationship with the early horizons represented by the Denbigh Flint Complex. However, certain notable differences distinguish this collection from the Imaigenik form of the Denbigh complex. The apparent absence of lamellar flakes if they are indeed lacking from the complex, is the most significant. If boiling rocks can be definitely associated with the Imaigenik flints, then the fact that there are none at Tuluak is also important. None of the peculiar 'old fashioned' scrapers found at Imaigenik (group 6) occur here either. Moreover, the general standard of workmanship of Tuluak is noticeably not so high as at Imaigenik.

The difference is not only in the traits missing from Tuluak, which are impressive *in toto* but individually open to some question. The Ipiutak-type drill (Pl. 2, 14), the square and the oval shaped pieces of flint (Pl. 2, 2, 15), both obviously finished implements, and the square-based small end blades with parallel and converging sides (Pl. 2, 1, 8) are distinguishing traits found in the Tuluak material that do not occur at Imagenik (or in the lowest levels at Cape Denbigh). Taken together they are sufficient to isolate the two sites. If the industries are both in the same autochthonous line of development, then the chronological gap between them may be presumed to be a long one. Nevertheless, there appear to be no industries closer in typology to Tuluak than the Denbigh Flint Complex—at least, none for which there are adequate descriptions.

An uncritical view of the facts might prompt one to call the Tuluak material a stage in the development from the Denbigh Flint Complex to Ipiutak, thereby implying a generic relationship and fixing on the map an inland phase of a "pre-Ipiutak" culture. There are enough parallels between Tuluak and Ipiutak to give this proposition a certain amount of support: the drill, square based blades, certain of the side blades and the two knife end blades; in fact, the majority of the traits that distinguish Tuluak from Imaigenik serve to align it with Ipiutak. (We are prevented by the similarities to Imaigenik from considering it anything but older than Ipiutak).

But, however convenient and temporarily useful it might be, such an identification would oversimplify the situation and perhaps prove misleading. There are nearly as many parallels with Knuth's Pearyland Dorset (1952) and Meldgaard's West Greenland Paleo-Eskimo Culture (1952) as there are with Ipiutak: the small side blades, the burins, end blades with sides converging to a square base, and serrated edges. The Ipiutak culture may have passed through a comparable stage during the course of its development, but we can not say that we have found the proto-Ipiutak phase at Tuluak. No more should we try to attach this Tuluak complex to the eclectic Dorset culture (though one is now

tempted more strongly than ever to seek western sources for Dorset elements). The connecting threads are still too tenuous to support the burden of proof or even to let us surmise with assurance the precise interrelationships of the Tuluak Flint Complex.

We are confronted, then, with a situation that can probably be explained best in the following way:

Elements, and perhaps most often groups of elements, of an old microlithic industry are found to occur in various combinations throughout the American Arctic (and beyond) with a distribution that in the New World seems to approximate that of the modern Eskimo. The culture matrix in which, according to present data, these microlithic elements usually appear, and which may well have been their principal vehicle, was adapted to both the littoral and the alpine tundra of the Arctic. This must therefore have been already a highly specialized culture with many basic similarities to that of the Eskimo. It was certainly not the culture of migrants passing through, or visitors, for we find a number of stages of it throughout the Arctic and vestiges among the succeeding Eskimo phases (Meldgaard, 1952, discussing the evolution of burins; notched scrapers in Ipiutak—Larsen and Rainey, 1948; lamellar flakes at Onion Portage—Giddings, 1952 a; Collins, 1953 b, dealing again with burins in the eastern Arctic).

In effect, there are indications in the stone typologies that remain to us of an extensive continuum through space and time. There is some evidence that in Greenland the continuum merges with the Dorset culture and ultimately with the modern Eskimo (Meldgaard, 1952; Collins, 1953 b). That such a continuum may be traceable in the west, marked notably by the Denbigh Flint Complex and by Ipiutak, is suggested by Giddings (1951, p. 200) and more recently by Collins (1953 a). The Tuluak complex serves as a referrent to support this contention. I believe we will see its validity demonstrated when Giddings' material from Iyatayet and Larsen's from the Trail Creek caves on the Seward Peninsula are fully analyzed.

The degree of unity or disunity in the "continuum" just dealt with is of relatively little importance at the present. The fact that one exists in the archaeological record means that there is a new basis on which to make an estimate of the manner in which the Eskimo culture developed. It may not be necessary after all to invade Asia in order to find whole cultures that will satisfy the requirements of parenthood. Those recently found in North America are old enough, and, so far as the present status of archaeology will permit us to judge, seem to offer more evidence of a direct relationship than do the Asiatic ones. This does not in any sense exclude influences from the west. But the fact is that in the region now occupied by Eskimos we have archaeological remains representing an impressive depth in time. So far as we can determine, it would be difficult for any hunting group to survive in the Arctic without certain techniques that are used by and are characteristic of the Eskimo.

Moreover, there is some evidence of a typological continuum in one element at least that can be traced throughout the archaeological

period. It would be unreasonable to suppose that only flint techniques were passed on. We must therefore regard Arctic America as a locus in which some, and perhaps many, important traits were developed for or transmitted to the Eskimo. The possibility exists that the agglomeration of traits that represent the Eskimo took place mainly where we find the Eskimo living today[6]. This, at any rate, is the view fostered by one segment of the body of evidence.

This hypothesis conforms rather well in some respects to the scheme proposed by Birket-Smith, largely on ethnographic evidence (condensed in 1937). Whether the basic industry of his "ice-fishing" phase was catching fish or caribou is a point of secondary importance. What is noteworthy and gratifying is that we now have archaeological evidence of men existing in the treeless part of the American Arctic and living inland at an early date. They probably used an economy comparable to that which Birket-Smith had in mind, but with more emphasis on hunting. There is a typological resemblance in the cores and burins of this archaeological complex to others of some antiquity from northerly parts of Europe and Asia. Thus, it looks as though we are approaching an archaeological demonstration of parts of Birket-Smith's theory.

We should not say, though, that Imaigenik is at the pre-ice hunting, pre-snowshoe stage. At the roughly contemporaneous (?) Cape Denbigh site it is likely that there was sea hunting (Giddings, 1951, Fig. 64—harpoon (?) blades), if not veritable ice-hunting, and some slight evidence from Interior Alaska (Skarland and Giddings, 1948) suggests comparable antiquity for hunting groups. But we can say that the finds at Imaigenik and Tulauk make it much easier for archaeologists to accept Birket-Smith's contention, both as to the importance of the "ice-fishing" stage in America, and its relationship to a circumpolar continuum. In other words, the primitive North Americans were on hand in time to take part in the specialization of arctic cultures from the ancient "paleolithic" economy of the alpine or dry tundra to the more elaborate forms adapted to the littoral, the large lakes and rivers, and the Boreal Forest.

In the east, the continuum in stonework seems to pass from an early stage with true burins, through a later "Dorset" phase and finally into the predecessor of the modern Eskimo. Whether or not these later developments in the east can be tied in with events in the west remains to be shown. The most that we can say of Tuluak is that it is an analogue to one of the stages in the flint continuum that can be followed through the Dorset culture.

[6]In using the term Eskimo somewhat promiscuously, I have intended to indicate a whole group of American Arctic and sub-Arctic cultures that can be most readily classed together on the basis of their language. In no sense do I mean to suggest a unity of origin by this use of the word. It is just a convenient way to refer to a large group of people with many traits in common who tend to restrict themselves to the northerly sea-coasts and treeless regions.

A consideration of some importance is that there is no material from the inland region to bridge the gap between Tuluak and the modern Eskimo. No sites to represent the paleo-Eskimo Ipiutak complex have been reported anywhere north of Point Hope or the Brooks Range. A number of implement types have been found there that are neither in the microlithic tradition nor part of the Eskimo sequence, but they do not fit well between the two. This is another reason why we should not say that Tuluak is in the line that produced Ipiutak. We can, however, say that at Tuluak there is a site representative of a local stage in an extensive Arctic culture continuum and that this stage shows specialization in the direction of the paleo-Eskimo.

Certain other aspects of the two sites can be dealt with briefly. First, there is no geological basis for estimating the age of either at the present time. Both are in a part of the valley that has been covered by glacier ice at least once. There is nothing to indicate, however, when the last glacier to cover the sites retreated.

Another fact that should be pointed out, though little use can be made of it at the present, is the virtual absence of macrolithic tools in both sites. Specifically, no large points or blades were found, i.e., nothing to suggest a relationship with early American complexes known from farther south. This needs an explanation, for points identified as Folsom, Oblique Yuma, Plainview, and Eden have all been reported from the lowest levels at Iyatayet. Folsom and 'Yuma-like' artifacts have also been reported from elsewhere in Alaska (Thompson, 1948; Skarland and Giddings, 1948).

Still another class of artifact is missing: axes, adzes, indeed anything but burins and microlithic blades that might be useful for working in wood. It would seem unlikely that the people cut their tent poles and weapon shafts with prismatic flakes, but there is no evidence of larger tools. It is possible that the missing implements were made of bone or antler rather than stone. (Such a precedent can be found in early cultures of northern Europe, Childe, 1937).

It will be interesting to discover the southern limit of some distinctive microlithic traits and to compare complexes of those found in the Boreal Forest with those from Arctic tundra and sea-coast. Also, the mechanism that fostered, among other specializations, the development of at least three types of cores for producing prismatic flakes deserves attention. These are the large, conical type found by Solecki (1951) north of the Brooks Range, and found also at Birch Lake near Fairbanks; the small roughly conical type from Anaktuvuk Pass and Cape Denbigh; and the small thin type from the University of Alaska Campus Site. This shows that we cannot assume the Denbigh Flint Complex to be the only medium through which prepared cores came to the New World. Refinements in descriptive technique will greatly enhance the significance of this sort of material.

We may expect further investigations to show that the Brooks Range is, and has been for some time, a peripheral region where innovations that served to elaborate the culture of coastal sea-hunting communities made little impression on the old pattern. Recently,

however, in spite of their archaic form of culture, its inhabitants have played an important role in the diffusion of many traits because of their position along trade routes between Kotzebue Sound and the northern coast. This may also have been the case in the past.

One can visualize a phase in the development of Arctic cultures when those of the alpine tundra were of greater importance, relative to contemporaneous coastal and river phases, than they are now. There may well have been a time, before technological innovations made the sea coast the richest food producing region in the Arctic, when the border between the forest and the tundra, and particularly those localities where the border follows a mountain range, were the important centers of population, and hence of cultural development and change.

Finally, it should be said that thorough and convincing treatment of many of the topics introduced here must await a great deal of additional field work. I submit them now as indications of what appear to be facts susceptible of proof and elaboration.

APPENDIX

I

Other Finds From the Anaktuvuk Valley

A

Near Nakaganik Springs, at the edge of Tuluak Lake, are a number of depressions, four of which we identified as the remains of houses. Elsewhere in the vicinity are some smaller pits, which are probably meat caches. It was found that the houses were used by post-contact Eskimos; they produced several beads and iron tools, in addition to some flint flakes and a flat stone lamp.

Three implements (Pl. 2, 13, 14, 15), which do not appear to be recent, were brought to me and attributed, somewhat doubtfully, to this location. The first is a thin, roughly made side blade which may have been broken at one end. Another is a smaller fragment of a side blade showing some evidence of diagonal flaking. The third appears to be the basal section of a weapon point. It is chipped only on one side, the one opposite being the flat bulbar surface, and has a strongly concave base. It resembles some points described as Dorset (Harp, 1951; Wintemberg, 1939).

The only conclusion to be drawn is that these houses were built on the site of a much older camp. However, no other material of this sort was found in the vicinity.

The houses conform to the pattern characteristic of the region, according to ethnographic information, and are similar to the later Kobuk houses (Giddings, 1952 a). The largest is 11 x 14 feet and has a 3 foot entrance passage extending from the middle of the short side toward the lake. The floors are less than a foot below the surface of the ground. Central fireplaces ringed with large stones were found in three of the houses. (The excavated floor and the entrance passage vary from the rule, but are occasionally used, according to the ethnographic account. The difference is too small to raise the question of foreign elements being present).

B

On the knolls east of Tuluak (and just south of the site described above) were found a great quantity of flint chips, and among them, some artifacts. These were probably left by hunters waiting for caribou to come from the south. They may be divided conveniently into three classes: those that appear to be fairly recent, those which are probably quite old, and those which cannot be placed chronologically. It is noteworthy that there are more specimens in the "old" category than in the other two taken together, and also that there is no distinguishable intermediate group.

Considered to be related to the sites at Imaigenik, and hence to represent the widespread Mesolithic tradition of Northern Alaska, are, first of all, a burin and a burin spall. The first is an angle burin, trimmed on one side only (Pl. 2, 10). The spall shows evidence of having come from a burin trimmed on both sides.

The square basal sections of two arrow points also belong in this group (Pl. 2, 6, 8). These resemble no. 8, plate 1, from Tuluak.

A number of small side blades, all fragmentary, were found; these display various degrees of perfection of the diagonal flaking technique. Of these, the one illustrated (Pl. 2, 5) is the smallest and also the finest, and therefore not altogether representative.

Two interesting end scrapers (Pl. 2, 16, 17) have also been placed in this category. No. 17 is fragmentary but appears to be of the same type as the other. They are distinguished from the Imaigenik form of this implement by earlike projections from the sides which may have facilitated hafting. Both are trimmed unifacially on all edges. Their small size and difference in form from later end scrapers are the principal reasons for classifying them with the old material. A small notched scraper (Pl. 2, 2) is included here because of its size, but it might be of relatively late manufacture.

Several lamellar flakes (not illustrated) probably belong here, as well as does a blade similar to no. 17, plate 1, from Tuluak.

The "recent" find was a cache of flint found under a small rock on top of a knoll. It is presumably the contents of a tool kit or work bag. Included were a number of large flakes, some of which have been retouched; a diamond shaped arrow point; and an implement tentatively called an adz. The arrow point, which lacks part of the base, resembles types found on the Kobuk River, particularly those of the Ekseavik phase (Giddings, 1952 a). The so-called adz is made of poor chert, much weathered. The broad end is slightly bevelled on one side. It is nowhere more than 1 cm. thick. It does not appear to be strong enough for wood-working, but no other use has been suggested for it.

The two problematical implements are arrow points (Pl. 2, 7, 9). Neither point resembles any known article of recent Eskimo manufacture. Both are well made but show no evidence of the flaking technique characteristic of older material in the region.

C

The site examined by Robert Hackman and reported by Solecki in 1950, which is situated some 15 miles northwest of Imaigenik and Tuluak, was visted and examined briefly. It is divided into two parts, one covering the end of a narrow point extending into Narivukararok Lake, and the other situated on a flat portion of the steep hillside next to the lake. On the point, where the cultural material extends over a large area, there were found a number of large core and flake tools chipped at the edges to form knives or scrapers (Pl. 3, 5, 6). Five lamellar flakes were found there as well. These implements came from the piles of flint chips unearthed by Hackman and therefore cannot be taken as representative of the site, which had been much disturbed.

The site of the hillside was marked by three tent rings formed by small boulders. They were circular, two of them being 9 feet in diameter, and a third, 7 feet. Found on the surface in one of them were two lamellar flakes and the distal portion of a blade chipped at the margins (Pl. 3, 7, 8, 9).

D

Near the summit of Anaktuvuk Pass on a high ground moraine were found two stone houses which probably had slab roofs. The first was roughly 8 by 11 feet and had an entrance passage 5 feet long extending from the short side. A few flint chips and a fragment of a point or scraper chipped only at the edge were all that was found during a brief examination. The second house was not investigated but was about the same size. A few feet away was a meat cache made of rocks. These houses are situated half a mile from the nearest water and a mile or more from the nearest wood that could be used for fuel. Moreover, they are exposed to very high winds. These facts and their peculiar construction made their presence there something of an enigma.

A few miles to the south, at the edge of a small pond that is now drying up, were found several house pits in which large rocks were an important element of construction. No artifacts were found, nor was anything else that might identify their builders.

E

A number of "rock shelters" of two kinds were found in the valley. These were easily distinguishable from the hunting blinds and wind-breaks of piled boulders that are made at the present time by the Eskimos. One type consists of rings of stone piled to form walls three feet or more high, over which were probably laid caribou skins supported by willow frames. Charcoal and bones, but no implements, were found inside them. They are generally situated on high ground near the base of a steep mountain slope. They occur at Kimignaktuk, near Akvalutak Creek, and in the vicinity of Kangomovik.

Two miles south of Tuluak Lake, along the high alluvial fan of Kimignaktuk Creek, are twenty-three walls of piled-up stones. Most of them are semicircular enclosures with the high part of the wall

(up to four feet) in the middle facing north or south along the axis of the valley. Some, however, are completely enclosed, except for a small entrance. Their maximum diameters are from 6 to 12 feet. These may be hunting blinds. Some may be walls over which caribou skins were stretched to make a tent. This would be one of the first spots to become snow-free and dry in the spring. It is also a good place to snare caribou as they move through the willows in the branching creek bed. The Nunamiut know nothing of their builders, although they evidently had rifles and other articles of western manufacture.

Implements that were found associated with the "stone rings" include a broken hammerstone (?); antler points that may have been used in caribou lances; an antler arrowhead with a modern type of tang (4 knobs); a feather toy; brass cartridge cases; pipes—one probably from a trader and a number made of hollowed-out willow sticks; snow shoe and sled parts; some pieces of bone shaped to scrape water out of fur clothing; a ladle for melting lead to make bullets, made out of a piece of scrap metal; and what is taken to be a hunter's visor made of wood. The last article has not, to my knowledge, been reported before from northern Alaska.

A second type of shelter is somewhat different from those just described. These were made in convenient cavities in the fractured outcrops of bed rock along the terraces cut by the glacier, and were, in some cases, roofed over completely with stone. Again, no implements were found. The local Eskimos connect these shelters with some former Indian neighbors, whom they refer to as "Uyagaamiut"—Rock People.

F

A cave on the south face of a mountain overlooking the Anaktiktok Valley, 5 miles above its confluence with the Anaktuvuk, was investigated with meager results. It is used by wolves, but it is not suitable for human occupancy, since there is only about 3 feet between the roof and the floor. The depth of the frozen detritus could not be determined.

Under the overhanging rocks at the entrance was a stone shelter similar to the type just described. Outside it, among the scattered caribou bones and charcoal, was found an antler arrow head (Pl. 2, 3). This does not resemble Eskimo arrow heads and may tentatively be called Indian, in view of the many fine barbs which may identify it with material from the interior of Alaska. The culture debris was sparse here and probably represents only a temporary camp.

G

The remaining implements from Anaktuvuk Pass are two flint pieces from a morainic knoll overlooking the river five miles south of Imaigenik. One appears to be a fragmentary knife or spear blade. It is symmetrical, with sides converging to a point which has been broken off. The other (Pl. 2, 4) is the diagonally flaked tail section of an arrow point with straight sides that converge slightly toward the base.

II

FINDS FROM THE KILLIK VALLEY

A

The valley of the Killik River, which is a hundred miles west of the Anaktuvuk, has peculiarities which distinguish it from some of the others in the region. First of all, it is larger—longer and broader—and the pass connecting it with the Alatna drainage to the south is somewhat lower. However, the most important feature is the weather. There appears to be more rainfall here than in the Anaktuvuk Valley, and high winds are reported to be much more frequent. The last two phenomena are directly responsible for a relatively luxurious growth of willow and large wind-formed features in the topography respectively. The willows and sand dunes combine to make sites hard to find, whereas in the Anaktuvuk Valley one might expect to find a chipping station on the top of every second knoll.

B

Nevertheless, while traveling along forty miles of the river from near the summit to the edge of the mountains, the writer found a few sites. The first is situated near the upper end of the valley on a high dune overlooking the river. Behind it is Maptigarok Lake, and a few miles away is a spot particularly well adapted to snaring sheep. The valley is somewhat narrower here than it is farther north and much flatter, which makes this a good locality for caribou hunting.

The characteristic implements are slate blades (both ulus and double edged knives), large unworked boulder chips ("tchi-thos"; Giddings, 1952 a) for working skins, and roughly made but serviceable edged tools of flint. A large adz blade of jade or nephrite was found. It was ground only at the cutting edge and was hafted directly to the handle without an antler socket. Implements of organic material were not found, although preservation seems to have been fairly good. The site appears to be not very old. However, excavation through five feet of drifted sand was not productive of sufficient artifacts for an analytical discussion. It is interesting to note that this is the only site I have found in the Brooks Range that contains ground tools.

Near by, but not definitely associated with the site, were found a dozen sherds from a large pot. They contain a coarse grit and feather temper, and the rim is scalloped. The pot had been mended by inserting small iron bands into holes in the sides. The original shape cannot be determined, but the pot appears to have been a large one.

Across the river from this site, protected from the wind by a grove of willows and a high bank overlooking the terrace of a creek, were the remains of several winter houses. They were found to contain caribou bones cut with saws and therefore are of recent construction. No implements were recovered. The floors were at ground level and were therefore marked only by the large rocks that formed the central fireplaces. In shape they were generally rectangular, but irregular shapes were also noted. Entrance passages could not be recognized.

It is presumed that the houses were made of moss laid over a frame of willow sticks. They fit the ethnographic description of an *ivrulik* much more closely than do those of Nakagnik in Anaktuvuk Pass, referred to above.

C

At the mouth of Akmallik Creek, near the edge of the mountains, there are many dunes and blowouts, and in the bottom of the latter are exposed large quantities of flint chips and some implements. There is no means of estimating the time of deposition. It is unlikely that they represent a single period. They are all of the same substance, black chert. One fragment was excavated from the side of a blowout some fifteen feet below the surface of the dune. It had not been worn by exposure to wind-blown sand, and may well have been *in situ*.

Characteristic of the artifacts are large core and flake tools, roughly chipped by percussion and similar to some reported by Solecki from Narivukarrok Lake and also to those from Kangomovik mentioned above. They appear to have been used as knives (Pl. 3, 1, 5) and scrapers (Pl. 3, 2, 4). They come in a variety of shapes and sizes, but none exhibits any degree of refinement in chipping technique. It is surprising, therefore, to find a well-made burin in this context (Pl. 3, 3). Speculation as to possible relationships is interesting but regrettably futile.

D

Three miles up the creek from its mouth are some high eminences of ground moraine, on top of which was found the fragment pictured in plate 3, 10. This appears to be either the proximal end of a hafted cutting tool or the working end of a type of scraper. The workmanship is careful and its shape is symmetrical.

E

On top of another high knoll 5 miles farther north were found two points. One (Pl. 3, 11) is asymmetrical and made of poor material. It resembles one figured by Rainey from the Campus Site at the University of Alaska (Rainey, 1940). The other is fragmentary (Pl. 3, 12). It is very well made, with regular flaking scars meeting in the middle.

F

Some fragmentary lamellar flakes and a few chips were found on a bare ridge half a mile from the river and a few miles outside the mountain line.

G

A rather unusual side blade (Pl. 2, 1) was found by an Eskimo in the valley of the Okogmilaga River, some 30 miles east of the Killik. The narrow projection at one end may have facilitated hafting, or it may have served as a point for the knife. It may be analogous to a similar projection occasionally found on slate ulu blades.

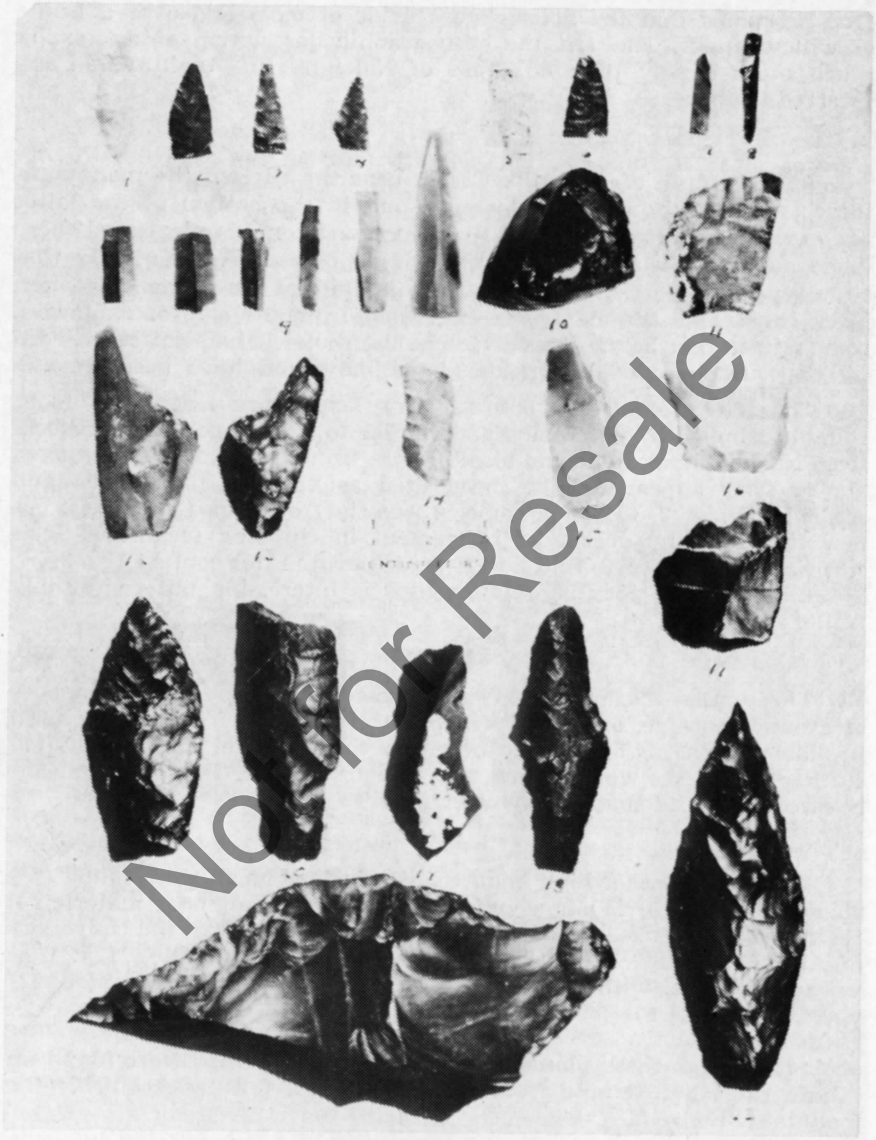

Plate No. 1

Nos. 1-19: Representative types from Imaigenik. Nos. 20-23: Selected types from the Killik River blowouts (Amallik Creek).

The second, third and fourth lamellar flakes from the left have been trimmed by the removal of spalls from one edge. Nos. 7 and 8 are burin spalls.

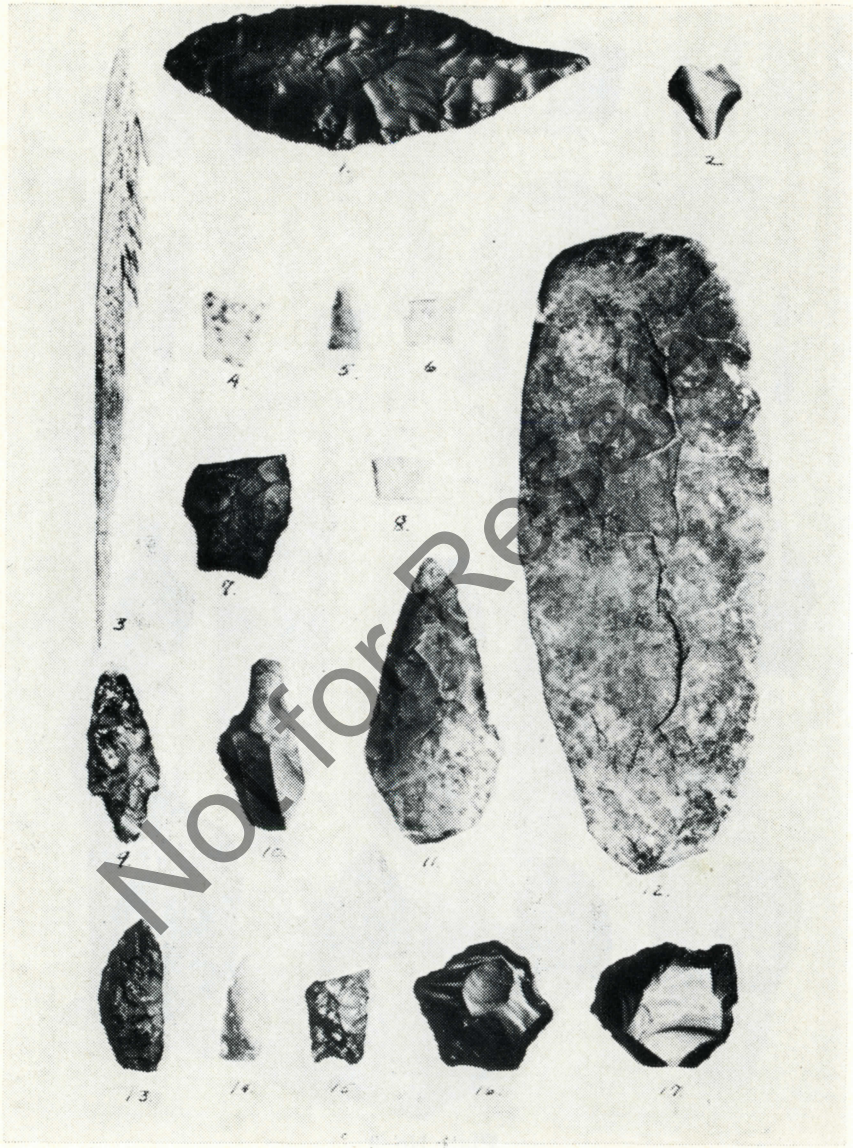

Plate No. 3

Miscellaneous Surface Finds. No. 1: Okognilaga Valley—side blade. Nos. 2, 4-10, 16, 17: knolls near Tuluak Site. No. 3: mouth of Anaktiktok cave. No. 11, 12: flint cache. Nos. 13-15: from house pits near Tuluak Lake.

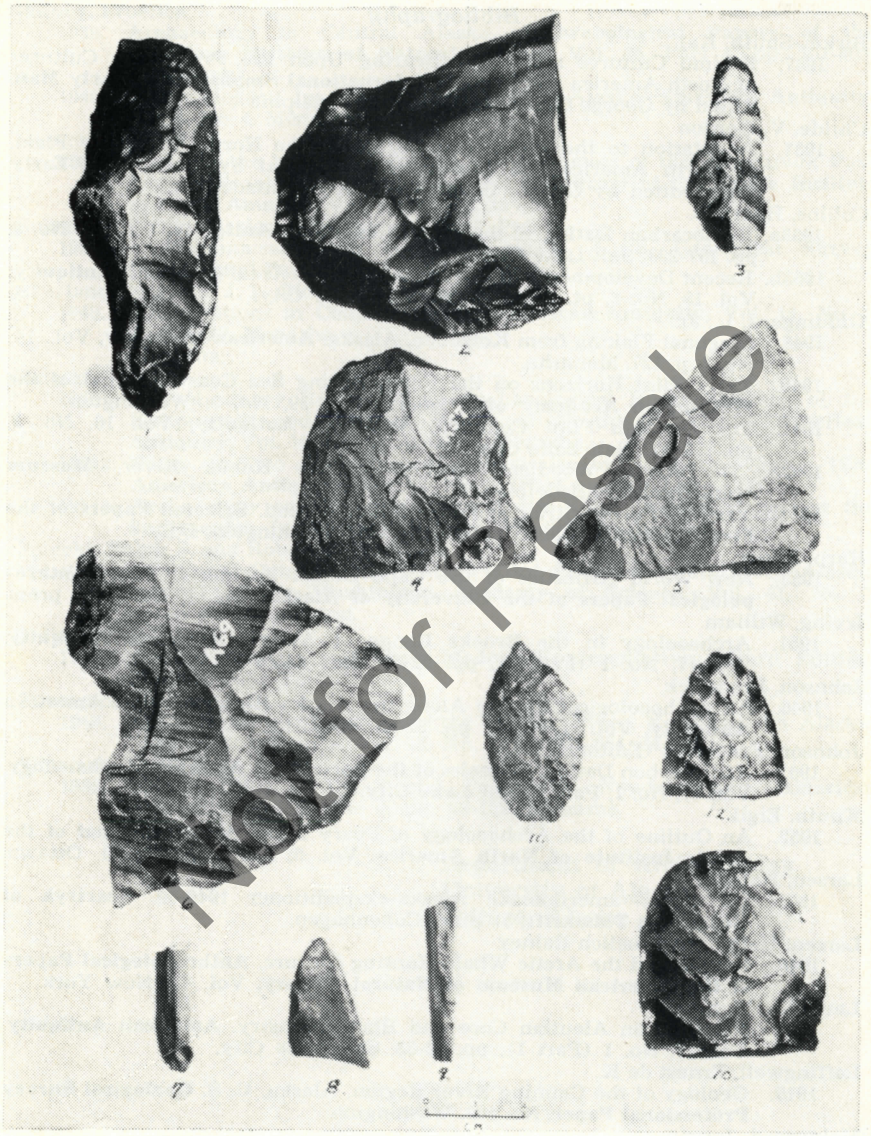

Plate No. 4

Miscellaneous Surface Finds. Nos. 1-3: Killik River blowouts (No. 3 is a true burin, trimmed on one face). Nos. 4-9: Narivukararok Lake (site previously visited by R. Hackman). Nos. 8 and 9 come from the tent rings. Nos. 10, 11: hilltops in the Killik Valley.

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