

# THE ARCHAEOLOGY OF COOK INLET, ALASKA

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WITH A CHAPTER ON SKELETAL MATERIAL  
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## PREFACE TO THE SECOND EDITION

I am most grateful to the Alaska Historical Society for republishing this report of 1934, now long out of print, and for permitting me to add to it more recent data and reflections. The photographic work necessary to prepare the plates was performed by Karl A. Dimler, photographer for Bryn Mawr College; lettering, redrawing of maps, mounting of prints, etc., was done by Susan Kaplan, graduate student in Anthropology at Bryn Mawr College. A William R. Kenan, Jr. Professorship enabled me to work on this new edition.

My deepest gratitude is to Karen and William Workman, both of whom have been most generous in sharing their information with me, in adding new data to the following summary, and in writing their warm appreciation of the original book. In addition, Karen Workman has edited this new edition.

In 1934 there was little solid archaeological material from other areas with which the Cook Inlet cultures might be compared. The bibliographies in Henry B. Collins, *Arctic Area*, Program of the History of America I (2), Comision de Historia, Mexico, 1954; in John M. Cambell (editor), *Prehistoric Cultural Relations between the Arctic and Temperate Zones of North America*, Technical Paper 11, Arctic Institute of North America, 1962; in Hans-Georg Bandi, *Eskimo Prehistory*, University of Alaska Press, 1967; in J. Louis Giddings, *Ancient Men of the Arctic*, Knopf, 1967; the files of *Arctic Anthropology* since 1962, of the *Anthropological Papers of the University of Alaska* since 1952; of *American Antiquity* since 1936, not to mention publications of the Smithsonian Institution and of the Canadian National Museum of Man during these years – all indicate the vast amount of data that has accumulated since 1934 and is still accumulating. Whereas many sites are now convincingly placed in time by several C-14 dates, we are still given, unfortunately too often, summaries of cultural sequences and their presumed significance rather than detailed illustrated reports. Comparisons are still difficult, especially since there is disagreement among archaeologists in terminology, in problems of dating, and of possible relationships between prehistoric cultures in different regions.

Because my own archaeological publications dealing with Alaskan materials are largely unknown, being either out of print or neglected because of my egregiously mistaken pre-Libbey guess dates, I cite them below, if only because they contain still significant distribution studies of many traits (harpoon heads, slate blades, pottery, etc.), or original identifications (Dorset ground burinlike tools), or early formulations of such concepts as a very ancient North Pacific cultural continuum and a later Circum-Pacific culture drift.

Since 1934 there have also been more finds on Cook Inlet itself. For example, although I would have given much to have been the lucky person, it was George Yuth who in 1955 found a beautifully decorated stone lamp on the West Beach of Yukon Island, evidently washed out of the upper part of the main midden (Yukon Island III). I am indebted to the Homer Society of Natural History for photographs of this lamp, and to Gordon Marsh for the descriptions in "A Stone Lamp from Yukon Island, Alaska" (*Anthrop. Pap. U. of Alaska* 4 (2):113-115, 1956).

The lamp (Plate 73) is about 44.5 cm. long, tapering from 23.5 cm. near the rear to about 14.5 cm. near the front. The whole lamp is carved to represent an unidentified animal with pug nose, prominent eyes and small pointed ears, lying on its back (when the lamp is set for use), and apparently entangled in a net or wicker trap. The animal's head is under the wick lip in front; a pair of four-toed paws or flippers rise to the rim at the rear on either side of a scowling human face in low relief. The netlike design is incised on the bottom of the lamp, reminiscent of the chevrons on an earlier lamp from Yukon Island III (Plate 26 - 3), but on the sides this is replaced by a web of raised bands that end in conventional whale tails towards the rear. Rising from the interior near the rear of the bowl is a human head, face turned upward. The features resemble those on other lamps with human figures, especially that from Yukon Fox Farm III (Plate 28; see also Plates 69, 70, 71). A groove across the lower lip suggests a labret slit; the hair would appear to be done up in a knot. This is certainly one of the most handsome lamps from southwestern Alaska, and clearly belongs to Kachemak Bay III.

On July 16, 1956 Gordon H. Marsh reported to the National Park Service (personal communication from him of that date) on a survey of pit houses on the spit between English Bay and the nearby river, below the present village of the same name. These pit houses resembled those of my Figures 3 and 4 in the present volume. Although the site would be disturbed by a proposed airfield, Marsh concluded that no significant archaeological remains would be destroyed.

In 1956 a request was made by a number of public-spirited citizens and organizations to have Yukon Island set aside as an archaeological and historical preserve to protect it from pot-hunters. On August 9, 1965 Secretary of the Interior Udall made Yukon Island a National Historical Landmark. A bronze plaque to this effect was later erected on the highest remaining part of the main site on the West

Beach, close to the scene of our excavations (Plate 76 -A). But, alas, the Good Friday Earthquake of 1964 had already resulted in great subsidence that destroyed much of the main site on Yukon Island as well as other sites on Kachemak Bay (Plates 75, 76, 77).

Also since my work in Cook Inlet, Joe Lawton in 1968 discovered additional pictographs on an overhanging rock at the western end of Clam Cove, on the northern shore of the entrance to Chinitna Bay. They are painted in dull red hematite, somewhat obscured by soot from camp fires. They were photographed by Joe Lawton and Richard Dixon, and traced by Buck Hayden for an article by Lance Petersen, "Ancient Aleut Rock Painting: The Clam Cove Pictographs" (*The Alaska Journal* 1 (4):49-51, 1971; from which the illustrations in Plate 74 were copied by kind permission of the author and the Alaska Northwest Publishing Company, Juneau). As can be seen, these pictographs closely resemble those previously known from Cook Inlet, although some are more fanciful in design. Identifications follow those suggested by Petersen. The figures have been reduced but the exact scale is unknown.

D. E. Dumond and Robert L. A. Mace, in "An Archaeological Survey along Knik Arm" (*Anthrop Pap. U. of Alaska* 14 (1):1-21, 1968), report on studies made in 1965 and 1966 to determine the earliest arrival of the Tanaina Indians on salt water, because at that time Dumond suggested that the inhabitants of Kodiak Island and adjacent Pacific shores, prior to the Christian era, may have been Indian rather than Eskimoan or Eskaleutian in speech (and culture?).

At any event, excavations at Knik Lake and on Cottonwood Creek above it revealed only Tanaina semi-subterranean houses (like my Figure 5) with modern materials (glass, iron, brass, glass beads), and at Fish Creek further investigations were made in the largest house pit, apparently the remains of a summer dwelling for smoking fish, like the Tanaina bark structure described by Cornelius B. Osgood (*The Ethnography of the Tanaina*, Yale U. Pub. in *Anthrop.* 16, 1937: 62). Additional material from Fish Creek consisted of coarse gravel-tempered pottery, like that found on the north shore of the Alaska Peninsula and on southern Kodiak Island dated between A.D. 1000 and 1500, and the sherds found in Kachemak Bay IV (Plate 29 - 1). Two copper pins might have been either Indian or Eskimo, but were judged not older than A.D. 1700. A large medial labret of lignite, as well as the lamp (or lamps) with human figure previously found at Fish Creek (Plate 70 - 2; pages 177-178), were certainly Eskimo. The authors conclude that the Eskimo were using Knik Arm at least seasonally for some time before A.D. 1000 to perhaps A.D. 1700, with the Tanaina moving in between A.D. 1650 and 1780.

These finds, therefore, simply corroborate my previous conclusions about the recency of Indian occupation of Cook Inlet.

In August 1975 Douglas Reger, State Archeologist of Alaska, found a barbed

ground slate blade, like those of Kachemak Bay III (Plate 31 -1, 8, 11, 12), about 4 inches below the surface at a site near McHugh Creek on Turnagain Arm, upper Cook Inlet. A flaked stone scraper was nearby. This site remains to be tested and firmly dated, although it may be attributed to Eskimo rather than to Indian occupation.

On Kenai Peninsula about six miles up Kenai River, Ke29 is the first reported inland Eskimo site in the Cook Inlet area (D. Reger, "An Eskimo Site Near Kenai, Alaska," M. A. Thesis, Wash. State U. 1973). This site shows evidence of connections with Kachemak Bay and Kodiak Island in its ground slate industry, while Reger sees definite Norton influence in its flaked stone. On typological grounds, he estimates that it was occupied within the time range of 200 B.C. to A.D. 200. Except for one birchbark container only stone artifacts were found, including a claystone head with oval to round face and gouged horizontal slits for eyes. The site is interpreted as a salmon fishing camp with a summer dwelling, outdoor hearths, and a large number of fish catching and processing implements. Reger feels that the large number (1,489) of notched stones indicates their use as net weights, an interpretation subject to debate (see my page 171; D. W. Clark, *Koniag Prehistory*, p. 67ff. Tübinger Monographien zur Urgeschichte, Band 1, Verlag W. Kohlhammer, Stuttgart, 1974). Reger finds that Ke29 correlates most closely with the Smelt Creek phase on the Alaska Peninsula (D. E. Dumond, *A Summary of Archaeology in the Katmi Region, Southwestern Alaska*, U. of Oregon Anthrop. Pap. 2, 1971: fig. 4). In both are found straight-based projectile points with slightly contracting stems, leaf-shaped points, fully chipped drills, drills with polished tips and chipped bodies, small chipped adzes with ground bits, and undecorated lamps. Insofar as ground slate implements are concerned, he noted little relationship with the Chagvan Bay sequence farther north in Bristol Bay (Robert E. Ackerman, *Prehistory in the Kuskokwim-Bristol Bay Region, Southwestern Alaska*, Report of Investig. 26, Lab. of Anthrop., Washington State U., Pullman, 1964). The same is true of the Iyatayet Norton collection (James L. Giddings, *The Archaeology of Cape Denbigh*, Brown U. Press, Providence, 1964), where ground slate is virtually absent, but where similarities can be seen in adze blades, straight-based lanceolate points, varieties of stemmed points, flake knives and drills. Reger concludes that Ke29 appears to have been influenced by Pacific Eskimo and Bristol Bay Norton although peripheral to both.

In May 1974 a crew under the direction of Alan Boraas of Kenai Community College and William Workman of Alaska Methodist University excavated a sizeable housepit, probably of late Tanaina Indian affiliation, on the Ciechanski property near Soldotna (i.e., inland from Kenai). Only one possibly diagnostic artifact, a large double-edged slate lance or knife blade, was recovered. This meager yield matches the earlier experience of James W. VanStone near Ninilchik.

Several sites have been located within the State Park system on Kenai Peninsula (R. Greg Dixon and William F. Johnson, "Survey of the Prehistoric and Historic Values of 48 Waysides of the Alaska State Park System," 1972), but since these have not yet been excavated, nothing can be said about their cultural affiliations.

In December 1961 Mrs. Mildred Smith, then of Halibut Cove, sent me information about six sites in or near the cove. Of these, the site at the old Nutbeam place on Ismailof Island and the site at Alvin Taescher's place on the mainland to the southeast, have both yielded, not simply the expected artifacts from Kachemak Bay, but implements of flaked red jasper, green chert, etc., picked up on the beach. Samples of these sent me by Mrs. Smith I showed the late Louis Giddings, who reported to me (letter of March 8, 1962) that "a blade-like or coarse microblade technique is indicated on one piece; another . . . shows a flaking technique frequently employed by the Old Whalers at Cape Krusenstern, dating about 1800 B.C." About others, he wrote, "I hesitate to call these cruder objects true microblades, but the technique is strongly implied." One yellow flake seemed to have a graver tip. "These traits together remind me a lot of the early horizons the Oregon group is finding near Naknek." (He presumably refers to what Dumond has called the Gomer Period of Brooks River Gravels, 1900 - 1000 B.C., affiliated with the Arctic Small Tool Tradition; "Prehistoric Culture Contacts in Southwestern Alaska," *Science* 166: 1110, 1969). ". . . In the larger package of flints [from the beach at Taescher's], there is even more suggestion of Denbigh-like or small tool workmanship." One piece was certainly used as a burin, even though Giddings was not sure that it had been intentionally made as such.

These finds, perhaps also the many pieces of flaked chert, jasper, etc. from Yukon Island I (never studied or illustrated), suggest an occupation on Kachemak Bay much older than any previously suspected.

In 1973 the Homer Society of Natural History, with a matching grant from the Department of the Interior, National Park Service, under provisions of the National Historic Preservation Act of 1966, conducted a survey of known sites in Kachemak Bay for the purposes of determining the present extent of remains, erosion damages, and potential for further work. Mr. Sam Pratt (see Plate 76 - B) and Mr. Frank Tupper, both of Homer, were assisted in this endeavor by Mr. Douglas Reger, then a graduate student at Washington State University. On the basis of their conclusions, both Karen and William Workman conducted further excavations at sites near the head of Kachemak Bay where, unfortunately, the 1964 earthquake subsidence and waves had been very destructive.

According to William Workman (letter of November 24, 1974), at Cottonwood Creek his party found numerous skeletons, some in excellent condition, many disarticulated and mutilated. Eleven burials, several multiple, were excavated in

addition to a number of isolated bones. There were no box burials such as I had found at this site, but very shallow single and multiple graves prevailed. There was clay on some of the skulls (not provable as masks, however); several had had the teeth extracted before burial. Like my finds, all this suggests a bizarre mortuary cult. (I should have noted in this book that many of the skulls and mandibles I found at this site also lacked teeth, which Jack Fields suggested had been lost by boiling the bones). With one middle-aged woman were two enormous labrets (for a mask?) and 3,198 rectangular bone and shell beads, probably sewn to a parka (or possibly a "veil" like that worn by aristocratic Chugach and Tlingit women). There were also substantial pit houses. These new finds confirm and amplify those of 1930 and 1931, and are ascribable to a late occupation of the site in late Kachemak Bay III times.

Scantier remains from a more recent level, separated from the main midden deposit by a sterile silt zone incorporating volcanic ash, include a splitting adz as well as what is interpreted by the investigators as strong evidence for cannibalism. (Possibly this level should be dated to Kachemak Bay IV.)

Karen Workman has reported on "Chugachik Island (SEL 033), Test Excavations at a Middle Kachemak Tradition Site in Kachemak Bay, Alaska, July 1974" (Alaska Division of Parks, 1975, mimeo). On Chugachik (Indian) Island she found an extensive stratified midden, with clear differentiation between upper and lower layers. The wet bottom levels preserved wooden stakes and birchbark basket fragments. The uppermost level which I had assigned to an historic Indian occupation (page 25) was not found. In the older deposits she discovered a flexed burial, a dog (?) burial, and a stone-set hearth. Unlike Cottonwood Creek, the site yielded toggling harpoon heads as well as numerous land and sea mammal bones. It has been suggested that when occupied the site may have been on the estuary of the Martin River. The Chugachik artifacts seem to me to be more similar to those of Yukon Island III than to those of Cottonwood, although I would not judge the site to be as old as Kachemak Bay II. Some of the differences in cultural materials found at Cottonwood Creek, Chugachik Island, and Yukon Island may, however, reflect seasonal differences in activities peculiar to the respective locations of the sites rather than relative age.

Radiocarbon dates from both sites may help to establish the true dating of Kachemak Bay III, especially of its later phases. A single recent radiocarbon date from Cottonwood Creek is available at this writing. It was obtained from thin carbonized planks of a structure 3.15 to 3.25 meters below the surface and very near the bottom of the thick midden deposit. The sample yielded a date of  $1745 \pm 65$  years, or A.D. 205 (S-1042/NMC 797). Since the dated material may well have been fashioned from driftwood, it may thus predate by an unknown span of years the time of its incorporation into the site (or the sample may have come from the center

of a large tree). This date appears to be several centuries older than the late (final?) Kachemak Bay III age postulated by Workman for the bulk of the collection from this site on typological grounds. A thorough assessment of the radiocarbon chronology of this site for Kachemak Bay prehistory in general must be deferred until the results of three additional radiocarbon determinations become available.

I should like to emphasize again (de Laguna 1962:166-167) that the dates for Cook Inlet and Prince William Sound materials published by F. G. Rainey and E. Ralph ("Radiocarbon Dating in the Arctic," *Am. Antiq.* 24 (4, pt. 1):365-374, 1959) were based on contaminated samples. The date of 748 B.C.  $\pm$  118 for Kachemak Bay I came from combining 8 pieces of antler from the lowest sub-beach level on Yukon Island; and the single date for Kachemak Bay III, A.D. 489  $\pm$  102, was obtained from 5 pieces of antler, presumably from the same site. All these had been soaked in salt water by high tides and washing, and had been treated with shellac and wood alcohol. The house post from the bottom of Palugvik midden in Prince William Sound, which had been boiled in paraffin, gave dates of A.D. 205 and 231, both  $\pm$  105 years. A date of 303 B.C.  $\pm$  112 for a contemporary shovel blade from the same location was rejected by Rainey and Ralph as contaminated. All these dates are, therefore, suspect. In any case, I was only guessing when I suggested that these earliest Chugach remains probably did not antedate Kachemak Bay III or sub-III. In the same article, I also suggested that the Kachemak Bay materials were older than suspected.

If the virtual destruction by the 1964 earthquake of the most ancient remains in Kachemak Bay make it impossible to secure materials which might be accurately dated, we are forced to suggest guesses based on similarities with other well-dated sites. How we interpret these similarities will depend on (1) what we take as criteria distinguishing successive cultural stages at different localities, (2) what features we consider to define persisting local cultures or "traditions", (3) what features we accept as significant "horizon markers", and (4) what regions we are willing to include within a major area of "co-tradition"; or, indeed, whether we are willing to utilize any of these possible clues. Lastly, can archaeological cultural manifestations be ascribed to language families (Eskimo, Aleut, or the parent Eskaleutian), and if so can we rely on glottochronological dates? Different investigators give different weighting to these factors, depending in part on their predilections for such processes as internal development (William Laughlin, Jean Aigner), migration (Don Dumond), wide diffusion within a North Pacific cultural continuum (Chester Chard, myself), or whether we are splitters (Dumond, Donald Clark) or lumpers (again myself). Are comparisons significant only if based upon entire cultural complexes or industries, or may single traits or features indicate diffusion and therefore connections of some kind? How much time-lag in diffusion should one take into



account when making comparisons over large areas? I confess to having been too conservative in estimating dates, as well as being an arch-diffusionist. But I also believe that bold guesses are necessary to advance theory.

Comparisons might now be made more fruitfully between Cook Inlet phases and those of the Kodiak-Afognak group and certain sites on the Alaska Peninsula (See Donald W. Clark, "Perspectives in the Prehistory of Kodiak Island, Alaska," *Am. Antiq.* 31 (3, pt. 1), 1966a; "Two Late Prehistoric Pottery Bearing Sites on Kodiak Island, Alaska," *Arctic Anthropol.* III (2): 157-184, 1966b; "The Late Kachemak Tradition at Three Saints and Crag Point, Kodiak Island, Alaska," *Arctic Anthropol.* VI (2): 73-111, 1970; "The Earliest Prehistoric Cultures of Kodiak Island, Alaska: 1971 Fieldwork, Preliminary Report," *Arctic Anthropol.* IX (1): 41-46, 1974a; *Contributions to the Later Prehistory of Kodiak Island, Alaska*. Archaeol. Surv. of Canada, Pap. 20, Mercury Ser., Nat. Museum of Man, Ottawa; W. B. Workman, "Archaeological Reconnaissance on Chirikof Island, Kodiak Group: A Preliminary Report," *Arctic Anthropol.* III (2): 185-192, 1966; D. E. Dumond, "Prehistoric Culture Contacts in Southwestern Alaska," *Science* 166:1108-1115, 28 Nov. 1969a; "Implements from Takli Island, Southwestern Alaska," 1969b, unpublished paper based on Gerald H. Clark, "The Archaeology of the Takli Site, Katmai National Monument, Alaska," M.A. thesis, U of Oregon 1968).

The following sequence for the Kodiak group largely follows D. W. Clark. Oldest known is Ocean Bay I, c. 3800 B.C., equivalent to or contemporary with Takli Alder phase of the Peninsula, 4000 - 3000 B.C. Ocean Bay II, 2250 - 1850 ? B.C., would be equivalent to Takli Birch phase, 2200 - 800 B.C. on the Peninsula. Clark believes the Ocean Bay sequence to be older than Kachemak Bay I, with a hiatus in the Kodiak record. Nevertheless, the scanty materials from the Ocean Bay components (Clark 1966a: figs. 2, 3) show surprising similarities to Kachemak Bay I and II, though lacking many types of the latter. I suggest we are dealing with local variants of an ancient North Pacific "co-tradition".

Old Kiavik, with a date of 1313 B.C.  $\pm$  61 from the middle of the level, is like an impoverished Kachemak Bay II.

The Three Saints phase (including Uyak Lower Levels), clearly like Kachemak Bay III, had dates of 78 B.C.  $\pm$  55 or 83 B.C.  $\pm$  52 to A.D. 831  $\pm$  49, probably A.D. 900. Kachemak Bay III has been suggested as beginning in 200 or 100 B.C.

Then seems to follow a hiatus on Kodiak Island when the Koniag phase, A.D. 1000 - historic times, was developing. The (Northern) Koniag non-ceramic manifestation (Uyak Upper Level equivalent) had a date of A.D. 1652  $\pm$  44; the (Southern) ceramic Koniag sites have dates of c. A.D. 1560 to 1670 (while the date of 952 B.P. or A.D. 1013 is questioned). The late Koniag phase may correspond in part to Kachemak Bay IV.

These suggested correspondences make the inferred dating of the Kachemak Bay sequence more reasonable.

Whereas in 1934 I compared the open-socket toggling harpoon heads with cut (not drilled) line holes from Yukon Island I to Thule Type 1 harpoon heads, I would now compare them with the early Canadian pre-Dorset heads (cf. de Laguna 1946, "Dorset 1" in figs. 9, 10), especially in view of the other similarities in flaked blades, small lamps, etc. This would reinforce the possibility of an Arctic Small Tool relationship for Yukon Island I. The Canadian pre-Dorset is estimated to date from 2000 B.C. to 700 B.C., with the Dorset then developing from it. If pre-Dorset were derived (in part) from Denbigh Flint Complex of 4000 B.C., a 2000 year lag for diffusion is suggested. I do not, however, postulate a single line of development for all these northern cultures. I would certainly not now, and should not have, even in 1934, looked for an "original Thule-like phase" (page 220) as *the* basic Eskimo culture. For as I later emphasized (1947:285), there have been many distinct cultural beginnings and many strands of influence that have gone to make up Eskimo culture as we know it. Similarities do not necessarily mean a common origin or direct derivation; they may suggest only diffusions of influences, the routes of which we cannot yet trace.

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## I. INTRODUCTION

The material upon which this report is based was collected during three seasons' work in Cook Inlet and Prince William Sound. In the summer of 1930 Dr. Birket-Smith of the Danish National Museum, Copenhagen, proposed to excavate in the area of Prince William Sound and Kenai Peninsula; the author, representing the University Museum, Philadelphia, was to accompany him as assistant; my brother, Wallace, was to be the third of the party. However, Dr. Birket-Smith was most unfortunately taken sick on the eve of sailing. My brother and I went to Alaska alone, and instead of excavating intensively at one or two sites, as had been the original plan, devoted ourselves to an archaeological survey of Prince William Sound and Cook Inlet, hoping that Dr. Birket-Smith might be able to accompany us the next summer.\* I was particularly anxious to work in Cook Inlet, because, as Dr. J. Alden Mason has argued, the finding in that region of stone lamps with a human figure in the bowl suggests that before the present Athabaskan Indians occupied this country, there was an earlier population with an Eskimo culture. Dr. Birket-Smith, on the other hand, in his monumental work on the Caribou Eskimo, had come to an opposite conclusion: namely that 'originally in the sub-arctic regions from the Yukon and southwards there has been a population which was different, somatically, linguistically, and culturally, from the Eskimos and only in the course of time became Eskimoised.'<sup>1</sup>

Half of our expenses for the first season were defrayed by the University Museum and half through the generosity of Mr. Percy C. Madeira, Jr., Mrs. William Carter Dickerman, Mrs. Alexander Gordon, and my father, Professor Theodore de Laguna.

We landed in Cordova on June 27 and remained in Prince William Sound until August 20, when we went to Anchorage on Cook Inlet. My brother had to leave on September 5, to return to college, but I did not sail from Alaska until a month later. Our debt to those who helped us in the field is very great, and I

\* That hope was realized in the summer of 1933 when Dr. Birket-Smith and I collaborated in a season of ethnological and archaeological research in Prince William Sound. A detailed description of the material obtained in Prince William Sound in 1930 has been omitted from the present volume. It will be included, however, in the joint report on that region which Dr. Birket-Smith and I are preparing. [All footnotes marked with an asterisk have been added as this report goes to press to incorporate suggestions made by Dr. Birket-Smith or pertinent information obtained on our joint field trip.]

<sup>1</sup> Birket-Smith, II, p. 229. [See Bibliography for full titles of all footnote references.]



regret that lack of space prevents me from thanking them all by name. However, I cannot neglect this opportunity of expressing our gratitude to Mr. Wingard and Captain Crawford of the *Kittiwake*, in the U. S. Bureau of Fisheries, Cordova, and to Mr. MacDonald, Mr. L. C. Pratt, and Captain Jacobsen of the *Chugach*, in the U. S. Forest Service, Cordova. It is to Mr. Pratt that we send our warmest thanks, for not only did he take us on our first over-night trip to initiate us into the art of camping in an Alaskan deluge, but he showed us three sites on Hawkins Island\* which he had discovered, and most generously shared with me all his ethnological and archaeological information about Prince William Sound.

While in Prince William Sound we made four camping trips with skiff and outboard motor, visiting Alaganik on the Copper River and sites in the Sound from Hinchinbrook Island to Gravina Bay. The *Kittiwake* gave us several lifts, and in August the *Chugach* took us for a ten-day cruise around the Sound, stopping at Tatitlik, Valdez, Chenega, and other villages where we had an opportunity to talk to the natives, and also touching at a few of the ancient village sites on our route.

In Anchorage we also rented a skiff and went up Knik Arm to Fish Creek, Knik, and Eklutna. Owing to the extreme range of the tides, from thirty-eight to forty feet, travel is very difficult. It is possible to go only with the tide, between half-tide and flood. At ebb tide the Arm drains almost dry, with the exception of certain channels which turn into streams, and with the return of the tide, a bore, sometimes several feet in height, sweeps up the mud flats.

In all, we traveled about 440 miles in our skiff, never camping for more than a week at one place. The work was surprisingly arduous, for to the strictly archaeological labors were added the heavy work of loading and unloading our gear, making camp, tinkering the outboard, and all the multitudinous tasks necessary to human existence, even on the simplest scale. It rained almost continuously—from July 15 to August 14 we did not see the sun—and whenever the rain slackened, swarms of the hungry mosquitoes and gnats for which Alaska is famous made up for lost time. We found the shell heaps usually covered by almost impenetrable thickets of salmonberry bushes and devil's clubs.

After my brother left me at Anchorage I chartered the *Dime*, a thirty-six foot gas boat, belonging to Mr. Jack Fields of Seldovia. I was most fortunate in my skipper, for he was interested in the archaeology of the region, and had himself explored the shell-heaps of Cottonwood Creek and Yukon Island in Kachemak Bay. Without his help I should certainly never have found the big midden under the west beach of Yukon Island. He did everything possible to help me, and devoted himself to the work with real enthusiasm. To him more than to any other I owe our success in the field. We visited sites along the Inlet south of Fire Island, with the exception of Turnagain Arm, the Tyonic district (from which a severe storm forced us to turn back), and the southwestern shore of the Inlet. Life aboard the gas boat was much pleasanter than setting up camp ashore

\* One of these sites was excavated by Dr. Birket-Smith and myself in 1933.

every night, though there were only two of us to run the boat and the work was not light. Cook Inlet is peculiarly lacking in sheltered harbors, and it seemed as if, no matter where we anchored, the tidal currents managed to hold us broadside to the waves. The tides made communication between the boat and the shore difficult. At Point Possession we had three times to fight the five-knot current before we managed to row out to our anchored boat, and at Cottonwood Creek we dragged the heavy dory across a mile of mud flats.

In the summer of 1931 I returned to conduct intensive excavations at the sites at Cottonwood Creek and Yukon Island in Kachemak Bay. My brother and Mr. Edwin B. Newman came with me as assistants. The expenses were defrayed entirely by the University Museum. With the exception of our last week in the field, during which Jack Fields assisted us, we had no outside help in the digging. My mother, however, joined our party for the five weeks on Yukon Island, and did most of the cooking and helped me with the cataloguing. We were in the field from June 21 to September 3. The season was unusually dry, and, moreover, Cook Inlet, even near the mouth, has much less rainfall than Prince William Sound. There were only a few days when storms interrupted our work, and since the sites were exposed to the wind, we were little troubled by gnats and mosquitoes.

In the summer of 1932 I returned again to Kachemak Bay for an entire season at Yukon Island. The expenses were defrayed by the University Museum and by a grant-in-aid from the National Research Council. My assistants were Mr. William Newman and Mr. Dana Street. Jack Fields was with us for the first month and the last two weeks. With him, William Newman and I explored the southwest coast of Cook Inlet from Chinitna Bay to Tuxedni Bay during the week of June 8 to 15. We were then joined by Dana Street and my mother, and went to Yukon Island. During the last two weeks of the season we visited minor sites in Kachemak Bay, and also spent three days at Port Graham, as guests of Mr. Smith, who assisted us in excavating a small site on his property. The length of time devoted to Yukon Island enabled us to make a much more extensive excavation than had been possible the previous season. The weather during the last half of the summer was very bad, and the rain, combined with the high tides that flooded the diggings, created endless delays and much extra work by causing the sides of the hole to collapse. The dampness also made the drying and preservation of the bone specimens very difficult. We are much indebted to the inhabitants of Seldovia and the vicinity, both white and native, for their very generous assistance and hospitality.

In the following pages I propose to describe the archaeological sites in Kachemak Bay and the material obtained from them, showing how it falls into four stages of an Eskimo culture older than the Athabaskan Indian culture in this region. Then, I will discuss the sites along the rest of the Inlet and the scanty material which we obtained from them, to see whether there is any evi-

dence that the Kachemak Bay Eskimo culture extended up the Inlet in prehistoric times. The sites in Prince William Sound will be reviewed and the small collection obtained from them will be compared to that from Kachemak Bay. Finally, I shall attempt to sketch the cultural position of the Kachemak Bay culture with reference to the archaeological cultures of the American Arctic and the North Pacific areas.

The material gathered in the three seasons' work numbers close to 6600 specimens. Besides these, all the animal bones found in the course of our work in Kachemak Bay were saved for identification, as well as samples of shells and of the midden materials. For assistance in preparing and cataloguing this material, for the photographs of specimens and the drawings used in this report I am indebted to the staff of the University Museum. The maps of Plates 1 and 2 are reproduced through the courtesy of the U. S. Coast and Geodetic Survey; they have been adapted from the Survey Charts by Miss M. Louise Baker. The other maps and the cross-sections were made in the field by Edwin Newman, my brother and myself, and were redrawn by Miss Eleanor Moore, who also prepared the text figures. The photographs were prepared by Mr. W. M. Witte and Mr. R. Goldberg. General editorial supervision of this volume has been under Mr. E. Bioren Getze. The skeletons were examined by Dr. George Wagoner, who furnished me with notes on the pathological condition of some of the bones, and they have been studied in detail by Dr. Bruno Oetteking of Columbia University who has contributed the special chapter on the skeletal material. The rocks used for artifacts have been identified by Dr. Edward H. Watson of Bryn Mawr College. Dr. A. Lincoln Dryden of Bryn Mawr College has identified the various species of shellfish. Dr. Percy Moore of the University of Pennsylvania has identified some of the cut bones, and Dr. George Goodwin of the American Museum of Natural History, New York, also identified some of these as well as the considerable quantity of unworked animal bones. Dr. Roger C. Wells of the U. S. Geological Survey has made the analysis of ash found at the Cottonwood Creek site. To all of those mentioned I wish to express my appreciation.

Finally, I wish particularly to express my great indebtedness to the American Council of Learned Societies for a grant-in-aid to finance the publication of this report.

## II. ARCHAEOLOGICAL SITES IN KACHEMAK BAY

### COOK INLET<sup>1</sup>

Cook Inlet is a drowned river valley in a plain of partly indurated sands and clays of Eocene age, known as the Kenai formation. From a geological point of view, the eastern shore of Cook Inlet is better known than the western shore, though, presumably, the same formations are to be found along both. The Kenai formation outcrops along the whole north shore of Kachemak Bay and is exposed almost continuously from Homer Spit nearly to Anchor Point, and again from Anchor Point to Clam Gulch, where it becomes obscured by glacial till. Presumably the Kenai formation underlies all the glacial deposits in the Cook Inlet valley north of that point, and on the west coast, north of Tuxedni Bay. This formation is made up of partly indurated sands and clays, interbedded with lignite layers from 3 to 7 feet thick, which form from 3 to 5 per cent of the total thickness of the formation. The formation is soft enough to be cut with a pick or knife, but is sufficiently consolidated to form cliffs several hundred feet high along the shores. A few outcrops of this formation are found on the south shore of Kachemak Bay. The most famous of these is at Port Graham, which contains the coal beds discovered by Portlock in 1786 and later mined by the Russians. Many of the lignite beds exposed in the cliff along the north shore of Kachemak Bay have burned, baking the clay and shale about them to bright orange and red. The fires have apparently been of natural origin. At present, a coal bed at the head of Cottonwood Creek canyon is still burning, after thirty or forty years. Fossils of numerous plants and of fresh-water shell-fish have been found in this formation, showing it to be of upper Eocene age and of fresh-water, not marine, origin.

The so-called Kenai lowland, formed by the Eocene sands and clays and by the glacial till, makes a fairly level plain between the high mountains of the Kenai Peninsula on the east and the volcanic range of the Alaska Peninsula on the west. It reaches a maximum elevation of 2000 feet in the Caribou Hills north of Kachemak Bay and at Susitna Mountain in the north. It is cut through by several large river systems, the most important of which are the Kasilof, Kenai, Kustatan, Susitna, and the Matanuska and Knik Rivers flowing into the

<sup>1</sup> The geological material for this chapter is taken from the work of Martin, Johnson, and Grant, pp. 1 to 128, the information about tides and navigation from *The U. S. Coast Pilot*, pp. 82 to 86.

head of Knik Arm. All of these bring down a vast amount of silt. The banks of the Inlet are constantly sloughing off, forming cliffs which range in height from 500 feet along the north shore of Kachemak Bay (with an extreme elevation of 750 feet at Bluff Point) to 262 feet at West Foreland, 150 feet at North and East Forelands, and from 100 to 30 feet along Knik Arm. The Inlet is thus becoming broader and shallower as the banks are eaten back and the bottom is silted up. Only at the mouths of the streams is it possible, in most places, to come up on the plateau, and it is only here, of course, that we should expect to find village sites.

The south shore of Kenai Peninsula presents very different geological and physiographic features. Here the rocks are mainly metamorphosed sediments, highly folded and altered, with some igneous intrusions. They are a continuation of the same group which forms the mountainous part of Kenai Peninsula, and which extends down to the sea along the southern shore of the Peninsula and along the shores of Prince William Sound. The physiographic characteristics of the southern shore of Kachemak Bay are similar to those of Prince William Sound. The rocks consist of Paleozoic slates and graywackes, chiefly exposed a little back from the coast, but outcropping at the head of Seldovia Bay, along the shores of Kasitsna Bay, Tutka Bay and Sadie Cove. These are overlaid by Triassic ellipsoidal basalt, which outcrops in a few places along the shore. This, in turn, is overlaid by beds of upper Triassic contorted chert, which forms most of the islands of the Yukon Island group and the coast to the northeast of them. Other rocks of less importance are the lower Jurassic tuffs about Dangerous Cape and English Bay, scattered outcrops of schists and limestone, and small dykes of gabbro and diabase.

The shore line along the south side of Kachemak Bay, like that of the south coast of Kenai Peninsula and Prince William Sound, presents the many islands, sheltered passages, and deep bays which result from the drowning of a coast line and the erosion of hard rocks by alpine glaciers. The coast line of Cook Inlet north of Kachemak Bay is very straight, so that there are approximately the same number of miles of shore line on the south side of Kachemak Bay as on the entire distance from the head of Kachemak Bay up to the head of Chikaloon Bay in Turnagain Arm.

Except for the shelter afforded by the mouths of the rivers, and by Kalgin and Fire Islands, Cook Inlet north of Kachemak Bay is open water exposed to severe storms, with no safe anchorage, except under the lee of the shore. Cook Inlet has a great tidal range and severe tidal currents. The extreme range of tide for Kachemak Bay is from 22 to 25 feet; at Anchorage on Knik Arm it is from 38 to 40 feet; on Turnagain Arm it reaches a maximum of 45 or 50 feet. The tidal currents increase from a velocity of 2 or 3 knots at the mouth of the Inlet to 5 or even 8 knots near Harriet Point, the Forelands, and the entrance to Turnagain Arm. These currents cause tide rips in certain places, especially at the mouth of Turnagain Arm, where there is almost always rough water. The water of the upper Inlet is heavy with silt, and at extreme ebb it may be dirty down to

the mouth, while at high tide it may be clear as far up as the Forelands. For this reason there are no shell fish north of Kalgin Island, where I am told the natives from Kustatan and Kenai are accustomed to dig clams. At low tide, vast mud flats are exposed, especially in Turnagain and Knik Arms, which are practically dry at ebb tide, and other mud flats are found along the north shore of Kachemak Bay and at Kustatan. In Kachemak Bay the water is clear, and there is an abundance of shell-fish along the south shore. On the north shore, though the upper edge of the beach is of gravel, the lower part is of mud and there are only a few, very small clams. However, the vast accumulation of shells at Cottonwood Creek and the smaller midden at Eastland Creek are evidence that there were once considerable beds of clams and mussels along the north shore, for it is hardly possible that the inhabitants would have crossed the Bay, here four miles wide, to dig clams. The mud flats along the north shore are of comparatively recent origin, geologically speaking, and have been formed by the silt from the streams and the sloughing off of the cliffs, deposited in the shelter of Homer Spit.

The timber of the Kenai lowland and the upper part of the Inlet consists of spruce, hemlock, birch, and poplar, growing in groves between open meadows of high grass or small bushes. Birch, poplar, and cottonwood are the most common, especially because of the severe forest fires which have ravaged the upper Inlet. The timber south of Kachemak Bay is mostly spruce and hemlock. Wild fruits are cranberries, currants, blueberries, huckleberries, but very few salmonberries, though these are common in Prince William Sound. The animal life is still very abundant and includes the black and the brown bear, mountain sheep, caribou, moose, lynx, ermine, marten, land otter, fox, coyote, wolverine, wolf, beaver, porcupine, marmot, woodchuck, rabbit, squirrel, etc., though many of these are no longer very numerous—the caribou, wolf, otter, and beaver being almost extinct. The moose is said to be a recent migrant to this region, where the species is now well represented, but archaeological evidence shows that the moose was known here at an early time, also. It is possible that the moose, a very wandering animal, may have abandoned the region temporarily. Theodore, an Indian of Eklutna, Knik Arm, told me how his grandfather saw the first moose in that region. Theodore's explanation of this appearance is that the natives who hunted the moose in its former home were not sufficiently respectful, and so the animals became dissatisfied and moved away. The sea-life also is very abundant. Among the fish, the salmon, of course, is the most important, though herring, cod, halibut, and candlefish are also caught, sometimes in great numbers. The sea-mammals include the seal, beluga, killer-whale, blackfish whale, porpoise, and in former times larger whales and the sea-otter. The birds include the eagle, hawk, raven, grouse, ptarmigan, loon, and various species of duck, goose, brant, puffin, gull, kittiwake, auk, and so forth.

The Cook Inlet region is at present inhabited by the Kenai Indians, a branch of the great Athabaskan family. Their territory extends down the Inlet as far as

Seldovia on the south shore of Kachemak Bay, and the south shore of Kamishak Bay on the west side of the Inlet. At Port Graham, at English Bay, and at Koyuktolik, or Dogfish Bay, are settlements of Eskimo—'Aleuts' as they are locally known. Some of these Port Graham Eskimo have recently moved into the Kachemak Bay region and have married Indian women. The Port Graham natives now form a separate tribal group, though they appear to be related more closely to the Chugach of Prince William Sound than to the Kodiak Islanders. Anisim, a Kodiak Eskimo living near Seldovia, has traveled in Prince William Sound and tells me that the Port Graham dialect is more like that of the Prince William Sound Eskimo than that of the Kodiak Eskimo.

The Kenai Indians are divided into several groups, speaking slightly different dialects, according to their own statements. The Knat'a·'na<sup>2</sup> live on Knik Arm at Eklutna and Anchorage. Knik is abandoned except for two white families. The Cucit'nat'a·'na live along the Susitna River, chiefly at Alexander, Susitna Station, and Croton. The Tava·'na live at North Foreland on the Tyonic Reservation. The Qeda·'na live at West Foreland, but their principal village, Kustatan, was abandoned in 1910, most of the natives moving to Kenai. The eastern shore of the Inlet is inhabited by the Yaxt'a·'na (Qaxnat'a·'na), whose chief village is Kenai. According to the natives at Kenai, the country about Kachemak Bay belongs to the Tanay·'na, or Seldovia Indians. Osgood, however, has applied this name ('Tanaina') to the whole group, in place of the older term 'Kenaikhotana.' Another sub-division lives about Iliamna Bay. I have no information about natives on Turnagain Arm.

Several writers have expressed the opinion that the Athabaskans are newcomers in the Cook Inlet region. Thus Dall writes of the 'Kāniāg'mūt' of Kodiak Island and the south shore of the Alaska Peninsula: 'At one time, until driven out by the Indians, they undoubtedly occupied the northern shore of Kenai Peninsula as well as the southern shore, which is still held by an allied community of Innūt' (the Chugach).<sup>3</sup> Petroff, too, speaks of the Indians as having 'succeeded in supplanting the Eskimo on the shores of Cook's inlet.'<sup>4</sup> Wrangell has shown that the culture of these Athabaskans is that of an inland people who have but recently moved to the sea and have not completely adjusted themselves to a coast life.<sup>5</sup> Just when this migration must have taken place is a matter which can not be determined without more archaeological work on the upper Inlet. In 1778 Cook saw natives in kayaks and umiaks at several places near the Forelands.<sup>6</sup> He writes: 'all the people we had met with in this river [Cook Inlet], seemed, by every striking instance of resemblance, to be of the same nation with those who inhabit Prince William's Sound.'<sup>7</sup> It is by no means certain that this opinion is

<sup>2</sup> See Key to the Transcription of Native Words, Appendix I.

<sup>3</sup> Dall, 1877, I, p. 20.

<sup>4</sup> Petroff, p. 124.

<sup>5</sup> Wrangell, p. 112 ff; cf. also Osgood.

<sup>6</sup> Cook, II, p. 390 ff.

<sup>7</sup> Cook, II, p. 400.

correct, for we know that the Indians had adopted much of the culture of their Eskimo neighbors.

Petroff in 1880 and Porter in 1890 placed the boundary separating the Indian from the Eskimo territory on the line drawn between Anchor Point and Iliamna Portage in Kamishak Bay, and spoke of Seldovia as being inhabited by 'Innuits' or by Kodiak Eskimo.<sup>8</sup> Mrs. Man, an Indian of Kenai, told me that in former times there were only Eskimo at Seldovia. At what time the Eskimo left and the Indians immigrated to Kachemak Bay it is difficult to say. Fitka, a Seldovia Indian, told me that the Indians moved into Kachemak Bay from the interior, coming down from the Caribou Hills. Cottonwood Creek was supposed to have been one of their first camping places. He mentioned some relative of his own who was among these first Indian settlers; so presumably this migration must have been very recent. On the other hand, he told me nothing about driving out the Eskimo, and since none of the natives about Seldovia knew anything about the older Eskimo sites, we may suppose that the Eskimo had already retreated. The Indian immigration must have taken place before the Russian occupation, (1786, when Shelikof sent a punitive expedition against the Indians to punish them for assisting the Eskimo of Shuyak Island in a rebellion<sup>9</sup>), for the Indian sites at China Poot Bay and on the Point West of Halibut Cove are without a trace of European goods. At Jakolof's place in Kasitsna Bay, the uppermost layer shows the transition between a stone culture to the present Europeanized culture.

#### SITES IN THE PORT GRAHAM DISTRICT

On the south shore of Kenai Peninsula there was formerly a village at Yalik in Nuka Bay, a settlement on Ayalik Bay, and a village called Nuna'tunaq in Rocky Bay. They are now abandoned.

A village in Port Chatham is called Axu'layik. The settlement called Chrome at the entrance to Port Chatham is To'qakvik.

The village in Dogfish or Koyuktolik Bay is Kogiu'xtolik. Jack Tanzy, Seldovia, has a fine greenstone splitting adze from the mouth of a stream at the head of the bay.

Alexandrovsk in English Bay is called Nanu'aluq. There are said to be only a few inches of modern midden on the south side of the entrance to English Bay, but on the spit some stone implements have been found.

Port Graham, the village, is called Palu'vik. There is a shell-heap just east of the cannery dock, containing many fire-cracked rocks. From a native at Port Graham I purchased a fine splitting adze [Plate 18 -2], said to have been found at the site of I'nulumuq, across the bay from the cannery.

On *Passage Island*, in the entrance to Port Graham, we found two sites. The

<sup>8</sup> Petroff, p. 26; Porter, pp. 69 and 156.

<sup>9</sup> Petroff, p. 99.



first of these is on a rocky island, just off the outer or west shore of the main island, and connected with it at all but the most extreme high tides. The midden is scanty, being an interrupted layer of shell material, only a few inches thick, just under the turf. It is apparently prehistoric, for in it we found a piece of chipped chert and a large bone knife [Plate 46 -14].

The second, or main site on Passage Island is on top of a high cliff at the Smith fox farm on the inner or eastern shore of the island [Plate 8A]. Here we found shells, mixed with many fire-cracked stones, to a depth of 18 inches, and in a house pit (?) to a maximum depth of 3 feet. The shells and bones do not seem to be very old, yet the specimens found apparently indicate a local phase of the Third Period of the Kachemak Bay Eskimo culture. Judging by the condition of the shells and bones, I would correlate the age of the site with that of layer 10, Yukon Island IV, or the Indian village site in China Poot Bay. The Passage Island site may represent the last stage of the Kachemak Bay culture when Kachemak Bay itself was already in possession of the present Indian inhabitants. The types found on Passage Island consist of the following:

notched stone (large)	coarse needle with medial hole
crude lamp	[Plate 44 -22]
ulo	bone pin
man's knife like ulo	bone chisel or scraper blade [Plate
barbed slate weapon blade [Plate	46 -6]
31 -5]	antler spoon [Plate 49 -1]
chipped slate blade	cut articulation [Plate 47 -27]
barbed heads for dart and fish spear	fish-vertebra ring
[Plate 39 -6, 23, 24]	tooth pendant [Plate 50 -25]
bird-bone awl	medial labret

A burial was discovered here by Mr. Smith when cultivating a garden. The skull and lower jaw were obtained in 1931 by Dr. Cornelius Osgood, Peabody Museum, Yale University. The skeleton was reported to have been found in a squatting position, under several large stone slabs. We uncovered and secured the remaining bones. Mud and traces of bark (wrappings?) were found in the lap. The bones, especially those of the legs, were considerably disarranged, but Mr. Smith said that he had disturbed only the upper part of the body. This disarrangement must be due either to the collapse of the skeleton upon the decomposition of the flesh, or to some other cause, operative before our excavation.

The Indian name for Port Graham, the district, is Tsq'aq' (Wassila, Seldovia), Q'sqaq (Seldovia Indian boy), Q'usq'aq' (Mrs. Man, Kenai Indian). The Port Graham Eskimo name for Kachemak Bay is *Tati'xaq*. They call the Indians *Kina'yut*.

All of the sites named are said to have been inhabited in pre-Russian times, according to my informants at Port Graham.

## SITES IN KACHEMAK BAY

### *Seldovia Bay*

Fitka told me that he found a stone knife on the middle part of the spit at the western side of Seldovia Bay. There was an old site on the spit and another on the little alder-covered island at the entrance to the lagoon behind the spit. This island is in two parts, joined by a gravel bar. There is a midden on each, but the shell heaps are very scanty. The clam shells in the midden on the north half of the island showed evidence of having been roasted in a fire. From the beach between the two islands we obtained the maul head [Plate 21 -6].

The Indian name for Seldovia is Axitaxnu (Kenai Indians). Native opinion about the age of Seldovia differs. The present town is certainly recent, but an Indian boy reports finding a grave under a house, which is apparently much older. On the beach near the Blue Fox Cafe was found the carved ivory figure [Plate 52 -9] now in the possession of Mrs. Meehan, Seldovia. However, the holes dug for piling along the beach did not seem to strike any sub-beach midden. A very beautiful chipped knife blade [Plate 30 -1] was found on the bank behind the Seldovia House, and was given to me by Mr. W. Lloyd. Apparently the old village site was on top of the bank, where native houses and the church now stand.

### *Barabara Point*

This is said to have been an old Indian camping place. The native name, Tc'va'lasnitlu, means 'tree (tc'va'la)—a bunch growing on a point (snitlu).' We did not investigate this site.

### *Kasitsna Bay*

From the base of *MacDonald Spit* comes the fine lamp with concave rim and side [Plate 24 -1], the gift of Jack Fields. It was found on the beach, on the east or Kasitsna Bay side of the spit. Just above the beach at this place, northeast of the path leading up to the house on top of the spit, is a midden, 1 foot thick, exposed where the ground has been leveled off for a fox pen. The midden did not appear to be very old, and nothing was found but a boulder chip of the usual type. There is no midden on the west or Cook Inlet side of the spit. In front, that is, north, of the house on top of the spit, we found traces of a large rectangular house pit, of the usual Indian type, but no midden. To the left, west of the path leading to the spring, and opposite the fox pens, is another house pit, 6 feet by 7 feet, probably for a bath house. The doorway is in the shorter side, facing east. Between the house pit and the path, traces of clam and mussel shells were found. Thus, the only trace of prehistoric habitation at MacDonald Spit seems to point to a recent Indian settlement. The lamp, however, is undoubtedly of Eskimo origin.

*Jakolof's place* [Plate 58D], Ksi'sina, or 'sandspit,' from the Indian name for

MacDonald Spit which shelters it (Fitka), is just to the east of a projecting rock which forms an island at high tide. At the west end of the little flat on which Jakolof's cabins are built, and under the shelter of the cliff, is a small midden. A shed is built on top of it. According to Tollak Olstead, Seldovia, when Jakolof was digging the cellar for the shed he came upon human bones, together with one or more splitting adzes, a slate knife, and the ivory statuette now in the collection of Mrs. Meehan [Plate 52 -7]. An excavation made beside this shed revealed the following sequence of strata:

Turf, 6 to 8 inches.

*Layer 3*: shells, animal bones, 2 feet 6 inches, with china, a bone cut with an iron knife, a bone awl [Plate 56 -13], and a crude dart head, cut with a stone knife [Plate 56 -3], the last from the bottom of the layer.

Sterile clay and stones, 6 inches.

*Layer 2*: midden material, 12 inches thick, containing part of a dart head and two pieces of pumice.

Beach wash, 10 inches.

*Layer 1*: midden, 3 inches.

The bottom of the cellar just reaches into the top of this second midden. Though evidently pre-Russian, the condition of the bones and shells from this layer did not seem to be very different from those of the post-Russian midden on top. We dug also at the edge of the beach and found that the first layer extended under the beach gravel. Being exposed to the action of the water, the shells from this first layer were much decayed. The land here, as at Halibut Cove and Yukon Island, has evidently sunk since the time of the first occupation.

*Herring or MacColough's Island*, on which stands the now-abandoned Monte Carlo Fox Farm, has a shell heap about 2 feet deep on the south side. This place is called Ma'qasuqi'lín, 'sunshine on one side' (Fitka).

On the small island just east of Herring Island, on the west side of the beach facing the entrance to Kasitsna Bay, are traces of shells between layers of beach gravel. A tree, 10 inches thick, is growing on them, and its roots are being exposed by the action of the sea, which suggests a continuous sinking of the land since the time of habitation. This may be the old place mentioned by Fitka, supposed to be on an island near the Monte Carlo Fox Farm, but he described the site as facing the entrance to Jakolof Bay. We found no sign of previous habitation on that part of the island.

#### *Jakolof Bay*

At his fox farm on the west side of Jakolof Bay, Louie Huber reports a small shell heap. From the small spruce-covered knoll on the west side of the bay, between the fox farm and the entrance, he found the grooved stone [Plate 17 -1], which he gave me.

*Grass Island* [Plate 8B]

This was apparently a refuge island. From it we obtained the crude lamp [Plate 23-1], the gift of Jack Fields. Our own excavations did not uncover a cultural deposit of any great extent or age. We found a bone pin and a retouched boulder chip.

*Tutka Bay*

The little grassy island about a mile and a half above the mouth of the bay is a refuge island, called Q'na'qesle (Anisim), [Plate 8c]. According to tradition, people were besieged on the island by enemies, and a man had to swim ashore at night to fetch water in a bladder because there is none on the island. The midden on the island is from 2 to 4 feet thick. Although the site did not appear to be very old, and was rich in fire-cracked stones, which are most numerous in Indian sites, the culture appears to have been Eskimo. The animal bones included those of the harbor seal, Steller seal-lion, beluga (?), and unidentified animals. Curiously enough, no notched stones, so very common in all the other Eskimo sites in Kachemak Bay, were found here. The specimens included the following types:

hammer stone	awls
pumice	bone pin [Plate 43 -23] (nose pin?
barbed slate blade [Plate 31 -9]	compare with similar specimen
socket-piece for dart or harpoon, in	from China Poot Bay)
one piece	bird-bone tube
slender barbed bone point, deco-	decorated bird-bone tube (needle-
rated [Plate 42 -23]	case?) [Plate 44 -27]

I hesitate to assign this material to any particular culture stage.

Behind this island is the beach where Jack Tanzy is said to have found the lamp decorated with whales [Plate 27], though the provenience is not certain. On or behind this beach are also said to have been found a plain stone lamp and a small collection which I later acquired, consisting of a decorated ivory object [Plate 50 -31], a barbed dart head, and a cut cachalot tooth. We found no trace of any camp or village site here, though we searched several times. Moreover, the decorated ivory piece appears to be very old, the dart head is younger, while the cut tooth may be modern. I am, therefore, not certain of the provenience of any of these objects.

A quarter of a mile above this beach and in front of Tanzy's cabin, is a rock, joined to the mainland by a gravel neck. On this rock are the ruins of house, with a bath room 11 feet 6 inches by 8 feet, and a main room 28 feet long. The other walls are not preserved. In the main room, just under the turf, we found a barbed slate lance blade, in two pieces [Plate 56 -14]. This seems to be an Indian house, and not very old. There is a shell heap along the south side of the island, whether connected with this house or not, it is difficult to say. The midden is 3 feet thick, and contains many fire-cracked stones.

A shell heap is reported in the bight opposite the cannery, and another is reported on a little peninsula on the southwest side of the bay, opposite the Tanzy cabin.

*Hesketh Island (Oho'rtutle)*

There is a shell heap at the Dwyer cannery and several very small unimportant ones along the shore facing Yukon Island.

*Yukon Island (Ni'ka or Ni'qa, 'island')*

There are three sites on this island: one at the Fox Farm on the beach to the east of the south point, the main site on the beach west of the point, and the third on a small refuge island, 'Elephant Rock,' at the west end of the west beach [Plate 13A]. It is connected with the main island only at the most extreme low tides. Near the north end of Elephant Rock we found traces of a house ruin, with a bathroom 5 feet square, and an outer doorway to the main room to the right of the bathroom, facing Yukon Island. A pounding stone [Plate 21 -3] was found near the house. This island was apparently used by the Indians, as the type of house would indicate. The Fox Farm site and the main Yukon Island site are so important that I defer a description of them to a separate section.

*Sadie Cove*

No village sites were found in Sadie Cove. On the north shore, about two and a half miles above the mouth of the bay, is a small cave [Plate 9A]. It is at the mouth of a small stream, and is so close to the beach that the highest tides flood the floor. On the right hand wall, just inside the cave, is a group of figures painted in red silhouette [Plate 68]. There are two bands of conventionalized land animals, above and below a row of realistic whales. A discussion of the cave paintings of Kachemak Bay will be deferred to Chapter V.

*Eldred Passage*

The high rock, Icaqa'yex, north of Anisim's cabin on the east side of Eldred Passage, is supposed to have been a refuge place, according to local tradition.

*Qatloxe'lye [Plate 8D]*

This is the treeless, rocky island a little over half a mile north of Cohen Island. The name means 'something under the soles of one's feet' (Seldovia Indian boy). From it one commands the most extensive and magnificent view of Kachemak Bay that can be obtained from any point on the water. The island is about the size and shape of a house, and is accessible only by a very narrow ledge on the north side. Anisim says that it was a refuge island. He found three skulls and a stone lamp here. There is not a real midden on top, but the soil contains animal bones, among which were found those of the harbor seal, porpoise,

walrus, brown bear, and several species of unidentified birds. We also obtained the following objects:

two large boulder chips [Plate 20 -7]	cut rib (awl or flint flaker)
piece of worn pumice	[Plate 56 -10]
two crude lamps	wedge-shaped antler implement
ulo blade (gift of Anisim) [Plate 56 -21]	[Plate 56 -20]
bird bone awls [Plate 56 -11, 12]	tooth pendant [Plate 56 -8]
	cut bone and antler fragments

All the objects are of types which might belong to the ancient Eskimo culture in Kachemak Bay. However, the bone specimens are well preserved and may not be very old. In view of the Indian tradition attaching to this site, it may well be that these artifacts are Athabaskan.

In the center of the island we found the skeleton of a man, 31-20-585<sup>10</sup>, lying in a hollow scooped in the bird excrement, which was here 3 feet thick and very compact. The skeleton was flexed and lying on the left side. It was wrapped in bark, and painted with red hematite. Traces of a wood cover were found. Nothing was found with the body.

From below the bird excrement, we obtained a chipped jasper lance blade, of typical Alaskan Eskimo shape [Plate 30 -26]. It is possible that this island was originally used by the Eskimo.

#### *China Poot Bay*

Gull Island near the mouth of China Poot Bay is probably a refuge island.

The Indian village site at Waterbury's place, on the north side of the bay, just inside the entrance, is supposed to be the oldest site in the region, according to the Indian tradition. It was called Sa'rqat (Fitka), Sa'yexqat (Seldovia Indian boy), Tsa'yerqat (Wassila, a Port Graham Eskimo living at Seldovia), or 'cave,' because of the big caves just north of the entrance to the bay. One of these was supposed to have been a burial cave, but we visited them and found nothing. The village site is on the high land behind the Waterbury cabin. The shell heap is from 18 inches to 3 feet 8 inches thick. Animal bones found here were identified by Dr. Goodwin as those of the harbor porpoise, harbor seal, blackfish whale, porcupine, marmot, brown bear, wolverine, goose, duck, and bald eagle. The shell heap did not appear to be very old. The shells and bones were well-preserved. There were many fire-cracked stones in the midden. Among the specimens found at this place were the following types:

barbed slate lance blade	tally stick or nose pin [Plate 56
stone scraper blade [Plate 56 -15]	-9]
sandstone whetstone	boulder chip
worn pumice	pieces of cut whale bone
barbed dart head [Plate 56 -2]	

<sup>10</sup> The University Museum catalogue numbers are given for all skeletal material.

Fitka told me he had found several bone needles with eyes here.

Near the beach, beside Waterbury's cabin, is another shell-heap, still younger, to judge by the state of preservation of the shells and bones.

The site shows the Eskimoized Indian culture prior to contact with the Russians. The site, however, cannot be more than a very few hundred years old.

*Point West of Halibut Cove* [Plate 9B]

On the mainland, just west of the entrance behind Ismailof Island, is a small rocky point a few hundred yards long. It is a former island connected to the mainland by a gravel bar. On the southern slope is a midden with a maximum depth of 6 or 7 feet. At the upper end of the midden, on the western side of the island, is a house pit, about 15 by 20 feet, with the doorway in the longer side facing the south, and a smaller room, 8 feet square on the opposite side. There are suggestions of another small annex on the east side of the main room. In front of the house, under 3 inches of turf, is a midden consisting of two layers, separated by 6 inches of sterile humus. The upper layer, of limited extent, is 9 or 10 inches thick, and contains many fire-cracked stones, and shell and bone material which does not appear to be very old. The bones are those of the seal and the beluga. This layer is evidently composed of refuse from the house. The lower layer, here 2 feet 4 inches thick, contains very few scorched stones, and the animal bones and shells in it are much more decayed. The bones are those of the harbor seal, porpoise, sea-otter, beluga, marmot, porcupine, bear, fox, goose, duck, and unidentified birds and fish. The stratification suggests two distinct periods of habitation, and two distinct cultures; the younger, associated with the rectangular house and the many fire-cracked stones, is undoubtedly Indian, probably contemporaneous with the Indian site at China Poot Bay, while the older part of the midden, which covers the whole southern end of the point, is Eskimo, and contains types showing that it belongs to the Third Period of the Kachemak Bay Eskimo culture. It is probably contemporaneous with the upper layers of Yukon Island III or with Cottonwood. In all, 146 specimens were obtained from the old midden, representing the following types:

small notched stones (24 in one cache, and isolated specimens)	slate drill [Plate 36 -20] slate 'awl'
stone grooved around the middle and over one end	bone drill [Plate 36 -5] slate mirror
splitting adze (unfinished)	barbed dart head [Plate 39 -21]
planing adze	slender barbed point
boulder chip	socket-piece in two parts (?)
whetstones, including 5-sided bar	fish-spear barb [Plate 43 -14]
pumice	fish hook
barbed slate weapon blade	barbed lance head [Plate 41 -21]
ulo blade	bone pin [Plate 43 -25]

bird bone point	cut articulation [Plate 47 -6]
bone awl [Plate 44 -16, 28, 31, 33, 35]	bird bone bead
double-pointed bone awl	red shale bead [Plate 50 -8]
needle [Plate 44 -4, 21]	medial labret
bird bone tube	top
antler pin with transverse knob [Plate 43-4]	cut red shale
wedge	cut bear tooth
bone scraper [Plate 45 -7]	worked bone and antler frag- ments [Plate 48 -9]

A human skeleton was found some years ago in this midden. In 1931 we found a fragment of the upper jaw of an adult, 31-20-801, and in 1932 a human vertebra, 32-8-312. Though found near the place where the skeleton is said to have been discovered, these fragments were probably from two other individuals.

This site belongs apparently to the upper half of the Third Period of the Kachemak Bay culture and is contemporaneous with the site at Cottonwood Creek.

#### *Halibut Cove*

This name is given to the settlement on the south side of Ismailof Island. The island is really double, the two halves being connected by a gravel bar, Beluga Spit. There are small shell heaps all along the inside shore of the islands and on the spit. At the Nutbeams' place at the easternmost end of the island, there is a midden, from 1 to 2 feet thick, covered over with the beach gravel, which indicates that the land has sunk since this midden was deposited. In the garden back of the house there are traces of midden material, and here was found the beautiful chipped flint knife blade [Plate 30 -23]. Most of the collection purchased in 1930 from Mrs. Rose Munson and the few specimens obtained in 1931 and 1932 came from the beach in front of the Nutbeam cabin, and presumably had washed from the sunken midden. The lamps, however, came from the beach in front of the Munson house or from Mrs. Munson's garden [Plate 9D]. Because of the uncertain provenience of the objects from Halibut Cove, we can not assume that the collection represents one period of culture.

The collection contains the following types:

large and small notched stones	chipped blades [Plate 30 -10, 14, 23, 27, 28, 29, 35]
planing adze blade [Plate 19 -11 and Plate 20 -1]	ulo blade [Plate 33 -4, 11]
hammerstone	double-edged slate blade, for knife ? [Plate 32 -8, 13, 14, 19]
whetstone	chipped drill point (Plate 36 -10)
pumice	
boulder chip	
lamp [Plate 23 -4 and Plate 24 -2]	



### *Aurora*

From the fox farm on the northern side of the entrance to Aurora Lagoon came the decorated slate lance blade, the gift of Mr. and Mrs. Axel Johnson, [Plate 31 -13]. They report a midden at this place.

On Aurora Spit are five rocky hills, formerly islands. On the south side of the northernmost of the three larger islands [Plate 9c], is a shell heap, from 6 to 7 feet thick, under a 9 to 12 inch layer of humus. The shells are much decayed, and the midden is very rich in animal and fish bones. Dr. Goodwin has identified the following species: harbor seal, harbor porpoise, marmot, porcupine, land otter, wolf (?), and birds, among which is the goose. At a depth of 4 feet we discovered the skeleton of a child, 31-20-312. It had been buried in a squatting position, the arms and legs drawn close to the body. Nothing was found with it.

25 specimens were obtained from this site, including the following types:

small notched stone	barbed dart head
boulder chip	bird bone awl
fragment of double-edged slate blade	scapula scraper
slate 'awl'	cut articulation
slate drill	cut bone and antler fragments
bone drill point [Plate 36 -2]	

The cultural material from this site shows it to belong to the last half of the Third Period of the Kachemak Bay Eskimo culture.

### *Bear Island*

On the north shore of Bear Island, just east of the rocky point giving shelter against the southwest wind, is a rock shelter [Plate 11A], used by the Indians when overtaken by a strong head wind on a trip down the bay. On the wall of this overhanging cliff are paintings [Plates 65, 66, and 67]. Dr. Cornelius Osgood, of the Peabody Museum at Yale, directed me to this place. There is a thin midden in the open space in front of the cliff, and under the protection of the rock there are two levels of midden. The younger, just 3 or 4 inches below the surface, is evidently only a few years old, for in it we found pieces of flowered china. At a depth of 1 foot 6 inches is an older midden layer, with a few animal bones. I think that the drawings were made during the period represented by the older midden, for with the exception of one figure, which is 6 feet above the present ground level, they are at a convenient height above the older midden level. The pictures are painted with what is apparently red hematite, mixed with fat. The surface of the rock has not been prepared in any way, and there is no evident composition. Some of the figures are simply daubs of color, others are intended to represent animals and men. These paintings will be discussed in Chapter V.

There are said to be other paintings on the mainland opposite the narrow passage behind Bear Island, though we were unable to find them.

### *Bear Cove (Tu'tcinlirqitnu, Fitka)*

There is a shell heap at the Leonard fox farm on the north side of the bay, where several house pits, about 12 feet in diameter, have been noticed.

In the small bight northeast of the fox farm, there is a thin midden, probably not very old. We explored the rocky point at the south side of the bight, and found an unfinished chipped blade and a broken, fire-cracked stone, grooved about the middle [Plate 17 -2]. The specimens were just under the turf, but we could find no midden there.

### *Indian Island*

On the north shore there is a scanty but continuous shell heap between the cliff and the beach. It is not thick anywhere except near the east end of the beach under an overhang of the cliff which forms a rock shelter [Plate 11B]. At this place we found two distinct levels. The upper 16 inches of refuse is modern Indian. In it we found a barbed iron head [Plate 56 -19], (a modern variant of the old barbed dart head), and a harpoon head, thin, with closed socket, divided spur, and cut to represent an inserted blade [Plate 56 -4]. Below this, there is a much older layer, about 2 feet thick. Unfortunately it furnished only a bone pin, a needle-sharpener of red shale, and a bone awl, so that it is impossible to assign this layer to any culture period, though the state of decomposition of the shells and bones suggests considerable age. On the overhanging face of the cliff there are about thirty vertical stripes or daubs of paint, none more than 3 or 4 feet above the present ground level. This suggests that they were made at the time of the older, Eskimo (?) midden.

### *Eastland Creek*

Along the bank just west of the mouth of Eastland Creek, for a distance of 200 feet, are very thin layers of shell, representing 5 distinct periods of habitation. The thickest layer is only 5 inches thick, and the total midden, including the sterile layers and the humus, from 12 to 18 inches thick, is about 3½ feet thick.

### *Cottonwood Creek*

There is a midden on both sides of the stream, but the great shell heap where our excavations were made is on the right bank. The midden represents two periods of culture, the older belonging to the last half of the Third Period of the Kachemak Bay culture,<sup>11</sup> and the younger belonging, in all probability, to the

<sup>11</sup> At the close of the season of 1931 I believed that the material from Cottonwood, Aurora Spit, and the Point West of Halibut Cove was sufficiently different from that obtained on Yukon Island to warrant its assignment to a 'Fourth' Period of the Kachemak Bay culture. However, some of the apparent distinctions between this material and that from Yukon Island III and Yukon Fox Farm III were found to be invalid when new material was obtained the next summer. From a typological point of view—it is dangerous to attempt too definite a chronological comparison—Cottonwood, Aurora Spit, and the Point West of Halibut Cove belong to the upper half of the Third Period; that is, they seem to overlap the upper layers of Yukon Island III, though not those of Yukon Fox Farm III. This opinion is based chiefly on the evidence afforded

Indian culture. According to Fitka, the name of this site is Usnu'sqilaut, and it was here that the Indian immigrants to the Kachemak Bay region established their first camp. Mrs. Man, a Kenai Indian, believes the name to be Eskimo, but doubtless my pronunciation was poor. Fitka has a trapper's cabin [Plate 58c] erected on the right bank of the stream, which he and some other natives occupy in the winter. It is a modified form of the old Indian rectangular wooden house. The midden at Cottonwood is so important that I defer a description of it to a separate section.

#### *Homer*

Several shell heaps and house ruins are reported along the north shore of Kachemak Bay in the vicinity of Homer. The large stone mortar [Plate 18 -4], owned by Mrs. MacColough of Seldovia, is said to have been found at the abandoned coal workings, about a mile west of Homer Light.

A site is reported near Bluff Point. This may be the same site as that reported at Dick Ray's place, on the north shore of Diamond Creek.

### YUKON ISLAND

Yukon Island is a mile and a third long and a mile wide, the greater length lying in a north-and-south direction. It is high and rocky, with precipitous cliffs, especially on the northwest side facing the open Inlet. It is heavily wooded (though the Indians and Anisim insist that according to tradition there were formerly no trees on the island), and it is well watered with springs and a few small streams. Yukon Island is the largest member of the island group which bears its name, and offers a strategic position for a village, commanding as it does the largest body of sheltered water in Kachemak Bay, including Eldred Passage, through which all small craft going up or down the Bay are accustomed to pass.

The extreme southern point of the island is a rocky cliff jutting out into the water, on each side of which are gravel bars, forming low swampy ground and shingle beaches. There is evidence that on the east side of the point the building out of the spit is still going on. On the flat are several abandoned buildings belonging to a fox farm, and the graves of some Indian children. A small brook runs down the center of the low cliff at the back of the flat, and is lost in the swamp. Half way between the cliff and the beach, on the inner side of the higher gravel bar, are traces of Indian habitation [Plate 11b]. Digging here, we found

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by the notched stones, the large ones dwindling away in comparison with the numbers of small specimens as we ascend the various layers from Yukon Island sub-III to the top of III, until they are completely absent (with one border-line exception from Cottonwood) at the three later sites. (See the discussion of this material in the section on Notched Stones in the next chapter.) The material from these last three sites is not very great, so that their cultural position must necessarily remain somewhat vague.

a modern midden with animal bones, shells, tin cans, china, etc., from 18 inches to 2 feet thick

Under this, and below one inch of sterile soil, is a much older midden, 12 feet deep. The bottom is 17 feet above mean lower low water, or 5 feet below the extreme high tide limit, suggesting that the land has sunk here as it has on the west beach of the island. The shells composing the midden are finely crushed and the animal bones are rotted. In general appearance and in cultural content the upper 8 feet of this old midden correspond to layers 6 to 9 of the great midden under the west beach of Yukon Island (Yukon Island III), while the bottom 4 feet correspond to layers 2, 3, and 4 of Yukon Island II, though there is no sharp stratigraphic break between the levels at the Fox Farm site as there is at the west beach.<sup>12</sup>

From the Yukon Island Fox Farm site approximately 270 specimens were obtained. With the exception of a scraper of split leg bone and a barbed iron head for a fish spear (modern variant of the barbed dart head) [Plate 56 -18], all the specimens are from the old midden.

In Yukon Fox Farm III, a house pit, 3 feet deep, was partially uncovered. Our hole was not large enough, however, to disclose the dimensions. The type of house seems to have been the same as that illustrated by remains in Yukon Island III and at Cottonwood. In this house, on top of a layer of shelly refill, 1 foot thick, were discovered the lamp with a human figure in the bowl [Plate 28] and the plain lamp found with it [Plate 25 -2]. The house must have been in ruins at the time when the cache was made, yet the house pit had not been completely obliterated, and doubtless the cache was made with reference to the remains of the house.

At a depth of 8 feet, fragmentary human remains, 31-20-2322, mixed with animal bones were found, and directly under this, at a depth of 9 to 10 feet (Yukon Fox Farm II), were two skeletons, evidently representing a double burial, 31-20-2320 and -2321. Under the skull of the skeleton on the east was found a cache of various implements and objects, figured on Plates 53 and 54.

To the west of the southern point of the island is a beach about 1400 feet long, behind the western end of which is a low, swampy flat, with a small pool [Plates 3, 4, 5, and 12]. The flat is separated from the beach by a higher gravel bar. Behind the swamp the hillside rises steeply. There is evidence that the sea has been washing the beach away in recent years. At the extreme west end of the beach, for a distance of about 200 feet, is a bank, from 4 to 10 feet high, which the sea is washing away. The upper 4 feet of this bank is a midden, containing shells, bones, and many stones, some of which had been cracked by fire. Excavation a few feet east of the small shed formerly used for fox feed [Plate 11c], shows that the midden contains china and bottle glass, and is therefore modern. The

<sup>12</sup> That is to say, the Second and the first half of the Third Period of the Kachemak Bay Eskimo culture are represented here. There is no 'Yukon Fox Farm I' since the First Period is not represented.

list of animal bones from this midden includes the following species: harbor seal, harbor porpoise, sea-otter, and unidentified bird and fish. At the bottom of this modern midden, is a layer of beach wash a few inches thick, below which is a very thin layer of midden material in which a rather unusual slate blade [Plate 31 -1] was found, together with a bar of slate used as a whetstone and a child's tibia. The shell material from this lower layer, though prehistoric, does not seem to be as old as the great midden under the beach uncovered by our main trench, though it may be contemporaneous with the uppermost layer 10 of that midden. The animal bones from the lower layer of the midden by the feed house include those of sea-otter, harbor seal, duck, and dog. This dog is an Indian dog—to quote Dr. Goodwin's letter—'probably of the plains type, very different from the one listed from Cottonwood [and those from Yukon Island found in 1932], which, I believe, is Eskimo dog. Allen describes this species from British Columbia as closely resembling a coyote and states that many authors claim that it was crossed freely with the coyote. . . . The shape and general structure of this jaw bone bears a strong resemblance to the coyote, but the spacing between the alveola, on careful consideration, rules out the possibility of its being a coyote.'

This exposed midden at the western end of the beach disappears a few feet east of the shed, though scattered animal bones, and bits of glass and china are found all along the beach wash between the shed and the great midden. An excavation half way between the shed and the main trench revealed only this modern cultural material mixed with gravel, so that it is impossible to correlate the sub-beach midden at the shed with the main midden, though I tentatively equate it with layer 10, or Yukon Island IV.

The geological evidence indicates that there was formerly a lagoon where the swamp is now, of which the pond is the remnant. A gravel bar was built out from the east side of the lagoon, gradually damming in the water. On this gravel bar the original village site was built, the shell heap accumulating to a maximum height of 14 feet. Our excavations at the edge of the beach show that the former land surface on which the shell heap was built is 16 feet below the present surface of the gravel bank above the beach: that is, it is now only 10 feet above the level of mean lower low water, the maximum height of the tide being about 22 feet above mean lower low water, except in time of storm. The edge of the midden has been washed away and covered over by the beach, and winter storms have pushed gravel up over the part just in back of the beach. The land has sunk at least 14 feet since the village was first settled. The sub-beach middens at Jakolof's place in Kasitsna Bay and at the Nutbeams' place in Halibut Cove show that this movement has been general in the Kachemak Bay region, and suggest that the movement has been continuous over a long period. The fact that we found no midden at the excavation made half way between the main trench and the shed, though we dug for 5 feet under the beach, means that the midden sloped off very rapidly towards the west, and that would indicate that the former entrance to the lagoon was probably at this point. In fact 50 feet on either side of the beginning

of our trench, at section A, the midden did not come to within three feet of the surface of the beach; that is, measured from mean lower low water, it was below the 19-foot level.

A somewhat diagrammatic cross-section, drawn from the beach back across the flat [Plate 4B] and reconstructed by means of the three trial pits and the main excavation, shows that the gravel bank at the edge of the beach is  $3\frac{1}{2}$  feet high, the land sloping abruptly from the beach down to the level of the flat, which is 19 feet above mean lower low water. The pond is at the 14-foot level, that is, 4 feet above the bottom of the midden. Trial pits I and II show the midden below  $2\frac{1}{2}$  feet of wind-blown sand, humus, and a little gravel washed down the slope from the beach. The midden slants down sharply from the edge of the beach, and at the edge of the swamp is overlaid by gravel deposited inside the lagoon. A trial excavation at III showed only gravel under the 6 inches of humus, though the hole was dug to a depth of 5 feet, so presumably this place was covered by the lagoon at the time people lived on the bar. The strata of the midden at hole II slope up to the west, and are cut off abruptly at the top, suggesting that this part of the midden was to the east of the center of the pile, and that the surface has been eroded. The character of the specimens found in pits I and II corresponds so closely with the material from the upper layers of the main excavation (Yukon Island III) that the specimens have been considered to be of the same age as the latter.

The old midden under the west beach was discovered by Jack Fields in 1924. At that time the surface of the old midden was visible under the beach wash at the edge of the bank. There Fields found a bone point, about 35 cm. long, 2 cm. in diameter, with a single crude barb in the middle. This was sticking from the bank, and when Fields dug here he discovered a human skeleton, which the local doctor identified as that of a woman. It was complete except for one of the legs. The body had been buried just under the surface of the old midden. It was extended on the back, and about the neck were hundreds of tiny oblong shell beads, making three complete strands. Near the woman's head was a bone object made in two parts, which I think must have been some kind of a labret. At the same locality Fields found several bone pins pointed at one or both ends. Later, the doctor returned to the site and obtained another skeleton. When we visited the site in 1930 it was completely hidden under the gravel.

The midden shows five distinct breaks, corresponding to three (four?) changes of culture. These five periods of habitation, numbering from the oldest and the lowest, have been designated as Yukon Island I, II, sub-III, III, and IV, respectively. Minor differences in the stratification of the midden have led to the division into 13 layers. When we visited the site in 1930, we dug a trial pit at the edge of the beach, sinking the hole to a depth of 7 feet [Plate 4A]. Though the depth of all the specimens was noted, I am not sure whether we found

anything in Yukon Island II; the bulk of the collection certainly came from Period III. In 1931, we began a trench just to the west of the old hole, which of course had been filled in with gravel during the winter. A base line, parallel to the bank and 6 feet from it, was established, and sections 5 feet long and 6 feet wide were excavated, beginning with A, at the east end of the trench, and running to H, the trench sloping down so that a wheelbarrow could be used to remove the shovelings [Plate 5A]. The midden was excavated in 6-inch (or 9-inch) layers, the material from each section being kept separate and the depth noted. Later it was possible, when the cross-sections of the midden exposed the stratigraphy, to correlate the various depths in the different trenches by layers, but as it was found that the cultural material from layer 1, from layers 2 to 4, and from layers 5 to 10 fell into three groups, differing from each other, but apparently homogeneous internally, the segregation of specimens by layer has been abandoned in favor of the distinction by period. When the extreme high tides came in the middle of August, the trench filled with water at each tide, and in order to work we opened a second row of sections, 5 feet long and 6 feet wide, on the edge of the gravel bank above the beach. These sections were 2D to 2G [Plate 12D]. The cross-section on Plate 5 show the sections at the side of the trench [Plate 5A] and the back wall of sections 2D to 2G [Plate 5B].

In 1932 we opened a large pit, comprising part of section 2H, all of 3H to 5H, part of J, and all of 2J to 5J, and 4K and 5K [Plate 5C]. This pit was entered by a sloping trench, leading into J, and running obliquely across sections K, L, M, and N. (There is no section I, that letter being omitted because of possible confusion.) Of these, sections J and 2J, 4J and 5J, 4H and 5H, 4K and 5K were carried down to the bottom of the midden, a total depth of almost 16 feet. The majority of the other sections were taken down only to layer 2 at the bottom of Yukon Island II. Some of the layers found in the excavation of 1931 did not appear in the main part of the 1932 diggings, and other layers were found to take their place. Thus, layers 3, 4, and 5 were missing from the pit, and their place between layer 2 and layer 6 was taken by layers 5a, 5b, and 5c (making 13 layers in all). Though the line between 5b and 5c can not be sharply drawn, the cultural material seems to show that 5c belongs to Yukon Island III, while layers 5a and 5b (and probably 5) represent a stage intermediate between II and III, though more closely allied to the latter. I have designated it as sub-III. Layer 10 was shown to be separated from layer 9 by beach gravel, in one place (the interior of a house pit?) 3 feet thick. Layer 10 thus belongs to a much younger period of habitation, though the cultural material shows that it is really part of the Kachemak Bay culture. The material would place it in the latter half of the Third Period; or, rather, it is too scanty to permit of a better classification. It should be noted, however, that the only fragments of *pottery* and the only specimens of *copper* are from layer 10. I have designated layer 10 as Yukon Island IV. As suggested, the lower half of the midden at the feed shed may be correlated with it.

The following species of shell-fish were identified by Dr. Dryden from specimens obtained at Yukon Island: clams: *Paphia staminea*, *Mya truncata*, *Saxidomus giganteus*; mussel: *Modiolus modiolus* (?); scallop: *Pecten caurinus*; oyster: *Ostrea* (species indeterminable); whelks: *Beringius kennicottii*, *Thais lima* (?); limpet: *Acmaea scutum*; marine snails: *Natica clausa* and *Littorina aleutica*.

The following animal bones were identified by Dr. Goodwin.

From Period I were obtained the bones of harbor seal and harbor porpoise (plentiful), young sea-lion, sea-otter (not uncommon), blackfish whale (not uncommon) and other whales, mostly small, brown bear, moose, mountain sheep, marmot and woodchuck (plentiful), porcupine, bird, including the duck, goose, eagle, swan, etc., and bones of unidentified fish. Bones of the Eskimo dog, while not plentiful, are very characteristic of this period.

From Period II we obtained bones of the harbor seal and harbor porpoise (plentiful), large seal, sea-otter, whales, including chiefly the blackfish and other small whales, walrus, moose, caribou, brown, black and polar bear, woodchuck and marmot (plentiful), porcupine, birds, including the goose, gull, duck (mallard and others), and unidentified fish. The Eskimo dog is also represented.

From Period sub-III we have the harbor seal and harbor porpoise (again the most numerous on the list), sea-otter, whales, chiefly the blackfish, moose, caribou, polar (?) and black bear, beaver, marmot and woodchuck (numerous), porcupine, bird, including the eagle, swan, goose and duck, and fish. The Eskimo dog is also characteristic though less common than in the preceding period.

From Period III there are seals, especially the harbor seal (very common) and larger seals, including the bearded and fur (?) seal, porpoise, probably all harbor porpoise (very common), sea-otter (common), sea-lion, walrus, dolphin, whales, including the beluga, blackfish, and fragments of larger species, marmot and woodchuck (plentiful), moose, caribou, black and brown bear, porcupine, red and gray fox, land otter, fisher, marten, bird, especially the duck (mallard and other varities), and the goose (both very plentiful), California murre, heron, eagle, gull, and so forth. Among the numerous fish bones, only those of the horned dog-fish could be identified with certainty. The Eskimo dog is very rare, and is represented only in the first half of the period (layers 6 and 7).

From layer 10 (Yukon Island IV), we have the harbor seal, harbor porpoise, Steller sea-lion, whale (blackfish or beluga), caribou, marmot, woodchuck, porcupine, and bird, including the duck and gull. The Eskimo dog is also represented.

The uniformity of the animal species hunted during this long period is surprising. The chief food animals were the seal, porpoise, marmot and woodchuck, bird, and fish. This is also true for the Indian site at China Poot Bay and for other sites which I have tentatively classed as Indian. The two animals not properly represented in this list are the whale and the deer (caribou and moose). The worked specimens are chiefly of whale bone and antler, though uncut bones of these animals are not common. This may be due to the fact that whales were



flensed on the beach, and caribou or moose were eaten during hunts away from the village, so that only the pieces of antler or whale bone required for tools were brought into the village.

The decrease in the number of dog bones from the first to the last period of the Kachemak Bay culture is suggestive. The Eskimo dog is represented in almost every lot of bones taken from sections in Yukon Island I; (each section measuring 5 by 6 feet and dug in 6-inch layers). Above the layers of sub-III, dog bones are absent except for the sporadic occurrence of about two bones in the lower half of Yukon Island III, and the isolated samples from Cottonwood and from Yukon Island IV. The evidence would support the hypothesis that the original population of Kachemak Bay was Eskimo, and that the Eskimo dog had been brought with them from the north, from a region where dog-sled travel was important. In the Kachemak Bay region, however, the dog-sled cannot be used at all, so dogs were no longer bred and the numbers were allowed to decline. The presence of the Plains Indian type of dog in the very last period of the Eskimo occupation (specimen from the lower midden layer at the feed shed, Yukon Island) would indicate contact with the Indians, probably at the beginning of the Indian invasion.

Not much can be learned about the *houses* on Yukon Island. There is, however, evidence of six pits which might have been houses. No evidence of a house was found in Yukon Island I.

#### *House I*

In Period II there was a structure of some sort in layers L to G. The pile of stones in L (under skeletons 32-7-144 A and B), is almost 2 feet high and marks the end of this house. It runs down the middle of the trench into section 2H (which we did not excavate below layer 5a). In the wall of stone we found two whale vertebrae. The floor was dug down for a depth of 9 or 12 inches into layer 2, and the refill in the house was layer 3. The many large stones removed from sections H and G in 1931 must have belonged to this house. Not enough stones were found to account for a complete structure. Either the extra stones had been removed at a later time, or the upper part of the walls was built of wood. The remains of charcoal between the stones in section G may represent the charred remains of the wall, though at first I believed that the charcoal indicated only a hearth. It is marked as 'Hearth VI' on the cross-section. As for the dimensions of the house, we know only that it was about 20 or 25 feet long parallel to the beach, and at least 10 feet long in the opposite direction.

#### *House II*

The cutting away of layers 5, 4, and 3 along the 2G-2H line (at right angles to the beach) and along the 2K-2J line (also at right angles to the beach) would

indicate the possibility that the excavation was made for a house. The width of the excavation here is 10 feet. The hole was filled with layer 5a. Traces of wood, suggestive of a floor, were found in 3J. The hearth (Hearth XII) in 3J and 3K, dug down through layer 2 into layer 1, was probably near one side of the house. The house, judging by the distribution of layer 5a, must have covered all the area of the main 1932 pit, and was therefore at least 21 by 15 feet. The narrower part in sections 2H and 2J may indicate a second room. This house, however, is the least clearly indicated of any.

#### *House III*

This is the most clearly preserved ruin. In the 1931 trench, we found that the eastern end of the gravel layer 5 had been cut away, the excavation also removing parts of layers 4 and 3. Two post holes were found in the floor of the pit, just inside the house. The excavation was 3 feet deep, and, judging by the slope of the layers in section D, was 15 feet long in a direction parallel to the beach. The cross-section at the back wall of sections 5H and 5J also shows an excavation which cut away layers sub-6, 5c, and 5b. A post hole was found near this wall with a fire pit (Hearth X) close by. Evidences of rotted wood and post holes were found along the line of the wall, running across 4J, 4H, and 3H. This excavation is also part of the same house pit as that cut by the 1931 trench. The house pit is filled with layer 6. Hearth V was also in the house. No stones were used in the construction of the house; it was wholly of wood. The length of the house must have been at least 30 feet (in a direction at right angles to the beach) and the width 15 feet.

#### *House IV*

The cross-section along the side wall between 4K-5K and 4L-5L [Plate 5c] shows an excavation about 10 feet long and from 12 to 18 inches deep, dug into layer 7 and filled with layer 8. At the bottom is a well-made, stone-set hearth (Hearth VII [Plate 14A]). This excavation may have been for a small house.

#### *House V*

Another excavation is shown on the cross-section of the back wall of sections 2D to 2F [Plate 5B and Plate 12D]. Layer 7 has been leveled off for a distance of about 8 feet between two piles of stones. A layer of charcoal fills the bottom of the shallow depression. It is not certain that this is a house.

#### *House VI*

This is represented by a pit in sections 2D to 2G (and 2H ?) and 3H to 5H and 5J. It is refilled with layer 9 and by a deposit of sterile beach gravel at least 3 feet thick that separates layer 9 from layer 10. The dimensions of this house must have been at least 24 feet (at right angles to the beach) and 30 feet (parallel

to the beach). The edge of the pit follows the line between 4J-5J and 4K-5K, then turns sharply at right angles between 3H and 4H, suggesting by this angle that the house had two rooms.

On top of layer 6, in the 1931 trench, there are remains of a wooden floor or similar structure, about 5 feet long, on which rest large stones. Whether this is part of a house it is impossible to say.

In all, about 12 *hearths* were discovered: 6 in 1931 and an equal number in 1932. These are excavations from 3 to 5 feet in diameter, and from 1 to 3 feet deep, usually lined with stones, and filled with charcoal. At the bottom are small fire-cracked rocks covered over with sand. Hearths III (1931) [Plate 13c] and VII (1932) [Plate 14A]<sup>13</sup> are the most carefully made. Above the covering of sand in Hearth III there is another layer of sand and charcoal, showing that after the original hearth was abandoned the place was still used for fires. About three wheelbarrow loads of sand were taken from Hearth VII. These hearths were evidently used for baking, the food being placed on the hot stones and covered over. Wassila's wife, an Indian woman from Kenai, remembers her mother telling of cooking in this way. Beside Hearth III a grinding slab and stone were found [Plate 13D], and a very large grinding slab was found near Hearth VII.

Beside Hearth IV is a round pit, 18 inches in diameter and 9 inches deep, which suggests the cooking pits lined with birch-bark which were used by the Athabaskan Indians for boiling meat by means of hot stones.

Inside Hearth IX (in layer 5a, sections 4K and 5K), was found the fragmentary human jaw, 32-7-1570, and at the same level near by was found the skull, 32-7-1532, perched on a stone.

The following hearths seem to have been associated with houses: Hearth XII with House II; Hearths X and V with House III, Hearth VII with House IV. As has been suggested, that labelled 'Hearth VI' may represent only the burned remains of House I.

Besides the big gravel pile, layer 5, there are other thin layers of gravel, evidently brought into the midden by human agency, though their significance cannot be ascertained. These layers can be seen on the cross-sections.

I had hoped that the sinking of the land might offer a clue to the age of the main site on Yukon Island, but after consultation with Dr. Philip T. Smith, Chief Alaska Geologist, U. S. Geological Survey, I find that it is impossible for the geologist to interpret such a minor movement, especially in a field so little explored, where violent and sudden movements of the earth are to be expected from the volcanic activity in the vicinity.

<sup>13</sup> The piles of stones on each side of Hearth VII are those found mixed with charcoal at the bottom.

## COTTONWOOD CREEK

Cottonwood Creek is a small post-glacial stream which has cut a narrow and precipitous gorge through the plateau of the north shore of Kachemak Bay, [Plates 6, 7 and 10]. The plateau is here 500 feet high, and is inaccessible from the beach, except at the mouths of the streams. The mouth of the Cottonwood Creek valley is only 300 feet wide, and it is only on the right (west) bank that there is a level place big enough for a camp. The main branch of the stream was probably established while the great Kachemak Valley glacier still filled the bottom of the Bay.<sup>14</sup> The glacier deflected it from the natural slope of the land, but the tributaries all follow the natural slope, or else are determined by fault lines. The exposed face of the cliff all along the north shore of the bay shows numerous fault lines and scarps, and though not all these movements are easy to determine, it seems evident that the block through which the mouth of Cottonwood Creek is cut has dropped, at least two subsidences being recorded, the total drop probably not being more than 100 feet. One of the fault lines, on the west side of the stream, suggests that there has also been a slight uplift along the same line on which a subsidence occurred. A good deal of the faulting of the plateau is doubtless very old, but the fault just to the west of the mouth of Cottonwood Creek, along which the double movement occurred, was made after the western branch of Cottonwood Creek was established, for the upper part of this branch follows the fault line back for a mile or more. The first tributary of the east branch follows a fault line in the same way. Thus, the evidence is that the faulting occurred after the main stream had been formed and before the tributaries had been established very firmly. A small fault just a few hundred feet to the east of the mouth of the stream has evidently shifted the stream from the old mouth, indicated on the cross-section and map, to the present mouth. This shift of the stream bed may have taken place since the first occupation of the midden, but this is a matter to which I shall return later.

The deposition of two terraces of gravel, the upper underlying the extreme western end of the midden, the lower underlying the main part of the shell-heap, indicates movements of the land which can be correlated with the faulting. After the original valley of Cottonwood Creek had been cut, the land must have sunk, so that the stream deposited a layer of gravel in the old valley. Then a rejuvenation of the stream, caused either by an actual uplift, or, more likely, by the eating back by the sea of the plateau along the shore, resulted in a second erosion of the stream valley, during which almost all of the gravel was removed, leaving only a small terrace. A subsequent sinking of the land caused the deposition of the second gravel terrace. A second rising of the land, or a second period of rejuvenation of the stream, has brought this gravel above the action of the stream. These movements must have been confined to Cottonwood Creek, for Eastland Creek shows no such terracing.

<sup>14</sup> I have here applied to Cottonwood Creek the arguments formulated by Martin for Fox and Falls Creeks where conditions are similar (Martin, Johnson, and Grant, p. 95).

The upper gravel rests on a bed of shale, 3 feet thick, under which is a 9-inch seam of lignite. This lignite bed has burned, baking the shale and the gravel and talus above it. The edge of the midden overlying the gravel is not baked, showing that the burning was prior to its deposition. On the east bank of the stream the continuation of the same seam has also burned. These two fires may have been connected, but they must have been started after the first gravel was deposited—perhaps after it was eroded away and before the second terrace was deposited, when the edge of the coal beds would have been exposed along the valley walls. Martin is under the impression that the fire was probably due to human agency, since thunderstorms are very rare in this region.<sup>15</sup> It is possible that the first inhabitants of Cottonwood Creek, who deposited layer 1, may have ignited the lignite bed. It must have been burned before layer 2, which overlies it, was formed, or before the house pit, House III, which is also over it, was dug. I think it very unlikely, however, that the inhabitants would have set the vein on fire purposely, for the burning coal gives off a most unpleasant stench, as we discovered when we visited the burning beds at the head of the stream valley. Moreover, there are a great number of these burned beds all along the north shore of the Bay, some in inaccessible places, and we can hardly ascribe all these fires to human agency.<sup>16</sup> The shale baked red and orange by these fires was used by the early Eskimo for paint, pencils, beads, and whetstones.

There are four sets of terraces at the mouth of Cottonwood Creek [Plate 6]. The lowest of the pair of terraces, A and A', are of sterile gravel, subject to periodic flooding.

The next terraces, B and B', are about 6 feet above the water, and contain scanty midden material. From the east bank of the stream, where the narrow terrace is being eaten away, we obtained a pounding stone, a piece of chipped red shale, and the female innominate bone, 31-20-7. The turf is 2 feet 8 inches thick, the scanty midden only 6 inches thick. At the present time it would be impossible for a midden to form here, because the terrace is now too narrow to live on. This makes me think that the midden was formed at a time when the bench was much wider, when, in fact, the stream flowed through the old channel. On the west bank of the stream, the corresponding bench shows 6 inches of humus, a thin line of shells, then sand with lignite boulders, probably resting on gravel.

The pair of benches, C and C', lie on either side of the former stream mouth. This former channel is on a level with bench B; that is, it is 6 feet above the present water level. Bench C and C' are from 10 to 15 feet above the beach. When digging away the edge of C to make a place to pitch a tent, we found the following

<sup>15</sup> Martin, Johnson, and Grant, p. 94.

<sup>16</sup> Spontaneous combustion seems very probable in view of the researches made by Rogers. He finds that it is most likely to occur in beds of soft coal or lignite, that is, in coals of a moderate or high proportion of volatile material. 'Burning is most prevalent along rapidly cutting streams . . . it is partly a function of the character of the topography. The writer has observed beds actually burning at six localities [in the Far West], and in all of them combustion evidently started in a gulch on a small, rapidly cutting stream.' (Rogers, p. 3.)

stratigraphy: 12 inches of humus, 3 inches of shells, 2 inches of sterile earth, 2 to 4 inches of shells and charcoal, and sterile sand below that. Do these two layers correspond to the old and the new middens of the great shell heap? Bench C', on which Fitka's cabin stands, has no midden except the refuse from the cabin. There is no trace of shells in the mouth of the old stream bed, a fact which makes me suppose that the stream was flowing here at the time when the old part of the great midden was being formed. In that case bench B (and B'?) did not exist, which would show that the shell heap there, under only 6 inches of turf, is more recent. The 2½ feet of humus over the midden at B' suggests that this terrace may be older. But these are matters very difficult to determine.

Terrace D is formed by the great shell heap. It merges with the bench below it a few hundred feet up stream, but for most of that distance its edge is marked by a cliff, in which the shell heap is exposed. This midden shows two distinct parts, the younger and smaller layer being separated from the older part by a thick deposit of wind-blown sand and humus, in one place over 2½ feet thick. This *younger midden* may represent the period of the Indian invasion. From it we obtained a hammerstone and a very large sandstone grinding slab. All the rest of the material, consisting of about 500 specimens, came from the *old midden*, and is probably younger than most of the material from Yukon Island III or Yukon Fox Farm III, but is contemporaneous with material from Aurora Spit and the Point West of Halibut Cove. I hesitate to assign it to a separate period, however, but would place it in the latter half of the Third Period of the Kachemak Bay culture.

The great midden is covered by 2 feet of sterile wind-blown sand and humus. A line of light gray in the roots of the grass is probably ash from the Katmai eruption of 1912. The midden has a maximum depth of 10 feet. It rests upon sterile sand and lignite boulders, which gradually passes into stratified gravel, though the lower part of the cliff is obscured by talus. The cliff is rapidly being cut back. The photograph of this site, published by Martin in 1915, shows many large cottonwood trees growing on the midden. Fields saw large trees when he visited the site in 1919, but when I saw it in 1930, all of the old trees but one had gone.

A base line was established from the west end of the midden down to the large cottonwood tree at the end of the bench, and the midden was divided into 5 foot squares. These we lettered from A to V (omitting I and O as confusing). The old midden disappears between sections S and V; that is, it is somewhat over 80 feet long. The young midden is only about 10 feet or so long. In 1930 Fields and I dug a little at the foot of the cliff in sections G and H, where we found the decorated lamp [Plate 26 -2]. We also sank a shaft 6 or 7 feet square in sections 1 and 2J and half of 1 and 2K, to a depth of 8 feet. In 1931 the sections 2E, 3E, 2F, 3F, 1J, 2J, 3J, 1K, 2K, 3K, 1L, 2L, 3L, 2M, and 3M were completely excavated. We also dug half way down in sections 2G, 3G, 2H, and 3H. The front edge of the G and H sections caved away while we were working, though we

recovered the skeletal remains buried in 1G. The stratigraphy as shown in the cross-section along the base line [Plate 7] is much the same throughout the part that we excavated, except that layer 1, cut away in 2G and 3G for House II, was at least 3 feet thick in 1G where the skeleton was buried.

We also dug a small trench, 15 feet long by 5 feet wide, in back of Fitka's cabin, making sections 1 to 3X, but the layers here could not be correlated with those in the main part of the excavation. The midden in 3X is 7 feet thick.

As at Yukon Island, the specimens were labeled according to their section and depth from the surface, and later these depths were correlated according to layers. However, I have not attempted to give the layers in this report, since the material seems to be uniform throughout the midden, and I could find no apparent difference between the material from layer 1 and that from layer 10. It is possible, however, that a greater number of specimens might show some development.

The following species of shell-fish were identified by Dr. Dryden from specimens obtained at Cottonwood: cockles: *Cardium corbis* (? but unusually large), *Cardium ciliatum*; horse clam: *Spisula voyi* or *alaskana*; clams: *Saxidomus giganteus*, *Paphia staminea* and another indeterminable species, *Mya truncata* or *japonica*; mussel: *Mytilus edulis* or *californiensis*; whelks: *Chrysodomus pribiloffensis*, *Chrysodomus liratus*, *Plicafusus* (? but unusually large, and species indeterminable), *Beringius kennicottii*; limpet: *Acmaea instabilis* (?); marine snail: *Natica clausa*; barnacle: *Balanus* (species indeterminable); ship worm: *Teredo* (species indeterminable); and 'gum boots': *Chiton* (species indeterminable). The contents of the other shell heaps seem to have been very similar.

Animal bones are surprisingly rare. Practically no bones of large animals were found, except those cut or already made up into objects. Yet these people hunted large animals, including the whale and the caribou (see also the list of animals from the related sites at Aurora Spit and the Point West of Halibut Cove). The most numerous bones were those of fish and birds. We must, therefore, imagine that the occupation of Cottonwood was seasonal, and at a time when the diet consisted chiefly of shell-fish, birds and fish; since even the bones of the latter are not numerous, it may be that shell-fish alone formed the staple part of their food supply. This would indicate that the village was occupied in the early spring, when the winter provisions had been exhausted and storms prevented renewed hunting. This time of year is always the worst for the natives along the coast. Clams and mussels have been frequently described as their starvation fare. The bones of the animals from Cottonwood are those of the harbor porpoise, harbor seal, small whale, marmot, bear, wolverine, field mouse, goose, duck, and unidentified birds and fish. Bones of an Eskimo dog were found.

It is probable that, when I first saw it in 1930, the greater part of the midden

at Cottonwood Creek had already been destroyed by the sloughing off of the bank. The chief differences between the various layers are due to the varying proportions of lignite ash<sup>17</sup> and wood ash. The lignite ash has colored the shell heap bright orange, red, yellow, and light brown. Where exposed to the air it rapidly bleaches white. The dark brown layers are colored dark by charcoal fragments. In general we found that the dark brown layers were those containing specimens, the lignite ash layers were almost entirely sterile. In some of the latter, particularly layer 1, the shells have been decomposed and solidified into masses of solid lime, white or white streaked with red and orange, depending on the proportion of ash to shell. Inside these masses of lime we often found cinders, suggesting that it was heat, probably from glowing coals, which caused this solidification.

The cross-sections give us considerable information about *houses* during the Third Period of the Kachemak Bay culture.

#### *House I*

In sections L, K, and M, the remains of a large house pit, *House I*, were found, the greater part, however, having been destroyed by the caving away of the bank. It had been dug down through layer 1 into the sterile soil below the midden, and was filled with material from layer 2. The excavation in the sterile soil is from 2 to 2½ feet deep; perhaps something should be added to this figure to represent the part dug through layer 1, but this is not more than 1 foot. As can be seen from the plan [Plate 6] the house had two rooms. The dimensions of the house cannot be ascertained, since it was not completely uncovered. The front room, running almost parallel to the edge of the cliff, was probably 20 feet or so long, though the edge of the cliff at the end of the room is obscured by talus, so that we cannot be sure of this figure. The room farther from the edge of the bank may be the smaller room. The arrangement of this two-room house is similar to that of the Indian houses described in Chapter V. The house at Cottonwood was made of wood exclusively, since no stones connected with its construction were found. Near the west corner of the front room was found a post hole, 6 inches in diameter and placed about 2 feet out from both walls. Beside this post hole was a charcoal log running the whole length of the 6-foot wall, about 2 inches above the floor. Near the north end of this wall were three niches scooped out of the sterile soil outside the house, in which were traces of small post holes. Other post holes, inside and outside of the house, are indicated on the diagram. They may or may not all have been connected with the house. The grave, 31-20-26, dug into layer 1, and covered with an unbroken stratum of layer 2, is set parallel to the wall of the house. It must have been dug when the house was still standing. Beside the post hole in the west corner of the house a charred grinding stone was found, and under this stone and behind it was a cache of 13 small notched pebbles.

<sup>17</sup> Dr. Wells' report on the analysis of this ash is given in Appendix II.



Another grinding stone, a whetstone, and the large barbed lance blade [Plate 31 -14] were also found on the floor of the house.

#### *House II*

This house was dug in sections 2G, 3G, 2H, and 3H into layer 1 and was filled with layer 2 (?). The pit was about 8 feet square and 2 feet deep. In about the middle of the east and west walls post holes were found. There may have been other post holes, but since the house was not completely excavated these were not discovered. I am not absolutely certain of the dimensions; it is possible that the house was slightly larger. The grave, 31-20-11, was close to this house, and like the grave, 31-20-26, may have been located with reference to the house wall; since the grave was destroyed by the caving away of the bank before the house pit was discovered, we cannot be sure of this.

#### *House III*

There was a larger structure about 3 feet west of House II, the floor being only a few inches above the level of the latter. The excavation was made into layer 1 at the east end and into the sterile gravel at the west. It was about 2 feet deep, 16 feet long, and over 8 feet wide (since the front of the cliff had caved away here, the total width cannot be known). The wall of the house does not show in the detailed cross-section along the base line [Plate 7], though the large post hole in F, marking the corner, is clearly shown. A small post hole in D and another in C were found, both only 3 inches in diameter. The pit is filled with layer 2 and is probably contemporaneous with Houses I and II. In fact the close proximity of II and III suggests that these pits may have been part of the same structure. No doorway was found connecting them, however.

Under the floor of House III, in section 2F, and separated from the floor of the house by a layer of orange ash and shell, part of layer 1, was a *hearth*, like those found at Yukon Island. It was an excavation 3 feet in diameter and 6 inches in depth, lined with stones, and filled with charcoal. On top was a thin layer of sand and fine gravel. This hearth may have been connected with the house, but I do not think this likely, since the layer of orange ash and shell above the hearth is continuous with the unbroken strata of layer 1.

#### *House IV*

Two trenches were found, both filled with layer 8, and therefore probably contemporaneous. One of these can be seen in the cross-section at the back wall of 3E. It may be the *entrance passage* to a house, the remains of which were observable as a shallow depression on the surface of the midden. The trench is 4 feet wide and 1 foot deep. (It may be deeper, since the stratigraphy here was not very clear.) It is impossible to estimate its length.

#### *House V*

In sections H and J the second trench was found, stretching from the base

line to the face of the cliff in section 1, giving it a length of at least 12 feet. The wall of this trench can be seen behind Field's shoulder in photographs taken in 1930 [Plate 10B and c]. This trench is probably an entrance passage also. It is 3 feet wide and 2½ feet deep, though this figure represents a minimum depth, the stratigraphy not being very clear.

Other holes and excavations were found. The edge of layer 2, in section K, has been cut away, as can be seen in the cross-section.

The shell heap at Cottonwood Creek was first observed and reported by Martin in *Bulletin 587* of the U. S. Geological Survey, published in 1915.<sup>18</sup> He mentions a human fibula which was found loosely imbedded in the shells, half way up the face of the cliff. He quotes Hrdlička's opinion that the bone is not more than a few years old. It is possible, as Martin reluctantly suggests, that the bone fell down a crack of the midden, but in view of the fact that many such examples of isolated human bones were found both at Cottonwood and at other sites in Kachemak Bay, and that all the bones from Cottonwood were remarkably well preserved, owing to the dryness of the shell heap, I think the bone was not intrusive, but belonged to the midden. Needless to say, no evidence of contact with Europeans was found in the midden. As Martin warns us: 'It must, however, be remembered that decay is slow in the climate of Alaska, and the bone should therefore be compared with bones of northern extinct mammals of known antiquity rather than with human bones preserved in other climates.'<sup>19</sup>

As for the age of the midden at Cottonwood Creek, we know nothing definite. As Martin has stated, the thickness of the soil on top and the growth of the large cottonwood trees give evidence of considerable antiquity. I have already noted that shell-fish can no longer be obtained from the beach near Cottonwood Creek. We made a careful examination and did not find enough for a single meal. It is evident that the site must have been inhabited before the deposition of the mud flat which killed the clams and mussels. This mud flat was formed in the shelter of Homer Spit. If we had geological information about the age of Homer Spit and the rapidity with which the mud flat was and is being formed, it might be possible to set a date for the site, since I think that the deposition of the flat, and the consequent destruction of the shell-fish, was probably the cause for the abandonment of the site.

In the spring of 1919 Jack Fields did a little digging at Cottonwood Creek. He found several bone pins pointed at one or both ends, two bone knives, and several animal bones, cut down into 'wedges' (leg bone scrapers?). He also uncovered a skeleton at the bottom of the midden. The bones were neatly piled in a small space, with the skull set on top. Two large, undecorated stone lamps were found on one of the lower terraces, where they had evidently been washed out by the stream. His collection has unfortunately been lost.

<sup>18</sup> Martin, Johnson and Grant, pp. 92-94.

<sup>19</sup> *Ibid*, p. 94.

### III. HUMAN REMAINS FROM KACHEMAK BAY

#### BURIALS

In Kachemak Bay we uncovered 13 burials, 5 disturbed graves or collections of bones, and about 84 scattered bones, representing almost as many individuals.

The oldest complete burials are from *Yukon Island II* (layer 4) and Yukon Fox Farm II.

The former, 32-9-1, comprises a single adult male skeleton [Plate 15c]. It was found in layer 4, under the edge of the gravel pile, layer 5, which is here lined with several layers of wood. Remains of a plank were found directly over the skeleton, suggesting that the body had been buried under a floor, or some other structure.\* The grave is just on top of the stones of House I. It is always possible of course, that the grave belongs to sub-III rather than to Period II. The skeleton was lying on the left side, with head to the west, both arms and legs being tightly flexed, the arms folded to the right. The bones of the left leg were found together in their proper relative positions, but those of the right leg, which had evidently been on top of the pile, were scattered. The bones of the ankles and feet were at and below the pelvis. Several curious displacements must be noted. The skull was found, not on the side, but upside down. The jaw was completely missing. The atlas and a finger bone were found near the left knee. A rib fragment was also found near the knee. Near the head was a very long medial labret [Plate 51 -31] like those collected by Jochelson in the Aleutian Islands, and intended, as he claims, for masks rather than for actual wear. A button-shaped bone object (ear plug?) [Plate 51 -13] and a bird bone bead [Plate 50 -16] were also found near the head. Under the rib fragment near the left leg was found a finely chipped lance or knife blade [Plate 30 -7]; nearer the pelvis was found a barbed dart head [Plate 39 -7].

From the scattered position of the bones it would seem as if the body could not have been completely in the flesh when buried. The small size of the grave (2 feet 6 inches by 1 foot 3 inches) would indicate that the body had been done up in a tight bundle. It is, therefore, possible that the body was in a mummified or partially decomposed condition at the time of burial, and the displacement of some of the bones took place prior to the burial, rather than afterwards.

At *Yukon Fox Farm II*, another burial was found dating from the Second

\* The body may have been in a wooden coffin, like those which we found in cave and midden burials in Prince William Sound, 1933. Prehistoric coffin burials were reported to me in 1930.

Period. Two complete skeletons were found, 31-20-2320 and -2321. I cannot say definitely whether the bodies were interred, or whether they had been exposed on the surface, since the stratigraphy of the shell heap was not clear. However, a layer 2½ feet above the skeletons was unbroken, showing that the deposition of the bodies must have been made previous to its formation. The two bodies were evidently deposited at the same time. They lay side by side, with heads to the north, facing east, lying on their left sides, the limbs tightly flexed. The bones seemed to be properly articulated, though the skulls had slipped a little from their original positions, and the lower jaw of 31-20-2320, the skeleton on the west, lay beside the skull. As in the case of 32-9-1, the position of the bones suggests that the bodies had somewhat decomposed inside the bundles prior to their deposition in the midden. The head of 31-20-2321 was pillowed in the left hand. Under the skull was a cache of grave goods, in a small pit. These objects are illustrated on Plates 53 and 54. They consist of 4 pieces of cut bone and antler [Plate 53 -1 to 3], a bone point [Plate 53 -4], a lump of red baked shale scraped for paint [Plate 53 -5], 5 whetstones of tuff and one of felsite [Plate 53 -6 to 11], a chip of jasper [Plate 53 -12], a chip of flint [Plate 53 -13], an ulo [Plate 53 -15], a broken man's knife like an ulo [Plate 53 -14], a shallow stone vessel, probably a hunter's lamp [Plate 53 -16], 8 variously shaped pieces of worked pumice [Plate 54 -1 to 8], 7 wedges of whale bone and antler [Plate 54 -9 to 11, -13 to 16], and an unfinished planing adze blade [Plate 54 -12]. These tools, with the possible exception of the ulo blade, are those used by men. The east skeleton was that of a man, the west skeleton that of a woman.

A double burial was found, dating from *Yukon Island sub-III* [Plate 13B and Plate 15D]. The grave had been dug from layer 5a through layer 2 into layer 1, a total depth of one and a half feet. Two complete skeletons were found, a man, 32-7-1744, and a child about five years old, 32-7-1746. The man was lying on the left side with head to the south. The legs were tightly flexed, the arms stretched down close to his sides. The child lay transversely at his feet, the head to the west. The child's skeleton seemed to be complete, and the bones in place, with the exception of the skull which had slipped, but before they could be uncovered they were destroyed by the collapse of the wall. Beside the head of the man were two extra skulls, 32-7-1743 and -1745. The first lay on its left side on the man's shoulder, with the lower jaw in place; the second lay upright on his chest and lacked the mandible.

The most interesting feature of this burial was the finding of artificial eyes, carved from bone, inside the eye sockets of the four skulls [Plate 51 -15 and 16]. On the left side of the man's jaw was found a gypsum labret [Plate 51 -36] and a very long marble labret stuck out from the middle of the child's lower jaw [Plate 51 -24]. A fragment of the child's frontal bone showed many knife marks, especially over the right temple. On the man's skull and the two trophy skulls was a layer of white clay that covered the face and jaw from frontal bone to the inside of the mandible and extended across between the mastoid processes, that is, from

ear to ear. The eye sockets were filled. The other bones were not covered. I cannot say whether the skull of the child had been so prepared. The artificial eyes and the labret on the man's jaw were embedded in this clay. Though the weight of the midden and the action of the salt water had destroyed the original shape of the clay, it seems probable that it was put on in an attempt to build up the features. The trophy heads (and the child's head, also, to judge by the knife marks) were probably bare skulls (?) at the time of burial. As for the man's body, the position of the bones would indicate that it was in the flesh. Why then, should a clay face have been necessary for him? A flat pointed piece of bone was found at the man's knee. There were no other grave goods.

Six graves were found dating from the Third Period. With one exception they were all dismembered or secondary burials. In this one case the body had

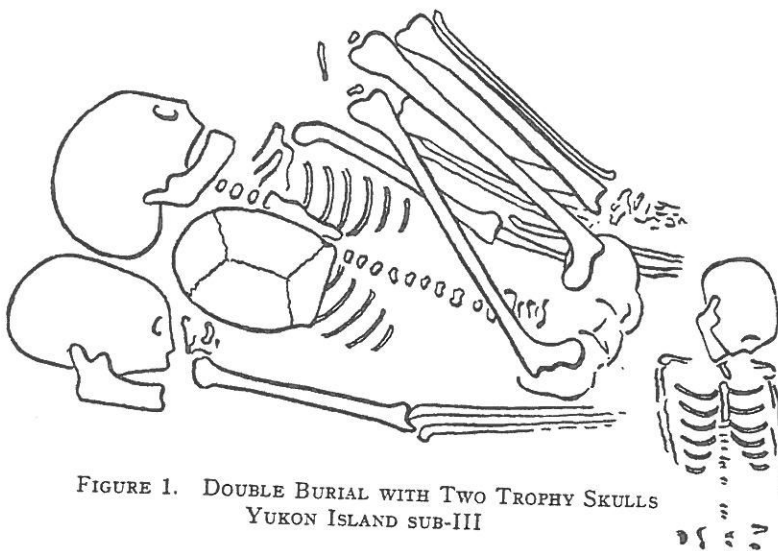


FIGURE 1. DOUBLE BURIAL WITH TWO TROPHY SKULLS  
YUKON ISLAND SUB-III

been interred in the flesh. This was a child, found at *Aurora Spit*. The body had been interred in a squatting position, the arms and legs doubled up close to the trunk. The child had died, according to the report of Dr. George Wagoner, University of Pennsylvania, from mastoiditis. Nothing was found with the body.

Four dismembered burials were found by us at *Cottonwood*. That found by Fields has already been mentioned. The bones were all piled up neatly with the skull set on top. They had apparently been enclosed in a box or container which had rotted away, leaving a loosely filled space about the bones.

Skeleton 31-20-11 [Plate 14c] was discovered by accident, when a portion of the bank caved away. Most of the bones slid down the slope and were picked up near the bottom; only the skull<sup>1</sup> and one humerus were left *in situ*. The vertebrae

<sup>1</sup> White clay was found on this skull. A sample of the clay from the eye sockets was preserved. Unfortunately, it did not occur to me until the burial in Yukon Island sub-III was discovered that this clay might have been used to build up the face, so I made no record at the time of the bones it covered.

and ribs, apparently in their proper relative positions, had slipped only a few inches from their original place. The skull was lying on the right side, facing the southwest. The two femurs lay one on each side of the skull with the proximal ends next it. The hole of the grave was very distinctly marked, having been dug into the white lime of layer 1, here 3 feet thick, and having been filled with the dark material from layer 2. The hole was 2 feet 3 inches long, 1 foot deep, and of undetermined width. It could have been covered by only a few inches of earth. It is possible that the trunk was buried in the flesh, but the small size of the hole and the position of the femurs show that the legs, at least, had been disarticulated. The grave was very close to House II. The skeleton is that of a girl in her teens, short and rather heavily built.

Another grave of about the same age, 31-20-26, was discovered in section 2K. It was dug into a layer of orange ash and shell, apparently continuous with the lime layer in which 31-20-11 was buried. The grave was parallel to the wall of House I, showing that it had been dug with reference to the house. The bones had originally been enclosed in a birch-bark box 18 inches long, 12 inches high, and 12 inches wide. A small birch-bark box was found under the burial box, but it contained nothing. The skull lay at the bottom of the pile of bones in the southwest corner and was badly crushed; 9 vertebrae and a few ribs, still articulated, lay along the west side. The long bones lay diagonally across the top of the pile. The two halves of the pelvis had been broken apart and were laid on top. The uppermost bones were badly scorched and there were traces of charcoal directly on top of the grave. The skeleton is that of an adolescent, but the bones were too badly broken to be of much value.

A double burial, 31-20-102 and -103 [Plate 14d], was found in section 1L, 7 feet below the surface. The grave had been dug in the refill in House I (layer 2), and is, therefore, probably much younger than the other two graves. The hole was 18 inches long, 12 inches wide, and not much over 9 inches high. The skeletal remains are those of a child, 31-20-103, and a young adult (male?), 31-20-102,<sup>2</sup> both buried at the same time. The skull of the man was in the east corner of the hole and lay partly on the right side. It was intact, except where the weight of the earth had crushed it. (In the photograph a large hole is shown on the left side, where the broken fragments had been taken out in cleaning away the earth.) The child's skull had been broken apart before or at the time of burial, and the pieces were separate. The greater portion, consisting of the temporal and occipital bones, was set like a dish in the southwest corner of the hole. The rest of the skull and the lower jaw were placed in the back of the hole under the other bones. Both skeletons were completely disarticulated. The patellae were missing, suggesting that they had remained attached to the ligaments and so had been lost. The teeth, also, were absent. The skull of 31-20-102 rested in the left innominate bone of the same individual. Under the skull were two cylindrical shell beads [Plate 50-12] and an artificial eye (?) [Plate 51-14]. On the west side of the

<sup>2</sup> Described by Oetteking, p. 224.

grave, thrust under the other bones, were two beautifully made socket-pieces [Plate 41 -9 and 10]. The grave was so small that the shafts must have been broken off short, or were completely absent.

A grave, 31-20-108 [Plate 15A], was found at the back of section 3J, dug through layer 1 into the sterile soil at the bottom. It was filled with layer 2, and was probably contemporaneous with graves 31-20-11 and 31-20-26. The grave was a small rectangular hole like the others, originally covered by only a few inches of earth. The skeleton is that of a child. The skull lay on the right side, facing west. The jaw was just to the east, set on edge. The teeth were missing. The femurs lay diagonally across the pile. The tibia and fibula of each leg were together, but were not articulated with the corresponding femur. The bones of each arm were articulated; the arms had evidently been folded to fit into the grave. The two halves of the pelvis had been broken apart. The ribs and some of the vertebrae were still in their proper positions. It was evident that the hands and feet, still in the flesh at the time of burial, had been stuffed inside the body cavity. Most of the vertebrae were scattered. Other bones had been tossed into the grave before the larger bones were laid in. At the very back of the grave was a large broken slate lance blade [Plate 32 -18], but I am not sure that it was associated with the burial.

The bones had evidently been held together by flesh when the body was prepared for burial. The knee-caps were missing; they had doubtless adhered to the ligaments when the legs were dismembered. The following bones showed knife marks at the joints, evidently made when the flesh was cut from the bones, or the bones were cut apart: both femurs, both fibulae, both tibiae, right humerus and ulna but not the radius, all the bones of the left arm, some of the ribs. The skull had a few scratches inside at the top of the vault, evidently made by a sharp instrument inserted into the foramen to scrape out the brain. The lower jaw had a small hole drilled through the base of the left ramus. There may have been a similar hole in the opposite ramus, but it was broken off, or had disintegrated. On the upper jaw, two holes had been drilled through the alveolar, one under each nostril.

Probably 31-20-11 was still partly in the flesh when buried; 31-20-26, -102, and -103 gave the impression of having been exposed before burial, since the bones were completely disarticulated and yet showed no knife marks. It is evident that 31-20-108, however, was still in the flesh when prepared for burial. The drilled holes through the upper and lower jaw and the cleaning out of the skull suggest that it was intended for a trophy. Why in that case was it buried with the other bones? Perhaps the knife marks are an indication of cannibalism. In that case, the removal of the brain is easily explained, though the holes through the jaw, (evidently to tie on or fasten up the lower jaw, perhaps even to articulate it like a marionette, ?)<sup>3</sup>, are difficult to explain. We know that the Kodiak and Aleut whalers made use of corpses, but the bodies are said to have been those of the

<sup>3</sup> Like the corpse marionettes in the Makah whaling legend (Curtis, p. 108 ff.).

members of their own secret society or of prominent men. It seems unlikely that they would have taken that of a child.

A dismembered burial, similar to those described from Cottonwood, was found at the bottom of *Yukon Island III* [Plate 15B]. Two skeletons, 32-7-144 A and B, both adult male (?), were piled together in a shallow depression on top of layer 5b. They were covered over by an arching and unbroken layer of charcoal at the bottom of layer 6. The bones had evidently not been interred. One humerus projected from the pile; the end had been broken off and thrust down to fit the restricted space. The bodies were not completely disarticulated. The greater part of one vertebral column and the ribs were found together in their proper relationships, and the bones of some of the arms and legs were together. The broken humerus showed knife marks at the distal end where the flesh had been stripped off, or where the ligaments had been cut.

The burial found by Fields on Yukon Island probably belonged to layer 10, *Yukon Island IV*, though this cannot be asserted positively. The woman's skeleton was extended on the back, and was complete except for one leg. About the neck were three strands of rectangular shell beads, reaching almost to the waist, and by the head was an object which we have interpreted as a labret. Another skeleton was later found at the same place.

The burial at *Port Graham* has already been mentioned. In view of the disturbed condition of the skeleton I cannot say definitely how the body was buried, but it seems probable that it was in a squatting position. The covering of stone slabs is the most distinctive feature.

The man buried on top of the *refuge island*, *Qatloxe'lye*, 31-20-585, [Plate 72] was an Indian, as Dr. Oetteking has shown. None of the cultural material from this site, with the exception of a lance blade from below the bird droppings, can be very old; the site is probably Indian. Dr. Wagoner believes that the extremely massive bones and the large limbs are pathological—a form of giantism. The skeleton lay on the left side, with arms and legs flexed, the head pillowed in the left hand. This was the position of the male skeleton, 31-20-2321, at the Fox Farm. The body had been painted with hematite, which stained almost all of the bones, and some of the surrounding soil. It had been wrapped in bark. The grave was very shallow, little more than a hollow scooped out of the hard-packed bird excrement, just large enough to hold the body. The body had been covered only by a sheet of bark or wood above the wrappings. The skeleton was in good condition except for the upper surface of the long bones, which had been badly rotted, due perhaps to contact with the bark above, which must have held the moisture. The puffins that breed on the island had tunneled into the grave and two were found roosting on the ribs. No artifacts were found with the body.

The Athabaskan Indians at Polly Creek, Tuxedni Bay, told me that while the Indians of Kenai and the middle Inlet formerly burned their dead (a statement also applicable to the upper Inlet, according to Little Nikita, Fish Creek, Knik



Arm), the Indians about Iliamna and Seldovia used to bury their dead in caves. This statement was made as if about a matter of common knowledge. Coming from Prince William Sound, rich in cave burials, I had naturally searched for human remains in the caves about Kachemak Bay, but found none. The archaeological evidence would show that both Indians (?) and Eskimo buried their dead in the ground. A Seldovia Indian boy told me that he had found human bones in one of the caves at China Poot Bay, but we were unable to find any.

#### DISTURBED BURIALS AND SCATTERED BONES

Isolated human bones and groups of bones, not properly buried, were frequently encountered. The oldest of these are from layer 2, *Yukon Island II*, and consist of a fragmentary jaw, 32-9-34 (of a young woman), and a canine tooth, 32-9-73 (from the same individual?). In section H, layer 4, bones of an adult and a child, 31-20-2346 A and B, were found mixed with animal bones. Some of the leg bones of the adult, including a patella, were found together in their proper relative positions. The other bones, however, were scattered. The animal bones found among the human remains suggest that, whatever the history of the latter, at the time of the formation of the layer they were nothing more than ordinary midden refuse. In 1932 more scattered human bones were found in this same layer, in sections J, K, and M. They consist of a lower jaw and several skull fragments, 32-9-95, a patella, 32-9-359, five finger bones, 32-9-190, the head of an ulna (not saved), and other fragments. These probably all belonged to the same individual. A tooth, 32-7-1252, belonging to a different individual, was found in the same layer.

In *Yukon Island sub-III*, 15 scattered human bones were found. One of these was a skull, 32-7-1532, complete except for the facial bones; it was found perched on a rock, with a notched stone inside it, and other notched stones near by. Two fragments of a second skull, 32-7-1336 A and -1359, from sections 2H and 3H, were found to fit together. Two fragmentary lower jaws were recovered. One, 32-7-1570, probably masculine, was inside the large hearth (Hearth IX), at the same level as the skull, 32-7-1532. The other jaw is that of a child, 32-7-1522. The other bones consist of three isolated teeth, 32-7-1523, -1599, and -1655, fragments of two radii, 32-7-1493 and -1714, of a femur, 32-7-1626, of a fibula, 32-7-248, of a pelvis, 32-7-1705, of a scapula, 32-7-1345 A, and a thoracic vertebra, 32-7-1580.

In *Yukon Island III* approximately 40 isolated human bones were found. There were 4 skull fragments, 32-7-732, -846, -1212, and -1213, the upper jaw of an adolescent, 31-20-2160 A, part of an infant's jaw, 31-20-1223, part of an adult's jaw, 31-20-2160 B, 8 isolated teeth, 31-20-1059, -1183, -1425, 32-7-415, -422, -1182, -1233 and -1791, several teeth of an aged adult, with signs of pyorrhea, 31-20-1201, a broken tibia with knife marks near the ends, 32-7-1183, two fibulae fragments, 32-7-1311 and -1741, two humeri, 31-20-2323 (a child's) and 32-7-652,

two radii, 32-7-74 F (a child's) and -573, 5 toe and finger bones, 31-20-1116 A and 32-7-74 A and B, -714 and -1164, an astragalus, 31-20-2160 C, two atlases, 31-20-1116 B and 32-7-570, a thoracic vertebra, 32-7-773, two lumbar vertebrae, 31-20-1647 A and B, and two fragments of pelvis, 32-7-715 (a child's) and -1303. Of unknown depth, but probably from Yukon Island III, are a tooth, 32-7-1043, a patella, calcaneum, phalange and two metatarsals, 32-7-677 A, B, C and D, and -1008.

In sections C and D, layer 6 or 7, Yukon Island III, were found a group of bones, evidently belonging to the same individual. The skull, tibia, pelvis, and several teeth were found, 31-20-1128. In section G, layer 6, a right tibia, os calcis, part of the sternum, fragments of rib, scapula, etc., were found, probably belonging to the same individual. This may represent a disturbed burial, or simply a refuse heap. Dr. Wagoner has drawn my attention to the osteo-porosis of the skull, due perhaps to a dietary defect.

A child's tibia was found in the lower (?) layer at the feed shed, 32-8-166.

From *Yukon Fox Farm III* are skull fragments, 32-8-160, a tooth, 32-8-184, a patella, 32-8-111, two femurs (only one saved, 32-8-367), two fibulae, 32-8-96 and -112, and a lumbar vertebra, 32-8-161. The leg bones and the vertebra were from approximately the same depth, 3 feet 3 inches, and may have belonged to the same individual. The skull fragments and tooth were deeper. Directly above the double burial were other human bones, badly decayed. A tibia, tooth, etc., were recovered, 31-20-2322.

A vertebra, 32-8-312, and a fragment of upper jaw, 31-20-810, were found at the *Point West of Halibut Cove*.

At *Cottonwood*, in section 3H, layer 8, several bones of a woman, 31-20-443, were found scattered about on what had formerly been the surface of the ground between two piles of refuse. This position may indicate that the body had been originally buried and was later shoveled out. Some shell beads [Plate 50 -19] were found among the bones, but the association was undoubtedly accidental. The skeleton of a field-mouse was also found among the human remains. The bones are those of a young woman and comprise the lower jaw, left scapula, both humeri, atlas, sternum, left radius and ulna, three teeth from the upper jaw, seven ribs, and four foot bones.

Other isolated human bones were found. From the narrow terrace between the left bank of the stream and the beach, was found a human innominate bone, (female?), 31-20-7, but no other part of the skeleton was recovered. Several fragments were found in layer 2, comprising a piece of skull, 31-20-2355, in section 1K, a fragment of rib in section 3M, 31-20-2356, and a toe bone in section 3F, 31-20-2359. In layer 5 a human radius was found in section 3M, 31-20-2353, and a human toe or finger bone from section 3L, 31-20-2358. In layer 8 a radius, humerus, second right metacarpal, fifth left metacarpal, and second left metatarsal were found in sections 2M and 3M, probably all from the same individual, 31-20-2327.

The proximal heads cut from two human tibiae were also found at Cottonwood and Yukon Island III [Plate 47-16 and 15], and will be described under the section on cut articulations in the next chapter.

Scattered and broken human bones have been reported from many sites and have sometimes been taken as proof of cannibalism. It is difficult to know how the condition of the human remains from Kachemak Bay should be interpreted. The evidence might, with some justification, be argued as proof of cannibalism, though I hesitate to advance this theory, since the scattered bones might all have come from disturbed graves. The cut bones, however, are more difficult to explain.

#### IV. ARCHAEOLOGICAL SPECIMENS FROM KACHEMAK BAY

In the collection from Kachemak Bay and Port Graham there are approximately 4700 specimens, of which about a quarter are of bone, antler, or ivory. The rest, with the exception of the skeletal remains already described and a few pieces of copper, birch bark, etc., are of stone. The large proportion of stone objects can be explained by the fact that they are not subject to decay, a factor which has been very important at Yukon Island. Here the salt water has probably destroyed a large part of the bone objects which might have been recovered under more favorable conditions. From Passage Island in Port Graham, there are approximately 38 specimens, from Cottonwood 500, from Aurora Spit 25, Qatloxe'lye 17, Halibut Cove 36, the Point West of Halibut Cove 146, Q'na'qesle in Tutka Bay 18, and Yukon Fox Farm 270. The remaining specimens are almost all from the great midden on Yukon Island.

These specimens will be described type by type, beginning with those of stone, then discussing those of bone and antler, and lastly ornaments and sundries.

##### NOTCHED STONES [PLATE 16]

The most numerous specimens of any type are beach pebbles notched at the ends or at the sides, objects commonly called 'sinkers.' Altogether 955 of these were found, 567 being *small*, that is, under 5 cm. in length; the remaining 388 are *large*, being 5 cm. or more in length. The distinction between the small and large types is real, as the distribution of the various sizes about the two means would indicate. The distribution of the two types at the various sites and in the different levels on Yukon Island shows that this distinction is significant. These stones are so numerous that I think the specimens collected give a fair picture of the distribution of the two types throughout the development of the Kachemak Bay culture, though this cannot be assumed for other types of specimens.

The small notched stones are made of oval beach pebbles of hard, dense stone: dolerite, graywacke, and fine-grained sandstone being the chief materials. The same rocks were also used for the larger specimens, though altered diabase was the most common material, especially in the Second Period. Slate, schist, hornblend porphyry, and other rocks were used, too. In general, the large notched stones are much less regular in size and shape than the smaller specimens.

With the exception of two doubtful specimens of large notched stones from Yukon Island I, not a single sure specimen was found in the First Period. With the exception of 11 stones 5 cm. or less in length, only large specimens were in Yukon Island II, and at Yukon Fox Farm II only large specimens occurred. At Yukon Island III and sub-III and at Yukon Fox Farm III both large and small stones are found, but the latter predominate. Only one specimen from Cottonwood is over 5 cm. long; all the rest are small. Only small specimens were found at Aurora Spit and at the Point West of Halibut Cove. The only specimen from Passage Island, Port Graham, is 5.5 cm. long, though in shape it resembles the smaller type.

The distribution of these two types is given in the following tables. The first gives the distribution of all the specimens according to size and locality, the second only of the unbroken specimens from the principal sites. The 11 'small' specimens from Yukon Island II and the 2 'large' specimens from the late Third Period sites (Cottonwood and Passage Island) show that the lines between the two types cannot be rigidly drawn.

TABLE I

SITE	SMALL NOTCHED STONES	LARGE NOTCHED STONES
Port Graham.....		1.....
Cottonwood.....	173.....	1.....
Aurora Spit.....	7.....	
Point West of Halibut Cove.....	43.....	
Halibut Cove.....	1.....	2.....
Yukon Fox Farm III.....	27.....	17.....
Yukon Fox Farm II.....		25.....
Yukon Fox Farm ?.....		2.....
Yukon Island IV.....	2.....	
Yukon Island III.....	221.....	38.....
Yukon Island III or sub-III.....	28.....	3.....
Yukon Island sub-III.....	75.....	32.....
Yukon Island II.....	11.....	260.....
Yukon Island I.....		(2?).....
Yukon Island ?.....	1.....	7.....

The small stones vary in weight from  $\frac{1}{8}$  to  $1\frac{1}{2}$  ounces, the large from 1 to  $12\frac{1}{2}$  ounces, though most weigh between 3 and 6 ounces.

TABLE II

Length in centimeters	Cottonwood	Aurora Spit	Halibut Cove	Pt. W. of Halibut Cove	Yukon Fox Farm III	Yukon Fox Farm II	Yukon Fox Farm ?	Yukon Island III	Yukon Island III or sub-III	Yukon Island sub-III	Yukon Island II	Yukon Island ?
1.5	8			1				3				
2.0	31	1		14	1			20		4		
2.5	65	3		13	1			31	10	20	1	
3.0	55	3		7	5			90	9	34	5	1
3.5	15			2	11			50	8	11	1	2
4.0	3		1	3	6			11	1	4		
4.5	2			2	3			1		2	2	
5.0	1				2	2		2		3	3	1
5.5					2			5		2	9	1
6.0			1		3	2	1	3		3	11	
6.5					1	5		4		4	21	
7.0					2	4		3	1	2	21	2
7.5					4	5		5		4	16	2
8.0						3		4		1	17	1
8.5						1					19	
9.0					2	1		2	1	4	12	
9.5					1			1			13	
10.0					1		1	1		1	12	
10.5					1			1		2	8	
11.0					2			2		2	7	
11.5										1		
12.0												
12.5											2	
13.0											1	
13.5												
14.0												
14.5												
15.0											1	
15.5									1			

The small stones are almost invariably notched at the ends. However, 33 specimens notched at the sides were found [Plate 16 -8 and 9]. Of these 7 are from Cottonwood (2 in a cache of 13 from House I), 2 from the Point West of Halibut Cove, 1 from Aurora, 23 from Yukon Island III (6 in a cache of 14), 1 from Yukon Island sub-III, and 1 from Yukon Fox Farm III. The larger stones are almost always notched at the ends, but since their shape is often very irregular it is difficult to distinguish the two kinds.

A small egg-shaped stone [Plate 16 -10] from Cottonwood, 3.1 cm. long, and a similar specimen [Plate 17 -7] from Yukon Island sub-III are not notched, but are grooved about the longer diameter. I have mentioned them here, rather than among the grooved stones, because of their small size.

The small notched stones were evidently used in groups, since five caches or groups were found. One group from House I, Cottonwood, has 13 stones; another group from Cottonwood has 12. A cache of 24 was found at the Point West of Halibut Cove. A cache of 14 was found in Yukon Island III, and a group of 13 stones in Yukon Island III or sub-III.

No cache of large notched stones was found, but there were so many specimens in the small cubic space excavated in layer 3, Yukon Island II, that it would seem as if these stones were used in groups, too. About half of those found were battered or broken; some had been renotched to use again. It is evident that they were put to some violent use.

The notches are, of course, intended to hold a cord to which the stones were tied. Specimens of this type are usually called 'sinkers' for nets or fish-lines, but I do not think this is the correct explanation. The discussion of this question is deferred to Chapter VII.

#### GROOVED STONES [PLATE 17]

Besides the two small specimens mentioned above, there are 69 examples of grooved stones from Kachemak Bay. They are naturally shaped beach stones, usually egg-shaped or ovoid, ranging in length from 4.5 to 12 cm., though the average is between 8 and 10 cm. They vary in weight from 4 ounces to 2 pounds. These rocks have been grooved by pecking, evidently to receive a thong or attachment of some kind. According to the method of grooving we can distinguish five types: (1) those grooved around the middle or shorter diameter, (2) those grooved around the longer diameter, (3) those grooved about the middle and over one end, (4) those with a short groove over one end, and finally (5) those grooved about one end, the type commonly called 'plummets.' The materials are dolerite, chert, granite or syenite, sandstone, porphyry, and so forth.

There are 12 examples of *stones grooved about the middle*, if we include the specimens with interrupted grooves. Two specimens are battered and one is broken. Mrs. Munson reports stones of this type from Halibut Cove. From

Bear Cove, at a spot that yielded only an unfinished chipped lance blade, we found a granite boulder, grooved about the middle, which had later been used as a bath or cooking stone [Plate 17 -2]. The most interesting specimen in this group is a nicely rounded stone of dolerite [Plate 17 -1], weighing 2 pounds, which was found on a wooded hill above Jakolof Bay. A broad groove runs about the middle, widening out into a flat area, which suggests that the specimen was hafted as a club head. It was injured in the fire which destroyed Mr. Huber's cabin. The distribution of stones of this type is: Bear Cove 1, Jakolof Bay 1, Cottonwood 1 (a poor specimen of red baked shale), Yukon Island III 3, Yukon Island III or sub-III 1, Yukon Island sub-III 4, Yukon Island ? 1. This type does not seem to have been older than the Third Period.

There are 8 specimens *grooved about the longer diameter*, not including the two very small specimens from Cottonwood and Yukon Island sub-III. These small stones probably served the same function as the small notched stones, or they may have been toys. The specimen from Yukon Island has traces of dull brick red pigment in the groove. The large specimens vary in length from 5.2 to 10 cm. One is broken. A specimen from Yukon Island sub-III has a rather flat surface on one side where the groove is interrupted. The distribution is: Cottonwood 1 [Plate 17 -3], Yukon Island III 2, Yukon Island sub-III 3, Yukon Island II 2. This type would appear to be older than the preceding.

The most common type, represented by 23 specimens, is that *grooved around the middle and over one end*. The specimens vary in length from 4.5 to 10.5 cm., though most of them are rather large. The two smallest specimens, from Cottonwood [Plate 17 -8] and Yukon Island III [Plate 17 -4], may have been for children's use. Four specimens are unfinished, being grooved over the end and at one side. Another, from Yukon Island sub-III, has a natural constriction about the middle, taking the place of a groove. One stone is battered and 6 are broken, which suggests a violent use. The two halves of one specimen were found in layer 5a, sections J and 5H. The distribution is: Cottonwood 4 [Plate 17 -5], Point West of Halibut Cove 3, Yukon Fox Farm III 1, Yukon Island III 11, Yukon Island sub-III 4. The type seems to be confined to the Third Period.

There are 17 specimens with a *short groove over one end*. On some the groove is so short that it is difficult to distinguish the specimens from hammer groove. The specimens vary in length from 8 to 12 cm. Four are broken. The distribution is: Yukon Island III 12 [Plate 17 -6] (possibly 14 in all), Yukon Island sub-III 3 (of which 2 may be from Yukon Island II). This type did not last into the last part of the Third Period.

There are 6 stones *grooved about one end*. The groove sets off a small cap or knob. On two specimens from Yukon Island II the groove is placed a little to one side, so that the knob is not directly at the end, and a shallow concavity has been pecked in the knob. The surface below the groove has also been worked on one of these [Plate 17 -12]. The specimens range in length from 9 to 11 cm. The distribution is: Yukon Island sub-III or II 1 [Plate 17 -11], Yukon Island II 2,



Yukon Island I 3 [Plate 17-9]. It is thus the oldest type, and the only one found in the First Period.

Two broken stones, from Yukon Island III and I, are too fragmentary to be identified.

It is usually assumed that grooved stones, like the large notched stones, are sinkers for nets or lines. Again, this explanation should be questioned.

#### STONES WITH HOLES [PLATE 17]

Stones pierced by holes are evidently related to the grooved stones. There are 11 specimens of this type (one is doubtful), varying in length from 4 to 10 cm. Nine are of clay ironstone, one is of hematite (?); the doubtful specimen is of sandstone (?). The holes are apparently of natural origin, though several have been artificially enlarged or show polishing around the edges, due to the rubbing of a thong. The shape is unworked, except for one specimen from Yukon Island III [Plate 17-10]. On this, the upper end is somewhat flattened where the hole has been drilled from one side to meet a natural pit. The function of these specimens was probably the same as that of the grooved stones. The distribution is: Yukon Island III 1 (and the doubtful specimen), Yukon Island sub-III 1 [Plate 17-13], Yukon Island II 5, and Yukon Island ? 3. The type is characteristic of the Second Period.

#### ADZE BLADES [PLATES 18, 19, 20, AND 54]

Two types of adze blades are represented in the collection from Kachemak Bay. I have called them 'splitting' and 'planing' adzes, on the basis of the distinction made by Chief Makaka and his brother Fred (Chugach Eskimo) between similar specimens from Prince William Sound.

*Splitting adze blades* are really wedges hafted adze-fashion, just as the 'go-devils' of our southern mountaineers are wedges hafted like axes. Compared to the planing adze, the splitting adze is much larger and heavier, with a blunt blade. It is higher, or rather thicker, than it is broad, and has one or two grooves across the top for attachment directly to a T- or an inverted L-shaped handle. The sides and bottom are generally flat, the top is arched. The most typical form of planing adze blade, on the other hand, is flat, with a sharp edge. It is usually set in a haft which is lashed to the handle. Intermediate types are sometimes found in which the blade is proportioned like a planing adze, but is grooved for attachment directly to the handle. However, in Kachemak Bay the two types are distinct.

Two examples of splitting adzes were found on the west beach of Yukon Island. It is probable that they washed out of the upper layers of the great

midden, and belong to Yukon Island III or IV. The first [Plate 18 -1] measures 23 cm. long, 3.5 cm. wide, and 7.5 cm. high, with a groove and ridges across the top to hold two sets of lashings. It is of altered diabase. The second [Plate 18 -3] is of dolerite, and is similar in shape, except for a very high knob on top, separating the two grooves. The point is broken, so that the specimen is now only 20 cm. long. It is 3 cm. wide, and 11.2 cm. high, including the knob.

An unfinished splitting adze of dolerite was found at the Point West of Halibut Cove. It is simply a long, rounded beach stone, 16 cm. long, which has been pecked along the bottom, over the top to narrow the blade for the cutting edge, and across the middle of the top at the place for the groove.

A fine splitting adze of dolerite was bought from the natives of Port Graham [Plate 18 -2]. It was said to have come from the site of I'nulumuq, across the bay from the Port Graham cannery. It is 21 cm. long, 3.8 cm. wide, and 6.5 cm. high, and has two grooves and a pronounced ridge to hold the lashings.

*The planing adze blade* is a simple celt, sawed or chipped out, with a polished or chipped cutting edge. It seems usually to have been hafted in a bone or antler head, which in turn was lashed to a shouldered handle. The larger specimens, however, like one from Halibut Cove [Plate 20 -1], a specimen from Yukon Island III and another from Yukon Island I, may have been lashed directly to the handle. It would be difficult to distinguish the smaller blades for planing adze from those for a skin scraper or fleshing tool, so I have not attempted it.

There are 35 planing adze blades in the collection from Kachemak Bay. They range in length from 4.5 to 21 cm., and in width from 2.3 to 8 cm. Most of the blades are shaped by chipping and polishing. Nine, however, made of very hard, green, altered lava and chert, have been sawed out. These are from Cottonwood [Plate 19 -7], the Point West of Halibut Cove, Yukon Fox Farm III, Yukon Island III and sub-III. The older specimens are not sawed, and no stone saws were found in layers dating from the First and Second Periods. The materials used for adze blades are green altered lava, dolerite, flint, chert, altered diabase, and greenstone. The specimens of altered lava were always sawed.

One of the objects in the cache of grave goods at Yukon Fox Farm II is an unfinished blade of greenstone [Plate 54 -12]. One of the smallest specimens [Plate 19 -8], from Yukon Island III, is the end of a sharp blade, only 2.3 cm. wide. It may have been a toy, but the excellence of the finish suggests a serious use. Other small, but complete blades are from Yukon Fox Farm II [Plate 19 -2], Yukon Island III and I.

The distribution of the planing adze blades is: Cottonwood 1, Halibut Cove 3 [Plate 19 -11], Point West of Halibut Cove 1, Yukon Fox Farm III 2, Yukon Fox Farm II 2, Yukon Island III 9 [Plate 19 -12], Yukon Island sub-III 2 [Plate 19 -9 and 10], Yukon Island III or II 2, Yukon Island II 1, Yukon Island I 6.

A specimen from Yukon Island III, measuring 5 by 2.3 cm. and battered

at the butt, may have been a *chisel* or *gouge* [Plate 19 -4]. Two butts of specimens from Yukon Island III and II may have been from gouges, also.

#### ADZE HAFTS [PLATE 19]

A piece of pumice from Yukon Island III is shaped to represent an adze blade inserted in a slit at the end of the haft or head [Plate 19 -3]. The haft is shaped underneath to fit the top of the handle, and is grooved across the top for the lashing. The toy is 5 cm. long.

There are 4 specimens of adze heads *with sockets* for the blade, of the same type as that represented by the toy. An antler head [Plate 19 -6] from Yukon Island III is 10 cm. long and 6 cm. wide at the blade slit. It is flattened on the under side to fit the handle, and a shallow groove, 2 cm. wide, runs across the top at the rear end to hold the lashing. The blade slit is about 5 cm. wide and 3 cm. deep. Inside the socket are traces of a grayish substance, probably the glue which held the blade. A second specimen of antler from the same locality is 11.5 cm. long, with a slot 2.5 cm. deep and 3.5 cm. wide. A narrow groove encircles the rear end. A whale bone<sup>1</sup> adze head [Plate 19 -1] from Yukon Island III (or IV) is 13 cm. long, with a blade slit 3.5 cm. deep and wide. There is a shoulder about the rim to hold a lashing to prevent splitting. The head is narrowed in the middle for attachment to the handle.

A bone haft, 15 cm. long, from Yukon Fox Farm III, is made of the end of a small whale rib (beluga or blackfish ?), unworked except for a narrow groove about the middle and the blade slit at the end. The irregularity of the shape suggests that it was not hafted. In this case it must have been a *scraper handle*.

Two whale bone adze heads [Plate 19 -5] and one of antler, from Yukon Island III, have a *bed for the blade*, not a socket. They measure 12.5 to 14 cm. in length, and are shouldered or grooved at the ends for lashing in the blade and for attachment to the handle. Four other fragments of worked bone from Yukon Island III were probably adze heads of this type.

#### MAUL [PLATE 21]

A maul head [Plate 21 -6] was found on the beach of the island at the entrance to the lagoon on the west side of Seldovia Bay. It is of diabase, with a flat pounding surface. The butt end is rounded. Across one side there is a wide, deep groove to hold the lashing. The specimen measures 14 by 10 by 5 cm., and weighs 4½ pounds. It has been scorched in a fire.

<sup>1</sup> The term *whale bone* is used to indicate the bone of the whale; *baleen* is used for the material popularly known as 'whalebone.'

A similar maul head, found by Jack Tanzy at the mouth of a salmon stream at the head of English Bay, suggests that the specimen from Seldovia was of Eskimo workmanship. Tanzy believes the specimen he found was used for driving stakes for a fish weir.

#### HAMMER STONES [PLATE 21]

About 30 hammer stones were collected in Kachemak Bay in 1931. They vary in shape from ovoid rocks [Plate 21 -2 and 8], like those used for grooving, to long and slender pestle-shaped implements [Plate 21 -3]. It is to be noted, however, that we did not find a single manufactured pestle. The stones showed marks of use on the ends and edges; none had been pounded on the middle of the side. The materials are dolerite, quartz, chert, jasperoid, felspar-porphry, and unidentifiable rocks. Some of the flatter, rounder specimens, from Yukon Island III, had been used also as grinding stones [Plate 20 -7]. Hammer stones were found at practically every site investigated, and belong to all stages of culture in Kachemak Bay.

#### GRINDING STONES, ETC. [PLATE 21]

There are 14 flat, round beach boulders which may have been used as grinding stones, anvils, pot rests, and so forth. They vary in diameter from 5 to 14 cm. Three of the smaller specimens, from Cottonwood [Plate 21 -5], Yukon Island II, and Yukon Island sub-III, show unmistakable signs of use as grinders or polishers. Four other specimens, from Cottonwood and Yukon Island III, showed no definite signs of use, but had evidently been brought into the midden for some purpose. A few similar specimens, found in 1932, were not saved.

Five of the larger specimens were charred on one side or at the edge, which suggests that they were used as rests for pots or stone cooking slabs. Two of these, badly scorched on one side, were found in the floor of House I, Cottonwood; one of the stones was on top of the cache of small notched pebbles. A specimen from Yukon Fox Farm III and another from Yukon Island III seem to be scorched along one edge. A specimen from Yukon Island III, 10.5 by 9 cm. in diameter, and showing signs of charring or weathering as well as of grinding, was found associated with a large grinding slab [Plate 13D]. A small grinding stone and a slab, both of sandstone, were found together in Yukon Island II. A specimen from Yukon Island III [Plate 21 -1] and another from Yukon Fox Farm III are ground on one side and pecked on the other, suggesting that they may have been used as anvils.

The distribution of these specimens is: Cottonwood 6, Yukon Fox Farm III 2, Yukon Island III 4, Yukon Island sub-III 1, Yukon Island II 1.

### GRINDING SLABS [PLATE 18]

Ten flat slabs of sandstone and 3 of graywacke (?), with one ground or smoothed surface were found. These were evidently used as grinding slabs. Some may have served as 'frying pans' or cooking slabs, but there was no clear evidence that they had been in the fire. Four specimens from Cottonwood had been rounded off on the edges. Most of the specimens are fragmentary. The smallest unbroken specimen is 17.5 by 11.7 cm., from Cottonwood. The largest, 50 by 45 cm., is from the new (Indian?) midden at Cottonwood. A very large slab and a smaller specimen were found near Hearth VII in House IV, Yukon Island III. The slab found with the grinding stone in Yukon Island III is typical [Plate 13D]. It is rough on the under side; the upper surface has a broad, shallow groove, made by rubbing. Like the grinding stone found with it, the slab shows a discoloration due to fire or to weathering.

The distribution of these slabs is: Cottonwood new midden 1, Cottonwood old midden 6, Yukon Island III 5, Yukon Island II 1 (another specimen may be a large whetstone).

A very heavy block of feldspar-porphyry, 17 by 13 cm., and 10 cm. thick, has been deeply grooved by rubbing on both sides. It is from Yukon Island III.

A dolerite grinding slab [Plate 18 -6] from Cottonwood is shaped like a large oval lamp, measuring 32 by 25 cm. and 7 cm. in thickness. The upper surface is ground smooth.

### MORTARS [PLATES 18 AND 21]

Aside from some of the doubtful specimens which I have preferred to call make-shift lamps, and the small vessels which may have been hunters' lamps, we obtained no specimen which was clearly a mortar. However, a fine mortar [Plate 18 -4] was found near Homer, though the provenience is not certain. It is of coarse-grained granite, worked inside and out. The dimensions are: length 28 cm., breadth 26, height 11, length of bowl 18, breadth of bowl 16.5, depth of bowl 6.5. On the under side is a small pit, 5 cm. in diameter and 1 cm. deep. It is unfortunate that we have no way of telling to what culture, Indian or Eskimo, this fine piece belongs.

A pebble of cherty sandstone [Plate 21 -4] from Yukon Island III, 9 cm. in diameter, has a hole, 3 cm. in diameter, which has been pecked through it from one side. The specimen is probably a worn-out mortar, the bottom of which has been pounded through.

### BOULDER CHIPS [PLATE 20]

The collection obtained from Kachemak Bay in 1931 contains 184 chips from split boulders. A number are doubtless rejected fragments, even though the

collection represents only the best and most typical specimens. Many other fragments, obviously rejects, were not saved; none of these found in 1932 were kept except six specimens which had been used as saws. The material is almost exclusively dolerite, though there is some sandstone and graywacke. The chips are oval in outline, but with considerable variations in size and proportions. The largest are 15 by 13 cm. and 16 by 11.5 cm.; the smallest 5.5 by 3 cm. and 5.2 by 5 cm. The majority range between 8 and 11 cm. in length. The natural rounded surface of the boulder forms one side and meets the fractured surface sharply at one edge to form a curving blade, and bluntly at the opposite edge to form a grip. Some of the chips have been intentionally retouched along one edge or all the way around [Plate 20 -5 and 6]; others have the edges blunted and battered by use [Plate 20 -8]; on others it is worn smooth [Plate 20 -2, 3, 4]. Some chips, like two very large specimens from *Qatloxe'lye* [Plate 20 -7], are worn not only on the edges but on the sides. Eight specimens have been used as saws and will be described under that section.

These boulder chips were evidently not hafted, and could have been used as knives, scrapers, wedges, choppers for splitting bones for marrow, saws for wood, and hammers for notching stones. No doubt a single specimen did serve a variety of uses. Boulder chips were found at every site where excavations of any extent were undertaken, and belong to all stages of the Kachemak Bay Eskimo culture and to the pre-Russian Indian culture.

#### STONE SAWS [PLATE 22]

There are 38 thin stone slabs with one or both longitudinal edges ground dull. I believe these implements were used as saws for cutting stone. The material is sandstone, graywacke, altered slate, and hornblend schist. The width varies from 2.5 to 10 cm., the length from 7 to 19.5 cm. Eight specimens are made from boulder chips. Three specimens have been utilized along both edges; these are: 1 from Cottonwood [Plate 22 -4] and 2 from Yukon Island III [Plate 22 -2]. A boulder chip from Yukon Island sub-III has three worn edges. The other specimens show evidence of use on one edge only [Plate 22 -5]. The edge is either straight or is worn concave. That some of these specimens may have been hafted is suggested by the remains of two and perhaps three holes drilled at the back of the blade and near one end of a specimen from Yukon Fox Farm III [Plate 22 -1]. The specimen is broken through at the holes. A specimen from Cottonwood [Plate 22 -3] appears to have had a hole at one end, also.

The distribution of stone saws is: Cottonwood 8, Yukon Fox Farm III 1, Yukon Island IV 1, Yukon Island III 22, Yukon Island sub-III 6.

There are many examples of sawed stone. The sawed adze blades have already been mentioned. Two fragments of sawed marble from Yukon Island III were probably cut for labrets. From Cottonwood is a slab of slate [Plate 18

-5], 45 by 12.5 cm., and 1.5 cm. thick. There is a deep groove on both sides, evidently made in order to saw the slab in two lengthwise. The attempt was abandoned, and the specimen was broken when found. No example of sawed stone was found earlier than Period sub-III.

#### WHETSTONES [PLATES 22, 53 AND 55]

There are 89 whetstones in the collection. The materials are sandstone, soft shale, tuff, red baked shale, slate, felsite, and other rocks. The specimens are usually flat slabs [Plate 22 -10, and Plate 55 -39], or small rectangular blocks [Plate 22 -7], though there are also irregular shapes. Three whetstones with grooves were evidently used to sharpen needles or awls. They are from Indian Island (prehistoric midden), Cottonwood [Plate 22 -6], and Yukon Island I. A sandstone whetstone from China Poot Bay has a thin groove running the whole length, but it seems to be too fine to have been made by sharpening anything. Six specimens of tuff and one of felsite [Plate 53 -6 to 11] were among the grave goods in the Yukon Fox Farm II burial. A sandstone whetstone [Plate 55 -39] was included in what I call the 'bag find' from Yukon Island III (see page 118). The plaque of soft shale [Plate 55 -38] in the same find was probably a mirror, but may have been a whetstone.

The most interesting whetstones are the *felsite (or tuff) bars* with from 5 to 8 whetted surfaces. These seem to be a specialized form of the rectangular blocks. Two typical examples with eight and six sides, respectively, both from Yukon Island III, are figured on Plate 22 -13 and 14. There are 10 specimens of this type, ranging in length from 5.5 to 19.5 cm.; all but two are of felsite. The distribution is: Point West of Halibut Cove 1, Yukon Fox Farm III 1, Yukon Island III 6 (one of tuff), Yukon Island sub-III 1 (of tuff) and Yukon Island II 1 (not very typical). This type seems to be characteristic of the Third Period.

The other varieties of whetstone have a universal distribution from the First Period of the Kachemak Bay culture to the modern Indian.

#### PUMICE [PLATES 22, 54, AND 55]

Lumps of red, black, and gray pumice of all sizes and shapes, from minute fragments up to blocks 14 or 15 cm. long, were used for polishing. Anisim specified that pumice was used for wood and bone only, but we found that it could be used admirably for shaping slate blades. Anisim gave the Athabaskan (?) name *tc'axe'*, Wassila, *ts'e'xe'*. In 1931, 207 pieces of pumice were found, including the toy adze head. In 1932, only a few of the many pieces found were saved. One or more surfaces were worn by use. Some of the pieces had been shaped into rectangular blocks [Plate 22 -8]; other fragments were grooved for sharpening

points [Plate 22 -12]. Three pieces were ground into cylindrical bars [Plate 22 -9]. One piece, from Yukon Island III, 8 cm. long, is grooved longitudinally to leave a ridge [Plate 22 -13]. It may have been a saw. Eight lumps of pumice of different sizes and degrees of coarseness [Plate 54 -1 to 8], were found among the grave goods in the Yukon Fox Farm II burial. Two lumps of pumice [Plate 55 -40 and 41], soft and light like the recent Katmai ejecta, were among the objects in the 'bag find' from Yukon Island III. Almost all the other pieces are much harder and heavier. The natives of Kachemak Bay probably obtained their pumice from the other side of Cook Inlet. Fragments of utilized pumice were found at almost every site investigated and belong to all stages of culture in Kachemak Bay.

#### LAMPS [PLATES 23 TO 29]

The lamps from Kachemak Bay and Port Graham are all of *stone*, and with one exception, *oval* in outline, though the proportions vary considerably. When the place for the wick is indicated, either by actual charring or by a lip cut in the rim of the lamp, it is always at the point of the oval, at the narrower end. There are 34 lamps or fragments of lamps in the collection. The materials are granite, gabbro, dolerite, sandstone, lava, and so forth. The crudest of these are naturally hollow stones and specimens that show little shaping. The bottoms are usually uneven, so that the lamps must have been propped up to prevent the oil from spilling. Two of these crude lamps, 23 and 25 cm. long, respectively, were found on the surface of the refuge island, *Qatloxe'lye*. From Grass Island is a lamp made from a boulder of granite [Plate 23 -1]. The natural shape of the boulder, 16 by 13 cm., is unmodified except for the shallow bowl, 11 by 9 cm., pecked on one side. The bottom of the lamp is flat, but the bowl is tilted, suggesting that the wick was laid along the side instead of at the end, or that the lamp was propped up when in use.

Two crude vessels, pecked from small beach stones, were obtained from Passage Island, Port Graham. The smaller, 10 by 9 cm., shows unmistakable signs of fire, but the larger, an almost circular vessel, 11 cm. in diameter, might have been a mortar.

A lamp made of a naturally hollow stone, but with signs of pecking on the bottom and on the inside of the bowl, was found in Yukon Fox Farm III. It is 24 cm. long.

Three poor specimens were found in Yukon Island II. One of these, 14 cm. long, is unworked. The second, 22 by 18 cm., is unshaped except for the bowl and the wick lip. The third, 17 by 12 cm., is badly weathered, but shows finishing inside and out. There are traces of fire at the wick lip.

The more carefully made lamps illustrate several variants of the same fundamental pattern. The lamp is oval, wider at the back than at the front, with a lip for the wick cut in the pointed end. The bottom is thicker than the



sides and is slightly rounded. The maximum height is at the back, so that the lamp tips forward slightly.

Two specimens are rather narrow. There is no separation between the top of the rim, the side, and the bottom, which all curve evenly into each other. One is from Halibut Cove [Plate 23 -4], measuring 22.5 by 14.5, and 8 cm. in height. The second, from House IV, Yukon Island III, is 20 by 14.5, and 10 cm. in height.

A specimen [Plate 23 -3] from Yukon Fox Farm III is almost spherical, except that the top of the rim is slightly flattened. There are traces of fire at the wick lip. The lamp is 13 by 12 cm., and 8 cm. high; the bowl is 2.7 cm. deep.

The other specimens are flatter and broader. A *toy lamp* [Plate 29 -2] from Yukon Island III, 6 by 5 cm., illustrates the main type. A much weathered specimen from House IV, Yukon Island III, was found beside the narrow lamp. Like it, there is no separation between rim, side and bottom. It is almost round, measuring 18.5 by 16.5 cm., and is 7.5 cm. high. The bowl is 3 cm. deep. Another specimen from Yukon Island III [Plate 25 -1] has similar dimensions, except that it is 6 cm. high, and the bowl 2.5 cm. deep. The rim is flat; the side slopes outward and downward. Another specimen [Plate 23 -2] from Yukon Island III has vertical sides, 4.5 cm. high at the back and only 1.5 cm. high at the front under the wick lip. The rim, 2.5 cm. wide, is grooved, and slopes sharply outward and downward. The lamp is 17.5 by 16 cm., and 9 cm. high; the bowl is 2 cm. deep.

A fragment of a well-made lamp [Plate 26 -1] from Yukon Fox Farm III illustrates a typical profile. The bottom is 7 cm. thick. The rim is flat, about 2 cm. wide, and slopes outward and downward. The upper part of the side is also flat and slopes outward. In consequence the bottom is much rounded.

Three fragments of lamp bottoms were found at Cottonwood. One of these shows the *medial groove* found on the decorated lamp from Yukon Island III (see below).

The lamp from the base of MacDonald Spit [Plate 24 -1] is a finely polished specimen of light green altered dolerite. The rim is horizontal, wide and concave. The side slopes inward toward the bottom and is also concave. The lip for the wick is very pronounced and is formed by a flat trough cut across the rim. The bottom of the lamp is almost flat. The dimensions are: length 14 cm., width 10.5, height 5, depth of bowl 11.8, width of rim 3.5, width of wick lip 5 cm.

A lamp with *two low knobs in the bowl* [Plate 24 -2] was found by Mrs. Munson in her garden at Halibut Cove. It is of fine grained altered gabbro (?) and is the largest complete specimen from Kachemak Bay. The rim is narrow and curves evenly from the inside to the outside of the bowl. The most interesting feature is the low rounded knobs, 3 cm. in diameter and 0.5 cm. high, near the back of the bowl. They may be decorative or they may have held a lump of blubber from which oil could flow to the wick. These knobs, though at the back, and in an oval lamp, remind us of the knobs in the Canadian Thule culture lamps. This specimen is 36 by 30.5 cm. and 11.5 cm. high. The bowl is 3 cm. deep.

There are 4 *decorated lamps* in the collection, and I am able to describe a fifth which was found in Kachemak Bay.

The fragment of a large decorated lamp [Plate 26 -2] was found at Cottonwood. It represents the front left-hand quarter (as one faces the lamp). The height is 11.5 cm., and the depth of the bowl 3 cm. When complete the lamp must have measured at least 36 by 30 cm. The rim is 2 cm. wide, almost flat, and slopes outward and downward. The side is only slightly curved and is almost vertical; the bottom, also, is almost flat. The decorations consist of an *encircling groove* around the outside just below the rim. The groove is broken at the front where there are three *raised bars*, about 1 cm. wide, and spaced 1 cm. apart. Since we cannot be sure if the lamp was broken exactly at the middle of the front, we cannot tell if there were more than three bars. It does not seem likely that there were more than four, in any case. There may have been similar elements at the back and sides. On top of the rim are eight *V-shaped lines*, pointing towards the front. The size of the lamp, the profile of the rim and side, the encircling groove, and the decoration of a group (probably groups) of raised elements on the side all suggest the larger lamps with the human figure in the bowl. It must be noted that the medial groove was not found on this specimen.

A lamp [Plate 26 -3] from Yukon Island III is decorated on the bottom. It measures 19 by 12 cm., is 6.5 cm. high, with a bowl 2.5 cm. deep. The decoration consists of incised lines or grooves which start at the rim and continue down the sides on to the bottom, forming V's or chevrons, the angles of which are on the bottom of the lamp. A set of three V's, one inside the other, is on each side and at the back. At the front, a smaller and more pointed V, incised entirely on the bottom, has the apex pointing towards the front of the lamp. On the inside of the bowl, there is a *medial groove*, bifurcated at the back, and probably at the front also, though the specimen is weathered. This medial groove is characteristic of the lamps with human figure. It has been noted on a fragment from Cottonwood, and it is also found on a lamp from Kenai River. Its purpose was probably to direct the flow of oil to the wick. The lamp from Yukon Island III is the only one in which this groove has been transformed into the characteristic Eskimo motif of the *double-ended Y*. It is curious that most of the decoration on this lamp can be seen only when it is turned upside down.

A *lamp with two whales in the bowl* [Plate 27] is said to have been found in Tutka Bay. It is now in the possession of Mr. Charles Hubbell of Seattle, who very kindly furnished me with the photographs and information upon which the following description is based. The specimen is of light gray igneous rock, probably granite. It measures 23 by 18.5 cm. and is 8.5 cm. high. The bowl is 2.5 cm. deep. The rim, 3 cm. wide, is horizontal, with a wide groove cut in it. The vertical side is 4 cm. high, and appears to be slightly concave. The grooved rim has already been noted on a lamp from Yukon Island III. The concave rim and side are also represented in the lamp from MacDonald Spit. In the bottom of the bowl are two figures of whales, 8.3 cm. long, carved in full relief, as if in

the act of spouting. A depression between them suggests the medial groove found on other lamps from this region. Although the provenience of this specimen is somewhat uncertain and it is unique in type, there seems to be no doubt that it is of Eskimo workmanship, and was possibly connected with whaling ritual. A photograph of this lamp was published by Hrdlička (1932, Fig. 98).

One of the most interesting finds was that of two decorated lamps in Yukon Fox Farm III. The smaller specimen is almost plain; the larger has a human figure in the bowl. The two lamps had evidently been cached in a house pit, the smaller set on top of the larger. In it was a bird bone tube which might have been a needlecase. The house was evidently in ruins when the cache was made, for the lamps rested on a refill of midden material one foot thick.

The smaller lamp [Plate 25 -2] measures 16 by 13.5 cm., and 6.5 cm. in height. The bowl is 2.5 cm. deep. The side is vertical, wider in front than behind; the rim slopes outward and downward. The decoration consists of a *single raised bar*, 1.5 cm. wide and 3.5 cm. long, at the front of the lamp. This is comparable to the three (or more?) vertical elements on the Cottonwood lamp. The specimen is beautifully finished by pecking.

*The lamp with human figure in the bowl* [Plate 28] measures 21 by 19 cm. and 8 cm. in height. The bowl is 2.5 cm. deep. The side is vertical, wider at the back than at the front, and is slightly concave. The rim is flat and slopes outward and downward. The sides and bottom are evenly pecked; the rim and the bowl are finely smoothed. The figure, 4.5 cm. high, is at the back of the bowl. It is carved in the round, from the waist up, as if sitting half-submerged in the oil which would have filled the bowl when in use. The arms are outstretched towards the front, the eyes closed, and the face upturned as if in an attitude of prayer. The carving of the features has been executed with considerable delicacy. The face is broad, the forehead low, the nose broad and flat, the eyes bulging. From between the clumsy hands, the fingers of which are sketchily indicated by incisions, a groove runs forward to the lip for the wick. The specimen lacks the encircling groove below the rim usually found on lamps of this type and on the fragment from Cottonwood. It is undecorated on the outside.

A fragment of a well-made lamp [Plate 29 -7] from Yukon Island sub-III or II has one curving and one straight edge. This is the only specimen of this type. The lamp must have been *semi-circular* in outline, and originally measured at least 20 cm. in length along the straight edge and 12 cm. in width. The maximum height of about 5 cm. was at the middle of the curving side. The wick must have been laid along the straight edge, though there is no evidence of charring. The rim and sides slope evenly into each other.

## HUNTERS' LAMPS [PLATES 29 AND 53]

Six stone vessels, much smaller than ordinary lamps, were probably hunters' lamps, like those found by Jochelson in the Aleutian Islands, some of which were as small as 4.5 cm. in diameter.<sup>2</sup> From the bottom of Yukon Island I is a sandstone bowl [Plate 29 -5], broken in two, about 8.5 cm. in diameter and 4 cm. high. The cavity is 2 cm. deep. It was probably a lamp, as suggested by a flat depression on the rim like a wick lip. However, the shape is not characteristic.

A naturally hollow pebble of felsite [Plate 29 -6], 10 by 6 cm., from Yukon Island III, is either a hunter's lamp or a toy. A somewhat similar specimen from Yukon Island II is a little larger and is probably a lamp. A crude vessel [Plate 29 -4], 11.5 by 9 cm., also a hunter's lamp, is from Yukon Island I or sub-III. The most perfectly made specimen is represented by a fragment [Plate 29 -3] from Yukon Fox Farm III. The bowl is shallow, the bottom and sides less than 1 cm. thick.

One of the objects in the double burial in Yukon Fox Farm II is a small dish of altered diabase, 7 cm. square, in which a shallow circular depression has been pecked [Plate 53 -16]. The association of this object with men's tools suggests that it also belonged to a man. Its capacity, however, is rather slight, even for a hunter's lamp.

From Yukon Island III is a flat oval beach pebble of graywacke, 6.3 cm. long, with a circular depression, 2 cm. in diameter, pecked at one end. It is possibly a *spoon for tending a lamp*. A very neatly made spoon of soapstone, of about this size, was found by Bird in a house ruin on Clavering Island, Northeast Greenland.<sup>3</sup> Murdoch mentions lamp-tending stones from Greenland.<sup>4</sup> A slate specimen [Plate 36 -19] from Yukon Island sub-III may have been a lamp tender or an unfinished drill (see below).

## STONE DISHES

Two fragments of stone dishes were found at Cottonwood. One of these is from the bottom of a shallow sandstone dish. The piece is about 14 cm. square and 1 cm. thick. The inner surface is evenly pecked; the under side has been scorched by fire. It was perhaps used for cooking. The second fragment, also of sandstone, represents a portion of a straight rim, 9 cm. long. The piece is polished on both sides but is not as concave as the first.

<sup>2</sup> Jochelson, 1925, p. 74.

<sup>3</sup> Specimen in the Museum of the American Indian, New York.

<sup>4</sup> Murdoch, p. 106, note 2, quoting Nordenskiöld: 'oblong stones, sooty at one end, which, after having been dipped in train-oil, have been used as torches.'

POTTERY [PLATE 29]

It is interesting to note that only 2 small pieces of pottery [Plate 29 -1] were found, and that they are from layer 10, Yukon Island IV. The fragments are evidently from a large vessel, roughly smoothed inside and out. The clay has been mixed with coarse sand, and while the fragments are quite black, especially on the inside, they do not appear to have been fired intentionally. This unfired ware is the same as that found in Alaska north of the peninsula. The blackness on the inside suggests that the vessel may have been a lamp.

CHIPPED STONE BLADES [PLATE 30]

In the collection there are 209 specimens of chipped stone, including finished blades and rejected flakes. The materials and their distribution are given below. (The stone flakes from the 'bag find,' Yukon Island III, are not listed.)

	chert	flint	jasper	quartz	chalcedony	basalt	dolerite	altered lava	graywacke	shale	slate	unknown	Total
Bear Cove .....										1			1
Qatloxe'lye .....			1										1
Port Graham .....	1										1		2
Seldovia .....						1							1
Halibut Cove.....	2	3		1						2		3	11
Cottonwood .....					1					1			2
Yukon Fox Farm III .....	1		1			1		2					5
Yukon Fox Farm II.....	2	1	1			1		2					7
Yukon Island III.....	5	2	2	5		7	1	10			7	1	40
Yukon Island III or sub-III.....						1		1					2
Yukon Island sub-III.....			1			1		5	1		7	1	16
Yukon Island sub-III or II.....						1					1		2
Yukon Island II.....	1		2	1		10		3	1		16		34
Yukon Island I.....	26	2	7			4	2	23	3		12	4	83
Yukon Island ?.....						1		1					2
Total.....	38	8	15	7	1	28	3	47	5	4	44	9	209

The slate is not the soft black variety used for the polished slate blades but is more or less altered. Some of it is phyllitic, finely laminated, with a green luster; some is very hard and compact and fairly homogeneous in texture. The latter was apparently as easy to chip as flint or basalt. The altered lavas are dense, light green and very hard. Chipped blades are more numerous than polished slate blades in the First and Second Periods. In the Third Period they are much fewer in proportion. This change in stone technique is one of the most important characteristics distinguishing the earlier from the later periods in Kachemak Bay. In this respect Period sub-III occupies an intermediate position.

It is difficult to classify the chipped blades, for though the main types can be distinguished, the individual specimens often do not fall clearly into a particular type, and there are many fragmentary blades.

From Halibut Cove is the only example of an arrow-head with barbs and notched tang [Plate 30 -10]. It is of chert, and measures 3.5 by 2.2 cm.

One of the commonest types is the *leaf-shaped blade narrowed to a straight base*. On some this narrowing produces a rudimentary tang, but it is never set off abruptly. The largest blade in this class is from Yukon Island II. It is of slate, and is the equivalent in a chipped form of the large polished slate lance blades. It measures 11.5 by 6.5 cm. The smaller chipped slate blades seem to correspond to the smaller blades of polished slate. The same shapes are found in jasper, basalt, and other materials. The 16 smaller specimens which can safely be assigned to this class vary in length from 4 to 9 cm., and in width from 1.2 to 3.2 cm. The blade [Plate 30 -7] found in the burial in Yukon Island II is of this type, though the base is slightly concave. A second specimen with a slightly concave base is from Yukon Island, depth unknown. The distribution of these blades is: Passage Island 1, Yukon Island III 2 [Plate 30 -2 and 9], Yukon Island sub-III 1, Yukon Island II 11 [Plate 30 -3, 4, 5, 7, 8 and 20], Yukon Island I 1, and Yukon Island ? 1.

Closely related to these is the very long and slender knife blade of basalt [Plate 30 -1] from Seldovia. It measures 6.5 by 1.5 cm.

Another group of at least 14 specimens is composed of slender blades *with rounded or pointed base*. These vary in length from 3 to 7 cm., and in width from 1 to 2 cm. The smallest are of phyllitic slate and fit the sockets on some of the barbed dart heads. The distribution is: Halibut Cove 1 [Plate 30 -14], Yukon Island III 1, Yukon Island sub-III 5 [Plate 30 -12 and 13], Yukon Island II 3 [Plate 30 -19], Yukon Island I 5 [Plate 30 -11, 21 and 22?].

There are 6 *oval blades* of chert, rather crudely made. They measure from 4 to 5.5 cm. in length and are thicker than the other blades. Their distribution is: Yukon Island III 1, Yukon Island I 4 [Plate 30 -16 and 17], Yukon Island ? 1 [Plate 30 -15].

There are 2 broad, leaf-shaped blades with irregular base. They are from Yukon Island III [Plate 30 -34] and I [Plate 30 -33], and measure 7 and 7.5 cm. respectively. They may be for lances or knives.

A leaf-shaped blade of yellow flint [Plate 30 -23], 8 cm. long, is probably for a knife. It is from Mrs. Nutbeam's garden, Halibut Cove.

Two broad blades [Plate 30 -27 and 29], pointed at both ends, measuring 7 by 3.5 and 7 by 4.5 cm., resemble the chipped *lance blades* used by the Eskimo about Bering Strait. They are from Halibut Cove. A smaller blade [Plate 30 -28] from the same locality, and of the same type, measures 4.7 by 2.5 cm. The jasper blade [Plate 30 -26] from Qatlox'e'lye, measuring 7 by 4 cm. is probably a lance blade, also. The piece of jasper [Plate 53 -12] among the grave goods in the Yukon Fox Farm II burial may be an unfinished blade of this type. An unfinished shale blade from Bear Cove, measuring 5.5 by 4.5 cm., is also a lance blade, though it differs from those just described because it has a straight base.

From Yukon Island sub-III or II is a fragment of a large basalt *knife blade with notched tang, and curved, asymmetric edge* [Plate 30 -36], like specimens from the Aleutian Islands figured by Jochelson.<sup>5</sup> It is 4.5 cm. wide.

From Yukon Island II there is a fragment of a basalt weapon *blade with small paired barbs* or projections along the edges [Plate 30 -30]. The fragment shows two pairs of these barbs. It is 3 cm. wide.

Besides the finished knife blades, there are several retouched flakes which could have been used as knives. The largest of these [Plate 30 -37], measuring 8 by 5.8 cm., and retouched along one edge, is from Yukon Island III. A smaller flake of brown flint [Plate 30 -35], from Halibut Cove, is retouched along both edges on one surface only.

From Yukon Island II there is a basalt *end-scraper blade with tang* [Plate 30 -25], measuring 6.4 by 3.2 cm. It was certainly hafted. The tang of a similar specimen was obtained at Halibut Cove, and an unfinished blade of slate is from Yukon Fox Farm III. A retouched flake of yellow jasper [Plate 30 -31] from Yukon Island I is a crude end-scraper of a type sometimes called a 'thumb scraper.' It is 3.5 cm. long, and was probably not hafted.

An *oval scraper blade* of black flint [Plate 30 -24] from Yukon Island III was probably unhafted. It is 7.3 by 4 cm. A similar specimen of banded graywacke is from the same locality. A thin *discoidal scraper blade* of chert [Plate 30 -32], 4.5 cm. in diameter, is also from Yukon Island III.

A flake of altered lava, retouched along one edge, and polished on both surfaces, seems to have been a *blade for a splitting knife* [Plate 30 -18]. It is 4.5 cm. long, and comes from Yukon Island III.

Besides these, there are many other fragmentary blades which cannot be classified.

#### DOUBLE-EDGED SLATE BLADES [PLATES 31, 32 AND 56]

There are altogether 107 double-edged polished slate blades, or fragments of such blades, in the collection. Some of these are barbed and were undoubtedly

<sup>5</sup> Jochelson, 1925, Pl. 15 -24 and 38; Fig. 17 etc.

blades for lances or arrows; others, without barbs, may have been for lances, arrows, or knives.

There are 24 *blades with barbs*, of which 18 form a fairly homogenous group [Plate 31 -2, 6, 7, 8, 9, 10, 11, 12 and 13, and Plate 56 -14]. The length of the complete specimens in this group varies from 5.8 to 12.6 cm., and the width from 2 to 3.5 cm. The barbs are paired, one on each side, just above the tang. The blade is thin and oval in cross-section, though there are some specimens with very slight facets. The edges are almost straight; the blade is widest at the barbs or just forward of them. The tang is from 1 to 2 cm. wide.

A barbed slate blade [Plate 31 -13] from Aurora Fox Farm is marked with a longitudinal line incised up the middle of each side, along which dots are placed at irregular intervals. This is probably an *owner's mark*.

The distribution of blades of this type is: Q'na'qesle, the refuge island in Tutka Bay, 1, Tutka Bay, Indian house ruin, 1 [Plate 56 -14], China Poot Bay 1, Cottonwood 3, Aurora Fox Farm 1, Yukon Fox Farm ? 1, Point West of Halibut Cove 1, Yukon Island III 5, Yukon Island III or sub-III 2, Yukon Island sub-III 1, Yukon Island II 1. The type thus seems to be common to the Second and Third Periods of the Kachemak Bay culture and to the Indian culture.

Two barbed blades have distinct *facets*, making a lozenge-shaped cross-section [Plate 31 -1]. They are from the lower layer of the midden by the feed shed on Yukon Island (Yukon Island IV ?) and from Passage Island, Port Graham.

Another barbed lance blade [Plate 31 -14], much larger than the others, measures 4.5 cm. in width. It was found on the floor of House I, Cottonwood. The blade is leaf-shaped; there are 4 small barbs on one side and 5 on the other, notched in the tang. A fragment of slate with 4 notches from Yukon Island III, may be from a similar specimen.

Another unusual specimen is a fragment [Plate 31 -5] from Passage Island. It was probably a triangular blade with concave face, forming two barbs or spurs; each spur is notched with an ornamental groove on each side. The blade must have been for an arrow or dart.

The smallest barbed blade is a crude specimen [Plate 31 -3], 3.5 by 2 cm., from Yukon Island sub-III.

There are 20 *blades with tangs*, but without barbs. Of these, 12 are fragments of large lance or knife blades, varying in width from 3 to 8 cm. The tangs are from 1.8 to 6 cm. wide. The specimens are all fragmentary. A blade from Cottonwood [Plate 32 -17] and another from Yukon Island III have a large notch in the base of the tang, probably to fit over a peg driven through the haft. This would prevent the blade from turning. It is probable that some of the tangs were wound with thong or baleen and that the blades were used as knives, without separate handles. These specimens are from Cottonwood [Plate 32 -16], Yukon Island III, and sub-III [Plate 32 -4].



Three blades with tangs are so small that they must have been for arrows. A complete specimen [Plate 32 -5] from Yukon Island III is only 5.4 by 2 cm. Similar blades are represented by a fragment from Yukon Island III [Plate 32 -3] and by a fragment from Cottonwood [Plate 32 -2].

Two specimens from Yukon Island III have roughly chipped tangs and may have been blades for knives [Plate 32 -15]. Two chipped tangs from similar blades are also from the same locality.

Another type of hafting is illustrated by a single specimen from Yukon Island III, with a roughly chipped notch on each side of the butt to hold a lashing.

There are 15 *leaf-shaped blades* without barbs or distinct tangs. The edges curve evenly towards both ends. The butts are chipped [Plate 32 -23], or are ground dull. The complete specimens vary in length from 10 to 14.8 cm.; the widths vary from 2.3 to 7.8 cm. The largest blade [Plate 32 -18] was found at the back of the child's grave, 31-20-108, at Cottonwood. Its association with the skeleton is not certain, however. The blades may be either for lances or for large flensing knives. The distribution is Cottonwood 1, Yukon Island III 12 [Plate 32 -20, 21 and 22], Yukon Island sub-III 1 [Plate 32 -6], Yukon Island I 1.

Two fragments with curving sides and straight bases, both from Yukon Island III, represent variants of the leaf-shaped blade.

The smallest blade in the collection [Plate 31 -4] is from Yukon Island II or sub-III. It is only 1 cm. wide, and was probably not more than 3 cm. long. It is faceted; with lozenge-shaped cross-section. The butt is missing.

There are 20 fragments of *blades with straight edges*. Two of these, one from Cottonwood [Plate 32 -11], the other from Yukon Island III [Plate 32 -10], are 4 and 5 cm. wide, respectively. The other 18 blades are much narrower. The longest fragment is 12 cm. long, tapering from 2.8 to 2.5 cm. Some of the fragments may have been broken from barbed blades, but other fragments are thickened at the butts [Plate 32 -19] and show that they were unhafted knives. One specimen [Plate 32 -10], from Yukon Island III, has an *owner's mark*<sup>6</sup> consisting of a line up the middle with pairs of branching or crossing spurs.

<sup>6</sup> It is curious that only two blades in the collection (from Aurora Fox Farm and Yukon Island III) have owner's marks, since such marks have been reported as common in this general region. According to Anisim, the Kodiak Eskimo put ownership marks on their lance blades, and the first man to strike received the game when it was killed. (Cf. Langsdorff, p. 343, Lisiansky, p. 202, Bancroft, p. 76.) We ought to mention also that, according to both Anisim and Wassila, slate blades were used primarily for whales (chipped blades were for porpoises, because they were 'easy to kill'). The name for slate is 'whale stone' in the Kodiak dialect. The whale killers formed a secret society. They made poison from human fat to put on their lances. After striking the whale once, they would drop a trail of this poison around the wounded whale, leading towards the land, or lay a line of poison across the mouth of the bay in which the whale had been lanced. The poison was supposed to cause the whale to die in three or four days' time and wash ashore at the designated spot. (Cf. Lisiansky p. 174.) The possible association of the rock paintings in Cook Inlet with the whale-killers' rites will be discussed later.

(The other side is defective.) The fragment is probably from a lance blade. The distribution of the 18 blades of this type is: Cottonwood 2, Halibut Cove 5 [Plate 32 -8, 14 and 19], Yukon Fox Farm III 2, Yukon Island III 7, Yukon Island sub-III 1, Yukon Island II 1, Yukon Island ? 1.

Forming a distinct group are 7 very small thin, straight-edged blades with straight base. They must have been blades for *small knives*. A fragment [Plate 31 -9], 1.8 cm. wide, is from Cottonwood. Others are as narrow as 1.5 cm. It is difficult to distinguish these blades from some of the smallest hafted blades for men's knives like ulos. The distribution is: Cottonwood 1, Yukon Island III 2, Yukon Island sub-III 2, Yukon Island sub-III or II 1, Yukon Island II 1.

There are, finally, 19 fragments of double-edged blades about which nothing can be said. They vary in width from 2 to 4 cm. The distribution is: Cottonwood 3, Aurora Spit 1, Yukon Fox Farm III 1, Yukon Island III 12, Yukon Island sub-III 1, Yukon Island II 1.

Two very curious blades from Yukon Island III [Plate 32 -12] and sub-III have sharp points but *blunt edges*. They measure 6.5 by 1.3 and (5.5) by 1.8 cm. respectively.

There is one *triangular faceted slate blade* of the type used for lance or harpoon heads [Plate 32 -1]. It is from Yukon Island III, measuring 4 by 4.3 cm., and has a hole drilled through the middle for hafting with a pin. It must be noted that none of the archaeological harpoon heads from Kachemak Bay had blade slits, and that this blade is so large that it would have fitted a head for walrus or whale. Since the whaling harpoon has never been used in southwestern Alaska, as far as is known, we must infer that this blade was for a lance.

Ten specimens appear to have been *blades for knives*. Two fine examples of flensing knife blades, with one curved and one straight edge, were found at Yukon Fox Farm III and Yukon Island III [Plate 32 -7]. They are 9.5 and 13.5 cm. long respectively. The butts are left roughly chipped. Three fragments of similar blades are from Yukon Island III.

A fragment of a large *single-edged knife blade* was found at Yukon Fox Farm III. The blade is 6.7 cm. wide, with a hole in the tang, made by a hand-drill and worked from both sides. A single(?) -edged knife blade from Yukon Island sub-III has the tang set off by a right-angled shoulder on one side. Another fragment of a single-edged knife blade is from Yukon Island III. A smaller, unfinished blade of red and gray banded slate, with chipped tang [Plate 32 -13], from Halibut Cove, is possibly for a single-edged knife. A long chipped tang from Cottonwood, and another from Yukon Island III (mentioned under the double-edged blades with tang) may have been broken from similar blades.

Though we have been able to recognize the following types in the collection—barbed lance and arrow blades, lance, arrow (and knife?) blades with tang, leaf-shaped lance blade, straight-edged lance and knife blades, triangular lance blade with hole, asymmetric double-edged knife blade and single-edged knife blade—our material is too fragmentary to determine the distribution and relative proportions of these types. Only five fragments can with certainty be determined as older than Period sub-III. The leaf-shaped blade is the only type represented in the First Period. It must have been known in the Second Period (though not represented in the collection), together with the barbed lance blade and the large and small straight-edged blades. It is impossible to prove that the other types are restricted to the Third Period, though the greater number of specimens would suggest a correspondingly wider range of types. From the distribution outside the area, we would expect the double and single-edged slate knife blades to belong to all periods of the Kachemak Bay culture. The barbed weapon blade is probably a type not found in the First Period. The faceted barbed blade seems to be found only in the last stages of the Third Period. The triangular lance blade is probably a late introduction from the north. These problems will be discussed more fully in Chapter VII.

#### ULOS [PLATES 33, 53, AND 56]

Jochelson<sup>7</sup> distinguished between two types of broad slate knives with lateral cutting edge. Those with curved edge are ulos, the traditional woman's knife of the Eskimo; those with straight cutting edge he calls men's knives. In this latter group he places the very narrow straight blades which I have preferred to discuss separately. On the basis of our material from Kachemak Bay, I find it impossible to separate the broad slate knives into two distinct types, for, between the semi-circular blade and the blade with straight edge, there is a complete range of intermediate forms. Even among the northern Eskimo, where the ulo with curved edge is the more typical, the straight edge will be represented in any large collection. In southwestern Alaska, I believe, the distinction between men's and women's knives has broken down. This hypothesis is suggested by the finding of a small knife, with straight cutting edge but with notches for lashing like an ulo [Plate 53 -15], among the men's tools in the grave at Yukon Fox Farm II.

Of the 225 specimens of ulo blades, 41 are very much curved, 71 have straight or almost straight edges, while the remainder are either slightly curved or so fragmentary that a further classification is impossible. The various types are illustrated on Plate 33. The distribution of the curved and straight blades is as follows:

<sup>7</sup> Jochelson, 1925, explanation of Pl. 16.

	Curved blade	Straight blade
Passage Island.....	1	3
Cottonwood.....	3	2
Halibut Cove.....	1	1
Point West of Halibut Cove.....	1	2
Yukon Fox Farm III.....	3	3
Yukon Fox Farm II.....		2
Yukon Island III.....	43	44
Yukon Island sub-III.....	3	6
Yukon Island II.....	2	3
Yukon Island I.....		2
Yukon Island ?.....	4	3

The blades vary enormously in size. The widest is at least 13.5 cm. wide, though part is broken off. The longest is the fine specimen [Plate 56 -21] from *Qatloxe'lye*, 20 cm. long. The narrowest is only 3 cm. wide, and should be classed with the men's knives like ulos, were it not for the notches to hold a wrapping about the grip. Both large and small specimens seem to have the same distribution.

On 101 blades and fragments there are notches at the back; 33 definitely lack them. (It must be remembered that it is much easier to recognize the notch than to be sure that it is lacking.) The notches may be nothing more than shoulders setting off a tang to be inserted in a handle [Plate 33 -9], but more commonly they form a reëntering angle, setting off a tang wider at the top than at the bottom. These ulos were probably not hafted, but were furnished with a winding of baleen or thong about the grip. There are 5 blades with holes. Three of these, from Port Graham, have two holes each. The holes are probably for fastening the blade to a handle. The distribution of the blades with notches, hole, or with plain backs is as follows:

	Notched	Hole	Unnotched
<i>Qatloxe'lye</i> .....	1		1
Passage Island.....	1	3	1
Cottonwood.....	2	1	2
Halibut Cove..... (reported)			2
Point West of Halibut Cove....	5		1
Yukon Fox Farm III.....	1		1
Yukon Fox Farm II.....	1	1	
Yukon Island IV.....	1		
Yukon Island III.....	80		19
Yukon Island sub-III.....	8		4
Yukon Island II.....	4		1
Yukon Island I.....	1		1
Yukon Island ?.....	5		3

It is a pity that the material from the earlier periods is so scanty. However, it seems likely that most of the ulos were not hafted, but had a grip made of windings of thong, baleen, or some other substance. No ulo handles of bone were found. The ulos at present used by the Indians and Eskimo about Seldovia have wooden handles [Plate 56-17], of the type illustrated by Otis T. Mason from Bristol Bay.<sup>8</sup> The natives told me that the handle was so designed that the forefinger could rest along it in a slightly flexed position.

There are 7 *toy ulo blades*. Two from Yukon Fox Farm III are 3.5 and 4 cm. long. One is straight-edged with notches [Plate 33-3]; the other has a semi-circular blade. A specimen from Yukon Island sub-III is 3.3 cm. long, and has an almost straight edge and notches. There are 4 specimens from Yukon Island III, including a doubtful specimen with very much rounded blade. The other three have notches, and measure 5 cm. in length.

#### MEN'S KNIVES LIKE ULOS [PLATES 34 AND 53]

There are 17 narrow blades with lateral cutting edge, straight or worn concave from use and much whetting. The back and ends are dull. They were evidently not hafted and would have served for whittling, shaving, or paring. The four complete specimens range in length from 9.5 to 11.5 cm., and in width from 1.8 to 4 cm. One of these, from Cottonwood [Plate 34-3], was identified by Anisim as a knife, to which he gave the Athabaskan name, q'ijaq'e, the same name that he applied to the double-ended slate scrapers (see below). Half of a blade of this sort was found in Yukon Island I, and half of another [Plate 53-14] was among the objects in the grave in Yukon Fox Farm II. Some of the specimens classed as ulos may be narrow enough to be men's knives of this type. They have notches like the large ulos, however. We should not try to draw too sharp a line. The distribution of these blades is: Cottonwood 1, Yukon Fox Farm III 1, Yukon Fox Farm II 1, Yukon Island III 10 [Plate 34-1 and 2], Yukon Island sub-III 2, Yukon Island II 1, and Yukon Island I 1.

There are also 5 small blades, from 1.1 to 1.8 cm. wide, which must have been hafted. It is possible, also, that some were toys. These small knives must be very closely related to the *baleen shaves* of the more northern Alaskan Eskimo. The distribution of these blades is: Passage Island 1, Yukon Island III 1 [Plate 34-6], Yukon Island III or sub-III 1, Yukon Island sub-III 1, Yukon Island sub-III or II 1.

#### SLATE SCRAPERS [PLATES 34 AND 56]

There are 12 slate scrapers with polished blades. Two specimens with sharp blades at each end [Plate 34-8 and 10] were found at Cottonwood, meas-

<sup>8</sup> O. T. Mason, Pl. LXIX -1 to 3.

uring 5 and 6.5 cm. in length. Anisim identified them as skin scrapers and called them q'eljiq'e. Four fragments from Yukon Island III and 1 from Yukon Island I may be from similar implements.

The second type of slate scraper was certainly hafted. The 6 specimens representing this type are dissimilar. The largest and finest specimen [Plate 34 -9] was found in Yukon Island III. It is 10 cm. long, with a polished cutting edge across one end, which was probably 8 or 9 cm. wide before being broken. The tang is narrowed slightly from each side. Another specimen [Plate 34 -5], also from Yukon Island III, has a rounded blade, 5.5 cm. wide, set off from a tang. The specimen is now 7.7 cm. long, but the end of the tang is broken. A third specimen [Plate 34 -7] from Yukon Island III is much thicker. The butt is rough, and the blade tapers towards the sharp edge without a distinct tang. A butt from Yukon Island III may be broken from a similar blade. Some of the butts, classed as fragments of large leaf-shaped lance blades, may have been broken from scrapers [Plate 32 -23]. A broken ulo blade with straight edge, from Yukon Island III, appears to have been hafted as a scraper [Plate 34 -4].

At China Poot Bay was found a blade of slightly altered slate, but similar in shape to those described above [Plate 56 -15]. The blade is rounded, but the tang is broken off. It shows that the hafted slate scraper blade was common to the Indian and Eskimo cultures in Kachemak Bay.

#### CHIPPED SLATE ULO OR SCRAPER BLADES [PLATE 35]

There are 19 blades of chipped slate which seem to be ulos or scrapers. Six are polished on both surfaces. One of these [Plate 35 -1], from Yukon Fox Farm III, is exactly like an ulo blade with notched grip. It measures 12 by 5.2 cm. It is possible that this specimen is simply an unfinished ulo, since poorly finished slate blades show that the edge was chipped before being ground. Another fragment [Plate 35 -4], 16 cm. long, from Yukon Island III, must have been from a similar blade. The specimens of this type are from: Yukon Fox Farm III 1, Yukon Island III 5.

The 13 remaining specimens are not polished at all. The largest is an enormous oval blade [Plate 35 -7], 28 by 14 cm., from Yukon Island III. The other specimens, however, are much smaller. Two oval scrapers, 13 and 12 cm. long, are from Yukon Island ? and III [Plate 35 -5], respectively. Another specimen, 11.5 by 8 cm. is from Yukon Fox Farm III. A slate chip from Cottonwood and another from Yukon Island III are probably variants of this type.

Some of the blades from Yukon Island II are narrower and are made from phyllitic slate. This type is represented by two complete specimens [Plate 35 -2], 12 by 6 cm. and 10 by 4.5 cm., and by two fragments. Another fragment is of ordinary slate [Plate 35 -6]. The distribution of these chipped blades is: Cotton-

wood 1, Yukon Fox Farm III 2, Yukon Island III 3, Yukon Island sub-III 1, Yukon Island II 5, Yukon Island ? 1.

Fragments of chipped slate are found in the deposits of all the periods of the Kachemak Bay culture. These may have been fragments of ulo or scraper blades of the type just described, but they are too small to be identified.

A rather unusual blade from Yukon Island III appears to be a *knife*, chipped in the same way. The surfaces are unpolished. It is 3.8 cm. wide, and measures 11 cm. in length, though broken. It may be unfinished.

From Yukon Island III there is also a scraper chipped from a thin slab of quartz [Plate 35 -3]. It has a dull curved edge and straight back.

#### DRILLS [PLATE 36]

In the collection there are 3 drills of *chipped stone*. The largest is a *hand drill* of flint [Plate 36 -11], 5.2 cm. long, from Yukon Island III. From the same locality there is a drill bit with pointed base, probably for a *bow drill* [Plate 36 -9]. It is 3 cm. long. A jasper drill point [Plate 36 -10], probably for a bow drill also, was obtained from Halibut Cove. Both the point and butt are slightly enlarged. It is 3.5 cm. long.

Not including the specimens termed slate 'awls,' 7 *slate* drills were found. Three are evidently *hand drills*. One is from the Point West of Halibut Cove [Plate 36 -20] and 2 are from Cottonwood [Plate 36 -18]. One of the two specimens from the latter site is of baked shale (?). A specimen from Aurora Spit, two from Yukon Island III [Plate 36 -15], and one from Yukon Island sub-III were probably hafted and may have been for *bow drills*.

An unusual slate specimen [Plate 36 -19] from Yukon Island sub-III is 8 cm. long, flat on one side and slightly rounded on the other. It tapers from a round butt to a blunt point. If an unfinished implement, it is probably a hand drill; if finished, it may have been for tending a lamp, as already suggested.

There are 41 *bone* drill points. The typical specimens are rather blunt, (from use ?). The complete specimens vary in length from 3.5 to 12.3 cm. The largest specimen is evidently a *hand drill* [Plate 36 -4]. Most of the specimens, however, are about 5 cm. long and must have been hafted, probably for use with the *bow drill*. The diameter of the bits varies from 0.25 cm. for drilling holes in beads [Plate 36 -8], to 0.6 cm. Other defective specimens which have been classed among the bone pins (see below) may have been drills also. The distribution of bone drills is: Cottonwood 4 [Plate 36 -1], Aurora Spit 1 [Plate 36 -2], Point West of Halibut Cove 3 [Plate 36 -5], Yukon Fox Farm III 2, Yukon Island III 20 [Plate 36 -3, 4, 6, 7, and 8], Yukon Island III or sub-III 2, Yukon Island sub-III 2, Yukon Island II 4, Yukon Island I 3.

Specimens with drilled holes (needles, dart and harpoon heads, etc.) have been found in all layers and belong to all periods. They show that both the bow and the hand drill were used in Kachemak Bay at the same time. The use of holes in hafting slate blades, however, was never important in Kachemak Bay.

#### SLATE 'AWLS' [PLATE 36]

There are 18 implements of slate, more or less oval in cross-section, with a pointed end. These we have called *slate 'awls'* for lack of a better term. The diameter varies from 0.4 to 2 cm. The only complete specimen [Plate 36 -17] is one of the most slender. It is from Yukon Island III and is 9.2 cm. long. The point is very sharp, the butt slightly flattened. Other fragments show wedge-shaped butts as though for hafting [Plate 36 -12]. Although the exact function of these implements is not certain, they seem to be a specialized form of drill, some of them intended for making very fine holes. Their distribution is: Point West of Halibut Cove 1, Yukon Fox Farm III 2 [Plate 36 -13 and 16], Yukon Island III 12 [Plate 36 -12, 14, and 17], Yukon Island III or sub-III 1, Yukon Island sub-III 2.

#### MIRRORS [PLATES 37 AND 55]

Seventeen plaques or fragments of such plaques, 13 of soft shale, 3 of slate, and 1 of red baked shale, were found. They are evidently not whetstones or cutting implements of any kind, but appear to be mirrors, similar to those of the Tsimshian, described by Emmons.

The best specimen is triangular in shape [Plate 37 -6], a form not found among the Tsimshian specimens. The edges are decorated by small notches cut along both surfaces. Two other fragments [Plate 37 -5], also from Yukon Island III, have a scalloped edge, the notches being cut through from side to side. These notches are a characteristic decoration on Tsimshian mirrors. The triangular specimen measures 11.5 by 9.3 cm. When wet, the surface gives a fairly clear reflection; most of the other specimens have a finer polish. A mirror broken across one corner and refinished along the broken edge was found at Cottonwood [Plate 37 -4]. It is rectangular in shape, measuring 11.5 by 8 cm., with a rectangular projection at one end. An unfinished shale slab, from Yukon Island III, gives the shape of what must have been the more common type, judging by the fragments. It measures 21 by 11 cm., narrowing slightly towards the lower end, with top and bottom slightly rounded. The shape is suggestive of that of the 'coppers' of the Northwest Coast Indians. A fragment from Cottonwood is evidently broken from the upper end of such a mirror [Plate 37 -1], while another fragment from Cottonwood [Plate 37 -2] and one from Yukon Island III are from the lower ends of similar specimens. A poorly made mirror



[Plate 37 -3] from Yukon Island III, 14 by 9 cm., has the same general shape, though the lower end is narrowed to a handle, as on the Tsimshian mirrors. On one side the handle is marked off from the reflecting surface by an incised line. A specimen from the Point West of Halibut Cove is simply rectangular, 10 by 6 cm., and a fragment from Yukon Island III is from a similarly shaped mirror. Other fragments, all from Yukon Island III, and the nicely shaped red shale plaque from Cottonwood may have been mirrors, though the shapes are irregular. Among the objects in the 'bag find' from Yukon Island III is a broken shale plaque [Plate 55 -38]. It may have been a whetstone, though a lump of red hematite, suitable for face paint, suggests that it was a mirror. A fragment of a slate plaque, polished on both sides, is from Yukon Island sub-III or II. If a mirror, it is the oldest specimen found. Except for this, the mirror is confined to the Third Period.

#### HARPOON HEADS [PLATES 38 AND 56]

In the collection there are 27 harpoon heads.\* Anisim and Wassila recognized pictures of both the open and closed socket types, specifying that the latter was the better.

There are 18 *Thule harpoon heads*: thin, with open socket closed by a lashing. The lashing, in every case, lay in a groove around the outside of the head, and did not pass through drilled holes or slots. None of the specimens have slits for blades. The line holes on all but three are made with a hand drill and are oval rather than round.

Twelve specimens (3 from Yukon Island III, the rest from Yukon Island I) belong to Mathiassen's *Thule Type I*; one specimen from Yukon Island III is of Mathiassen's *Thule type II*; the remaining 5 fragments (2 from Yukon Island sub-III and 3 from Yukon Island I [Plate 38 -6]) cannot be identified more closely.<sup>9</sup> The *Thule Type I* heads lack both barbs and blade. The complete specimens range in length from 5.5 to 8.5 cm., the variation being in the length of the point above the line hole. The line hole, especially on specimens from Yukon Island I, tends to be laterally placed [Plate 38 -11, 12 and 13]. Of those specimens on which the spur can be seen, 3 have a *medial spur* which is slightly arched back from the socket. One of these specimens is from Yukon Island III [Plate 38 -9]; two are from a cache of five heads in Yukon Island I [Plate 38 -11]. Six heads have the *spur on the left side* of the socket. These are: 1 in the cache in Yukon

\* For the sake of clearness I have followed Mathiassen's terminology, reserving the name *harpoon head* for the detachable 'toggle' head with a socket to fit over the foreshaft. *Barbed dart head* has been used for the head with a tang to fit into a socket on the shaft, although, as Birket-Smith has pointed out, any weapon with detachable head intended to secure game, whether it be a spear thrust with the hand, a dart hurled with the throwing board, or an arrow shot from a bow, is functionally a harpoon. The heads which depend exclusively on their toggling action to hold the animal, those which depend upon barbs alone, and those which utilize a combination of both devices, may all with justice be termed 'harpoon heads.'

<sup>9</sup> See the classification of harpoon heads, Mathiassen, 1927, II, p. 11 ff.

Island I [Plate 38 -16], 2 from the same level [Plate 38 -12], and 3 from Yukon Island III [Plate 38 -15] (including the Thule Type II specimen [Plate 38 -7]). Six have the spur on the *right side* of the socket. One of these is from the cache in Yukon Island I; the others are isolated specimens from the same level [Plate 38 -6, 13 and 14]. The laterally placed spur may be arched back slightly from the socket [Plate 38 -12], or it may be formed simply by the base of the head which has been cut off obliquely [Plate 38 -13 and 14]. One of the heads from Yukon Island III was broken down the middle; the rough edge has been trimmed for use again. The line was evidently tied about the head in the constriction made by the old line hole.

An unfinished head [Plate 38 -7] from Yukon Island III is the only example of *Thule Type II*: thin, open socket, with barbs, but without blade. The specimen is of highly fossilized bone, and is only 4.4 cm. long. The base to the right of the spur and the tip of the right barb are broken off. The socket is only partly cut out; the hole for the line and the groove for the socket-lashing have not been made.

The remaining 9 specimens have *closed sockets*. With the exception of a modern Indian head from Indian Island, to be discussed later, there is no indication of an inserted blade. All but two are *thin*. Five specimens, all from Yukon Island III, represent Mathiassen's Type A II a; that is, they lack *barbs and blades*. They are, with one exception, distinguished by the elegant silhouette of the long and pointed spur. Two of the heads [Plate 38 -2 and 5] have faceted points, making lozenge-shaped cross-sections. This shape is common on the harpoon heads of the Old Bering Sea and Punuk cultures.<sup>10</sup> Two heads [Plate 38 -2 and 4] have deep grooves running up from the line hole towards the point. One of these [Plate 38 -2] also has a shallow groove leading down from the line hole. Another head [Plate 38 -1] has the curious silhouette, with spur bent far back, characteristic of heads from the ancient site at Port Möller, on the Alaska Peninsula. The line hole is the only one in this group of specimens which was made with the bow drill. It has been enlarged from both sides, probably for decorative effect. Shallow grooves lead down from it. The heads in this group vary in length from 4.8 (an unfinished specimen [Plate 38 -8]) to 7 cm.

A single specimen [Plate 38 -3] from Yukon Island III belongs to Type A II b. It has a pair of *barbs*, but they are in the plane of the line hole, which is unusual. The silhouette of the spur is like that of the heads with closed sockets but without barbs. On each side the barbs are outlined by short incised lines. These lines are so narrow and so deep that they appear to have been made with metal tools. There are six lines, less well incised, slanting down from right to left; two are on each side of the spur, and two are on the head above the line hole, one on each side. The specimen is 6.3 cm. long.

Two specimens with almost *round* cross-sections are both fragmentary. One, measuring 1.2 cm. in diameter, is from Yukon Island III; the other, slightly

<sup>10</sup> Collins, 1929-I, Pl. 1a and b, c; Pl. 11a, e; Pl. 12a, b, c; Collins, 1932-I, Fig. 4 -1, 19, 20, 21, etc.

larger, is from Yukon Fox Farm II [Plate 38 -10]. The spur of the latter was evidently of the same shape as that of the other closed socket heads of the period. The line holes on both specimens were made with a bow drill.

The modern Indian head [Plate 56 -4] from Indian Island is of whale bone, carved in one piece to represent the *inserted blade*. The blade is at right angles to the line hole, and the head lacks barbs. It belongs to Mathiassen's Type A II c 2. The line hole is made with a bow drill, and has grooves leading down from it. The spur is bifurcated. The specimen is 9.7 cm. long. A piece of cut bone from Yukon Island III suggests a bifurcated spur cut from a similar head.



FIGURE 2.  
DEGENERATE THULE TYPE II  
HARPOON HEAD, TUTKA BAY  
SLIGHTLY REDUCED

A harpoon head, said to have been found at the Point West of Halibut Cove, was shaped like a barbed dart head with a single spur (see below), except that the butt had a shallow socket for the foreshaft cut on one side and a groove across the other side to hold a lashing. This seems to be a degenerate form of Thule Type II.

These harpoon heads, with the exception of the modern specimen, are very small, and could have been used only for salmon, sea-otter or small seals. They could not have been used for large sea-mammals.

#### BARBED DART HEADS [PLATES 39, 40 AND 56]

From Kachemak Bay and Port Graham 72 examples of detachable dart (or arrow) heads with *barbs on one side* were found. Complete specimens have from 1 to 3 barbs; three fragments have 4 barbs. The distribution of these is given in the following table.

	Complete Specimens			Fragments			
	1 barb	2 barbs	3 barbs	1 barb	2 barbs	4 barbs	? barbs
China Poot Bay.....			1				
Jakolof's place: Modern Indian layer 3.... Eskimo? layer 2.....	1				1		
Passage Island.....		2	1	1	1		1
Cottonwood.....	1				2		
Aurora Spit.....				1			
Point West of Halibut Cove..	2	1					
Yukon Fox Farm III.....							2
Yukon Fox Farm II.....				1			1
Yukon Island III.....	12	1	1	5	6	2	9
Yukon Island sub-III or II..				3			
Yukon Island II.....		1					1
Yukon Island I.....		2		2		1	2
Yukon Island ?.....	2		1				

These heads vary in length from 4 cm. (a very small specimen from Yukon Island III [Plate 39 -1]), to 14.5 cm. (an unusually large specimen with two barbs from Passage Island [Plate 39 -24]). Most of the heads are between 7 and 10 cm. long and were probably for darts or harpoons used with the throwing board. The smallest heads [Plate 39 -1, 2, 3, 4 and 5] were probably for arrows, like the modern sea-otter arrow. The largest [Plate 39 -23 and 24] were probably for fish spears, like their modern imitations in iron. On the typical specimens the tang is wedge-shaped, widening just below the barbs where it is pierced by the line hole. The barbs protrude about as far as the widest part of the tang. They are usually curved on the under side and are arched in a double curve on the upper side, making a characteristic silhouette. Two specimens from Yukon Island III—one a large dart head [Plate 39 -9] (possibly from IV), the other a small arrow head [Plate 39 -1]—have a secondary, decorative barb on the back, just above the line hole. A defective specimen [Plate 39 -10] from Yukon Island, depth unknown, has two such dorsal barbs. A fragment from Yukon Island III with four (?) barbs [Plate 39 -13] is much more slender than the others. The profile of a crude head [Plate 39 -14] from Yukon Island I is similar to that of the barbed heads from the mouth of the Stikine River, southeastern Alaska.<sup>11</sup>

Other variations from the typical pattern should be noted. A fragment [Plate 39 -19] from Yukon Island III bulges abruptly at the line hole, forming a

<sup>11</sup> Ring Collection, U. S. National Museum.

ring through which the line passed. On 6 specimens the line was tied or looped around the tang. One of these [Plate 39-20], from Yukon Island III, has a semi-circular notch instead of a hole for the line. On a head from Cottonwood [Plate 39-22] and on another from the Point West of Halibut Cove [Plate 39-21] the line is held by a ridge across one side of the tang. On three specimens from Yukon Island III the tang is shouldered to hold the line [Plate 39-18]. A head [Plate 39-8] from Yukon Island, but of unknown depth, originally had a hole; the butt was broken, and the head was reshaped for use with two notches. A specimen from Yukon Island III was recut with a ridge across one side after a similar break. The 37 specimens with hole for the line come from all the periods of the Kachemak Bay culture and from the Indian culture also. These holes are made with the bow drill, with 9 exceptions: China Poot Bay 1 [Plate 56-2], Passage Island 4 [Plate 39-6], Yukon Island III 2, Yukon Island I 2 [Plate 39-11].

A head from Yukon Island I [Plate 39-17] and another from sub-III are decorated with a longitudinal line down each side. The line on the older specimen was made with a stone blade, but that on the younger suggests a metal instrument.

Six heads are grooved on one side of the point, forming a bed to hold a narrow *blade* [Plate 39-8 and 16]. In no case is there a blade slit. A fragmentary specimen from Jakolof's place, layer 2, is grooved for the entire length of the small fragment. On two specimens there is a shoulder on the side opposite to the groove to hold the lashing. The sockets are from 2 to 3 cm. long and are about 0.6 cm. wide. They would hold some of the smallest chipped phyllite blades with rounded or pointed butt. These heads are from the Point West of Halibut Cove 1, Yukon Island III 3, and Yukon Island ? 2.

A fragment of a dart head [Plate 40-16] from Yukon Island III has two large barbs on one side and three small barbs on the dorsal side, opposite the upper barb. The point is faceted. The two rows of barbs are set off by a pair of longitudinal lines on each side. Two X's are incised on the edge below the three small barbs and opposite the lower of the two large barbs. The small size of the dorsal barbs suggests that this head is more closely related to those with barbs on one side than to those barbed on both sides. It is not, however, included in the table given above.

Besides the two Indian heads—from China Poot Bay [Plate 56-2] and layer 3, Jakolof's place [Plate 56-3],—there are three modern specimens in the collection, cut out of strap iron, but patterned after the older heads of bone. Two were found in the modern Indian middens at Indian Island [Plate 56-19] and at Yukon Fox Farm [Plate 56-18]; the third [Plate 56-22] is an ethnological specimen collected in Port Graham by Mr. Smith. The Port Graham and Yukon Fox Farm specimens have a line hole and four and three barbs, respectively. They measure 21 and 14 cm. in length. The Indian Island head is broken, but

is still 14.5 cm. long and has four barbs. The line was tied above the lowest barb (?). The Port Graham specimen is set into a hole at the end of a wooden pole about six feet long, and was once attached to it, according to Mr. Smith, by a thong just long enough to allow the head to slip from the socket. The spear was used for salmon.

Closely related to the heads described above are 4 specimens *barbed asymmetrically on both sides*. Two specimens are complete. One measures 8.5 cm. and has two barbs [Plate 40 -1]; the other with three [Plate 40 -3] is 4.5 cm. long. The two fragments have two and three barbs respectively. The fragment with two barbs [Plate 40 -2] from Yukon Island III is decorated on each side with longitudinal lines setting off the barbs. These longitudinal lines are connected below the barbs by two pairs of transverse lines. The decoration appears to have been made with a metal tool and is similar to patterns found in Punuk art. On the heads of this type the hole for the line tends to be placed to one side, as on the heads barbed on one side only. These four specimens are from: Yukon Island III 1, Yukon Island sub-III 2, Yukon Island II 1.

There are 8 specimens *symmetrically barbed on both sides*. Of these, 5 fragmentary specimens are very slender and appear to have had a centrally placed line hole. The most complete example [Plate 40 -5] is from Yukon Fox Farm II. It has two pairs of barbs, and measures 6 cm. from the line hole to the point. A fragment from Yukon Fox Farm III with a single pair of barbs and a point 10 cm. long, may possibly be an unusual type of slender barbed point (see below). Other fragments are from Yukon Island sub-III, II, and I.

From Yukon Fox Farm II (?) is a single example of a type of dart head characteristic of the Aleutian Islands [Plate 40 -7]. It is 6.5 cm. long, and has a pair of symmetrically placed barbs at the point. The tang is shouldered on both sides to hold the line. The tang of a similar head was found on Passage Island.

A fragment of a very flat and broad, detachable (?) head barbed on both sides was found in Yukon Island III [Plate 40 -6]. It is decorated with a longitudinal groove set between two slight ridges. Two of the barbs are short and are set off by incised lines. The two lower barbs, somewhat asymmetrically placed, are broken off. The fragment is now 6.7 cm. long and is 2.6 cm. wide at the widest part.

#### MISCELLANEOUS BARBED HEADS [PLATE 40]

An unusual type of barbed head is represented by three specimens from Yukon Island II. The most complete fragment [Plate 40 -18] is now 12 cm. long, and was originally about 14 cm. long. The lower part of the shaft is circular in cross-section. Above the barbs it is oval, but evidently became circular again at

the point. There is no hole, but a line may have been attached between the two barbs. The upper barb is large and sharp; the lower was probably only ornamental. Both are set off by incised lines. On each side of the lower barb are three lines parallel to its lower edge. The second fragment [Plate 40 -17] is evidently from a closely related specimen. The large upper barb is broken off, and the place of the lower is taken by an angular swelling. The third specimen is simply a fragment of a butt.

A weapon point [Plate 40 -14] from Yukon Island II, is a piece of rib, 11 cm. long, with two pairs of slightly detached barbs. There are two notches at the butt for attachment to the shaft. The head may have been detachable, however, with a line fastened at the notches. The profile of the barbs is not typical. A fragment from Yukon Island III or sub-III is from a similar specimen.

Another specimen [Plate 40 -13], probably rigidly attached also, has a single barb with a notch below it. This combination of notch and barb is found on many Aleut points. The specimen measures 7.5 cm. (incomplete) and is from Yukon Island III.

A barbed point [Plate 40 -15] from Yukon Island II, originally with four barbs on the same side, is of interest because the profile of the straight and sharply detached barbs is similar to that of weapon points from southern British Columbia.

A unique specimen [Plate 40 -12] from Yukon Island I, with two barbs, is notched at the butt on the same side as the barbs, evidently for a rigid attachment. It was probably one prong of a *multi-pronged spear or dart*. There is a longitudinal line down each side of the specimen. The sides and edges are flat, making a rectangular cross-section. Two other fragments with a single barb each may be from similar specimens; one from Yukon Island sub-III is faceted; the other, from Yukon Fox Farm III, has a longitudinal line down one side.

#### SOCKET-PIECES [PLATES 41 AND 56]

Seventeen socket-pieces for darts and harpoons were found in Kachemak Bay.

There are 7 socket-pieces *made in one piece*. Only two are complete. The first of these [Plate 41 -9] is one of the two specimens found in the double burial at Cottonwood (32-20-102 and -103). It is 14 cm. long, oval in cross-section, with a maximum diameter of 2 cm. The oval socket is 1.5 cm. deep and was probably for a barbed head with tang. The specimen is scarfed at the lower end to a *long, flat tang* to fit between the two halves of the bifurcated wooden shaft. The base of the tang has shoulders at the edge to hold the lashing. The second specimen [Plate 41 -12] is a small ivory socket-piece with *conical tang* from Yukon Island III. It is only 1.8 cm. long and 1.5 cm. in diameter. The socket is circular, perhaps for a harpoon foreshaft.

Three fragments, 2 from Yukon Island III and 1 from Q'na'qesle, the refuge island in Tutka Bay, appear to have been broken from socket-pieces with *bifurcated base*, like the modern Kodiak and Port Graham socket-pieces for sea-otter arrows. One specimen [Plate 41 -13] from Yukon Island III has a groove at the base of the bifurcation and two grooves across the end of one prong (the other is broken off) to hold the lashings.

Two broken specimens from Yukon Fox Farm III show only the upper part of two socket-pieces made in one piece. The socket of the first is oval, measuring 2.1 cm. in width and 1.3 cm. in depth. There is a groove and a shoulder about the rim for a lashing to prevent splitting. The socket of the second [Plate 41 -5] is round (for a harpoon foreshaft ?) and is 1.5 cm. deep. On both specimens the socket has been broken out and the tang cut off. A fragment [Plate 41 -8] from Yukon Fox Farm III, found near the second specimen, and described under shaft fragments, may be the butt end of this socket-piece.

The other specimens in the collection are *made in two parts*. The second specimen [Plate 41 -10] from the double burial at Cottonwood is 14.5 cm. long, and is rectangular in cross-section, measuring 2 by 1.5 cm. The socket at the fore-end and the socket at the base to fit over the tenon of the wooden shaft have been hollowed out on the inner surfaces of the two pieces. The two halves are shouldered at the top and bottom for lashing together. A similar socket-piece [Plate 41 -4] from Yukon Island III is 7.2 cm., long to the base of the tang (now broken off). The socket is 4.2 cm. deep and was probably 1 cm. wide. It was evidently for a harpoon foreshaft. The shoulder at the top to hold the lashing is 1.5 cm. wide. There is a fragment of an almost identical specimen from Yukon Island sub-III. Another fragment from the Point West of Halibut Cove is from a much bigger specimen. A very small socket-piece, only 1.7 cm. wide, is represented by a fragment from Yukon Island III.

The socket-pieces in two parts from Yukon Island II are shorter and broader than those just described. One specimen [Plate 41 -7] measures 7.5 by 3 cm., another [Plate 41 -6] 6 by 2.5 cm. The sockets are oval and are cut down almost to the beginning of the scarf. There is a prominent shoulder at the top for the lashing. A fragment of a similar specimen is from Yukon Island II and another from Yukon Island III (layer 6 or 5c).

Half of a fine socket-piece in two parts [Plate 41 -11] was found in Yukon Island I. It measures only 2.7 cm. in length and 2 cm. in diameter. The socket is circular and about 1 cm. deep. About the top is a double rim and about the middle is a shoulder setting off a wide groove for the lashing. There is another shoulder about the bottom.

The evolution of the socket-piece in Kachemak Bay has been towards longer and more slender forms, and from the two-piece type to that made in one piece. Apparently the central tang and the bifurcated base are equally old, but the very long and slender socket-pieces for the modern sea-otter arrows are bifurcated [Plate 56 -1].



#### SHAFTS (?) [PLATE 41]

Eight fragments of whale bone shafts were found which may have been parts of harpoons or of similar weapons. The largest [Plate 41 -8] is a fragment from Yukon Fox Farm III, 2.3 cm. in diameter, with the butt narrowed from two sides and pierced by a hole. This is the specimen which may have been cut from one of the socket-pieces in one piece from Yukon Fox Farm III [Plate 41 -5]. Another fragment of bone shaft [Plate 41 -19] from the same locality is grooved around the rounded butt. The smallest fragment, from Yukon Island III, is only 0.8 cm. in diameter. Four other fragments were found in Yukon Island III [Plate 41 -20] and another at Cottonwood. The latter is scarfed for lashing.

#### FORESHAFTS [PLATE 41]

Weyer has suggested that some of the bone rods or pins found by him at Port Möller may have been foreshafts for harpoons. They are from 6 to 22 cm. in length and are pointed at both ends.<sup>12</sup> None of these specimens have holes, however. With the exception of some of the bone pins from Kachemak Bay, (see below), only three specimens can be described as harpoon foreshafts.

One of these is a complete specimen [Plate 41 -1] from Yukon Island III, 11.8 cm. long. The shaft is round, and fits the larger heads with closed socket. The butt has a shoulder with a drilled hole for the line; the shape is evidently patterned after that of the barbed dart heads. For this reason, it is not safe to assume that all socket-pieces with oval sockets were intended for dart heads alone.

A specimen [Plate 41 -2] from Yukon Island II, the point of which is missing, is probably a harpoon foreshaft, but it may be the butt of a barbed dart head (compare Plate 40 -5). The butt is widened symmetrically on both sides; the line hole is in the middle.

A fragment [Plate 41 -3] from Yukon Island I may also have been a foreshaft. It is oval in cross-section. It is broken at the hole; the fragment is now 7.7 cm. long. The end fits the open sockets of the larger heads from Yukon Island I, but we cannot be sure that this end was the point.

#### BARBED LANCE HEAD [PLATE 41]

From the Point West of Halibut Cove we obtained a single specimen of a barbed lance head with blade slit [Plate 41 -21]. The specimen is now 12.5 cm. long, and is broken at both ends. It is rectangular in cross-section, measuring 2 by 0.5 cm. The slit is cut from edge to edge in the plane of the barbs. There

<sup>12</sup> Weyer, 1930, p. 269.

were at least two pairs of barbs, symmetrically placed, each row outlined by incised lines. The blade was probably of slate, to judge by the narrowness of the slit, and was perhaps of the triangular, faceted type, though it must have been thinner than the specimen from Yukon Island III [Plate 32 -1].

#### BONE ARROW HEADS [PLATE 41]

A splinter of moose leg bone [Plate 41 -15] from Yukon Island II, is 7 cm. long (the point is missing) and 1.8 cm. wide. It is sharpened along both edges and has a roughly shaped tang. Two notches on one edge suggest an attempt to cut barbs. The specimen is probably a bone arrow head. A fragment from Q'na'qesle, the refuge island in Tutka Bay, may be part of a similar specimen.

A bone arrow head [Plate 41 -14] from Yukon Island III is of a different type. It is 15 cm. long (only the tip of the point is broken), rounded on three sides with a sharp angle on the third. The butt tapers. A fragment of a similar head was found at the Point West of Halibut Cove.

#### BONE ARROW HEADS WITH BLADES [PLATES 41 AND 55]

Besides the slender barbed points with blade slit [Plate 42], there are 10 specimens with bifurcated points which were probably arrow heads with inserted blades.

Three of these, 1 from Yukon Island III [Plate 41 -17] and 2 from Cottonwood [Plate 41 -16], are rather heavy, measuring 5.7, 8, and 5.5 cm. respectively. In the slots of the two larger specimens there are actually the remnants of finely chipped blades with straight bases. One specimen from Cottonwood is ornamented with four longitudinal lines; the others have each one line. The heads are round to oval in cross-section. The butts are cut off squarely.

These specimens are very similar to objects from Hawkins Island in Prince William Sound. These are also decorated with longitudinal lines, and the butt, as well as the point, is bifurcated.

A small bone implement from Yukon Island III, only 2.8 cm. long, notched at both ends, suggests the Prince William Sound type of arrow head.

Besides these, there are 5 (6 ?) slender bone pins with bifurcated points [Plate 41 -18]. The blades must have been very thin; none of the slate blades in the collection are fine enough to fit. The complete specimens vary in length from 5.5 to 8 cm. The smallest [Plate 55 -18] is from the 'bag find,' Yukon Island III. These heads were evidently not detachable. They are from Yukon Island III 2 (3 ?), Yukon Island sub-III 1, Yukon Island sub-III or II 1, and Yukon Island II 1 [Plate 41 -18].

### SLENDER BARBED POINTS [PLATE 42]

From Kachemak Bay there are 98 specimens of barbed bone and ivory points, long and slender in shape (though the actual dimensions have a considerable range of variation), oval to round in cross-section, with conical or blunt butts. In addition, 47 fragments are probably parts of similar points. The specimens are almost all of whale bone, though a few are made of antler or ivory. These specimens can be divided into two main types; the most striking differences are in the profile of the barbs and in the presence or absence of lines bordering the rows of barbs. Those with bordering lines can be further sub-divided into two groups based upon size. Because of their characteristic distribution, I have called the larger specimens with lines the 'Yukon Island I' type, the smaller the 'Yukon Island III' type. For lack of a better term, the type without lines I have called the 'Cottonwood' type because it was originally found only at Cottonwood.

There are 39 specimens of the '*Yukon Island III*' type; 29 fragments probably belong to this group also, though identification is uncertain. The typical specimens are shaped like slender pencils, sharpened at both ends, with a single row of narrow, slightly detached barbs, outlined by a pair of longitudinal lines. These lines are so evenly cut that they suggest the use of a metal tool. Both point and butt are conical. The specimens range in length from 7 cm. (possibly recut from a broken specimen) to 12 cm. The average is about 11 cm. The diameter is about 0.7 cm. with but little variation. Most of the specimens appear to have had three barbs [Plate 42 -21]. Two broken points have been reshaped with one [Plate 42 -9] and two barbs [Plate 42 -22], respectively, and there is a complete specimen with two barbs [Plate 42 -10], and a fragment with five [Plate 44 -19].

Three specimens have two rows of barbs, the barbs being on opposite sides of the shaft, and alternately spaced. Two of these are from Yukon Island III, [Plate 42 -7], the third is from Yukon Island II or III [Plate 42 -14]. A fourth specimen [Plate 42 -20], from Yukon Island III, has four barbs, three at equidistant points about the circumference, the fourth above one of the three. Besides the three pairs of longitudinal lines there are two extra lines. Extra lines are also found on some of the specimens with a single row.

The most distinctive specimen [Plate 42 -23] is from Q'na'qesle, the refuge island in Tutka Bay. It is a fragment 9.8 cm. long, with three barbs. The shaft has four facets, producing a lozenge-shaped section. On two opposite angles there are longitudinal lines. Each barb is set off by a separate pair of lines, running only part way along the shaft. The uppermost barb on the fragment is cut by thin slits into three separate barbs (possibly more, since the specimen is broken). The tang seems to be inclined away from the row of barbs, but this may be partly due to warping.

A specimen from Yukon Island III [Plate 42 -12] and a doubtful fragment

from Yukon Island sub-III have *blade slits*. These slits are very narrow, and may possibly have been for metal blades (?).

The 'Yukon Island III' points were probably arrow heads, though they may have been points for multi-pronged darts. They seem to have been rigidly attached to the shaft. The specimen from Q'na'qesle with slightly oblique tang would suggest the *multi-pronged dart*, while the specimens with blades were almost certainly *arrow heads*. These specimens are not typical, however. The distribution of this type is:

	1 row barbs	Several rows	Blade	Fragments
Q'na'qesle.....	1			
Point West of Halibut Cove.....				1
Yukon Fox Farm III.....	1			2
Yukon Island III.....	29	3	1	21
Yukon Island sub-III.....	1		1	1
Yukon Island III or II.....		1		
Yukon Island II.....				1
Yukon Island I.....	1			1
Yukon Island ?.....	1			2
TOTAL.....	34	4	2	29

There are 22 examples of the larger 'Yukon Island I' points. The only complete specimen [Plate 42 -16], found with its butt in layer 2 and the point in layer 5a (probably dating from Period II) is 20 cm. long, but there are fragments from larger specimens [Plate 42 -17 and 18]. The diameters range from 1 to 1.8 cm. The shafts are oval, the tangs rounded and blunt. The single line of barbs seems to stand on a ridge, an impression also given by the smaller 'Yukon Island III' points. On several specimens there are additional longitudinal lines on one or both sides [Plate 42 -11]. On two specimens (the complete point [Plate 42 -16] and a fragment from Yukon Island I), there are two transverse lines or notches below the barbs. A similar combination of notch and barb was noted on a specimen described among the miscellaneous heads [Plate 40 -13]. Two specimens from Yukon Island I have a *blade slit* [Plate 42 -13]. As on the small specimens from Yukon Island III, the blade was in the plane of the barbs. Both specimens are defective; the butts have been cut off. The distribution of this type is: Yukon Island III 1, Yukon Island sub-III 3, Yukon Island II 2, Yukon Island I 18 (including the two specimens with blade slit).

There is no reason to suppose that these points were detachable. They are too large for arrows, but could have served as the heads for spears or darts used with the throwing board. They are probably related to the barbed moveable heads of the Aleut lances.

There are 34 specimens of the 'Cottonwood' type and 18 fragments which are probably from similar specimens. The decorative lines are absent, and on the typical specimens the barbs are very long and much more detached than on the 'Yukon Island' points. On a few, however [Plate 42 -1], the barbs are rather similar to those on the 'Yukon Island III' specimens. The butt is usually cut off bluntly, but on a few points it tapers a little. Below the lowest barbs there is often a slight swelling. Unfortunately, there are only 3 complete specimens. One from Cottonwood, with a single barb [Plate 42 -5], is 9 cm. long; one from Yukon Island III is 7.5 cm. long; the third, with two barbs [Plate 42 -6], from Yukon Island II is 8.5 cm. long. There is a single fragment [Plate 42 -4] originally with three (?) barbs. One fragment, from Yukon Island sub-III, with two barbs (possibly more, originally), is barbed asymmetrically on both sides [Plate 42 -3]. On the other specimens, the barbs are always on the same side. It is difficult to say how these points were hafted. One fragment [Plate 42 -15] from Yukon Island III has a very blunt barb like a shoulder in place of the usual enlargement above the butt. The distribution is:

	1 barb	2 barbs	Fragments
Cottonwood.....	2	5	4
Point West of Halibut Cove.....		1	1
Yukon Fox Farm III.....			1
Yukon Island III.....	7	10	10
Yukon Island III or sub-III.....			1
Yukon Island sub-III.....		4	1
Yukon Island sub-III or II.....	1		
Yukon Island II.....	1	3	
TOTAL.....	11	23	18

#### FISH-SPEAR BARBS [PLATES 40 AND 43]

From the Point West of Halibut Cove there is an antler point [Plate 43 -14], 7 cm. long, notched and scarfed at the butt for lashing obliquely to a shaft. It is evidently the barb for the side-prong of a fish spear. A similar specimen of bone [Plate 43 -15], 7.5 cm. long, and notched for lashing, is from Yukon Island I. Two broken dart heads (lacking the barbs), from Yukon Island III and Yukon Fox Farm III, have been reshaped as if for the same purpose.

No example of the *side-prong for a bird-dart* was found. A fragment of a butt [Plate 43 -20] from Yukon Island sub-III, flat on one side and shouldered on the other, may have been broken from such a specimen, or from a fish-spear barb.

Ten bone and antler implements, shouldered near the point to form *very dull barbs* [Plate 40 -8 to 11], are perhaps barbs for the side-prongs of fish spears. The butts of the 4 complete specimens are cut off straight, without notching or scarfing. They could not have been lashed on, but must have been inserted in holes. Four of these specimens are from Yukon Island II, the remaining 6 from Yukon Island III. The complete specimens range from 5.7 to 7 cm. in length. Only one of the barbs [Plate 40 -8] is sharp enough to have been effective, but some of the others are so carefully made that the bluntness of the barb must have been intentional.

#### FISH HOOKS [PLATE 43]

In Kachemak Bay 70 fish-hook barbs were found. These specimens are all barbed and were evidently parts of compound fish hooks. The shank part of the hooks was not found, so presumably it was made of wood or some other perishable material. Of these barbs, 51 have a groove (or two notches) at the butt for lashing to the shank [Plate 43 -6 to 12]; 18 have plain butts [Plate 43 -5]. The specimens range in length from 1.6 to 7 cm. The sizes seem to be evenly distributed in the various periods. The shaft of most of the hooks is round; some of the barbs have the double curve silhouette of the barbed dart heads. A large specimen [Plate 43 -11] from Cottonwood is decorated with three short transverse lines across the back. A specimen [Plate 43 -9] from Yukon Island I has a longitudinal line down each side, and two transverse lines on each side of the butt. These lines may have been made with a metal tool (?). This is the only example of 'metal-cut' lines from the First Period. The largest specimen [Plate 43 -12], from Yukon Fox Farm III, is the only one with a curved shaft like those found by Jochelson on the Aleutian Islands.

The distribution is:

	Grooved	Not grooved	Unfinished
Cottonwood.....	3	2	
Point West of Halibut Cove.....	2		1
Yukon Fox Farm III.....	3		
Yukon Island III.....	35	12	
Yukon Island sub-III.....	4	1	
Yukon Island II.....	1	1	
Yukon Island I.....	2	2	
Yukon Island ?.....	1		
TOTAL.....	51	18	1

A specimen [Plate 43 -13] from Yukon Island II with three small barbs on the same side may also be part of a fish-hook barb. The shaft is straight, and the butt has been cut off.

#### BIRD BONE POINTS [PLATES 43 AND 55]

There are 39 sharp bird bone splinters which appear to have been hafted, perhaps as barbs for fish hooks. On almost all the butts are unfinished, but on 7 they are either cut off squarely [Plate 43 -17 and 19] or worked to a point [Plate 43 -18]. The specimens vary in length from 2 to 5 cm., and in width from 0.2 to 1 cm. One point [Plate 55 -19] was among the objects in the 'bag find' from Yukon Island III, and 5 were found together in Yukon Island II. That these specimens were intended as weapon points of some kind is suggested by the notching along the edges of 4 points [Plate 43 -16]. These specimens have up to four fine notches, on one edge only, and are distributed as follows: Yukon Island III 1, Yukon Island III or sub-III 1, Yukon Island sub-III 2. The distribution of all the bone points is: Cottonwood 4, Point West of Halibut Cove 1, Yukon Fox Farm II 2, Yukon Island III 19, Yukon Island III or sub-III 2, Yukon Island sub-III 4 (1 is doubtful), Yukon Island II 5, and Yukon Island I 2 (1 is doubtful).

#### BONE PINS [PLATES 43 AND 53]

There are 168 bone pins of various kinds. They range in length from 4 to 10 cm. The most typical specimens are about 7 cm. long. The sections are round or oval, rarely flattened or rectangular. The pins are more or less sharply pointed at one end. The butt is cut off squarely [Plate 43 -26 and 30] or is shaped to a blunt conical point [Plate 43 -25 and 29]. It is difficult to say for what these specimens may have been used. The sharper pins may have been awls or bodkins [Plate 43 -27 and 28]; others were evidently hafted and may have served as the barbs of large fish hooks or fish spears, as teeth for fish rakes, and so forth. Weyer has suggested that the specimens of this type from Port Möller may have been foreshafts for harpoons. None of these bone pins have holes or grooves in which the foreshaft line could have been attached, and though the number of foreshafts from Kachemak Bay is out of proportion to the number of harpoon heads, the number of bone pins is equally out of proportion.

An antler pin [Plate 43 -21], 8 cm. long, from Yukon Island III, is decorated with two (formerly with three?) longitudinal lines, one of which is bifurcated at the base, the triangular area filled with fine oblique hatching slanting down from right to left. This is a common variant of the Y motif.

The distribution of bone pins is: Indian Island (prehistoric) 1, Grass Island 1, Passage Island 2, Cottonwood 9, Point West of Halibut Cove 5, Yukon Fox

Farm III, Yukon Fox Farm II 3 (1 in grave, Plate 53 -4), Yukon Island IV 2, Yukon Island III 106, Yukon Island III or sub-III 4, Yukon Island sub-III 15, Yukon Island sub-III or II 3, Yukon Island II 6, Yukon Island I 8. The bone pin is thus among the types of universal distribution.

#### ANTLER POINTS WITH TRANSVERSE KNOB [PLATE 43]

A very definite type, about which we know nothing as to function, is represented by 4 specimens. These are antler pins (one is of whale bone), sharp at one end, with a transverse ridge or knob near the butt on the side formed by the inner part of the antler. Two specimens [Plate 43 -1 and 2] from Yukon Island III measure 8.7 and 7 cm. The smallest and most carefully made [Plate 43 -4] is from the Point West of Halibut Cove and is only 3.8 cm. long. The fourth specimen [Plate 43 -3], from Yukon Island III, is flattened on one side. On the other there are two transverse ridges setting off a groove for a lashing. The specimen is 4 cm. long.

#### AWLS [PLATES 44, 55 AND 56]

Besides the bone points, some of which may have been used as awls or bodkins, but about which we can say nothing definite, there are 269 awls, made for the most part of bird bone. These can be described under several heads.

There are 26 awls made of *bone splinters*, usually unworked, except at the point. They range in length from 5.5 to 14.5 cm. The two finest specimens are made of bird bone and could have served to drill holes in red shale beads. The others are much coarser. The distribution is: Jakolof's Place, layer 3, 1 [Plate 56 -13], Q'na'qesle in Tutka Bay 1, Indian Island 1, Passage Island 4, Cottonwood 3, Point West of Halibut Cove 1, Yukon Island IV 1, Yukon Island III 12 [Plate 44 -17], Yukon Island I 2. They are thus of universal distribution.

There are 98 awls made of whole bones, with the articulation left at the end. The largest of these are made of *animal bones*. There are 20 specimens of this type. There are two awls of seal radius [Plate 44 -32] and one of dog radius [Plate 44 -34] from Yukon Island III and one of seal radius from Cottonwood. A specimen of dog ulna [Plate 44 -33] is from the Point West of Halibut Cove. Seven awls of sea-otter fibula [Plate 44 -24] were found in Yukon Island III; one is from the 'bag find' [Plate 55 -15]. An awl made from the upper end of a dog tibia [Plate 44 -31] is from the Point West of Halibut Cove. Two specimens of penis bone (bear and sea-otter?) [Plate 44 -35] are from the same site. A specimen of marmot tibia is from Yukon Island III. Two specimens of caribou metacarpal split in two [Plate 44 -30], and two others of unidentified bone are also from Yukon Island III.



There are 78 awls made of *bird bone* with articulation handles, or fragments of such awls. Of these, 36 are practically complete. They range in length from 5.6 to 13 cm., and there are considerable variations in diameter depending upon the bone selected.

The most interesting specimen, from which the point is unfortunately broken, is made in two parts, the smaller bone being set into the larger bone which served as the handle [Plate 44-10]. It is from Yukon Island III.

The bird bones used for awls are: cormorant radius [Plate 44-15 and 16] and ulna [Plate 44-13], crane tibia, gull tibia and radius [Plate 44-12 and 14], loon ulna, swan metacarpal [Plate 44-23], femur [Plate 44-28], and humerus [Plate 44-29], and so forth.

The distribution is: Qatloxe'lye 3 [Plate 56-11 and 12], Q'na'qesle 1, Cottonwood 6, Aurora Spit 2, Yukon Fox Farm III 2, Yukon Fox Farm ? 1, Yukon Island III 43, Yukon Island-sub III 3, Yukon Island III or II 2, Yukon Island II 4, Yukon Island I 5.

Besides these, there are 20 miscellaneous specimens of *shaped bone* which are also awls. Nine specimens from Yukon Island III [Plate 44-18 and 19] and 1 from Yukon Island II have enlarged butts like hand drills. Two specimens from Yukon Island III and 1 from sub-III are more like bone pins. A specimen from Cottonwood and another from Yukon Island I [Plate 44-20] are very fine, almost like needles. Three specimens from Yukon Island III and 2 from Yukon Island sub-III are simply fragments of points about which nothing can be said.

#### DOUBLE-POINTED AWLS [PLATE 44]

There are 25 specimens of bird bone, with the articulation left as a head, and the end sharpened by grinding across the hollow bone from two sides, producing two points. It is hard to say for what these specimens were used, but on several the points are almost worn off as if by rubbing. The complete specimens vary in length from 6.5 to 12 cm. As far as could be identified, the bones are the radius and ulna of the cormorant [Plate 44-25], and radius of the gull [Plate 44-11].

The distribution is: Point West of Halibut Cove 2, Yukon Island III 22, Yukon Island III or II 1.

#### NEEDLES [PLATE 44]

There are 36 examples of sewing needles in the collection. They are made of bird bone. The longest specimen (broken) measures 7 cm. [Plate 44-4]; the shortest complete needle [Plate 44-1] is 5.3 cm. long. There are 2 specimens, from Yukon Island II [Plate 44-2] and from Cottonwood, in which the eyes are slits. On 12 specimens the eyes are drilled holes; these are from Cottonwood, Yukon Island III, sub-III and I. This is evidently the common type. The

needles are very slender, circular in cross-section, but usually flattened at the eye. The drilled eyes are so small that they will take nothing coarser than number 60 thread; some are still finer. The smallness of the eyes suggests that they were made with a metal drill, but this cannot be accepted as certain.

There are also 18 pieces of bird bone, probably unfinished needles. Three of these, complete except for the eye [Plate 44 -9], were found together in Yukon Island III.

The distribution of sewing needles is: Cottonwood 4 [Plate 44 -5], Point West of Halibut Cove 3 [Plate 44 -4], Yukon Island III 20 [Plate 44 -1, 3, and 7] (and 14 unfinished), Yukon Island III or sub-III 1, Yukon Island sub-III 3 [Plate 44 -6] (and 1 unfinished), Yukon Island II 1 [Plate 44 -2] (and 3 unfinished), Yukon Island I 4 [Plate 44 -8].

A very coarse needle [Plate 44 -21] was found at the Point West of Halibut Cove. It is 7.8 cm. long, and 0.6 cm. wide. The eye is cut. A bone implement like a needle [Plate 44 -22], pointed at both ends and with a slit in the middle, was found at Passage Island. It is 10.5 cm. long. It is difficult to say how these two specimens were used.

#### BIRD BONE TUBES [PLATES 44 AND 55]

There are 53 bird bone tubes in the collection, varying in length from 6 to 14 cm. Of these, 27 are partially split up into pieces suitable for needles [Plate 44 -26]. The others are unworked except for the cutting away of the bone at each end. Of the plain tubes, 18 may have served as *needlecases*, though in all but one case identification is doubtful. This is a fragmentary specimen [Plate 44 -27] from Q'na'qesle, the refuge island in Tutka Bay. It is ornamented with encircling lines in groups of two and three. Half of a bird bone tube was in the 'bag find,' Yukon Island III [Plate 55 -17].

The distribution of these specimens is:

	Split for needles	Unsplit	Needlecases?
Q'na'qesle . . . . .			3
Cottonwood . . . . .	1		
Point West of Halibut Cove . . . . .			2
Yukon Fox Farm III . . . . .	1	1	2
Yukon Island IV . . . . .	1		
Yukon Island III . . . . .	14	7	11
Yukon Island sub-III . . . . .		1	
Yukon Island II . . . . .	4		
Yukon Island I . . . . .	4	1	

## BONE SCRAPERS [PLATE 45]

In the collection there are 8 cut *caribou scapulae* which appear to have been used as scrapers, probably for dressing hides. The lower end is cut off from 9 to 12 cm. below the head. On a few [Plate 45 -14 and 17] the articulation is trimmed to fit the hand. The longitudinal ridge on the dorsal side has been cut away [Plate 45 -14]. These specimens are from: Yukon Fox Farm III 2 (1 unfinished), Yukon Island III 2 [Plate 45 -14], Yukon Island sub-III 3 [Plate 45 -15 and 16], Yukon Island II 1 [Plate 45 -17]. Owing to their fragmentary condition, the identification of these as scrapers is not absolutely certain.

A scraper of the same type as the above, but made of a beluga (or porpoise?) mandible [Plate 45 -13], was found in Yukon Island III or IV. The head, or the grip for the hand, is missing. The blade is very sharp. The specimen measures (12) by 6 cm.

Two of the *caribou scapulae* [Plate 45 -15 and 16] show an attempt to cut out a triangular area from the blade. Two such triangular pieces, 6.5 and 4 cm. long, are from Yukon Island III and Yukon Fox Farm III, respectively. Another fragment is from Yukon Island III. These pieces were intended as blades for scrapers, to be hafted in a handle. Two finished blades of this type [Plate 45 -9 and 10], measuring (6) by 3.5, and 10 by 4 cm., from Yukon Island sub-III and III, respectively, were found. The cutting edge is across one end and part way up one side. Both pieces are lined with knife marks as if they had also served as cutting boards.

There are also 8 scrapers made of animal scapulae and mandibles, but with *longitudinal, not transverse edge*. They must have been manipulated like knives. One of these [Plate 45 -12], made of a sea-lion (?) scapula, has the articulation cut away. The rounded edge of the bone serves as the grip, while the thin inner part of the scapula has been sharpened for the blade. This specimen measures 16 by 3.5 cm., and is from Yukon Fox Farm III. A similar blade made from the mandible of a large porpoise or beluga [Plate 45 -11] is from Yukon Island III. The edge is worn by much use and repeated whetting. Another specimen from Yukon Island sub-III has many knife marks on the blade, showing that it was used on occasion as a cutting board. Another specimen with lateral edge, made of the scapula of a large, unidentified mammal, is from Aurora Spit. From Cottonwood there is a scraper made of the scapula of a young brown bear. The articulation has been cut to fit the hand, and the longitudinal ridge cut off. Two specimens made of very small, thin scapulae are both from Yukon Island III.

Besides these, there are 9 fragments of sharp bone blades, probably broken from scrapers with lateral edge. All but one are from Yukon Island III. The ninth is from Yukon Island sub-III.

There are 6 scrapers made of *split caribou leg bones* (ulna, metacarpal, and metatarsal). The only complete specimen is made of a caribou metatarsal [Plate 45 -8], from Yukon Island III. In it were found five fish vertebra rings, covered

over with a bird breast bone. The caribou metatarsal had been split open and sharpened to an edge on one side. We do not know if the other end of the bone was retained as a handle. It seems unlikely, in view of the thinness of the specimen where it is broken. Like the scapula and mandible scrapers with longitudinal edge, these hollow bone scrapers seem to have been used like knives. Their distribution is: modern Indian midden at Yukon Fox Farm 1, Yukon Island III 4, Yukon Island III or sub-III 1.

A scraper from Yukon Island III and another from the Point West of Halibut Cove [Plate 45 -7] are made of the dorsal process of a thoracic vertebra of a moose. In type they are related to the split leg bone scrapers. The first specimen is fragmentary; the second was later trimmed down to 8.5 cm. in length.

Other fragments of split bone scrapers are from: Cottonwood 1 (highly fossilized bone [Plate 45 -5]), Yukon Island IV 1, Yukon Island III 1.

A fine scraper or knife [Plate 45 -6], made of a swan metatarsal with the distal end preserved as the handle, was found at Cottonwood. It is 9.5 cm. long.

A section cut from edge of the innominate bone of a brown bear has been hollowed out inside, and the edge is worn smooth as if it had been used as a *fat scraper*. The specimen is from Yukon Island III.

#### CUT RIBS [PLATES 45 AND 56]

There are 51 cut animal ribs. Those which have been identified are of the black and the brown bear. Others are probably from seal, porpoise, and other animals. They range in length from 5.2 to 16.5 cm. Two specimens, one a brown bear rib from Yukon Island II [Plate 45 -1], the second a black bear rib from Yukon Island III [Plate 45 -2], have been cut to a sharp point. Most of the specimens have blunt points, showing marks of use [Plate 45 -3]. They have probably been used as *flint flakers*. A few specimens are simply short sections of rib [Plate 45 -4]. The distribution is: Qatloxe'lye 1 [Plate 56 -10], Cottonwood 1, Yukon Fox Farm III 1, Yukon Island III 24, Yukon Island sub-III 3, Yukon Island sub-III or II 1, Yukon Island II 12, Yukon Island I 8.

#### CUTTING BOARDS [PLATE 46]

Four thin whale bone slabs from Yukon Island III have served as cutting boards [Plate 46 -10]. There are, of course, many slabs of bone and antler with knife marks, but these four specimens have been used as cutting boards over a considerable period of time, to judge by the deep and numerous cuts. The largest is 9 cm. long. The shapes are irregular and the specimens broken. On one the edge is nicely rounded.

#### HANDLES [PLATE 46]

Handles for knives are strikingly absent from the collection. No ulo or knife handle which could with certainty be identified as such was found. Doubtless many blades were unhafted, or the handles were of wood.

From Yukon Fox Farm III is a piece of the tibia (?) of a large animal [Plate 46-11], 13 cm. long, which has been cut to a blunt, bifurcated point, forming a slot 2.5 cm. deep. This may have been a knife handle though it was probably very clumsy.

A charred fragment of a nicely finished bone implement from Cottonwood looks like a knife handle, but the end which would have held the blade is missing.

A section of antler [Plate 46-12], 7 cm. long, from Yukon Island III, has a hole in one end and a deep groove part way around the other. This may have been the handle for a small knife. Another section of antler, 5.5 cm. long, also from the same locality, might have been a handle, though the interior of the antler is now rotted.

Three sections of bone from Yukon Island II are notched, as if for a grip, or for the attachment of a blade. The end which might have had the blade slit is missing in each case.

#### WEDGES [PLATES 46, 54 AND 56]

There are 95 wedges of whale bone and antler, or wedge-shaped implements, from Kachemak Bay. Some were undoubtedly used for *splitting wood* and are battered at the butt [Plate 46-2, 4 and 5, and Plate 54-9 to 11, and 13 to 16]. Others, too long and slender, not shaped to drive true, and without marks of blows, were probably used for *stripping bark* [Plate 46-1 and 3, and Plate 56-20]. The distinction between the two types is not always clear. The splitting wedges vary in length from 6 to 16 cm.—the average being about 10 cm. long—and in width from 2.5 to 5.5 cm. Two bark stripping wedges are much longer; one from Yukon Island III measures 41 cm. [Plate 46-1], another from Yukon Fox Farm III, 25 cm. Both specimens are curved. Another bark stripping wedge [Plate 56-20] from *Qatloxe'lye* is only 13 cm. long.

A specimen [Plate 46-8] from Yukon Fox Farm III is a splinter of (moose?) leg bone, ground along both edges to a wedge-shaped point. The butt is battered. It was probably used as a chisel.

Two specimens of ivory, from Yukon Island II and ?, measuring only 2.8 and 4 cm. in length, may have been toys, or may have been inserted under lashings, etc. to tighten a hafting, or they may have served some other function.

The distribution of the various wedge-shaped implements is: *Qatloxe'lye* 1, Point West of Halibut Cove 2, Yukon Fox Farm III 3, Yukon Fox Farm II 10 (7 in the double burial [Plate 54]), Yukon Island III 33, Yukon Island III or sub-III 1, Yukon Island sub-III 6, Yukon Island sub-III or II 2, Yukon Island II 10,

Yukon Island I 27. The wedge was apparently more used in earlier than in later times. Its decline in importance may be due to the introduction or development of the splitting adze.

#### ICE PICKS (?) [PLATE 46]

Two specimens from Yukon Island I and one from Yukon Island III [Plate 46 -9] look more like ice picks than wedges. Unfortunately the tangs are missing. One of the specimens from Yukon Island I is faceted [Plate 46 -7]. The other two specimens are simply pointed. They were probably used for breaking ice on lakes for winter fishing (or to get water), for though Kachemak Bay sometimes freezes over as far down as Bear Island (winter of 1931-32), and the arms, such as Sadie Cove, may freeze over (winter of 1932-33), there can hardly have been strong enough ice to permit of sealing or fishing through it. The interpretation of these specimens as ice picks is not certain, however.

#### PICK [PLATE 46]

A pick made of whale bone [Plate 46 -13] was found in Yukon Fox Farm III. It is 27 cm. long, circular in cross-section with a maximum diameter of 2 cm. The specimen is curved; the surface is polished throughout its length. It may have been hafted, though there is no indication to that effect. It was probably used to dig roots or to pry up shell-fish.

#### SHOVEL BLADES [PLATE 48]

Three specimens of whale bone are possibly blades for shovels. One of these [Plate 48 -11], from Yukon Island III, is 14 cm. long and 10 cm. wide. It is somewhat broken at both ends, and was at least 20 cm. long when complete. The butt is grooved for hafting. The second specimen from Yukon Island III is rectangular, measuring 17 by 7.5 cm. It is broken at the groove for hafting. The blade has been slightly hollowed out. The third specimen, from Yukon Island sub-III or II, is 9.5 cm. wide, with a wide groove across the narrowed base. The edges of the implement were rounded.

#### BONE DAGGER [PLATE 46]

A whale bone implement [Plate 46 -14], very different from the thin, sharp-edged knives or scrapers already described, was found on Passage Island, at the rock on the outer side of the island. It is 25.5 cm. long, and 3.3 cm. wide, with

three facets on each side. The grip is 8 cm. long. The edges are not very sharp. The implement was probably not used to cut anything, but might have served to stab wounded game. It is unique in the collection.

#### CUT ARTICULATIONS [PLATE 47]

There are 123 articulations, cut chiefly from the long bones of birds and mammals. The method of cutting has been to saw around and around until the head was severed from the shaft of the bone. As far as the bones can be identified, they are: Hawk, humerus; Eagle, ulna; Loon, humerus [Plate 47 -8, and 9] and ulna; Crane, humerus and ulna; Cormorant, humerus; Gull, humerus [Plate 47 -6] and ulna; Swan, ulna [Plate 47 -11], femur, and metacarpal; Owl, humerus [Plate 47 -10]; Gannet, humerus; Caribou, scapula, humerus [Plate 47 -22], ulna, radius [Plate 47 -14], femur, tibia [Plate 47 -24], metacarpal [Plate 47 -2, 3, and 12], metatarsal [Plate 47 -13], and tarsal bone; Moose, tibia; Dog, radius and femur [Plate 47 -7]; White Whale, flipper bone; Black Bear, humerus [Plate 47 -17], radius [Plate 47 -1], ulna [Plate 47 -20], femur [Plate 47 -18], tibia; Brown Bear, mandible [Plate 47 -4], humerus [Plate 47 -27], radius, ulna, femur [Plate 47 -23 and 26] and tibia [Plate 47 -19, 21 and 25]; unidentified Bear, penis bone.

The most interesting specimens are the heads from *two human adolescent tibiae* [Plate 47 -15 and 16]. The second of these, from Cottonwood, can be identified as a left tibia. The spongy interior of the bone has been removed, making a small cavity. The other specimen, from Yukon Island III, is not only hollowed out inside, but has a shoulder or lip around the edge, as if for a lashing. There are two pits hollowed out inside the bone, as if it had been the handle of some implement with double-pronged butt. The fragmentary head of a human (?) femur is also from Yukon Island III.

Most of these articulations were probably cut off and thrown away, the rest of the bone being utilized. Some could have served admirably as small boxes, since they are hollow inside and are capable of standing upright. Some of the bird bones could have been used as needlecases. These articulations have the following distribution: Q'na'qesle 1, Passage Island 2, Cottonwood 5, Aurora Spit 2, Point West of Halibut Cove 2, Yukon Fox Farm III 10, Yukon Fox Farm ? 1, Yukon Island III 70, Yukon Island III or sub-III 3, Yukon Island sub-III 14, Yukon Island sub-III or II 3, Yukon Island II 3, Yukon Island I 2, Yukon Island ? 5.

#### CURVED AND GROOVED POINT [PLATE 43]

From Yukon Island III is a curved piece of bone [Plate 43 -22], 8 cm. long, and grooved on the convex side. The ends are blunt and worn, as if it had been used as a flint flaker.

At Port Möller, Weyer found a curved bone implement, with longitudinal grooves on both the convex and concave sides. It suggests the specimen from Yukon Island, but it is 38 cm. long. A similar specimen from Port Möller has deep grooves on one side and on the concave edge.<sup>13</sup>

#### WORKED BONE AND ANTLER (PLATE 48)

From 550 to 600 miscellaneous pieces of worked bone and antler were collected, every site and every period being represented. The specimens vary in size and shape, though the most common are sections of bone and antler, sections of whale rib, shaped blocks, slabs, rods, and so forth. The methods of cutting were by sawing a groove across the piece or around and around until the desired section could be broken off. Hacking, whittling, and polishing were also employed [Plate 48 -4 to 10, 13]. There are no examples in which drilling has been used to separate two pieces, though several fragments with drilled holes or pits were found [Plate 48 -12]. The most common material, as far as identification was possible, was whale bone. Antler was much used, also. Bird bone was less frequently encountered, while walrus ivory or cut teeth were rare.

Several sections of cut whale rib may have served as *clubs*, but there is only one specimen [Plate 48 -14], from Yukon Island III, which is shaped to suggest a grip. It is 20.5 cm. long.

A whale vertebra from Yukon Island I has been hacked on the sides; the dorsal and lateral processes are cut off.

About 50 *bones cracked for marrow* were collected [Plate 48 -1 to 3]. They are from all periods and are without special significance.

#### SPOONS AND LADLE [PLATE 49]

A fragment of a bone spoon with a short straight handle [Plate 49 -2] was found in Yukon Island III. The handle is 4.3 cm. long, and is pierced at the end. The bowl was apparently very broad and shallow; it is rounded on the back and hollowed out on the inside, except for an area 1.5 cm. wide at the base of the handle.

A beautifully made antler spoon [Plate 49 -1] was found on Passage Island. It measures 14 by 3.8 cm. The bowl is an elongated oval, with only a slight concavity. The handle is broad and flares at the end and at the base of the bowl where it forms a pointed shoulder on each side.

A fragmentary whale bone handle [Plate 49 -4], 4.2 cm. wide at the widest part, was found in Yukon Island III or II. Both ends are missing. It appears to have been broken from a dipper, for the edge of the bowl is preserved, and the shape of the handle is not adapted to difficult or arduous manipulation. However, the fragmentary condition of the specimen prevents a certain identification.

<sup>13</sup> Unpublished specimens, American Museum of Natural History.



#### DRUM HANDLE [PLATE 49]

From Yukon Fox Farm III there is a whale bone handle [Plate 49 -12], 9.5 cm. long, and oval in cross-section, measuring 2.5 by 3 cm. There is a groove about the butt as if for a suspension thong. The other end has been cut down from one side almost to the middle, forming a scarf. The specimen appears to have been a handle for a drum. When complete there should have been a shoulder at the end of the scarf to form the slot in which the drum frame was fitted. Because the specimen is defective, identification remains uncertain.

#### TOPS [PLATE 49]

Four tops were found. One, from Yukon Island III, is made of the epiphysis of a small whale vertebra [Plate 49 -13], 7 cm. in diameter, with a hole drilled in the center for the pin on which the top was spun. A similar specimen, 9.5 cm. in diameter, is from Yukon Island IV. Two others, made of thin slabs of whale bone, 7 and 7.5 cm. in diameter, are from Yukon Island III and the Point West of Hali-but Cove, respectively. The holes through the first two specimens are made with the bow drill, those through the last two with the hand drill.

#### STONE BALLS

Three small, almost spherical stone balls, 2.5, 3 and 3.5 cm. in diameter, were found in Yukon Island III. They resemble two stone balls figured by Jochelson from Umnak Island, one of which he describes as a 'round stone of tachylite tuff used in the game called *a'gix*'. The game consists in throwing three or four stones up, one after the other, with one hand, and catching them in the same hand.'<sup>14</sup>

#### MEN FOR A GAME? [PLATE 49]

Four short bars of antler from Yukon Island II may have been men for a game [Plate 49 -9], possibly all from the same set. They are from 3 to 3.7 cm. Two are marked with three transverse lines on one side. An animal toe bone from Yukon Island sub-III has three cuts on one edge and may be a similar specimen.

#### BOXES? [PLATE 49]

From Cottonwood there is a fragment of a hollow bone object with a lip around one end [Plate 49 -8]. The other end is missing. It was identified by

<sup>14</sup> Jochelson, 1925, explanation of Pl. 17 -27 and 29.

Anisim as a 'handle,' for what he could not say, and by Wassila as a haft for an adze, tu'kuli. However, the specimen seems to be too fragile to have been an adze haft. At Yukon Island III was found part of a similar object, still more delicate. It is possible that these are fragments of small boxes.

#### AMULET BOX [PLATE 51]

A rectangular piece of ivory [Plate 51 -6] from Yukon Island sub-III, measuring 2 by 1.8 cm. and 0.8 cm. thick, has four facets on one side, somewhat after the style of the ivory objects described below as buckles. In the other side is cut a shallow depression running to one edge of the object, through which is drilled a small hole (for suspension?). Across the faceted side there is an interrupted groove. The specimen is probably half of an amulet box, like those of the Canadian Thule culture or modern specimens from northern Alaska, made of two parts lashed together by a string in an encircling groove.

#### BEADS [PLATE 50]

Thirty beads of red baked shale were found in Kachemak Bay. These are all cylindrical, with the same diameter throughout, except for a single specimen [Plate 50 -10] from Yukon Island III, 2.3 cm. long and 1 cm., in diameter, which tapers towards both ends. The typical specimens [Plate 50 -5 to 8] vary in length from 0.5 to 1.8 cm., and in diameter from 0.6 to 1.5 cm. One of the unfinished specimens, from Yukon Island sub-III, is almost rectangular and is 2.3 cm. long. The holes in the beads were made by both hand and bow drills with very fine points. The holes were usually drilled from both ends of the bead. In the largest specimen [Plate 50 -11], from Yukon Island III, the hole has been drilled from one end only. It is 0.35 cm. in diameter at one end and 0.2 cm. at the other. The length and fineness of the hole raises the problem of how it was made. Like the incised lines noted on several bone and ivory specimens, it gives the superficial impression of having been made with a metal tool. The very fine slate 'awl' [Plate 36 -17] from Yukon Island III might have drilled many of the small holes, but it is too coarse for this specimen. It is difficult to say if finer slate 'awls' could be made. On the other hand, the baked shale is soft enough to be worked with bird bone. The bone drill point, figured on Plate 36 -8, is fine enough to have made the holes. It is significant that beads of this type are made only of the soft baked shale. The distribution of these beads is: Cottonwood 8, Point West of Halibut Cove 2, Yukon Island III 12, Yukon Island III or sub-III 1, Yukon Island sub-III 7. This type appears to belong only to the Third Period. Natives to whom I showed specimens were unfamiliar with this kind of bead.

From Yukon Island sub-III is a rather curious, flat, rectangular bead of red

shale with *two holes*, side by side [Plate 50 -9]. The specimen measures 2 by 1 cm. and is poorly finished.

Two very small *tubular shell beads* [Plate 50 -12] were found under the skull of the young man, 31-20-102, in the double burial at Cottonwood. They are 0.6 and 0.4 cm long, and are irregular in shape. Presumably this was the type of bead worn by men.

About the neck of the woman's skeleton found by Fields in the upper layers at Yukon Island, were a great quantity of small *rectangular shell beads*, forming three strands reaching almost to the waist. They are made of cockle (*Cardium*) shell, and measure approximately 0.5 by 0.7 cm. The hole in most cases is drilled from both sides with a hand drill. Beads of the same type [Plate 50 -19] were found among the scattered bones of a woman at Cottonwood. These beads were not, as I have explained, buried with the body, but became associated with it by accident. They measure 0.5 by 0.8 cm. Both Anisim and Wassila were familiar with beads of this type, and gave the Athabaskan name *tcunq'c* (Anisim) or *tsa'ng'as* (Wassila). The latter specified that they were worn by women. Anisim said the Eskimo of Port Graham called them *aqlu't*.

From Yukon Island III there are two beads of the same shape, made of *bone* [Plate 50 -4 and 13]. They are 1 and 1.3 cm. long.

A *cylindrical bead of ivory* [Plate 50 -21] and an oblong specimen made of a large molar (animal) were found in Yukon Island III. They are both 1.8 cm. long. Alec Mishikof, a Kenai Indian, told me that the Indians used to get fossil ivory beads from the Eskimo of the Alaska Peninsula and that they were prized as amulets by both Eskimo and Indians. A bead of ivory was considered by the Cook Inlet Athabaskans to be the proper fee to a shaman for services or for initiation. In the stories Alec told me, Ba'xlarax, chief of the Afognak Island Eskimo, owed part of his supernatural power to such a string of beads.

Ten *sections cut from bird bones* [Plate 50 -14 and 15] and 2 cut from small animal bones, appear to have been beads. A bird bone bead [Plate 50 -16] was found beside the skull of the man buried in Yukon Island II, (32-9-1). These beads vary in length from 0.9 to 4.5 cm., and in diameter from 0.5 to 1.2, depending on the size of bone chosen. Their distribution is: Point West of Halibut Cove 1, Yukon Fox Farm II 1, Yukon Island III 5, Yukon Island sub-III 3, Yukon Island II 1.

A section of a natural *concretion*, formed about a root, was found in Yukon Island III. It may have been used as a bead.

#### PENDANTS [PLATES 50, 52, AND 56]

Not including the long ivory rods with holes, in the 'bag find' from Yukon Island III, 22 pendants were found in Kachemak Bay. Four pendants are animal teeth, 9 are of undecorated ivory and bone, 6 are of ivory and bone and are

decorated, and 2 are carved into realistic forms. One specimen of red baked shale is unfinished.

The *tooth pendants* are from Yukon Island I (a fragment with a hole), Yukon Island II (a seal canine with suspension hole [Plate 50 -26]), Passage Island (seal canine with groove about the roots [Plate 50 -25]), and lastly from Qatloxe'lye (a beluga or porpoise tooth grooved about the roots [Plate 56 -8]).

Seven pendants are simply *plain bars of ivory*, with a hole at one end [Plate 50 -27 to 29]. One of these [Plate 50 -37], from Yukon Island III, is made of a large buckle (see below), split lengthwise. It is 8 cm. long. The others are from 3 to 6 cm. long. They are all from Yukon Island III, except for one from Yukon Island II.

A flat bone rod from Yukon Island sub-III, 8.3 cm. long, with a hole at one end [Plate 50 -30], may be a pendant or may be of the same type as the ivory rods in the 'bag find' (compare Plate 55 -1 to 14).

The unfinished *pendant of red shale*, from Yukon Island III, is the same shape as the ivory bar pendants.

An ivory drop pendant, *with slender neck* [Plate 50 -23], was found in Yukon Island III. The end of the neck with the hole has been broken off. The fragment is 4 cm. long.

Of the *decorated specimens*, 5 have *transverse ridges or notches*. Four are of ivory and are from Yukon Island III. The first of these [Plate 50 -17], 3.3 cm. long, is decorated about the bottom with two encircling grooves, in the lower one of which is an unfinished hole. Another has four lines about the narrow neck and six longitudinal lines below it [Plate 50 -2]. A third has four encircling lines about the upper part [Plate 50 -1]. The fourth specimen [Plate 50 -3] is somewhat flattened, 2.3 cm. long, and is much wider at the bottom than at the top. The suspension hole, now broken out, is drilled from edge to edge, rather than from side to side. The ornamentation consists of five transverse lines running across both edges and one side.

A specimen of bone [Plate 50 -18], from Yukon Fox Farm II, is notched on both edges near the bottom. The upper end is missing. It was originally about 4.5 cm. long.

The sixth specimen has an *incised decoration* [Plate 50 -24]. It is of bone, oval, flat on one side and slightly rounded on the other. There is a hole in the middle, and the specimen has been cut in two lengthwise through this hole. The decoration consists of a small triangular hatched area about the hole, a line running down beside the hole (on both sides?), a transverse line through the hole, and another transverse line across the bottom. The rounded bottom of the pendant and the lower transverse line have a row of tiny spurs or notches. A curving line (or lines?) connects the upper transverse line and the longitudinal line (or lines).

From Yukon Island III there are 2 ivory pendants carved in *realistic forms*. The first of these is only 3.5 cm. long and represents a bird (eider duck?) with

neck outstretched as if in flight [Plate 52-6]. The wings are not indicated. The feet are represented by a slight projection, the eyes by tiny pits. A third small pit is in the center of the breast. The hole for suspension is in the tail. It is difficult to say what the second pendant represents [Plate 52-4]. It cannot be a snake or a lizard for these reptiles are not found in this region. The eyes are again represented by pits, and there is a line of six pits down the back. The specimen is 6.8 cm. long to the suspension hole, where it is broken.

#### FISH VERTEBRA RINGS [PLATES 51 AND 55]

There are 56 rings made from the vertebrae of large fish (halibut ?) [Plate 51-4]. These rings were made by cutting off the ends of the vertebrae. Some have been smoothed on the inner or convex side, others are left rough. The rings vary in diameter from 2.2 to 3.8 cm., and the holes from 1 to 2.5 cm. Similar rings, made of halibut and shark vertebrae, were found by Jochelson in shell heaps on the Aleutian Islands. These, he reports, were used in pairs to fasten the straps of the kayak half-jacket.<sup>15</sup> Some of the specimens in our collection were found singly. In Yukon Island III, 5 complete rings and 7 fragments, representing in all 12 (?) specimens, and another set of 23 rings were found together, lying as if strung on a cord. Five rings were found in a hollow bone scraper [Plate 45-8], under a cover made of the breast bone of a loon, in Yukon Island III, and a single ring [Plate 55-20] was among the objects in the 'bag find.' With the exception of a specimen from Passage Island, and another from Yukon Island sub-III, all are from Yukon Island III.

#### BUCKLES AND TOGGLES [PLATES 50 AND 51]

Ten objects made of walrus ivory [Plate 50-32 to 38] were found at Yukon Island and Cottonwood. They are rectangular, ranging in size from 1.7 by 1.2 cm. to 6.5 by 3.5 cm. The broken specimen, made into a pendant [Plate 50-37], is 8 cm. long, and was probably 3 cm. wide. They are flat on one side, with four bevels on the other and a hole through the middle. The largest complete specimen [Plate 50-38], from Yukon Island III, is worn as if it had been a latch for a door or box, rotated on a pin, the ends fitting into slots. None of the other specimens show signs of wear. One specimen, poorly made and lacking facets [Plate 50-33], is from Yukon Island II. Another [Plate 50-36], from Yukon Island III, has a hole through one end, as if later used as a pendant. That these specimens may have been belt buckles is suggested by a description of such buckles worn by the Eskimo about Bering Strait: 'Another style of button or belt fastener is made from a rounded, oval, or quadrangular flattened piece of

<sup>15</sup> Jochelson, 1925, Fig. 104, p. 100.

ivory or bone, pierced through the center with a single hole for the accommodation of the belt cord.<sup>16</sup> It is evident from the poorer finish on the flat side that it was meant to be concealed. The distribution of these: is Cottonwood 1, Yukon Island III 7, Yukon Island III or II 1, Yukon Island II 1.

A piece of ornamented ivory [Plate 50 -20], from Yukon Island III, appears to be one end of a heavy buckle, like that used farther north for the dog harness. (It can hardly have been used for that purpose in this region.) The decoration is on each edge of the buckle. At the bottom of the fragment is a small drilled pit, from which a pair of double lines diverge to the end of the buckle. The lines appear to have been cut with a metal tool.

A toggle of antler [Plate 50 -22], 4.5 cm. long and oval in cross-section, was found in Yukon Island III. It has a hole through the middle. A fragment of a toggle (?) with a groove about the middle was found in Yukon Island II. It was originally about 6 cm. long. A fragmentary toggle or buckle [Plate 51 -12], decorated with a longitudinal line (metal-cut ?) on each side, is from Yukon Island III.

#### IVORY CLASP (?) [PLATE 50]

A decorated ivory object [Plate 50-31], said to have been found in Tutka Bay at the same spot where the lamp with whales was found, is apparently an ornament of some kind. It consists of a broad curved piece of ivory attached at one end to a cylindrical bar, which it almost touches at the other end. The total length is 8.5 cm. When the ivory was fresh it had more elasticity, and could have held something (clothing, hair ?) in the fashion of a clasp. The decoration consists of a double line outlining the curved piece. At the top, the outer line has a series of spurs. There are three pairs of curving transverse lines across the curved piece, the lower line of each pair being spurred. The ornamentation, though simple, suggests the art of the Old Bering Sea culture. These lines have been cut with a stone tool. The specimen has been whittled and scratched by the finder.

#### LABRETS [PLATE 51]

There are 39 labrets in the collection. The materials are bone, ivory, fossilized wood (?), gypsum, marble, oil shale,<sup>17</sup> and tuff. At first I attempted to

<sup>16</sup> Nelson, p. 61.

<sup>17</sup> Labrets of oil shale are known from the Eskimo of Point Hope and Point Barrow. The material is obtained from the vicinity of Point Barrow. The oil shale of which the Kachemak Bay specimens is made does not resemble that from the Point Barrow region, but was derived from some unknown source. (Information from Dr. Philip Smith, Chief Alaska Geologist, U. S. Geological Survey.) The nearest oil field to Kachemak Bay is that of the Inuskin-Chinitna region, southwestern Cook Inlet. There is another oil field at Katalla, Controller Bay, in the Gulf of Alaska. It cannot be proved by an analysis of the labrets that the material out of which they were made was derived from either of these two possible sources.

classify them by size and shape as 'novices' (very small and slender), 'lateral' (narrow at the base with long stud), and 'medial' labrets (broad base and low stud), but later discovered that such an arbitrary classification was misleading.

Only 3 labrets were found associated with burials. The oldest of these [Plate 51 -31] was with the skeleton of a man, 32-9-1, in Yukon Island II. The labret is simply a narrow strip of ivory, 6.7 cm. long and 1.8 cm. wide, curved on the inner side to fit the jaw. A fine line (cut with a metal tool ?) outlines the projecting edge. The labret evidently belongs to that class, described by Jochelson from the Aleutian Islands, which was not actually worn but was fitted into wooden masks.<sup>18</sup> The child in the double burial in Yukon Island sub-III wore, in the middle of his lower lip, a flat marble labret [Plate 51 -24] with a very long stud. The specimen measures 1.5 by 5.8 cm. The man in the same burial wore a flat gypsum labret [Plate 51 -36] in the left cheek. The specimen is 2.7 cm. wide, and must have been at least as high before being broken. Presumably there was a similar labret in the other cheek, but it was not found.

Beside the head of the woman's skeleton, found by Fields in the upper layers of Yukon Island, there was an object which Fields at first interpreted as a clasp. After he had seen some labrets, he was inclined to consider it a labret. The object was of bone or ivory, carved in two parts which fitted together with a tenon and socket joint, fastened by a small pin. Both pieces had rectangular bases with rounded corners, and when joined together formed a spool-shaped object.

An ivory carving of a man from Jakolof's place [Plate 52 -7] has three holes in the lower lip for labrets. The man's face on the curious double-faced doll from Yukon Island II [Plate 52 -2c] shows what is possibly a large medial labret. The archaeological evidence thus shows that women sometimes wore a large labret (medial ?), and that men wore the medial labret, a (pair of ?) lateral labrets, or three labrets in the lower lip. Holmberg reports that the men of Kodiak wore a single labret, and that the women wore from two to six in the lower lip.<sup>19</sup> A mummy of an adult male from Prince William Sound has incisions for a pair of lateral labrets below the corners of the mouth.<sup>20</sup>

In the collection there are 9 specimens which are probably *novices' labrets*. They vary in height (i. e., length of stud) from 1.8 to 3.2 cm. and are of ivory, marble, and shell. They are flat [Plate 51 -23] or oval in section [Plate 51 -17 to 20] and are rounded at the base to fit the jaw. The tallest of these, from Yukon Island III, has a hole at the end for the suspension of a pendant [Plate 51 -17]. The distribution of these is: Cottonwood 1, Yukon Island III 6, Yukon Island sub-III 2, Yukon Island I 1. A much weathered specimen of gypsum from Yukon Island III or sub-III may be included in this group also. A small specimen [Plate 51 -9] from Cottonwood may be a labret, or possibly an ear plug.

<sup>18</sup> Jochelson, 1925, p. 100, especially Fig. 90A, 10 cm. long.

<sup>19</sup> Holmberg, p. 82; Bancroft p. 72.

<sup>20</sup> Dall, 1878, p. 32.

There are 3 *flat bone specimens*, from Yukon Island III [Plate 52 -25], Yukon Island III or sub-III, and Yukon Island sub-III, varying in height from 3.3 to 5 cm.

Nine labrets [Plate 51 -22, 26, 27, 29 and 30], probably worn in pairs have a *cylindrical or 'hat-shaped' stud*, from 1.6 to 3.5 cm. high. The bases are oval and vary in width from 1.9 to 2.8 cm. All but two [Plate 51 -27 and 30] are rounded to fit the jaw. They are of ivory, marble, gypsum, oil shale, and tuff. The distribution is: Passage Island 1, Cottonwood 1, Yukon Island III 6, Yukon Island II 1.

A very remarkable specimen [Plate 51 -21] from Yukon Island III, has an oval stud, 3.5 by 2.8 cm., *incised to represent an eye*. A pit, almost 0.5 cm. deep, held an inset to represent the pupil. Around this is a circular band, hatched with radiating lines, and outlined by two concentric circles, evidently incised first with a compass or some other mechanical device and retraced by hand. At the corners of the 'iris' are two hatched triangular areas, pointing downward. The shape of the labret is also unusual. From the size of the base, 4 by 1.5 cm., one would suppose it was a medial labret, yet it must have been one of a pair. The labret is asymmetric, the top of the stud projecting 1 cm. to one side. On that side there is a small hole at the base, perhaps so that the labret might be connected inside the lip with its mate. In that case, the specimen was worn on the right side.

Among the specimens with *broad base and low stud* there are 5 of marble [Plate 51 -28 and 33]. On all but one the stud flares slightly. The base varies from 4.5 by 2 cm. to 3 by 1.3 cm., the height of the stud from 1 to 1.3 cm. Their distribution is: Cottonwood 1, Point West of Halibut Cove 1, Yukon Island III or sub-III 1, Yukon Island sub-III 1, and Yukon Island ? 1. A much weathered specimen of gypsum from Yukon Island III was probably of this type. A labret of highly fossilized wood (?) from Yukon Island sub-III is of a closely related type.

Four fragments of oil shale [Plate 51 -32 and 34] are from *very large labrets*, almost certainly medial. One of these, from Cottonwood, was originally circular in shape. Over half the circle is gone and the flare which fitted inside the lip is broken off. The rough edges have been smoothed and an attempt has been made to regroove it for further use, though it seems unlikely that it could be worn again. The circular shape and the concavity in the outer surface remind us of the labrets worn by the Tlingit women. The other three labrets were originally oval in outline, with a deep groove running around the edge. They vary in thickness from 2 to 2.5 cm. The largest fragment [Plate 51 -34] is from a specimen originally about 5 by 6.5 cm. They are curved on the base to fit against the gums. The outer surface of the stud is flat [Plate 51 -34] or slightly concave [Plate 51 -32]. They are from Yukon Island III.

A unique specimen of ivory [Plate 51 -35] is from Yukon Island I. It has a flat round stud, and an elongated oval base with pointed ends. The labret is 3.8 by 1.2 cm. at the base, and 1 cm. high.

A curious specimen of marble [Plate 51 -37] from Yukon Island III is



circular, flaring from 2 to 2.5 cm. in diameter. It is 1.8 cm. high. Through the middle is a drilled hole. It is not possible to prove that this specimen was a labret.

EAR PLUG, NOSE ORNAMENTS, ETC. [PLATES 43, 51 AND 56]

Near the skull of 32-9-1, in Yukon Island II, was found a button-shaped object of bone [Plate 51 -13]. The circular base is 2.5 cm. in diameter, very thin at the edge, and slightly convex on the lower surface. The cylindrical shank is 1.5 cm. long. From the position in which the specimen was found, as well as from its shape, we may infer that it was worn in a hole in the ear. The ivory carving from Jakolof's place [Plate 52 -7] has two holes in the helix of each ear; the ivory head from Yukon Island III [Plate 52 -1] has a single hole in each ear. These are evidently to hold *ear ornaments* of some kind.

From Yukon Island III we obtained a remarkable bone carving, evidently an ornament [Plate 51 -11]. It is 3 cm. long, circular in cross-section, and shaped like a U, with downward sloping knobs at each end. At the two ends of the U and at the ends of the two knobs there are pits, evidently to hold inserts. The only sign of wear is a rubbed groove at the middle of the U. The object was probably worn in a hole through the lobe of the ear or in the septum of the nose. It is quite unique, however, and any explanation of it must be highly conjectural.

The ivory bust from Jakolof's place has a hole drilled through the septum for a *nose ornament* of some kind. Some of the beads may have been worn on strings hanging from the nose. Though no nose pins like those found by Jochelson and Weyer were obtained in Kachemak Bay, there are several specimens in the collection which may have been worn in the nose.

An ivory pin [Plate 51 -10], 6 cm. long, from Yukon Island III, is decorated by a raised band about the middle and an encircling groove and ridge at the ends. It is evidently an ornament of some kind.

Another specimen from Yukon Island III is a fragmentary ivory pin [Plate 51 -7], now 5 cm. long, decorated with three transverse lines. The specimen evidently tapered towards both ends and was about 10 cm. long. From Cottonwood there is a poorly made pin of whale bone decorated with seven transverse lines on one side. It is also broken.

From China Poot Bay there is a pin of whale bone [Plate 56 -9], 8.6 cm. long, tapering slightly towards the blunt ends. It is decorated with a fine spiral line making almost three complete turns. A fragment from the Point West of Halibut Cove is perhaps from a similar specimen. A slender ivory pin [Plate 43 -23], blunt at both ends, was found at Q'na'qesle. It is not possible to say how these pins were used. They may have been tallies for a game or they may have been worn in the nose.

A very nicely carved bone object [Plate 51 -3] from Yukon Island III consists of an oval ring, with a maximum diameter of 2.8 cm., along one side of

which the bone widens to enclose a groove or socket, the outer edge of which is broken away. A small section is also broken from the ring. The object seems too fragile to have been subjected to much strain. It is probably an ornament, whether for finger, nose, or ear, etc., it is impossible to say.

#### DENTALIUM SHELL [PLATE 51]

A dentalium shell [Plate 51 -8] was found at Cottonwood. This species is not native to Alaska. Shells were formerly obtained from Washington or Oregon, and were traded by the Northwest Coast Indians to the Eskimo of Kodiak Island and to the Indians of Cook Inlet and the Tanana River, who used them as nose or ear ornaments. They were sometimes traded as far north as the mouth of the Kuskokwim. They were highly prized by the Kodiak Eskimo and the Aleut, who used them both for the nose and ears.<sup>21</sup>

#### ARTIFICIAL EYES [PLATE 51]

In the sockets of all four skulls (man's, child's, and the two trophy heads) in the double burial in Yukon Island sub-III, were found artificial bone eyes. The largest and best preserved specimens [Plate 51 -15] are those from the man's skull. They are thin, slightly curved pieces of whale bone, shaped like an oval with pointed ends, 1.5 by 3 cm. A hole drilled through the center evidently represents the pupil or was to hold a dark inset.<sup>22</sup> The specimen [Plate 51 -16] found in the socket of the child's skull (the mate was not found) is smaller, besides being more curved and narrower in proportion. It is 2.5 cm. long. The eye found in the first of the trophy skulls (the mate was not found) is of ivory and is equally narrow and pointed. Those from the second skull are broader in proportion, but are also smaller than those of the man.

Under the skull of the adult in the double burial at Cottonwood was found an object [Plate 51 -14] which was at first interpreted as a small buckle. It is almost identical with the artificial eye, later found in the socket of the child's skull in Yukon Island sub-III. The only difference is that one edge of the Cottonwood specimen is straight and the other sharply curved, while the eyes from Yukon Island sub-III are symmetrically shaped. I think, however, that the specimen from Cottonwood was an eye, also. It measures 2.4 by 0.8 cm. An identical specimen, 2.7 cm. long, was found in Yukon Island III, but apparently without any association with skeletal remains.

<sup>21</sup> Petroff, pp. 25, 138, and 162; Langsdorff, p. 339; Holmberg, p. 81. They are also reported from the Eskimo of Bering Strait and the Mackenzie delta (Birket-Smith, II, p. 268, Table A62).

<sup>22</sup> In the loot sent by Cortez to Charles V, is a mask, now in the British Museum. It is inlaid with turquoise, and has pieces of shell representing the eyes and the upper teeth. The eyes are identical in shape with those of Yukon Island, and are without insertions in the pupil. (J. Eric Thompson, *Mexico Before Cortez*, New York, 1933, Pl. X.)

### DOLLS OR FIGURINES [PLATES 52 AND 56]

In the modern Indian layer near the feed shed, Yukon Island, was found a piece of whale bone, cut to suggest a human head, neck and shoulders [Plate 56 -7] The features are not indicated. It is possible that a stuffed body was added, or that the doll was made to fit the man-hole of a toy kayak. The figure is 3.5 cm. long. The interpretation is not certain, however.

From Yukon Island III, a rectangular slab of whale bone, 9.8 cm. long, is cut to suggest a head without features, and a body without arms and legs. The interpretation of this specimen is also doubtful.

In striking contrast to the above are the ivory carvings from Yukon Island and Jakolof's place. The ivory bust [Plate 52 -7] from Jakolof's place, layer 2, was found in a grave, together with one or more splitting adzes, and a slate knife. It was evidently the property of a man, one of his most precious possessions, or else an object which his survivors, like the finder Jakolof, feared to keep. The artistic skill shown in the carving of this specimen and the head from Yukon Island III is so great that they do not appear to have been children's toys. The Indians at Kenai to whom I showed a picture of the Jakolof bust, told me that it was a *shamans's puppet*, ja'nju (Athabaskan), a representation of his guardian spirit.\*

The Jakolof carving represents the head and upper part of a man, lacking arms. The piece is of walrus ivory, 7.5 cm. high, 5 cm. wide, and 2.5 cm. thick. The head is high, narrow, and shaped like an egg. It was apparently bald, for there is no indication of hair. The face is long and narrow, with high cheek bones. The eyes slant a little, and as someone aptly described them, they seem to follow one about with an evil expression. The nose is long and slender; the septum has been pierced for a nose pin or other ornament. The ears each have two holes for ear ornaments. The lower lip is pierced by three holes to accommodate miniature labrets, and hangs down, as if by their weight, almost to the chin. The front of the chest is finished very roughly, but the back shows the modeling of the muscles. The figure is cut off squarely at the waist, with a large hole drilled from the front to the base. The long narrow face does not suggest that of an Eskimo, though this specimen is obviously of Eskimo manufacture.

The ivory head from Yukon Island III [Plate 52 -1] is broken off at the neck. The head is flattened from front to back, probably due to the limitations of the material. The hair is indicated by straight, vertical lines, and falls behind the ears to the nape of the neck. A curved line shows the edge of the hair over the forehead. The forehead is low, the face flat and broad with high cheek bones, wide flat nose almost negroid in shape, and long thin upper lip. The eyebrows

\* The high pointed head is a striking characteristic of the shaman's familiar spirit, Dr. Birket-Smith informs me. This concept of the spirit with pointed head is found in Siberia and we encountered it also in our ethnological work in Prince William Sound in 1933. We might note, however, the possibility of artificial deformation of the skull. 'Kodiak Island shows the first trace in the far north of cranial deformation, of the cradle-board variety (occipital flattening). But this was not universal.' (Hrdlička, 1932, p. 102).

are well arched. The pupils of the eyes are formed by tiny pits, in which plugs were probably inserted. The ears are each pierced with a fine hole. Viewed from the side, the face seems to have a sullen expression, with prominent chin and thin protruding lips. In the back of the head, a deep pit has been drilled, evidently after the head was broken from the body. It is possible that it was then used as the *mouthpiece for a bow drill*. The head is 3 cm. high. These two specimens are the finest examples of Eskimo portraiture that I have seen.

A rather crude doll [Plate 52 -3] from Yukon Island sub-III, carved from a walrus molar (?), is in the same curious style as the stone and ivory dolls from Port Möller on the Alaska Peninsula. The face is flat, oval in outline, and is separated from the body (represented by the main part of the tooth) by a deep groove. The features, consisting of the eyes, eyebrows, nose and mouth, are indicated by dots and lines. Below the mouth is a vertical line with three pairs of short spurs slanting down from it, which suggests the *tattooing* on the chins of the Alaskan Eskimo women. The specimen is 5.5 cm. long. It was found in layer 5a, in the refill above the double burial, with which, however, it probably had no connection.

An ivory carving from Yukon Island II has a human face on each side [Plate 52 -2]. One has a mild expression (the sex is uncertain [Plate 52 -2a]); the other [Plate 52 -2c], a man's face with mustache, is rather forbidding. On the first, the eyes and mouth are indicated by horizontal lines, and the eyebrows by a row of fine vertical lines. On the man's face the eyebrows and mustache are indicated in the same way. The eyes are small drilled pits, surrounded by very small circles (drawn with a compass?). There were probably insets in the eyes. The mouth is open; inside can be seen the tongue or the flange of an enormous medial labret. On both faces two pairs of lines slant down from the bridge of the nose across the cheeks, representing *tattooing or painting*. The top of the head on both sides is pointed (representing a hat? or simply the conventionalized shape), and is outlined by two lines on one side and by three on the other. Between the faces is a slit, as if to hold a blade. At the level of the mouth a hole has been drilled through from edge to edge. Above this hole there are three pits, partially drilled through from one edge [Plate 52 -2b], and two pits in the other edge. In the uppermost of the three pits are the remains of a bone inset. The neck is long and cylindrical, like a handle; the end is broken off. It is pierced by a slot, 2 cm. long, made by cutting away the ivory from between two drilled holes. The total length of the specimen is now 6 cm.; the head alone measures 2.5 by 1.5 cm. and is 1.3 cm. thick. It is difficult to determine for what it was used. While the slit suggests a blade, the neck or handle seems to have been too fragile for practical use. If we apply the Indians' explanation of a shaman's puppet (also suggested by the pointed head), we should probably say that the head was articulated on a body, and that the two faces, with their different expressions, were turned forward at different stages of the performance. This explanation is highly conjectural.

From Yukon Island I we have a *stone head* [Plate 52 -8]. It is simply half of an egg-shaped pebble, 5 by 3.4 cm. in diameter, on the rounded surface of which a face has been pecked out. Only the portion about the nose and below the brows has been removed, but the artist has been able to suggest the slanting eyes, high cheek bones and narrow nose of the Eskimo. Aside from the lamps with human figure and with whales, this is the only realistic carving in stone from this region. The workmanship is inferior to that of the lamps, but it is interesting to find that technique already developed in the First Period which was to produce those masterpieces of stone carving in the Third.

#### IVORY SEA-OTTER [PLATE 52]

On the beach at Seldovia was found a carving in fossil mammoth ivory [Plate 52 -9]. It is almost identical with a specimen from Bristol Bay which Collins has published as an example of the persistence of the Punuk decorative style into modern times.<sup>23</sup> The Seldovia carving was probably an ornament or buckle, fastened to some other object by two holes drilled through a longitudinal ridge at the back. It measures 9.3 cm. As on the Bristol Bay carving, an animal\* is shown, holding its head in its hands, the forelegs being in full relief and detached. The eyes of the Seldovia figure are small drilled pits, which originally must have held insets. On the Bristol Bay carving the eyes and nostrils are indicated. On the latter specimen, the rear flippers are shown, while the Seldovia figure has only four incised lines at the concave base, corresponding to the marks on the flippers in the other figure. On the body of the Seldovia sea-otter is incised a longitudinal line, with four round dots on it, from which slanting lines run downward to the edge of the figure. On the belly are three isolated dots, forming a triangle whose apex is upward. A very similar decoration is found on the Bristol Bay specimen, except that the single longitudinal line is here a double line with cross bars, dots being placed in the spaces, and the three dots at the bottom are in a reverse position, and are connected by lines. The Seldovia carving thus shows a remarkable conformity to Punuk art style.

#### WORM (?) [PLATE 52]

A walrus (?) tooth from Yukon Island I has been carved to suggest a worm [Plate 52 -5]. The head (left) is formed by the crown of the tooth, cut from both sides to a blunt end, and bulging slightly from the rest. Two longitudinal lines run the length of the tooth on the concave and convex edges, as if down the mid-

<sup>23</sup> Collins, 1929-I, Pl. 18a.

\* This is almost certainly a sea-otter. An old Eskimo of Prince William Sound told me that this was the traditional style of representing that animal, and that he had often seen sea-otters resting in that posture on the water.

dle of the back and of the belly. Both sides are covered by transverse lines. The root of the tooth is encircled by a line or groove in which a sinew might have been tied.

#### WHALE TAIL [PLATE 49]

At Cottonwood was found a piece of tuff (?), the natural shape of which suggests a whale tail [Plate 49 -3]. A groove has been added to separate the flukes. This may be a *whaling amulet*.

#### BONE INSET, MOUNTINGS ETC. [PLATE 51]

Several specimens have been mentioned which have small holes or pits to hold insets. These insertions were evidently of a perishable nature (wood, baleen ?) and have not survived. A small ivory object [Plate 51 -1], from Yukon Island III, oval, with one surface slightly concave, may have been such an inset. It is 1 cm. long.

Three fragments of slender bone strips were found together at Cottonwood, all apparently pieces of the same bone mounting. They are 0.8 cm. wide. One fragment [Plate 51 -5] has a hole by which it was pegged to some other object. Three strips, 0.7, 0.9, and 1 cm. wide, were found in Yukon Island III and sub-III.

A bone ring, 1.8 cm. in diameter, was found at Cottonwood. It is flat on one side and slightly rounded on the other. A similar ring [Plate 51 -2], 1.5 cm. in diameter, was found in Yukon Island sub-III. These may have been mountings for the sockets of very small darts or arrows with detachable barbed points (?).

#### PAINT [PLATE 49]

Pieces of red and yellow *baked shale* seem to have been used as crayons [Plate 49 -7] or were scraped into powder for paint. Some pieces are cut into rectangular bars [Plate 49 -11] or other shapes. There are altogether 42 pieces of cut baked shale, distributed as follows: Indian Island 1; Jakolof's place, layer 3 (Indian) 1; Cottonwood 8; Point West of Halibut Cove 1; Yukon Fox Farm III 2; Yukon Fox Farm II 1 (in grave); Yukon Island, lower part of midden by shed 1; Yukon Island III 15; Yukon Island III or sub-III 1; Yukon Island sub-III 6; Yukon Island II 4; Yukon Island I 1.

*Hematite* was also used for paint. On the beach, at the extreme west end of the midden on Yukon Island, was found a naturally hollow pebble, in which had been mixed red hematite paint. It is the same as that used for the paintings at Indian Island, Bear Island, and Sadie Cove. Lumps of hematite showing knife marks were found at Cottonwood and in Yukon Island III. Lumps of hematite

mud were found at the same localities and in all the lower layers of Yukon Island. A lump of red paint was among the objects in the 'bag find,' Yukon Island III. Layer 3 of Yukon Island II was filled with hematite, so that almost everything found in it was stained red, and there were lines of paint in layer 2.

#### COPPER [PLATE 49]

Five objects made of native copper were found, all derived from layer 10, Yukon Island IV.

The largest specimen is a sickle-shaped *blade* [Plate 49 -14], about 3 cm. wide and 22 cm. long. There is no evidence of hafting, but it might have been inserted into a slab of wood or bone to make the blade of a large ulo. The outer edge near one end appears to have been purposely serrated with very fine notches (to make a saw ?). Another fragment of blade [Plate 49 -15] measures 6 by 2 cm.

A copper *bracelet* [Plate 49 -10], 5 to 5.5 cm. in diameter, has been made by bending a strip of copper 0.8 cm. wide until the two ends met. The strip is thicker at the middle than at the ends. The bracelet is just large enough to fit a slender woman's wrist.

Two hollow conical objects [Plate 49 -5 and 6] were made of rolls of copper. They are 4.4 and 2.1 cm. long. In the longer specimen there is preserved what appears to be a raw-hide thong. This would indicate that the specimens are *beads*. Their shape suggests that of the dentalium shell [Plate 51 -8].

The nearest source of native copper was Prince William Sound, or the Copper River, just to the east. From the Copper River, copper was traded to the Tlingit and to the Chugach Eskimo. Copper knives and weapon blades are reported from several ancient sites in Prince William Sound. In the early days the Copper River Athabaskans used to cross the divide into the valley of the Valdez Arm, paying tribute to the Eskimo at Ellamar for the privilege of passing through their territory. Later, when a quarrel disrupted this arrangement, they traded through the Eyak Indians at the mouth of the Copper River, or themselves undertook the dangerous journey all the way down the river and into Prince William Sound. The Cook Inlet Athabaskans used to ascend the Matanuska River and cross the 12-day portage to Tazlina River, where they traded with the Copper River Indians from the vicinity of the present town of Copper Center. Cook noted that the Cook Inlet natives had spears and knives with copper blades.<sup>24</sup>

#### ASSOCIATIONS OF OBJECTS: THE 'BAG FIND' [PLATE 55]

We have had occasion to mention groups of objects found together. The articles found in *graves* have been listed in the descriptions of the burials, and also

<sup>24</sup>Abercrombie, p. 390 f.; Wrangell, p. 114 f.; Allen, p. 413; Cook, II, p. 400.

under the appropriate headings in this chapter. Caches or groups of several specimens of the same kind have also been mentioned. These were: groups of from 12 to 24 small notched stones, the small lamp and the lamp with human figure at Yukon Fox Farm, grinding stones and slabs, 3 unfinished needles, 5 Thule harpoon heads, 5 bird bone points, strings of rectangular shell beads, and of 12 and 23 fish vertebra rings. Besides these, we ought to recall the 5 fish vertebra rings found inside a hollow bone scraper and covered with the breast bone of a loon.

The most interesting association of objects is that to which I have referred as the '*bag find*,' from Yukon Island III. It consists of 42 specimens: 14 ivory rods with holes at the end [Plate 55 -1 to 14], a fish vertebra ring [Plate 55 -20], bird bone point [Plate 55 -19], small arrow head with blade slit [Plate 55 -18], awl of sea-otter fibula [Plate 55 -15], piece of bird bone (broken awl ? [Plate 55 -16]), half of a split bird bone tube [Plate 55 -17], 2 pieces of pumice [Plate 55 -40 and 41], sandstone whetstone (used also as a saw ? [Plate 55 -39]), shale plaque (mirror ? [Plate 55 -38]), lump of red hematite paint, and 17 stone flakes ([Plate 55 -21 to 37], mostly of altered lava, a few of dolerite, and one of quartz). These objects were all piled together as if they had been enclosed in a box or bag. The ivory rods lay together in two groups, with the holes together, as if they had all been strung on a cord. The arrow head is the only object which definitely suggests that the collection belonged to a man. Some of the specimens (awl, pumice, whetstone) definitely belong in a work-kit, but the fish vertebra ring, paint, and mirror (?) belong more properly to a 'vanity case.' The stone flakes are not retouched in any way, and while sharp enough to cut, show no signs of having been used. However, they are not simply workshop debris; they cannot be fitted together to form a core, but were evidently selected for some purpose.

With the exception of an undecorated pendant [Plate 50 -30], described above, there are no other objects from Kachemak Bay like the *ivory rods* in the '*bag find*.' These vary in length from 12 to 16 cm., and in width from 1 to 2 cm. They are not very well made, a fact which might indicate that they were not ornaments, or not intended primarily for decorative use. Their position, however, suggests that they formed a necklace. They might have been pendants on a ceremonial robe. An exact identification is impossible. The two widest specimens [Plate 55 -7 and 8] differ from the others in being obliquely narrowed at one end, through which the hole is drilled through from edge to edge, not from side to side, as on the other specimens. Two of these rods are ornamented on one side. The first [Plate 55 -1] has 11 oblique lines, running down from right to left. On the lowest line, which runs only part way across, are three spurs on the lower side. The second specimen [Plate 55 -2] has a flower-like decoration, composed of the *dot-and-circle* motif (drawn with a compass), with four triangular, hatched spurs on top, and a long 'stem' running down from the central dot. The 'stem' joins the uppermost of four oblique lines; at this point of junction is another dot. These incised decorations have the rigid and mechanical perfection



of the Punuk art style, which seems to be due to the use of metal tools. The motif, also, is characteristic of that phase, as well as of modern Alaskan art.

#### DECORATIVE ELEMENTS

The decorative elements which we have found incised on bone, ivory, or stone objects comprise the following motifs:

- longitudinal lines, especially lines bordering rows of barbs [Plate 38 -3, Plate 40 -2 and 16, Plate 41 -21, and Plate 42 -7 to 14, 16 to 23] (Yukon Island I to III, Yukon Fox Farm III, Point West of Halibut Cove, Q'na'qesle in Tutka Bay).
- short transverse lines, especially in groups of two or three [Plate 40 -2, Plate 43 -11, and Plate 51 -7] (Cottonwood, Yukon Island II to III).
- encircling lines, also grouped [Plate 44 -27 and Plate 50 -1, 2, 3] (Q'na'qesle, Yukon Island III).
- line with spurs [Plate 50 -24 and 31] (Tutka Bay, Yukon Island III).
- line with paired oblique spurs [Plate 32 -10, and Plate 52 -3] (Yukon Island III, and Yukon Island sub-III as tattooing on a doll).
- line with dots [Plate 31 -13, Plate 50 -20, Plate 52 -9, and Plate 55 -2] (Aurora Fox Farm, Seldovia, Yukon Island III).
- X [Plate 40 -16, on edge not illustrated] (Yukon Island III).
- V or chevron [Plate 26 -2 and 3] (Cottonwood and Yukon Island III).
- Y with oblique hatching between the prongs [Plate 43 -21] (Yukon Island III).
- double-ended Y [Plate 26 -3] (Yukon Island III).
- dot-and-circle ? [Plate 52 -2c] (eyes on doll, Yukon Island II).
- dot-and-circle with hatched spurs [Plate 55 -2] (Yukon Island III).
- double concentric circle [Plate 51 -21] (Yukon Island III).
- edges notched for decorative effect [Plate 37 -5, 6, Plate 40 -13, Plate 42 -16, and Plate 50 -18] (Yukon Island II and III, Yukon Fox Farm II).

Many examples from the Third Period, a few from the Second Period [Plate 40 -18, Plate 42 -14?, Plate 51 -31, and Plate 52 -2], and a single example [Plate 43 -9], very doubtful, from the First Period, have been cited as incised lines which seem to have been made with a *metal tool*. What that metal was, we cannot say. It must be remembered that the only copper specimens found were from Yukon Island IV. The neatness and precision of these incised lines, in contrast to those which we know must have been made with stone tools, is a significant characteristic of style, distinguishing the Third Period from the first two periods in Kachemak Bay, and linking it with the Punuk period on St. Lawrence Island. The question of how these straight lines (and the dot-and-

circle) were made need not concern us here; it is sufficient to note only their distinctive appearance. The problem of their manufacture will be briefly discussed in Chapter VII.

#### THE THREE PERIODS OF THE KACHEMAK BAY CULTURE

Having reviewed the material from Kachemak Bay and Port Graham type by type, it will be of interest to summarize this information and list the various types found in the three periods of the Kachemak Bay culture. Types not actually represented by specimens but which we may infer belong to a period are indicated thus: [ ]; specimens of uncertain provenience are indicated thus: ( ); and specimens of doubtful interpretation are queried. Types distinctive or characteristic of each period are in italics.

##### *The First Period (Yukon Island I)*

*grooved stone: about one end*  
planing adze blade [and haft]  
hammer stone  
boulder chip  
whetstone  
pumice  
stone lamp: round or oval  
*chipped stone blades: leaf-shaped with straight base*  
leaf-shaped with rounded or pointed base  
*oval*  
thumb scraper  
polished slate blades: leaf-shaped  
ulo: straight edge, notched, or unnotched back  
man's knife like ulo: unhafted  
bone drill  
*harpoon head: Thule type I*  
dart head: barbed on one side  
barbed symmetrically on both sides  
socket-piece: in two parts  
*foreshaft for harpoon with central hole*  
*slender barbed point: especially 'Yukon Island I' type, with and without blade*  
*'Yukon Island III' type rare*  
plain barb for fish spear  
fish hook  
bird bone point  
bone pin  
awls: bone splinter

awls: bird bone  
shaped bone  
sewing needle  
bird bone tube  
rib flint flaker  
*wedge*  
ice-pick ?  
cut articulation  
tooth pendant  
labret  
stone head  
ivory worm  
paint: baked shale and hematite  
incised decorations: longitudinal lines bordering barbs  
one doubtful example of metal-cut line

*The Second Period (Yukon Island II and Yukon Fox Farm II)*

*notched stones: small very rare*  
*large very common*  
grooved stones: grooved around long diameter  
(grooved over one end, II or sub-III)  
*grooved around one end*  
*pierced stone*  
planing adze blade [and haft]  
hammer stone  
grinding stone and slab  
boulder chip  
whetstone  
pumice  
stone lamp: oval  
(*semi-circular*, II or sub-III)  
hunter's lamp  
*chipped stone blades: leaf-shaped with straight base*  
leaf-shaped with rounded or pointed base  
[oval]  
(*knife blade with notched tang and asymmetric edge*, II or sub-III)  
blade with barbs  
end-scraper blade  
polished slate blades: with barbs  
[leaf-shaped]  
straight-edged  
ulo: straight or curved edge, back notched, unnotched, or with hole  
man's knife like ulo: hafted and unhafted

chipped slate ulo or scraper  
bone drill  
(mirror ?, sub-III or II)  
harpoon head: [Thule type I]  
    closed socket: [thin] and almost round  
dart head: barbed on one side  
    barbed asymmetrically on both sides  
    barbed symmetrically on both sides  
socket-piece: in two parts  
*harpoon foreshaft with central hole*  
bone arrow head: without blade  
    with blade  
slender barbed point: 'Yukon Island I' type  
    'Yukon Island III' type  
    'Cottonwood' type  
barb for fish spear: plain  
    barbed  
fish hook  
bird bone point  
bone pin  
awls: bone splinter  
    bird bone  
    shaped bone  
(double-pointed awl, II or III)  
sewing needle  
bird bone tube  
bone scraper: whole caribou scapula  
rib flint flaker  
knife handle ?  
*wedge*  
[ice-pick ?]  
(bone shovel, II or sub-III)  
cut articulation  
(dipper, II or III)  
*men for a game ?*  
bead: bird bone  
pendant: tooth  
    plain  
    decorated with notches  
buckle  
toggle  
labret  
ear plug

ivory doll  
[realistic stone carving]  
paint: baked shale and hematite  
incised decorations: longitudinal lines bordering barbs  
    transverse lines  
    dot-and-circle ?  
    *metal-cut lines rare*  
*flexed burials with grave goods, with wooden masks ?, bodies mummified ?*  
scattered and broken human bones  
*semi-subterranean house, partly of stone and whale bones*

*Period sub-III (Yukon Island sub-III)*

*notched stones: small twice as numerous as large*  
*grooved stones: grooved around short diameter*  
    around long diameter  
    *around middle and over one end*  
    *over one end*  
    (about one end, II or sub-III)  
pierced stone  
planing adze blade [and haft]  
hammer stone  
grinding stone and slab  
boulder chip  
*stone saw*  
whetstone: plain  
    *felsite bar*  
pumice  
stone lamp: oval  
    (semi-circular, II or sub-III)  
hunter's lamp  
chipped stone blades: leaf-shaped with straight base  
    leaf-shaped with rounded or pointed base  
    [oval]  
    (knife blade with notched tang and asymmetric edge, II or sub-III)  
    [end-scrapers blade]  
*polished slate blades: barbed*  
    with tang  
    leaf-shaped  
    straight-edged  
ulo: curved or straight blade, back notched, unnotched, or with hole  
man's knife like ulo: hafted and unhafted  
chipped slate ulo or scraper  
drill: bone  
    slate

*slate 'awl'*  
 (mirror ?, II or sub-III)  
 harpoon head: [Thule, type I]  
     [with closed socket]  
 dart head: barbed on one side  
     barbed asymmetrically on both sides  
     barbed symmetrically on both sides  
 socket-piece: in two parts  
 [harpoon foreshaft]  
 arrow head: [without blade]  
     with blade  
 slender barbed point: 'Yukon Island' I type  
     'Yukon Island III' type  
     'Cottonwood' type  
 barb for fish spear: [plain]  
     barbed  
 side-prong for bird-dart ?  
 fish hook  
 bird bone point: plain and with barbs  
 bone pin  
 awl: bone splinter  
     bird bone  
     shaped bone  
 (double-pointed awl, II or III)  
 sewing needle  
 bird bone tube  
 bone scraper: whole caribou scapula  
     scapula blade  
     *split bone*  
 rib flint flaker  
 [knife handle ?]  
 wedge  
 [ice-pick ?]  
 cut articulation  
 (dipper, II or III)  
*men for a game ?*  
*amulet box*  
*bead: red shale*  
     bird bone  
 pendant: tooth  
     [plain ivory]  
 fish vertebra ring  
 buckle

[toggle]  
labret  
[ear ornament]  
*ivory doll: Port Möller type*  
[realistic stone carving]  
bone mounting  
paint: baked shale and hematite  
*incised decorations: longitudinal lines bordering barbs*  
    transverse lines  
    line with paired spurs on both sides ?  
    [dot-and-circle ?]  
    *metal-cut lines*  
*flexed burial, with artificial eyes and labrets, and clay masks ?*  
scattered and broken human bones  
semi-subterranean house, of wood ?  
*hearth pit*

*The Third Period* (Yukon Island III and IV, Yukon Fox Farm III, Point West of Halibut Cove, Cottonwood, Aurora Spit, and Passage Island)

*notched stones: small six times as numerous as large*  
*grooved stones: grooved around short diameter*  
    around long diameter  
    *around middle and over one end*  
    *over one end*  
pierced stone  
*splitting adze*  
planing adze  
adze haft: with bed, or with socket for blade  
hammer stone  
grinding stone and slab  
boulder chip  
mortar ?  
*stone saw*  
whetstone: plain  
    *felsite bar*  
pumice  
stone lamp: oval, plain and *decorated, with human figure*  
hunter's lamp  
lamp tending stone ?  
stone dish  
*pottery (Yukon Island IV only)*  
chipped stone blades: leaf-shaped with straight base  
    leaf-shaped with rounded or pointed base  
    oval

chipped stone blades: lance blade  
     end-scrapers blade  
     oval and discoidal scraper  
*polished slate blades: barbed*  
     with tang  
     leaf-shaped  
     straight-edged, with owner's mark  
     *triangular lance blade*  
     single and double-edged knife blade  
 ulo: curved or straight edge, back notched, unnotched, or with hole  
 man's knife like ulo: hafted or unhafted  
 double-ended slate scraper  
 hafted slate scraper blade  
 chipped slate scraper or ulo  
 drill: chipped stone  
     slate  
     bone  
*slate 'awl'*  
*slate mirror*  
 harpoon head: Thule type I  
     *Thule type II*  
     *closed socket, thin, without barbs or blade*  
     *closed socket, thin, with barbs, without blade*  
     *closed socket, almost round*  
 dart head: barbed on one side, with and without blade  
     barbed asymmetrically on both sides  
     barbed symmetrically on both sides  
 socket-piece: in two parts  
     *in one piece: with central tang or bifurcated butt*  
*harpoon foreshaft with lateral hole*  
 bone shaft  
*barbed lance head*  
 bone arrow head: without blade  
     with blade  
 slender barbed point: 'Yukon Island I' type rare  
     '*Yukon Island III*' type, with and without blade  
     '*Cottonwood*' type  
 barb for fish spear: plain  
     barbed  
 fish hook  
 bird bone point: plain and with barbs  
 bone pin  
*antler pin with transverse knob*



awl: bone splinter  
     animal bone  
     bird bone: in one piece and in two pieces  
     shaped bone  
*double-pointed awl*  
 sewing needle  
 coarse needle  
 double-pointed needle  
 bird bone tube: needlecase  
 bone scraper: whole caribou scapula  
     scapula blade  
     *scapula or mandible with longitudinal edge*  
     *split bone*  
     *fat scraper*  
 rib flint flaker  
*bone cutting board*  
 knife handle (?)  
 wedge  
 ice-pick ?  
*pick*  
*shovel*  
*bone dagger*  
 cut articulation: animal and *human*  
 bone club?  
*spoon*  
 (dipper, II or III)  
*drum*  
*top*  
*stone ball for game*  
 box  
*bead: red shale*  
     bird bone  
     *rectangular bone and shell*  
     ivory  
 pendant: tooth  
     plain ivory  
     decorated ivory  
     in realistic shape  
*fish vertebra ring*  
 buckle  
 toggle  
 labret  
 ear plug ?

nose pin ?  
 ivory head  
*whale tail amulet*  
 bone mounting  
 paint: baked shale and hematite  
*copper: knives, bracelet, beads (Yukon Island IV only)*  
*incised decorations: longitudinal lines bordering barbs*  
     transverse lines  
     encircling lines  
     line with spurs on one side  
     line with paired spurs on both sides  
     line with dots  
     X  
     V  
     Y with hatching between the prongs  
     double-ended Y ?  
     *dot-and-circle, with hatched spurs, and double concentric circle*  
     *metal-cut lines characteristic*  
*burial in squatting position*  
*burial in extended position with grave goods (Yukon Island IV ?)*  
*dismembered burials, single or double, with or without grave goods, and*  
     *artificial eyes*  
 scattered, broken, and *cut* human bones  
*semi-subterranean house of wood, with semi-subterranean entrance passage*  
*stone-set hearth, inside house and out-doors*

Not all the types which we have indicated by italics are of equal significance. Thus, the *men for a game ?* of Periods II and sub-III, the *amulet box* of Period sub-III, the *triangular slate lance blade*, the *drum handle*, the *whale tail amulet*, etc., of Period III, are not of great importance, since they are each represented by a single specimen, or at most by only a few. Such scantily documented evidence or the absence of a particular type is not a reliable guide in most cases.

We can briefly summarise the development of the Kachemak Bay culture by again referring to the following significant features. The stone industry of the earlier times is characterised by the greater relative importance of chipping, including even the chipping of slate. The use of the stone saw is unknown. The notched stone is conspicuous by its absence; and of the grooved stones, only the type with groove about one end is found. Somewhat to our surprise, perhaps, we find realistic representation in stone already present in the First Period. Later, polished slate grows in importance, and is applied to new types, while chipped stone becomes relatively less common. Perhaps we should associate the appearance of the felsite bar whetstone in Period sub-III with this development of polished slate. The stone saw is introduced in the same period. Notched stones

suddenly appear in great numbers in the Second Period, with the large type at first predominating, then losing ground, and at last giving way entirely to the small type. Grooved stones become more numerous, and there are changes in type. While the bone wedge is common to all periods, it is relatively more important before the appearance in the Third Period (latter half ?) of the large splitting adze, by which it was, perhaps, to some degree supplanted. Stone types characteristic of the later stages are the slate awl, the slate mirror, and the decorated stone lamp.

In the bone industry, we must note the importance of the Thule Type I harpoon head in the First Period. In actual number of specimens it equals approximately all the various forms of barbed heads combined. In succeeding periods this very primitive harpoon head yields place to more developed types, and becomes less important than the barbed dart head. The development of the barbed head with tang is reflected in the change of the harpoon foreshaft from the type with symmetrically placed line hole to the Third Period form with asymmetric tang like that of the barbed dart head. The socket-piece evolves from a short two-piece type towards the long and slender modern form in one piece. Incised decorations on bone objects become more common in the later periods, and while metal-cut lines and motifs are found earlier, they are typical of the Third Period. New types appearing in the later stages are the double-pointed bird bone awl, the antler pin with transverse knob, bone scrapers with longitudinal edge, the red shale bead, rectangular bone and shell beads, the fish vertebra ring, and other types. Curiously, enough, the labret is found even in the earliest period.

Pottery and copper are rare and are restricted to the very last stage of the Third Period.

The Second and sub-Third Periods alike have flexed burial with grave goods. The squatting and extended (?) burials of the Third Period may be closely related forms. The dismembered burial is peculiar to the Third Period. Artificial eyes and clay masks (?) are characteristic of Periods III and sub-III. Scattered and broken human bones belong to all periods (except the First).

The house of the Second Period is partially built of stone and whale bone; that of the Third Period is entirely of wood. Both are semi-subterranean. The stone-set hearth seems to belong only to the Third and sub-Third Periods.

The Eskimo dog, fairly well represented in the First Period, declines in numbers throughout the development of the Kachemak Bay culture. In the very last stage of the culture, the Plains Indian type of dog makes its appearance.

In many respects, the culture of the last two periods (sub-III and III) was richer than that of the first, even discounting the exaggerated impression of the variety of cultural types which depends in some measure upon the large number of specimens from the Third Period. The First Period culture is simpler, and, as we shall see from the analysis in Chapter VII, has more points of resemblance to the Arctic Thule culture of Canada. The culture of the Third Period shows a

development away from the more typical 'Eskimo' pattern towards a more specialized, local complex. This seems to be in part due to the accretion of cultural elements peculiar to the North Pacific regions. And yet, throughout its evolution, the Kachemak Bay culture has maintained an individual stamp.

## V. ARCHAEOLOGICAL SITES ON COOK INLET

### THE SOUTHEASTERN SHORE NORTH OF KACHEMAK BAY

This is the country of the Tanay·'na, or Seldovia Indians. On his map in the *Tenth Census* Petroff includes within the Indian territory the north shore and the head of Kachemak Bay as far south as Aurora Spit.

#### *Anchor Point*

Q'eq'a'q' (Mrs. Man, Kenai), Qeqa'x (Fitka, Seldovia), Q'q'aq', 'big reef' (Seldovia Indian boy), X'qaq' (Wassila). Several sites have been reported here. On Petroff's map in the *Tenth Census* the town of Laida is marked at Anchor Point.

#### *Cape Starichkof*

Stuxtatl'nt (Fitka). There is a two-room house ruin behind Ero Wally's fox farm. The large room measures 18 by 15 feet; the small room in back is 6 feet square. There was no entrance passage. From the shell heap in front we secured a toy lamp [Plate 56-16], a barbed bone arrow head [Plate 56-5], a slender barbed point [Plate 56-6], and a clam shell containing red hematite powder. The shells and bones in the midden did not appear to be very old.

### THE EASTERN SHORE

This is the country of the Yaxt'a·'na or Qaxnat'a·'na, the Kenai Indians.

#### *Ninilchik*

Shell heaps are reported. A stone lamp has been found here.

#### *Cape Kasilof*

In Petroff's time this was the main village at Kasilof. Later the natives moved to Kalifonski. The age of these two sites has not been determined.

#### *Kasilof*

Qasila'tnu (Kenai Indians). The new road along the north side of the river passes through five house pits on a low rise of ground near the cannery. On the

high ground  $\frac{3}{4}$  of a mile up the road there are four more house pits, one of which (House I) is almost destroyed by the road. House II is 14 by 20 feet; House III is 12 feet square and 4 feet deep, with no trace of a doorway. House IV has two rooms, the larger 12 by 15 feet, the smaller 6 feet square. This is probably the Indian village of Nuntutuct ('a big tide will reach this place,' Theodore Sasha, Kenai). At Mile 1 and at Mile 3 we found two human skulls (30-25-157 and -158), uncovered when the road was built. One was found under the roots of a large tree. On the high plateau south of the mouth of the river there is a post-Russian-contact village site, with a house pit 10 feet square.

#### *Kalifonski*

*Orenisitnu*. The Kenai Indians report house ruins north of the present village.

#### *Chinilof*

This was a post-contact village on high land south of Kenai River. It is given as 'Chernilof' on Petroff's map.

#### *Kenai*

The modern village is *Qa'xnu*. From the Russian graveyard I obtained three skulls, the gift of Andrew Berg (30-25-150, -151, -152).<sup>1</sup> The last is that of mature individual, showing traces of syphilis in the third stage. Andrew Berg also gave me a crude stone lamp [Plate 59 -1], found somewhere in the vicinity. The prehistoric village was on both sides of a small stream flowing into Kenai River from the north, where the cannery of the Kenai Packing Company is now located [Plate 57A]. The village was called *Ya'nuq* in pre-Russian days, afterwards *Tc'k'itu'k'*. It was inhabited until 1910, when the priest moved the natives to the present village of Kenai. Both 'Chkituk' and Kenai are indicated on Petroff's map.

In the woods on the north bank of Kenai River, between the Northwestern cannery and the bend in the river, there are about fifteen old house ruins which can be seen from the trail running to Meyer's and Ernest's cabins. This is *Wackaqe'x*, 'Wacka's town,' but who Wacka was the Kenai Indians could not tell me. We measured a few of these pits. House I is 4 feet deep, and 10 by 12 feet, without a sign of a doorway. House II is 19 by 17 feet; House III has two rooms, the larger measuring 18 by 20 feet. House V has two large rooms, north and south, with a small room on the east, and what appear to be five small blocked doorways, but which were identified by Alec Mishikof, the Kenai Indian with us, as sleeping compartments. The main entrance faced south. The larger of the main rooms is 19 by 24 feet; the room on the north is a little smaller; the small room on the east is only 10 feet square. A splitting adze has been found at Meyer's place, which is also included in *Wackaqe'x*.

<sup>1</sup> Described by Oetteking, p. 222 f.

About  $\frac{1}{4}$  mile up stream from Ernest's cabin was a summer camping site, *K'uk'atliax*.

On the south side of Kenai River, at Libby's cannery, is the site of *Sa'stin*. From this site we obtained a large stone lamp [Plate 59-4], the gift of Martin Hermensen. According to Mrs. Man, a Kenai Indian, many old things had been found here, including a small stone lamp, ornamented with the figure of a man in the bowl. Andrew Berg also remembered such a lamp, but described it as a large one, with decorations on the outside. From Mrs. Man's description, the lamp might be the one now in the museum at Sitka, of unknown provenience [Plate 70-1].

Other sites on Kenai River near the mouth are *Qunstnist*, *Qeje'lice*, *Pentsu'xt*, *Q'uq'itlitl* or Portage. Above these, Theodore Sasha of Kenai enumerated other places: *Qaxlnika* or Eagle Rock, *Claka*, *Stila'tnu* or Custom House, *Nilnunqa* at Moose River, *Stu'tlinint* above Moose River, and *Sq'i'la* on Russian River, where he thought we might find a lamp with human figure. It must be remembered that the lamp with human figure [Plate 69], now in the University Museum in Philadelphia, is said to have come from Kenai Lake (*Sqilamina*).

#### *Nikishka I*

The three *Nikishka* villages were named after three brothers of that name. A mile or a mile and a half up the trail from *Nikishka I* to the lake, are reported old houses belonging to *Tukyektat*. *Savantci'c*,  $2\frac{1}{2}$  miles south of *Nikishka I*, may be an old place.

#### *Nikishka II*

*Tituqi'lst* (Kenai natives), called 'Titukilsk' on Petroff's map, is supposed to have been an old village site, though we found no trace of it. It may easily have been covered by slides from the high bluff or by high tide deposits.

#### *Nikishka III*

*Treja'lux* (Kenai Indians) or *Treya'luqt* (Nikita and Theodore, *Eklunta*). This is probably the 'Kultuk' of Petroff's map. There is a modern midden by the stream, and in the bank along the beach we found four birch-bark cooking baskets. These were simply pits about 12 inches deep and 20 inches wide, lined with folded pieces of bark. About  $\frac{1}{2}$  mile from the beach, on the left bank of the stream, there is a house pit consisting of two rooms [Plate 58A]. The larger is about 20 feet square, and 2 feet below ground level before excavation. When excavated, the floor was found 1 foot below the surface of the refill. There was a fire pit, 2 feet deeper still, in the center of the room. There were two entrances, one in the middle of the wall opposite the door to the little room, the other in the northeast corner. The small room, on the west, is about 12 by 15 feet, and 4 feet below the level of the ground. We did not excavate it. Outside the house were piles of fire-cracked stones. There were no entrance passages to the outer doors.

*Swanson Creek*

Yare'xnu (Kenai Indians). There are said to be house ruins here. From this place came the splitting adze [Plate 59 -3] and hunter's lamp [Plate 59 -2], the gifts of Jack Fields.

*Birch Hill*

Stone adzes are said to have been found here.

*Libby Creek*

There is a village site of five houses on the right bank of the stream,  $\frac{1}{4}$  mile above the mouth. The name for the stream is Qoqan'i'ktalik (Theodore Sasha,

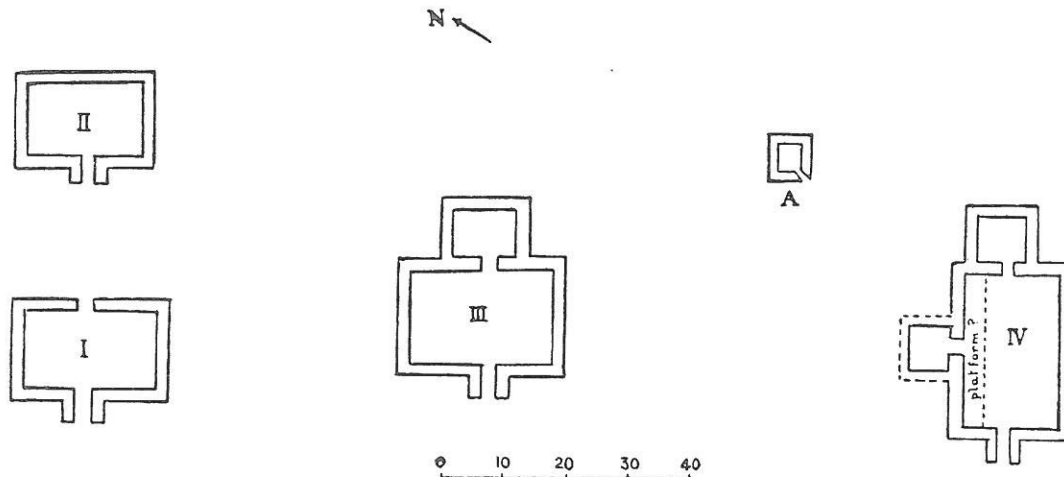


FIGURE 3. VILLAGE SITE AT LIBBY CREEK.

THE DISTANCES BETWEEN THE HOUSES  
HAVE BEEN REDUCED ON THIS DIAGRAM.

Kenai). These houses are so well preserved that I doubt if they can be very old. The walls are about 2 feet high and 2 feet thick. House I has two doors, both in the longer sides of the house, one facing the stream, with an entrance passage 5 feet long; the other, without a passage, faces House II. The doorways are 2 feet wide. The inside dimensions are 19 by 13 feet. The floor is just under the sod, so this house cannot be very old.

House II is 50 feet in back of House I and faces it. The inside dimensions are 12 by 17 feet, the entrance passage 2 by 5 feet.

House III has a main room  $14\frac{1}{2}$  by  $23\frac{1}{2}$  feet. The front entrance passage is  $2\frac{1}{2}$  by 5 feet, and when excavated seems to have been lower than the floor of the house. The small room in the rear measures 10 by 12 feet. Outside the house we found an agate (very common along the beach north of Boulder Point),



and inside the main room a whetstone and a small stone drill or awl. These specimens were unfortunately lost. The floor of the main room was just under the sod.

Between House III and House IV is a small house pit, A, less than 5 feet square, with walls 1 foot thick. The door is in the southeast corner, and the floor of the room shows a gradual slope upwards towards the outside. It is 6 inches below the ground level. In the house were traces of charcoal. This place may have been a girl's menstrual hut, or a bath room, but in neither case should we expect to find a hearth inside. I therefore hesitate to advance any definite explanation.

House IV has a main room and two smaller rooms on the west and north sides. The main room is  $27\frac{1}{2}$  by 19 feet, the two smaller rooms about 8 by 9 feet. The entrance passage is 6 feet long, with the floor 1 foot lower than that of the main room. There seems to have been a raised platform along the west side of the main room. In one corner we found a stone slab, and in the passage way a piece of pumice. The floor of the main room was just under the sod.

The thinness of the humus in these house ruins shows that they cannot be very old. They were probably not inhabited for very long, or we should have found something more than the few objects mentioned and the scanty piles of bath stones outside the doors.

#### *Point Possession*

Tucqant (Theodore Sasha, Kenai). The village, Tca'tliniq't (Nikita), is modern, and is said to have been founded by the survivors from the epidemic which destroyed a village on Fire Island, Nututli (Theodore, Eklutna).

### THE SOUTHWESTERN SHORE

South of Redoubt Point, on the north side of the mouth of Tuxedni Bay (at Polly Creek), the west shore of Cook Inlet is formed by beds of middle and upper Jurassic sedimentary rocks, mostly sandstones and shales, which are folded up and faulted upon the lower Jurassic lavas and granites that make up the range of volcanoes paralleling the west coast. These sedimentary beds dip in a great monocline east-southeast under Cook Inlet; their strike parallels the shore and controls the formation of the coastal range. The volcanic and granitic rocks are correlated with the lower Jurassic tuffs and agglomerates of Port Graham. The middle and upper Jurassic sedimentary rocks have no correlates on the east shore of Cook Inlet. They consist of the oil-bearing Tuxedni Sandstone (which also contains some shale), the Chinitna Shale (with some calcareous sandstone), and the Naknek Formation (Chisik conglomerate, shale, and sandstone). The presence of oil in the Tuxedni Sandstone (exposed from Iniskin Bay to the south

shore of Tuxedni Bay at Fossil Point) is of interest as a possible source for the oil shale used for labrets by the prehistoric Eskimo of Kachemak Bay.<sup>2</sup>

Timber in this region is scanty and is confined to the valleys. The game is limited. Caribou, moose, and mountain sheep are not found, but bears, especially the brown bear, and seals are numerous. Ptarmigan, grouse, eider duck, and salmon are plentiful in season. The region as a whole is forbidding. There is little water protected from the southeast storms. The bays are silted up; and the extreme tides make navigation difficult and dangerous. It is not surprising, therefore, that we did not find many evidences of prehistoric occupation.

I have no information regarding sites at Iliamna or elsewhere in Kamishak Bay.

### *Chinitna Bay*

There are modern house pits just inside the north point of Chinitna Bay. One of these has a main room, 21 by 13 feet, and 3 feet deep, with an entrance passage, 4 or 5 feet long, opening south towards the water. It leads into an ante-chamber of the main room, about 8 by 10 feet. On the west side there is a small room, about 6 feet square and 4 or 5 feet deep, entered from the main room by a tunnel, some of the timbers of which are still preserved. On the east side of the main room there are two small rooms of about the same size, entered by tunnels about 8 feet long. About fifty feet west of the large house is a smaller structure, 12 by 6 feet, with a doorway, 4 feet wide, facing the large house.

### *Tuxedni Bay*

We had hoped to find old ruins at *Polly Creek*, on the north shore of Tuxedni Bay, for this is supposed to be the home of the Tu'ltcena clan, one of the eleven matrilineal clans of the Cook Inlet Indians. These clans are supposed to have been founded by the illegitimate children of two cousins (parallel?), who were guilty of an incestuous union. The name of the Polly Creek clan means 'the other side,' since the founders were supposed to have drifted across the Inlet on the ice (Mrs. Man, Kenai). However, Wrangell derives the name 'Tultschina' from 'those who love to bathe in cold water at the end of autumn.'<sup>3</sup>

None of the houses here proved to be very old. A typical ruin is one a quarter mile up the creek, between Mr. Teide's house and garden. Large stumps are standing in the dirt walls of the house. The main room is 3 feet deep and measures 12 by 18 feet. It is banked up with earth walls 2 feet high. The small room at the back is 10 feet square and 5 feet deep, but lacks the dirt walls. It is entered by a passage 6 feet long. The main entrance passage is 10 feet long and also lacks dirt walls. Houses of the same size and shape were observed at the camping place of the late Chief Chikalootian, west of the mouth of the creek. An entrance passage 12 feet long was seen here. None of these house pits had more than 4 inches of humus in them, and no artifacts were found.

<sup>2</sup> Moffit, 1921 and 1927.

<sup>3</sup> Wrangell, p. 104; 'von der Neigung sich im Spätherbst im kalten Wasser zu baden.'

The only old site found on Tuxedni Bay is on the point just east of the mouth of *Grecian River* (locally known as 'Crescent River'), about four miles west of Polly Creek. Off the point is a rocky island, separated from the land at high tide [Plate 57B]. On it is a patch of turf 100 feet long and 12 feet wide. The humus is about 1 foot 9 inches thick; below this is a layer of whitish soil, 1 foot 3 inches thick; this in turn rests on midden material 1½ feet thick. At one place the midden layer is 4½ feet thick, where a house pit, 3 feet deep, has been excavated. The great age of this site is shown by the thickness of the humus and sterile soil above the midden and by the fact that the greater part of the island has been washed away since the time of habitation. The midden material is very scanty in remains; only a few razor clam and cockle shells were found. The artifacts include a grinding stone, a leaf-shaped blade of green shale (compare Plate 30-29), several flakes of quartz, flint, shale, etc., and a lump of red hematite.

On the north shore of Tuxedni Bay, almost at the head, and fully fifteen miles above Grecian River, is a *rock shelter with paintings* [Plate 61 to Plate 64]. The place is very difficult of access. Its location suggests that it was chosen for secrecy. Under the shelter of the overhanging cliff, excavations revealed a deep deposit of earth and animal bones, etc., mixed with blocks which had fallen from the cliff. We were not able to dig deeper than three feet. Near the surface a steel knife, cartridge, and other modern objects were found, but most of the deposit seems to be prehistoric. The animal remains are those of the seal and porpoise (especially the mastoid bones), bear, porcupine, ground squirrel, and duck, besides a few clam and whelk shells. The paintings are in red hematite, less brilliant than those of Kachemak Bay and on a larger scale. They will be discussed in a later section.

#### WEST FORELAND

West Foreland is called Qeda·'naq and the natives Qeda·'na (Nikita, Knik Arm).

#### *Kustatan*

Kustatan or Kusta·'nuq (Kenai Indians) was a modern village, peopled by Indians from Polly Creek. It was abandoned in 1910, some of the inhabitants going to Chief Chikalootian's place north of West Foreland, others going to Kenai. Alec Mishikof, a Kenai Indian, tells me that the village was almost destroyed by a disease sent by an unfriendly shaman at Susitna. The modern village was on the top of the bluff behind the cannery [Plate 57c]. On the first bench behind the cannery there is a prehistoric midden 2½ feet deep, from which we obtained a retouched flake of stone [Plate 60-3]. On the second bench above the cannery there are several depressions suggestive of house pits. We excavated one of these [Plate 57D]. It was about 10 feet square, though not very regular,

and 2 feet deep. We found no sign of a doorway. The walls were not built up. The midden inside the house was 2 feet thick and contained beluga bones, a few clam (*Spisula*) and large cockle (*Cardium*) shells, and a few fire-cracked rocks. There was a floor of burned clay. In the house we found a few objects [Plate 60 -1, 2, 4, 5 and 6], suggestive of types belonging to the Kachemak Bay Eskimo culture.

Other villages at West Foreland and just north of the point were reported by Andrew Berg. Most of these are doubtless modern. K'nu'ka, at the south end of Trading Bay, is possibly prehistoric. There were natives living there in 1891. Petroff places 'Toyonok Station' just north of West Foreland, but this must be an error.

#### NORTH FORELAND<sup>4</sup>

This is the country of the Tava-'na or Tyonic Indians (Nikita, Knik Arm).

##### *Ladd*

The modern village is on an ancient site, Ts'uz'tna, from which the name of the river, Chuit, is probably derived.

##### *Tyonic or Moquawkie*

There is an old village site, Qa'qesle, near the modern village. In the woods at the top of the hill behind the village are the houses where the natives used to live for fear of raids made by the Kodiak Eskimo.

##### *Old Tyonic*

This village is called Ta-'naq, and may be old. This seems to be the 'Toyonok' of Petroff's map.

##### *Granite Point*

The site of Tsila'xna is at a small stream south of Granite Point.

#### SUSITNA RIVER

The river is called Cucitnu', and the natives the Cuci'tnat'a-'na. There was an old village at Alexander called Daqole'staqta, an old village on the right bank opposite Susitna Station, and a third village at Croton, called De'sqa, from des, 'sand bar.' These are probably the three 'Sushetno Villages' on Petroff's map.

<sup>4</sup> The information about North Foreland and about Susitna (below) was supplied by Nikita, whom I met at Fish Creek, Knik Arm.

## KNIK ARM

Knik Arm is called Qay'tnu (Nikita) or Qi'tnu (Theodore, Eklutna). The natives are the Knat'a·'na.

### *Point Woronzof*

There was a summer fishing camp about one mile south of the point, called Nuti'ctunt.

### *Anchorage*

The native name for Anchorage is Xa'tikiuct (Theodore Sasha, Kenai). This suggests that there may have been an older village here. I was not able to identify the town of 'Zdluiat,' which Petroff located on his map a little north of the present site of Anchorage. It may be the same place as that where house pits or 'fortifications' have been seen, on the north bank of Ship Creek, opposite Anchorage.

### *Moonshine Creek*

There was a village, Tcukti'ntlinat, on the north bank of the stream. Theodore of Eklutna found a T-shaped hunting adze or pick here.

### *Eklutna*

The old village of Eklutna was called Ikluat. We found several house pits near the modern houses, but they did not seem to be very old. I do not know if there are any prehistoric sites here. 'Old Kinik' is the name given to a village site near Eklutna, which was inhabited in the last century. 'Nitak' is another name given to a village in this vicinity, but I am not sure if either Old Kinik or Nitak were distinct from the old houses of Ikluat. Only 'Nitakh' is indicated on Petroff's map at the present site of Eklutna, and 'Kinik' is placed just to the west of the mouth of Knik River.

### *Matanuska River*

Near the mouth of the Knik and Matanuska Rivers there is said to be a village site called To'xnaytkitc (Theodore, Eklutna). His placing of this village and of Nitak are not very certain, however. This is probably the 'Kinik' of Petroff's map.

### *Cottonwood*

At Cottonwood Creek, above Knik on the west shore of Knik Arm, there was an old village site on a high hill, called Tladje't. The name is derived from tlatc, 'sand,' and the stream is called Tladjau'tnu (Nikita). Theodore of Eklutna told me that this was both a summer and a winter village. It was one mile above the mouth of the stream.

### *Knik*

The village is deserted now, except for two white men and one woman, though it was a prosperous town before the building of the railroad shifted the people to Anchorage. A young white woman told me that as a child she had found a stone dish or lamp near Knik. We found no traces of old habitation near the modern town, but there are several house ruins at Knik Lake. This is probably the site of Cu'nta (Nikita). The houses measure 12 feet square (House I and II), and 25 by 30 feet (House III). The doorways are in the longer sides facing the lake. There were hearths in each house, and shallow piles of scorched rocks outside. I do not think the houses are very old.

### *Fish Creek*

It was on Ulanky's farm at Fish Creek [Plate 58B] that two of the lamps with human figure in the bowl were found. The first of these was found by Ulanky himself and has been described by Father Kashevaroff in the *Descriptive Booklet on the Alaska Historical Museum* at Juneau. The second lamp [Plate 70-2] was found by a man named Vaukey, and was acquired by the Museum of the American Indian in 1916, having passed through several hands. Since no one in Anchorage had heard of Vaukey or of the finding of this second lamp, it is possible that some doubt should be attached to its reputed provenience. Both lamps have been described in an article by J. Alden Mason, in the *Museum Journal*, Philadelphia, June 1928.

It was with hopes of finding some trace of the village or burial site from which these lamps were derived that we came to Fish Creek. We were unable to get any information at Anchorage, and since Ulanky's farm had been abandoned for years, we could not tell where the fields had been, though we knew that Ulanky was supposed to have found the lamp when plowing. Nikita, an Indian putting up fish at Fish Creek, knew nothing of the lamps and denied, as did Theodore, that the Indians ever used stone lamps. He showed us a former village site, however, on a low terrace on the north bank of the stream, about a mile above the mouth. Later, Mr. Ulanky wrote me that the lamp had been found in the swamp near the east side of this low terrace. The possibility that it was derived from the village site cannot, therefore, be dismissed. A Chinese talisman is said to have been found at the same time and place as this lamp, but was not acquired by the Juneau museum until some years later.

The old village site is marked by the frame of a modern smoke house and a modern bath house, the latter made of branches bent over to form an inverted basket large enough to admit a single person. Nikita told me that this village was called Knakha'tnu, and was supposed to have been only a summer camp, though from the house pits, he imagined it must originally have been a winter village. These pits are very poorly preserved. The best is 38 by 20 feet, with the doorway in the longer side facing the stream to the south. The entrance passage, if there was one, and the walls are obliterated. The depression is about 2 or 3 feet deep.

We excavated a little in the house, and found only a few cracked stones and charcoal under a thin layer of humus, and a whetstone. On the bank of the terrace facing the stream there is a scanty midden, only 12 inches thick at the most, part of which is certainly modern. From it we obtained some very poorly made objects consisting of a pounding stone, two whetstones, adze blade, slate knife, fragment of double-edged slate blade, and a piece of slate blade with chipped edge [Plate 60-7 to 11]. These objects unfortunately tell us very little, and they are so poorly made that it is doubtful if they have any connection with the two lamps.

Other reputed house pits in the vicinity of Fish Creek proved to be kettle holes, that is, natural depressions in an old moraine.

On Petroff's map 'Knakatnuk' is located at Fish Creek.

#### HOUSE RUINS ON COOK INLET

Owing to the short time spent at most of the sites, our information about the houses on Cook Inlet is very scanty. Including the Indian houses of Kachemak

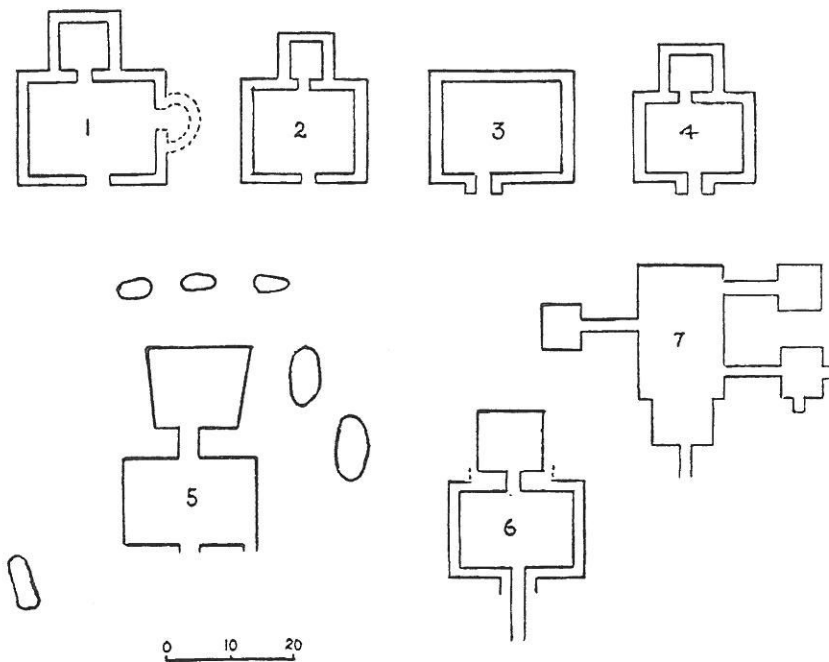


FIGURE 4. INDIAN HOUSE RUINS ON COOK INLET.

1. POINT WEST OF HALIBUT COVE; 2. CAPE STARICHKOF; 3. HOUSE II, KASILOF;
4. HOUSE IV, KASILOF; 5. NIKISHKA III; 6. POLLY CREEK; 7. CHINITNA BAY.

Bay (at the Point West of Halibut Cove, Tutka Bay, Elephant Rock near Yukon Island, and MacDonald Spit) we examined about 30 houses. They are all

rectangular (a few square) with the doorway in one of the longer sides. The doorway on the shorter side was noted at Chinitna Bay. Of these about 15 have small rooms, used for sleeping and for sweat baths. Three or possibly four of these houses had a second smaller room (Point West of Halibut Cove?, Libby Creek IV, Kenai IV, and Chinitna Bay I). In general, we can say that the small rooms were attached to the larger houses. Some of the houses have walls which still show as low mounds of earth; other houses are simply depressions. Some of the houses were undoubtedly excavated, though not very deeply (Point West of Halibut Cove?, Libby Creek III—small room, Libby Creek IV and A, Chinitna Bay, Polly Creek, Nikishka III, Kustatan, and Fish Creek). Small deeply excavated pits, without obvious doorways were observed (Kasilof III and Kenai I). Other houses did not seem to have been dug below the ground level. Some of the houses had simple doorways about which there could be no mistake; at Chinitna Bay and Libby Creek, however, all the houses had entrance passages from 5 to 6 feet long. Those at Polly Creek were up to 12 feet in length.

The houses of the Cook Inlet Indians have been described by Petroff. He writes: 'They build their permanent dwellings of logs. These logs are so fashioned that the under side, hollowed out, fits down tight, almost air-tight, upon the rounded surface of the timber next below. Some of their houses are from 15 to 20 feet square, and have regular rafters, giving a pitch to the roof sufficient to shed rain and melting snow. The covering of the roof is the bark of spruce trees. The fire-place is in the center, with a smoke-hole directly above it. The entrance to the house consists of a low, square aperture scarcely large enough to admit an adult person. The floor consists of the natural earth trodden hard, and along the sides of the inclosure are rude platforms, erected a foot or two from the ground, covered with grass mats and skins, and serving as sleeping- and lounging-places in the evening. In the houses of the well-to-do hunters we find wings or box-like additions to the main building, tightly framed and put together, opening into the main room. These little additions are furnished with the luxury of a rough plank floor, and in many instances with a small window covered with fish-gut. They are used in winter as sleeping apartments, and as reception-rooms during visits of ceremony, and also as bath-rooms, being heated during the winter with hot stones carried in from the fire outside, thus enabling the natives to dispense with clothing during the night, which they consider a great luxury.'<sup>5</sup> Porter writes in the *Eleventh Census*: 'On the shores of Cook inlet, among the Athapaskan tribes, a log dwelling entirely above ground takes the place of the barabara. These houses are generally divided into 2 compartments, an outer one, in which the cooking and rougher labor is performed, and an inner sleeping room, floored and ceiled, but very low, not more than 4 or 5 feet in height, and generally provided with a small pane of glass or seal gut. This inner room can be almost hermetically closed and affords a warm sleeping place in the coldest weather. In some of the Tnaina villages this bedroom is also utilized for bathing purposes,

<sup>5</sup> Petroff, p. 162 f.



being then heated with red-hot stones; but the general custom is to have 1 or 2 separate bath huts for each settlement.

'In the more primitive villages on the Sushitna and Kinik rivers we still find the old communal log house occupied by several families, each of which has its own sleeping room connected with the main structure by small openings in the wall. . . . All buildings of the Tnaina tribe are roofed with spruce bark.'<sup>6</sup>

Wrangell writes that the winter houses of the Kenai Indians are like those of the 'Ugalenze' (Eyak Indians, mouth of the Copper River) and the 'Atna' (Copper River Athabaskans). They consist of a large room, built of logs, with a fire place in the middle, partitioned off into as many compartments along the sides as there are families living together. There may be two or more bath rooms at the ends. These bath rooms are like those of the Aleut, but are not so roomy and light. They are built up on all sides with dirt, and have only a small entrance. Hot rocks are used to heat them.<sup>7</sup>

These statements seem to conflict with the archaeological evidence that some of the houses were partly sunk, and that some had entrance passages. Yet the houses with these peculiarities must have been Indian, for though the Athabaskans may not have been on Cook Inlet for a very great length of time, yet I cannot believe that any of the houses we found on the Inlet can be so old that they go back to a period before the coming of the Athabaskans, except perhaps the house ruin from Kustatan and the very ancient house pit at Grecian River. The evidence that the former may be Eskimo is based on an analysis of the objects found in the ruin, rather than on the shape of the house pit itself.

The modern houses at Jakolof's place [Plate 58D], Cottonwood Creek [Plate 58C], and Eastland Creek in Kachemak Bay are all variants of the original Indian house. We are perhaps justified in reconstructing the following type.

In the four corners are the four corner posts. Two beams, supporting the eaves of the roof, run between the corner posts on each side. Near the middle of the long front wall and near the middle of the long back wall are four middle posts, between which are the front door and the door to the bath room at the back. Connecting the front and back middle posts there is a roof beam on each side. Across these are four short beams, one at the front, one at the back, and one on each side of the smoke hole in the middle. Connecting the two cross beams in the front is a short ridge pole, running from the front of the house to the smoke hole. A similar short ridge pole runs from the second transverse beam at the smoke hole to the rear of the house. The roof is in two parts; the upper part runs from the short ridge poles to the roof beams on each side, and overlaps the lower part of the roof, which rests on the roof beams and the beams at the eaves. The smoke hole is protected by boards set up about three sides to shelter it from the prevailing winds. The walls along the sides of the house are of horizontal logs, the front and back of the house are of vertical planks, except above the

<sup>6</sup> Porter, p. 167.

<sup>7</sup> Wrangell, p. 111.

doors, where short horizontal boards cover the triangular space under the gable. The bath room is built with a simple gable roof resting on a single ridge pole set on two transverse beams, one fastened across the middle posts at the back of the main room, the other resting on a beam between the corner posts at the back of the bath room. The bath room is about 5 feet high in the middle. It has a plank floor and a small window at the back, covered with gutskin or an old flour sack. In the center of the main room is an open fire-place, set about with large stones. Along one or more sides are sleeping places, separated from the bare dirt floor by a log; the space behind the log is covered with straw. A canvas curtain shuts off the bath room. The front door is of wood, hung on leather hinges. On some of

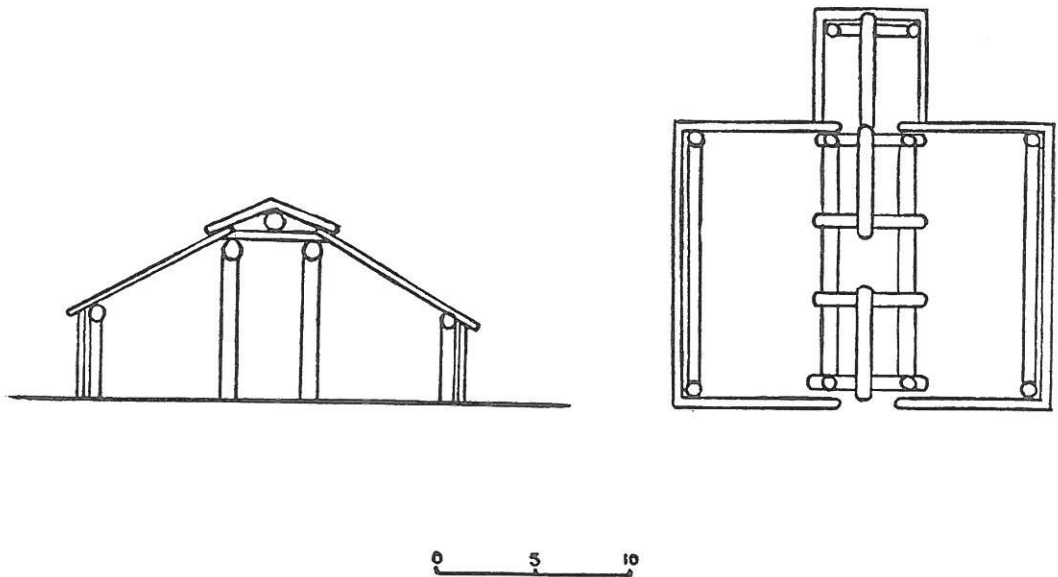


FIGURE 5. DIAGRAM OF CONSTRUCTION OF INDIAN HOUSE.

the houses the roof is covered with turf (Eastland Creek). About some of the houses are low walls of logs set a little distance out from the walls, the space between filled with earth (Cottonwood Creek).

The house is thus seen to be of simple construction. The use of the two middle posts and the two roof beams, instead of a single post in the middle and a single ridge pole, is necessitated by the placing of the smoke hole in the middle of the gable roof.

#### ARCHAEOLOGICAL MATERIAL FROM COOK INLET

##### *Cape Starichkof*

This small collection [Plate 56] seems to represent the culture of the Athabaskans just before or just after contact with the Russians. The bone specimens

are very fresh, and seem to have been made with sharp metal knives. On the other hand, no glass beads, fragments of china, or European metal tools were found in the midden. The house ruin was well-preserved.

A bone arrow head was found with two large barbs and three smaller ones, all on the same side [Plate 56 -5]. The specimen is now 8 cm. long, the tang having been broken off. The head is ground to three facets on each side. Since there seems to be no place for the attachment of a line, we must assume that the head was fixed.

Another barbed point [Plate 56 -6] seems to be a modification of the 'Cottonwood' type of slender barbed point, except that the barb is not much detached. The shaft is almost rectangular in section. Unfortunately the specimen is broken.

An oval beach pebble, 5.3 by 4 cm., and hollowed out on one side, was probably a toy lamp [Plate 56 -16]. A clam shell (*Spisula*) was found with traces of red hematite powder in it.

#### *Kenai and Swanson Creek*

Miscellaneous objects from these sites [Plate 59] suggest that excavations at the mouth of the Kenai River and along the shore north of Boulder Point would show a stage of Eskimo culture resembling that found in Kachemak Bay, or a culture imitating it.

From the vicinity of Kenai comes the crude stone lamp, made from a boulder, unworked except for the bowl and the wick lip [Plate 59 -1]. It measures 17 by 15 cm.

A fine lamp of dolerite [Plate 59 -4] was found at the site of *Sa'stin*, on Kenai River. It is similar in shape to the lamps from Kachemak Bay, especially to those from Yukon Island III, though it is bigger than these. It is oval in shape, broader at the back than at the front, with bulging sides and curved rim. The lip for the wick is well defined. It has a medial groove, deepest in the middle of the bowl. The dimensions are: length 25 cm., width 21.5 cm., height 8 cm., depth of bowl 3.3 cm. The discoloration is due to the oil which began to run out of the stone when the lamp was accidentally set near a radiator.

The lamp with human figure in the bowl said to have been found at that same site has already been mentioned. The natives at Kenai recognized pictures of this type. Russian River, where Theodore Sasha told me I might find a lamp like this, and Kenai Lake where the University Museum specimen was found [Plate 69], connect with Kenai River.

The Port Graham type of splitting adze is also known from Kenai. A specimen 20 cm. long, 9 cm. high, and 6 cm. wide, was found at Wackaqe'x. The bottom is flat, the top arched with a groove between two low ridges.

From Swanson Creek, above Boulder Point, we have a very fine splitting adze of dolerite [Plate 59 -3], 26 cm. long, 8.5 cm. high, and 4.6 cm. wide. The transverse ridges on top, between which the lashing was placed, are unusually high and well formed.

At the same place was found the hunter's lamp [Plate 59 -2]. It is made of dolerite, and is almost circular in outline, measuring 9 by 8.5 cm. in diameter. It is very shallow and lacks a lip for the wick. It should be compared to the specimen found in the grave at Yukon Fox Farm II [Plate 53 -16].

#### *Grecian ('Crescent') River, Tuxedni Bay*

The few specimens from this site consist of a chipped leaf-shaped blade of green shale (compare Plate 30 -29), a well-worn grinding stone, a lump of hematite and several stone flakes, and are undoubtedly very old. The fact that only chipped stone was found, while no piece of polished slate was obtained, would suggest the older periods in Kachemak Bay. Though the evidence is scanty, it points to an early Eskimo occupation of this part of Cook Inlet. The cave paintings (see below) also support this theory. The evidence of a semi-subterranean house is not inconsistent.

#### *Kustatan*

With the exception of the retouched flake [Plate 60 -3], the small collection comes from the house pit on the second terrace above the cannery.

The best specimen is a planing adze blade [Plate 60 -5], 8.5 by 4.5 cm., made of green sedimentary (?) rock, chipped and pecked and polished on both sides.

A chip of dolerite is ground along both edges [Plate 60 -4], perhaps for an arrow blade.

A triangular blade of schist, 9.5 by 8.5 cm., with a dull, curved edge [Plate 60 -1], suggests an unsuccessful attempt to make an ulo out of inferior rock.

A water-worn beach pebble, 8 by 2.5 cm., has a very dull chipped edge along one side [Plate 60 -2]. It appears to be a man's knife like an ulo, made of inferior stone.

There is also a knife, with blade and handle in one [Plate 60 -6]. It is made of dolerite, 9.7 by 1.8 cm., and has a single, dull cutting edge, made by grinding from both sides.

There are also three whetstones, a piece of worn pumice, two lumps of agate, several quartz chips, a pounding stone, and an unworked lump of red baked shale. The agates probably came from Boulder Point, the red baked shale and pumice from the lower Inlet, and the clam and cockle shells from Kalgin Island. A piece of worked shell may be a fragment of an ornament.

The flake [Plate 60 -3] from the first bench above the cannery is of dolerite (?), with rough end, a blunt point, and two curving edges, one retouched on both sides, the other on one side only. This specimen is almost identical with the flake from Halibut Cove [Plate 30 -35].

This collection from Kustatan gives the impression of a culture like that of Kachemak Bay, but one in which the specimens are poorly made, probably because of the substitution of inferior dolerite or schist for slate.

*Fish Creek*

These few specimens tell us very little.

A piece of stone, 7 by 3.5 cm., with a very poorly finished and slightly oblique, but sharp, cutting edge at one end is probably a planing adze blade [Plate 60-8].

There is a knife blade of slate [Plate 60-7], 7 by 2 cm., with a single sharpened edge and a rough tang for hafting.

A broken double-edge slate blade [Plate 60-9], 0.4 cm. thick and 2 cm. wide, is evidently a blade for an arrow or dart, though the steep beveling along the edges makes it different from any found at Kachemak Bay.

A piece of brownish slate [Plate 60-10], polished on both sides, but chipped along one edge to a straight blade, is possibly part of an ulo with chipped edge, though the specimen is too small for identification.

A whetstone [Plate 60-11], three hammerstones, and a thin strip of copper, which may be from the older or the modern part of the midden, were found.

Nothing much can be learned from a study of this poor collection. It is by no means certain that this material has any connection with the lamps with human figure, which were found near by. These few objects undoubtedly came from the house ruin, and are probably not very old, since they were found just under the turf. The assumption is, therefore, that they are of Indian manufacture. The single-edge knife blade, it must be remembered, was not well represented in the Eskimo collection from Kachemak Bay. The fragment of chipped slate, though it suggests the chipped slate ulos or scrapers of the Kachemak Bay culture, is too small to be of much value.

The report of plain stone lamps from Knik and from the hills back of Fish Creek certainly suggests an Eskimo occupation previous to the coming of the Athabaskans, since the natives of Knik Arm told me that their ancestors did not use stone lamps, but burned candle-fish in wooden receptacles. The finding of stone lamps near Kenai means very little, however, since we know that the Indians there made them, and their occurrence may mean only an imitated rather than a genuine Eskimo culture. The Eskimo influence was much less strongly felt on Knik Arm. Only at Kustatan and Tuxedni Bay did we find positive archaeological evidence to support Mason's thesis of an original Eskimo population of Cook Inlet. The strongest argument for this theory still remains that which he based upon the finding at Fish Creek of lamps with a human figure in the bowl. This argument has been materially strengthened as a result of our excavations in Kachemak Bay which have definitely determined that this type of lamp belonged to the Third Period of the Kachemak Bay culture. There remains no reasonable doubt that this culture extended over the entire Cook Inlet Basin, but whether the earlier periods had the same wide distribution only further archaeological research can determine.

## ROCK PAINTINGS ON COOK INLET<sup>8</sup>

Rock paintings at four sites have been mentioned: Indian Island, Bear Island, and Sadie Cove in Kachemak Bay, and a rock shelter at the head of Tuxedni Bay. The paintings at the first of these sites need not concern us further. They are simply vertical daubs of red paint, about 10 cm. long and from 2 to 3 cm. wide. There are about thirty of these, none more than four feet from the present ground level. The paintings at the other sites are, however, of considerable interest.

The paintings were, I believe, the work of Eskimo, though it is impossible to correlate them with any particular stage of the Kachemak Bay culture. Osgood reports the Indian tradition that those of Bear Island were made by 'people who lived there long ago.'<sup>9</sup> The cultural deposits found at three sites—Indian Island, Bear Island, and Tuxedni Bay—point to a considerable antiquity, probably greater than that of any of the known Indian sites in Kachemak Bay. Furthermore, rock paintings are common on Kodiak and Afognak Islands, which the Athabaskans did not reach in their recent migration from the interior,<sup>10</sup> and in Prince William Sound there are rather similar paintings, the Eskimo origin of which is indisputable.\*

Outside of southwestern Alaska,<sup>11</sup> however, I know of only one site with Eskimo rock paintings. These are the pictures which Jenness discovered on the Tuksuk River, about 17 miles above Teller, Alaska. These appear to be slightly different in style from those of Cook Inlet and are in both red and black paint. 'The majority represented human beings in various attitudes.' The local Eskimo believe these pictures illustrate a war between themselves and the Siberians who have raided the Alaskan coast for centuries. Of these paintings, Jenness con-

<sup>8</sup> These paintings have been published in the *Journal de la Société des Américanistes*, n. s., vol. xxv, Paris, 1933, under the title 'Peintures rupestres eskimo.'

<sup>9</sup> Osgood, *The Ethnography of the Tanaina*, Chapter VIII, in preparation. A copy of the two paragraphs dealing with these paintings was generously supplied me by the author.

<sup>10</sup> However, Osgood (*ibid.*) suggests a slightly different explanation. 'At first, these primitive artists seemed not to be Indians but numerous informants in different villages gave evidence to the contrary, although one man admitted that they [the paintings] were made more often by the Eskimo. Another old man said that the figures were made in spare hours on rocks of various sizes brought into the barabaras and that this was done for the purpose of teaching the boys the animals. He also said that the paint was applied with the fingers. Three other informants at villages in the Middle Inlet and Iliamna concurred unknowingly in perhaps a more plausible explanation. They had all seen such paintings, and said that they were records of the hunt, always made small because they were not meant to be seen except by those who were told the location. Individual artists were said to have been recognized by their work. One man, by way of conclusion, added that the painted animals "grew." A fact, leading to the hypothesis that the figures were not made, at least originally, by the Tanaina, was that they were apparently unknown in the Upper Inlet.' However, in his preliminary report in the *American Anthropologist* (p. 706), he seems to assume that the paintings were made by the Indians.

\*Dr. Birket-Smith and I discovered these paintings in 1933. The whole complex of the archaeological Eskimo culture in this area is so similar to that of Kachemak Bay that it may be considered a local phase of the latter, and the cave paintings in both regions are undoubtedly of the same origin.

<sup>11</sup> Cave paintings may be found on the Aleutian Islands. 'On Agatu Island is a grotto-like cave on the walls of which are many figures representing woman's sexual part. They were made by a shaman named Hani'kax', which means "The one who is standing on the water's surface.'" (Jochelson, 1925, p. 122).

cludes: 'It is, therefore, one more indication of the close connection that has existed between the Indians and Eskimos of Alaska since remote times.'<sup>12</sup> Certainly the remarkable development of Eskimo rock paintings in the peripheral area of southwestern Alaska demonstrates the stimulus of foreign influence. These pictures, though crude, have a definite style of their own which finds no close parallel elsewhere. The figures painted on modern Eskimo dishes, boxes, kayaks, etc., are totally unlike the cave paintings, and clearly reflect their origin in Northwest Coast Indian influence. Rock carvings are known from southeastern Alaska,<sup>13</sup> and from the east coast of Vancouver Island,<sup>14</sup> but these are quite different in style (and, of course, in technique) from the Cook Inlet paintings, even when the same subjects—whales, birds, or men—are figured. Except for the pictures near Teller and some red paintings about 30 miles up Chilcat River,<sup>15</sup> there are no paintings on rock nearer than those of the interior Salish tribes of British Columbia, and these do not offer many similarities. They are not confined to figures in silhouette, as are those of Cook Inlet; the subject matter and style of conventionalization are different, also.

The paintings reproduced on Plates 62 to 68 were made from tracings of the originals. The broken lines indicate indistinct outlines; the hatched lines mark cracks or breaks in the rock. Whole groups or isolated figures are indicated by letters; the members of a group by Arabic numerals. The reproductions have the same vertical orientation as the originals, with the exception of Plate 62A. This figure is painted on the ceiling of a little recess, so low that one is forced to lie down on the ground to see the painting, and I have reproduced it as it appears from that position. The pictures in Plate 65C and Plate 66F and I are reproduced from fragments of rocks loaned me by Dr. Osgood. Not having seen them *in situ* I have been forced to determine their orientation by comparison with analogous paintings. By no means all the pictures at the different sites are reproduced. The pigment is indistinct and has weathered badly. Only about half of the figures at Tuxedni Bay could be copied, and only a slightly larger proportion of those at Bear Island. Only a small portion of the single group at Sadie Cove is missing, however.

The paint in every case is red hematite, probably mixed with animal fat. Water, and light applications of gasolene, kerosene, and wood alcohol apparently have no effect on the paint, but wetting with alcohol intensifies the color as long as the surface remains moist. The Tuxedni Bay paintings are a dull brick red; those of Kachemak Bay, especially a few figures at Bear Island, are brighter. The pigment at the last mentioned site is far from uniform, which suggests that the paintings were made over an interval of time. The surface of the rock was never prepared. The paintings at Tuxedni Bay may have been made with the

<sup>12</sup> Jenness, 1928, p. 78 f. Dr. Jenness has kindly sent me a photograph of the paintings.

<sup>13</sup> Niblack, Pl. XX.

<sup>14</sup> Smith, 1900-1908, vi, Pls. X, XI, XII, Figs. 115, 117.

<sup>15</sup> Reported by Lieutenant Emmons in a letter to Dr. Jenness.

finger, as one of Osgood's informants suggests, or with the frayed end of a stick. Those at Sadie Cove and Bear Island were certainly painted with a finer instrument.

The paintings at *Tuxedni Bay* are arranged in eight main groups, as determined by the joint planes of the rock. No real attempt at composition is evident, however, and the members of a group are not even drawn to the same scale. The figures are not always vertical. For example, those reproduced in Plate 64 are oblique, because a crack in the rock, slanting down from left to right, was taken for the horizon or ground. In this group, Figure 2 is actually 10 cm. above and to the left of Figure 3, while Figure 1 is 18 cm. beyond Figure 2. There are also smears of paint at the ends of the line which I have not attempted to reproduce. Some distance below the group is the painting shown in Plate 63C. Most of the group from which Plate 63E is taken is undecipherable. At one place in it there is a large smear where paint was evidently mixed or tested.

An identification of the subjects represented is difficult. The most prominent figure [Plate 62B], which dominates the whole group, and can even be seen from the water's edge, suggests the conventionalized symbol used by the Eskimo of Bering Strait to represent the raven.<sup>16</sup> For the Indians of the Northwest Coast, including the Eyak of the Copper River delta and the Athabaskans of Cook Inlet, all of whom possess the dual social organization of eagle (or wolf) and raven moieties, such a symbol would undoubtedly be of totemic significance. But for the prehistoric Eskimo of Cook Inlet we should have to offer another explanation,<sup>17</sup> since it is unlikely that they had this type of social organization.\*

Little can be said of the figure of Plate 62A. The lower part suggests the 'ladder' pattern, an ancient Eskimo motif, known also from southern British Columbia. The upper part resembles the representation of the vulva, painted on a boulder called by the Thompson Indians 'the Coyote's Wife.'<sup>18</sup>

Another figure, which I have not reproduced, is a vertical band of 13 horizontal lines, ending at the top and bottom with a cross. It is painted on the wall of the recess, under the symbol of Plate 62A.

There are seven representations of men (or perhaps of bears or anthropomorphic figures). On four [Plate 62C -2, Plate 63A -2 and 3, and Plate 63B -1] the penis is indicated; on two [Plate 64 -4 and 6] it is clearly lacking. On the seventh [Plate 63E], we cannot be sure if it is the penis or a tail. Other characteristic features are the broad, somewhat flattened head, suggesting an animal's muzzle, the widespread arms and legs, and the round, squat bodies. Representations of men, painted by the Shuswap<sup>19</sup> and Thompson Indians,<sup>20</sup> though

<sup>16</sup> Nelson, p. 324 f., Fig. 114.

<sup>17</sup> Cf. a similar figure, of unknown significance, painted on a boulder by the Thompson Indians (Teit, 1898-1900, iv, Pl. XX -5).

\*The Eskimo of Prince William Sound were without clan or moiety divisions, though the Raven is an important figure in their mythology.

<sup>18</sup> Teit, *ibid.*, Pl. XX -13e.

<sup>19</sup> Teit, 1900-1908, vii, Fig. 252.

<sup>20</sup> Teit, 1898-1900, iv, Pl. XX -6 and -24b.



equally crude, lack these peculiarities. While these pictures seem to be men, we must not overlook the possibility that they may represent bears, or even human beings disguised as bears. In view of the unique position which the bear occupies in the religious concepts of both northern Indians and Eskimo, we might well expect that in art, too, the bear might have more of the human than the animal.

Four figures [Plate 62c -3, Plate 63A -1, Plate 63F, and Plate 64 -3] seem to represent men in kayaks. In recent years two- or three-man bidarkas were more common on Cook Inlet and neighboring waters than the kayak for a single person. Unfortunately the pictures are too crude to give us much idea of the shape of the kayak. The stern was apparently rather short and the bow considerably upturned. The shape of the prow reminds us a little of the kayaks of the Canadian Thule culture.<sup>21</sup> The kayaks of Cape Espenberg in Koztebue Sound, and of King and Nunivak Islands, Alaska, also have an upturned prow, but those of the last two localities are pierced by a hole. The modern bidarkas of the southwestern Alaskan Eskimo have divided prows. The paintings may, therefore, furnish archaeological proof that the ornamented prows of the modern Alaskan kayaks are a recent feature, and that the original kayak was like that of the Canadian Thule culture.

One of the kayakers [Plate 64 -3] is apparently wearing a hunting hat or helmet with a brim, like those worn until recent times by the southern Eskimo and the Aleut.<sup>22</sup>

Two objects [Plate 63B -2, and Plate 64 -5] seem to be umiaks. The first and last upright elements may be the bow and stern of the boat, but they are more probably the occupants. Thus, one boat carries six, the other seven persons. Analogous representations of men in boats are familiar from archaeological sites in Europe and Siberia. Two similar paintings made by the Thompson Indians represent trenches, however; one is bordered by shoveled-out dirt, the other by a line of poles. These symbolize work performed by adolescents during their puberty observances.<sup>23</sup>

Other figures represent whales [Plate 62c -1 (?), Plate 63c, D, and G, and Plate 64 -2]. One of these [Plate 64 -2] can be identified as a killer whale. Two, however [Plate 63c and G], are indistinct and may possibly be quadrupeds of some sort. There is also a swan (?) [Plate 64 -1], the eye of which is formed by a naturally dark spot on the rock (left white in the reproduction).

The paintings at *Bear Island* are much finer and smaller in scale than those of Tuxedni Bay; the reproductions are natural size while the Tuxedni Bay pictures have been reduced to one third. The surface of the rock is considerably broken up, and the pictures are scattered with little reference to each other.

There are two human figures. The man [Plate 65B] suggests by his flattened head the human figures of Tuxedni Bay, though the elongated proportions of the

<sup>21</sup> Cf. engravings on ivory and wooden toys. (Mathiassen, 1927, I, Pl. 52 -14, Pl. 62 -11, Pl. 72 -5, and Fig. 81).

<sup>22</sup> Nelson, Pl. LXIV -20 and 22.

<sup>23</sup> Teit, 1898-1900, iv, Pl. XX -7e and 13f.

body are different. We should also note the fingers on the left hand. The second figure [Plate 65A] is that of a pregnant woman; the head is cut off by a break in the rock. This picture is very different from anything else found in this region. Perhaps the closest parallel would have to be sought in the European Paleolithic. There are two other anthropomorphic (?) figures [Plate 66E and H-1].

Several pictures are probably seals, sea-otter, or similar sea mammals [Plates 65E-1, and 2?, and Plate 66A, B, C, D, F, G, and I-2]. Four appear to be wounded with harpoons or darts. The knob at the end of the shaft sticking into the side of one of these [Plate 66G] is evidently the bladder attached to the dart or harpoon used with the throwing board.

The other animals are difficult to identify. There are two quadrupeds standing on their hind legs (?) [Plate 67A-1 and 2]; the third figure in the same group is a shark (?). There is a kid or faun<sup>24</sup> [Plate 65D; Plate 65C may be the same], a bear (?) [Plate 67E], a walrus (?) [Plate 67D], a whale [Plate 67B], and a fox or other quadruped [Plate 66H-2]. The cross-like figure [Plate 67C] is suggestive of a conventionalized living form, perhaps that of a flying bird.<sup>25</sup>

The fragmentary painting [Plate 66I-1] may be a boat.

The paintings at *Sadie Cove* [Plate 68] are the most interesting from an artistic point of view, for they offer the only example of true composition. They are larger than those of Bear Island. Their size and the motif of the leaping whale point towards Tuxedni Bay. Only one group of paintings was found. The paint has weathered badly, the upper left-hand portion being completely obliterated. There were doubtless four whales originally, and the upper band, composed like the lower of highly conventionalized land animals, formerly extended across the whole group. The whales are blackfish, very well drawn, and in characteristic action. The land animals, however, cannot be identified.

That these paintings were not intended primarily as works of art is evident from the fact that they are all more or less remote from the permanent villages, and that no paintings were found on convenient rock surfaces near village sites. The modern Indians and Eskimo about Kachemak Bay whom I questioned know nothing definite about the pictures. Anisim, the Kodiak Eskimo living near Seldovia, said that on Kodiak Island there were many such paintings and that they were 'like letters,' to tell others of game which had been killed; (compare with the explanations given to Osgood). A woman from Afognak, an island in the Kodiak group, said that formerly only the 'old people' (the initiated?) made these paintings, and that they were to bring good luck in hunting. Alec Mishikof, a Kenai Indian, the nephew of a shaman, was inclined to connect the paintings with the whale killers.\* He was the best informed on magical and religious

<sup>24</sup> Cf. the figure of a mountain goat from the Thompson Indians, Teit, 1898-1900, iv, Pl. XX-15.

<sup>25</sup> Cf. a figure painted on a Tahltan drum (Emmons, 1911, Fig. 10).

\* Our informant in Prince William Sound (1933) also told us that the whalers had made such pictures. We discovered several sites with paintings, all of which were unknown to the natives, and in every case these were ascribed, not to human agency, but to an evil man-eating spirit, a shaman's familiar, who figures in their folklore.

matters of any of the natives that I met, though he insisted that the Kenai Indians also had a secret society of whale killers, like the Eskimo. This statement was vigorously denied by the other Indians at Kenai. The figures of whales which appear at the three sites certainly support his belief that they were made by whalers. The harpooned seals of Bear Island also suggest a hunting ritual. Alec Mishikof thought that the rock shelters were the secret places where the whalers used to boil out the human fat from which they made poison for their lance blades. Afterwards, the bones had to be reassembled (with pitch, he hazarded) and fed regularly, otherwise the skeleton would pursue the whaler and devour him.<sup>26</sup> Our excavations at Tuxedni Bay, Bear and Indian Islands, however, did not uncover any human remains.

Since the nearest analogies to these paintings have been found in the interior of British Columbia, we ought perhaps, for lack of better information, to turn there for a suggestion as to their meaning. Teit writes of the Lillooet: 'Paintings were made on rocks and on trees by adolescent boys and girls as a record of their observances, but also by men as a record of their dreams. There are several rocks on which every person passing by for the first time had to paint a picture.'<sup>27</sup> Paintings were made by adolescent boys and girls among the Shuswap and Thompson Indians.<sup>28</sup> Among the former: 'Most of these pictures were representations of objects seen in their dreams, and the painting of them was supposed to hasten the attainment of a person's manitou or other desires.'<sup>29</sup>

While we dare not hazard a definite explanation, it seems probable that the cave paintings of Cook Inlet were connected with the religious and magical practices of the prehistoric inhabitants, that the knowledge of their location and perhaps of their meaning was secret, and that they were directed to secure good luck in hunting or in other activities. Under what circumstances and by whom they were made—by adolescents, by whalers or some other shamanistic society—must remain a mystery unless ethnological investigations on Kodiak Island be not too late to find the solution.\*

<sup>26</sup> The Eskimo of Ugamuk Strait, Kodiak Island, used to offer the first berries, fish, and oil of the season to the mummy of a famous whaler (Dall, 1878, p. 27).

<sup>27</sup> Teit, 1900-1908, v, p. 282.

<sup>28</sup> Teit, 1898-1900, iv, p. 381.

<sup>29</sup> Teit, 1900-1908, vii, p. 590.

\*In the light of our somewhat scanty information from Prince William Sound, it seems probable that these paintings were made by whalers or by shamans.

## VI. ARCHAEOLOGY OF PRINCE WILLIAM SOUND

As I have explained in the Introduction, the results of my archaeological survey of Prince William Sound in 1930 have had to be omitted from the present report. This information, however, will be incorporated in the monograph on the archaeology of Prince William Sound which Dr. Birket-Smith and I are preparing. I shall, therefore, but briefly summarize the results of this preliminary work.

Eskimo sites at the following localities were investigated: Point Whitshed Radio Station; Mummy Island; Boswell Bay, Port Etches, and Anderson Bay on Hinchinbrook Island; a small island in Hawkins Cut-Off; three sites on Hawkins Island, one of which Dr. Birket-Smith and I excavated in 1933; Grass Island in Cordova Bay; Sheep Bay; Gravina Bay; Boulder Bay; Ellamar; Galena Bay; and Bainbridge Island. Besides these, other sites were located by report: Long Bay; Eaglik Bay; Esther Passage; Passage Island; Culross Island; Ewan Bay; Jackpot Bay; Chenega Island; Knight Island; Evans Island; and Montague Island. Some of these sites were visited in 1933.

The collection obtained in 1930 contained 90 specimens of stone and 19 of bone. Besides these, a few objects in the hands of private collectors were studied. The following types were represented. All, except those indicated by italics, are types belonging to the Kachemak Bay culture: stone grooved around short diameter, stone grooved around long diameter, splitting adze, planing adze, *stone axe*, chisel, *stone pick* (for use in warfare ?), *slate chisel or carving tool*, maul head, *pestle*, *mortar of whale vertebra*, hammer stone, stone saw, whetstone, oval stone lamp with vertical ridge below the lip, hunter's lamp, large chipped stone scraper, slate lance blade (cf. Plate 31 -1), straight double-edged slate blade, ulo, man's knife like ulo, greenstone drill point, slate 'awl,' barbed dart head, slender socket-piece with bifurcated (?) tang, bone arrow head for inserted blade, bone pin, needle, crude ivory doll, *crescent-shaped slate pendant*, labret (?), cut animal tooth and cut articulation. Objects of native copper have been reported from several sites.

Cave burial is common. Desiccated human bodies, wrapped in furs and seated against the wall of the cave, have been found in various parts of the Sound. Skeletons have also been found inside wooden coffins placed in caves. I found one flexed inhumation (?) under an overhanging cliff, and examined several rock shelters and caves containing human bones, the scattered condition of which was probably caused by modern skull hunters. We also found scattered and broken

human bones in the shell heaps. Burial or exposure on top of a refuge island is reported.

Shallow depressions in the surface of the middens at two sites seem to be remains of semi-subterranean houses. At one village site these pits were about 12 feet in diameter, and were ranged in two rows along the edge of the water. Originally the houses were probably square or rectangular. We dug to a depth of three feet in one of these pits, and found a few fragments of wood (part of the timbers ?), but did not reach the bottom.

The similarity of the Prince William Sound culture to the Kachemak Bay Eskimo culture is thus demonstrated. The phase of the latter to which it shows the closest resemblance is that of the Third Period, though the absence of any notched stones from Prince William Sound should be noted.

In the *Tenth* and *Eleventh Census* reports the Eskimo population of the southern coast of Kenai Peninsula, including the Port Graham district, is treated as a part of the Chugach Eskimo tribe of Prince William Sound. It would be more accurate to consider the Eskimo of the Sound as a distinct though closely related group, the limits of whose territories extend only to the western entrance to the Sound. The eastern extent of the Chugach Eskimo is still harder to define. At present, Cordova and Point Whithed mark the edge of their country, but there is some evidence to show that they formerly lived as far east as Kayak Island.<sup>1</sup> The country about Cordova and the mouth of the Copper River is inhabited by the Eyak Indians. They have been considered as the southeasternmost branch of the Alaskan Eskimo (under the name 'Ougalakmiut') a group eventually absorbed by the Tlingit.<sup>2</sup> From what the Eyak themselves told me, and from a study of the writings of Dall, Krause, and especially of Abercrombie,<sup>3</sup> I reached the conclusion that the Eyak (or 'Ougalentsi') are an Athabaskan-speaking people who have pushed down the Copper River to its mouth, separating the Eskimo of Kayak Island from their neighbors in Prince William Sound. This hypothesis, formulated in 1930, has been supported by the results of our ethnological studies in 1933. The name 'Ougalakmiut,' if it can be used at all, should be applied only to the Eskimo formerly inhabiting or frequenting Kayak Island and Controller Bay, and who were driven out or absorbed by the Tlingit.

In 1930 several Eyak sites were visited on the Copper River, Eyak River, and Eyak Lake, but nothing was found but the foundations of a community house and a few trifling objects.

Besides our report on the archaeology of Prince William Sound, Dr. Birket-Smith and I are preparing a paper on the ethnology of the Eyak and a longer study of the ethnology of the Prince William Sound Eskimo.

<sup>1</sup> Steller saw a semi-subterranean house here in 1741 (Krause; p. 18). The traditions of the Eskimo themselves also support this theory (Field notes, 1933).

<sup>2</sup> Petroff, p. 146; Porter p. 155; *Handbook of American Indians*, I, p. 433 f. and II, p. 862; Dall, 1877, I, p. 21.

<sup>3</sup> Dall, 1877, I, p. 21; Dall, 1885; Krause, p. 323 ff; Abercrombie, 1884, pp. 397 and 401.

## VII. AN ANALYSIS OF THE KACHEMAK BAY CULTURE

In the following pages an attempt will be made to sketch the position of the Kachemak Bay culture with respect to the archaeological cultures of the American Arctic and North Pacific regions. To make the account complete, the archaeology of the Pacific coast south of Puget Sound should be included, since there are many traits common to the whole Pacific area of North America, but I have preferred to limit this study to the northern part of that region. The bibliography which I have used makes no pretence to completeness. The present study only tries to show how the archaeological culture of Kachemak Bay, while built upon an Eskimo foundation in which certain Thule culture types were important, reflects influences from Kamchatka and Japan on the one hand, and from the Northwest Coast of America on the other. Unfortunately, Henry B. Collins Jr.'s important archaeological discoveries on St. Lawrence Island have not yet been published in full, and of the archaeology of southeastern Alaska and northern British Columbia we know practically nothing. These gaps in our knowledge must not be forgotten.

### HOUSES

We know nothing about the houses of the First Period of the Kachemak Bay culture, and of those of the Second Period we know little, except that large stones and whale vertebrae were used in their construction. The use of stone in building is anomalous in a region so heavily timbered. It could only be accounted for by the supposition that the builders were people who had come from a region where timber was not plentiful and where stone was the natural building material. It is perhaps dangerous to labor this point when our information from Yukon Island is so unsatisfactory. It should be pointed out, however, that this 'stone structure' seems to suggest the stone and whale bone house of the Canadian Thule culture. This type of house was used by the Siberian Eskimo before they adopted the Chukchi tent. Without going into the question of the relationship between the round stone Thule house and the square wooden Point Barrow house, we must note that since Mathiassen's discussion of this problem,<sup>1</sup> the stone and bone

<sup>1</sup> Mathiassen, 1927, II, p. 152 ff. Mathiassen believes these two types of house to be related, and though refusing to commit himself as to which is the older type, he seems, as Birket-Smith (II, p. 45) has pointed out, to regard the wooden Point Barrow house as the original type.

house has been found on St. Lawrence Island, where Collins reports the following sequence of house types: 'The houses of the Old Bering Sea period . . . were small, semi-subterranean, square or rectangular structures with stone floors but no sleeping platforms and with walls of horizontally laid small timbers held in place by wood and bone stakes; there was a long narrow entrance passage with stone floor and walls with timbered roof, with the floor at a slightly lower level than that of the house. A modification of this type came into use during the early stages of the succeeding Punuk period; it was similar in all essential respects but was almost twice as large and had a roof of small driftwood timbers.

'Later in the Punuk period there appeared a different type of house, semi-subterranean, square to rectangular, with stone floor but with walls of stones, whale bones, and walrus skulls instead of horizontal timbers; no sleeping platforms; entrance passage narrow and roofed with whale ribs or large stones. There was usually a circular enlargement or annex to the passage, used probably for cooking and storage purposes. A modification of this form, with walls entirely of stones and lacking an entrance passage was used apparently as a summer dwelling.'<sup>2</sup>

This stone and bone house is probably, like certain elements in Punuk art,<sup>3</sup> a feature borrowed from a contemporaneous Thule or Thule-like culture elsewhere in Alaska. If we could only be sure that the structure in Yukon Island II were a house, we might then argue that the stone house was very widespread in Alaska. We should thus be inclined to look for it on the mainland in northern Alaska<sup>4</sup> at a stage prior to that which saw the introduction of the modern wooden house at Point Barrow, and prior also to the appearance of the stone house on St. Lawrence Island.

The houses of the Third Period of the Kachemak Bay culture were semi-subterranean—that is, they were excavated to a depth of at least 2 or 3 feet—and were entered by a semi-subterranean entrance passage, very narrow and at least 12 feet or more long. The houses were built of wood, with posts in the corners and at other places along the walls. Some of the houses had more than one room, and some seem to have had a fire-place in the main room.

The indoor *hearth* is mentioned in the descriptions of the Kodiak house of the last century.<sup>5</sup> Shelikof, who landed on Kodiak Island in 1784, definitely states that the Kodiak house had no fire-place.<sup>6</sup> However, the indoor fire-place is found as far north as Norton and Kotzebue Sounds,<sup>7</sup> and even some of the houses of the Thule culture had hearths.<sup>8</sup> On the other hand, some of the stone-set baking hearths of Yukon Island III, and probably that of Cottonwood as well, were outside of the house.

<sup>2</sup> Collins, 1932-I, p. 114.

<sup>3</sup> de Laguna, 1932-33, Part II, p. 92.

<sup>4</sup> See reports of bone houses, Mathiassen, 1927, II, p. 152.

<sup>5</sup> Bancroft, p. 74; Holmberg, p. 97; Petroff, p. 141.

<sup>6</sup> Quoted by Petroff, p. 137.

<sup>7</sup> Murdoch, p. 77 f.

<sup>8</sup> Mathiassen, 1927, II, p. 132.

wood for rafters and posts, and walrus hide for the roof. At their inland village on Lake Walker, sufficient timber enables them to build above ground, with wooden floors and platforms.<sup>16</sup>

The house of the Kodiak Eskimo was of this same type. It was semi-subterranean, excavated about 3 or 4 feet, with a frame of posts 7 or 8 feet high; the walls were of vertically set planks, slightly inclined inward. The beams of the roof were of whale ribs or timbers, and the whole was covered with sods. In the center of the main room was dug the pit for the fire-place; the smoke hole was above, and could be covered with a gut-skin window. The floor was of dirt strewn with straw; plank floors are also mentioned. Partitions divided off sleeping rooms for three or four families. These sleeping rooms, 13 by 14 feet, like the small rooms of the Cook Inlet house, had plank floors, very low ceilings, and sometimes a gut-skin window. They were used as bathrooms, steam being produced by pouring water over red hot stones.<sup>17</sup> Langsdorf specified that the house was half sunk in the ground, with a low entrance at the side, though he did not definitely mention a tunnel.<sup>18</sup> Holmberg, on the other hand, wrote as if only the three or four sleeping rooms were semi-subterranean.<sup>19</sup> Shelikof's description, to which we have already referred, gives a very different picture, which we are at a loss to explain. He writes: 'The people live in subterranean dwellings, the walls of which are lined with planks; the window-openings are on top, covered with bladders of various animals; the entrance is from beneath. They have no fire-places, and make no fire because it is warm enough without. Their bath-houses are similarly constructed, and heat is produced with stone heated in a fire outside; here the natives rub themselves with bundles of grass and twigs. These baths are very hot, but no steam is used.'<sup>20</sup>

The Kodiak type of house was also built in Prince William Sound.<sup>21</sup> It has been found as far east as Kayak Island, where Steller described a house, 18 by 12 feet, excavated to a depth of 12 feet, with roof of grass, stones, and bark, laid upon poles.<sup>22</sup> Where the Chugach came in contact with the Tlingit, they built the plank house entirely above ground with front porch.<sup>23</sup>

The same type of house was originally used on the Aleutian Islands. Dall believed that the large Aleut community house, with roof entrance and extra sleeping rooms or burial chambers—the type described by Jochelson<sup>24</sup>—though

<sup>16</sup> *Ibid.*

<sup>17</sup> Petroff, p. 141; Porter, p. 167; Bancroft, p. 74 f; Holmberg, p. 96 f; Lisiansky p. 212 ff.

<sup>18</sup> Langsdorff, p. 356; cf. also Lisiansky, *ibid.*

<sup>19</sup> Holmberg, p. 96 f. The whole house is, however, turfed over.

<sup>20</sup> Quoted by Petroff, p. 137.

<sup>21</sup> Petroff, p. 28; excavations on Hawkins Island, 1930; and information from L. C. Pratt, Cordova, Alaska.

<sup>22</sup> Krause, p. 18.

<sup>23</sup> Petroff, *ibid.*

<sup>24</sup> Jochelson, 1925, esp. pp. 23, 32, 34. The size varied from 36 by 26 feet to 14 by 12 feet on Attu Island, from 33 by 21 to 19 by 12 feet on Atka Island, and from 40 by 21 feet to 100 by 35 feet (the last possibly post-Russian) on Umnak Island. These figures are approximate. Cf. Porter p. 168; Langsdorff, p. 332 f.



pre-Russian, was not very old, and that the original type was smaller, with entrance at the side.<sup>25</sup> Petroff also writes: 'Remains of huts built with whale-ribs, such as the coast Eskimo erect, have been discovered high upon the mountain sides of Oonimak and Atkha islands. These buildings were probably erected in the immediate vicinity of the sea-shore as it then was, the islands having since risen through volcanic action.'<sup>26</sup>

On the basis of an exhaustive study of house types in North America and northern Eurasia, Birket-Smith advances the following chronology: 'The earth lodge with the entrance passage is the oldest, then comes the earth lodge with entrance through the roof, and youngest is the square plank house.' The round form of the Eskimo house he believes is older than the rectangular,<sup>27</sup> which was introduced into the area from the Northwest Coast.<sup>28</sup>

It seems probable that the rectangular, semi-subterranean houses of Kamchatka were related to those of southwestern Alaska. Jochelson writes: 'The Kamchadal earth-hut was only a winter dwelling. Its smoke hole in the ceiling served at the same time as a window and door, through which one entered by descending along a log with notches or holes. This was the only entrance opening, but there was, however, an underground passage in the shape of a narrow channel, for the draught, which started from the hearth and came out of the house at the side. Women, children, and the so-called transformed men used to go in and out through this passage.'<sup>29</sup> The transformation of the smoke hole into a door in Kamchatka must be related to the same change on the Aleutian Islands, where, however, no vestige of the entrance passage was left at the time of the Russian conquest. The entrance through the roof of the store room at Cape Darby and St. Michael may be a related phenomenon.

The house of the prehistoric Ainu of Japan was a pit dwelling, excavated to a depth of 1 to 2 feet, sometimes even to 3 or 4. The hearth in the center was set about with stones or fragments of pottery. The walls and roof were of posts or beams, covered with planks and brush, and then turfed over. The outline of the house varied from square or rectangular to almost circular. There were one or more rooms. The entrance was through a 'corridor.'<sup>30</sup> This type of house, like those represented by ruins in Kamchatka and the Kurile Islands, must be related in some way to the semi-subterranean house of the Eskimo.

The house of the interior Salish Indians is a semi-subterranean wooden structure, circular, with roof-entrance.<sup>31</sup> If the house in this region is related to that of the Eskimo, we should expect to find traces of ancient house pits on the

<sup>25</sup> Dall, 1877, II, p. 83.

<sup>26</sup> Petroff, p. 147.

<sup>27</sup> Birket-Smith, II, p. 54.

<sup>28</sup> *Ibid.*, p. 48.

<sup>29</sup> Jochelson, 1928, p. 64. The house pits found in northern Kamchatka are almost circular, like the earth houses of the Koryak (*Ibid.*, p. 65).

<sup>30</sup> Munro, p. 68 ff., Schnell, p. 36.

<sup>31</sup> Teit, 1898-1900, IV, Figs. 135 and 136, p. 192 ff.

coast of British Columbia and in southeastern Alaska, dating from a period prior to the development of the Northwest Coast plank house. If we follow Birket-Smith's chronology, we should expect to find the entrance passage associated with the earliest of these house pits, and roof-entrance with the later. There is, however, a difficulty to be encountered if we attempt to relate the roof-entrance of the Kamchadal and Aleut house with that of the interior Salish. There is no evidence that roof-entrance was ever associated with the houses of the Pacific Eskimo, and this constitutes a formidable gap.

*The kashim*, either as a festival place or as a men's house, seems to have been used all over the Alaskan Eskimo area. On Kodiak Island it was of the same construction as the ordinary house,<sup>32</sup> though no longer in use in Holmberg's time (1855).<sup>33</sup> The last kashim was seen on the Aleutian Islands in 1878.<sup>34</sup> When Jochelson visited them in 1909 and 1910 all memory of them had disappeared.<sup>35</sup> The failure of Petroff to note the kashim among the Chugach in 1880 is, therefore, of little significance. It seems probable that the kashim was known to the Kachemak Bay culture.

The relative scarcity of fire-cracked stones in the older sites, both in Prince William Sound (Hawkins Island), and in Kachemak Bay (all the Eskimo sites, with the exception of Q'na'qesle in Tutka Bay, the sub-beach midden at the Nutbeam's place in Halibut Cove, and layer 2 at Jakolof's place) contrasts with the comparatively great numbers found at all the Indian sites on Cook Inlet, and suggests that the Eskimo in former times did not use the present form of *sweat bath*, in which steam is made by pouring water over hot stones. If they knew the bath it was probably that of the more northern Eskimo, in which heat is obtained from the fire in the kashim and urine is used as soap.<sup>36</sup> The present type of bath is taken in the small room attached to the house, or in a small bath house, and is enjoyed by women and girls, not men alone. Urine is not used now though it was in former times.<sup>37</sup> At the Kuskokwim the two types overlap, the bath is taken by the men in the kashim, but both steam and urine are used.<sup>38</sup> The steam bath in southwestern Alaska may be, therefore, a recent innovation taken over from the Indians.

Apparently the same principles affecting the *selection of village sites* in Kachemak Bay and Prince William Sound were found among the Kodiak Eskimo

<sup>32</sup> Bancroft, p. 75.

<sup>33</sup> Holmberg, p. 98.

<sup>34</sup> At Attu (Porter, p. 168).

<sup>35</sup> Jochelson, 1925, p. 34.

<sup>36</sup> Nelson, p. 287 f.

<sup>37</sup> Field notes for the Cook Inlet Indians and Prince William Sound Eskimo, 1930 and 1933; Petroff, p. 141 for Kodiak Island; Bancroft, p. 83 for Pacific Eskimo in general; Lisiansky, p. 214.

<sup>38</sup> Porter, p. 102.

and the Aleut.<sup>39</sup> These were an extended view and the possibility of escape by boats in several directions. The same conditions influenced the selection of the ancient sites about Bering Strait.<sup>40</sup> *Refuge islands* were also used, not only by the Pacific Eskimo and Aleut, but by the Kamchadal, from whom the name, 'kekūr,' was introduced into Alaska by the Russians.<sup>41</sup> Sentries, mentioned by informants in Prince William Sound, were also employed by the Aleut.<sup>42</sup>

#### DISPOSAL OF THE DEAD

The methods of disposal of the dead in Kachemak Bay seem to be very different from any methods employed by the Eskimo, among whom we find cairn burial in the east (a Thule culture trait surviving in Greeniand but almost gone in Canada), simple exposure (modern Central Eskimo tribes and sometimes in northern Alaska), platform burial (northern Alaska), box burial above ground (Alaska south of Bering Strait), cave burial and mummification (Kodiak and Prince William Sound Eskimo, and the Aleut).<sup>43</sup> The Kachemak Bay methods also differ strikingly from the box burial and cremation of the Indians of Cook Inlet<sup>44</sup> and the Northwest Coast.

*Flexed inhumation* was practiced in the Second Period of the Kachemak Bay culture. The body found in Yukon Island II, 32-9-1, was buried in a shallow grave, and it has been noted that the fragments of rotted wood above the skeleton may suggest the wooden coffin used in Prince William Sound. The skeletons found in Yukon Fox Farm II may have been exposed, since there is no stratigraphic evidence of interment, but the stratigraphy may indicate that the grave was very shallow. The double burial with trophy skulls in Yukon Island sub-III was certainly an interment. Flexed inhumation is known from Prince William Sound, where wooden coffins were sometimes used.\* Burials in the ground are reported from the Kodiak Eskimo<sup>45</sup> and from the Aleut. Among the latter, the body was often buried in a compartment of the community house, flexed or in a squatting attitude.<sup>46</sup> Skeletons in a *squatting position* were found at Aurora Spit and

<sup>39</sup> Jochelson, 1925, p. 23; Porter, p. 168 f. This applied only to the eastern end of the islands that were in danger of the Eskimo raids.

<sup>40</sup> Nelson, p. 241 f.

<sup>41</sup> Porter, p. 167 f; Holmberg, p. 130.

<sup>42</sup> Jochelson, *ibid.*, and field notes, 1930 and 1933.

<sup>43</sup> Birket-Smith, II, Table A 111, p. 293 f.

<sup>44</sup> Box burial above ground on the Inlet at least as far north as Tyonik (Petroff, p. 163), and cremation throughout the Inlet (Nikita, Knik Arm; Wrangell, p. 105 f; and Osgood, p. 714). An Indian at Polly Creek told me that the Indians of Iliamna and Kachemak Bay formerly practiced cave burial, but I was unable to find archaeological evidence to support this statement. A cave at China Poot Bay, said to have contained human bones, was empty when we visited it. My informant at Polly Creek was probably confusing Indian with Eskimo practice.

\*Field notes, 1930 and 1933.

<sup>45</sup> Dall, 1878, p. 31. Hrdlička reports flexed inhumations in shallow graves with grave goods at Uyak Bay, Kodiak Island, (Hrdlička, 1933, p. 41).

<sup>46</sup> *Ibid.*, p. 7; Jochelson, 1925, p. 49.

Passage Island, it must be remembered. It was suggested that the position of the bones in the burials in Yukon Fox Farm II and Yukon Island II suggested *mummification* (natural desiccation) previous to burial. This would be in accord with practices of the Aleut and the Pacific Eskimo, though they usually deposited the mummies in a cave. MacLeod has argued that there is a relationship between the mummification practiced by the Ainu and that practiced by the Aleut and Pacific Eskimo.<sup>47</sup> The evidence from Yukon Island might indicate that the practice was older in Alaska than he has supposed. Burial in the ground in both flexed and squatting attitudes are reported from the prehistoric Ainu.<sup>48</sup> Munro finds evidence that the ancient inhabitants of Japan and Formosa buried their dead in houses, but that the dwelling was afterwards abandoned.<sup>49</sup>

South of the area of cremation on the Northwest Coast, burials in the ground are found. MacLeod believes that there is evidence of interment on the Northwest Coast prior to the practice of cremation.<sup>50</sup> In the shell heaps of the lower Fraser River and the east coast of Vancouver Island, flexed skeletons were found; the bodies may have been exposed, for the layers of midden material above them seem undisturbed.<sup>51</sup> This may indicate only a shallow grave, however. Burials in both flexed and squatting positions were made by the Shuswap, and flexed burials with grave goods were found by Smith at Lytton. Some of the bodies had apparently been wrapped in bark.<sup>52</sup>

*Burial in an extended position*, as reported by Fields from Yukon Island, was also encountered by Weyer at Port Möller.<sup>53</sup> Dall claims that at the time of the Russian conquest extended burials were made by the Aleut,<sup>54</sup> though he denies that those reported by Pinart from a cave on Unga Island were of this type.<sup>55</sup> Burials in an extended position, though rare, are reported from the prehistoric Ainu of Japan.<sup>56</sup>

*The dismembered burials* of the latter part of the Third Period in Kachemak Bay find few parallels elsewhere. Some of the photographs published by Jochelson from the Aleutian Islands suggest this type, though he explains the disorder of the bones by the assumption that the body was buried in a squatting position and that the skeleton collapsed when the flesh rotted. The condition of one of the skeletons found at Port Möller also suggests this type of burial. 'The bones were badly deranged. . . . the pelvic ends of the femurs lay toward the head, about a foot from the chin.' With these bones, as with all the human remains at the site,

<sup>47</sup> MacLeod, p. 146 f.

<sup>48</sup> Schnell, p. 37.

<sup>49</sup> Munro, p. 87.

<sup>50</sup> MacLeod, p. 129. Cf. Niblack, p. 355: 'Cremation is not the universal practice even amongst the northern Tlingit, a large proportion of sepulture being by inhumation.'

<sup>51</sup> Smith, 1900-1908, IV, p. 134, p. 186 f; *Ibid.*, VI, p. 321 f.

<sup>52</sup> Smith, 1898-1900, III, p. 158 ff.

<sup>53</sup> Weyer, 1930, p. 262.

<sup>54</sup> Dall, 1878, p. 5; contested by Jochelson, 1925, p. 43 f.

<sup>55</sup> Dall, 1878, p. 30, note.

<sup>56</sup> Schnell, p. 37.

there was a quantity of red paint.<sup>57</sup> On the lower Fraser River, Smith found some of the skeletons 'in disorder, as if they had been reburied,'<sup>58</sup> though apparently the box-like graves of Cottonwood were not noted. Dawson reports from the Shuswap, 'a few bones placed in such a manner as to suggest that they were buried after the decomposition of the soft parts.' He observed the Indians of Nicola Valley rebury a body that had been dead for a year.<sup>59</sup> At Lytton, Smith found 'some irregular piles of human bones.'<sup>60</sup>

*The covering of the dead with stones* was noted in the case of the burial on Passage Island.\* The few stones scattered about the double dismembered burial in Yukon Island III and the burial in Yukon Island II may not have been intentional, since they may have been derived from House I. The disarranged skeleton at Port Möller 'lay in a rude frame of several rocks, with two stones over the feet, one over the head, and two skulls of large sea mammals over the trunk.' A stone lay over the knees of the extended skeleton at the same site.<sup>61</sup> Dall mentions old reports that 'the Kania'gmūts sometimes interred their dead in the ground, covered them with stones, and erected poles in the vicinity.'<sup>62</sup> On the lower Fraser River: 'Some skeletons were found covered by a few bowlders, both bones and bowlders being covered by shell-heap material.'<sup>63</sup> On Vancouver Island cairn burial is supposed to have preceded the putting of the corpse in or on the shell heap.<sup>64</sup> It is possible that the cairn burial in this region is related to the covering of the dead with stones in southwestern Alaska. The cairn graves of the Canadian Thule culture are also suggested.

*Burial on top of a refuge island*, like that found on Qatloxe'lye in Kachemak Bay, suggests the burials found by Weyer on a small island near Unalaska. In addition to the elaborate sarcophagus containing the mummies, there were shallow graves on the island.<sup>65</sup> Besides the Aleut, the Indians of the Northwest Coast placed their dead in similar spots. Among the Tlingit, Haida and Tsimshian, the shaman was never burned, but was placed in a box, wrapped in a bark or grass mat, on top of a small island, or conspicuous point, at some distance from the village, usually along a frequented route. The body was deposited in a flexed or squatting position.<sup>66</sup> Among the Kodiak Eskimo: 'Dead shamans or sorcerers were laid with all their implements and insignia in bidarkas, these

<sup>57</sup> Weyer, 1930, p. 262.

<sup>58</sup> Smith, 1900-1908, iv, p. 186.

<sup>59</sup> Smith, 1898-1900, iii, p. 158. Cf. Reburial among the Thompson and Shuswap, (Teit, *op. cit.*, iv, p. 330, and 1900-1908, vii, p. 593).

<sup>60</sup> *Ibid.*, p. 160.

\*Graves set about with stones or wood and graves covered with stones were found by Dr. Birket-Smith and myself in Prince William Sound.

<sup>61</sup> Weyer, 1930, p. 262.

<sup>62</sup> Dall, 1878, p. 31.

<sup>63</sup> Smith, 1900-1908, iv, p. 186.

<sup>64</sup> Smith, *ibid.*, vi, p. 322.

<sup>65</sup> Weyer, 1929, p. 227.

<sup>66</sup> Niblack, p. 355; Bancroft, p. 113.

being generally deposited upon a steep cliff or occasionally in a cave.<sup>67</sup> Burial or exposure on a rocky island was reported from Boswell Bay, Hinchinbrook Island, Prince William Sound.

What makes the find on *Qatloxe'lye* unusual is that no grave goods were left with the body, and that it was covered with *red hematite paint*. Weyer writes: 'The use of this red powder in burials seems to have been common at the Hot Spring village site,' at Port Möller.<sup>68</sup> It is curious, therefore, that red paint was not found associated with the human remains at Cottonwood or Yukon Island, in view of the similarity between the Kachemak Bay culture and that of Port Möller. Schnell reports that the ancient Ainu of northern Japan smeared the head and chest of the dead with red hematite. The paint was found adhering to the bones when excavated.<sup>69</sup> Red paint was smeared on the heads of the dead by the Thompson Indians, and lumps of paint were found among the grave goods at Lytton.<sup>70</sup>

*Wooden masks* for the dead are well known from the Aleut and from the Eskimo of Kodiak Island and Prince William Sound,<sup>71</sup> but the *clay masks* found on the skulls in the double burial in Yukon Island sub-III seem to be the only examples of this type yet reported. The former existence of a wooden mask on the man buried in Yukon Island II might, as has been suggested, be argued from the type of labret.

*Artificial eyes* are reported with a trophy skull from Kodiak Island.<sup>72</sup>

*Trophy heads* are widely distributed on the Northwest Coast and are reported from the Eskimo as far north as Bristol Bay and the Kuskokwim.<sup>73</sup> The skull found by Weyer at Port Möller was probably a trophy, also.<sup>74</sup> The trophy head was certainly derived by the Eskimo from the Northwest Coast Indians, as Birket-Smith has pointed out.<sup>75</sup>

*Scattered human bones* were also reported by Weyer from Port Möller. He mentions in particular a human skull, filled with pebbles and earth and stained with red hematite powder.<sup>76</sup> Broken and scattered human bones were found in the prehistoric shell heaps of Japan, which Professor Morse, the pioneer archaeologist in that field, interpreted as evidence of wholesale cannibalism. Munro examined the same material and on 5 out of 35 bones found 'marks of scratching

<sup>67</sup> Petroff, p. 143; see Holmberg, p. 122 f.

<sup>68</sup> Weyer, 1930, p. 262.

<sup>69</sup> Schnell, p. 37.

<sup>70</sup> Smith, 1898-1900, III, p. 158 ff.

<sup>71</sup> Dall, 1878, pp. 5, 28 ff., and 32.

<sup>72</sup> Press reports of Hrdlička's work, 1931.

<sup>73</sup> Nelson, p. 329.

<sup>74</sup> Weyer, *ibid.*

<sup>75</sup> Birket-Smith, II, p. 48; cf. de Laguna, 1933 -I.

<sup>76</sup> Weyer, *ibid.*

and cutting along the lines of muscular attachment.'<sup>77</sup> (Compare with isolated bones and bones in dismembered burials at Yukon Island III and Cottonwood.) Other marks he believes were made by animals that broke open the graves or were allowed to devour the dead. Exposure, he states, was the practice in Kamchatka until recent times. The scattered bones may have been derived from graves disturbed by later diggings. In conclusion, he admits that anthropophagy may have been practiced to a limited extent, but was not as general as Morse supposed. The Ainu, he tells us, admit that they used to be cannibals.<sup>78</sup>

Scattered and broken human bones were found at village sites in Prince William Sound.<sup>79</sup> According to press accounts, Hrdlička found conditions on Kodiak Island similar to those in Kachemak Bay. Besides regular burials, scattered and broken bones were frequently encountered, which he has interpreted as evidence of cannibalism.<sup>80</sup> Scattered human bones were also found in the shell heaps of the lower Fraser River and Vancouver Island.<sup>81</sup>

It seems likely that there is a connection between these instances of lack of regard for the dead (or cannibalism) in the North Pacific area.

*Utilized human bones* like the cut tibiae from Cottonwood and Yukon Island have not been reported from the area. A parallel to the drilled skull and jaw of the Cottonwood child (31-20-108) can perhaps be found in a skull found near Comox, Vancouver Island. The skull had 'a nearly circular hole carefully cut from the upper side through the lower part of each orbit.'<sup>82</sup> A comparison with the Makah practice of using corpses for marionettes in whaling ritual, according to the legend related by Curtis, has already been suggested.

#### MATERIAL CULTURE

*Notched stones* have a very wide distribution, though we shall consider only a limited area. Except for a few examples, occasionally used by the modern Alaskan Eskimo as net-weights,<sup>83</sup> notched stones are foreign to Eskimo culture. They are not found in any archaeological site north of the Alaska Peninsula. Weyer reports thirty stones, notched at the ends, from Port Möller, and believes the type to be younger than the grooved stones. He illustrates a large notched stone;<sup>84</sup> we do not know if he found the small stones, also. Jochelson figures notched stones from the Aleutian Islands, varying in length from just under 5 cm. to 8.5 cm.<sup>85</sup> Evidently only the large type is represented. The specimen

<sup>77</sup> Munro, pp. 239, 244.

<sup>78</sup> Munro, p. 238 ff.

<sup>79</sup> 1930 and 1933 field notes.

<sup>80</sup> Hrdlička, 1932, p. 102, and 1933, p. 41 ff.

<sup>81</sup> Smith, 1900-1908, IV, p. 186; VI, p. 323.

<sup>82</sup> Smith, *ibid.*, VI, p. 322.

<sup>83</sup> Nelson, p. 188, Fig. 54, from St. Michael.

<sup>84</sup> Weyer, 1930, Fig. 22c, p. 273.

<sup>85</sup> Jochelson, 1925, Pl. 17 -15, small; Pl. 17 -6 and 12, large.

figured by Dall is 7.5 cm. long.<sup>86</sup> It is interesting to note that Dall found the notched stones in the lower as well as the upper layers on the Aleutian Islands, while the grooved stones were found only in the upper layers.<sup>87</sup> This distribution does not agree with the evidence from Kachemak Bay. From Kamchatka Jochelson figures large stones, notched both at the ends and at the sides.<sup>88</sup> In the shell heaps of Japan, stones notched at the ends, more rarely at the sides, were found, varying in length from 3 to 12 cm., and in breadth from 2 to 9 cm., but we do not know if there was any real distinction between the large and the smaller specimens.<sup>89</sup> Notched stones, with one exception from Eburne,<sup>90</sup> do not occur in the shell heaps of the lower Fraser River, nor in the Puget Sound and Gulf of Georgia region, though the type is widely distributed elsewhere in North America.

*The grooved stone*, except for a very few specimens from northern Alaska, is not found among the Eskimo outside of the southwestern Alaskan area.<sup>91</sup> There is a single small pebble grooved over both ends in the University Museum collection obtained by Van Valin from 'Birnik' culture burials at Point Barrow.<sup>92</sup> From Norton Sound Nelson figures a stone grooved over each end for use as a fishing-line sinker, and a braining stone grooved around the short diameter and fastened to a short thong.<sup>93</sup> On a dip net from Siberia he describes: 'A heavy granite boulder, grooved [how ?] to receive the lashing, is fastened to a whalebone ring in the bottom of the net.'<sup>94</sup>

However, to disregard for a moment the possible function of these grooved stones, we may note the distribution of the various types in the North Pacific area. In Prince William Sound I found stones grooved about the middle and stones grooved about the long diameter. From Port Möller Weyer figures stones grooved about the longer diameter, about the middle and over one end, and about one end.<sup>95</sup> From the Aleutian Islands, besides small grooved stones, described as bird bolas, Jochelson figures larger specimens, grooved about the shorter or about the longer diameter.<sup>96</sup> Some of these are battered. From prehistoric Japanese shell heaps, Kishinouye describes stones grooved about the longer diameter, and

<sup>86</sup> Dall, 1877, II, Fig. on p. 56.

<sup>87</sup> *Ibid.*, p. 56.

<sup>88</sup> Jochelson, 1928, Pl. 10, -1, 3, 4, and Pl. 11 -1.

<sup>89</sup> Kishinouye, p. 356, Figs. 89, 92, 93, 94.

<sup>90</sup> Smith, 1900-1908, IV, p. 155.

<sup>91</sup> Mathiassen, 1927, II, p. 59.

<sup>92</sup> This collection has been described in a preliminary report by J. Alden Mason, under the title 'Excavations of Eskimo Thule Culture Sites at Point Barrow, Alaska.' The culture, however, differs in many important respects from the Thule culture as we know it from Canada, and until its position has been more clearly defined it seems better to designate it by the term 'Birnik' which is the name that has been given to the type of harpoon head predominant at the Point Barrow sites. The word 'Thule' should apply only to the Canadian culture.

<sup>93</sup> Nelson, Pl. LXVIII -28, p. 181, and Pl. LII -5.

<sup>94</sup> *Ibid.*, Pl. LXX -12, p. 187.

<sup>95</sup> Weyer, 1930, Fig. 22a, d, e.

<sup>96</sup> Jochelson, 1925, Pl. 17 -1, 5, 8, 25.



about the middle and over one end (the same types as those found at Port Möller).<sup>97</sup> In Kamchatka, stones grooved about the middle were found.<sup>98</sup> Curiously enough, no grooved stones were found on the lower Fraser River,<sup>99</sup> but on the east coast of Vancouver Island, stones grooved partially or completely around the long diameter, and around the middle and over one end have been found.<sup>100</sup> Stones grooved around the middle, found at Lytton and on the Thompson River, Smith has interpreted as club heads.<sup>101</sup> Grooved stones, especially of the simpler types, are of frequent occurrence in archaeological sites in many parts of North America. It is interesting to see that the stone grooved over one end seems to be a local type, apparently restricted to the earlier part of the Third Period in Kachemak Bay. The stone grooved around the middle and over one end, also belonging to the Third Period, is distributed from prehistoric Japan to British Columbia. Stones grooved about one end, as we have seen, are mentioned from Port Möller. There, as on Yukon Island, they appear to come principally from the lower layers.<sup>102</sup> They are also known from ancient Formosa.<sup>103</sup> This type of stone, often called a 'plummet,' is also found in North America, outside of the North Pacific region. It seems to have been an ancient type, forgotten long ago in most localities.

*Stones with holes* near one end were found by Weyer at Port Möller, at or near the surface.<sup>104</sup> From Point Hope, Nelson figures a modern braining stone, strung on a thong.<sup>105</sup> A similar specimen made of a lump of walrus jaw is from Point Barrow. Murdoch says of it: 'This may be compared with the stone balls used by the ancient Aleuts for striking a man on the temple.'<sup>106</sup> Several stones with a hole pecked through the center were found by Jochelson on the Aleutian Islands.<sup>107</sup> 'Fish hook sinkers' with holes through one end were found in Kamchatka.<sup>108</sup> From prehistoric Japan are recorded stone or earthenware balls with a hole through the middle.<sup>109</sup> Stones with holes through one end or through the middle have been found in shell heaps on the lower Fraser River,<sup>110</sup> on Vancouver Island,<sup>111</sup> and from the vicinity of Kootenay in the interior of British Columbia.<sup>112</sup> Besides these, very large stones with holes, described as 'anchors,' were found

<sup>97</sup> Kishinouye, Figs. 81, 88, 90, 91, 95, p. 356.

<sup>98</sup> Jochelson, 1928, Pl. 10 -2, 7, p. 29.

<sup>99</sup> Smith, 1900-1908, iv, p. 163.

<sup>100</sup> Smith, 1900-1908, vi, p. 311, Fig. 105, p. 338, Fig. 124b.

<sup>101</sup> Smith, 1898-1900, iii, Fig. 39, p. 142, vi, Fig. 347, p. 415.

<sup>102</sup> Weyer, 1930, Fig. 22a, p. 273.

<sup>103</sup> Bylin, Pl. II -5.

<sup>104</sup> Weyer, 1930, Fig. 22b, p. 273.

<sup>105</sup> Nelson, Pl. LII -1, p. 127.

<sup>106</sup> Murdoch, Fig. 173, p. 191.

<sup>107</sup> Jochelson, 1925, Fig. 36, Pl. 17 -3 and 4.

<sup>108</sup> Jochelson, 1928, Pl. 10 -5, 6.

<sup>109</sup> Munro, Fig. 23 -1 and 2, Fig. 71 -2.

<sup>110</sup> Smith, 1900-1908, iv, Fig. 22a and b, p. 154 f.

<sup>111</sup> *Ibid.*, vi, pp. 311, 338, Fig. 125, p. 358.

<sup>112</sup> Smith, 1913, Pl. III d.

near Victoria, British Columbia, and near Marietta, Washington.<sup>113</sup> Of four stones, found together near Comox, Vancouver Island, three were pierced near one end, the fourth in the middle. One of those from the lower Fraser River is battered.<sup>114</sup>

Though notched, grooved, and pierced stones are often called '*net-sinkers*,' this interpretation seems to be incorrect, at least as far as the specimens from Kachemak Bay are concerned. Hallowell has shown that the evidence, though somewhat uncertain, tends to prove that only the small dip net was used in America in pre-Columbian times, and that the seine was introduced by the white man. Moreover, '*net-sinkers*' are often found away from rivers and streams, and when weights are needed for nets, many peoples today use unworked stones.<sup>115</sup> Murdoch has shown that Eskimo nets and net-making tools were recently introduced into Alaska from Siberia, and have the same distribution as the Siberian form of tobacco pipe.<sup>116</sup> The same opinion is held by Jochelson with respect to the Aleutian Islands. The notched and grooved stones he believes to have been fishing-line sinkers.<sup>117</sup> Kishinouye also warns us against assuming that the notched and grooved stones of Japan were net-sinkers, since they are often found at sites other than those where fish hooks and fish bones are abundant, and since the modern Japanese rarely use anything but unworked stones for their net weights.<sup>118</sup>

However, I am not prepared to accept without question the theory advanced by Jochelson that the notched and grooved stones are all *sinkers for fishing lines*, even though Anisim did identify a small specimen from Cottonwood as a sinker, yama'q (Kodiak Eskimo), or qa'tlniti (Athabaskan). In the first place, the distribution of the notched and grooved stones does not correspond to that of the fish hooks. Fish-hook barbs were found in the First, Second and Third Periods, with no change of type during all that time, while there has been considerable change in the types of stones. No notched stones (with the exception of two *very* doubtful fragments) were found in Yukon Island I, though fish-hook barbs were found there. Comparatively few fish-hook barbs were found in Yukon Island II, where notched stones were so abundant. The small notched stones must have been evolved from the large specimens, yet they are too small to have been sinkers. The stones grooved around the middle and over one end are surely too elaborate. Moreover, though a few examples of simple grooved stones used as sinkers by the modern Alaskan Eskimo can be cited (see above), most of the Eskimo sinkers, when not unworked stones, are of a very different type. They are usually long bars of stone, with a hole in each end, often variegated in color to attract the fish.<sup>119</sup> Furthermore, the finding of notched and grooved stones at

<sup>113</sup> Smith, 1900-1908, vi, Fig. 145, Fig. 151, p. 368.

<sup>114</sup> Smith, 1900-1908, iv, Fig. 22b.

<sup>115</sup> Hallowell, unpublished manuscript.

<sup>116</sup> Murdoch, p. 286.

<sup>117</sup> Jochelson, 1925, p. 107.

<sup>118</sup> Kishinouye, p. 356 f.

<sup>119</sup> Nelson, Pl. LXIX, p. 181.

sites away from the water or not rich in fish bones suggests that they may have had nothing to do with fish. The breaking of the large notched stones, and the battering and breaking of many of the grooved stones in Kachemak Bay and on the Aleutian Islands, suggests that the use to which they were put was violent.

The grooved stones from Prince William Sound, it will be remembered, were identified as *throwing stones* used in war or in hunting. Though none of the natives in Kachemak Bay to whom I showed grooved stones recognized them (some in fact specified that they were 'lucky stones,' made by the men that live in the volcanoes), one boy at Seldovia remembered that the men in former days were said to have used the throwing stone. The pierced braining stone on a short thong from northern Alaska and from the Aleutian Islands is surely related to this weapon. These grooved stones were used singly. The stone grooved over one end was probably not attached, but was thrown from a sling.

From the Aleutian Islands, Jochelson has figured two small round pebbles, one 2.5 cm. in diameter with two grooves at right angles, the other 5 cm. with a single (?) groove. These he calls bird bola stones.<sup>120</sup> It is interesting to note that the Aleut name for the bird bola weight is the same as that for the fish-line sinker, suggesting that the specimens may have been actually interchangeable. As a matter of fact, Jochelson interprets specimens almost identical with the bird bolas as fishing-line sinkers.<sup>121</sup> It is significant that the bone or ivory bolas of the Alaska Eskimo have not been found on or south of the Alaska Peninsula. The small grooved stones found by Jochelson suggest the small grooved stones found at Cottonwood and Yukon Island sub-III [Plate 16-10 and Plate 17-7], which I have interpreted as an unusual variant of the small notched type of stone. These small notched stones we know to have been used in groups of 12 or more; might they not have been bird bolas? The large notched stones, then, of which such numbers were found in Yukon Island II as to suggest that they were used in groups, would have been bolas, possibly for larger animals. It is interesting to note in this connection that Munro suggests that the prehistoric earthenware balls from Japan, grooved about two or three diameters, or pierced by a hole, might have been bolas or sling stones, as well as fishing weights.<sup>122</sup> Kroeber made the same suggestion for similar specimens found in the Sacramento Valley, and the Wabanaki recognized notched stones as bolas or throwing stones.<sup>123</sup>

However, in advancing this theory, I do not wish to maintain that the notched, grooved, and pierced stones were used exclusively as bola weights. The notching, grooving, or piercing of a stone are natural methods of attaching it to a cord, and doubtless many of these stones were used for other purposes. As is suggested by the Aleutian linguistic evidence, the same type, even the same specimen, may have been used for both fish-line and bird bola. However, on the whole, the evidence shows that the stone bola and the related throwing or braining

<sup>120</sup> Jochelson, 1925, Pl. 17-7 and 20.

<sup>121</sup> *Ibid.*, Pl. 17-23.

<sup>122</sup> Munro, p. 165, Fig. 71.

<sup>123</sup> Hallowell, unpublished manuscript.

stone were used in the North Pacific area, and that these forms were akin to the ivory bird bola<sup>124</sup> of the Eskimo. In the last analysis, perhaps, the lines cannot be rigidly drawn between the hafted club, braining stone, single throwing stone, bola, and sling shot.

*The splitting adze* is not found in archaeological sites in the Arctic region. Nelson figures one from the lower Kuskokwim and another from the lower Yukon, describing the former as 'a curiously shaped celt,'<sup>125</sup> which testifies to its rarity even here. From Cape Nome he figures an adze blade, which from its shape I should take to be a planing adze, but with two grooves across the top for lashing directly to the handle.<sup>126</sup> An archaeological specimen of this kind was found at Point Barrow.<sup>127</sup> The splitting adze was not found by Dall or Jochelson on the Aleutian Islands, nor by Weyer at Port Möller. It is common all over Cook Inlet and Prince William Sound, and it seems to be the dominant type among the Tlingit, Tsimshian and Haida. It is interesting to note that among the specimens figured by Niblack, one of the Haida adzes<sup>128</sup> is almost identical with the specimen from Port Graham [Plate 18 -2]. This type of adze has not been found in the shell heaps of southern British Columbia. The splitting adze, therefore, must be a fairly recent type on the Northwest Coast,<sup>129</sup> not older than the level represented by Kachemak Bay Period III, (latter half ?).

The type of adze which I have called the *planing adze* is of extremely wide distribution, both in the new world and the old. It is found in the Canadian Thule culture<sup>130</sup> and in archaeological sites in northern Alaska.<sup>131</sup> All of the adze blades figured by Murdoch from Point Barrow are of this type, made by sawing and polishing, or chipping and polishing.<sup>132</sup> This is also the common type figured by Nelson.<sup>133</sup> Jochelson found the adze rare on the Aleutian Islands, presumably because wood is scarce there, though he found a few small adze blades, apparently all made by chipping and polishing.<sup>134</sup> From the Aleutian village of Chermofsky, is a crude adze blade, of chipped slate, with no polishing.<sup>135</sup> Though Weyer found no adze blades at Port Möller, the adze heads show that the planing adze

<sup>124</sup> Mathiassen (1927, II, p. 54) finds the bola a common Eskimo type, associated with the Thule culture, (cf. Birket-Smith, II, p. 26). Birket-Smith, also mentions the Koryak 'sling-shot with a single ball' as a related type.

<sup>125</sup> Nelson, Pl. XXXIX -11 and 13, p. 92.

<sup>126</sup> *Ibid.*, -3, p. 92. Cf. Murdoch, Fig. 132 from Pt. Barrow.

<sup>127</sup> Mathiassen, 1930, Pl. 8 -12. Mathiassen (p. 94) lists this anomalous type—'large stone blades for adzes'—among the types of the 'western Thule Culture.'

<sup>128</sup> Niblack, Pl. XXIII, -91.

<sup>129</sup> Cf. Birket-Smith, II, p. 27.

<sup>130</sup> Mathiassen, 1927, II, p. 75 ff; Jenness, 1925, Fig. 4c, a blade of sawed ? nephrite, (Cape Dorset culture).

<sup>131</sup> *Ibid.*, and 1930, p. 94; and the Van Valin collection from Point Barrow, University Museum.

<sup>132</sup> Murdoch, p. 165 ff.

<sup>133</sup> Nelson, p. 92, Pl. XXXIX.

<sup>134</sup> Jochelson, 1925, p. 120, Pl. 15 -18, 19, 20, 25, 26, 41.

<sup>135</sup> U. S. National Museum, 46196.

blade was used there.<sup>136</sup> In Kamchatka, Jochelson excavated a great number of planing adze blades, most if not all of which were shaped by chipping and polishing, not sawing,<sup>137</sup> Some of those from Japan and Formosa figured by Munro, were apparently shaped by sawing.<sup>138</sup> The planing adze blade was used on the Northwest Coast,<sup>139</sup> and was the only type found in the region about the Gulf of Georgia and Puget Sound and on the Fraser and Thompson Rivers. The celts from southern British Columbia were almost all shaped by sawing, not by chipping.<sup>140</sup> It must be remembered that the sawed adze blades from Kachemak Bay were all from the Third Period. It would seem as if chipping were the older method, as far as the Eskimo of the Arctic and of Kachemak Bay are concerned.

The plain *adze head or haft*, with blade socket at one end and groove for lashing to the handle, is a common Eskimo type, though holes instead of the groove are frequently encountered. The simple adze head is known from the Canadian Thule culture,<sup>141</sup> and from archaeological sites at Point Atkinson, Point Barrow and Point Hope.<sup>142</sup> The adze head with groove for lashing is also figured by Murdoch from Point Barrow.<sup>143</sup> However, it is apparently the more modern type at Punuk, where the 'shoe-shaped' adze head with bed for the blade is found in the Punuk culture level.<sup>144</sup> The plain adze head with socket is evidently a type which was reintroduced by the late back-wash of the Thule culture from Canada to Alaska. Plain heads with bed or socket are equally represented in the Third Period in Kachemak Bay and at Port Möller.<sup>145</sup> No adze heads were found by Jochelson in the Aleutian Islands, however. Most of the adze heads of the Gulf of Georgia and the lower Fraser River are simple antler hafts, but with a hole in each end.<sup>146</sup> At North Saanich, east coast of Vancouver Island, and at Utsalady, northern Washington, hafts with holes at one end only were found.<sup>147</sup> The specimen from Saanich is almost identical with that from Yukon Island. Smith writes concerning the adze head: 'I am not aware of any specimen found north of Comox until the Yukon Valley in Alaska is reached, nor of any found in the United States south of Utsalady. In the area under discussion they are numerous, so far as I am aware, only in the heaps of the Lower Fraser and in the region from the Saanich Peninsula to Victoria.'<sup>148</sup> It seems probable, however,

<sup>136</sup> Unpublished specimens, American Museum of Natural History, N. Y.

<sup>137</sup> Jochelson, 1928, Pl. 9.

<sup>138</sup> Munro, Fig. 15, Fig. 16 -5 and 6, Fig. 18 -5 to 8, and Fig. 31. Cf. Schnell, Pl. XII -6.

<sup>139</sup> Niblack, Pl. XX -79.

<sup>140</sup> Smith, 1898-1900, III, Figs. 40 to 42, p. 142; VI, p. 416 f, Figs. 349, 350; 1900-1908, IV, Fig. 29, p. 163 ff; VI, Fig. 153, p. 340 ff.

<sup>141</sup> Mathiassen, 1927, I, Pl. 20 -1 to 3, from Naujan.

<sup>142</sup> Mathiassen, 1930, Pl. 2 -10, Pl. 8 -14, Pl. 13 -3; and the Van Valin collection from Pt. Barrow, University Museum.

<sup>143</sup> Murdoch, Figs. 133 and 134.

<sup>144</sup> Collins, 1929 -II, p. 145.

<sup>145</sup> Unpublished specimens, American Museum of Natural History.

<sup>146</sup> Smith, 1900-1908, IV, Fig. 29d, e, p. 165; VI, Fig. 107, p. 314, Fig. 129.

<sup>147</sup> *Ibid.*, VI, Fig. 130b, Fig. 157.

<sup>148</sup> *Ibid.*, p. 344.

that the simple adze haft, with single socket and groove for lashing, was an old type distributed from the Arctic to the northern part of the state of Washington, and that if southeastern Alaska and northern British Columbia were explored it would be found at a level of culture corresponding to the Third Period of the Kachemak Bay culture, and probably still earlier. The double sockets on the one hand, and the drilled holes for the lashing on the other, seem to be local variations in the Salish and in the Arctic regions.<sup>149</sup> It is impossible to say anything about the relative ages of the adze head with socket and the adze head with bed for the blade. At Port Möller and Yukon Island they appear to be contemporaneous (Third Period). The adze head with socket has the wider distribution.

*Mauls* like those from Kachemak Bay and Prince William Sound are very common in northern Alaska. A specimen figured by Murdoch from Point Barrow, used for crushing bones, is almost identical with that from Seldovia Bay.<sup>150</sup> Similar hafted hammer heads are known from the Canadian Thule culture.<sup>151</sup> Aside from the specimens in our collection, I do not know of any others from southwestern Alaska,<sup>152</sup> though more will probably be found in this region. Mauls are figured by Niblack from the Haida and the Kwakiutl.<sup>153</sup> None were found in the shell heaps of the Fraser River and the Gulf of Georgia.

*Pestles* do not seem to be found archaeologically north or west of Prince William Sound, though naturally-shaped stones which might have been used as such have a wide distribution. I disregard the modern mortars and pestles used by the Alaskan Eskimo for preparing tobacco. Carefully made pestles of various shapes are common on the Northwest Coast, so the few specimens from Prince William Sound are doubtless rather recent borrowings from the Indians to the southeast. The shape of the handle of some of the Prince William Sound pestles suggests that of the head of some archaeological stone clubs from Puget Sound and the Yakima valley.<sup>154</sup> Shaped *mortars* tend to have the same distribution as shaped pestles, though a mortar was found in the Kachemak Bay region, and doubtful specimens were found in Yukon Island III and on Passage Island. However, since the only clear example is of uncertain provenience, it seems useless to pursue the study further, except to remark that mortars of whale vertebra are known from Prince William Sound and probably from the Aleutian Islands, also, (for I am not altogether satisfied with Jochelson's interpretation of similarly shaped objects as 'bone lamps'<sup>155</sup>). Perhaps further investigation would reveal

<sup>149</sup> Cf. discussion of the adze in Birket-Smith, II, p. 27 ff. Birket-Smith is not willing to say whether the planing adze is an original Eskimo element. This must be understood in the light of his whole theory of the origin of Eskimo culture.

<sup>150</sup> Murdoch, Fig. 27.

<sup>151</sup> Mathiassen, 1927, I, Pl. 48 -1.

<sup>152</sup> Except the specimen found by Tanzy at English Bay.

<sup>153</sup> Niblack, Pl. XXII -81, 82, 85, and 86.

<sup>154</sup> Smith, 1900-1908, VI, Fig. 177b, c, and d, and Fig. 178.

<sup>155</sup> Jochelson, 1925, p. 73 ff.

this type in the Kachemak Bay culture. There is, however, some question of its antiquity.

*Grinding slabs and grinding stones* appear to be foreign to Eskimo culture outside of southwestern Alaska. They were found by Jochelson on the Aleutian Islands,<sup>156</sup> and also in Kamchatka.<sup>157</sup> In southeastern Alaska, in British Columbia, and in Washington the mortar and pestle is the predominant type.

*Stone clubs* are common on the Northwest Coast and in Washington. They are very rare among the Eskimo, though what appears to have been such a weapon was found by Van Valin at Point Barrow.<sup>158</sup> The stone clubs or 'swords' of the prehistoric Ainu seem to be a highly specialized form of the monolithic club. *Bone Clubs* on the other hand are known from the Thule culture,<sup>159</sup> though the braining clubs of the Eskimo were usually composed of a head of bone or stone on a wooden handle.<sup>160</sup> From the Aleutian Islands, Jochelson reports clubs of whale bone, made especially of the rib, and used for dispatching fish and game.<sup>161</sup> The whale bone club reached a very high stage of development on the southern part of the Northwest Coast,<sup>162</sup> though from farther north only wood, stone, and stone hafted in wood are reported by Niblack.<sup>163</sup> Thus in respect to clubs, the Kachemak Bay culture stands closer to Eskimo than to Indian culture, but if the stone clubs of the Indians are related to the stone 'swords' of the Ainu, the monolithic club ought to be represented at some prehistoric level in southern Alaska and Kamchatka.

*Stone saws* of the type found in Kachemak Bay and Prince William Sound have not been mentioned north of the Alaska Peninsula, though sawed adze blades are found all the way to Point Barrow. Three specimens from the Aleutian Islands may have been saws, though only one, which is of sandstone, can be identified with certainty.<sup>164</sup> Saws should be found on Kodiak Island and at Port Möller at a level corresponding to that of the Third Period in Kachemak Bay, but probably not earlier. Sandstone saws were frequently found at Lytton on the upper Fraser River, though not on the Thompson River. There were probably saws in this region, also, but they were lost at the quarries.<sup>165</sup> They are found in the shell heaps of the lower Fraser River and the Gulf of Georgia.<sup>166</sup> The stone

<sup>156</sup> Jochelson, 1925, Pl. 19 -4.

<sup>157</sup> Jochelson, 1928, Fig. 40.

<sup>158</sup> Specimen in the University Museum.

<sup>159</sup> Mathiassen, 1927, I, Pl. 58 -1.

<sup>160</sup> *Ibid.*, II, p. 83; Murdoch, Fig. 23 ff.

<sup>161</sup> Jochelson, 1925, Pl. 26 -9, 12, 15.

<sup>162</sup> Boas, in Smith, 1900-1908, VI, p. 403 ff.

<sup>163</sup> Niblack, p. 282.

<sup>164</sup> U. S. National Museum, 64342, 46194, and 46190.

<sup>165</sup> Smith, 1898-1900, III, p. 143 f., Fig. 47; VI, p. 417.

<sup>166</sup> Smith, 1900-1908, IV, p. 167; VI, pp. 314, 339.

saw seems, therefore, to have reached southwestern Alaska from the south at the time of the sub-Third Period in Kachemak Bay, and should be expected in southeastern Alaska and northern British Columbia. From evidence already cited on page 173, stone for adze blades was cut by sawing in ancient Japan and Formosa (but not in Kamchatka ?), but this does not necessarily demonstrate that the stone saw was used. The nephrite adze blade from Cape Dorset, already cited, may have been shaped by sawing, but again this does not postulate the presence of the stone saw.

*Whetstones* are, of course, of universal distribution, but the peculiar octagonal and hexagonal felsite specimens of Yukon Island III seem to be a local type, probably confined to the Kachemak Bay region.<sup>167</sup>

*Pumice* seems to have been used as a grinding and polishing tool whenever available. Nelson writes of the Alaskan Eskimo methods of curing skin: 'Small skins are soaked in urine to remove the fat, after which they are stretched and worked with the hands and finally rubbed with pieces of pumice until dry.'<sup>168</sup> Jochelson found pumice ('andesitic lava') on the Aleutian Islands worked into various shapes.<sup>169</sup>

*The oval stone lamp* is found in Bristol Bay, on the Alaska Peninsula, and Kodiak Island,<sup>170</sup> as well as on Cook Inlet and Prince William Sound. Oval, round, and almost square lamps were found by Jochelson on the Aleutian Islands.<sup>171</sup> Though Jochelson definitely states, from information given by the natives, that the wick of the Aleut lamp was placed in the middle of the bowl,<sup>172</sup> it is possible that the wick was sometimes placed at the narrower end of the oval lamps. A small oval lamp with wick lip was found at Port Möller.<sup>173</sup> The lamps of Kamchatka were of stone, oval and 'sad-iron'-shaped.<sup>174</sup> Crudely shaped oval stone lamps were found at Canadian Thule culture sites.<sup>175</sup>

*The semi-circular stone lamp* with straight wick edge is found along the Arctic coast from Labrador to Alaska. It is not reported farther south in Alaska than Norton Sound, where its place is taken by the oval or circular lamp.<sup>176</sup> The lamp typical of the Canadian Thule culture was semi-circular in outline but had a

<sup>167</sup> However, cf. Jochelson, 1928, Pl. 11 -5 from Kamchatka. The illustration is not very clear.

<sup>168</sup> Nelson, p. 117.

<sup>169</sup> Jochelson, 1925, Pl. 16 -22, 23 and 25.

<sup>170</sup> Hough, p. 1038.

<sup>171</sup> Jochelson, 1925, Pls. 18, 19, and 20.

<sup>172</sup> *Ibid.*, p. 76.

<sup>173</sup> Unpublished specimen, American Museum of Natural History.

<sup>174</sup> Jochelson, 1928, Pls. 14 and 15, Figs. 64 to 66, p. 67.

<sup>175</sup> Mathiassen, 1927, II, p. 99.

<sup>176</sup> Hough, p. 1038.



partition or row of knobs parallel to the straight edge.<sup>177</sup> At Point Barrow ('Birnik' culture—see the Van Valin collection, University Museum), and on St. Lawrence Island (Old Bering Sea culture)<sup>178</sup> we know that the circular (?) lamp of pottery was the older type. The modern semi-circular stone lamp of northern Alaska is a fairly recent importation from the east,<sup>179</sup> and is probably one of the Canadian types brought by the recent westward movement of the Thule culture. The presence of the semi-circular stone lamp in Yukon Island II or sub-III suggests, however, that this type should be sought in northern Alaska at an earlier stage than the pottery lamp. It is found too early in Kachemak Bay to have been introduced there as a result of the late back-wash of the Thule culture.

It is curious that the *low knobs* in the back of the lamp from Halibut Cove, and the single knob at the rear of two Aleut lamps,<sup>180</sup> should be associated with the oval and not with the semi-circular form. These knobs suggest those of the Canadian Thule culture lamps. Lamps of the Thule type with knobs or partitions are found in archaeological sites from Greenland to Siberia.<sup>181</sup>

Both Birket-Smith and Hough have argued that the original Eskimo lamp was of stone, not of pottery.<sup>182</sup> Setting aside Birket-Smith's thesis that the naturally hollow stone is the original form—for which there is as yet no archaeological proof or disproof,—the material from Kachemak Bay is insufficient to indicate which of the two manufactured shapes, oval or semi-circular, is the older. From a typological point of view the former certainly appears to be the more primitive. As far as *pottery* is concerned, it seems to have been introduced into the Kachemak Bay region only at or near the end of the prehistoric Eskimo period. Only a single pottery lamp has been found on the Aleutian Islands.<sup>183</sup>

South of the Eskimo area in Alaska, the stone lamp is not found, except for a vessel used in the salmon festival among the Lillooet, though Birket-Smith would interpret as lamps the bowls held by carved human figures, found at archaeological sites in British Columbia.<sup>184</sup> Some of the undecorated stone vessels, usually called mortars, resemble in shape the southern Eskimo lamps.<sup>185</sup>

Five *lamps with human figure in the bowl*, similar to that from Yukon Fox Farm III, were found previous to its discovery. These are: the lamp from Kenai Lake, now in the University Museum [Plate 69]; the lamp found by Ulanky at

<sup>177</sup> Mathiassen, 1927, II, p. 99.

<sup>178</sup> Information from Henry B. Collins, Jr., U. S. National Museum.

<sup>179</sup> Mathiassen, 1930, p. 90 f.

<sup>180</sup> Jochelson, 1925, Pl. 18-2, 7, and 11(?)

<sup>181</sup> Mathiassen, 1927, II, p. 102.

<sup>182</sup> Birket-Smith, II, p. 102; Hough, p. 1038; however, Mathiassen (1930, p. 89 ff.) believes that the original Eskimo lamp was a round or oval pottery vessel.

<sup>183</sup> Jochelson, 1925, p. 122. Dall, 1877, II, Fig. opp. p. 80, no. U. S. 13021 is a lamp 'carved from unbaked clay,' but this should scarcely be termed *pottery*.

<sup>184</sup> Birket-Smith, II, p. 190.

<sup>185</sup> Smith, 1913, Pl. IV.

Fish Creek, Knik Arm, near or with which was found a Chinese amulet coin, and which is now in the Alaska Historical Museum at Juneau; a second lamp from the same site, now in the Museum of the American Indian in New York [Plate 70-2]; a small lamp from Kaltag on the Yukon [Plate 71]; and a lamp in the museum at Sitka, of unknown provenience [Plate 70-1]. The problem of the origin of these lamps was discussed by J. A. Mason in 1928. The Juneau lamp from Fish Creek was published by Father Kashevaroff in the *Descriptive Booklet* of the Alaska Historical Museum (p. 27 ff.). Unfortunately none of these lamps was found *in situ* by a scientific expedition. The finding places of the four lamps of known provenience lie outside the present boundaries of the Eskimo territory, in country now occupied by the Athabaskan Indians. Nothing like these lamps was known to have been made or used by Eskimo or Indians within historic times. The Athabaskan Indians, argued Mason, could not have been the makers, since they lack artistic ability; and though carving in stone is foreign to Eskimo art, the Eskimo of southwestern Alaska made undecorated lamps of the same general shape and proportions. The provenience of these lamps, he felt, argued that the Eskimo once inhabited the whole of the Cook Inlet region and the Yukon valley as far north as Kaltag or above. Petroff, in fact, reports that the Eskimo formerly lived within 40 or 50 miles of Nulato, that is, in the vicinity of Kaltag, and that they were driven by the Indians down to Paimute below Anvik.<sup>186</sup>

The finding of a Chinese amulet with or near the Juneau lamp at Fish Creek led Father Kashevaroff to seek in China the origin of these lamps or at least of their style of decoration. The amulet may prove trade with Asia at an early date—there is considerable archaeological evidence, I think, of cultural contacts between the Aleutian Islands and Kamchatka—yet the amulet is not necessarily connected with the lamp. Certainly, the finding of the sixth lamp in a prehistoric Eskimo site in Kachemak Bay offers conclusive proof in support of Mason's theory.

The origin of the decoration of these lamps, however, presents a problem. It will be of value to summarize their salient features. Though from such scattered localities, the six specimens show a remarkable uniformity. They are all of fine-grained igneous rock, oval in outline, the rim sloping outward and downward, the side and bottom slightly rounded, (on the Kachemak Bay lamp the side is slightly concave). There is a lip for the wick and a medial groove leading to it. The human figure in the bowl is shown from the waist up, facing the wick, with arms outstretched. On the three larger lamps from Kenai Lake and Fish Creek, the face looks towards the wick; on the smaller lamps the face is upturned. The figure is squat, with massive neck; the hands flat and disproportionately large, the separation between the fingers roughly indicated by incised lines. The nose is broad and flat, almost negroid, the eyes bulging, the mouth large and the lips full. On the New York lamp from Fish Creek and the lamp from Kenai Lake, the hair is shown like a cap. This is the style of hair-cut observed by Captain Cook and

<sup>186</sup> Petroff, p. 5.

the early explorers among the Eskimo of Prince William Sound and Kodiak Island. The hair of the men was 'cropt round the neck and forehead'<sup>187</sup> 'to a tuft in the middle.'<sup>188</sup> It is thus the contemporary Eskimo type which is portrayed.

Except for the encircling groove below the rim, the Sitka and Kaltag lamps are undecorated outside. The Yukon Fox Farm lamp lacks even this groove. The three larger lamps have rather elaborate decorations. There are three groups, each of three raised units, in the back and at the two sides. These raised units are suggestive of bears' heads on the Juneau lamp from Fish Creek and the specimen from Kenai Lake. On the New York lamp they are without realistic significance. There are three groups of three corresponding elements in low relief on the inside of the bowl, and corresponding elements in low relief on the outside, below the encircling groove. On the front of the Kenai Lake lamp and the Juneau specimen from Fish Creek is a human face. On the second lamp from Fish Creek there are simply vertical bars. On the last specimen and on the Kenai Lake lamp four sets of festoons in low relief connect the four groups.

A number of these stylistic features can be duplicated on the lamps of the Aleut and the Pacific Eskimo. The vertical elements outside appear in a simplified form on the front of the fragment from Cottonwood, and on the small lamp found with the decorated specimen at Yukon Fox Farm. Their position is analogous to that of the face or the vertical bars on the larger lamps with human figure. A lamp from Mummy Island, Prince William Sound (1930), has simply a bulge in front. A lamp obtained by Hrdlička from Uyak Bay, Kodiak Island, has an animal's head on the rim where the wick lip should be, similar to the animal heads on the Juneau and Kenai Lake lamps. This lamp also has a human figure in the bowl, but it is lying on its back, with arms and legs outstretched.<sup>189</sup> This lamp seems to be the result of a local degeneration of the more widely diffused style. The human figure, in each case, occupies a position analogous to that of the plain knobs in the lamps from Halibut Cove and from the Aleutian Islands. It is these plain knobs, I think, which have become elaborated into the human figure or into the whales of the Tutka Bay lamp.

The decorated stone vessels from the lower Fraser River and the Gulf of Georgia, which are usually called mortars but which Birket-Smith would identify as lamps,<sup>190</sup> suggest the source of that influence under which the elaboration of the plain knobbed lamps has taken place. These have the encircling groove,<sup>191</sup> and the human face in front of the bowl,<sup>192</sup> while the human figure embracing the bowl in his arms<sup>193</sup> is probably analogous to the human figure inside the bowl of

<sup>187</sup> Cook, II, p. 369.

<sup>188</sup> 'Bis auf einen Schopf in der Mitte,' Birket-Smith, II, p. 269.

<sup>189</sup> Hrdlička, 1932, Fig. 97.

<sup>190</sup> The similarity in the decoration of the lamps of the southern Eskimo region in Alaska and of these stone vessels of British Columbia strengthens this theory, but should not be taken as conclusive proof.

<sup>191</sup> Smith, 1900-1908, IV, Fig. 53a; VI, Fig. 142.

<sup>192</sup> *Ibid.*, IV, Fig. 53a, b; VI, Fig. 186c, Fig. 189; anthropomorphic or animal features in the same place: *Ibid.*, VI, Fig. 183c, Fig. 184, Fig. 185a, c.

<sup>193</sup> *Ibid.*, Figs. 183, 184 and 185.

the lamp. The massive, squat figure, lacking a distinct neck, with bulging, pop eyes, full round lips and enormous mouth, and broad flat nose, is characteristic of the carvings in stone from this region.<sup>194</sup> The style of the hair, however, is different, since it seems to hang long and close about the face or else is gathered into a knot on top of the head. These resemblances can hardly be fortuitous.\*

Though small lamps are always chosen in preference to the larger lamps when the Eskimo go on long journeys, the small *hunter's lamp*, intended to be carried in the kayak, is apparently a local type restricted to the Aleut and the Pacific Eskimo.<sup>195</sup> Some of the Aleut lamps had rings for suspension to the hunter's belt.<sup>196</sup> Since this is the only region in the Eskimo area where lamps with rings have been developed, and since the same type is found in archaeological sites in Kamchatka,<sup>197</sup> there must be some connection between the lamps of the two regions.

*The chipped stone arrow head with barbs and notched tang* is foreign to Eskimo culture. The specimen found at Halibut Cove is either Indian, or made under Indian influence.

*The chipped leaf-shaped blade with rounded or pointed base* is known from the Thule culture,<sup>198</sup> and has been found at archaeological sites at Point Hope and Point Atkinson.<sup>199</sup> It was used in other parts of Alaska for both knives and lances.<sup>200</sup> Blades of this type were found by Weyer at Port Möller,<sup>201</sup> and by Jochelson on the Aleutian Islands and in Kamchatka.<sup>202</sup> It is found in the Japanese shell heaps,<sup>203</sup> and in British Columbia from the east coast of Vancouver Island, the lower Fraser River, and the Thompson River region.<sup>204</sup> It is evidently a very old type.

There must be some connection between the chipped blades of southern British Columbia and those of Alaska. Smith states that Comox on Vancouver Island is the most northern point, south of Alaska, at which chipping is found.<sup>205</sup>

<sup>194</sup> *Ibid.*, and Fig. 186c.

\* A preliminary discussion of the problem of these lamps was published by the author in *The Illustrated London News*, October 21, 1933, and in *Die Umschau*, Frankfurt am Main, April 22, 1934.

<sup>195</sup> The 'traveling lamp' used by the Point Barrow Eskimo on winter journeys is from 6 to 8 inches long, or considerably larger than the tiny hunter's lamps (Murdoch, p. 105, Fig. 49).

<sup>196</sup> Jochelson, 1925, Pl. 18-5.

<sup>197</sup> Jochelson, 1928, Fig. 64, Pl. 14-3, 6, and 9. The Kamchadal lamps with ring are full-sized.

<sup>198</sup> Mathiassen, 1927, I, Pl. 19-1 and 2. It is also a Cape Dorset type, (Jenness, 1925, Fig. 4L).

<sup>199</sup> Mathiassen, 1930, Pl. 15-9 (cf. knife blade, Halibut Cove, Pl. 30-23); Pl. 3-7 and 13.

<sup>200</sup> Nelson, Pl. XLVII-2 and 3 (base not shown) Pl. LVII A-1, 7 and 8.

<sup>201</sup> Weyer, 1930, Fig. 20j.

<sup>202</sup> Jochelson, 1925, Pl. 15-1 to 5, 8, 11 and 16, etc.; Jochelson, 1928, Figs. 24, 29, 30, 36, 56, and 61, Pl. 6A and B, etc.

<sup>203</sup> Munro, Fig. 25-12 and Fig. 59; Schnell, Pl. XII-11, 12, 14 to 17; with slight tang, Pl. XII-19.

<sup>204</sup> Smith, 1900-1908, IV, Fig. 10; VI, Fig. 102a, Fig. 118a, c; Smith, 1898-1900, VI, Fig. 331a, and Fig. 332a.

<sup>205</sup> Smith, 1900-1908, VI, p. 308.

However, since the intermediate area has hardly been explored, the fact that chipped blades have not been found may only show them to be of great antiquity. Moreover, in the Ring collection from the mouth of the Stikine River, south-eastern Alaska, is a retouched flake of obsidian. Dall has already remarked on the Eskimo-like character of this collection.<sup>206</sup>

*The chipped blade with straight base* is also known from the Canadian Thule culture,<sup>207</sup> from northern Alaska,<sup>208</sup> from Port Möller,<sup>209</sup> and from the Aleutian Islands.<sup>210</sup> Some of the blades from the last locality are like the very slender specimen from Yukon Island III. This type occurs in Kamchatka.<sup>211</sup> The triangular blade with straight or concave base is found chiefly in the southern part of Japan.<sup>212</sup> The blade with straight base is not found on the coast of British Columbia, though it occurs at Lytton and on the Thompson River.<sup>213</sup>

Some of the specimens just mentioned, especially two from Port Möller,<sup>214</sup> and one from Kuril Lake, Kamchatka,<sup>215</sup> seem to be identical with the chipped slate blades characteristic of the Second Period in Kachemak Bay. The comparative rarity of polished slate and the development of chipped slate and shale, so pronounced in Yukon Island I and II, is paralleled at Port Möller,<sup>216</sup> and at the Old Bering Sea culture village on St. Lawrence Island.<sup>217</sup> Owing to the lack of uniformity of terms used to describe the stone material it is impossible to study the distribution of this type of chipped slate blade without a first-hand examination of the specimens.

Small, *asymmetric* (Mathiassen, 'crooked') *blades for knives*, with notched tang, straight back, and curved cutting edge (Kachemak Bay II or sub-III), are known from the Canadian Thule culture, but only at Qilalukan and Button Point in Baffinland. Jenness considers them a type of the Cape Dorset culture. They may be related to Solberg's 'sewing knives' from West Greenland.<sup>218</sup> Though not over 3.5 cm. in length, they resemble in shape the large chipped knife blades from the Aleutian Islands,<sup>219</sup> and the fragment from Yukon Island II or sub-III [Plate 30-36]. The type is represented at Port Möller,<sup>220</sup> and in

<sup>206</sup> U. S. National Museum, 9824; cf. Dall, 1877, I, p. 21. He believes this collection proves the Eskimo to have once lived as far south as the Stikine River.

<sup>207</sup> Mathiassen, 1927, I, Pl. 19-4. The blade with deeply concave base is a Cape Dorset type, (Jenness, 1925, Fig. 4 f, g).

<sup>208</sup> Murdoch, Fig. 246; Mathiassen, 1930, Pl. 14-5.

<sup>209</sup> Weyer, 1930, Fig. 20 g, h, i.

<sup>210</sup> Jochelson, 1925, Pl. 15-10, Pl. 16-17, 18, 28.

<sup>211</sup> Jochelson, 1928, Pl. 6, Pl. 7-3, 4, 14, etc.; Schnell, Pl. XVII-5 and 6.

<sup>212</sup> Schnell, p. 33; cf. Munro, Fig. 58-5, 6, etc.

<sup>213</sup> Smith, 1898-1900, III, Fig. 3; VI, Fig. 333b.

<sup>214</sup> Unpublished specimens, American Museum of Natural History.

<sup>215</sup> Jochelson, 1928, Pl. 7-3, of 'silicified slate.'

<sup>216</sup> Weyer, 1930, p. 274.

<sup>217</sup> Collins, 1932-I, p. 113.

<sup>218</sup> Mathiassen, 1927, II, p. 75; Jenness, 1925, Fig. 4i.

<sup>219</sup> Jochelson, 1925, Figs. 17, 18A, 19, etc. Both the straight and curved edges are sharp.

<sup>220</sup> Weyer, 1930, Fig. 20m. The tang is, however, not notched.

Kamchatka,<sup>221</sup> but in neither case very clearly. It is not known from Neolithic Japan unless some of the chipped 'sickles'<sup>222</sup> can be considered a variant of the type. It is not known from British Columbia.

*The end-scrapers blade of chipped stone* is found in the Canadian Thule culture,<sup>223</sup> in the archaeological collection from Point Atkinson,<sup>224</sup> and is a common Alaskan form.<sup>225</sup> It does not seem to have been found at Port Möller or on the Aleutian Islands, unless some of Jochelson's types can be reinterpreted. It is common, however, in Kamchatka,<sup>226</sup> and is known from Japan.<sup>227</sup> It is not found archaeologically in the territory of the coast Salish, but has been found at Lytton and Kamloops.<sup>228</sup> *The chipped discoidal scraper*, found in the Kachemak Bay culture, Period III [Plate 30 -32], is known only from the Aleutian Islands,<sup>229</sup> and seems to be a local type.

*Hafted scraper blades of polished slate* are common in the Canadian Thule culture.<sup>230</sup> This type was apparently not found on the Aleutian Islands, unless some of the small adze blades published by Jochelson should be reclassified. Munro describes slate blades with tang and transverse cutting edge, similar to the large scraper from Yukon Island III [Plate 34 -9]. These Japanese blades vary in length from 4 to 27 cm. Owing to the fragility of the material, Munro hesitates to call them adze blades, but suggests that they were used as hoes.<sup>231</sup> The smaller ones, however, were more probably scrapers. Slate is too fragile a material to be much good for working in the ground, in any case. A similarly shaped object, of friable schistose rock, was found near Nanaimo, Vancouver Island. The tang, or handle, is long and is perforated by a drilled hole.<sup>232</sup> It may have been used as a scraper, but was probably unhafted. This is the only blade of this type from the area.

Any discussion of the *double-edged slate blades* of Kachemak Bay is difficult because it is almost impossible to distinguish the different types. Double-edged slate *knife blades* are an old, common Eskimo type.<sup>233</sup> Both the hafted and unhafted knife is known from the Canadian Thule culture,<sup>234</sup> and is represented in the

<sup>221</sup> Jochelson, 1928, Pl. 7A -2 and 13; Schnell Pl. XVI -2.

<sup>222</sup> Munro, Fig. 35 -1, 2, etc.

<sup>223</sup> Mathiassen, 1927, I, Pl. 61 -16.

<sup>224</sup> Mathiassen, 1930, Pl. 3 -19 and 20.

<sup>225</sup> Murdoch, Fig. 297, p. 298.

<sup>226</sup> Jochelson, 1928, Pl. 7 -18 to 29, etc.

<sup>227</sup> Schnell, Pl. XII -1 and 3.

<sup>228</sup> Smith, 1898-1900, III, Fig. 63, Fig. 64; VI, Fig. 352a, b, and c.

<sup>229</sup> Jochelson, 1925, Fig. 35, Umnak Island. (However, cf. Schnell Pl. XII -2 from Japan).

<sup>230</sup> Mathiassen, 1927, I, Pl. 25 -7, 8, Pl. 51 -2. For Alaskan specimens cf. Nelson, Pl. XLIX -10 to 13.

<sup>231</sup> Munro, Figs. 33 and 34, p. 121 ff.

<sup>232</sup> Smith, 1900-1908, VI, Fig. 114.

<sup>233</sup> Mathiassen, 1927, II, p. 73.

<sup>234</sup> *Ibid.*, I, Pl. 19 -6, Pl. 47 -1.

archaeological collections from Point Atkinson and Barter Island.<sup>235</sup> The slate knife blade is also figured by Murdoch from Point Barrow,<sup>236</sup> and by Jochelson from the Aleutian Islands.<sup>237</sup> *The barbed slate lance blade* does not seem to be found north of Bering Strait. Nelson figures both barbed and unbarbed lance blades from the region including Norton Sound and the Kuskokwim. They were hafted in detachable wooden foreshafts, and were used for stabbing sea-mammals. The methods employed must have been very similar to those of the Kodiak and Prince William Sound whalers, except that the latter dared strike only once (?), while the Bering Strait hunter continued the attack until the animal was killed or his supply of lance heads exhausted.<sup>238</sup> Other examples of barbed slate lance blades are from Bristol Bay, and from Katmai on the south side of the Alaska Peninsula.<sup>239</sup> It is not known from Kamchatka.<sup>240</sup> The barbed slate blade with lozenge-shaped cross-section, known from Prince William Sound as well as Kachemak Bay, has been found at Unalaska (?)<sup>241</sup> and Afognak Island.<sup>242</sup> It is evident that the slate lance blade played a more important role in the sub-Arctic Alaskan area than in the Arctic. *The unbarbed slate weapon blade* is known from the Canadian Thule culture<sup>243</sup> and from northern Alaska.<sup>244</sup>

Slate blades are lacking in the upper Fraser River and Thompson River region, except for such specimens as have been imported from the coast.<sup>245</sup> Both leaf-shaped lance or knife blades, and barbed dart or arrow blades are known from the lower Fraser River and Gulf of Georgia.<sup>246</sup>

It is curious that the *triangular, faceted harpoon and lance blade*, so characteristic of the Canadian Thule culture, should not be found south of the Yukon,<sup>247</sup> except for the single specimen from Yukon Island III. It is known from Japan and Formosa, even with a hole for pegging to the head,<sup>248</sup> a feature which is typical of the Canadian Thule culture and of the Thule phase recently introduced into Alaska, but not found in the Punuk or Old Bering Sea culture.<sup>249</sup>

*Single-edged knife blades* of slate are found in the Canadian Thule culture, and in Alaska.<sup>250</sup> The very large knife blade is well represented in archaeological

<sup>235</sup> Mathiassen, 1930, Pl. 3-10, 11, 14 and 15, p. 25.

<sup>236</sup> Murdoch, Fig. 100, etc.

<sup>237</sup> Jochelson, 1925, Pl. 16-10 and 11.

<sup>238</sup> Nelson, Pl. LVII A, p. 147.

<sup>239</sup> U. S. National Museum, 150071 and 90391.

<sup>240</sup> Jochelson, 1928.

<sup>241</sup> Dall, 1877, II, Fig. opp. p. 75. The specimen is broken. With this exception, the barbed slate blade is not found among the Aleut.

<sup>242</sup> U. S. National Museum, 90393.

<sup>243</sup> Mathiassen, 1927, I, Pl. 61-15.

<sup>244</sup> Archaeological collection from Pt. Hope, University Museum.

<sup>245</sup> Smith, 1898-1900, VI, p. 409.

<sup>246</sup> Smith, 1900-1908, IV, Fig. 11a (cf. Plate 31-5), b, c; VI, Fig. 102b, c, Fig. 120, p. 308.

<sup>247</sup> Mathiassen, 1927, II, p. 39.

<sup>248</sup> Munro, Fig. 51c (an imitation in bone like Eskimo bone harpoon blades); Bylin, Pl. II-1 and 2.

<sup>249</sup> Cf. Collins, 1929-I, p. 44.

<sup>250</sup> Mathiassen, 1927, I, Pl. 19-7 and 8; Murdoch, Fig. 106.

collections from Point Barrow and Point Hope.<sup>251</sup> It is not found on the Alaska Peninsula, the Aleutian Islands, or in British Columbia. It seems, therefore, to have been a northern type.

*Ulos* with curved edge are the most common type in the Canadian Thule culture, though specimens with straight edge are also found.<sup>252</sup> Straight ulo blades, together with the traditional curved form, are found in Alaska.<sup>253</sup> I have already given my reasons for not distinguishing between these two types, as Jochelson has done on the basis of his material from the Aleutian Islands.<sup>254</sup> The hafted ulo blade is the more common form, but the ulo blade with wrapping of baleen or other material about the back is known from the Canadian Thule culture and from Alaska.<sup>255</sup> The type with the blade hafted in the asymmetric wooden handle, like the modern ulo of Kachemak Bay, is found among the Tlingit.<sup>256</sup> A Tlingit blade with notches is figured by O. T. Mason,<sup>257</sup> but this specimen was probably hafted. Notches are also found on Aleut specimens.<sup>258</sup> The ulo with curved blade is known from Kamchatka.<sup>259</sup> The ulo blade with holes for attachment to the handle is found in Japan,<sup>260</sup> as is a chipped form, with notches and a tang for hafting.<sup>261</sup> An ulo blade with straight edge and holes for hafting is figured by Bylin from Formosa.<sup>262</sup> The 'fish-knife' or ulo, without notches or drilled hole, is known from the lower Fraser River, Vancouver Island, and the Thompson River. These knives all have a curved edge and a more or less straight back.<sup>263</sup> The ulos of Kachemak Bay and Prince William Sound resemble, therefore, the northern Eskimo types more closely than they do the simple specimens from British Columbia, though specimens of this simpler type are also found in our collection.

*The slate ulo or scraper with chipped edge* is found at Port Möller,<sup>264</sup> and the Aleutian Islands.<sup>265</sup> This type should not be confused with ulos chipped from ordinary material like flint, such as those found at Kuk, Southampton Island, where slate was hard to obtain.<sup>266</sup> The ulo or scraper blade of chipped slate is

<sup>251</sup> Unpublished specimens, University Museum.

<sup>252</sup> Mathiassen, 1927, I, Pl. 50-13.

<sup>253</sup> Cf. Van Valin collection from Point Hope, University Museum.

<sup>254</sup> Jochelson, 1925, Pl. 16, and explanation.

<sup>255</sup> Mathiassen, 1927, I, Pl. 50-8 and 9; II, p. 84 ff; Mathiassen, 1930, Fig. 9; (cf. Murdoch, Figs. 126 and 127, ulos with notches).

<sup>256</sup> Museum, University of Washington.

<sup>257</sup> Otis T. Mason, Pl. LXXI-3.

<sup>258</sup> Jochelson, 1925, Pl. 16-4 and 6.

<sup>259</sup> Jochelson, 1928, Fig. 38.

<sup>260</sup> Munro, Figs. 36, 37 and 38.

<sup>261</sup> *Ibid.*, Fig. 24-1, 2 and 3, p. 126 ff.

<sup>262</sup> Bylin, Pl. II-6.

<sup>263</sup> Smith, 1900-1908, IV, Fig. 25; VI, Fig. 133, p. 309; 1898-1900, III, Fig. 34; VI, Fig. 344.

<sup>264</sup> Unpublished specimens, American Museum of Natural History.

<sup>265</sup> U. S. National Museum, 16057, 46197.

<sup>266</sup> Mathiassen, 1927, I, Pl. 70-2 and 3, p. 239.



apparently a special form found only in southwestern Alaska. It seems to have been developed in the Second (First?) Period when chipping was the common technique of working stone.

*Men's knives like ulos* are found on the Aleutian Islands,<sup>267</sup> in Kachemak Bay and Prince William Sound. This type seems to be limited to southwestern Alaska. It is a special form of the hafted *baleen shaves* of the modern Alaskan Eskimo and the Canadian Thule culture. The unusual development of the unhafted ulo in this region has probably been associated with the development of the unhafted form of baleen shave. The traditional hafted baleen shave is also found in Kachemak Bay.

*Drill points of ground slate* are known from the Canadian Thule culture and from archaeological sites in Alaska.<sup>268</sup> Though Jochelson figures several mouth-pieces for drills, he does not figure any of the points. In Canada and in Alaska the *chipped drill point* was also used.<sup>269</sup> The chipped drill point alone (?) is found in Kamchatka<sup>270</sup> and Japan.<sup>271</sup> Curiously enough, Smith did not find any stone drill points in the shell heaps of the lower Fraser River or the Gulf of Georgia, though this must have been accidental, for chipped drills were found at Lytton.<sup>272</sup>

The only examples comparable to the *slate 'awls'* of Kachemak Bay (Third Period) and Prince William Sound is a specimen from Port Möller,<sup>273</sup> a pencil-shaped piece of slate from North Saanich, Vancouver Island,<sup>274</sup> and an awl-like object of steatite from Lytton.<sup>275</sup> Similar specimens are, however, found in the northern San Joaquin Valley, California.<sup>276</sup>

*The bone drill point* is a Canadian Thule culture type,<sup>277</sup> and is known from archaeological sites in Arctic Alaska.<sup>278</sup> It is also a type belonging to the Penuk culture.<sup>279</sup> A bone hand drill or reamer, made of a splinter of a large bone, was found by Ring at the mouth of the Stikine River.<sup>280</sup> The bone drill has not been reported from the other regions in the North Pacific area, which may mean either that it is an Eskimo type, or simply that it is hard to recognize.

<sup>267</sup> Jochelson, 1925, Pl. 16 -2, 3, 9 and 15.

<sup>268</sup> Mathiassen, 1927, I, Pl. 22 -20 and 21, Pl. 49, -8, 11 to 16, p. 173; 1930, pp. 14, 27.

<sup>269</sup> Mathiassen, 1927, I, Pl. 22 -23; 1930, pp. 14, 27; Murdoch, Fig. 159.

<sup>270</sup> Jochelson, 1928, Pl. 7 -5.

<sup>271</sup> Munro, Fig. 18 -10 to 14, Fig. 25 -1, 2 and 7, p. 130 f.

<sup>272</sup> Smith, 1898-1900, III, Figs. 69 and 71.

<sup>273</sup> Weyer, 1930, Fig. 20b.

<sup>274</sup> Smith, 1900-1908, VI, p. 339. Compared to 'finger-shaped' whetstones of schistose rock from the lower Fraser River (*ibid.*, IV, p. 168), and 'simple, finger-shaped pieces of slate or fine-grained schist rubbed on all sides,' also whetstones, from the Thompson River (*ibid.*, 1898-1900, VI, p. 417).

<sup>275</sup> *Ibid.*, 1898-1900, III, Fig. 67. Dawson (*ibid.*, p. 158 f.) reports 'stone objects resembling slate-pencils' in Shuswap graves.

<sup>276</sup> Schenk-Dawson, Pl. 97i to q, p. 384.

<sup>277</sup> Mathiassen, 1927, I, Pl. 49 -7.

<sup>278</sup> Mathiassen, 1930, pp. 14, 27, 43, Pl. 9 -19.

<sup>279</sup> Collins, 1929 -II, p. 145.

<sup>280</sup> U. S. National Museum, 9817.

Evidence of both the *hand drill* and the *bow drill* have been found in all periods of the Kachemak Bay culture. Both belong to the Thule culture,<sup>281</sup> but Birket-Smith believes that the hand drill was the original Eskimo tool, while the bow drill was introduced later by way of Bering Strait.<sup>282</sup>

The similarity between the *slate and shale mirrors* of the Third Period of the Kachemak Bay culture and those of the Tsimshian, published by Emmons, has already been noted. It must be remembered that the Tlingit did not have the mirror and it was unknown also to the Haida and Kwakiutl. The only other northwestern tribe who possessed it were the Athaskan Babine, who evidently borrowed it from their Tsimshian neighbors. The Thompson River Indians of British Columbia have a tradition of slate mirrors, though mica mirrors seem to have been more common among the interior Salish tribes. The mirrors of the Tsimshian were oblong, wider at the top than at the bottom end, which served as handle and was separated from the reflecting part by a neck. They were notched along the upper edge, and were polished on one or both surfaces. These mirrors were worn by women of high rank, and were spat upon or rubbed with grease when they were to be used. The mirror from the Babine<sup>283</sup> approaches the 'copper'-shaped mirrors of Kachemak Bay more closely than do the Tsimshian specimens, for the separation between the handle and the reflecting part is only slightly indicated. These mirrors are the only specimens of their kind found in an Eskimo site; the type has evidently come to Kachemak Bay from the south at the beginning of Period sub-III.

The *harpoon heads* from Kachemak Bay with open socket have been closed by a lashing set in a *groove*. Collins<sup>284</sup> and Jenness<sup>285</sup> have shown for St. Lawrence Island and the mainland of Alaska at Bering Strait that holes for this lashing are younger than slots. Holes are apparently a Thule culture device which originated in Canada and was introduced into Alaska at a comparatively recent time. The groove, if simplicity of form can be taken as a criterion of primitiveness, should be older than the slot. In any case it is not younger, for a combination of groove and one slot is found on the heads of the Old Bering Sea culture and the 'Birnik' culture of Pt. Barrow,<sup>286</sup> while the groove alone, as well as the holes, is found in the Canadian Thule culture and only the groove is found in the Cape Dorset Culture.<sup>287</sup> Another simple feature, suggestive of great age, is the *lack of inserted blades* in the harpoon heads of Kachemak Bay.

The finding of only *Thule Type I harpoon heads* in the oldest period of the

<sup>281</sup> Mathiassen, 1927, II, p. 79 ff.

<sup>282</sup> Birket-Smith, II, p. 109 f.

<sup>283</sup> Emmons, 1921, Fig. 3.

<sup>284</sup> Collins, 1929 -I, p. 43 f.

<sup>285</sup> Jenness, 1928, explanation of Pl. XII and p. 76 f.

<sup>286</sup> Collins, 1929 -I, Pl. 2c; and J. A. Mason, 1930, Pl. V -6, 9, 10 to 13.

<sup>287</sup> Mathiassen, 1927, I, Pl. I -1, 3, 4 and 7 (?); Jenness, 1925, Fig. 8a, b, and c.

Kachemak Bay culture is of the greatest importance. Several specimens are identical in style, as well as in analyzable features, with specimens from the Canadian Thule culture. Hitherto, except from the post-Punuk sites on St. Lawrence Island, the Thule Type I harpoon head has not been found in Alaska though it is known from East Cape, Siberia. Mathiassen says of this type that it must have been very old, and generally known, though not used to a great extent. It was for salmon or seal.<sup>289</sup> It was evidently the most important (if not the sole) type, however, in the First Period of the Kachemak Bay culture. Its presence in the First and Third Periods in Kachemak Bay, shows that it was known, not only during a period corresponding to the Punuk culture stage (for I shall hope to show that the Third Period in Kachemak Bay does correspond to the Punuk culture), but at a much earlier time. Mathiassen has argued that, at Point Barrow, Thule harpoon heads were to be expected at a level older than that represented by Van Valin's burial finds, in which the Birnirk type of harpoon head predominates. Whether or not an early Thule or proto-Thule culture will be encountered at Point Barrow itself, the presence of these Thule harpoon heads in Kachemak Bay proves that it will be found somewhere in Alaska, and at a level older than that represented by the Punuk culture. Collins' finds at Gamble, St. Lawrence Island, leave no place for such a Thule stage between the Old Bering Sea and the Punuk cultures. It follows that this Thule or proto-Thule culture must be older than the Old Bering Sea culture, if it is to be found on St. Lawrence Island. If it existed only on the mainland, it may be contemporaneous; in that case it did not reach St. Lawrence Island at all, until the post-Punuk appearance of the Canadian Thule culture from the east. Unfortunately, without more accurate geological information, we cannot correlate the lowering of the sea-level at St. Lawrence Island since the Bering Sea village was founded with the sinking of the land in Kachemak Bay since the formation of Yukon Island I, though both movements apparently argue a considerable antiquity. In any case, the Thule Type I harpoon heads from Yukon Island I offer the strongest proof yet advanced in favor of Mathiassen's hypothesis of an Alaskan Thule culture antedating the Birnirk and Old Bering Sea stages.

*The Thule Type II harpoon head* of the Third Period in Kachemak Bay is known from the Canadian Thule culture, from Greenland, from Arctic Alaska, and from North Cape, Siberia. Of it Mathiassen writes: 'In this type we thus see a harpoon head that is known from nearly the whole Eskimo territory, but only from old finds; it is not in use anywhere now; formerly, however, it seems to have played a great part.' He contends that it was originally used for seals, though Birket-Smith suggests it was for salmon.<sup>290</sup> It is interesting to note that the same

<sup>288</sup> Collins, 1932 -I, Fig. 4 -33 and 34, p. 111.

<sup>289</sup> Mathiassen, 1927, II, p. 14 f. The heads which Mathiassen calls variants of the Thule types with bifurcated and trifurcated spurs are really not Thule heads at all, but belong to the Old Bering Sea and Birnirk culture stages. Thule Type I heads, with groove for socket lashing and laterally placed line hole, like the heads from Yukon Island I, are among the Cape Dorset types from Coats Island, Hudson Bay, (Jenness, 1925, Fig. 8a and b).

<sup>290</sup> Mathiassen, 1927, II, p. 17.

type of degeneration of this head, from a toggling form with spur to a non-toggle, spurless type, took place in the Canadian Arctic and in Kachemak Bay. The head from the Point West of Halibut Cove [Text Figure 2] is paralleled by one from Button Point, a Thule site in northern Baffinland.<sup>291</sup>

*The thin, closed socket harpoon head without barbs or inserted blade* is the dominant type in the Third Period in Kachemak Bay. It has hitherto been known only from the Thule culture of Canada and Greenland,<sup>292</sup> though there is a single specimen of this type in the University Museum collection from 'Birnik' culture burials at Pt. Barrow, and it is possible, also, that one (or more) of the harpoon heads found by Jochelson in the Aleutian Islands are of this type.<sup>293</sup> Some of the prehistoric Japanese heads are also to be classed in this type, though the direction of the line hole is in the plane of the spur, not at right angles to it,<sup>294</sup> as on Eskimo heads. Some of the ancient Japanese harpoon heads have bifurcated spurs.<sup>295</sup> In view of this distribution, the type must be older and more generally used than Mathiassen has indicated.

*The thin harpoon head, with closed socket and barbs but without inserted blade*, is not represented in the Canadian Thule culture, though it is found in West Greenland, and is very common among the western Eskimo.<sup>296</sup> The more common form is with the barbs at right angles to the line hole, not parallel as on the specimen from Kachemak Bay. Mathiassen finds that this type is younger than the corresponding Thule Type II. However, it is interesting to see that this type, but with line hole in the plane of the spur, is found in Japan. The barbs are on one or both sides, and are in the plane of the spur.<sup>297</sup>

The elegant *silhouette* of the closed socket harpoon heads of Kachemak Bay appears to be unique. One head with very bent back spur [Plate 38 -1] has been cited as similar to specimens from Port Möller.<sup>298</sup>

*The thin harpoon head with closed socket and inserted blade* at right angles to the direction of the line hole, represented by the modern Indian head from Kachemak Bay, is known from the Thule culture, usually with bifurcated spur, and is distributed from Greenland to Siberia.<sup>299</sup> It is common in the Old Bering Sea culture.<sup>300</sup> In the Punuk and modern Alaskan cultures, however, the blade is almost always parallel to the line hole,<sup>301</sup> and this is also the type found at Port

<sup>291</sup> *Ibid.*, I, Pl. 61 -19, p. 209.

<sup>292</sup> *Ibid.*, II, p. 20.

<sup>293</sup> University Museum, 29-80-198; Jochelson, 1925, Pl. 27 -22.

<sup>294</sup> Kishinouye, Fig. C, Figs. 50, 54, and 57.

<sup>295</sup> Schnell, Fig. 10.

<sup>296</sup> Mathiassen, 1927, II, p. 20. There are, of course, Cape Dorset heads of this type, but the style of these is too unusual to admit of comparison here.

<sup>297</sup> Kishinouye, Pl. XXII -53, 58 and 60.

<sup>298</sup> Unpublished specimens, American Museum of Natural History.

<sup>299</sup> Mathiassen, 1927, II, p. 21 f.

<sup>300</sup> Collins, 1929 -I, Pl. 1a and e.

<sup>301</sup> *Ibid.*, Pl. 11a b, d, e; Nelson, Pl. LVA -6, 7, 8 and Pl. LVIIb -4, 5, 6, 14, etc.

Möller.<sup>302</sup> Apparently, it is the older, less efficient style of hafting the blade which has survived into modern times in Kachemak Bay.

Attention should be drawn to the *direction of the line hole* on the Japanese and Port Möller heads. Only on the harpoon heads from these two localities, with the exception of the 'butterfly' heads of the Old Bering Sea culture (side blades, trifurcated spur, two line holes one above the other), does the line hole run parallel to the plane of the spur, not at right angles to it.<sup>303</sup> This peculiarity in the direction of the line hole is even found on some of the barbed dart heads from Japan, on which the hole for the line is sometimes in the plane of the barbs.<sup>304</sup> This feature is so unusual that it must argue a relationship between the harpoon heads of Neolithic Japan and those of Port Möller, probably at a period prior to that represented by most of Jochelson's material from the Aleutian Islands.

The toggling harpoon head made in one piece was not found by Smith in the archaeological sites of British Columbia.

*Detachable barbed heads* with tang were not very important in the Canadian Thule culture, though they were used for the bladder dart and the bird arrow.<sup>305</sup> They seem to have been more important in the Cape Dorset culture, where heads barbed symmetrically and asymmetrically on both sides are found.<sup>306</sup> The Thule culture heads are *barbed on both sides* with from one to six pairs of barbs, and the line hole is in the center of the symmetrical tang. This type is represented by a few specimens from Kachemak Bay, First to Third Period. Mathiassen believes that the fish and sea-otter arrows of Alaska have developed from this type. Nelson illustrates heads of this kind, barbed on both sides, for the hand-thrust harpoon,<sup>307</sup> and throwing-board dart,<sup>308</sup> as well as for the fish spear<sup>309</sup> and fish arrow.<sup>310</sup> These modern Alaskan forms have a distinct conical tang, and there is a tendency towards asymmetry, due to the omission of one barb from the upper pair. Heads barbed symmetrically or asymmetrically on both sides are found at Port Möller.<sup>311</sup> Two fragmentary specimens parallel very closely the unique specimen from Yukon Island III with longitudinal grooves and ridges [Plate 40 -6]. Symmetrically barbed heads with central hole are also known from the Aleutian Islands,<sup>312</sup> but most of the specimens are barbed asymmetrically. The war-lance heads<sup>313</sup> may be considered, in some respects, a

<sup>302</sup> Weyer, 1930, Fig. 17b and e. On b, the blade is parallel to the usual direction of the line hole, through on this curious head the line hole is in the plane of the spur.

<sup>303</sup> Weyer, 1930, Fig. 17b, p. 266; Kishinouye, Fig. C, Figs. 50, 53, 54, 57, and 60.

<sup>304</sup> *Ibid.*, p. 339, Fig. 44.

<sup>305</sup> Mathiassen, 1927, II, pp. 31, 49 f.

<sup>306</sup> Jenness, 1925, Figs. 6b to j, 9g and k.

<sup>307</sup> Nelson, Pl. LVA, p. 138 ff.

<sup>308</sup> *Ibid.*, Pl. LIV, p. 135 ff., Pl. LVII B -16, 18, 19 and 20.

<sup>309</sup> *Ibid.*, Pl. LXVIII -8 and 30.

<sup>310</sup> *Ibid.*, Figs. 42 -3, and 44 -2.

<sup>311</sup> Weyer, 1930, Fig. 17c, and unpublished specimens.

<sup>312</sup> Jochelson, 1925, Pl. 24 -21, 29, and 46 (?).

<sup>313</sup> *Ibid.*, Pl. 23.

special variant of this type. A dart head, barbed asymmetrically on both sides, with three holes for the line, is figured by Schnell from Kamchatka.<sup>314</sup>

Most of the specimens from the Aleutian Islands have a *shouldered tang* to hold the line, not a hole.<sup>315</sup> They are barbed on one or both sides, usually asymmetrically. There are specimens with a single pair of barbs,<sup>316</sup> like the specimen from Yukon Fox Farm II [Plate 40-7]. Heads barbed on both sides with shouldered tang were found at Port Möller.<sup>317</sup> Those from the lower Fraser River are symmetrically barbed, with notched or shouldered tang.<sup>318</sup>

The combination of large barbs on one side and small barbs on the other, represented by specimens from Yukon Island III [Plate 39-1, 9, 10 and Plate 40-16], is common on the barbed heads from Port Möller and the Aleutian Islands. Jochelson figures a war lance head on which three dorsal barbs are paired with a single large barb.<sup>319</sup> This style seems to be confined to southwestern Alaska.

Dall believed that the heads *with barbs on one side* were older than those barbed on both sides,<sup>320</sup> but the material from Kachemak Bay does not support this view. The heads barbed on one side are certainly the more common type in Kachemak Bay during all periods, and they are also the more common type to the south. Though a few unilaterally barbed bladder dart heads are known from the Canadian Thule culture and from Arctic Alaska,<sup>321</sup> these specimens are not very much like those from Kachemak Bay. Some of the specimens from Port Möller are almost identical with heads from Kachemak Bay. Weyer states that the proportion of heads with holes for the line is equal to those without (in this respect the Port Möller culture is closer to that of the ancient Aleut), but that the type with shouldered tang may be the older.<sup>322</sup> At Port Möller the proportion of detachable barbed heads to harpoon heads is 25 to 4, similar to the proportion from Kachemak Bay III. Several individual specimens from Port Möller are almost identical with specimens from Kachemak Bay (see Plate 39-18 and 19).<sup>323</sup> A few examples of heads barbed on one side with hole for the line were found by Jochelson in the Aleutian Islands<sup>324</sup> and Dall found a few others of this type. From Kodiak Island, Lisiansky has figured the Kachemak Bay type of barbed head with four barbs on one side, hafted in a feathered sealing dart used with the throwing board, and another with two barbs on a bladder dart for seals.<sup>325</sup> With the exception of the specimen figured by Schnell, which is barbed on both sides and has

<sup>314</sup> Schnell, Pl. XVII-7.

<sup>315</sup> Jochelson, 1925, Pl. 24, and Dall Collection, U. S. National Museum.

<sup>316</sup> Jochelson, 1925, Pl. 24-25, 31 and 43.

<sup>317</sup> Unpublished specimens, The American Museum of Natural History.

<sup>318</sup> Smith, 1900-1908, iv, Fig. 19.

<sup>319</sup> Jochelson, 1925, Pl. 23-1.

<sup>320</sup> Dall, 1877, II, p. 76.

<sup>321</sup> Mathiassen, 1927, II, p. 31.

<sup>322</sup> Weyer, 1930, p. 266.

<sup>323</sup> *Ibid.*, Fig. 17a and d.

<sup>324</sup> Jochelson, 1925, Pl. 25-1, 11 (?), 16, 29, 36.

<sup>325</sup> Lisiansky, Pl. III m and o.

three holes for the line, the barbed head is not found in Kamchatka. The specimens from Japan are of a different style from those found in Kachemak Bay. The Kachemak Bay type of head has been found at an archaeological site on Admiralty Island, southeastern Alaska,<sup>326</sup> and is represented by several specimens from the mouth of the Stikine River, with the same silhouette as those of Kachemak Bay.<sup>327</sup> It is also a type used by the modern Tlingit.<sup>328</sup>

This type of barbed head is also very common in the shell-heaps of the lower Fraser River. The outline of the barbs and of the tang is rather different from those of Kachemak Bay. These heads have from one to three barbs on the same side. On some there are rectangular projections or shoulders on each side of the wedge-shaped tang, above which the line was looped.<sup>329</sup> Two other specimens have a hole for the line, though the rectangular projection remains on the rear of one,<sup>330</sup> while on the other it becomes a very small barb, like the ornamental barbs on a few heads from Yukon Island.<sup>331</sup> There must surely be a connection between these specimens. The hole for the line is not drilled through the tang itself, but through a projection forming a ring, similar to one specimen from Yukon Island [Plate 39-19], and to one, already mentioned from Port Möller. One of the barbed dart heads from Eburne, on the lower Fraser River, has a circular notch for the line cut in the tang,<sup>332</sup> almost identical with a specimen from Yukon Island [Plate 39-20]. At Comox detachable (?) heads barbed on one side were found.<sup>333</sup> At the mouth of the Nootsak River, near Marietta, Washington, was found a very crude barbed head with seven barbs on one side and a rectangular butt with line hole.<sup>334</sup> Most of the specimens from the Gulf of Georgia and Puget Sound are unperforated and seem intermediate in type between the barbed points which remain fixed to the shaft, and those which are detachable. No close parallels to the Kachemak Bay type were found here. From Lytton, however, there are two antler points, with two barbs on the same side, and perforated wedge-shaped tang.<sup>335</sup>

The unusual decorated barbed head from Yukon Island II [Plate 40-18] finds no parallels, except for a Japanese head, barbed on both sides, with the line hole in the plane of the barbs.<sup>336</sup> The profile of the barbs and the incised decoration are rather similar to those of the Yukon Island head. However, I hesitate to press the resemblance.

The Canadian Thule culture Eskimo and the Eskimo of northern Alaska,

<sup>326</sup> Alaska Historical Museum, Juneau.

<sup>327</sup> U. S. National Museum, 9822, 9820.

<sup>328</sup> Museum, University of Washington.

<sup>329</sup> Smith, 1900-1908, iv, Fig. 18a, b, and c.

<sup>330</sup> *Ibid.*, d.

<sup>331</sup> *Ibid.*, e.

<sup>332</sup> Hill-Tout, p. 90, Fig. 2.

<sup>333</sup> Smith, 1900-1908, vi, p. 310 f.

<sup>334</sup> *Ibid.*, Fig. 150.

<sup>335</sup> Smith, 1898-1900, iii, Fig. 20, p. 137.

<sup>336</sup> Kishinouye, Fig. 44, p. 339.

both ancient and modern, almost invariably hafted the blades of harpoon heads, lances, etc. in slits. The *hafting of blades in beds* or grooves, as on the Kachemak Bay dart heads, seems to be especially characteristic of southwestern Alaska. It was the usual method of hafting the blades for war lances on the Aleutian Islands,<sup>337</sup> though the slit was also employed.<sup>338</sup> Even a knife blade was hafted in a bed and lashed on.<sup>339</sup> Both the slit and bed for blades are found at Port Möller. The heads with blades hafted in beds which most closely resemble the Kachemak Bay specimens are the shorter Aleut war-lance heads, barbed on both sides with central hole for the line.<sup>340</sup> A similar specimen was found at Port Möller.<sup>341</sup> There are *dart heads with blades*, hafted in slits, from Point Hope, Point Barrow, and Okat in Langton Bay.<sup>342</sup> However, the barbed dart head with blade is not common in northern Alaska.

A few miscellaneous barbed points from Yukon Island II and III [Plate 40 -14 and 15], which were apparently not detachable, resemble in the profilation of their barbs some of the barbed heads from British Columbia. Some of the 'fish-spear heads' figured by Jochelson from the Aleutian Islands also have this profile.<sup>343</sup>

The slender barbed point of the 'Yukon Island III' type has been found in archaeological sites at Point Atkinson and Barter Island. Mathiassen is not sure whether these specimens are arrow heads or leister prongs, though he favors the latter interpretation.<sup>344</sup> This type of barbed point is certainly less specialized in shape than most Eskimo barbed weapon heads. The 'Yukon Island I' and 'III' types with one and with two rows of barbs are well represented at Port Möller, though the barbs are slightly more detached than on specimens from Kachemak Bay.<sup>345</sup> Very similar points with conical tangs are figured by Jochelson from the Aleutian Islands, though his illustrations are not clear enough to permit of a very close comparison.<sup>346</sup> Both large and small specimens are figured. They are variously described as the central and side-prongs for bird-darts, arrow heads, fish-spear prongs, and so forth. There must be some relationship, if only in the style of barbing, between the heavy 'Yukon Island I' points and the barbed war or whaling lance heads from Port Möller and the Aleutian Islands. The notching on two of the Yukon Island specimens is paralleled by similar decorations on the Aleut war lance heads from Dutch Harbor, collected by Capps.<sup>347</sup> In the Van

<sup>337</sup> Jochelson, 1925, Pl. 23 -3, 4, 5, etc.

<sup>338</sup> *Ibid.*, -7 and 9.

<sup>339</sup> Jochelson, 1925, Fig. 69.

<sup>340</sup> *Ibid.*, Pl. 23 -10, 11, 15, and 17.

<sup>341</sup> Unpublished specimen, American Museum of Natural History.

<sup>342</sup> Wissler, Figs. 15b, 34, and 37a.

<sup>343</sup> Jochelson, 1925, Pl. 25 -11, 30, 31, etc.

<sup>344</sup> Mathiassen, 1930, Pl. 1 -16, pp. 10, 23.

<sup>345</sup> Weyer, 1930, Fig. 19, p. 268, and unpublished specimens.

<sup>346</sup> Jochelson, 1925, Pl. 24 -37 and 39; Pl. 25 -17, 18 and 25.

<sup>347</sup> Unpublished specimens, University Museum.



Valin collection from Point Barrow there are several heads for bladder darts, with from one to three rows of barbs, conical tang, and line hole, which strongly suggest the 'Yukon Island I' type.

The four prongs on a 'fish-arrow' (bird arrow?) from Kodiak Island, published by Lisiansky, may be of the 'Yukon Island III' type, though the illustration is not clear.<sup>348</sup> Barbed points with conical tang, and with from 1 to 6 barbs on one side have been found on the lower Fraser River. They resemble the 'Cottonwood' type more closely than the 'Yukon Island' types, for there are no bordering lines, and the barbs are detached. However, most of the barbed points from this region are much flatter and broader than any from Kachemak Bay.<sup>349</sup> None of the barbed points from the Gulf of Georgia and Puget Sound are like the slender barbed points of Kachemak Bay, though the general type of fixed, slender point, with barbs on one side is represented. On one specimen from Whidbey Island, Washington, the bordering lines are found.<sup>350</sup>

The 'Cottonwood' type of barbed point seems to be restricted to Kachemak Bay, if we except the specimens from the lower Fraser River, just mentioned.

Thus, the prototype of the 'Yukon Island I' slender barbed point seems to have been an ancient Alaskan Eskimo type, perhaps itself derived from a more generalized and amorphous form like the barbed points of the lower Fraser River. The Eskimo prototype became reinterpreted in the various regions of Alaska as arrow head, bladder-dart head, war-lance head, etc., and elsewhere, as in Kachemak Bay, was succeeded by the smaller 'Yukon Island III' type, or analogous forms.

The slender barbed points ('Yukon Island I' and 'III') with blade slit suggest the Thule culture *arrow heads*. Of those *with barbs and inserted blade*, Mathiassen writes that they form an old type, originally known from Alaska to Greenland, which disappeared early in the central regions, but lasted in the east and west as long as the bow and arrow were used.<sup>351</sup> From Jochelson's photographs it is impossible to say if the corresponding type is represented on the Aleutian Islands. Some of the large barbed points with blades, analogous to the 'Yukon Island I' type, seem to be this form adapted for the throwing-board dart, used for whaling or warfare.<sup>352</sup> Typologically, the distinction between arrow head and dart head is not always definite.

*The bone arrow head with blade but without barbs* is also a widely distributed type belonging to the Thule culture. The Canadian and Alaskan specimens of this type are, however, much larger than those from Kachemak Bay. The larger

<sup>348</sup> Lisiansky, Pl. III k.

<sup>349</sup> Smith, 1900-1908, iv, Fig. 17; however, cf. *ibid.*, g. Fig. 17a, with one barb, may be a fish-hook barb like those from Kachemak Bay. Cf. Smith, 1898-1900, iv, Fig. 337, described as harpoons for beavers (p. 411).

<sup>350</sup> Smith, 1900-1908, vi, Fig. 123, especially a and e; Figs. 141a and 159.

<sup>351</sup> Mathiassen, 1927, II, p. 49.

<sup>352</sup> Cf. a very heavy barbed point for bladder dart or harpoon, with blade slit, three barbs on one side, and lateral line hole, from Barter Island (Mathiassen, 1930, Pl. 5 -6).

type from Kachemak Bay is found on the Aleutian Islands,<sup>353</sup> in Kamchatka,<sup>354</sup> and Japan.<sup>355</sup> From Kamchatka there are specimens wholly of bone, carved to represent the inserted blade,<sup>356</sup> The very small type of bone pin with bifurcated point is restricted to Kachemak Bay. Bone arrow heads with inserted blade are not found archaeologically on the Northwest Coast south of the Eskimo area.

*The arrow head without barbs or blade* is also an old and widely distributed Eskimo type.

The material from Kachemak Bay is too scanty to permit of more exact comparisons among the other Eskimo groups.

*The moveable lance head with hafted blade and conical butt* is an old type, known from the Thule culture (one specimen from Baffinland)<sup>357</sup> and from archaeological sites in Greenland and Alaska.<sup>358</sup> The type with two line holes is a modern eastern variant related to the harpoon foreshaft with two holes.<sup>359</sup> The war lance heads with a single line hole, from the Aleutian Islands and Port Möller, also represent a local development of the simple lance head to which *barbs* have been added. The fragmentary barbed lance head with blade slit from Kachemak Bay Period III is closely related to the Aleut war lances, though, of course, we do not know how it was hafted.

*The socket-piece in two parts* is apparently restricted to southwestern Alaska. From Port Möller there is a specimen exactly like the short, broad type of the Second Period in Kachemak Bay.<sup>360</sup> The same type is also known from the Aleutian Islands.<sup>361</sup>

*The socket-piece made in one piece with flat, central tang*, like those from the Third Period in Kachemak Bay, is apparently an Alaskan type.<sup>362</sup> The socket-piece of the Canadian Thule culture has a bifurcated butt or 'pyramid shaped rear end.'<sup>363</sup> A small socket-piece with conical tang was found in Yukon Island III. Socket-pieces with central tang are known from archaeological sites at Barter Island,<sup>364</sup> Bailie Island,<sup>365</sup> Point Barrow,<sup>366</sup> and Point Hope.<sup>367</sup> They were

<sup>353</sup> Jochelson, 1925, Fig. 57; also ? Pl. 24 -27, Pl. 25 -19, 20, 33, 35 and 37.

<sup>354</sup> Jochelson, 1928, Pl. 12 -17 to 23.

<sup>355</sup> Munro, Fig. 30 -2 and 3, Fig. 51, and Kishinouye, Fig. 14 (as 'arrow-nocks').

<sup>356</sup> Jochelson, 1928, Pl. 12 -15 and 16.

<sup>357</sup> Mathiassen, 1927, I, Fig. 49, p. 152.

<sup>358</sup> *Ibid.*, II, p. 37 f.

<sup>359</sup> *Ibid.*, p. 38.

<sup>360</sup> Unpublished specimen, American Museum of Natural History.

<sup>361</sup> Jochelson, 1925, Pl. 26 -31, 33 and 40.

<sup>362</sup> Mathiassen, 1930, p. 80.

<sup>363</sup> Mathiassen, 1927, II, p. 34.

<sup>364</sup> Mathiassen, 1930, Pl. 5 -8.

<sup>365</sup> Wissler, Fig. 38f.

<sup>366</sup> *Ibid.*, Fig. 42c; Mathiassen, 1930, Pl. 8 -6.

<sup>367</sup> *Ibid.*, p. 56.

chiefly used with the bladder dart,<sup>368</sup> though Murdoch also figures a similar socket-piece for a walrus harpoon.<sup>369</sup> A specimen almost identical with that from Cottonwood [Plate 41 -9] was found on the Aleutian Islands.<sup>370</sup>

*The socket-piece with bifurcated butt*, represented by fragments from Kachemak Bay III, and used in modern times by the Pacific Eskimo, is also a Thule culture type, though the specimens from Canada are much shorter and thicker.<sup>371</sup> Murdoch mentions a specimen of this type from Point Barrow, where, however, it was not common.<sup>372</sup> Very long and slender socket-pieces, like the modern specimens for sea-otter arrows, were found at Port Möller<sup>373</sup> and the Aleutian Islands.<sup>374</sup>

The distribution of the socket-piece would suggest that the type made in one piece was the original Arctic Eskimo form, though it was not introduced into Kachemak Bay before the Third Period. However, our material is not extensive enough to prove conclusively that the type in two parts was the only form known in southwestern Alaska in the earlier periods. All we are sure of is that both types were used in southwestern Alaska during the Third Period.

*The barb for a fish-spear side-prong* found in Kachemak Bay, Periods I and III, is a Thule culture type. Most of the specimens figured by Mathiassen from Canada have holes for attachment to the prong, though there are others with a simple shoulder and groove like those from Kachemak Bay.<sup>375</sup> This type of fish-spear is distributed from Greenland to Alaska.<sup>376</sup> The barb with holes for a lashing is figured by Lisiansky from Kodiak Island.<sup>377</sup> The barb with shoulder and scarf was found at Port Möller.<sup>378</sup> This type was not found in the Aleutian Islands, nor does it appear archaeologically in British Columbia, though it is known from the modern Indians of the Northwest Coast.<sup>379</sup> It is represented archaeologically in the San Joaquin Valley, California.<sup>380</sup>

*The barbed barb for the fish spear* is apparently lacking from the Thule culture, with the possible exception of a specimen from Naujan, figured by Mathiassen as a barb for a leister.<sup>381</sup> It is, however, very different from the other leister prongs and may have been lashed obliquely to the side-prong of a fish spear. The poorly barbed points from Yukon Island were not lashed on, but were in-

<sup>368</sup> *Ibid.*, p. 35.

<sup>369</sup> Murdoch, Fig. 222.

<sup>370</sup> Jochelson, 1925, Pl. 26 -42.

<sup>371</sup> Mathiassen, 1927, I, Pl. 3 -11.

<sup>372</sup> Murdoch, p. 230.

<sup>373</sup> Weyer, 1930, p. 269.

<sup>374</sup> Jochelson, 1925, Pl. 23 -19 to 24, Pl. 26 -16.

<sup>375</sup> Mathiassen, 1927, I, Pl. 12 -13 and 16.

<sup>376</sup> *Ibid.*, II, p. 56; Nelson, Pl. LXVII -3 and 5, Fig. 42 -1.

<sup>377</sup> Lisiansky, Pl. III h.

<sup>378</sup> Weyer, 1930, Fig. 18a, and unpublished specimens.

<sup>379</sup> Birket-Smith, II, p. 155, and Table B 21, p. 322 f.

<sup>380</sup> Schenk-Dawson, Pl. 80L.

<sup>381</sup> Mathiassen, 1927, I, Pl. 12 -9, p. 41.

serted in holes. The same type of barb was found at Port Möller.<sup>382</sup> Lashed-on barbs, barbed on both sides, are figured by Jochelson from the Aleutian Islands.<sup>383</sup> One of these is like the Yukon Island specimens, in that the barbs are not really effective. This type was also known from Japan, with barbs on one or on both sides.<sup>384</sup>

The line of distinction between the barbed *side-prong for bird-dart* and what I have called the barbed barb for the fish spear is difficult to draw. In view of the distribution of the side-prong for the bird-dart, which is found in the Thule culture, in Alaska,<sup>385</sup> at Port Möller,<sup>386</sup> on the Aleutian Islands,<sup>387</sup> in Japan,<sup>388</sup> the lower Fraser River (?)<sup>389</sup> and the San Joaquin Valley, California,<sup>390</sup> it is surprising that it should not have been found in Kachemak Bay. The fragment from Yukon Island sub-III [Plate 43 -20] cannot be identified with certainty. The type may have belonged to the First or Second Periods, but was not represented in our collection because it was very rare, and it died out later. Perhaps the slender barbed points or the stone bird bolas took the place of the bird-dart.

From St. Lawrence Island, Alaska, Nelson has figured two modern *compound fish hooks*, with shank of wood, and bone or antler barb, like those from Kachemak Bay.<sup>391</sup> The hooks are for cod or wolf-fish. The bone part has a single barb and a straight shaft. The fish-hook barbs figured by Jochelson from the Aleutian Islands are curved and most of them are barbed on both sides.<sup>392</sup> Since no example of the shank part of the hook was found in Kachemak Bay, we can assume that it was made of wood like the modern Alaskan specimens. Numerous bone shanks were found by Jochelson. Although this type of fish hook may not be as old as the simple gorge, which Birket-Smith ascribes to the 'ice-hunting' cultures,<sup>393</sup> it is, nevertheless, of considerable antiquity, at least in Kachemak Bay, where it is represented in the First Period. I have already mentioned (footnote 349) barbed points from the lower Fraser River and the Thompson River, described by Smith as 'harpoon-points,' which resembled the Kachemak Bay fish-hook barbs.

<sup>382</sup> Unpublished specimens, University Museum.

<sup>383</sup> Jochelson, 1925, Pl. 25 -27 and 28 (my interpretation).

<sup>384</sup> Kishinouye, Figs. 17, 22, 24, and 49.

<sup>385</sup> Mathiassen, 1927, II, p. 54.

<sup>386</sup> Weyer, 1930, Fig. 18d.

<sup>387</sup> Jochelson, 1925, Pl. 25 -4, 5, 7, 30 and 31. His identification was confused, I think. I give my own interpretation.

<sup>388</sup> Kishinouye, Figs. 48, 51, 52, and 56, p. 343, for 'fish-spears,' but this discussion is based on typological similarities rather than the possibility of identification of the actual game hunted.

<sup>389</sup> Smith, 1900-1908, IV, Fig. 17k, doubtful.

<sup>390</sup> Schenk-Dawson, Pl. 80a, n to q, p. 368 f, for 'fish spear,' or 'fishhook.' These specimens are identical in style with the Eskimo bird-dart side-prongs, barbed on one side.

<sup>391</sup> Nelson, Pl. LXIX -25 and 29, p. 181.

<sup>392</sup> Jochelson, 1925, Pl. 25 -40 to 51, Figs. 58 and 59.

<sup>393</sup> Birket-Smith, II, p. 156 f, p. 209. The compound fish hook of Alaska should be compared to the Thule culture gull hook.

*Bone pins*, probably hafted, are known from Port Möller,<sup>394</sup> from Kamchatka,<sup>395</sup> from Japan,<sup>396</sup> and were very common in the shell heaps of the lower Fraser River,<sup>397</sup> the Gulf of Georgia,<sup>398</sup> and the Thompson River.<sup>399</sup> The distribution of these points supports Smith's suggestion that they were teeth for fish-rakes. This implement is at present not used north of the Tlingit territory. They may, however, have been used as barbs for a simple type of compound fish hook (related to the gull hook of the Thule culture). Such a hook for wolf-fish, with shank of wood and prong of antler is figured by Nelson from St. Michael, Yukon Delta.<sup>400</sup> The halibut hook of the Northwest Coast Indians is a specialization of this type. The bone pins may also have been used as awls, bodkins, and so forth.

*Bird bone awls* with articulation heads are known all over the Eskimo territory and are presumably a very old type.<sup>401</sup> They were numerous at Port Möller<sup>402</sup> and the Aleutian Islands,<sup>403</sup> and are known from Kamchatka.<sup>404</sup> They have been found on the lower Fraser River,<sup>405</sup> the Gulf of Georgia,<sup>406</sup> and the Thompson River region.<sup>407</sup> The awl made of a gull radius hafted in the ulna is an unusual type, belonging to the Thule culture and also found at Port Williams and Dungeness on the Gulf of Georgia.<sup>408</sup>

*Awls made of seal radius*, like the specimen from Cottonwood, are also a common Eskimo type.<sup>409</sup> In view of the wide distribution of the *deer, or caribou ulna awl*,<sup>410</sup> it is curious that we did not find any in Kachemak Bay. As far as I know, the use of the dog tibia and radius and the sea-otter fibula is not recorded outside of Kachemak Bay. *Awls made of splinters* are such a common type, that no interest attaches to their distribution.

*The double-pointed awl* appears to be limited to the Third Period of the Kachemak Bay culture, unless one of the Aleut awls figured by Jochelson is of this type.<sup>411</sup>

<sup>394</sup> Weyer, 1930, p. 269.

<sup>395</sup> Jochelson, 1928, Pl. 12 -24 and 25.

<sup>396</sup> Munro, Fig. 42 -7 and 9.

<sup>397</sup> Smith, 1900-1908, iv, Fig. 14a and b, p. 147.

<sup>398</sup> *Ibid.*, vi, p. 309.

<sup>399</sup> Smith, 1898-1900, vi, Fig. 336.

<sup>400</sup> Nelson, Pl. LXIX -11, p. 180.

<sup>401</sup> Mathiassen, 1927, II, p. 98.

<sup>402</sup> Weyer, 1930, Fig. 18b, p. 270.

<sup>403</sup> Jochelson, 1925, Pl. 24 -7, 8, 9, 10 and 12, Pl. 28 -1 to 12, 22 to 37.

<sup>404</sup> Jochelson, 1928, Pl. 12 -1 to 10.

<sup>405</sup> Smith, 1900-1908, iv, Fig. 35, p. 170 f.

<sup>406</sup> *Ibid.*, vi, p. 317, Fig. 108.

<sup>407</sup> Smith, 1898-1900, vi, Fig. 357c.

<sup>408</sup> Found at Ponds Inlet, Canada, (Mathiassen, 1927, I, Pl. 52 -10); and Inugsuk, West Greenland, (Mathiassen, M. o. G., 1930, p. 223 f.). It was very common at Dungeness and Port Williams but was not found at Comox, Saanich, Victoria, or the Fraser River Delta, (Smith, 1900-1908, vi, p. 390, Fig. 162).

<sup>409</sup> Mathiassen, 1927, II, p. 98.

<sup>410</sup> *Ibid.*; Nelson, Pl. XLVI -16; Smith, 1900-1908, iv, p. 170, etc.

<sup>411</sup> Jochelson, 1925, Pl. 24 -8.

*Sewing needles with eyes* have a wide distribution. They are known all over the Eskimo area, and are a Thule culture type.<sup>412</sup> They are also known from Japan (?),<sup>413</sup> the lower Fraser River,<sup>414</sup> the Gulf of Georgia (?),<sup>415</sup> Lytton,<sup>416</sup> and the Thompson River,<sup>417</sup> though only the Eskimo needles are fine enough to be compared to those of Kachemak Bay. At Port Möller a very fine needle with eye was found.<sup>418</sup> The needles of the Aleut, it must be remembered, had a groove instead of an eye, and were probably a degenerate type.<sup>419</sup> The needles of the Thule culture were sometimes made of the whole bird bone,<sup>420</sup> though more commonly of a flat, thin splinter.<sup>421</sup> None seem to have been as well made as the Kachemak Bay needles.

The very large needle from the Point West of Halibut Cove [Plate 44 -21] is similar to an ivory specimen published by Nelson as a needle for mending nets.<sup>422</sup> The double-pointed needle from Passage Island [Plate 44 -22] is also similar to a specimen from the Eskimo about Bering Strait, said to have been used for the same purpose.<sup>423</sup> This is hardly sufficient proof, however, that the Kachemak Bay Eskimo used the fish net, for these needles could have been used for other purposes.

While the typical *needlecase* of the Thule culture was the 'winged' needlecase, both plain and decorated bird bone tubes were also used.<sup>424</sup> The Sadlermiut of Southampton Island, the last Thule Eskimo, used to keep their needles in a roll of skin, thrust into a swan humerus, closed at one end.<sup>425</sup> A bird bone needlecase was found at Point Atkinson,<sup>426</sup> and they were common in the Punuk culture,<sup>427</sup> as well as in modern Alaska. The decoration is almost always of encircling lines or bands. A bird bone tube, 10 cm. long, from Port Möller, and three others, 7.5 cm. long, described as beads,<sup>428</sup> may have been needlecases. Bird bone needlecases are specifically mentioned from the Aleutian Islands.<sup>429</sup> The prehistoric Ainu used to keep fish hooks in similar bone tubes.<sup>430</sup> Bird bone tubes about 6.3

<sup>412</sup> Birket-Smith, II, Table A 82, p. 281, cf. also p. 209, Table B 55, p. 359 f.; Mathiassen, 1927, II, p. 92. They are also a Cape Dorset type, (Jenness, 1925, Figs. 7f, 9h to j).

<sup>413</sup> Munro, p. 132.

<sup>414</sup> Smith, 1900-1908, IV, p. 172, Fig. 36.

<sup>415</sup> *Ibid.*, VI, p. 317.

<sup>416</sup> Smith, 1898-1900, III, Figs. 76 to 79.

<sup>417</sup> *Ibid.*, VI, Fig. 358 a.

<sup>418</sup> Weyer, 1930, p. 274.

<sup>419</sup> Jochelson, 1925, p. 91, explanation of Fig. 67a and b.

<sup>420</sup> Mathiassen, 1927, I, Pl. 52-9, p. 175.

<sup>421</sup> *Ibid.*, Pl. 69-9 and 10.

<sup>422</sup> Nelson, Pl. LXXIII -6, p. 192.

<sup>423</sup> *Ibid.*, -7, p. 192. Cf. with specimens from the Thompson River region, and the lower Fraser River, Smith, 1898-1900, VI, Fig. 358c and e; *Ibid.*, 1900-1908, IV, Fig. 36a.

<sup>424</sup> Mathiassen, 1927, I, Pl. 67-3 and 4, ornamented needlecases, from Kuk, Southampton Island; II, p. 92.

<sup>425</sup> *Ibid.*, I, p. 281.

<sup>426</sup> Mathiassen, 1930, p. 16.

<sup>427</sup> Collins, 1929 -I, Pl. 17 b, c and d.

<sup>428</sup> Weyer, 1930, p. 276, and unpublished specimens.

<sup>429</sup> Dall, 1877, II, p. 82.

<sup>430</sup> Jochelson, 1928, Fig. 74.

to 9.8 cm. long have been found on the lower Fraser River, and though they were probably too short for drinking tubes, they also appear to have been too short to hold the clumsy needles from this region.<sup>431</sup> However, the Thompson River Indians report that they used the natural grooves in the skin scrapers and chisels made of hollow deer bones as receptacles for awls and matting needles, wrapping the whole in a skin or textile when not in use.<sup>432</sup> (Compare with the find of five fish vertebra rings in a similar scraper, Yukon Island III.) Bird bone tubes were found at Lytton and, though described as drinking tubes, gambling bones, and so forth, might have served as needlecases.<sup>433</sup> This suggests, though not very definitely, that the needlecase may have been known in this region. I have already suggested that the hollow bone needlecase may have been the original Eskimo, or proto-Eskimo form, and have also given the reasons why this is difficult to prove.<sup>434</sup>

*Bone wedges* are a Canadian Thule culture type, and are known from Greenland to Alaska.<sup>435</sup> They were found on the Aleutian Islands,<sup>436</sup> at Port Möller,<sup>437</sup> and in Kamchatka.<sup>438</sup> Though wooden wedges were generally used along the Northwest Coast in recent times,<sup>439</sup> the bone or antler wedge reappears in the archaeological sites of the lower Fraser River, the Gulf of Georgia and Puget Sound, and on the upper Fraser and Thompson Rivers.<sup>440</sup> Birket-Smith classes the wedge among the elements of the 'ice-hunting' culture.<sup>441</sup>

*Scrapers of caribou scapulae* with transverse blade have been reported from the Canadian Thule culture. Mathiassen suggests that the longer specimens were used for removing liquids spilled on the platform skins, the shorter for softening skins.<sup>442</sup> According to Mathiassen, scrapers of this type have not been found outside the Canadian Arctic.<sup>443</sup> However, Nelson has published a scapula scraper from Kotzebue Sound,<sup>444</sup> and, at Port Möller, Weyer found a very well made specimen;<sup>445</sup> the articulations of both had been trimmed for the handle. From the Aleutian Islands, Jochelson obtained a scoop-shaped scraper of ivory, the shape

<sup>431</sup> Smith, 1900-1908, iv, p. 155.

<sup>432</sup> Smith, 1898-1900, vi, p. 420.

<sup>433</sup> *Ibid.*, iii, p. 154.

<sup>434</sup> de Laguna, 1932-33, part II, p. 101.

<sup>435</sup> Mathiassen, 1927, ii, p. 78.

<sup>436</sup> Jochelson, 1925, Pl. 26 -2 to 8.

<sup>437</sup> Unpublished specimens, American Museum of Natural History.

<sup>438</sup> Jochelson, 1928, Pl. 13B.

<sup>439</sup> Niblack, p. 281; Birket-Smith, Table B 59, p. 361 f.

<sup>440</sup> Smith, 1900-1908, iv, Fig. 26, p. 161; vi, Fig. 132, p. 344 f.; 1898-1900, iii, p. 141; vi, p. 414, Fig. 345.

<sup>441</sup> Birket-Smith, ii, pp. 200, 208.

<sup>442</sup> Mathiassen, 1927, i, Pl. 25 -1 to 3, p. 61 f.

<sup>443</sup> *Ibid.*, ii, p. 90.

<sup>444</sup> Nelson, Pl. L -18, p. 115.

<sup>445</sup> American Museum of Natural History, 60.1/5681.

of which strongly suggests that of the scapula scraper found by Weyer.<sup>446</sup> Though the scapula scraper is not reported from the lower Fraser River or the Gulf of Georgia, it is figured from Lytton and from the Thompson River, with a lateral, not a transverse blade.<sup>447</sup> This distribution would indicate that the scapula scraper, probably of caribou, belongs to a very old Eskimo culture stage, and that it should be found in archaeological sites in northern Alaska at a level corresponding to the Canadian Thule culture on the one hand, and the Second (perhaps the First) and Third Periods of the Kachemak Bay culture. The scapula scraper and the related mandible scraper with *longitudinal blade* seem to have been more recent (?) types, restricted, among the Eskimo, to the Third Period in Kachemak Bay (?), and were probably developed under the influence of the split leg bone scraper.

*The scraper blades* made of triangular sections cut from caribou scapulae are almost identical with similar specimens from the Thompson River valley, identified as scrapers for getting sap or the soft inner bark.<sup>448</sup>

*The scraper of split hollow bone*, used to remove fat from skins, is a Thule culture type, distributed from Alaska to Greenland. It is also found among the Chukchi and Asiatic Eskimo.<sup>449</sup> It seems to occupy a position analogous and subordinate to the ivory cup-shaped scraper of the Canadian Thule culture, and to be developed only in regions, such as at Inugsuk, West Greenland, or Kachemak Bay, where ivory for making the cup-shaped scraper is difficult to obtain. Conversely, in Canada, where the cup-shaped scraper was commonly used, the leg bone scraper is rare. At Port Möller, both Dall and Weyer found scrapers made of caribou leg bones with the articulation left at one end as a handle.<sup>450</sup> This type was found on the lower Fraser River, the Gulf of Georgia, and at Lytton; though not found in the Thompson River valley, it was reported by the natives.<sup>451</sup> It seems to have been an old, widely distributed type. *The cup-shaped fat scraper of ivory* is an exclusively Eskimo type.<sup>452</sup> The scraper made of a section of bear pelvis, from Yukon Island III, seems to represent this type reproduced in inferior material for lack of sufficient ivory.

*The cutting board* is an old and widely distributed Eskimo type. That it has not hitherto been mentioned among the Pacific Eskimo is due simply to oversight, as Birket-Smith has pointed out.<sup>453</sup>

The snow *shovel* with wooden or bone blade, especially with a blade made of a whale scapula, is common in the Thule culture, and in Arctic Alaska. It is

<sup>446</sup> Jochelson, 1925, Fig. 60.

<sup>447</sup> Smith, 1898-1900, III, Fig. 66; VI, Fig. 356, p. 420.

<sup>448</sup> Smith, 1898-1900, VI, p. 412, Fig. 339a and b.

<sup>449</sup> Mathiassen, 1927, II, p. 91; Mathiassen, M. o. G., 1930, p. 222 f; Murdoch, Fig. 113, p. 311, used as a fish scaler, and Fig. 299 as a skin scraper.

<sup>450</sup> Dall, 1877, II, Fig. opposite p. 78; unpublished specimens, American Museum of Natural History.

<sup>451</sup> Smith, 1900-1908, IV, Fig. 34, p. 169 f; VI, p. 316; 1898-1900, III, Fig. 65; VI, p. 420.

<sup>452</sup> Mathiassen, 1927, II, p. 91.

<sup>453</sup> Birket-Smith, II, p. 112.



apparently an old, wide-spread type.<sup>454</sup> A shovel was found by Steller on Kayak Island,<sup>455</sup> a locality which we suppose to have been Eskimo territory in 1741, and bone shovel blades were found by Jochelson on the Aleutian Islands and in Kamchatka.<sup>456</sup> Presumably these southern examples had nothing to do with building snow houses, though they may have been used to shovel snow. The three examples of shovel blades from Yukon Island III are simpler than the Aleutian specimens. The shovel, or rather the snow-shovel which is limited to the Arctic and sub-Arctic, Birket-Smith places among the elements of the 'ice-hunting' culture.<sup>457</sup>

The bone *drum handle* is a common Eskimo type, belonging to the Thule culture.<sup>458</sup> Most of the drum handles figured by Murdoch from Point Barrow are rather elaborately decorated, but the fundamental pattern is the same as that of the specimen from Kachemak Bay.<sup>459</sup> The drum handle has also been found on the Aleutian Islands.<sup>460</sup> The tambourine type of drum is very widely distributed in northern Eurasia and North America, and is one of the elements of the 'ice-hunting' culture, though, of course, this does not mean that the handle was always of the same shape.<sup>461</sup>

*Spoons* of horn and bone are known from the Canadian Thule culture, and are in general use all over the Eskimo territory.<sup>462</sup> The dipper, ladle, and spoon are all types with a wide distribution and belong to the 'ice-hunting' culture.<sup>463</sup> None of the spoons that Mathiassen figures from the Canadian Thule culture are very similar to those from Kachemak Bay. Those from Point Barrow have a longer handle.<sup>464</sup> The bone spoon found by Weyer at Port Möller<sup>465</sup> is almost identical with the specimen from Yukon Island III. Bone spoons were found on the Aleutian Islands. One of those figured by Jochelson has a hole in the handle. It was made after the Russian conquest.<sup>466</sup>

*The amulet box* is a Canadian Thule culture type,<sup>467</sup> and is found in modern collections from northern Alaska.<sup>468</sup> It is, however, made of wood and lacks the suspension hole found on the ivory specimen from Yukon Island sub-III.

<sup>454</sup> Mathiassen, 1927, II, p. 67.

<sup>455</sup> Birket-Smith, II, Table A 87, p. 283.

<sup>456</sup> Jochelson, 1925, Pl. 26-36 (with two slots for lashing to the handle); 1928, Figs. 42 and 44.

<sup>457</sup> Birket-Smith, II, p. 112.

<sup>458</sup> Mathiassen, M. o. G. 1930, p. 273.

<sup>459</sup> Murdoch, Figs. 384 and 385.

<sup>460</sup> Jochelson, 1925, Fig. 76.

<sup>461</sup> Birket-Smith, II, p. 201.

<sup>462</sup> Mathiassen, 1927, II, p. 108.

<sup>463</sup> Birket-Smith, II, p. 142 f.

<sup>464</sup> Murdoch, p. 104.

<sup>465</sup> Weyer, 1930, p. 274, specimen in the American Museum of Natural History.

<sup>466</sup> Jochelson, 1925, Pl. 26-19 and 41.

<sup>467</sup> Mathiassen, 1927, II, p. 125.

<sup>468</sup> Mathiassen, 1930, p. 95; Murdoch, Figs. 426 and 428.

*Beads* are a common Eskimo type. The cylindrical bead is known from the Canadian Thule culture, and from Alaska.<sup>469</sup> Those figured by Mathiassen from Naujan include tubular beads with straight or tapering sides.<sup>470</sup> In Alaska both men and women wore beads hanging from the lobe or rim of the ears. Little girls sometimes wore them hung from the septum of the nose.<sup>471</sup> Beads hanging from the ears and from the lower lip are reported from the Kodiak Eskimo.<sup>472</sup> The Aleut wore beads hung from the ears and nose, and from the nose pin.<sup>473</sup> Those found in the nose of the Aleut mummy, figured by Weyer, are cylindrical, some straight, the others tapering; four are of Korean amber.<sup>474</sup> Beads of bird bone are mentioned by Dall from the Aleutian Islands,<sup>475</sup> and bone tubes, the longest of which is 7.5 cm. long, are reported from Port Möller as beads,<sup>476</sup> but some of these may have been needlecases. The ancient Japanese beads were of stone, bone, or clay. They were tubular with straight or tapering sides, spherical, or disk-shaped.<sup>477</sup> Smith does not figure any beads from the lower Fraser River or the Gulf of Georgia, but at Eburne, on the lower Fraser River, a woman's skeleton was found, afterwards, with which were associated round shell beads.<sup>478</sup> A bird bone tube from Comox, 2.2 cm. long, may have been a bone bead.<sup>479</sup> Disk-shaped shell beads were found on the Thompson River, associated with the pendants worn by chief's daughters,<sup>480</sup> and many flat rectangular bone beads, like the rectangular shell and bone beads of the Third Period in Kachemak Bay, were found associated with cremated burials in this region.<sup>481</sup> Rectangular bone beads are known archaeologically from the Lillooet.<sup>482</sup> Disk-shaped or cylindrical shell beads were found at Lytton.<sup>483</sup> In order to find the closest parallel to the rectangular shell beads of Kachemak Bay, we must turn to the San Joaquin Valley, California, where almost identical specimens were found, as well as disk-shaped shell beads.<sup>484</sup>

The use of red baked shale is confined to Kachemak Bay for purely geographical reasons. Apparently the notion of copying the cylindrical Eskimo bone and ivory beads in this admirable material did not occur to the inhabitants of Kachemak Bay until Period sub-III. Shell beads are foreign to Eskimo culture. The

<sup>469</sup> Mathiassen, 1927, II, p. 116.

<sup>470</sup> *Ibid.*, I, Pl. 31-8, 10 and 11 (the last of bird bone).

<sup>471</sup> Nelson, p. 52 f.

<sup>472</sup> Birket-Smith, II, p. 268, Table A 62; Lisiansky, p. 195; Holmberg, p. 81.

<sup>473</sup> Langsdorff, p. 338 f; Jochelson, 1925, explanation of Fig. 95.

<sup>474</sup> Weyer, 1929, p. 234, Fig. 6.

<sup>475</sup> Dall, 1877, II, p. 86.

<sup>476</sup> Weyer, 1930, p. 276.

<sup>477</sup> Munro, Fig. 160-1 and 2, Fig. 161-9, 10, 12, 14, 17 to 21.

<sup>478</sup> Hill-Tout, p. 91.

<sup>479</sup> Smith, 1900-1908, VI, p. 318.

<sup>480</sup> Smith, 1898-1900, VI, Fig. 366.

<sup>481</sup> *Ibid.*, p. 426, Fig. 370.

<sup>482</sup> Smith, 1913, Pl. XII e.

<sup>483</sup> Smith, 1898-1900, III, p. 153.

<sup>484</sup> Schenk-Dawson, Pl. 87k, r and s.

use of shell and the shape (rectangular and disk-shaped) were introduced into Kachemak Bay from the south in the Third Period.

*Drop pendants*, especially those decorated with encircling ridges, are typical of the Eskimo. Mathiassen has figured many from the Thule site of Naujan in Canada, and though the stylistic similarity to those of Kachemak Bay is striking, no exact duplicates can be found.<sup>485</sup> Drop pendants are known all over the Eskimo region.<sup>486</sup> From Port Möller, Weyer has figured a drop pendant with the same type of encircling ridge as that used for ornamentation on the Kachemak Bay and Thule specimens.<sup>487</sup> A cylindrical bone pendant with the same type of ornamentation was found on the lower Fraser River,<sup>488</sup> but those from the other sites explored by Smith in British Columbia are flat plaques, very different from this Eskimo-like pendant.

*Tooth pendants*, worn as ornaments on the clothing or as amulets (especially the bear canine), are known from the Canadian Thule culture and are distributed from Greenland to Alaska.<sup>489</sup> Jochelson found tooth pendants on the Aleutian Islands, suspended by means of a hole or a groove for the string.<sup>490</sup> Tooth pendants are known from Neolithic Japan. The tooth or claw pendant was later elaborated into the amulet of semi-precious stone, called *magatama*.<sup>491</sup> The tooth pendant is of wide distribution on the North American continent. It is only necessary to mention archaeological examples from the east coast of Vancouver Island,<sup>492</sup> the lower Fraser River,<sup>493</sup> the Thompson River,<sup>494</sup> and from Lytton.<sup>495</sup>

*The crescent-shaped slate plaque* from Prince William Sound is of a type foreign to Eskimo culture. It very closely resembles, however, a shell pendant from North Saanich, on the east coast of Vancouver Island.<sup>496</sup> This is another instance in which the archaeological culture of Prince William Sound shows the Indian influence more strongly than does the culture of Kachemak Bay.

One of the pendants from Yukon Island, carved in the shape of a bird, suggests the *swimming bird figures* of the Canadian Thule culture.<sup>497</sup> These figures are known from Northeast and Northwest Greenland to East Cape and the Chukchi territory.<sup>498</sup> They have, however, a definite style, different from that

<sup>485</sup> Mathiassen, 1927, I, Pl. 30 -1 to 20.

<sup>486</sup> Mathiassen, 1927, II, p. 116.

<sup>487</sup> Weyer, 1930, Fig. 24c.

<sup>488</sup> Smith, 1900-1908, IV, Fig. 45a.

<sup>489</sup> Mathiassen, 1927, II, p. 115.

<sup>490</sup> Jochelson, 1925, Figs. 97, 98 and 99; Dall, 1877, II, p. 86.

<sup>491</sup> Munro, Fig. 160 -9, Fig. 161 -5 and 6, Fig. 162 -12, and p. 280.

<sup>492</sup> Smith, 1900-1908, VI, Fig. 138c.

<sup>493</sup> *Ibid.*, IV, p. 178.

<sup>494</sup> Smith, 1898-1900, VI, Fig. 369, p. 426.

<sup>495</sup> *Ibid.*, III, Figs. 96 to 98; Smith, 1913, Pl. XII d.

<sup>496</sup> Smith, 1900-1908, VI, Fig. 138a.

<sup>497</sup> Mathiassen, 1927, II, p. 117 f.

<sup>498</sup> Nelson, Fig. 125; Murdoch, Fig. 364; Nordenskiöld, p. 509.

of the bird pendant. Collins regards these bird figures as a comparatively recent introduction into Alaska from the east, along with other elements of the Canadian Thule culture. He mentions finding four of these bird figures in the Punuk midden, however.<sup>499</sup> A bird figure, suggestive of the Canadian Thule type, was found in the Old Bering Sea site on St. Lawrence Island. The style of the carving is definitely that of the Old Bering Sea art.<sup>500</sup> It seems likely that bird figures of some kind are an old Eskimo type, but that in each culture phase the style of the carving was different. The modern form of these bird figures is that which was developed in the Thule culture.

The ivory *worm* (?) from Yukon Island I can be compared to an antler carving from Orcas Island, Washington, to a modern Eskimo carving of the mythical 'man-worm,' and to bone carvings of worms and larvae from the modern Chukchi.<sup>501</sup>

*The labrets* found in Kachemak Bay are mostly of simple types distributed from British Columbia (we might even say from Mexico) to Point Barrow. They are different from the strings of beads and the very long, slender labret recently worn by the Kodiak Eskimo.<sup>502</sup> According to Murdoch, no labrets are worn east of the Mackenzie. They came to Cape Bathurst, the easternmost limit of their distribution, after 1850. The Point Barrow Eskimo wear two lateral labrets, but formerly wore a single *medial labret* in the lower lip.<sup>503</sup> The specimens of this type which he obtained,<sup>503</sup> Murdoch compares with specimens found by Dall in Amaknak Cave,<sup>504</sup> though a closer comparison could be made with the marble labret from Cottonwood [Plate 51-33]. Medial labrets of this type have been found at Barter Island and Point Atkinson.<sup>505</sup> They were also found by Jochelson on the Aleutian Islands.<sup>506</sup> We have already compared the labret found in the grave in Yukon Island II with the very much longer and thinner specimens which Jochelson thinks were used only with death masks.<sup>507</sup> A large medial labret is figured by Dall from Port Möller.<sup>508</sup> However, it must be noted that the medial labret with spike or projection found at Port Möller by Dall and by Weyer<sup>509</sup> was not found at Kachemak Bay. It seems to have been a local type. Two medial stone labrets like the Cottonwood specimen were found on the lower Fraser River,<sup>510</sup> and another on Vancouver Island,<sup>511</sup> but none was found

<sup>499</sup> Collins, 1929-I, p. 44.

<sup>500</sup> Information from Henry B. Collins, Jr.

<sup>501</sup> Smith, 1900-1908, vi, Fig. 194; Nelson, Fig. 158; Nordenskiöld, p. 507.

<sup>502</sup> Lisiansky, Pl. III d.

<sup>503</sup> Murdoch, p. 143, Fig. 96a, b, and c.

<sup>504</sup> Dall, 1877, II, Fig. opp. p. 89, no. U. S. 12991, 14933.

<sup>505</sup> Mathiassen, 1930, Pl. 6-8 and 10, Pl. 4-12.

<sup>506</sup> Jochelson, 1925, Figs. 84 to 87.

<sup>507</sup> *Ibid.*, Figs. 88 to 90, p. 100.

<sup>508</sup> Dall, 1877, II, Fig. opp. p. 89, no. U. S. 16138.

<sup>509</sup> Dall, *ibid.*, no. U. S. 16139; Weyer, 1930, Fig. 15b.

<sup>510</sup> Smith, 1900-1908, IV, Fig. 44, p. 178.

<sup>511</sup> *Ibid.*, VI, Fig. 138b, p. 350.

on the upper Fraser River. It is important to note that these specimens from southern British Columbia are of the Eskimo, not the Tlingit type with a trough. The Tlingit type was represented or suggested by the large specimens of oil shale from Cottonwood and Yukon Island III [Plate 51 -32 and 34]. However, a slight hollow is not necessarily a Tlingit feature, for a flat, oval labret, with a hollow on one side, was illustrated by Mathiassen from East Cape, Siberia.<sup>512</sup>

The simple *lateral labret*, either conical or hat-shaped, is found all over Alaska.<sup>513</sup> A specimen from East Cape, Siberia,<sup>514</sup> is apparently identical with the conical specimen in oil shale from Yukon Island III [Plate 51 -30]. The lateral labret is known from Port Möller, though the specimen figured by Weyer is higher and more pointed than most of the Kachemak Bay specimens.<sup>515</sup> The lateral labret is found on the Aleutian Islands.<sup>516</sup> There was also a large hat-shaped labret, a special form worn in the cheek, though Jochelson does not specify how many were worn.<sup>517</sup>

*The novice's labret* is known all over Alaska. Specimens from Barter Island<sup>518</sup> and Sledge Island<sup>519</sup> are almost identical with the small peg-shaped shell specimen from Cottonwood [Plate 51 -20], while a flat labret from Amaknak Island<sup>520</sup> is almost identical with the flat marble specimen from Yukon Island III [Plate 51 -23]. Other localities where the novice's labret has been mentioned are Point Barrow,<sup>521</sup> and Point Hope.<sup>522</sup>

From this study we should suppose that the medial labret is the older type, the lateral labret being a special Eskimo development. Among the Eskimo north of the Yukon, the labret is worn by men only;<sup>523</sup> south of the Yukon, including the Pacific Eskimo and the ancient Eskimo inhabitants of Kachemak Bay (latter half of Period III at any rate), the labret was worn by both men and women. The women of Kodiak are said to have had from two to six holes in the lower lip, the men only one.<sup>524</sup> However, we know that the men of Kachemak Bay (Third Period) sometimes wore as many as three. It is in the region south of the Yukon and north of the Alaska Peninsula that the most elaborate forms were evolved. The saucer-shaped labret, worn by women only, is a local development on the

<sup>512</sup> Mathiassen, 1930, Pl. 19 -13.

<sup>513</sup> Pt. Barrow: Mathiassen, 1930, p. 47; Murdoch, p. 143 f. Pt. Hope: Mathiassen, 1930, p. 66 f. North of the Yukon: Nelson, Pl. XXII -19, 20 and 21.

<sup>514</sup> Mathiassen, 1930, Pl. 19 -12, p. 75. The labret is no longer worn in Siberia, though tattooing suggests that it was abandoned recently. This is possibly the interpretation to be made of the marks representing tattooing on clay images from Neolithic Japan (cf. Munro p. 260).

<sup>515</sup> Weyer, 1930, Fig. 15 a.

<sup>516</sup> Jochelson, 1925, Fig. 92.

<sup>517</sup> *Ibid.*, Fig. 94.

<sup>518</sup> Mathiassen, 1930, Pl. 6 -7.

<sup>519</sup> Nelson, Pl. XXII -22, p. 48.

<sup>520</sup> U. S. National Museum, 46422; cf. Jochelson, 1925, Fig. 92c.

<sup>521</sup> Mathiassen, 1930, p. 47; Murdoch, Fig. 91, p. 144.

<sup>522</sup> Mathiassen, 1930, p. 66.

<sup>523</sup> Nelson, p. 45.

<sup>524</sup> *Ibid.*, Niblack, p. 256; Holmberg, p. 82.

Northwest Coast. As far as the Eskimo are concerned, the labret came to them from the south, and dates from oldest culture stage in Kachemak Bay. It is interesting to note that Jochelson mentions finding near Petropavlovsk, Kamchatka, 'a polished marble object resembling a labret . . . , but it must be noted that no labrets were used as personal ornamentations by the ancient Kamchadal.'<sup>525</sup> However, as he does not figure the specimen, it is impossible to judge. It is quite possible, local tradition to the contrary, that the labret was once known there, considering the number of cultural types common to southwestern Alaska and Kamchatka. That the labret has not yet been reported from Attu, the most westerly island of the Aleutian Chain,<sup>526</sup> may be of little significance since not much archaeological work has been done there. The tradition of the natives interviewed by Jochelson has already been proved faulty in the matter of the kashim, so the fact that they deny the labret means nothing. Munro suggests that the labret may have been worn in Neolithic Japan. Incisions on pottery figures, at the corners of the mouth, are supposed to represent tattooing or even a pair of labrets. The pattern of the tattooing itself may have been derived from labrets.<sup>527</sup> He published a grooved cylindrical object as an ear or lip plug.<sup>528</sup>

*Ear ornaments* are wide-spread among the Eskimo, including those of southwestern Alaska, though the ornaments usually take the form of strings of beads, dentalium shells, or ivory pendants.<sup>529</sup> Some of those figured by Nelson from Alaska are of ivory, with a hook at the back to fit into a hole in the lobe of the ear. They are carved in various shapes and sometimes have strings of beads hanging from them.<sup>530</sup> Ear plugs are mentioned by Jochelson from the Aleutian Islands, though no archaeological specimens are figured.<sup>531</sup> The ancient Ainu inhabitants of Neolithic Japan wore ear plugs. Actual ear plugs, as well as clay figurines, some with holes in their ears, others with representations of ear plugs, have been found.<sup>532</sup> From the lower Fraser River, Smith publishes as an ear ornament a tubular specimen of stone with two projecting loops. It may have been either a plug or a pendant.<sup>533</sup> Thus, while ear ornaments of some kind seem to be a widely distributed type, no exact parallels in form to the button-shaped specimen from the grave in Yukon Island II have been found.

*Toggles and buckles* are typical of the Eskimo. The material from Kachemak Bay is not sufficiently definite in style to warrant a close comparison. The pos-

<sup>525</sup> Jochelson, 1928, p. 43.

<sup>526</sup> Jochelson, 1925, p. 100.

<sup>527</sup> Munro, p. 260, Fig. 149. Dall (1877, II, p. 88) mentions a Japanese carved head with two ivory labrets.

<sup>528</sup> Munro, p. 225, Fig. 161 -15.

<sup>529</sup> Birket-Smith, II, p. 268, Table A 62.

<sup>530</sup> Nelson, Pl. XXIV, p. 52 ff.

<sup>531</sup> Jochelson, 1925, p. 96. The tooth pendants, however, are described as possible ear ornaments.

<sup>532</sup> Munro, Fig. 122 -2 and 3, p. 280 f, Fig. 161 -15.

<sup>533</sup> Smith, 1900-1908, IV, Fig. 45b.

sible resemblance between the rectangular faceted buckles of Kachemak Bay and similar buckles, described by Nelson, has been suggested.

*The fish vertebra rings*, as we have already remarked, were used by the Aleut as buckles for their kayak half-jackets, and are apparently a local type, restricted to southwestern Alaska. Beads made from whole fish vertebrae were found at Dutch Harbor,<sup>534</sup> and Munro figures what is apparently the same type from Neolithic Japan.<sup>535</sup> This kind of bead is, of course, rather different from the ring.

*Nose pins* have been found at Port Möller and on the Aleutian Islands,<sup>536</sup> but these have a head at one end, and are thus different from the specimens from Kachemak Bay. However, the Eskimo of Kodiak Island seem to have worn a bone nose pin without head, to judge from Holmberg's description.<sup>537</sup> Although the nose pin has a wide distribution among the natives of the Northwest Coast, including the southern Eskimo, it seems useless to trace that distribution in detail, since the identification of the Kachemak Bay specimens is not certain. The specimen with encircling ridges from Yukon Island III has, however, a typical Eskimo form of ornamentation. The nose ornament is apparently an Indian element which has been borrowed by the southern Eskimo, probably not much earlier than the Third Period of the Kachemak Bay culture, if we can rely on the present archaeological evidence.

*The copper bracelet and beads* from Kachemak Bay might be compared to specimens from Lytton and from the Thompson River valley. At Lytton was found a copper bracelet, almost identical with that from Yukon Island. It may have been modern, but copper stains on wrist and ankle bones show that copper bracelets of some kind were worn in ancient times.<sup>538</sup> The same style of bracelet is made by the Northwest Coast Indians. The copper beads are very similar to specimens found at Lytton. These were made of rolls of copper, from 2 to 4 centimeters long. Smith figures a string in which copper beads have been combined with dentalium shells.<sup>539</sup>

*The stone balls* used in a game have already been mentioned from the Aleutian Islands, and they are also found in Kamchatka.<sup>540</sup>

*The top* is a wide-spread Eskimo type, known from the Thule culture, where it was often made of the epiphysis of a small whale vertebra.<sup>541</sup> Specimens of this type were numerous at Port Möller.<sup>542</sup> The top is one of the elements of the 'ice-hunting' culture.<sup>543</sup>

<sup>534</sup> Capps Collection, University Museum.

<sup>535</sup> Munro, Fig. 161 -16, a snake vertebra, possibly an ear or lip plug (p. 280).

<sup>536</sup> Weyer, 1930, Fig. 16; Jochelson, 1925, Fig. 95.

<sup>537</sup> Holmberg, p. 81.

<sup>538</sup> Smith, 1913, p. 30, Pl. XII m.

<sup>539</sup> Smith, 1898-1900, vi, Fig. 371, p. 426 f.

<sup>540</sup> Jochelson, 1928, Fig. 49.

<sup>541</sup> Birket-Smith, II, Table A 110, p. 293; Mathiassen, 1927, II, p. 120.

<sup>542</sup> Weyer, 1930, p. 274, described as pendants.

<sup>543</sup> Birket-Smith, II, p. 205 f.

*Dolls* are among the most characteristic elements of Eskimo culture. Those of the Thule culture lacked arms and features, but in Alaska the features are often indicated.<sup>544</sup> It is interesting to note that the lack of the arms on the carvings from Jakolof's Place and Yukon Island sub-III is a characteristic linking these specimens with the Canadian Thule dolls, rather than with the modern Alaskan<sup>545</sup> or Punuk culture figures.<sup>546</sup> However, in the portraiture of the features, the Kachemak Bay specimens surpass other Eskimo carvings. The closest parallels are to be found in the modern dolls figured by Lisiansky from Kodiak Island.<sup>547</sup> Of these he writes: 'The women, indeed, who have no children, keep them, I was told, to represent the wished-for infant offspring, and amuse themselves with them, as if they were real infants. If we may judge by these figures, the inhabitants of Cadiack must have lost much of their skill in carving, their old productions of this kind being greatly superior.'<sup>548</sup> One of these figures has both the arms and legs, the other lacks arms. In the ears of both are holes, three in the ears of the first, from which hang strings of beads, and six in the ears of the other, from which the strings are lost. The nose of each is also pierced; one holds four beads strung on a stiff thread. Although no dolls of this sort were found by Smith in British Columbia, Hill-Tout found a stone vessel in the shape of a human figure embracing a bowl. The right ear, the only one visible in the illustration, is pierced by a small hole.<sup>549</sup> The human faces carved on various objects from the Aleutian Islands are quite different from those of Kachemak Bay. The crude dolls from Port Möller, figured by Weyer,<sup>550</sup> are like the specimen from Yukon Island sub-III [Plate 52 -3]. The head found by Dall at Port Möller is somewhat like the better Kachemak Bay carvings, at least in the degree of skill shown.<sup>551</sup>

The use of *small insets*, especially of baleen, is a characteristic Eskimo device, going back to the Old Bering Sea culture in Alaska, where such insets are used both in non-representative carvings and to depict the eyes of animals.<sup>552</sup> Inset eyes in animal carvings and dolls are found in the archaeological collections from Point Hope, and East Cape, Siberia, published by Mathiassen.<sup>553</sup>

*The whaling amulet*, in the shape of a whale or a whale's tail, is typical of the Alaskan Eskimo but not of the Canadian Thule culture. A whale-tail pendant,

<sup>544</sup> Mathiassen, 1927, II, p. 119.

<sup>545</sup> Nelson, Pl. XCIII.

<sup>546</sup> Collins, 1929 -I, Pl. 16.

<sup>547</sup> Lisiansky, Pl. III a and b.

<sup>548</sup> Lisiansky, p. 178.

<sup>549</sup> Hill-Tout, p. 91.

<sup>550</sup> Weyer, 1930, Fig. 23a and b, and unpublished specimens. Fig. 23b has tattooing (?) on the chin like the Yukon Island doll.

<sup>551</sup> Dall, 1877, II, Fig. on p. 87.

<sup>552</sup> Collins, 1929 -I, p. 7, Pl. 4a.

<sup>553</sup> Mathiassen, 1930, Pl. 12 -12, 13, 16 to 18, Fig. 14, Pl. 17 -7, Pl. 19 -15.



elaborately carved, was found at Port Möller.<sup>554</sup> An archaeological specimen of sandstone, which Schnell figures from Kamchatka, suggests a conventionalized whale.<sup>555</sup> It is interesting to see that in spite of the differences in the methods of whaling—whaling by lance among the Pacific Eskimo, instead of with the harpoon as among the northern Alaskan (and Thule culture) Eskimo—the same sort of whaling amulet should be used.

*Incised decorations*<sup>556</sup> are not very common in the Kachemak Bay collection. *The bordering lines* on each side of the barbs on the slender barbed points are a decorative feature frequently found on the weapon points of the Alaskan Eskimo.<sup>557</sup> A point with this type of decoration has been mentioned from Puget Sound. *The line with spurs* on one side is a very common Eskimo decoration, found in the Thule and in the Old Bering Sea cultures as well as among the modern Eskimo of Alaska. It is also found on a carving from the lower Fraser River,<sup>558</sup> and on objects from Lytton,<sup>559</sup> together with the 'ladder' pattern (double line with cross bars), an equally old Eskimo motif. *The line with paired spurs on each side* is also an ancient Eskimo motif, but it does not occur on the archaeological material from British Columbia, described by Smith, except on one specimen from the Thompson River.<sup>560</sup> *Transverse lines in groups of three* appeared in the Second and Third Periods in Kachemak Bay. Transverse lines, without the bordering lines transforming them into the 'ladder' pattern, are not common in Eskimo art. They are found, however, on a fragment of a 'bone awl' from Lytton,<sup>561</sup> together with a line of X's, employed in the same way as on the ivory pin from Yukon Island III [Plate 51 -7]. A bone dagger from the Thompson River region has a similar decoration along the edges.<sup>562</sup> *The inverted Y with hatching between the prongs* on the blunt antler point from Yukon Island III [Plate 43 -21] reminds us of the same decoration on the harpoon heads of the Thule culture. Spaces with hatching are also characteristic of the Old Bering Sea culture. *The double-ended Y* is a common Eskimo design. It is interesting to note that the closely related figure, which I have called the 'arrow', with two pairs of 'barbs', is found on a needle from Lytton.<sup>563</sup> *The chevrons* or V's on the lamps from Cottonwood and Yukon Island are a decorative element almost never encountered in Eskimo art, and their occurrence in the Kachemak Bay culture we must ascribe to outside influence. The chevron and the zig-zag line, a closely

<sup>554</sup> Weyer, 1930, Fig. 24a.

<sup>555</sup> Schnell, Pl. XVII -9.

<sup>556</sup> For an analysis of Eskimo decorative art, cf. de Laguna, 1932-1933, part II.

<sup>557</sup> Mathiassen, 1930, Pl. 1 -19 from Point Atkinson; Pl. 9 -1 and 7 from Point Barrow; specimens from Port Möller in the American Museum of Natural History.

<sup>558</sup> Smith, 1900-1908, iv, Fig. 59.

<sup>559</sup> Smith, 1898-1900, iii, Fig. 110.

<sup>560</sup> *Ibid.*, vi, Fig. 375c.

<sup>561</sup> *Ibid.*, iii, Fig. 108.

<sup>562</sup> *Ibid.*, vi, Fig. 360b.

<sup>563</sup> *Ibid.*, iii, Fig. 76.

related element, are both decorations associated with the lamp-like vessels of British Columbia. One specimen, which we have had occasion to compare to the lamps with human figure, because of the human face at the front of the bowl, has the encircling line and the row of chevrons on the rim, as on the fragment of a lamp from Cottonwood.<sup>564</sup> The chevron is a common decorative element in the archaeological sites of British Columbia,<sup>565</sup> and presumably the examples found in Kachemak Bay must have come from the south, together with the other decorative features found on the stone lamps.

Examples of decorations suggestive of those found in the Punuk culture have already been noted. These were combinations of dots and lines from the Third Period.<sup>566</sup> The Punuk designs composed of these motifs, however, have a much more elaborate composition.

Other Eskimo patterns found in the archaeological sites in British Columbia, but not in Kachemak Bay are: the double line with alternating internal spurs,<sup>567</sup> the ladder,<sup>568</sup> and the round bored dot alone.<sup>569</sup> It seems likely that these have spread south from the Eskimo and that further investigations should reveal them in Kachemak Bay. The ladder and the dot have been found on the Aleutian Islands.<sup>570</sup>

The *compass-drawn dot-and-circle* is one of several elements introduced into Alaska from Siberia. In Eskimo art this mechanically made circle has taken the place of the plain round dot of the Thule culture and the free-hand circles and ovals of the Old Bering Sea art. It is one of the most characteristic designs of the fully developed Punuk culture, as well as of modern Alaskan art. The free-hand circle with round bored central dot seems to have been an intermediate form belonging to the early stages of the Punuk culture.<sup>571</sup> This form of the motif is found on certain Aleut specimens.<sup>572</sup> In the incisions of these specimens are traces of black and red paint. The use of paint in incised designs is another element which seems to have been derived from Siberia and which distinguishes Punuk and modern Alaskan art from that of the Old Bering Sea and Thule stages. The compass-drawn dot-and-circle is also found on an archaeological miniature mask from Kodiak Island,<sup>573</sup> and it occurs on specimens from the shell heaps of the lower Fraser River and the Gulf of Georgia, as well as from archae-

<sup>564</sup> Smith, 1900-1908, iv, Fig. 53a.

<sup>565</sup> Smith, 1898-1900, iii, Figs. 111 and 114; vi, Figs. 373c, 374b, and 375c; 1900-1908, iv, Fig. 51; vi, Figs. 190a and 193c.

<sup>566</sup> The pattern of a longitudinal line with dots along it like that of the barbed slate lance blade from Aurora Fox Farm, was found on a barbed head from the Aleutian Islands (Jochelson, 1925, Fig. 56).

<sup>567</sup> Lower Fraser River: Smith, 1900-1908, iv, Fig. 50b; Vancouver Island: *Ibid.*, vi, Fig. 141b.

<sup>568</sup> Vancouver Island: *Ibid.*, Fig. 113a; Lytton: Smith 1898-1900, iii, Figs. 110 and 111; Thompson River: *Ibid.*, vi, Fig. 376.

<sup>569</sup> Thompson River: *Ibid.*, Fig. 377.

<sup>570</sup> Jochelson, 1925, Figs. 70 and 72.

<sup>571</sup> Information from Henry B. Collins, Jr.

<sup>572</sup> Jochelson, 1925, Pl. 23 -3 and Fig. 69.

<sup>573</sup> Hrdlička, 1932, Fig. 95 and 1933, Fig. 44.

ological sites on the upper Fraser and Thompson Rivers and the Yakima Valley. The double concentric dot-and-circle, illustrated by the 'eye' labret from Yukon Island III, is found in modern Alaskan art—only the single circle is known in the Punuk stage.

Collins has shown that on St. Lawrence Island the introduction from Siberia of small amounts of *metal* was an event ushering in the beginning of the Punuk period, and that this metal transformed the whole art style.<sup>574</sup> I have attempted to prove that the dot-and-circle is technically and historically dependent upon the use of metal tools.<sup>575</sup> We have already remarked upon the precise and rigid character of the incised lines on many objects from the Third Period, and on a few from the Second Period in Kachemak Bay. These decorations seem to have been made with metal tools. The same type of incised line is one of the distinguishing features of Punuk art. It is also found at Port Möller on the slender barbed points, a barbed dart head, and two harpoon heads.<sup>576</sup> To judge by the illustrations, some of the bordering lines on the war lance heads from the Aleutian Islands are also of this type.<sup>577</sup> Collins believes that the engraving tool on St. Lawrence Island was of iron, obtained from tribes in Siberia long before direct contact with the Russians. As far as southwestern Alaska is concerned, the question of the material of the engraving tool cannot be solved without direct archaeological evidence. It is, of course, possible that in the course of diffusion from Bering Strait southwards, the stiff straight line and the dot-and-circle became divorced from the original iron tools and were made instead with instruments of copper.

*The cave paintings* of Cook Inlet have already been analyzed. They, as well as many other elements of Eskimo culture in southwestern Alaska, point towards the interior Salish Indians of British Columbia.

#### CONCLUSION

An enumeration of the various types of the Kachemak Bay culture which are also found in the various regions we have discussed may be of interest. Naturally, the negative, as well as the positive, evidence shown in these lists is of more significance for those areas where intensive archaeological work has been done, than for less well known regions. Because our information about northern Alaska has not been coördinated to give us an understanding of the relative ages of the various cultural types which have been found there, our picture of that region might be called two-dimensional rather than three-dimensional. Collins' series of culture stages on St. Lawrence Island, from the Old Bering Sea to modern times,

<sup>574</sup> Collins, 1932 -II, p. 107 f.

<sup>575</sup> de Laguna, 1932-33, part II, pp. 80-84.

<sup>576</sup> Weyer, 1930, Fig. 17b and c, Fig. 19, and an unpublished specimen.

<sup>577</sup> Jochelson, 1925, Pl. 23 -2 to 6, Fig. 68.

has not yet been published, and the cultural position of the 'Birnik' finds from the north coast has not yet been established.

The following types of the *Canadian Thule culture* have been found in Kachemak Bay; those items in parenthesis are slightly different from the Kachemak Bay forms: (semi-subterranean house of stone and bone, with entrance passage, platform, and sometimes with interior hearth), (burial under stone cairn), (bone and ivory bola), planing adze, adze head with socket for blade, maul, bone club, crude oval stone lamp, (semi-circular lamp), knob in bowl of lamp, pottery, chipped leaf-shaped blade with rounded or pointed base, chipped leaf-shaped blade with straight base, chipped asymmetric knife blade with notched tang (belongs to Cape Dorset culture only?), chipped end-scrapers blade, polished slate scraper blade, double-edged slate knife and lance blades (lance blade with tang not typical), triangular harpoon blade with hole for hafting, single-edged slate knife blade, hafted and unhafted ulu blades, (hafted baleen shave), chipped stone, polished slate, and bone drills, Thule Type I and II harpoon heads with groove for the socket lashing, thin harpoon head with closed socket and without barbs and blade, thin harpoon head with closed socket and barbs but no blade (found only in Greenland, not Canada), dart head barbed symmetrically on both sides with hole for line, (dart head barbed on one side), (arrow head with barbs and blade), (arrow head with blade only), (arrow head without barbs or blade), (movable lance head, but without barbs), (socket-piece with bifurcated butt, but shorter than Kachemak Bay type), barb for fish spear, (barbed barb for fish spear?), side-prong for bird-dart, (gull hook, a special form of compound fish hook), bird bone awl with head, awl of gull radius set in ulna, awl of seal radius, sewing needle, bone tube needlecase, bone wedge, caribou scapula scraper, split bone scraper, cup scraper, cutting board, bone shovel, drum handle, spoon and dipper, amulet box, cylindrical bead, bead of section of bone, drop pendant with encircling ridges, tooth pendant, (bird figure), toggle, bone top, (doll without arms or features), line bordering barbs, line with spurs on one side, line with paired spurs on both sides, Y with hatched area, double-ended Y.

Of these Thule culture types, the following were probably introduced into Kachemak Bay in the Third Period: burial under stones, pottery, triangular harpoon blade with hole for pegging, socket-piece with bifurcated butt, and most of the decorative elements (?). The harpoon head with closed socket was present in the Second Period. Presumably the other types belong to the First Period of the Kachemak Bay culture, even though they are not actually represented in our collection. We must remember, however, that more of these Thule types than we now suspect may be proved to be Canadian forms of comparatively recent introduction into Alaska.

Practically all of the Canadian Thule types found in the Kachemak Bay culture are represented in northern Alaska, though we cannot say in what hori-

zon they first appear. The types as yet not found are: burial under stone cairn and chipped asymmetric knife blade with notched tang. However, they probably will be found when further archaeological investigations are made.

In the Canadian *Cape Dorset culture*, the relationship of which to the Thule culture is still uncertain, we can note the following types: planing adze blade, sawed ? stone, chipped asymmetric knife blade with notched tang, Thule Type I harpoon head with groove for lashing and laterally placed line hole, dart heads barbed symmetrically and asymmetrically on both sides, and needle.

In addition to the Canadian Thule types, *in Alaska north of the Alaska Peninsula* there are also the following types belonging to the Kachemak Bay culture: Kodiak type of house (from Norton Sound south), sweat bath without steam from rocks (north of the Kuskokwim), trophy heads (south of the Kuskokwim), notched stone sometimes used as net-weight, stone partially grooved over long diameter, stone grooved around middle, stone with hole, splitting adze (south of the Yukon), (but anomalous type is found to Pt. Barrow), adze head with bed for blade, pumice, oval stone lamp (Bristol Bay), lamp with human figure (Yukon River), barbed slate lance blade (Norton Sound and south), thin harpoon head with closed socket and barbs but no blade, (barbed dart head with blade, but hafted in slit), 'Yukon Island I' and 'Yukon Island III' slender barbed points, socket-piece with flat central tang, compound fish hook with bone barb, (worm figure), medial, lateral, and novice's labrets, baleen insets, whale-tail amulet, (combination of dots and lines of typical Punuk style), metal-cut lines, dot-and-circle.

Of these, pumice, oval stone lamp, 'Yukon Island I' (and 'Yukon Island III'—rare) slender barbed point, compound fish hook with bone barb, and labret belong to the First Period in Kachemak Bay. With the exception of the labret which we know was diffused from south to north, these types are presumably old Alaskan Eskimo culture elements.

The sweat bath with steam from rocks (south of the Kuskokwim), splitting adze, lamp with human figure, barbed dart head with blade?, socket-piece with flat central tang, and metal-cut designs seem to be late in Kachemak Bay and in Alaska. The first three have a southerly distribution, and the decorative elements we know did not appear before the Punuk period. For the other Alaskan elements we can be less sure. We have already explained why the stone lamp is probably older than the pottery lamp (Birnik, Old Bering Sea). The trophy head has a southern distribution and is probably not old. The notched and grooved stones have never been important; they, too, were probably introduced from the south, though the stone grooved about the longer diameter is as old as the 'Birnik' culture. The adze head with bed for the blade is a Punuk type. The age of the adze head with socket is uncertain; it is post-Punuk on St. Lawrence Island. The barbed slate lance blade and the socket-piece with flat tang may be fairly recent.

The following types of the Kachemak Bay culture have been found at *Port Möller* on the Alaska Peninsula: extended inhumation, dismembered burial, burial under stones, trophy head, scattered human bones, notched stone (large only ?), stone grooved around long diameter, stone grooved around middle and over one end, stone grooved around one end, stone with hole, adze head with socket for blade, adze head with bed for blade, oval stone lamp, chipped leaf-shaped blade with rounded or pointed base, chipped leaf-shaped blade with straight base, (chipped asymmetric knife blade with notched tang ?), chipped slate ulu or scraper, slate 'awl,' dart heads barbed symmetrically and asymmetrically on both sides with hole or with shouldered tang, dart head barbed on one side with hole or with shouldered tang, dart heads with combination of large and small barbs and with blade hafted in bed, 'Yukon Island I' and 'III' slender barbed points, barbed lance head, socket-piece in two parts, socket-piece with bifurcated butt, barb for fish spear, barbed barb for fish spear, side-prong for bird-dart, bone pin, bird bone awl with head, sewing needle, bone tube needlecase, bone wedge, scapula scraper, split bone scraper, spoon, bone bead, drop pendant with encircling ridges, medial labret, lateral labret, nose pin (but with head), bone top, doll with face, Port Möller type doll, whale-tail amulet, lines bordering barbs, metal-cut lines.

The following Kachemak Bay types have been found on the *Aleutian Islands*: houses built partly of bone with side entrance passage (older than large wooden community house with roof entrance), refuge island, (mummification), flexed inhumation, squatting inhumation, extended inhumation (before conquest?), dismembered burials?, (utilized corpse), large notched stone, stone grooved around long diameter, stone grooved around short diameter, stone with hole, planing adze, grinding stone and slab, bone club, stone saw, pumice, oval stone lamp, knob in lamp, pottery (rare), hunter's lamp, chipped leaf-shaped blade with rounded or pointed base, chipped leaf-shaped blade with straight base, chipped asymmetric knife blade with notched tang, chipped discoidal scraper blade, double-edged slate knife blade, barbed slate lance blade (very rare), hafted and unhafted ulu blades, man's knife like ulu, chipped slate ulu or scraper, thin harpoon head with closed socket and without barbs or blade (?), dart head barbed symmetrically or asymmetrically on both sides with hole or shouldered tang, dart head barbed on one side with hole or shouldered tang (older than that barbed on both sides?), barbed heads with blade in a bed, and with combination of large and small barbs, 'Yukon Island I' slender barbed point, 'Yukon Island III' slender barbed point, (weapon head with barbs and blade), large Kachemak Bay type of arrow head with blade and no barbs, barbed lance head, socket-piece in two parts, socket-piece with bifurcated butt, socket-piece with flat central tang, (barbed barb for fish spear), side-prong for bird-dart, (fish hook), bird bone awl with head, double-pointed awl?, (sewing needle, but without eye), bird bone tube needlecase, bone wedge, (ivory scraper modeled after scapula scraper), bone shovel, drum handle, spoon, cylindrical bead, bead made of section of bone,

tooth pendant, medial labret, labret for mask, lateral labret, novice's labret, (ear plug), nose pin (but with head), fish vertebra ring, stone ball for game, line bordering barbs, (free-hand circle with round bored dot), metal-cut designs, cave paintings?.

The culture of *Prince William Sound* has already been analyzed.

Our information about *Kodiak Island* is very scanty; we can only mention the following types: house, steam bath with rocks, refuge island, (mummification), flexed inhumation, covering of dead with stones, artificial eyes in skull, trophy skull, scattered and broken human bones, (utilized corpse), oval stone lamp, (lamp with animal head and human figure), barbed slate lance blade, dart head barbed on one side, 'Yukon Island III' slender barbed point?, barb for fish spear, (labret), nose pin, doll with arms and face, dot-and-circle, and cave paintings.

Among these types found at Port Möller, Kodiak Island, Prince William Sound, and on the Aleutian Islands, the following seem to be *restricted to southwestern Alaska*, as far as the Eskimo are concerned: refuge island (Kodiak, Prince William Sound, Aleut), mummification (Kodiak, Prince William Sound, Aleut), flexed inhumation (Kodiak, Prince William Sound, Aleut), squatting inhumation (Aleut), extended inhumation (Port Möller, Aleut?), dismembered burials (Port Möller, Aleut?), scattered and broken human bones, (Port Möller, Kodiak, Prince William Sound), trophy skull (Kuskokwim and south, Port Möller, Kodiak), utilized corpse (Kodiak, Aleut), large numbers of notched and grooved stones, especially stone grooved around middle and over one end (Port Möller), stone grooved around one end (Port Möller), stone saw (Prince William Sound, Aleut), grinding stone and slab (Aleut), oval stone lamp (including Bristol Bay), hunter's lamp (Aleut), decorated stone lamp (including Yukon River), chipped discoidal scraper (Aleut), chipped slate ulo or scraper (Port Möller, Aleut), man's knife like ulo (Prince William Sound, Aleut), slate 'awl' (Port Möller, Prince William Sound), barbed dart head with blade in bed (Port Möller, Aleut), dart head with combination of large and small barbs (Port Möller, Aleut), barbed lance head (Port Möller, Aleut), large Kachemak Bay type of arrow head with blade (Prince William Sound, Aleut), socket-piece in two parts (Port Möller, Aleut), barbed barb for fish spear (Port Möller, Aleut), double-pointed awl? (Aleut?), bone pin (Port Möller, Prince William Sound), labret for mask (Aleut), nose pin, ear plug (Aleut), fish vertebra ring (Aleut), stone ball for game (Aleut), native copper (Prince William Sound), cave paintings (Kodiak, Prince William Sound, Aleut?). When the report of Hrdlička's excavations on Kodiak Island is published, we shall doubtless be able to add to this list.

In the archaeology of the *Coast Salish* the following types are represented: flexed inhumation (?), dismembered burials, (cairn burial, older than shell-heap burial on Vancouver Island), scattered human bones, utilized human bones, (utilized corpse, Nootka), notched stone (one specimen), stone grooved around long diameter, stone grooved around middle and over one end, stone with hole,

planing adze, adze head with socket, mortar and pestle, (bone club), stone saw, stone vessel with decorative elements like lamp with human figure, chipped leaf-shaped blade with rounded or pointed base, slate scraper blade (?), double-edged slate blade for knife or lance, barbed slate weapon blade, ulo, slate 'awl'?, dart head barbed symmetrically on both sides with shouldered tang, dart head barbed on one side with hole or shouldered tang, (slender barbed point), side-prong for bird-dart?, barb for fish hook?, bone pin, bird bone awl with head, awl of gull radius set into ulna, sewing needle, bone tube (use?), bone wedge, split bone scraper, (disk-shaped shell bead), bead made of section of bone (?), drop pendant with encircling ridge, tooth pendant, medial labret, (ear plug?), line bordering barbs, line with spurs on one side, V's, dot-and-circle.

From the *Interior Salish* the following types are known: (round, semi-subterranean house with roof entrance), flexed and squatting inhumations, dismembered burials, stone grooved around middle, stone with hole, planing adze, mortar and pestle, stone saw, stone lamp (for Lillooet salmon festival), chipped stone blade with rounded or pointed base, shipped stone blade with straight base, chipped end-scraper blade, slate knife or lance blades imported from coast, ulo, chipped drill, (steatite and slate 'awl'?), slate (?) mirror, dart head barbed on one side with hole, (barb for fish hook?), bone pin, bird bone awl with head, sewing needle, bone tube (needlecase?), bone wedge, scapula scraper with lateral blade, triangular blade for scraper cut from scapula, split bone scraper, (disk-shaped shell bead), rectangular bone bead, tooth pendant, copper bracelet and bead, line with spurs on one side, line with paired spurs on both sides, transverse lines in groups of three, X, V, dot-and-circle, and (rock paintings).

Of these Salish Indian types, the following are particularly significant in showing *relationship with Kachemak Bay and the southwestern Eskimo*: (semi-subterranean house of the Interior), flexed inhumation, dismembered burial, scattered human bones, utilized human bones and corpse (Coast), stone grooved around middle and over one end (Coast), stone with hole, adze head with socket (Coast), mortar and pestle, decorative elements on stone vessel (Coast), slate 'awl'?, slate ? mirror (Interior), dart head barbed on one side, bone pin, awl of gull radius set into ulna (Coast), scapula scraper with lateral blade (Interior), blade for scraper cut from scapula (Interior), shell bead, rectangular bone bead (Interior), medial labret (Coast), copper bracelet and bead (Interior), incised decorations, and rock paintings (Interior).

The following types are found in *Kamchatka*: (semi-subterranean house, with smoke hole used as entrance, and passage), refuge island, large notched stone, stone grooved around middle, stone with hole, planing adze, grinding stone and slab, oval stone lamp, (lamp with ring), chipped leaf-shaped blade with rounded or pointed base, chipped leaf-shaped blade with straight base, (chipped asymmetric knife blade with notched tang), chipped end-scraper blade, ulo, chipped drill, (dart head barbed asymmetrically on both sides, with three holes),



large Kachemak Bay type of arrow head with blade but no barbs, bone pin, bird bone awl with head, bone wedge, bone shovel, labret ?, stone ball for game, whale amulet ?.

The following types are known from the Ainu of *Neolithic Japan*: (semi-subterranean wooden house with central hearth and entrance passage), (mummification), extended, flexed, and squatting inhumation (in the house), scattered, broken, and cut human bones, large and small notched stones, stone grooved around long diameter, stone grooved around middle and over one end, stone grooved around one end (Formosa), stone with hole, planing adze blade, sawed stone (stone saws ?), chipped leaf-shaped blade with rounded or pointed base, chipped leaf-shaped blade with straight base (esp. southern Japan), (chipped asymmetric knife blade with notched tang ?), (hafted slate scraper blade ?), triangular slate blade with hole for pegging, ulu, chipped drill, (thin harpoon head with closed socket, no barbs or blade, but line hole is in plane of spur), (thin harpoon head with closed socket and barbs, no blade, but line hole is in plane of spur), (barbed dart heads), large Kachemak Bay type of arrow head with blade and no barbs, barbed barb for fish spear, side-prong for bird-dart, bone pin, sewing needle ?, bone tube (case for fish hooks), tubular, spherical, and discoidal beads, tooth pendant, lateral labret (?), ear plug.

It is difficult to formulate a conclusion to this study since in no sense can it be considered as final. We have found out a good deal about the Third Period of the Kachemak Bay culture, but the interpretation of this information must remain uncertain as long as we have so little information from the earlier stages in that region and from the areas to the north and south. As a pioneer study it should attempt to set problems, rather than to offer a hasty solution.

The analysis of the elements has exhibited the complexity of the Kachemak Bay culture. The basis seems to have been a fairly generalized type of Eskimo culture, which itself included a number of elements common to the Arctic and North Pacific areas. It is, however, the style of workmanship, especially the finish of the bone and antler specimens, and certain stylistic features, difficult to describe and impossible to enumerate, that most clearly show the Eskimo character of the Kachemak Bay culture. Although our material from the First Period is of purer Eskimo type than that from the later periods, we must remember that evidence, based on such a small collection as we have at present from the First Period, is not conclusive. It is always possible that the Indian and Asiatic elements which we now believe to have been introduced in the Second, and especially in the Third Period, may some day be found in the First Period.

Unfortunately, as will be seen by a study of Dr. Oettinger's chapter on the skeletal remains, none of the older material from Kachemak Bay was complete enough to be of any value in determining the physical type. Birket-Smith's thesis that the first inhabitants south of the Yukon were not Eskimo thus re-

mains neither demonstrated nor refuted. It would be rash, moreover, to assume that the midden on Yukon Island was formed by those first inhabitants, though at present it represents the oldest site of which we have any information. All we can say, therefore, is that the Eskimo dog and the character of the cultural remains from Kachemak Bay strongly suggests that the population in this region, prior to the invasion of the Athabaskans, was of Eskimo racial type.

The most completely illustrated phase of the Kachemak Bay culture is that of the Third Period, in which we found a rich blending of widespread common elements, of Eskimo types, and of influences from both sides of the North Pacific, especially from southern British Columbia. It is interesting to note how the geographical position of the various sites in southwestern Alaska has been an important factor. In Prince William Sound the Indian influence was stronger than in Kachemak Bay, introducing the shaped pestle, stone pick?, slate chisel or carving tool?, and crescent-shaped pendant. The hunter's lamp with ring and the roof entrance to the house show a cultural relationship between the Aleutian Islands and Kamchatka; while at Port Möller, and nowhere else in Alaska, is found the Japanese type of harpoon head.

A close connection between British Columbia and southwestern Alaska must have existed at a period prior to the development of the modern Northwest Coast culture, and probably before the Tlingit occupied their present territory. It would be premature to attempt to define this former culture without systematic excavations in southeastern Alaska, though we can assume for the present that this culture possessed the types found common to southern British Columbia and southwestern Alaska.

I suggest that on the Northwest Coast, as well as in Alaska, there were at least two phases, a pre-dot-and-circle (pre-Punuk) stage, and a dot-and-circle (Punuk or post-Punuk) stage. The same applies to the Alaska Peninsula, to Kodiak Island, and to the Aleutian Islands, where there must have been a period before and a period after metal-cut decorations were introduced.

On the Peninsula I suggest that there was also a stage corresponding to the First Period of the Kachemak Bay culture, and analogous to the Thule-like culture phase, which I have suggested for Alaska. A later phase, represented by the bulk of Weyer's collection, can be correlated with the Third Period of the Kachemak Bay culture, and because of the metal-cut decorations with the Punuk culture. In this period, the Japanese influence is seen in the direction of the line holes of some of the harpoon heads. (The high development of slate and shale chipping as opposed to polished slate, however, suggests the First and Second Periods of the Kachemak Bay culture or the Old Bering Sea culture.) The last stage is that of the modern Aleut, who at present include Port Möller in their territory.

In 1877, Dall tried to establish an elaborate chronology for the Aleutian Islands, which has been completely rejected as being too extreme, I wonder, therefore, whether Jochelson did not go to the opposite extreme in denying any

evidence of cultural development on the Aleutian Islands. We do not know if a period corresponding to Kachemak Bay I is to be found on the islands, though we suspect from the various types of socket-pieces, barbed heads, decorations, etc. represented in Jochelson's collections that the later periods have their analogies. Somewhere in the series we must look for the Japanese type of harpoon head, found at Port Möller, and for relations with Kamchatka represented by the development of the roof entrance to the house and the lamp with suspension ring. The sites excavated by Jochelson were all on the shore, while from observations made by Petroff and Veniaminoff the older sites are to be found on the hillsides, at former beach levels. Jochelson's collection certainly gives the impression of being very heterogeneous, as if it included material from several stages.

In this connection we can hardly do better than to quote from Dall's discussion of Aleut culture, published in 1878, which might, with equal validity, be applied to the Kachemak Bay culture: 'The evidences of the shell heaps are conclusive as to the identity with the continental Eskimo of the early inhabitants of the islands, as far as implements and weapons go; but their insular habitat, and the changed fauna and climatic conditions under which they existed, gradually modified their habits, and their manufactures, of every kind. With these changes, it is probable, the language changed.'<sup>578</sup> 'It is an interesting and pregnant fact that, as we examine the prehistoric deposits in the order of their age, among the Aleutian Islands we invariably find that the older they are, the more the relics and evidences of customs approximate to the typical continental Eskimo type; and also that in the earliest historic times, customs were still in vogue among the Kaniag'müts that had already passed away among the Aleüts, (though formerly practiced, as evinced by the remains in early deposits in caves and shell heaps,) and that those customs, or some of them, still obtain among the northern and western Innuits, though now extinct among the Kaniag'müts. The gradual differentiation, from the typical Eskimo to the Aleutian type, is thus clearly set forth in an unmistakable manner.'<sup>579</sup>

The recent excavations made by James A. Ford at Point Barrow have revealed the following culture sequence there: Birnirk, Thule (introduced from the east), and modern. The Old Bering Sea culture is not represented except by a few objects (trade pieces ?) from burial mounds back of Utkiavik. This is paralleled by the harpoon head decorated in Old Bering Sea style from one of the Birnirk graves excavated by Van Valin.<sup>580</sup> The Penuk stage is not represented farther north than 60 miles south of Barrow, and the evidence points to a northward migration of Penuk Eskimo from Bering Strait.<sup>581</sup>

Lastly, I suggest that on the Alaskan mainland, north of the Peninsula, traces of a Thule or proto-Thule culture should be found, correlated both with the

<sup>578</sup> Dall, 1878, p. 2.

<sup>579</sup> *Ibid.*, p. 7.

<sup>580</sup> J. Alden Mason, 1930, Pl. 5 -1.

<sup>581</sup> Collins, 1933, p. 48.

Canadian Thule culture and with the First Period of the Kachemak Bay culture. From a chronological point of view, the proto-Thule stage must have been pre-Punuk. It was, therefore, contemporaneous with the Old Bering Sea culture on St. Lawrence Island; or, if it existed on St. Lawrence Island, it was older than the Old Bering Sea culture. However, what types this Thule-like culture possessed cannot be determined by a typological analogy of second-hand archaeological collections from Alaska, solely in the light of the Canadian Thule culture, as Mathiassen has attempted in his *Archaeological Collections from the Western Eskimos*. As Collins has already suggested, there is strong evidence of a recent westerly movement of the Canadian Thule culture into Alaska, introducing the post-Punuk phase which forms the basis of the modern Alaskan culture.<sup>582</sup> It would be impossible to determine except by direct stratigraphic evidence (or possibly by analogies from peripheral regions) whether the Thule types found in an uncertain collection belonged to the original Thule-like phase or to the modern 'Thule' period. However, in default of absolute archaeological information, we may provisionally assume that the original Thule-like culture contained those elements common to the Canadian Thule culture and to the First Period of the Kachemak Bay culture.

These hypotheses are advanced as suggestions of problems to be considered in future archaeological research.

<sup>582</sup> Collins, 1929 -I, p. 44 f.

## VIII. SKELETAL MATERIAL FROM COOK INLET AND PRINCE WILLIAM SOUND

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The skeletal remains collected by Dr. Frederica de Laguna during archaeological work in Alaska in the summers of 1930-1931, were submitted to the writer for an anthropological critique. The material comes from the regions of Prince William Sound (Mummy Island) and Cook Inlet (Kenai, Kasilof; and *Qatloxe'lye*, Cottonwood Creek, and Yukon Island in Kachemak Bay). With the exception of one cranium, 31-20-585, and some of the skeletal parts belonging to it, which are in an excellent state of preservation, the numerous remains, unfortunately, are in a rather fragmentary condition and therefore useless for an exact comparative investigation. The cranium 31-20-585 from *Qatloxe'lye* in Kachemak Bay, however, just mentioned, merited a more detailed study not only for the reason of its better preservation but also on account of its type appearance.

### PROVENIENCE AND DESCRIPTION OF MATERIAL

The material to pass upon may first be grouped according to its geographical provenience and briefly described in addition:

#### *Prince William Sound: Mummy Island.*

30-25-92A: ♂ mat-sen.<sup>1</sup>

Humerus: left, very robust, length 316 mm.

Calculated stature: 161.4 cm.

30-25-92B: Cm<sup>1</sup> ♀ mat. and long bones.

The skull is strongly distorted in such a way that post-mortem anterolateral pressure has pushed the right side of the face backwards and mesially, causing a compensatory posteroparietal bulging of the same side.

The cranial status was apparently mesocranial; the orbital index of 90.9 (maxillofrontale) or 100.0 (lacrimale) indicates hypsikonchy, the nasal index of 41.8 leptorrhiny.

<sup>1</sup> The state of preservation of a skull, its sex and age are symbolized in the following manner: Cr, cranium, i. e. the skull and its lower jaw, which latter, if a single lower jaw is indicated by md, mandibula; cm, calvarium, i.e. the skull without its lower jaw; ca, calvaria, i.e. the skull without its face and lower jaw; cv, calva, i.e. the skull cap. ♂ and ♀ are the familiar symbols for male and female. The age stages are indicated as follows: inf I or II, infantile ages; juv, juvenile or adolescent age; ad, mat, sen, also in combinations (ad-mat, mat-sen, juv-ad), indicate adult, mature, and senile.

The long bones show signs of arthritic degeneration; the right femur, rather short set, has a trochanter III; the two tibia fragments are not platycnemic; the right humerus has a perforated septum. The available long bones suggest a body height of 149.7 cm.

*Cook Inlet: Russian Cemetery, Kenai.*

30-25-150: Cr ♀ ad-mat.

The top of the skull shows an irregular opening which extends from the circumbregmatic region over the left parietal until almost to the lambdoid suture. The skull is brachycranial at 84.6, orthocranial at 74.0, and tapeinocranial at 87.4. Its narrow forehead makes it stenometopic at 60.8. The somewhat low face, euryenic at 45.5, which at the same time is orthognathous at 94.7 (gnathic index), has a chamaerrhinc nose at 54.4 and a mesokonchic orbit at 77.8 with the maxillofrontale width or hypsikonchic at 87.5 with the lacrimale width. The maxilloalveolar index at 127.7 is brachyuranic. There is a slight indication of a torus palatinus. The mandibular fossae are medium deep but rather wide in the anteroposterior sense.

The lower jaw is elegantly shaped, the ramus low (51 mm.) and medium broad (35 mm.), markedly declining posteriorly, and has a deep condylocoronoid incisure. The ramus index attains 68.6. The chin prominence is medium. The teeth,  $m^{1-3}$  on the right and  $pm^{1-2}$  and  $m^1$  on the left side of the upper jaw, while the lower has all its teeth preserved, are unimpaired and of medium size.

This skull, in spite of certain primitive traits (stenometopy, very narrow nasal bones: minimum breadth 4 mm., maximum breadth 15 mm.) shows otherwise more refined morphological marks like well pronounced canine fossae and a distinctly oxycraspedotic edge of the nasal aperture.

30-25-151: Cm. inf. II, and belonging to it, 30-25-153: md.

The skull may be female; it is of delicate texture, ultrabrachycranial at 91.8, hypsicranial at 76.6, tapeinocranial at 83.5, and stenometopic at 56.3. The upper face index with 51.3 reveals meseny, the gnathic index orthognathy at 91.6. The orbits are almost circular with hypsikonchic indices of 94.6 (maxillofrontale) and 106.1 (lacrimale), this infantile condition being emphasized by the somewhat primitively shaped apertura piriformis and a chamaerrhinc nasal index of 51.3. The nasal bones are somewhat narrow at 8 by 12 mm. Canine fossae are fairly absent. Unfortunately, the incisival region of the upper jaw is damaged by scouring which also impairs the palate where an indication of torus palatinus might be realized.

Neither the lower jaw nor the incomplete denture show anything unusual.

Features of interest are seen in the perforated tympanic plates and the beginning hyperostosis of the tympanic edge, also the unusually wide entrance into the canalis nasolacimalis.

30-25-152: Cm ♀? mat.

A somewhat massive skull with syphilitic destructions in the flat bones of the brain case, probably female, despite the spacious palate and the narrow nose. The skull is brachycranial at 82.6, orthocranial at 74.9, tapeinocranial at 90.6, and stenometopic at 63.8. The face is mesenic at 53.4, and mesognathous at 102.2, close however to the prognathous division of the gnathic index. The rather large orbits are mesokonchic at 79.1 (maxillofrontale) or hypsikonchic at 87.2 (lacrimale), while the nose at 42.0 signifies a leptorrhinic condition. The very wide dental arch is pronouncedly brachyuranic at 126.9, while the palate shows a distinctly developed torus palatinus.

Special features of the facial skeleton are the narrow nasal bones at 7 by 10 mm., a foramen supraorbitale above each orbit, and somewhat shallow canine fossae. The brain case has a slightly protruding upper occipital squama, mesially pointing mastoids, and thickened tympanic edges.

30-25-154 Md ad.

The lower jaw is rather gracile, has a well developed chin prominence and spina mentalis. The free extremity of the left ramus is broken off. The ramus index at 57.1 signifies a rather short-set ramus of 63 mm. in height and 36 mm. in breadth.

#### *Kasilof*

30-25-157: Ca ♂ mat.

This is a rather remarkable calvaria of strongly elliptic outline in norma verticalis where the occiput, as also in norma lateralis, is unusually pointed and the minimum frontal breadth attains only 87 mm. The skull has a mildly developed sagittal crest to which the temporal lines come relatively close.

The small cranial breadth of 130? mm. against the cranial length of 176 mm. indicates a markedly dolichocranial condition at 73.9, while the length-height index of 68.2 signifies chamaecrany, and the breadth-height index of 92.3 in expression of the small breadth and height (130 by 120 mm.) marks the skull just metriocranial. The small cranial breadth is likewise responsible for a eurymetopic index of 71.3.

It is quite interesting to observe that the foramen magnum in this relatively long skull is pointed at both ends, corresponding thus to the form of the skull.

30-25-158: Ca ♀? ad.

A weatherworn specimen with the right temporal and part of the cranial basis missing.

The skull resembles the type of 30-25-152; it is brachycranial at 80.6, orthocranial at 73.1, tapeinocranial at 90.8, and stenometopic at 65.3. The minimum frontal breadth at 92 mm. is greater by 5 mm. than in 30-25-152. The occiput is well rounded and the tympanic edges are likewise hyperostotic, while the mastoids are rather pointed and more straightly directed downward.

*Kachemak Bay: Cottonwood*

31-20-102: Cr ♂? ad. [PLATE 14D]

A fragmentary skull of rather delicate texture, dolichocranial at 73.5, and stenometopic at 61.8. The mandible, somewhat impaired, is of substantial build with a ramus index of 70.9, and a chin height of 36 mm.

The impaired left humerus has a perforated septum; the tibiae are not platycnemic.

*Aurora Spit: 31-20-312*

The fragmentary skeleton of a child with an approximate cranial length-breadth index of 74.0.

*Qatloxe'lye: 31-20-585: or ♂ mat. [PLATE 72]*

The skeleton is not complete but the skull is the best preserved in the collection.

The long bones, as far as they are available, suggest a body height of 168.7 cm. which brings it thus fairly to the upper limit of medium size stature. The clavicles, scapulae, and ribs are strong and massive, tali and calcanei rather small, the patellae medium in size but rather thick with well marked incisurae.

The skull, as already stated, merits a more detailed descriptive and metrical examination which follows herewith:

SKULL

Cranial length.....	187 mm.
Cranial breadth.....	138 "
Cranial height.....	137 "
Cranial module.....	154 "
Cranial base.....	104 "
Min. front. breadth.....	89 "
Foramen magnum length.....	37 "
Foramen magnum width.....	32 "
Facial height (total).....	129 "
Facial height (upper).....	80 "
Facial breadth.....	139 "
Facial length.....	110 "
Nasal height.....	54 "
Nasal width.....	26 "
Orbital height.....	36 "
Orbital width (mf).....	43 "
Orbital width (la).....	38 "
Interorbital breadth (mf).....	19 "
Interorbital breadth (la).....	26 "
Exorbital breadth.....	100 "
Maxilloalveolar breadth.....	69 "
Maxilloalveolar length.....	61 "

MANDIBLE

Bicondylar breadth.....	120 mm.
Bigonial breadth.....	111 "
Chin height.....	42 "
Ramus height.....	76 "
Ramus breadth.....	42 "

INDICES

Cranial length-breadth.....	73.8
Cranial length-height.....	73.3
Cranial breadth-height.....	99.3
Transverse parietofrontal.....	64.5
Foramen magnum.....	86.5
Facial (upper).....	57.6
Transverse craniofacial.....	100.7
Gnathic index ( <i>Flower</i> ).....	105.8
Nasal.....	48.2
Orbital (mf).....	83.7
Orbital (la).....	94.7
Maxilloalveolar.....	113.1
Mandibular breadth.....	92.5
Ramus.....	55.3

ANGLES (EAR-EYE ORIENTATION [except first])

Central ( <i>Klaatsch</i> ).....	92°
Prognathy, facial.....	79°
Prognathy, midfacial.....	80°
Prognathy, alveolar.....	73°
Foramen magnum.....	+1°
Frontal declination.....	49°
Parietal declination.....	26°
Occipital declination.....	115°
Upper occipital squama.....	89°
Interoccipital.....	114°
Nasal roof ( <i>R. Martin, 75</i> ).....	59°
Nasal roof ( <i>R. Martin, 75, 1</i> ).....	20°



According to these measurements, the skull under discussion is dolicho-ortho-acrocranial, stenometopic, leptenic; meso-hypsikonchic; mesorrhinic and mesuranic; the face is pro-mesognathous, pronouncedly prognathous in the alveolar region. Other metrical conditions may be realized from the list of measurements.

The accompanying photographs [Plate 72], showing skull 31-20-585 in *normae frontalis* (1) and *lateralis* (2), are meant to supplement the following descriptive remarks.

The skull in question is of robust type in shape and texture. Without being artificially deformed it has thrown its bulk posteriorly of the porion-bregma line, anteriorly counteracted by facial protrusion and the large-sized mandible. The morphologic features of the specimen may best be discussed in consideration of the five cranial *normae*, as follows:

*Norma verticalis*: Cranial outline sphenoid with strong postorbital constriction; markedly phaenozygous; sutures moderately serrate; tubera parietalia prominent; forr. parietalia: left small, right minimal.

*Norma lateralis*: Contour well rounded, forehead somewhat receding; inial flexure well marked; squama temporalis high; llin. temporales medium high; crista supramastoidea pronounced; procc. mastoidei large; porus acusticus externus round and large; tympanic margin slightly thickened; nasal roof somewhat flat but only in the upper division slightly concave; alveolar process high.

*Norma frontalis*: Orbits relatively small but high; nasal bones wing-shaped; inferior nasal incisure amblycraspedotic; spina nasalis anterior lophoxyacanthic; supraorbital eminences medium; high alveolar process; canine fossae flat; infrazygomatic curve shallow.

*Norma basilaris*: Foramen magnum somewhat rounded, anteriorly and posteriorly pointed, mandibular fossa medium deep; dental arch somewhat squarish; palate spacious; slight indication of torus palatinus; teeth well worn, incisors shovel-shaped; third molars markedly smaller than preceding ones.

*Norma occipitalis*: Gable-roofed contour upon broad basis; torus occipitalis indicated; lambdoid suture rather simple, amplitude of serrations limited.

*Mandible*: Massive with steeply rising ramus; deep incisura; chin well projected; basal outline straight; dental arch rather narrow; incisors somewhat crowded.

#### DISCUSSION

The scarcity of the material under investigation, in addition to the precarious state of preservation, does not easily yield to a clarifying form analysis. A superficial observation, however, reveals a certain type variation indicative, perhaps, more of innate type variability than racial admixture.

The cranial specimens are distinguished by medium to submedium size and a rather delicate texture, except the skull last discussed (31-20-585). The cranial module of this specimen is 154.0 mm., exceeding thus the other specimens which

range, both male and female, from 139.3 mm. to 148.0 mm., i. e., below the figures for eastern Indians, given by *Hrdlička*,<sup>2</sup> (1916, 118), which in the males comprise the values from 152.2 to 160.0 mm., and in the females from 146.6 to 150.0 mm. But even our above-mentioned specimen with 154.0 mm., is seen to hold a low station in the eastern male range.

The type variation finds its expression in the following indications: The cranial length-breadth index ranges from 69.3 to 84.6 (91.8), the parenthesized index being that of a child of the inf. II stage (30-25-151 and 153). The peculiar fact occurs in our small series of six adult skulls that only dolicho- and brachycrany are represented in equal numbers.

The cranial length-height index ranges from 68.2 to 74.9 (76.6), comprising one chamaecranial and four orthocranial adult skulls, while the parenthesized value belonging to the inf. II specimen of the preceding paragraph, is hypsocranial.

The transverse parietofrontal index with an extension from 60.8 to 65.3 marks stenometopy in each case.

The upper face index covering the values from 45.5 to 57.6 marks one specimen as euryenic, two (including the inf. II) as mesenic, and one, the best preserved and most massive of all, as leptenic.

The gnathic index could be computed from only four skulls, two of which, including the inf. II, are orthognathous, while one is mesognathous, and another one, again the best preserved one (31-20-585), prognathous.

The orbital index with the maxillofrontale as the medial measuring point for its width ranges from 77.8 to 90.9 (94.6), rendering three specimens mesokonchic, and two, including the inf. II, hypsikonchic; general hypsikonchy prevails in the indices with the lacrimale width.

The nasal index extending from 41.8 to 54.4 comprises two leptorrhine, one mesorrhine (31-20-585), and two chamaerrhine conditions, the latter including the inf. II.

The maxilloalveolar index is brachyuranic in three specimens attaining individual indices of 126.9, 127.7, and 137.2, while 31-20-585 is mesuranic at 113.1.

Other measurements and metrical proportions of the last named skull, 31-20-585, may be gained from the table of measurements on p. 224.

For a better understanding of the differences and similarities of type as revealed by the craniometrical procedures, the accompanying condensed table has been computed according to the gradually increasing cranial length-breadth index. This, as already referred to on this page, marks either dolicho- or brachycrany, while orthocrany prevails in the length-height proportions. Quite interesting is the uniformity of stenometopy in the parietofrontal dimensions and which is recognized as an Indian characteristic. The upper face index indicates mes- to euryenic conditions, with one exception in the shaman 31-25-585 from Kachemak

<sup>2</sup> *Hrdlička, Aleš*, Physical Anthropology of the Lenape or Delawares, and of the Eastern Indians in General, Bulletin 62, Bureau of American Ethnology, Washington.

Bay, whose upper face is leptenic and at the same time prognathous against mesorthognathous conditions in the few other specimens. The orbits are uniformly mesokonchic except those of the infant, where, reflecting typical conditions, it is chamaerhinc. Brachyurany seems to be the prevailing conditions in the dental arch.

CONDENSED TABLE OF OBSERVATIONS (CRANIAL)

(The Specimens are Arranged According to the Increasing Cranial Length—Breadth Index.)

Number Sex Age	INDICES								
	L-Br.	L-H	Transv. Par. front.	Upper Facial	Gnathic	Orbital (mf)	Nasal	Maxillo- Alveolar	Module (in mm.)
30-25-157 Ca ♂ mat	dolicho- cranial	chamae- cranial	steno- metrio- metopic	—	—	—	—	—	139.3
31-20-102 Cr ♂ ad	dolicho- cranial	—	steno- metopic	—	—	—	—	—	—
31-20-585 Cr ♂ mat	dolicho- cranial	ortho- cranial	steno- metopic	leptenic	pro- gnathous	meso- konchic	mesor- rhinc	meso- uranic	154.0
30-25-158 Ca ♀ ? ad	brachy- cranial	ortho- cranial	steno- metopic	—	—	—	—	—	148.0
30-25-152 Cm ♀ ? mat	brachy- cranial	ortho- cranial	steno- metopic	mesenic	meso- gnathous	meso- konchic	leptor- rhinc	brachy- uranic	143.3
30-25-150 Cr ♂ ad-mat	brachy- cranial	ortho- cranial	steno- metopic	eury- enic	ortho- gnathous	meso- konchic	chamae- rhinc	brachy- uranic	145.8
30-25-151 +153 Cr inf II	brachy- cranial	hypsi- cranial	steno- metopic	mesenic	ortho- gnathous	hypsi- konchic	chamae- rhinc	—	141.3

Applying, finally, the descriptive and metrical observations in the sense of racial appurtenance, four possibilities must be considered: (1) Eskimo, (2) Indian, (3) White, and (4) White amalgamation.

Eskimo affinities seem to be expressed by longheadedness although not in the sense of eastern Eskimo morphology. Longheadedness occurs also in the Haida of Queen Charlotte Islands and mildly in the Athapascan. The average conditions in these groups, according to the author's report on the crania collected by the Jesup Expedition (vol. XI, 1930), are mesocranial, but the ranges begin as low as 71.0 in the Eskimo, 74.0 in the Athapascan, and 70.8 in the Haida. Unfortunately, our longheaded specimens are devoid of their facial parts so that another Eskimo characteristic cannot be traced or proved, i. e., bizygomatic extension. Such a condition, however, is indicated in one of the skulls, 30-25-150, which will be referred to again under amalgamation.

Indian affinity is doubtless marked by the stenometopic condition of the forehead and the lesser bizygomatic extension. An excellent example of Indian morphology is represented by the shaman's skull (31-20-585) which at the same time shows a number of primitive marks, pointed out in their respective places (pp. 225, 226).

Pure White characteristics signified by general morphological refinement obtain only in connection with certain features of an Eskimoid nature. There are, for instance, in specimen 30-25-150, associated with the well defined lower nasal incisure (oxycraspedotic), canine fossae, orthognathy, a number of Eskimoid features such as very narrow nasal bones, obtaining more or less in all the skulls, then spacious and rounded orbits, a weak chin prominence, an indication of a torus palatinus. There is a possibility of racial amalgamation for the reason that this skull and a few others (30-25-150 to -154) came from an old Russian graveyard at the Indian village of Kenai.

#### CONCLUSIONS

Final conclusions in connection with the racial affinities of the material under discussion are difficult to establish because of its fragmentary condition. The identity of the shaman 31-20-585 as Indian may be definitely assumed, and is further corroborated by the accompanying photographs. The stature calculated from the long bones in a small number of cases is medium to submedium.

## APPENDIX I

### KEY TO THE TRANSCRIPTION OF NATIVE WORDS.

The phonetic symbols used in transcribing Indian and Eskimo words and names are those established by the Committee of the American Anthropological Association in the *Phonetic Transcription of Indian Languages*, except that in certain cases letters in italics had to be substituted for the conventional symbols. On the maps [Plates 1 and 2], however, the conventional symbols have been used. In the text, the following substitutions are to be noted:

*a* has been substituted for the turned e, to represent the obscure vowel.

*e* has been substituted for the epsilon, to represent the e of *met*.

*i* has been substituted for the iota, to represent the i of *it*.

*o* has been substituted for the turned c, to represent the o of the German *voll*.

*u* has been substituted for the upsilon, to represent the u of *full*.

*l* has been substituted for the barred l, to represent the voiceless l.

*g* has been substituted for the gamma, to represent the spirant g.

*r* has been substituted for the gamma with inferior point, to represent the velar spirant g.

*n* has been substituted for the symbol representing the ng of *sing*.

*t* has been substituted for the symbol representing the dental t.

*v* is used to represent the bilabial v.

No differentiation between the palatal spirant k and the corresponding velar spirant has been attempted. Both are indicated by x.

No method of indicating nasalization has been attempted. The following words, however, have nasalized vowels:

Axitaxnu (page 17)—the first vowel is nasalized.

Oho'rtutle (page 20)—the first vowel is nasalized.

Orenisitnu (page 133)—the first vowel is nasalized.

K'uk'atliax (page 134)—the second vowel is nasalized.

Tukyektat (page 134)—the second vowel is nasalized.

Qeda.'naq (page 138)—the last vowel is nasalized.

Kusta'nuq (page 138)—the last vowel is nasalized.

Ta.'naq (page 139)—the last vowel is nasalized.

It should also be noted that the second l of Qatloxe'lye (first appearing on page 20) is palatalized.

## APPENDIX II

### ANALYSIS OF ASH FROM COTTONWOOD CREEK.

Samples of ash from Cottonwood Creek, Kachemak Bay, as well as of ash from a burned lignite bed in the vicinity and a sample of the unburned lignite, were submitted to Dr. Roger C. Wells, Chief Chemist of the U. S. Geological Survey, who very kindly offered to make a chemical analysis of the material. Owing to the fact that the samples were not pure ash, but contained a mixture of various materials and that separation of these was impossible, he was unable to make a definite report. I quote from his letter:

'Of the 37 different samples received the one from a hearth in the midden marked 2K 6' 9" was studied particularly by Mr. R. K. Bailey, of the Survey laboratory. He finds this material to be a very heterogeneous mixture of shells in different stages of disintegration, charred wood, possibly unburned lignite, bones, bone fragments more or less disintegrated, a little gravel and clay material, and tissue-like structures from animal residues. . . . No inorganic cinders or slag particles were seen. . . . The material from the hearth, however, was also examined by Miss Taisia Stadnichenko, of the Geological Survey, who is familiar with coals. She says that preliminary observations seem to indicate that some particles or residues of coal are present in the sample. Enough of this material has been separated to analyze, and the Bureau of Mines has kindly offered to analyze this.'

Unfortunately, the results of this analysis have not been available for publication in this volume, but the author will be glad to supply anyone interested in this problem with the report of the Bureau of Mines.

It is significant that Weyer found conditions in the midden at Port Möller similar to those at Cottonwood Creek. His investigations tend to support my original opinion that the midden at Cottonwood contained lignite ash, though it should be observed that the analyses of ash from Port Möller were inconclusive, also.

Weyer writes: 'Throughout the excavating evidences of fire were found at almost all depths down to the very bottom. It is noteworthy that among the charred material fragments of lignite were sometimes present. Samples of this material [from five levels] . . . were identified by Doctor Herbert Whitlock. . . . We cannot be certain that coal was used as fuel by the ancient inhabitants

here, but we could not expect more evidence pointing towards the fact than we found. The source of the fragments found among the black ashes probably was in Möller Bay a few miles seaward from the village site where fair sized seams of coal are exposed along the beach cliffs. Driftwood is rather scarce and the gnarled alders about a mile from the village site are a difficult source of fuel.<sup>1</sup>

Thus, the evidence, though inconclusive, tends to demonstrate that the pre-historic inhabitants of Port Möller and Kachemak Bay burned lignite, and they are, therefore, the only American aborigines using coal for fuel of which we have any record.

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On the eve of going to press, a communication was received from Miss Stadnichenko, Associate Geologist at the U. S. Geological Survey, enclosing the analyses of fragments of coal from the ash of Hearth 2K 6' 9" at Cottonwood, and of two samples of lignite (brown coal and sub-bituminous coal) from beds near the site. These analyses were made by Dr. H. M. Cooper of the Bureau of Mines, and confirm Miss Stadnichenko's original opinion that the midden ash contained coal fragments. In commenting upon the analyses, Miss Stadnichenko writes:

'The differences in the percentage of ash are of no particular importance as the coal is high in ash and it is possible to expect great variations in the ash content. The percentages of carbon and oxygen, that are very important factors in the characteristics of coal, in both samples are very close. The amount of sulphur is identical. The percentage of nitrogen in the kitchen midden is considerably higher than in the coal bed, but this may possibly be due to the external animal enrichment. The British thermal units of both samples are also very close.

'I hope you realize that due to the fact that the samples were very small, the results are necessarily only indicative of the great similarity between the brown coal and the uncharred remains [from the midden]. However, the analyses as well as the microscopic examination prove definitely that in the midden we found remains of mineral fuel.'

<sup>1</sup> Weyer, 1930, p. 276.

## Supplement to Appendix II

### Analysis of ash from Cottonwood Creek

The following analyses, which were very kindly made by Dr. H. M. Cooper of the U. S. Bureau of Mines, Department of the Interior, were received too late to be included in the author's publication on Cook Inlet. They are, however, of such interest that they have been made available in the present form. Miss Stadnichenko's comments on these analyses have already been quoted in Appendix II. These reports show that ash from Hearth 2K 6'9" in the midden at Cottonwood Creek contained fragments of lignite derived from the coal beds near the shell heap.

#### Analysis 1 (Lab. No. A-96694, May 15, 1934).

Pieces of Coal, from Hearth 2K 6'9", Cottonwood Creek.

<u>Proximate Analysis</u>	Coal (as received)	Coal (moisture free)	Coal (moisture and ash free)
Moisture . . . . .	12.1		
Volatile matter . . . . .	34.7	39.5	47.8
Fixed carbon . . . . .	37.9	43.2	52.2
Ash . . . . .	15.3	17.3	
	100.0	100.0	100.0
 <u>Ultimate Analysis</u>			
Hydrogen . . . . .	4.8	3.9	4.7
Carbon . . . . .	48.5	55.2	66.8
Nitrogen . . . . .	2.0	2.3	2.8
Oxygen . . . . .	28.9	20.8	25.0
Sulphur . . . . .	.5	.5	.7
Ash . . . . .	15.3	17.3	
	100.0	100.0	100.0
 <u>Calorific Value</u>			
Calories . . . . .	4478	5094	6161
British thermal units . . . . .	8060	9170	11090



Analysis 2 (Lab. No. A-96692, May 15, 1934)

Brown Coal (lignite) from beds near Cottonwood Creek.

<u>Proximate Analysis</u>	Coal (as received)	Coal (moisture free)	Coal (moisture and ash free)
Moisture . . . . .	10.2		
Volatile matter . . . . .	35.4	39.4	50.7
Fixed carbon . . . . .	34.4	38.3	49.3
Ash . . . . .	<u>20.0</u>	<u>22.3</u>	
	100.0	100.0	100.0

Ultimate Analysis

Hydrogen . . . . .	4.9	4.2	5.4
Carbon . . . . .	45.9	51.1	65.7
Nitrogen . . . . .	1.2	1.3	1.7
Oxygen . . . . .	27.6	20.6	.6
Sulphur . . . . .	.4	.5	.6
Ash . . . . .	<u>20.0</u>	<u>22.3</u>	
	100.0	100.0	100.0

Calorific Value

Calories . . . . .	4344	4833	6222
British thermal units . . . . .	7820	8700	11200

Analysis 3 (Lab. No. A-96693, May 15, 1934)

Sub-bituminous Coal from beds near Cottonwood Creek.

<u>Proximate Analysis</u>	Coal (as received)	Coal (moisture free)	Coal (moisture and ash free)
Moisture . . . . .	10.3		
Volatile matter . . . . .	38.9	43.4	46.4
Fixed carbon . . . . .	44.9	50.0	53.6
Ash . . . . .	<u>5.9</u>	<u>6.6</u>	
	100.0	100.0	100.0

Ultimate Analysis

Hydrogen . . . . .	5.5	4.9	5.2
Carbon . . . . .	59.4	66.2	70.8
Nitrogen . . . . .	1.4	1.6	1.7
Oxygen . . . . .	27.3	20.2	21.8
Sulphur . . . . .	.5	.5	.5
Ash . . . . .	<u>5.9</u>	<u>6.6</u>	
	100.0	100.0	100.0

Calorific Value

Calories . . . . .	5700	6356	6800
British thermal units . . . . .	10260	11440	12240

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## LIST OF ILLUSTRATIONS

### PLATE 1

#### MAP OF COOK INLET, ALASKA

Adapted from the U. S. Coast and Geodetic Survey Chart.

### PLATE 2

#### MAP OF KACHEMAK BAY, COOK INLET

Adapted from the U. S. Coast and Geodetic Survey Chart.

### PLATE 3

#### MAP OF THE WEST BEACH, YUKON ISLAND.

### PLATE 4

#### DIAGRAM OF EXCAVATIONS AT THE WEST BEACH, YUKON ISLAND

See pages 27-30.

- A. Map of the excavations.
- B. Diagrammatic cross-section of the west beach.

### PLATE 5

#### CROSS-SECTIONS OF EXCAVATIONS AT THE WEST BEACH, YUKON ISLAND

See pages 27-30.

- A. Cross-section along the back wall of sections A to H (1931).
- B. Cross-section along the back wall of sections 2D to 2G (1931). See Plate 12D.
- C. Cross-section along the side wall of sections 4K and 5K, and along the back wall of sections 5K to 5H (1932). See Plates 13B and 14B.

### PLATE 6

#### MAP OF COTTONWOOD CREEK

See pages 35-41.

Map of the site, diagrammatic section along the cliff, and diagram of the excavation.

PLATE 7

CROSS-SECTION ALONG THE BASE LINE, COTTONWOOD CREEK

See pages 37-41.

PLATE 8

SITES IN PORT GRAHAM AND KACHEMAK BAY.

See pages 16, 19-21.

- A. The fox farm site, Passage Island, Port Graham.
- B. Grass Island, Kasitsna Bay, seen from Yukon Island.
- C. *Q'na'qesle* (the small island on the right), Tutka Bay. The beach on the left where the boat is anchored is where the lamp with the whales [Plate 27] and the ivory clasp [Plate 50 -31] are said to have been found.
- D. *Qatloxe'lye*, the refuge island off Cohen Island, seen from the south.

PLATE 9

SITES IN KACHEMAK BAY

See pages 20, 22-24.

- A. Sadie Cove: The cave with the paintings is just to the left of the two figures.
- B. The Point West of Halibut Cove, seen from the east.
- C. The Munson's house, Halibut Cove.
- D. Aurora Spit.

PLATE 10

COTTONWOOD CREEK

See pages 35-41.

- A. Cottonwood Creek at high tide: the midden is the mound to the left of the stream.
- B. and C. The midden: Fields is standing at the foot of the shell heap.

PLATE 11

SITES IN KACHEMAK BAY

See pages 24-28.

- A. The rock shelter with paintings, Bear Island. (Edwin Newman, phot.)
- B. The rock shelter with paintings, Indian Island.
- C. Section of the midden near the feed shed, Yukon Island.
- D. Yukon Island Fox Farm: Fields is standing at the excavation (1930).

## PLATE 12

### YUKON ISLAND

See pages 27-29.

- A. The west beach seen from a tall tree on the hillside above the swamp. The dump of the 1931 excavation can be seen on the beach. (Wallace de Laguna, phot.)
- B. and C. The west beach seen from a tree on the cliff at the west end of the beach (1931). (Wallace de Laguna, phot.)
- D. Back wall of sections 2D to 2F. See Plate 5B. The stones on the right were placed to retain the loose gravel.

## PLATE 13

### YUKON ISLAND

See pages 20, 29-30, 34, 43-44.

- A. The trench (1932) at high tide. Elephant Rock in the background.
- B. The double burial, Yukon Island sub-III. The sections exposed are illustrated in Plate 5c.
- C. Hearth III, Yukon Island III.
- D. Grinding stone and slab, *in situ*, Yukon Island III, (31-20-1043 and -1218).

## PLATE 14

### COTTONWOOD CREEK AND YUKON ISLAND

See pages 29-34, 44-46.

- A. Hearth VII, Yukon Island III, with the stones which were removed from it.
- B. The bottom of sections 4J and 5J, Yukon Island. Water is entering the hole at half flood tide. See Plate 5c.
- C. Dismembered burial, Cottonwood, (31-20-11).
- D. Double dismembered burial, Cottonwood, (31-20-102 and -103). (Wallace de Laguna, phot.).

## PLATE 15

### BURIALS AT YUKON ISLAND AND COTTONWOOD CREEK.

See pages 42-44, 46-47.

- A. Dismembered burial, Cottonwood, (31-20-108).
- B. Double dismembered burial, Yukon Island III, (32-7-144 A and B).
- C. Burial in Yukon Island II, (32-9-1).
- D. Double burial with trophy skulls, Yukon Island sub-III. The child's skeleton has not yet been uncovered. See Figure 1, page 44. (32-7-1744 etc.)

PLATE 16

NOTCHED STONES

Scale 3 : 4.

1. Small notched stone, Cottonwood, (31-20-417).
2. Small notched stone, Cottonwood, (31-20-377).
3. Small notched stone, Cottonwood, (31-20-387).
4. Small notched stone, Cottonwood, (31-20-430).
5. Small notched stone, Cottonwood, (31-20-121).
6. Small notched stone, Cottonwood, (31-20-210).
7. Small notched stone, Cottonwood, (31-20-72).
8. Small stone notched at sides, Yukon Island III, (31-20-636).
9. Small stone notched at sides, Cottonwood, (31-20-264).
10. Small grooved stone, Cottonwood, (31-20-170).
11. Large notched stone, Yukon Fox Farm III, (31-20-2122).
12. Large notched stone, Yukon Island II, (31-20-2046).
13. Large notched stone, Yukon Island II, (31-20-1654).
14. Large notched stone, Yukon Island II, (31-20-2053).
15. Large notched stone, Yukon Island II, (31-20-1792).

PLATE 17

GROOVED STONES AND STONES WITH HOLE

Scale 1 : 2.

1. Stone grooved around the middle (club head ?), near Jakolof Bay, (31-20-594).
2. Stone grooved around middle, Bear Cove, (31-20-357).
3. Stone grooved around long diameter, Cottonwood, (31-20-360).
4. Stone grooved around middle and over one end, Yukon Island III, (32-7-676).
5. Stone grooved around middle and over one end, Cottonwood, (31-20-452).
6. Stone grooved over one end, Yukon Island III, (31-20-616).
7. Stone grooved around long diameter, Yukon Island sub-III, (32-7-1512).
8. Stone grooved around the middle and over one end, Cottonwood, (30-25-164).
9. Stone grooved around one end, Yukon Island I, (32-9-284).
10. Stone with hole, Yukon Island III, (32-7-1084).
11. Stone grooved around one end, Yukon Island sub-III or II, (32-7-182).
12. Stone grooved around one end, Yukon Island II, (32-9-305).
13. Stone with natural hole, Yukon Island sub-III, (32-7-1658).

PLATE 18

SPLITTING ADZES, MORTAR, ETC.

Scale 1 : 4.

1. Splitting adze, Yukon Island, period unknown, (31-20-592).



PLATE 18—*Continued*

2. Splitting adze, I'nulumuq, Port Graham, (31-20-1).
3. Splitting adze, Yukon Island, period unknown, (31-20-590).
4. Mortar, vicinity of Homer Spit, (private collection, Seldovia).
5. Sawed slate, Cottonwood, (31-20-494).
6. Grinding slab, Cottonwood, (31-20-493).

PLATE 19

PLANING ADZE BLADES AND HEADS

Scale 2 : 3.

1. Whale bone adze head with socket, Yukon Island III, (32-7-71).
2. Adze blade, Yukon Fox Farm II, (32-8-223).
3. Toy adze head with blade, pumice, Yukon Island III, (31-20-1481).
4. Chisel or gouge, Yukon Island III, (32-7-258).
5. Whale bone adze head with bed for the blade, Yukon Island III, (31-20-986).
6. Antler adze head with socket, Yukon Island III, (31-20-2231).
7. Adze blade, Cottonwood, (31-20-506).
8. Adze (?) blade, Yukon Island III, (30-25-254).
9. Adze blade, Yukon Island sub-III, (32-7-1419).
10. Adze blade, Yukon Island sub-III, (32-7-1364).
11. Adze blade, Halibut Cove, (30-25-184).
12. Adze blade, Yukon Island III, (31-20-711).

PLATE 20

ADZE BLADE AND BOULDER CHIPS

Scale 1 : 2.

1. Adze blade, Halibut Cove, (30-25-183).
2. Boulder chip, worn edge, Cottonwood, (31-20-150).
3. Boulder chip, worn edge, Cottonwood, (31-20-369).
4. Boulder chip, worn edge, Yukon Island III, (31-20-1493).
5. Boulder chip, chipped edge, Yukon Island III, (30-25-215).
6. Boulder chip, chipped edge, Yukon Island III, (31-20-1398).
7. Boulder chip, worn edges and surface, Qatloxe'lye, (31-20-603).
8. Boulder chip, battered edges, worn surface, Yukon Island III, (31-20-2133).

PLATE 21

MAUL, HAMMER STONES, ETC.

Scale 5 : 9.

1. Grinding stone with battered surface, Yukon Island III, (30-25-235).

PLATE 21—*Continued*

2. Hammer stone, Yukon Island III, (31-20-2236).
3. Hammer stone, (Prehistoric Indian?), Elephant Rock, Yukon Island, (31-20-1411).
4. Broken mortar (?), Yukon Island III, (31-20-1401).
5. Grinding stone, Cottonwood, (31-20-486).
6. Maul head, Seldovia Bay, (31-20-509).
7. Grinding and hammer stone, Yukon Island III, (31-20-1135).
8. Hammer stone, Yukon Island I, (31-20-1995).

PLATE 22

SAWS, WHETSTONES, ETC.

Scale 4 : 7.

1. Saw, Yukon Fox Farm III, (31-20-2125).
2. Double-edged saw, Yukon Island III, (31-20-1311).
3. Saw, Cottonwood, (30-25-172).
4. Double-edged saw, Cottonwood, (31-20-143).
5. Saw, Cottonwood, (30-25-171).
6. Needle sharpener, baked shale, Cottonwood, (31-20-83).
7. Shale whetstone, Cottonwood, (31-20-22).
8. Pumice, Cottonwood, (31-20-450).
9. Pumice, Yukon Fox Farm III, (32-8-51).
10. Sandstone whetstone, Cottonwood, (31-20-458).
11. Pumice, Yukon Island II, (31-20-2089-1).
12. Pumice, used for sharpening points, Yukon Island, Period unknown, (31-20-2114-13).
13. Pumice saw (?), Yukon Island III, (31-20-1341).
14. Eight-sided felsite whetstone, Yukon Island III, (31-20-979).
15. Six-sided felsite whetstone, Yukon Island III, (31-20-875).

PLATE 23

LAMPS

Scale 1 : 2.

1. Lamp, Grass Island, Kasitsna Bay, (31-20-2093).
2. Lamp with grooved rim, Yukon Island III, (32-7-1).
3. Lamp, Yukon Fox Farm III, (32-8-75).
4. Lamp, Halibut Cove, (30-25-182).

PLATE 24

LAMPS

Scale 1 : 3.

1. Lamp, MacDonald Spit, (31-20-508).
2. Lamp with knobs in bowl, Halibut Cove, (30-25-181).

PLATE 25

LAMPS

Scale 1 : 2.

1. Lamp, Yukon Island III, (31-20-959).
2. Lamp cached with lamp with human figure, Yukon Fox Farm III, (32-8-119).

PLATE 26

LAMPS

Scale 1 : 3.

1. Fragment of lamp, Yukon Fox Farm III, (30-25-203).
2. Fragment of decorated lamp, Cottonwood, (30-25-186).
3. Decorated lamp, Yukon Island III, (31-20-1224).

PLATE 27

LAMP WITH WHALES

Scale 1 : 2.

Decorated lamp, Tutka Bay (Courtesy of Mr. Charles Hubbell, Seattle).

PLATE 28

LAMP WITH HUMAN FIGURE

Scale 1 : 2.

Decorated lamp, Yukon Fox Farm III, (32-8-120).

PLATE 29

MISCELLANEOUS LAMPS, ETC.

Scale 1 : 2.

1. Pottery fragments, Yukon Island IV, (32-7-264).
2. Toy lamp, Yukon Island III, (32-7-779).

PLATE 29—*Continued*

3. Fragment of hunter's lamp, Yukon Fox Farm III, (32-8-130).
4. Lamp, Yukon Island I or sub-III, (32-9-354).
5. Hunter's lamp (?), Yukon Island I, (31-20-2217).
6. Hunter's lamp (?), naturally hollow stone, Yukon Island III, (31-20-713).
7. Semi-circular lamp, Yukon Island sub-III or II, (32-7-1029).

PLATE 30

CHIPPED STONE BLADES

Scale 1 : 2

1. Knife blade, Seldovia, (32-8-361).
2. Arrow (?) blade with straight base, Yukon Island III, (31-20-567).
3. Arrow (?) blade with straight base, Yukon Island II, (32-9-389).
4. Arrow (?) blade with straight base, Yukon Island II, (32-9-7).
5. Arrow (?) blade with straight base, Yukon Island II, (31-20-1679).
6. Arrow (?) blade with straight base, Yukon Fox Farm II, (32-8-196).
7. Dart or small lance blade with concave base, from grave 32-9-1, Yukon Island II, (32-9-4).
8. Small lance blade with straight base, Yukon Island II, (31-20-1418).
9. Lance blade, Yukon Island III, (32-7-402).
10. Arrow blade with barbs and notched tang, Halibut Cove, (31-20-4).
11. Blade with pointed base, Yukon Island I, (32-9-255).
12. Blade with pointed base, Yukon Island sub-III, (32-7-1341).
13. Blade with rounded base, Yukon Island sub-III, (32-7-1354).
14. Blade with pointed base, Halibut Cove, (31-20-3).
15. Oval blade, Yukon Island, period unknown, (32-9-76).
16. Oval blade, Yukon Island I, (32-9-362).
17. Oval blade, Yukon Island I, (32-9-99).
18. Splitting knife blade, polished edge, Yukon Island III, (32-7-646).
19. Blade with rounded base, Yukon Island II, (32-9-288).
20. Blade with straight base, Yukon Island II, (32-9-429).
21. Blade with pointed base, Yukon Island I, (32-9-406).
22. Blade with rounded (?) base, Yukon Island I, (32-9-409).
23. Knife blade, Halibut Cove, (30-25-200).
24. Oval scraper, Yukon Island III, (31-20-940).
25. End scraper blade, Yukon Island II, (32-9-97).
26. Lance blade, (Prehistoric Eskimo ?), *Qatloxe'lye*, (32-8-267).
27. Lance blade, Halibut Cove, (30-25-198).
28. Small lance (?) blade, Halibut Cove, (30-25-197).
29. Lance blade, Halibut Cove, (31-20-793).
30. Lance blade with barbs, Yukon Island II, (32-9-446).

PLATE 30—*Continued*

31. End or 'thumb' scraper, Yukon Island I, (32-9-253).
32. Discoidal scraper, Yukon Island III, (31-20-888).
33. Leaf-shaped knife (?) blade, Yukon Island I, (32-9-301).
34. Leaf-shaped knife (?) blade, Yukon Island III, (31-20-1082).
35. Flake retouched on both edges, Halibut Cove, (30-25-196).
36. Butt of asymmetric knife blade with notched tang, Yukon Island II or sub-III, (32-7-1724).
37. Retouched flake, Yukon Island III, (31-20-524).

PLATE 31

BARBED SLATE BLADES

Scale 3 : 4.

1. Facetted slate blade, prehistoric midden by feed shed, Yukon Island IV (?), (31-20-1530).
2. Blade for small lance (?), Yukon Island III or sub-III, (32-7-146).
3. Arrow (?) blade, Yukon Island sub-III, (32-7-243).
4. Arrow (?) blade, Yukon Island sub-III or II, (32-7-1728).
5. Arrow (?) blade, Passage Island, (32-8-234).
6. Lance Blade, Point West of Halibut Cove, (32-8-273).
7. Lance blade, Yukon Island III, (31-20-939).
8. Lance blade, Yukon Island sub-III, (32-7-1667).
9. Lance blade, Q'na'qesle, Tutka Bay, (32-8-13).
10. Lance blade, Yukon Island II, (32-7-1250).
11. Lance blade, Cottonwood, (31-20-113).
12. Lance blade, Cottonwood, (31-20-176).
13. Lance blade with owner's mark, Aurora Fox Farm, (31-20-507).
14. Lance blade, House I, Cottonwood, (31-20-196).

PLATE 32

DOUBLE-EDGED SLATE BLADES

Scale 1 : 2.

1. Triangular lance blade with hole for hafting, Yukon Island III, (32-7-40).
2. Arrow or dart blade with tang, Cottonwood, (31-20-439).
3. Arrow or dart blade with tang, Yukon Island III, (31-20-1063).
4. Small lance (?) blade with tang, Yukon Island sub-III, (32-7-1678).
5. Arrow or dart blade with tang, Yukon Island III, (31-20-1212).
6. Leaf-shaped blade, Yukon Island sub-III, (32-7-1462).
7. Asymmetric knife blade, Yukon Island III, (32-7-590).
8. Point of straight-edged blade, (cf. Figures 14 and 19), Halibut Cove, (30-25-190).

PLATE 32—*Continued*

9. Small straight-edged knife blade, Cottonwood, (31-20-13).
10. Straight-edged lance blade with owner's mark, Yukon Island III, (32-7-360).
11. Straight-edged blade, Cottonwood, (31-20-495).
12. Blade with dull edges, Yukon Island III, (32-7-1090).
13. Unfinished knife blade, Halibut Cove, (31-20-1543).
14. Fragment of straight-edged blade, like Figures 8 and 19, Halibut Cove, (30-25-187).
15. Blade with tang, Yukon Island III, (31-20-746).
16. Blade with tang, Cottonwood, (31-20-274).
17. Blade with notched tang, Cottonwood, (30-25-170).
18. Large leaf-shaped lance blade, from grave 31-20-108, Cottonwood, (31-20-109).
19. Butt of straight-edged knife blade, (cf. Figures 8 and 14), Halibut Cove, (30-25-192).
20. Leaf-shaped lance blade, Yukon Island III, (32-7-1078).
21. Leaf-shaped lance blade, Yukon Island III, (31-20-1010).
22. Leaf-shaped lance blade, Yukon Island III, (32-7-432).
23. Butt of large leaf-shaped lance blade (?), Yukon Island III, (31-20-717).

PLATE 33

ULO BLADES

Scale 1 : 2.

1. Ulo blades with notches and curved edge, Yukon Island III, (31-20-1571).
2. Ulo Blade with notches and almost straight edge, Yukon Island III, (31-20-1081).
3. Toy ulo blade, Yukon Fox Farm III, (32-8-42).
4. Ulo blade without notches, with curved edge, Halibut Cove, (30-25-186).
5. Ulo blade with notches and curved edge, Yukon Island III, (31-20-1004).
6. Ulo blade with notches and curved edge, Yukon Island III, (32-7-867).
7. Ulo blade with notches and pointed edge, Yukon Island III, (31-20-1723).
8. Ulo blade without notches, with curved edge, Yukon Island III, (32-7-39).
9. Ulo blade with notches and curved edge, Cottonwood, (31-20-5).
10. Ulo blade with notches and almost straight cutting edge, Yukon Island III, (31-20-862).
11. Ulo blade without notches, with straight edge, Halibut Cove, (30-25-185).

PLATE 34

MEN'S KNIVES LIKE ULOS, AND SLATE SCRAPERS

Scale 2 : 3.

1. Man's knife like ulo, Yukon Island III, (31-20-1932).

PLATE 34—*Continued*

2. Man's knife like ulo, Yukon Island III, (31-20-732).
3. Man's knife like ulo, Cottonwood, (31-20-401).
4. Scraper blade made from broken ulo, Yukon Island III, (32-7-131).
5. Slate scraper blade, Yukon Island III, (31-20-705).
6. Blade for man's knife like ulo, (to be hafted), Yukon Island III, (32-7-1225).
7. Slate scraper blade, Yukon Island III, (31-20-1052).
8. Double-ended slate scraper, Cottonwood, (31-20-337).
9. Slate scraper blade, Yukon Island III, (30-25-272).
10. Double-ended slate scraper, Cottonwood, (31-20-428).

PLATE 35

CHIPPED SLATE SCRAPER OR ULO BLADES

Scale 1 : 2.

1. Ulo (?) blade, Yukon Fox Farm III, (30-25-205).
2. Scraper, Yukon Island II, (31-20-1777).
3. Scraper, quartz, Yukon Island III, (31-20-999).
4. Fragment of ulo or scraper, Yukon Island III, (31-20-981).
5. Scraper, Yukon Island III, (30-25-243).
6. Fragment of scraper, Yukon Island II, (31-20-1330).
7. Scraper, Yukon Island III, (32-7-12).

PLATE 36

DRILLS

Scale 1 : 1.

1. Bone drill, Cottonwood, (31-20-127).
2. Bone drill, Aurora Spit, (31-20-322).
3. Bone drill, Yukon Island III, (31-20-570).
4. Bone drill, Yukon Island III, (32-7-5).
5. Bone drill point, Point West of Halibut Cove, (32-8-331).
6. Bone drill point, Yukon Island III, (31-20-1423).
7. Bone drill point, Yukon Island III, (32-7-975).
8. Bone drill point (for beads), Yukon Island III, (32-7-969).
9. Stone drill point, Yukon Island III, (32-7-195).
10. Stone drill point, Halibut Cove, (30-25-199).
11. Stone drill, Yukon Island III, (32-7-1064).
12. Slate 'awl,' Yukon Island III, (32-7-149).
13. Slate 'awl,' Yukon Fox Farm III, (32-8-36).
14. Slate 'awl,' Yukon Island III, (32-7-859).
15. Slate drill point, Yukon Island III, (32-7-873).

PLATE 36—*Continued*

16. Slate 'awl,' Yukon Fox Farm III, (32-8-131).
17. Slate 'awl,' Yukon Island III, (32-7-21).
18. Slate drill, Cottonwood, (31-20-426).
19. Unfinished slate drill, or lamp tending stone ?, Yukon Island sub-III, (32-7-1296).
20. Slate drill, Point West of Halibut Cove, (31-20-835).

PLATE 37

MIRRORS

Scale 2 : 3.

1. Fragment broken from top of 'copper-shaped' mirror, shale, Cottonwood, (31-20-473).
2. Fragment from bottom of similar mirror, slate, Cottonwood, (31-20-96).
3. Shale mirror, Yukon Island III, (32-7-54).
4. Shale mirror, Cottonwood, (31-20-155).
5. Fragment of shale mirror with scalloped edge, Yukon Island III, (32-7-878).
6. Shale mirror, Yukon Island III, (31-20-1521).

PLATE 38

HARPOON HEADS

Scale 1 : 1.

1. Harpoon head, closed socket, Port Möller profile, Yukon Island III, (32-7-220).
2. Harpoon head, closed socket, Yukon Island III, (32-7-15).
3. Harpoon head, closed socket and barbs, Yukon Island III, (31-20-1350).
4. Harpoon head, closed socket, Yukon Island III, (32-7-408).
5. Harpoon head, closed socket, Yukon Island III, (31-20-960).
6. Butt of harpoon head, open socket, Yukon Island I, (32-9-151).
7. Unfinished harpoon head, Thule Type II, Yukon Island III, (30-25-261).
8. Unfinished harpoon head, closed socket, Yukon Island III ?, (31-20-1243).
9. Harpoon head, Thule Type I, Yukon Island III, (32-7-1035).
10. Fragment of harpoon head, almost circular section, Yukon Fox Farm II, (32-8-168).
11. Harpoon head, Thule Type I, from cache, Yukon Island I, (32-9-374).
12. Harpoon head, Thule Type I, Yukon Island I, (32-9-445).
13. Harpoon head, Thule Type I, Yukon Island I, (32-9-129).
14. Harpoon head, Thule Type I, Yukon Island I, (31-20-1717).
15. Harpoon head, Thule Type I, Yukon Island III, (31-20-961).
16. Harpoon head, Thule Type I, from cache, Yukon Island I, (32-9-372).



PLATE 39

BARBED DART HEADS

Scale 2 : 3.

1. Head for sea-otter arrow (?), with dorsal barb, Yukon Island III, (31-20-1403).
2. Head for sea-otter arrow (?), Yukon Island I, (31-20-2002).
3. Head for dart or arrow, Yukon Island I, (31-20-2003).
4. Head for dart or arrow, Yukon Island III, (32-7-22).
5. Head for dart or arrow, Yukon Island sub-III, (32-7-1540).
6. Dart head, Passage Island, (32-8-247).
7. Dart head, grave 32-9-1, Yukon Island II, (32-9-5).
8. Dart head with blade socket, butt broken and reshaped, Yukon Island, period unknown, (32-7-1685).
9. Dart head with dorsal barb, Yukon Island III (or IV ?), (31-20-1098).
10. Dart head with two dorsal barbs, Yukon Island III or II, (32-7-1681).
11. Dart head, Yukon Island I, (31-20-1841).
12. Fragment of dart head, Yukon Island III, (32-7-852).
13. Dart head, originally with four barbs, Yukon Island III, (32-7-1286).
14. Dart head with profile like heads from mouth of Stikine River, southeastern Alaska, Yukon Island I, (32-9-126).
15. Dart head, Yukon Island III (or IV ?), (32-7-61).
16. Dart head with blade socket, Yukon Island III, (30-25-257).
17. Decorated dart head, Yukon Island I, (32-9-184).
18. Butt of dart head, Yukon Island III, (31-20-1410).
19. Butt of dart head, Yukon Island III, (31-20-1348).
20. Dart head, Yukon Island III, (31-20-1225).
21. Dart head, Point West of Halibut Cove, (32-8-313).
22. Dart head, Cottonwood, (31-20-496).
23. Fragment of large spear head, Passage Island, (32-8-301).
24. Spear head, Passage Island, (32-8-245).

PLATE 40

MISCELLANEOUS BARBED HEADS

Scale 3 : 4.

1. Dart head, barbed asymmetrically on both sides, Yukon Island sub-III, (32-7-1457).
2. Dart head, barbed asymmetrically on both sides, Yukon Island III, (32-7-1754).
3. Dart head, barbed asymmetrically on both sides, Yukon Island II, (32-9-237).
4. Fragment of dart head, barbed symmetrically on both sides, Yukon Island I, (32-9-199).

PLATE 40—*Continued*

5. Dart head, barbed symmetrically on both sides, Yukon Fox Farm II, (32-8-170).
6. Dart head (?), barbed symmetrically on both sides, Yukon Island III, (31-20-1185).
7. Dart head, barbed symmetrically on both sides, Yukon Fox Farm II, (32-8-136).
8. Fish-spear barb, Yukon Island III, (31-20-1121).
9. Fish-spear barb, Yukon Island III, (31-20-951).
10. Fish-spear barb, Yukon Island III, (32-7-740).
11. Fish-spear barb, Yukon Island III, (31-20-664).
12. Barbed prong for fish spear (?), Yukon Island I, (32-9-148).
13. Barbed point, Yukon Island III, (32-7-1375).
14. Barbed point, Yukon Island II, (32-9-414).
15. Barbed point, Yukon Island II, (32-9-245).
16. Dart head, with dorsal barbs, Yukon Island III, (32-7-670).
17. Fragment of barbed head, Yukon Island II, (32-9-434).
18. Barbed head, Yukon Island II, (31-20-1789).

PLATE 41

FORESHAFTS, SOCKET-PIECES, ARROW HEADS, LANCE HEAD

Scale 2 : 3.

1. Harpoon foreshaft, Yukon Island III, (31-20-1351).
2. Harpoon foreshaft (?), Yukon Island II, (32-9-312).
3. Harpoon foreshaft (?), Yukon Island I, (31-20-1840).
4. Fragment of socket-piece in two parts, Yukon Island III, (31-20-2265).
5. Fragment of socket-piece in one piece, Yukon Fox Farm III, (32-8-53).
6. Half of socket-piece in two parts, Yukon Island II, (31-20-1294).
7. Half of socket-piece in two parts, Yukon Island II, (31-20-1280).
8. Butt of shaft, (or of socket-piece, Figure 5 ?), Yukon Fox Farm III, (32-8-54).
9. Socket-piece in one piece, double burial, 31-20-102 and -103, Cottonwood, (31-20-106).
10. Socket-piece in two parts, double burial, 31-20-102 and -103, Cottonwood, (31-20-107).
11. Half of socket-piece in two parts, Yukon Island I, (32-9-163).
12. Socket-piece in one piece, Yukon Island III, (32-7-1236).
13. Fragment of socket-piece with bifurcated tang, Yukon Island III, (32-7-626).
14. Arrow head, Yukon Island III, (32-7-853).
15. Arrow head, Yukon Island II, (31-20-1927).
16. Arrow head with stone blade, Cottonwood, (31-20-501).

PLATE 41—*Continued*

17. Arrow head with stone blade, Yukon Island III, (32-7-870).
18. Arrow head with slit for blade, Yukon Island II, (32-9-56).
19. Butt of bone shaft, Yukon Fox Farm III, (30-25-214).
20. Bone shaft fragment, Yukon Island III, (31-20-1479).
21. Barbed lance head, Point West of Halibut Cove, (32-8-347).

PLATE 42

SLENDER BARBED POINTS

Scale 3 : 4.

1. Slender barbed point, 'Cottonwood' type, Yukon Island sub-III, (32-7-902).
2. Slender barbed point, 'Cottonwood' type, Cottonwood, (31-20-261).
3. Slender barbed point, 'Cottonwood' type, barbed on both sides, Yukon Island sub-III, (32-7-1398).
4. Slender barbed point with three (?) barbs, 'Cottonwood' type, Cottonwood, (31-20-478).
5. Slender barbed point, 'Cottonwood' type, Cottonwood, (31-20-125).
6. Slender barbed point, 'Cottonwood' type, Yukon Island II, (32-7-963).
7. Slender barbed point, 'Yukon Island III' type, barbed on both sides, Yukon Island III, (31-20-1357).
8. Slender barbed point, 'Yukon Island III' type, Yukon Island III, (31-20-1127).
9. Slender barbed point, 'Yukon Island III' type, broken and reshaped, Yukon Island III, (32-7-292).
10. Slender barbed point, 'Yukon Island III' type, Yukon Island III, (32-7-342).
11. Slender barbed point, 'Yukon Island I' type, Yukon Island I, (32-9-296).
12. Slender barbed point with blade slit, 'Yukon Island III' type, Yukon Island III, (32-7-1155).
13. Fragment of slender barbed point with blade slit, 'Yukon Island I' type, Yukon Island I, (32-9-224).
14. Slender barbed point, 'Yukon Island III' type, barbed on both sides, Yukon Island III or II, (30-25-269).
15. Slender barbed point, 'Cottonwood' type, Yukon Island III, (32-7-635).
16. Slender barbed point, 'Yukon Island I' type, Yukon Island II (or sub-III ?), (32-9-244).
17. Slender barbed point, 'Yukon Island I' type, Yukon Island I, (32-9-178).
18. Slender barbed point, 'Yukon Island I' type, Yukon Island I, (31-20-2140).
19. Slender barbed point, 'Yukon Island III' type, Yukon Island III, (31-20-2266).
20. Slender barbed point, 'Yukon Island III' type, barbed on three sides, Yukon Island III, (30-25-255).

PLATE 42—*Continued*

21. Slender barbed point, 'Yukon Island III' type, Yukon Island III, (32-7-333).
22. Slender barbed point, 'Yukon Island III' type, broken and reshaped, Yukon Island III, (31-20-684).
23. Slender barbed point, 'Yukon Island III' type, Q'na'qesle, Tutka Bay, (32-8-11).

PLATE 43

FISH HOOKS, BONE PINS, ETC.

Scale 1 : 1.

1. Antler point with transverse knob, Yukon Island III, (31-20-1487).
2. Antler point with transverse knob, Yukon Island III, (31-20-543).
3. Bone point with transverse knob, Yukon Island III, (32-7-1424).
4. Antler point with transverse knob, Point West of Halibut Cove, (31-20-839).
5. Barb for fish hook, Yukon Island sub-III, (32-7-1617).
6. Barb for fish hook, Yukon Island II, (32-9-323).
7. Barb for fish hook, Cottonwood, (31-20-292).
8. Barb for fish hook, Yukon Island III, (32-7-459).
9. Decorated barb for fish hook, Yukon Island I, (32-9-348).
10. Barb for fish hook, Yukon Island III, (31-20-1404).
11. Decorated barb for fish hook, Cottonwood, (31-20-80).
12. Barb for fish hook, Yukon Fox Farm III, (32-8-55).
13. Barb for fish hook (?), Yukon Island II, (32-7-942).
14. Barb for fish spear, Point West of Halibut Cove, (31-20-843).
15. Barb for fish spear, Yukon Island I, (32-9-152).
16. Bird bone point, Yukon Island III, (32-7-657).
17. Bird bone point, Yukon Island sub-III, (32-7-1711).
18. Bird bone point, Yukon Island I, (32-9-250).
19. Bird bone point, Yukon Island III, (32-7-1147).
20. Butt of side-prong for bird-dart ?, Yukon Island sub-III, (32-7-1410).
21. Decorated antler pin, Yukon Island III, (31-20-915).
22. Curved and grooved bone point, Yukon Island III, (31-20-559).
23. Ivory pin (nose pin ?), Q'na'qesle, Tutka Bay, (32-8-20).
24. Grooved pin, Yukon Island I ?, (32-9-228).
25. Bone pin, Point West of Halibut Cove, (32-8-332).
26. Bone pin, Yukon Island III, (30-25-238).
27. Bone pin, Yukon Island III, (31-20-1121).
28. Bone pin, Cottonwood, (31-20-90).
29. Bone pin, Yukon Island III, (32-7-373).
30. Bone pin, Yukon Island III, (32-7-298).

PLATE 44

NEEDLES, AWLS, AND NEEDLECASE

Scale 3 : 4.

1. Bird bone sewing needle, Yukon Island III, (32-7-619).
2. Bird bone sewing needle, Yukon Island II, (32-9-394).
3. Bird bone sewing needle, Yukon Island III, (32-7-452).
4. Bird bone sewing needle, Point West of Halibut Cove, (32-8-327).
5. Bird bone sewing needle, Cottonwood, (31-20-165).
6. Bird bone sewing needle, Yukon Island sub-III, (32-7-1677).
7. Bird bone sewing needle, Yukon Island III, (31-20-1475).
8. Bird bone sewing needle, Yukon Island I, (32-9-112).
9. Unfinished needle, one of set of 3, Yukon Island III, (32-7-595).
10. Bird bone awl with separate handle, Yukon Island III, (32-7-457).
11. Double-pointed awl, proximal end of gull radius, Yukon Island III, (32-7-712).
12. Awl, proximal end of gull radius, Yukon Island III, (32-7-931).
13. Awl, distal end of cormorant ulna, Yukon Island III, (32-7-615).
14. Awl, distal end of gull radius, Yukon Island III, (32-7-730).
15. Awl, proximal end of cormorant radius, Yukon Island III or II, (32-7-1684).
16. Awl, distal end of cormorant radius, Point West of Halibut Cove, (32-8-323).
17. Awl made of bone splinter, Yukon Island III, (32-20-1640).
18. Shaped bone awl, Yukon Island III, (32-7-1159).
19. Shaped bone awl, Yukon Island III, (31-20-1478).
20. Shaped bone awl, Yukon Island I, (32-9-195).
21. Large needle, Point West of Halibut Cove, (32-8-314).
22. Large double-pointed needle, Passage Island, (32-8-248).
23. Awl, proximal end of swan metacarpal, Yukon Fox Farm III, (32-8-47).
24. Awl, sea-otter fibula, Yukon Island III, (32-7-614).
25. Double-pointed awl, proximal end of cormorant ulna, Yukon Island III, (32-7-357).
26. Bird bone tube, partially split for needles, Yukon Island III, (32-7-496).
27. Decorated bird bone needlecase, Q'na'qesle, Tutka Bay, (32-8-15).
28. Awl, swan femur, Point West of Halibut Cove, (31-20-2318).
29. Awl, swan humerus, Cottonwood, (31-20-362).
30. Awl, caribou metacarpal, Yukon Island III, (32-7-498).
31. Awl, dog tibia, Point West of Halibut Cove, (31-20-806).
32. Awl, seal radius, Yukon Island III, (32-7-49).
33. Awl, proximal end of dog ulna, Point West of Halibut Cove, (32-8-335).
34. Awl, distal end of dog radius, Yukon Island III, (32-7-121).
35. Awl, sea otter (?) penis bone, Point West of Halibut Cove, (32-8-328).

PLATE 45

FLINT FLAKERS, SCRAPERS

Scale 1 : 2

1. Awl or flint flaker, brown bear rib, Yukon Island II, (31-20-1778).
2. Awl or flint flaker, black bear rib, Yukon Island III, (31-20-726).
3. Flint flaker, rib, Yukon Island II, (32-9-44).
4. Cut section of rib, Yukon Island III, (32-7-278).
5. Scraper, split bone, highly fossilized, Cottonwood, (31-20-123).
6. Scraper, swan metatarsal, Cottonwood, (31-20-387).
7. Scraper, dorsal process of moose vertebra, Point West of Halibut Cove, (31-20-805).
8. Scraper, distal end of caribou metatarsal, Yukon Island III, (32-7-686).
9. Scraper blade, caribou scapula ?, Yukon Island sub-III, (32-7-242).
10. Scraper blade, caribou scapula ?, Yukon Island III, (32-7-981).
11. Scraper, porpoise or beluga mandible, Yukon Island III, (32-7-685).
12. Scraper, sea-lion (?) scapula, Yukon Fox Farm III, (32-8-71).
13. Scraper, beluga (?) mandible, Yukon Island III, (or IV ?), (32-7-214).
14. Scraper, caribou scapula, Yukon Island III, (31-20-575).
15. Scraper, caribou scapula, Yukon Island sub-III, (32-7-1547).
16. Scraper, caribou scapula, Yukon Island sub-III, (32-7-1416).
17. Scraper, caribou scapula, Yukon Island II, (31-20-1459).

PLATE 46

WEDGES, ICE PICKS, CUTTING BOARDS, KNIVES.

Scale 1 : 2

1. Bark-stripping wedge, Yukon Island III, (32-7-371).
2. Splitting wedge, Yukon Island III, (32-7-591).
3. Bark-stripping (?) wedge, Yukon Island III, (32-7-120).
4. Splitting wedge, Yukon Island II, (31-20-1288).
5. Splitting wedge, Yukon Island I, (31-20-2310).
6. Chisel or scraper blade, Passage Island, (32-8-251).
7. Ice pick, Yukon Island I, (32-9-39).
8. Chisel, Yukon Fox Farm III, (32-8-67).
9. Ice pick, Yukon Island III, (31-20-1765).
10. Cutting board, Yukon Island III, (32-7-1301).
11. Knife handle, Yukon Fox Farm III, (30-25-258).
12. Knife handle, Yukon Island III, (32-7-372).
13. Pick, Yukon Fox Farm III, (32-8-93).
14. Bone dagger (?), Passage Island, (32-8-300).

PLATE 47

CUT ARTICULATIONS

Scale 1 : 2

1. Proximal end of radius, black bear, Yukon Island III, (32-7-478).
2. Proximal end of metacarpal, caribou, Yukon Island sub-III, (32-7-1428).
3. Distal end of metacarpal, caribou, Yukon Island III, (32-7-295).
4. Mandible, brown bear, Yukon Island III, (31-20-1854).
5. Distal end of ulna, loon (?), Yukon Island III, (32-7-374).
6. Distal end of humerus, gull, Point West of Halibut Cove, (32-8-351).
7. Proximal end of femur, dog, Yukon Island III, (32-7-553).
8. Proximal end of humerus, loon (?), Yukon Island III (?), (32-7-693).
9. Distal end of humerus, loon, Yukon Island sub-III, (32-7-1663).
10. Distal end of humerus, owl (?), Yukon Island III, (32-7-1174).
11. Ulna, swan, Yukon Island III, (31-20-1799).
12. Distal end of metacarpal, caribou, (fragment of scraper ?), Yukon Island III, (31-20-527).
13. Proximal end of metatarsal, caribou, Yukon Island sub-III, (32-7-172).
14. Radius, caribou, Yukon Island III, (31-20-2005).
15. Proximal end of human tibia, Yukon Island III, (31-20-871).
16. Proximal end of human left tibia, Cottonwood, (31-20-115).
17. Distal end of humerus, black bear, Yukon Fox Farm III, (32-8-165).
18. Proximal end of femur, black bear, Yukon Island, period unknown, (32-7-1682).
19. Proximal end of tibia (?), brown bear, Yukon Island III, (32-7-1214).
20. Proximal end of ulna, black bear, Yukon Island III, (32-7-851).
21. Proximal end of tibia, brown bear, Cottonwood, (31-20-254).
22. Distal end of humerus, caribou, Yukon Fox Farm III, (32-8-31).
23. Proximal end of femur, brown bear, Yukon Island III, (32-7-571a).
24. Proximal end of tibia, caribou, Cottonwood, (31-20-17).
25. Proximal end of tibia, brown bear, Yukon Island sub-III, (32-7-1521).
26. Distal end of femur, brown bear, Yukon Island III, (32-7-571b).
27. Distal end of humerus, brown bear, Passage Island, (32-8-310).

PLATE 48

SHOVEL, CLUB, MISCELLANEOUS CUT BONE AND ANTLER

Scale 6 : 10

1. Moose humerus, broken for marrow, Yukon Island II, (31-20-2050).
2. Moose bone, broken for marrow, Yukon Island II, (31-20-2070).
3. Young brown bear leg bone, broken for marrow, Yukon Island II, (31-20-1779).

PLATE 48—*Continued*

4. Sawed bone, Yukon Island III, (31-20-1966-1).
5. Sawed and cut bone, Yukon Island III, (31-20-1346).
6. Sawed and chopped bone, Yukon Island III, (31-20-867).
7. Chopped bone, Yukon Island III, (31-20-1382).
8. Sawed and broken caribou antler butt, Cottonwood, (31-20-2360).
9. Cut section of antler, Point West of Halibut Cove, (31-20-808).
10. Sawed and cut bone, Yukon Island III, (31-20-987).
11. Bone shovel blade, Yukon Island III, (31-20-1999).
12. Antler, with drilled pits, Yukon Island II, (31-20-1289).
13. Sawed and split antler, Yukon Island III, (31-20-1061).
14. Club, whale rib, Yukon Island III, (31-20-1024).

PLATE 49

SPOONS, LADLE, DRUM HANDLE, TOP, COPPER OBJECTS, ETC.

Scale 2 : 3

1. Antler spoon, Passage Island, (32-8-302).
2. Bone spoon, Yukon Island III, (30-25-232).
3. Whale tail amulet, tuff, Cottonwood, (31-20-95).
4. Dipper handle, Yukon Island III or II, (30-25-270).
5. and 6. Copper beads, imitation of dentalium shell ?, Yukon Island IV, (32-7-574 and 861).
7. Crayon, baked shale, Cottonwood, (30-25-169).
8. Fragment of bone box, Cottonwood, (31-20-214).
9. Man for game ?, Yukon Island II, (31-20-1299).
10. Copper bracelet, Yukon Island IV, (32-7-1176).
11. Bar of baked shale, Cottonwood, (30-25-174).
12. Drum handle, Yukon Fox Farm III, (30-25-210).
13. Top, epiphysis of small whale vertebra, Yukon Island III, (31-20-1955).
14. Copper ulo (?) blade, Yukon Island IV, (31-20-2324).
15. Copper knife, Yukon Island IV, (32-7-306).

PLATE 50

BEADS, PENDANTS, AND BUCKLES

Scale 3 : 4

1. Ivory pendant, Yukon Island III, (32-7-16).
2. Ivory pendant, Yukon Island III, (32-7-50).
3. Ivory pendant, Yukon Island III, (32-7-334).
4. Rectangular bone bead, Yukon Island III, (32-7-1068).



PLATE 50—*Continued*

5. Red shale bead, Cottonwood, (31-20-489).
6. Red shale bead, Yukon Island III, (32-7-672).
7. Red shale bead, Yukon Island III, (32-7-1297).
8. Red shale bead, Point West of Halibut Cove, (32-8-355).
9. Red shale bead with two holes, Yukon Island sub-III, (32-7-1409).
10. Red shale bead, Yukon Island III, (31-20-665).
11. Red shale bead, Yukon Island III, (32-7-983).
12. Shell bead, under skull 31-20-102, double burial, Cottonwood, (31-20-105).
13. Rectangular bone bead, Yukon Island III, (32-7-877).
14. Bird bone bead, Yukon Island III, (32-7-671).
15. Bird bone bead, Yukon Island sub-III, (32-7-1710).
16. Bird bone bead, grave 32-9-1, Yukon Island II, (32-9-53).
17. Ivory pendant, Yukon Island III, (31-20-941).
18. Bone pendant, Yukon Fox Farm II, (32-8-213).
19. Rectangular shell beads, Cottonwood, (31-20-444).
20. Fragment of decorated ivory buckle, Yukon Island III, (32-7-967).
21. Ivory bead, Yukon Island III, (31-20-1967).
22. Antler toggle, Yukon Island III, (31-20-1877).
23. Ivory pendant, Yukon Island III, (31-20-1044).
24. Fragment of decorated bone pendant, Yukon Island III, (32-7-378).
25. Seal tooth pendant, Passage Island, (32-8-249).
26. Seal tooth pendant, Yukon Island II, (32-7-944).
27. Ivory pendant, Yukon Island III, (32-7-818).
28. Ivory pendant, Yukon Island II, (32-9-238).
29. Ivory pendant, Yukon Island III, (32-7-354).
30. Bone pendant, Yukon Island, sub-III (32-7-247).
31. Ivory clasp (?), Tutka Bay, (32-8-362).
32. Ivory buckle, Cottonwood, (31-20-204).
33. Ivory buckle, Yukon Island III, (31-20-1217).
34. Ivory buckle, Yukon Island II, (32-9-68).
35. Ivory buckle, Yukon Island III, (32-7-679).
36. Ivory buckle, later worn as pendant, Yukon Island III, (32-7-433).
37. Pendant made from half of ivory buckle, Yukon Island III, (32-7-1427).
38. Ivory buckle, Yukon Island III, (31-20-1184).

PLATE 51

LABRETS, ARTIFICIAL EYES, NOSE AND EAR ORNAMENTS, ETC.

Scale 3 : 4

1. Ivory inset, Yukon Island III, (32-7-1138).
2. Bone mounting for socket (?), Yukon Island sub-III, (32-7-173).

PLATE 51—*Continued*

3. Ornament, Yukon Island III, (32-7-419).
4. Fish vertebra rings, two from cache of 23, Yukon Island III, (32-7-1470, 1482, and 611).
5. Bone mounting, Cottonwood, (31-20-290).
6. Half of amulet box, Yukon Island sub-III, (32-7-1776).
7. Decorated ivory pin (nose pin ?), Yukon Island III, (31-20-1595).
8. Dentalium shell, Cottonwood, (31-20-2325).
9. Labret (ear plug ?), Cottonwood, (31-20-30).
10. Nose pin (?), Yukon Island III, (31-20-544).
11. Nose pin (?), Yukon Island III, (32-7-392).
12. Buckle or toggle (?), Yukon Island III, (32-7-379).
13. Ear plug, grave 32-9-1, Yukon Island II, (32-9-3).
14. Artificial eye under skull, 31-20-102, double burial, Cottonwood, (31-20-104).
15. Pair of artificial eyes from eye sockets of man, 32-7-1744, in double burial, Yukon Island sub-III, (32-7-1747A and B).
16. Artificial eye from child, 33-7-1746, in double burial, Yukon Island sub-III, (32-7-1751).
17. Labret with suspension hole for drop pendant, Yukon Island III, (32-7-1136).
18. Marble labret, Yukon Island III, (32-7-816).
19. Ivory labret, Yukon Island I, (32-9-160).
20. Shell labret, Cottonwood, (31-20-412).
21. Ivory labret with eye design, Yukon Island III, (32-7-130).
22. Tuff labret, Yukon Island III, (32-7-1739).
23. Marble labret, Yukon Island III, (32-20-1193).
24. Marble labret from child, 32-7-1746, in double burial, Yukon Island sub-III, (32-7-1752).
25. Bone labret, Yukon Island III, (32-7-1053).
26. Gypsum labret, Cottonwood, (31-20-289).
27. Ivory labret, Yukon Island III, (31-20-1814).
28. Marble labret, Yukon Island III or sub-III, (32-7-203).
29. Oil shale labret, Yukon Island III, (32-7-1080).
30. Oil shale labret, Yukon Island III, (31-20-1249).
31. Ivory labret (for mask ?), grave 32-9-1, Yukon Island II, (32-9-2).
32. Oil shale labret, Yukon Island III, (31-20-872).
33. Marble labret, Cottonwood, (31-20-81).
34. Oil shale labret, Yukon Island III, (32-7-653).
35. Ivory labret, Yukon Island I, (32-9-108).
36. Marble labret, from man, 33-7-1744 in double burial, Yukon Island sub-III, (32-7-1748).
37. Marble labret (?), Yukon Island III, (32-7-620).

PLATE 52

REALISTIC CARVINGS

Scale 1 : 1

- 1 *a, b, and c.* Ivory head, Yukon Island III, (31-20-880).
- 2 *a, b, and c.* Double-faced ivory figurine, Yukon Island II, (32-9-201).
- 3 *a and b.* Ivory figurine, walrus tooth, Yukon Island sub-III, (32-7-1099).
4. Pendant in shape of unidentified animal, Yukon Island III, (32-7-455).
5. Walrus (?) tooth carved to represent a worm, (inverted in plate), Yukon Island I, (32-9-435).
6. Pendant in shape of bird, Yukon Island III, (32-7-1258).
7. Ivory figurine, grave in layer 2, Jakolof's Place, Kasitsna Bay, (Private collection, Seldovia).
8. Stone head, Yukon Island I, (32-9-300).
9. Ornament in shape of sea-otter, mammoth (?) ivory, Seldovia beach, (Private collection, Seldovia.)

PLATE 53

GRAVE GOODS, FOUND WITH SKELETON 31-20-2321, YUKON FOX FARM II

Scale 6 : 7

1. Section cut bone, (31-20-2098).
- 2 *a and b.* Antler tip, cut in two, (31-20-2095 and -2096).
3. Section cut bone, (31-20-2097).
4. Bone point, (31-20-2107).
5. Red baked shale, (31-20-2150).
6. Tuff whetstone, (31-20-2116, 3).
7. Felsite whetstone, (31-20-2115).
8. Tuff whetstone, (31-20-2149, 1).
9. Tuff whetstone, (31-20-2149, 2).
10. Tuff whetstone, (31-20-2116, 1).
11. Tuff whetstone, (31-20-2116, 2).
12. Unfinished jasper blade, (31-20-2143).
13. Fragment of chipped green flint, (31-20-2144).
14. Fragment of man's knife like ulo, (31-20-2147).
15. Ulo, (31-20-2146).
16. Hunter's lamp, (31-20-2142).

PLATE 54

GRAVE GOODS, FOUND WITH SKELETON 31-20-2321, YUKON FOX FARM II

Scale 1 : 2

1. to 8. Pumice, (31-20-2151 to -2157, 2).

PLATE 54—*Continued*

9. to 11. and 13. to 16. Bone and antler wedges, (31-20-2099 to -2105).
12. Unfinished adze blade, (31-20-2148).

PLATE 55

THE 'BAG FIND,' YUKON ISLAND III, (32-7-511 TO -534, -536 TO -552)

Scale 1 : 2

1. Ivory rod with hole, decorated.
2. Ivory rod with hole, decorated with dot-and-circle motif.
- 3 to 14. Ivory rods with holes.
15. Awl, sea-otter fibula.
16. Bird bone, broken.
17. Split bird bone tube.
18. Arrow head with blade slit.
19. Bird bone point.
20. Fish vertebra ring.
- 21 to 37. Stone flakes.
38. Shale plaque (mirror ?).
39. Sandstone whetstone (also used as a saw ?).
- 40 and 41. Pumice.

PLATE 56

PREHISTORIC AND MODERN INDIAN, AND MODERN ESKIMO ARTIFACTS

Scale 1 : 2

1. Socket-piece for sea-otter arrow, made by Anisim, (Kodiak Eskimo).
2. Dart head, prehistoric Indian, China Poot Bay, (31-20-2185).
3. Dart head, prehistoric ? Indian, Jakolof's place, layer 3, (30-25-281).
4. Harpoon head, modern Indian, Indian Island, (32-8-6).
5. Arrow head, prehistoric ? Indian, Cape Starichkof, (30-25-160).
6. Slender barbed point, prehistoric ? Indian, Cape Starichkof, (30-25-161).
7. Doll, modern Indian, near feed shed, Yukon Island, (31-20-511).
8. Tooth pendant, prehistoric Indian, *Qatloxe'lye*, (32-8-265).
9. Tally or nose pin, prehistoric Indian, China Poot Bay, (31-20-2186).
10. Awl or flint flaker, prehistoric Indian, *Qatloxe'lye*, (32-8-263).
11. Bird bone awl, prehistoric Indian, *Qatloxe'lye*, (31-20-588).
12. Bird bone awl, prehistoric Indian, *Qatloxe'lye*, (32-8-262).
13. Bone awl, modern Indian, Jakolof's place, layer 3, (30-25-280).
14. Barbed slate lance blade, prehistoric Indian, Tutka Bay, (30-25-275).
15. Slate scraper blade (to be hafted), prehistoric Indian, China Poot Bay, (31-20-2184).

PLATE 56—*Continued*

16. Toy lamp, prehistoric ? Indian, Cape Starichkof, (30-25-159).
17. Ulo, made by Anisim, (Kodiak Eskimo).
18. Spear head, patterned after bone barbed dart head, modern Indian, Yukon Fox Farm, (32-8-38).
19. Spear head, modern Indian, Indian Island, (32-8-5).
20. Bark-stripping wedge, prehistoric Indian, *Qatloxe'lye*, (31-20-587).
21. Ulo blade, prehistoric Indian, *Qatloxe'lye*, (32-8-1).
22. Spear head, modern Eskimo, Port Graham.

PLATE 57

SITES ON COOK INLET

See pages 133, 138-139.

- A. Kenai River: view east from Kenai towards the site of *Ya'nuq*.
- B. Site near the mouth of Grecian ('Crescent') River, Tuxedni Bay.
- C. Kustatan, West Foreland.
- D. Kustatan, West Foreland: Excavated house pit on second bench above the cannery.

PLATE 58

SITES ON COOK INLET AND MODERN INDIAN HOUSES

See pages 134, 141, 144-145.

- A. House pit, *Nikishka III*: The small room seen from the main room. See Text Figure 4-5.
- B. Fish Creek, Knik Arm: *Ulanky's* farm from the bank above Little *Nikita's* fish camp.
- C. *Fitka's* Cabin, Cottonwood Creek.
- D. Smoke house at *Jakolof's* place, *Kasitsna* Bay.

PLATE 59

SPECIMENS FROM THE EAST SHORE OF COOK INLET

Scale 1 : 3

1. Lamp from vicinity of Kenai, (30-25-155).
2. Hunter's lamp, Swanson Creek, (31-20-1920).
3. Splitting adze, Swanson Creek, (31-20-1921).
4. Lamp from *Sa'stin*, Kenai River, (30-25-156).

PLATE 60

OBJECTS FROM KUSTATAN AND FISH CREEK

Scale 7 : 8

1. Ulo blade, Kustatan, (30-25-140).
2. Man's knife like ulo, Kustatan, (30-25-142).
3. Retouched flake, Kustatan, (30-25-137).
4. Arrow blade (?), Kustatan, (30-25-139).
5. Planing adze, Kustatan, (30-25-138).
6. Single-edged knife, blade and handle in one, Kustatan, (30-25-143).
7. Slate single-edged knife blade, Fish Creek, (30-25-131).
8. Planing adze blade (?), Fish Creek, (30-25-130).
9. Double-edged slate blade, Fish Creek, (30-25-132).
10. Fragment of chipped slate blade, Fish Creek, (30-25-134).
11. Sandstone whetstone, Fish Creek, (30-25-135).

PLATE 61

CAVE PAINTINGS, TUXEDNI BAY

See pages 138, 150-152.

- A. Rock shelter, Tuxedni Bay.
- B. Painting, Tuxedni Bay: See Plate 62B.
- C. Painting, Tuxedni Bay: See Plate 62c.

PLATE 62

PAINTINGS, TUXEDNI BAY

Scale 1 : 3

- A. Painting on ceiling of small recess.
- B. Symbol representing the Raven? See Plate 61B.
- C. Group: 1. Whale ?; 2. Man; 3. Man in kayak ? See Plate 61c.

PLATE 63

PAINTINGS, TUXEDNI BAY

Scale 1 : 3

- A. Group: 1. Man in kayak; 2. and 3. Men.
- B. Group: 1. Man; 2. Umiak.
- C. Whale?
- D. Whale?

PLATE 63—*Continued*

- E. Man or anthropomorphic figure.
- F. Man in kayak?
- G. Whale?

PLATE 64

GROUP OF PAINTINGS, TUXEDNI BAY

Scale 1 : 3

- 1. Swan (?).
- 2. Killer whale.
- 3. Man in kayak.
- 4. Man.
- 5. Umiak.
- 6. Man.

(All the figures are on the same line. Figure 2 is 10 cm. above and to the left of Figure 3. Figure 1 is 18 cm. beyond Figure 2).

PLATE 65

PAINTINGS, BEAR ISLAND

Scale 1 : 1

- A. Woman.
- B. Man.
- C. Animal.
- D. Kid (or faun).
- E. Group: 1. Seal; 2. Young seal?

PLATE 66

PAINTINGS, BEAR ISLAND

Scale 1 : 1

- A. Wounded seal or sea-otter.
- B and C. Seals or sea-otters.
- D. Wounded sea-mammal.
- E. Sea-mammal, or anthropomorphic figure?
- F. Sea-mammal, wounded?
- G. Sea-mammal, wounded with bladder dart.
- H. Group: 1. Anthropomorphic figure; 2. Fox?
- I. Group: 1. Boat?; 2. Sea-mammal.

PLATE 67

PAINTINGS, BEAR ISLAND

Scale 1 : 1

- A. Group: 1 and 2. Quadrupeds standing on hind legs; 3. Shark.
- B. Whale.
- C. Symbol?
- D. Walrus?
- E. Bear?

PLATE 68

PAINTINGS, SADIE COVE

Scale 1 : 2

Group of blackfish whales and conventionalized animals.

PLATE 69

LAMP WITH HUMAN FIGURE

Scale 1 : 3 See pages 177-180.

Decorated lamp from Kenai Lake, (N. A. 9251).

PLATE 70

LAMPS WITH HUMAN FIGURE

See pages 177-180.

- 1. Decorated lamp, provenience unknown, (Sitka Museum. Photograph through the courtesy of Father Kashevaroff, Juneau). Scale 2 : 3 ?
- 2. Decorated lamp, Fish Creek, Knik Arm. (Photograph from a cast, original in the Museum of the American Indian, Heye Foundation, New York City). Scale 1 : 3.

PLATE 71

LAMP WITH HUMAN FIGURE

Scale 5 : 8 See pages 177-180.

Decorated lamp, Kaltag, Yukon River, (Private collection. Photograph through the courtesy of Father Kashevaroff, Juneau).

PLATE 72

SKULL FROM QATloxe'LYe, KACHEMAK BAY, (31-20-585)

Scale 1 : 3

- 1. Norma frontalis.
- 2. Norma lateralis.



PLATE 73

Lamp with Human Figure, West Beach, Yukon Island. (Photographs by Howard Stapples and Associates, 711 Madison Street, Seattle, Washington; courtesy of the Homer Society of Natural History. See Gordon Marsh, "A Stone Lamp from Yukon Island, Alaska," *Anthropological Papers of the University of Alaska*, Vol. 4, No. 2: 113-115, 1956).

Scale: Slightly over 1/3 natural size.

PLATE 74

Pictographs, Clam Cove, Chinitna Bay. (From Lance Petersen, "Ancient Aleut Rock Painting: The Clam Cove Pictographs." *The Alaska Journal: History and Arts of the North - Quarterly*. Autumn 1971, Vol. 1, No. 4:49-51. Original tracings by Buck Hayden; redrawn by Susan Kaplan.)

- A. and B. Jumping whales.
- C. Running or leaping human figure.
- D. Conventionalized animal, perhaps a bear.
- E. Running deer.
- F. Human figure.
- G. Perhaps two superimposed human figures.
- H. Linked ovals.
- I. Mythological spirit?
- J. Boat with four paddlers, five paddles, and flying figure.

PLATE 75

Map of Main Site, West Beach, Yukon Island, redrawn by Susan Kaplan from Survey made October 20, 1966 by James W. Thurston; Showing Damage from Earthquake of 1964.

PLATE 76

- Main Site, West Beach, Yukon Island, Showing Damage by Earthquake of 1964
- A. Swamp and Pond from Highest Point of Main Site, 1966. (Photograph, courtesy of Burton W. Silcock, State Director, Bureau of Land Management.)
  - B. Samuel L. Pratt, President, Homer Society of Natural History, Standing at Remains of Recent Midden Near Former Feed Shed, at West End of Site, 1967. (Photograph by Paul J. F. Schumacher, then Chief, Archaeological Research, National Park Service, San Francisco.)
  - C. Monument at Highest Remaining Portion of the Great Midden, 1966. (Photograph, courtesy of B. W. Silcock.)

PLATE 77

Panorama of Remains of Main Site, West Beach, Yukon Island, 1966. (Photographs, courtesy of Burton W. Silcock, State Director, Bureau of Land Management.)

TEXT FIGURE 1

DOUBLE BURIAL WITH TWO TROPHY SKULLS, YUKON ISLAND SUB-III (PAGE 44)

TEXT FIGURE 2

DEGENERATE THULE TYPE II HARPOON HEAD, TUTKA BAY (PAGE 82)

Slightly reduced.

TEXT FIGURE 3

VILLAGE SITE AT LIBBY CREEK (PAGE 135)

The distances between the houses have  
been reduced on this diagram.

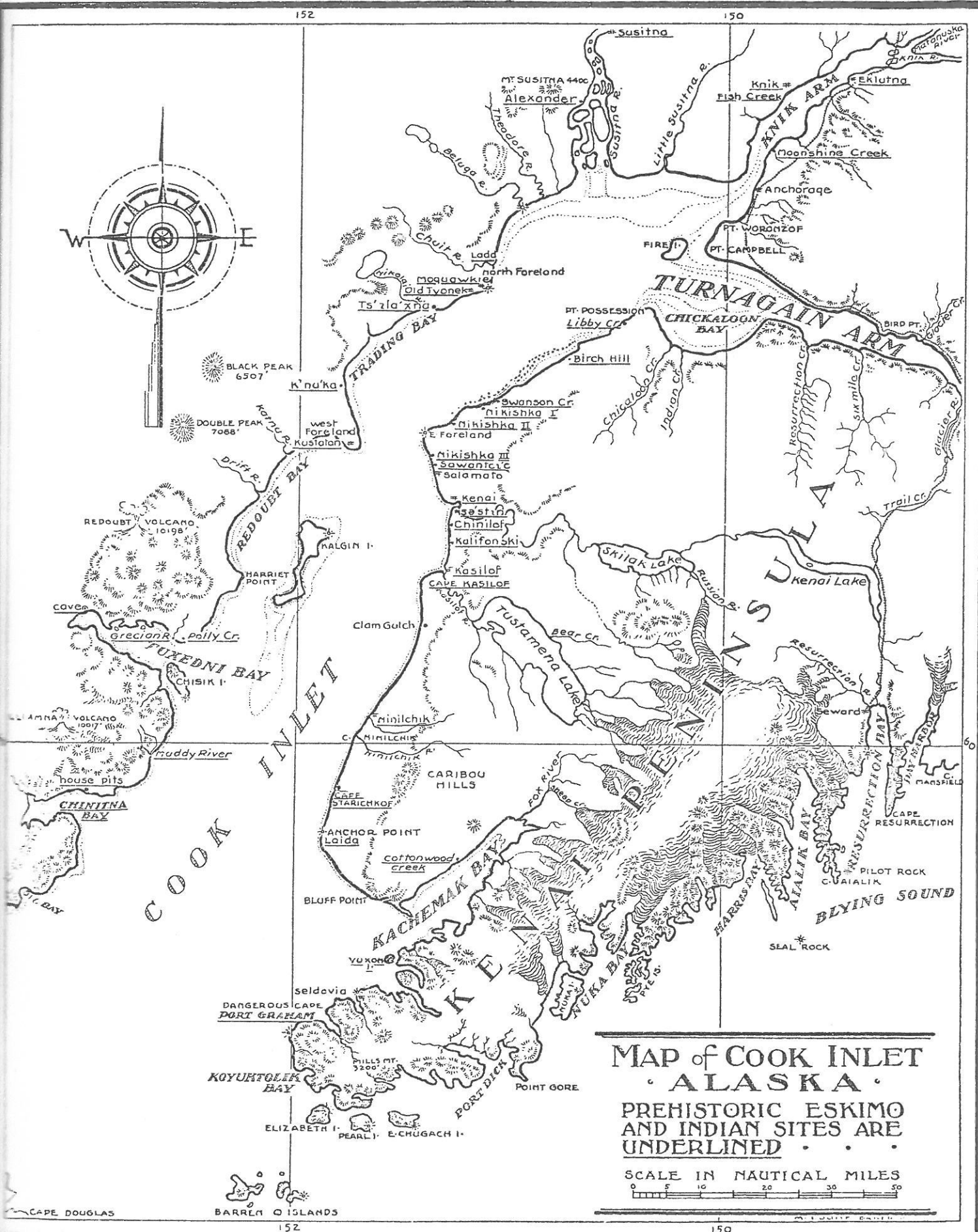
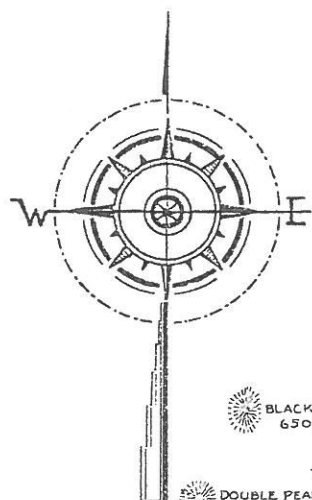
TEXT FIGURE 4

INDIAN HOUSE RUINS ON COOK INLET (PAGE 142)

1. Point West of Halibut Cove.
2. Cape Starichkof.
3. House II, Kasilof.
4. House IV, Kasilof.
5. Nikishka III.
6. Polly Creek.
7. Chinitna Bay.

TEXT FIGURE 5

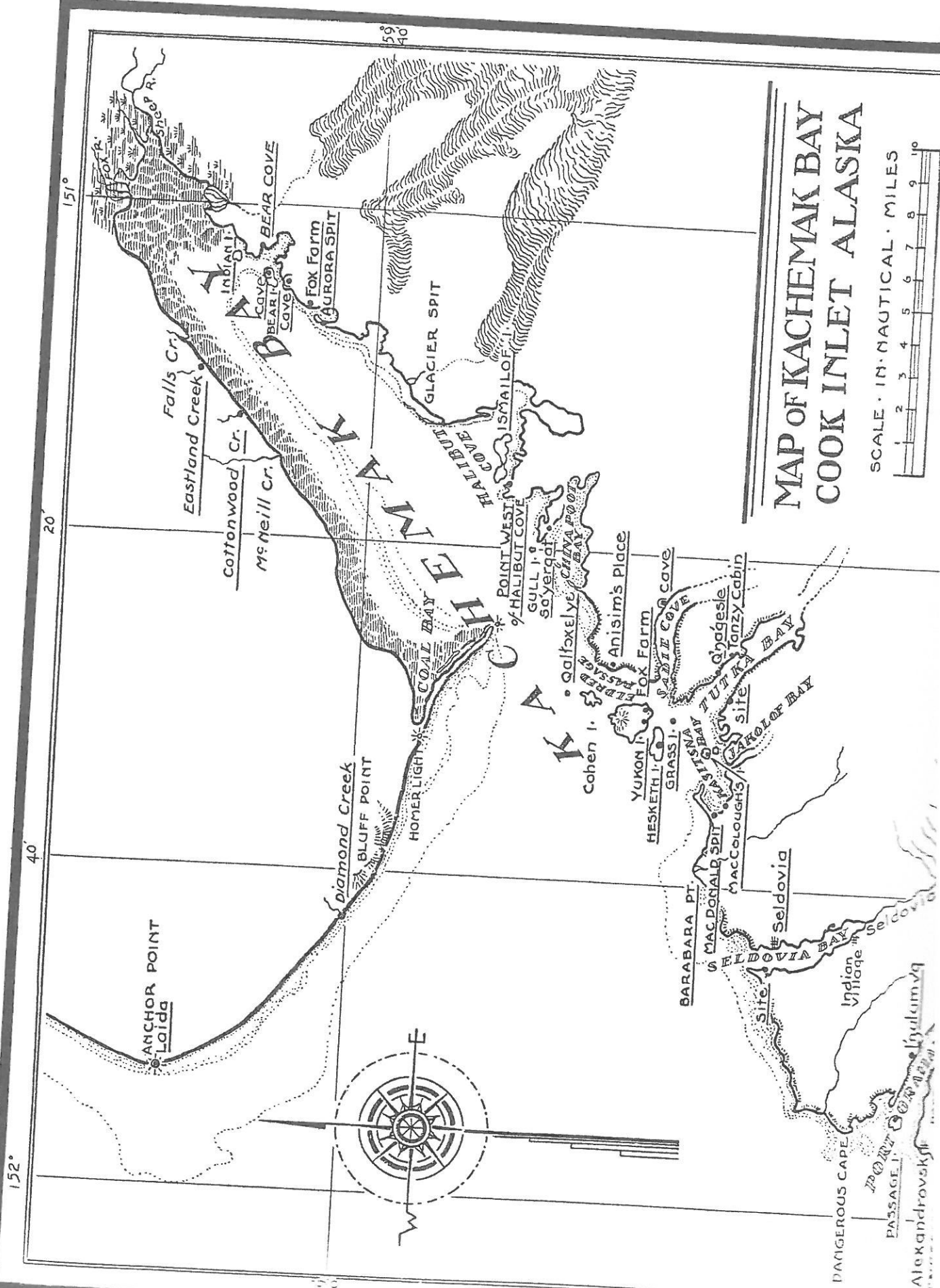
DIAGRAM OF CONSTRUCTION OF INDIAN HOUSE (PAGE 145)

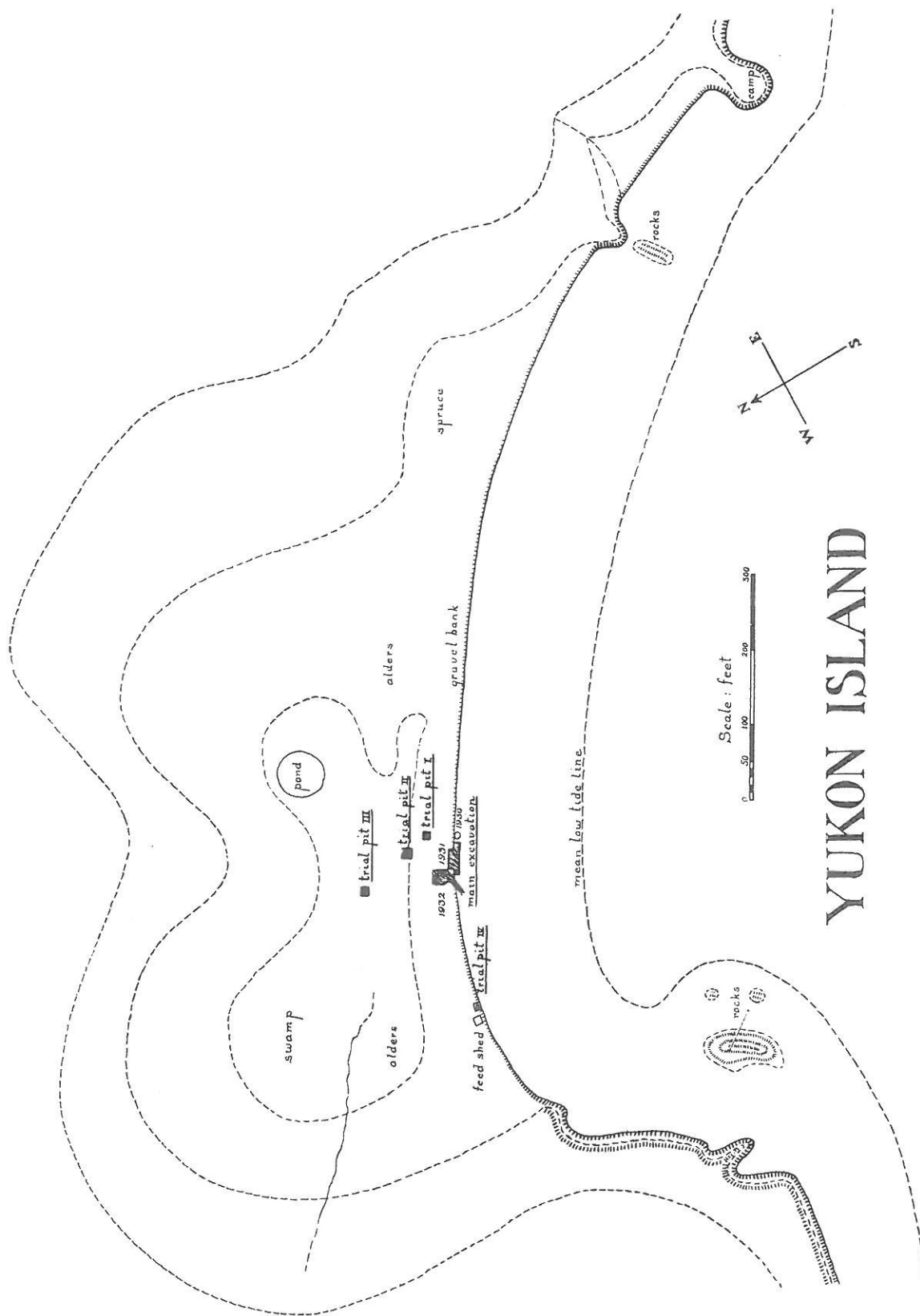


# MAP of COOK INLET ALASKA

PREHISTORIC ESKIMO AND INDIAN SITES ARE UNDERLINED . . .

SCALE IN NAUTICAL MILES  
0 5 10 20 30 40 50





# YUKON ISLAND

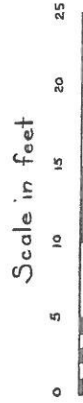
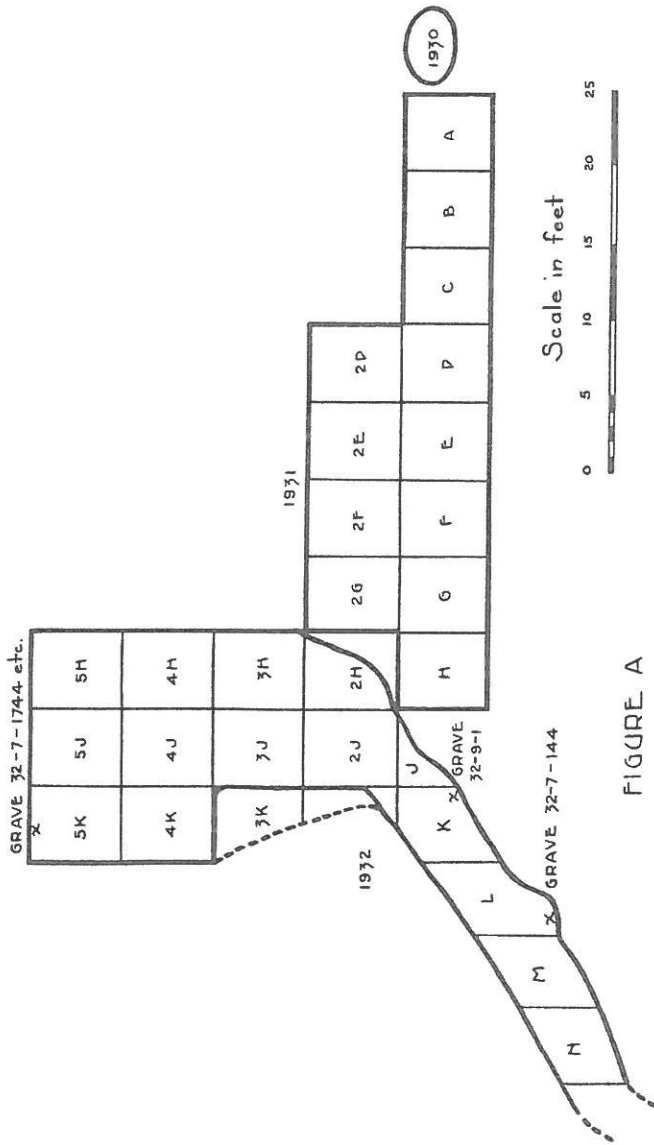
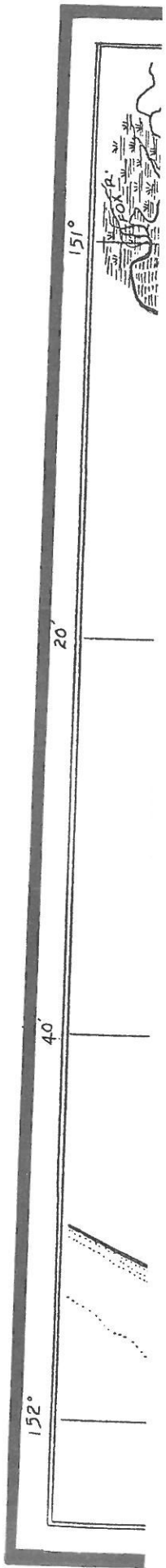
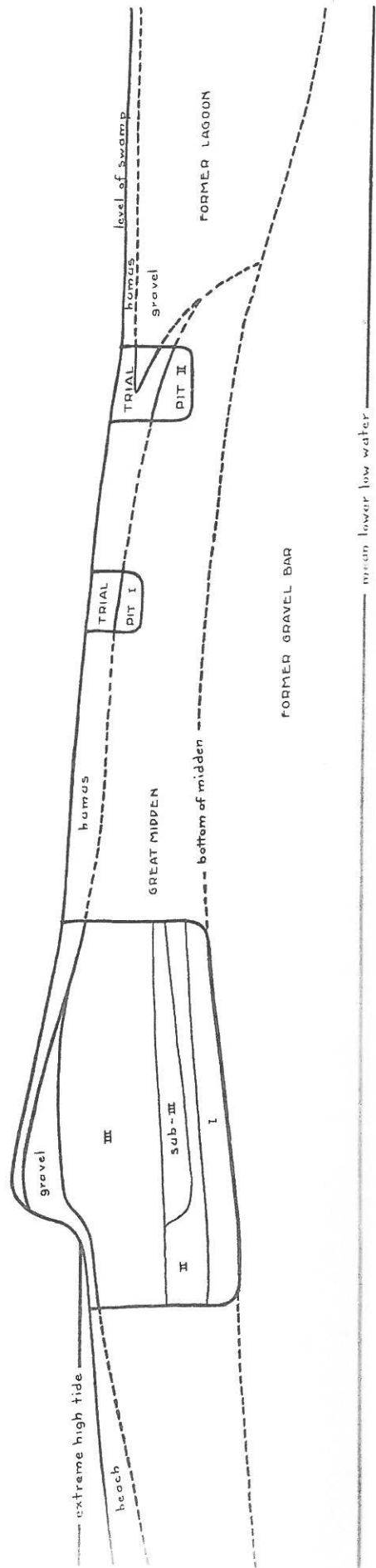
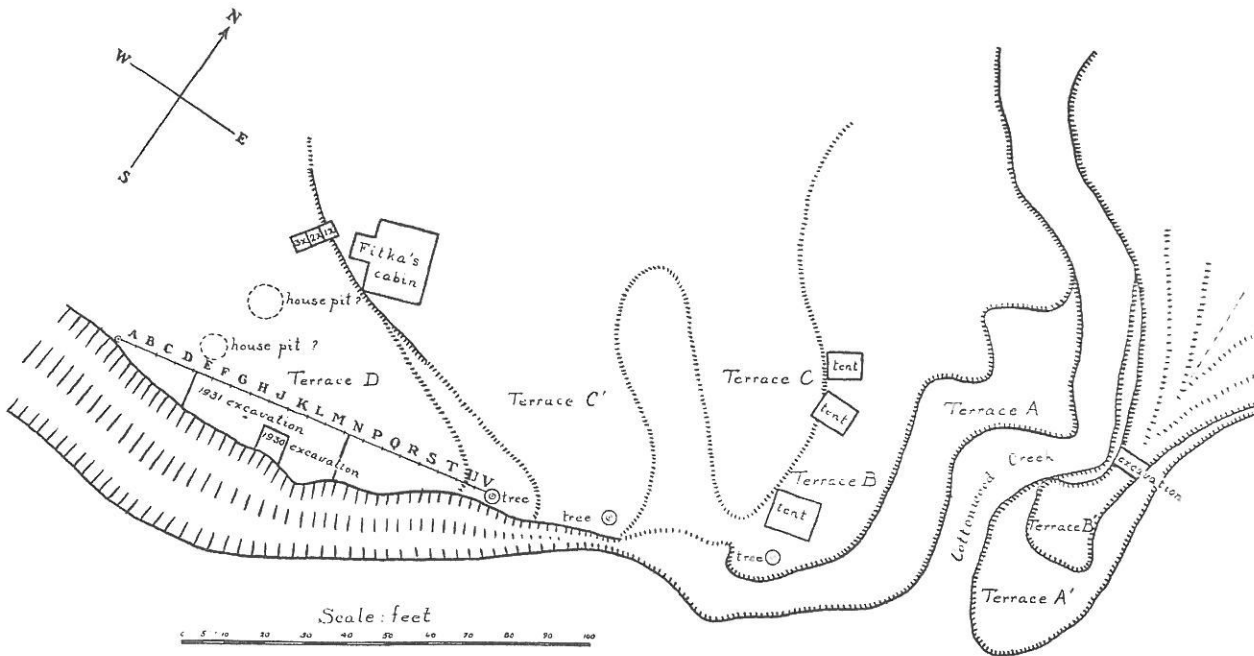
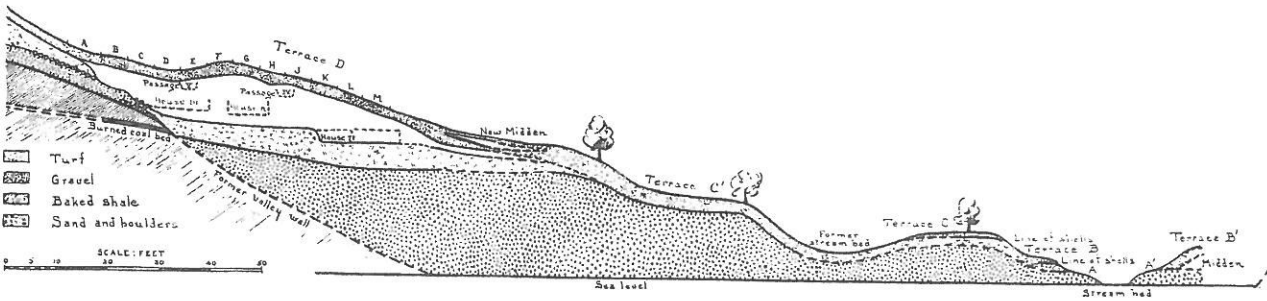
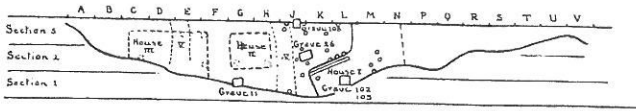


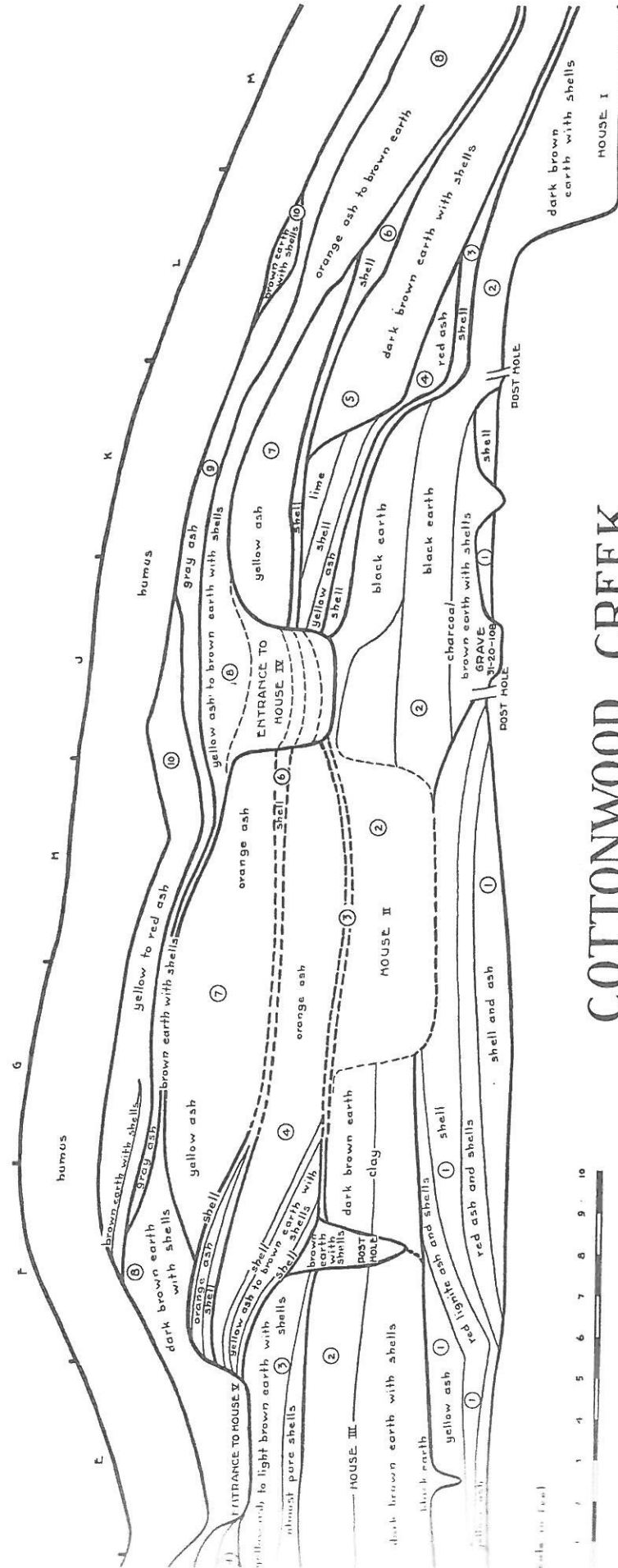
FIGURE A



midden lower low water



# COTTONWOOD CREEK

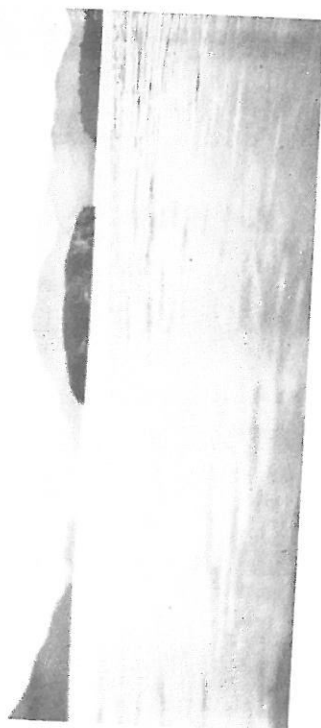


# COTTONWOOD CREEK





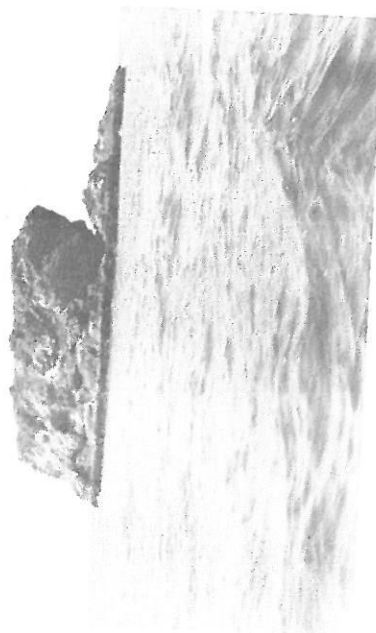
A



B



C



D

PLATE 9



A



B



C



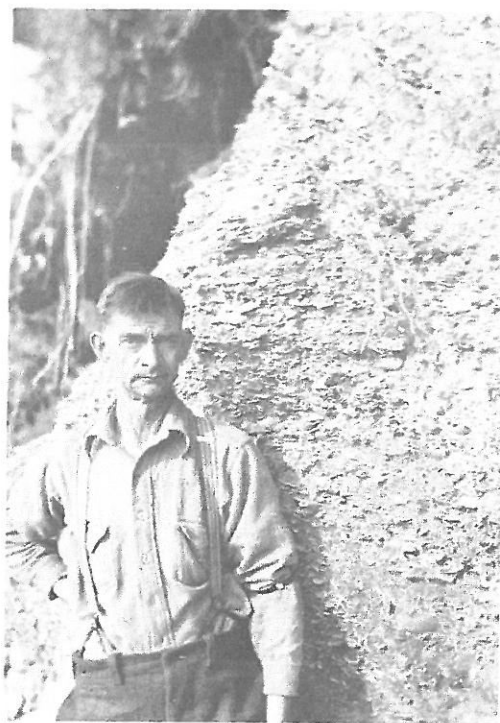
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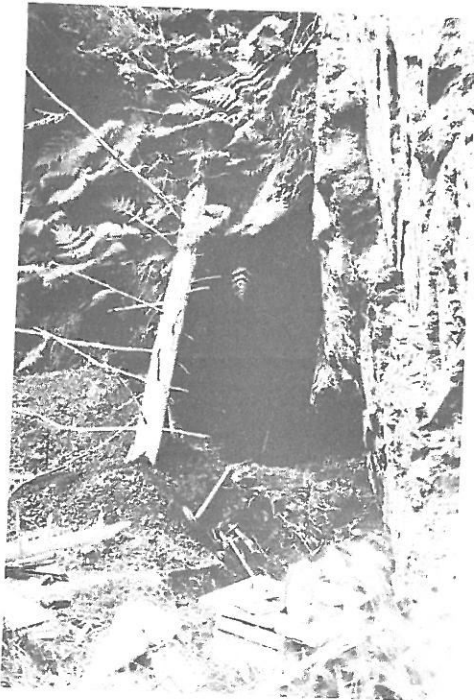
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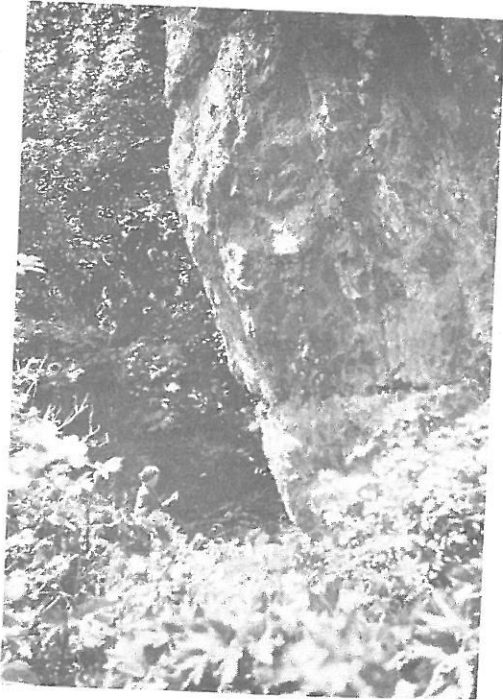
B



C



A



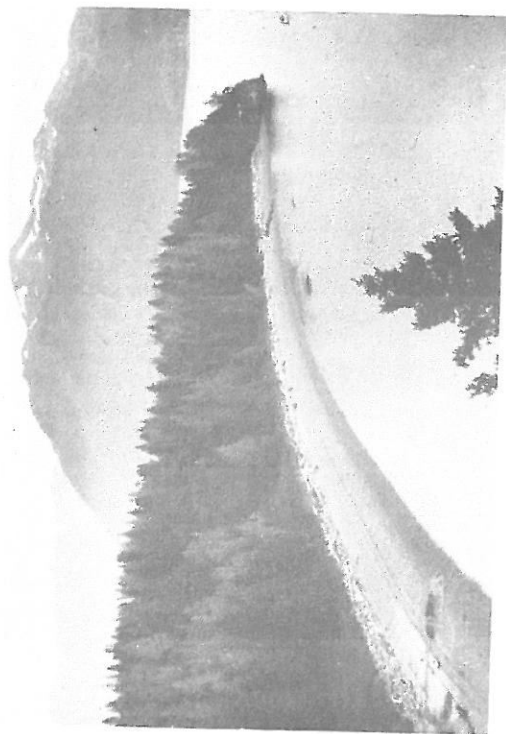
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C



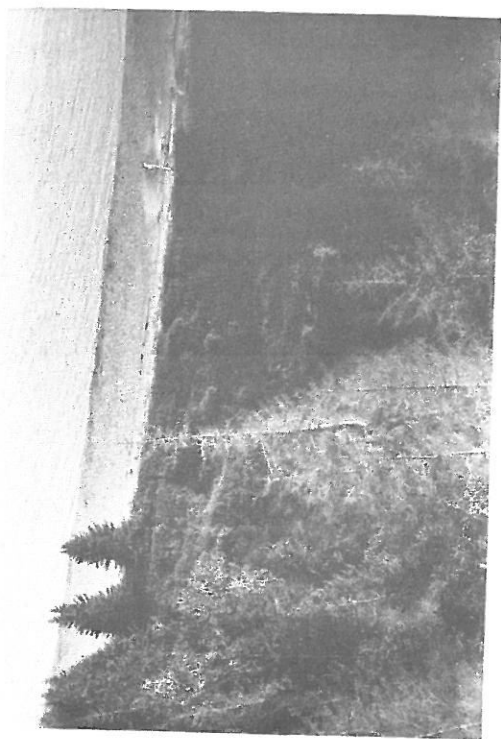
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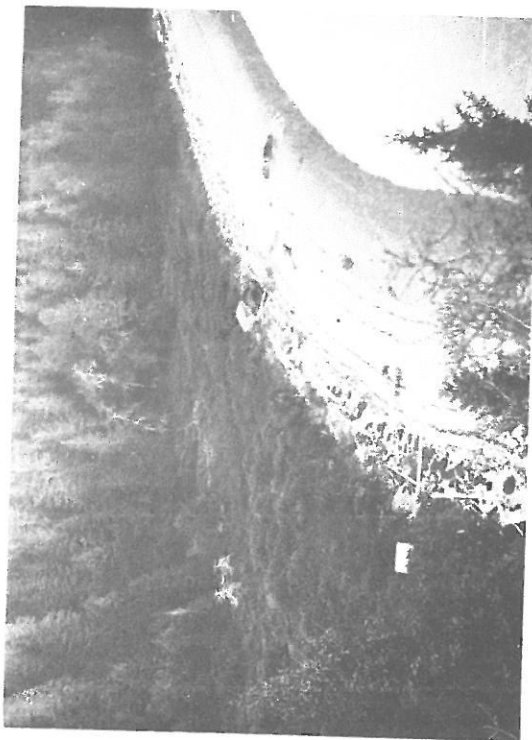
B



D



A



C



A



B



C



D



B



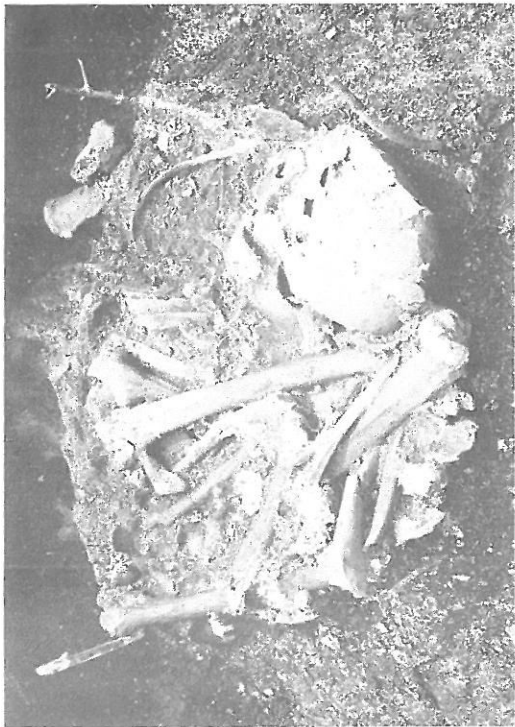
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A



C



B



D

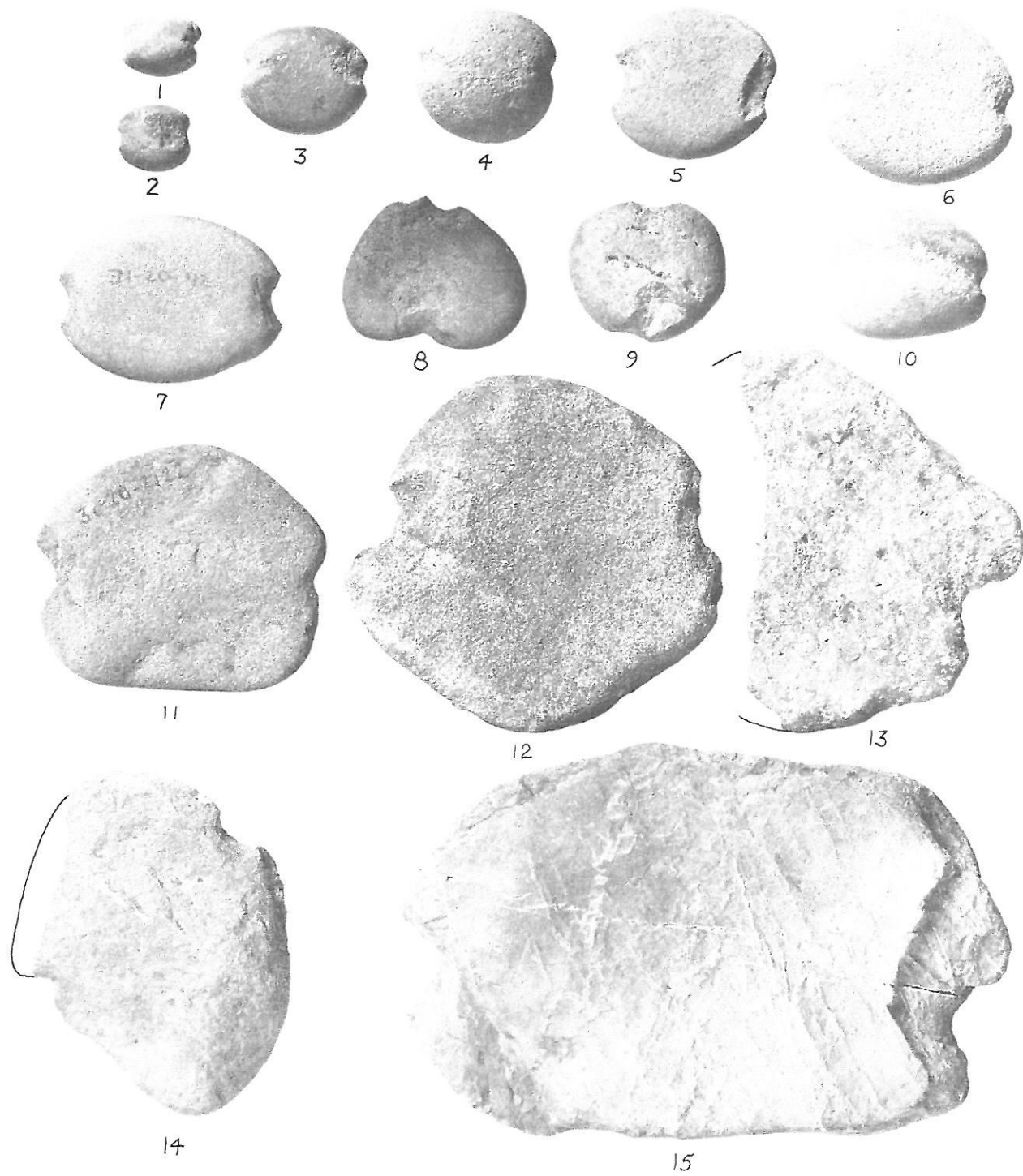


A



C

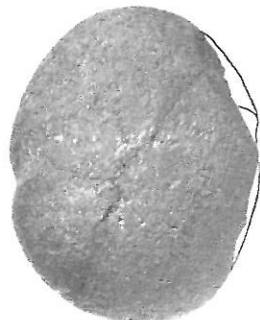




SCALE 3:4



1



2



3



4



5



6



7



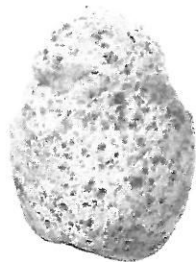
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9



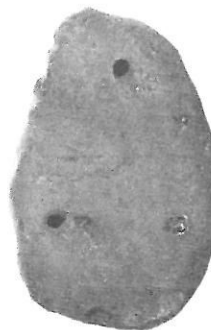
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11



12



13

SCALE 1:2



1



2



3



4

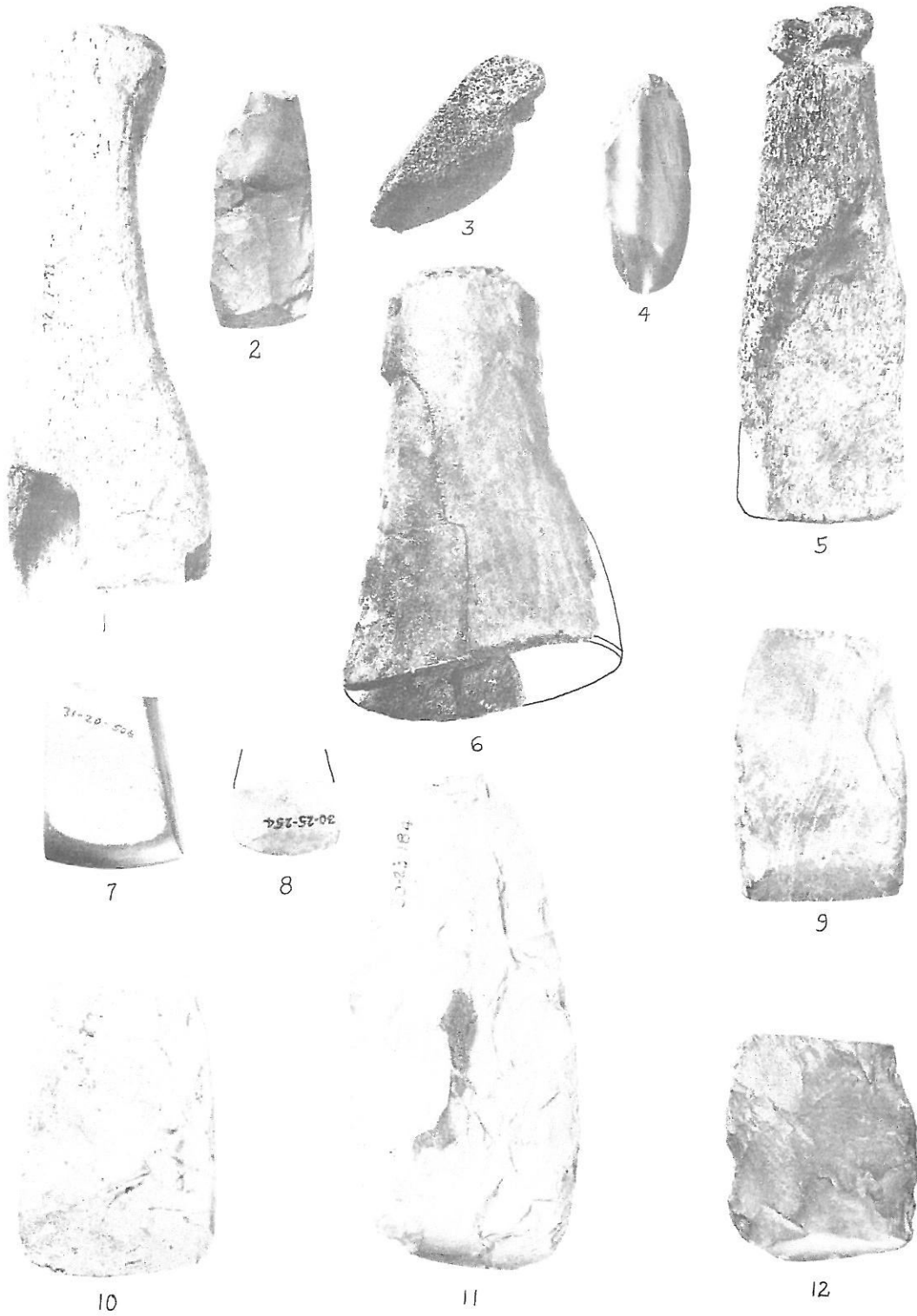


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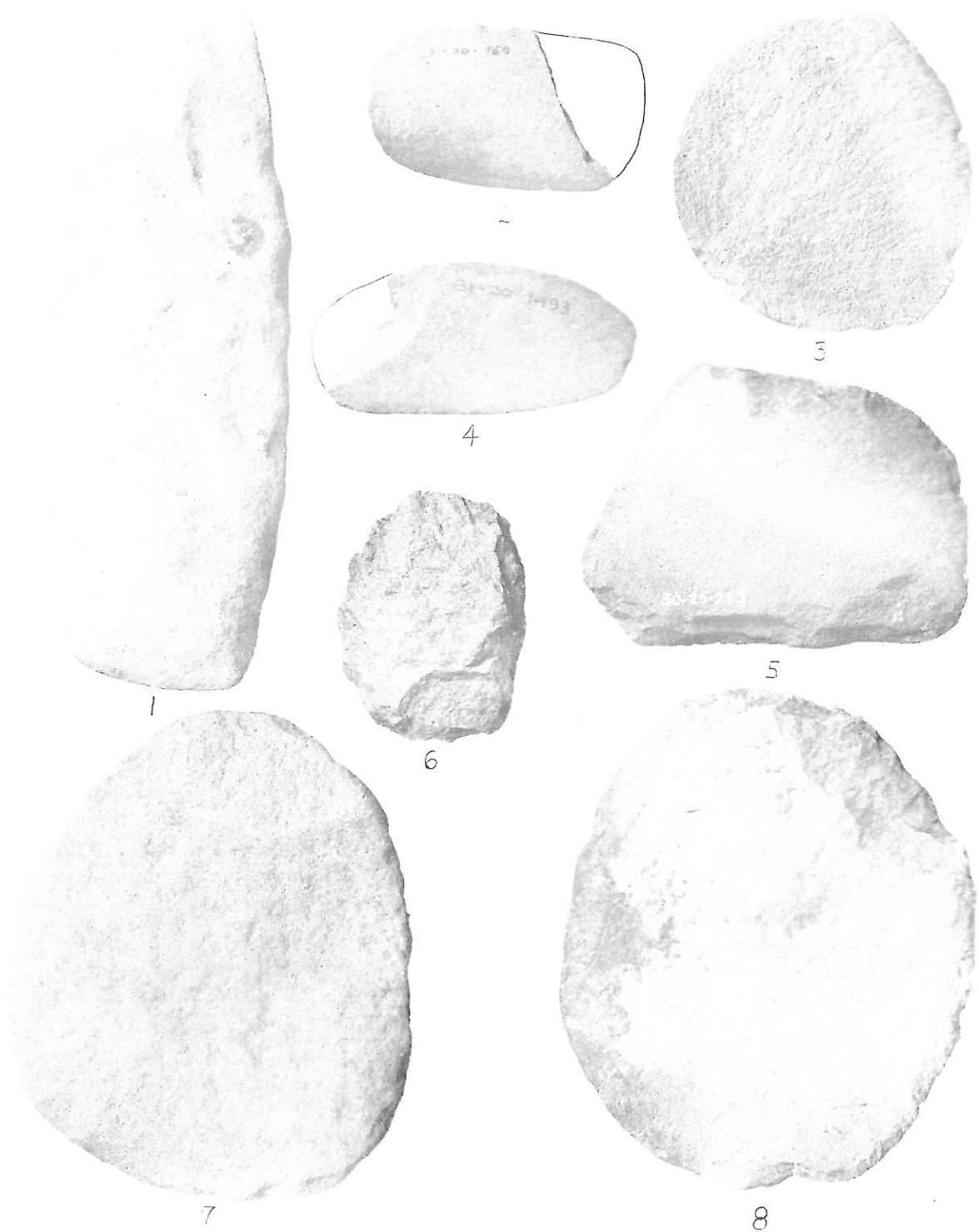


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SCALE 1:4



SCALE 2:3



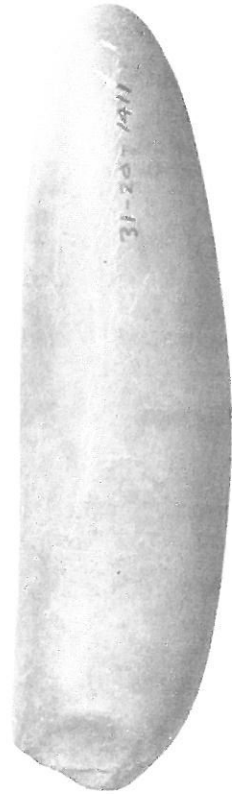
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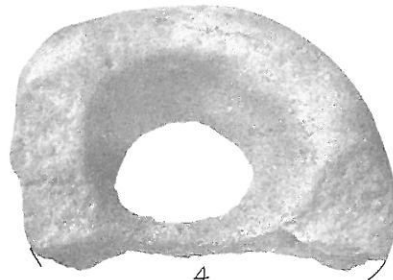
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3



4



6



5



7



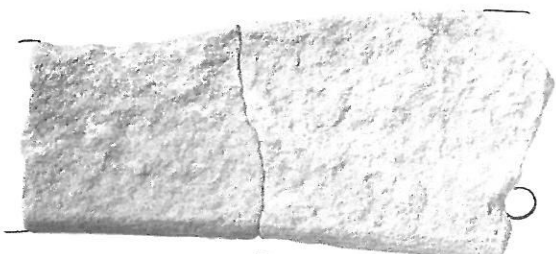
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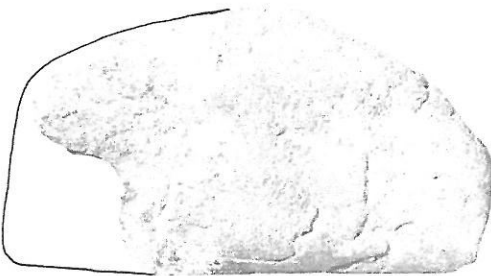
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3



4



5



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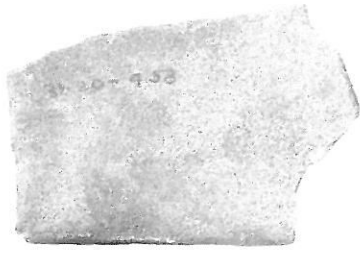
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10



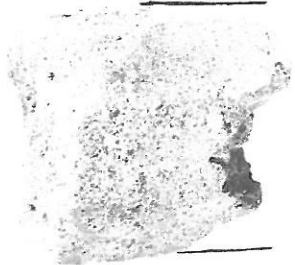
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12



13



14



15

SCALE 4:7



2



4



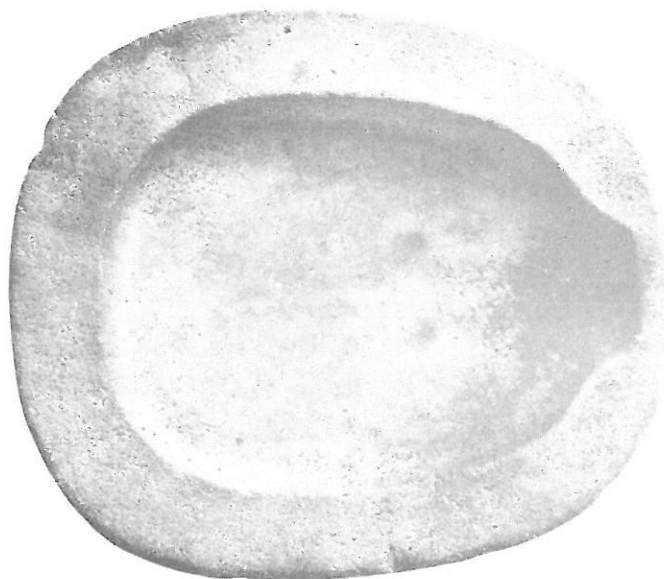
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3

SCALE 1:2



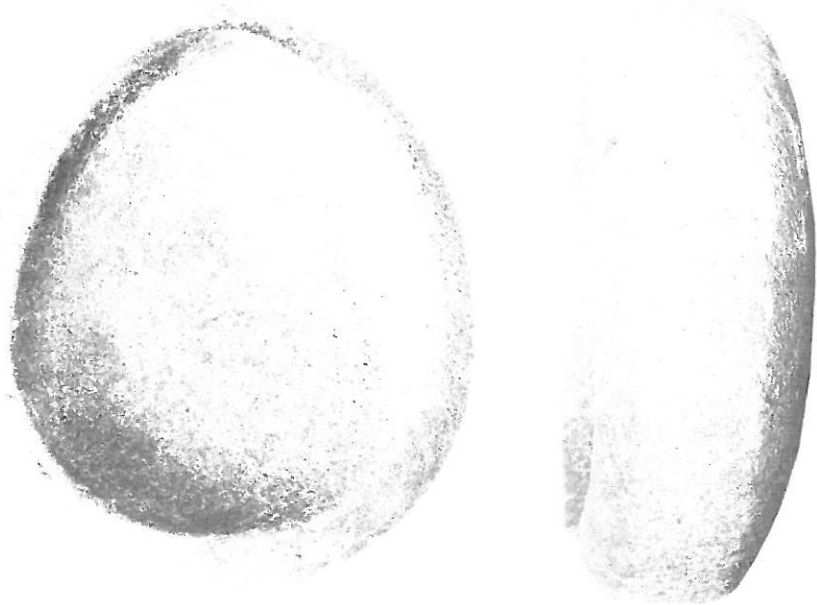


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2

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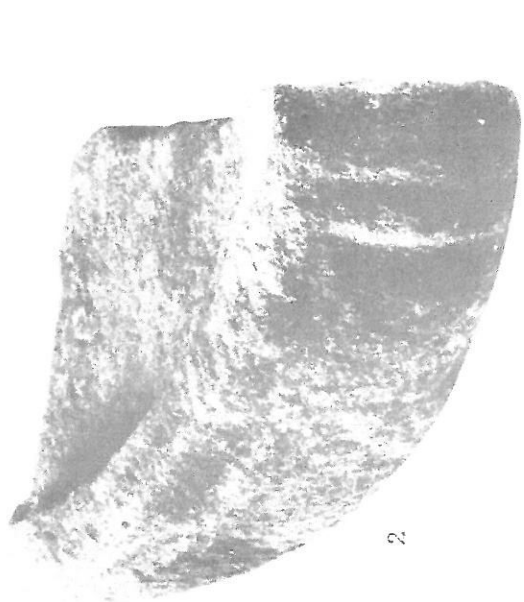


2



1

SCALE 1:2



2



3



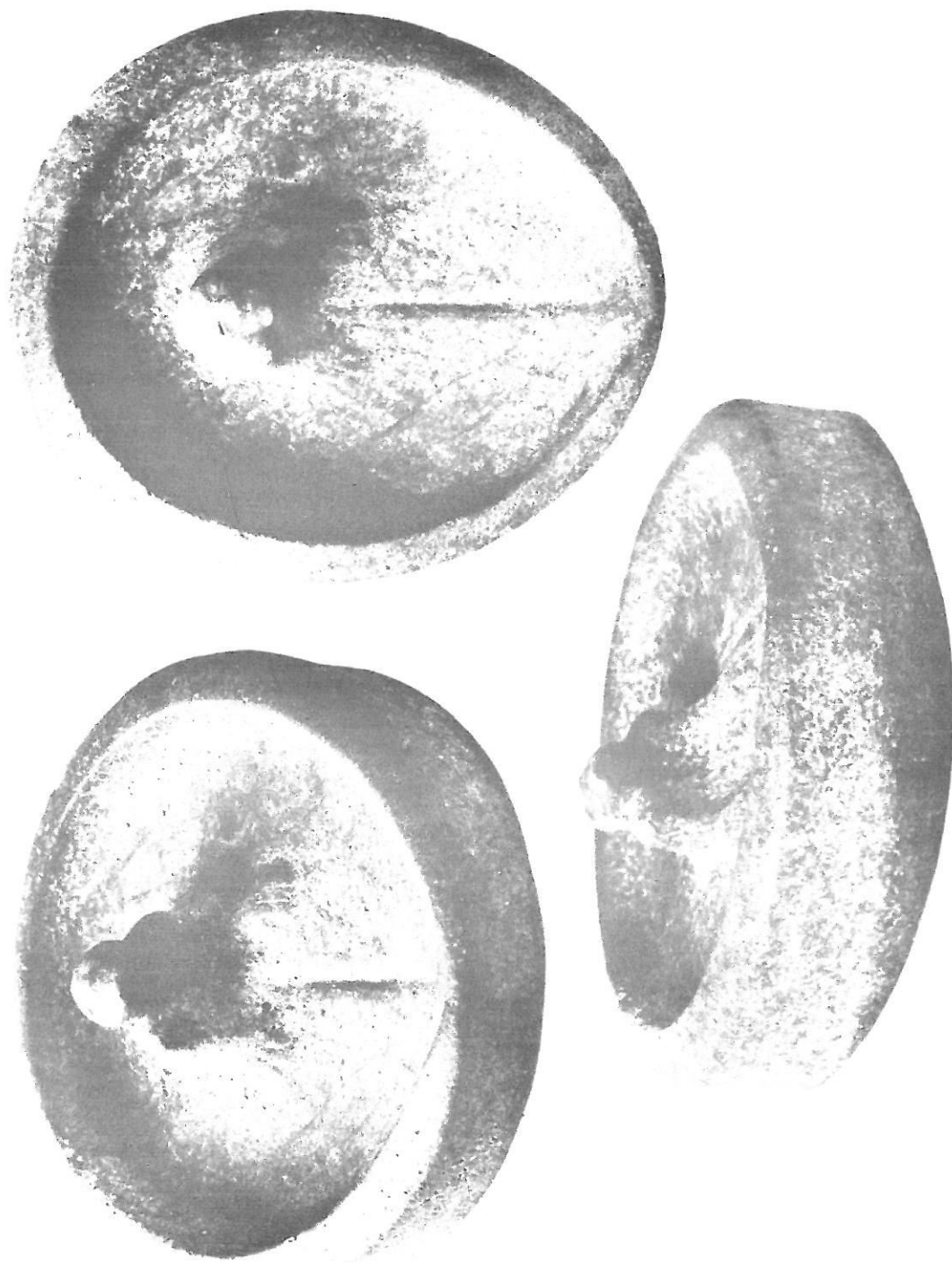
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SCALE 1:2



SCALE 1:2



1



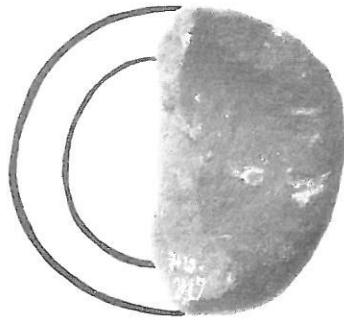
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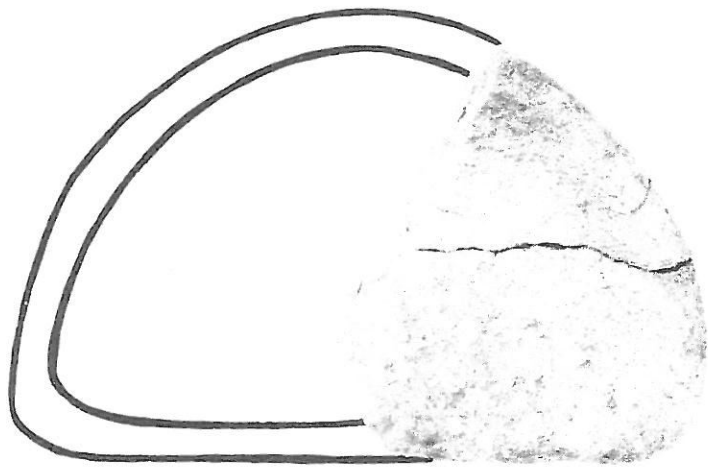
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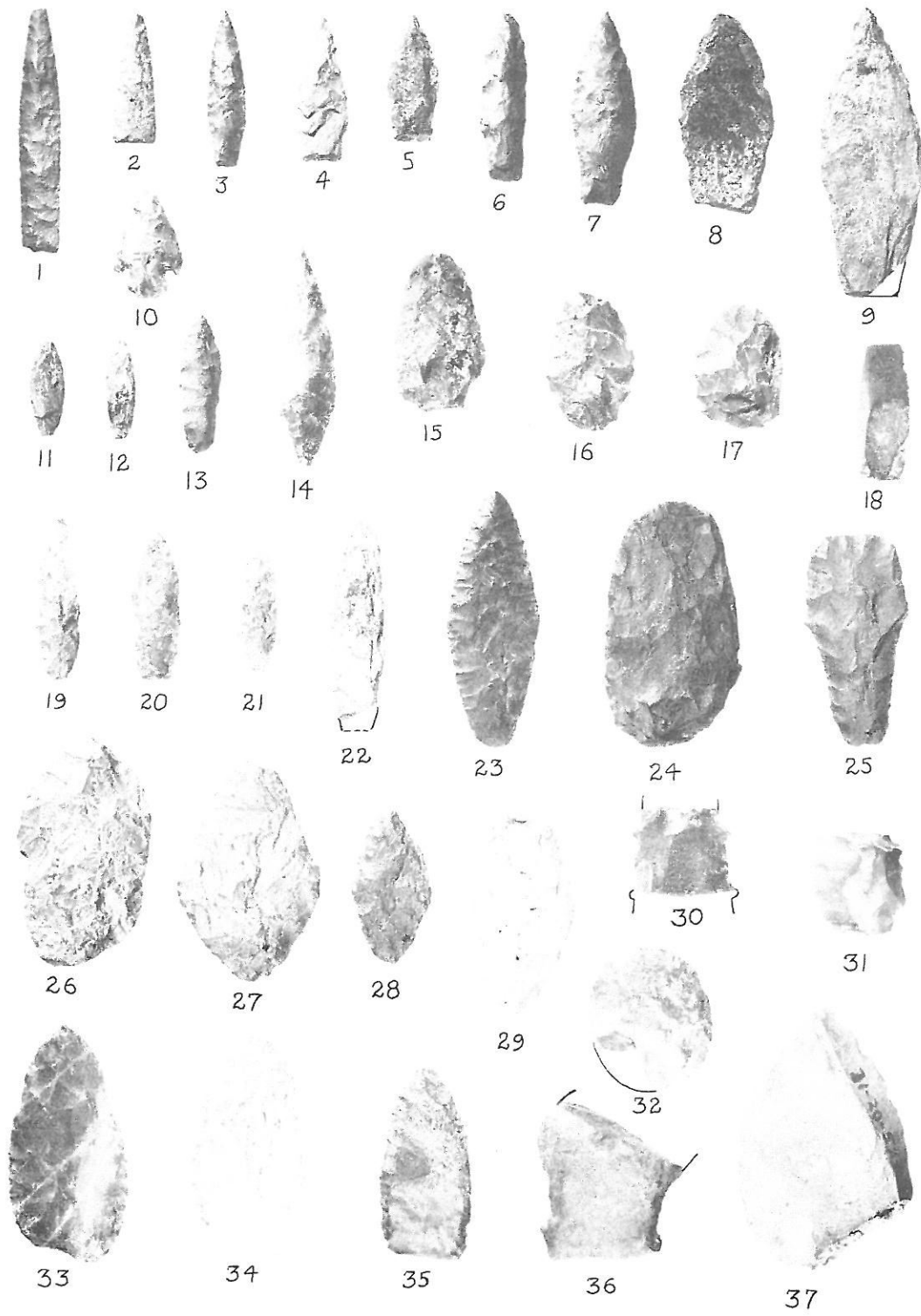


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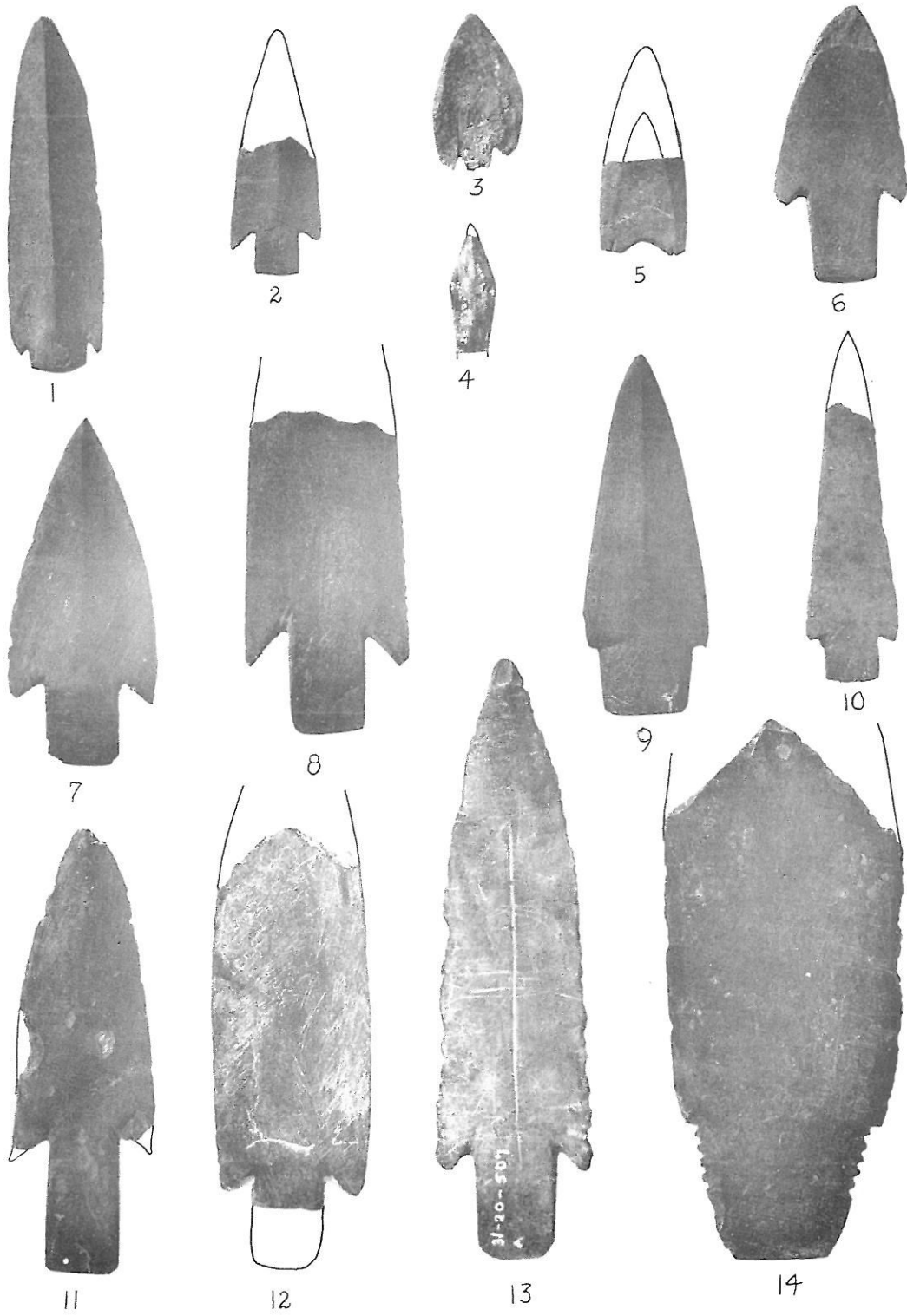


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SCALE 1:2

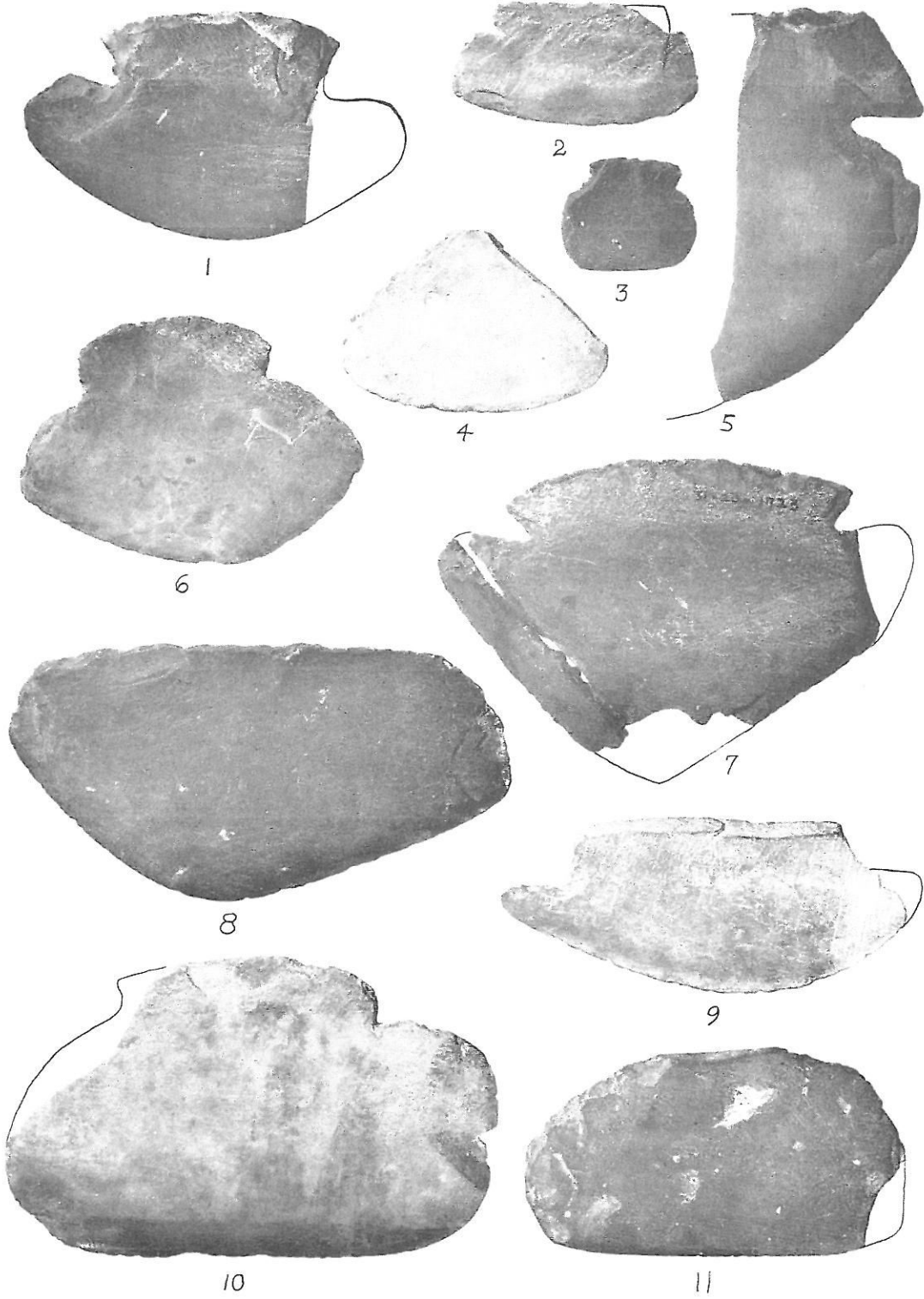


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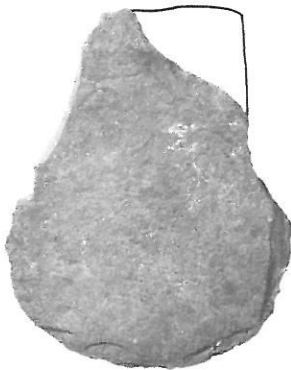
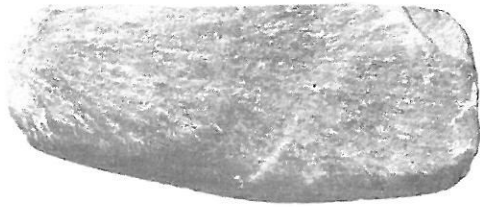




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SCALE 1:2



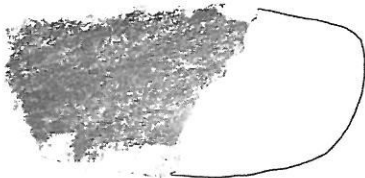
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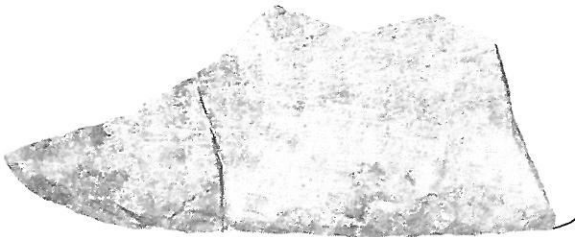
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2



3



4



5

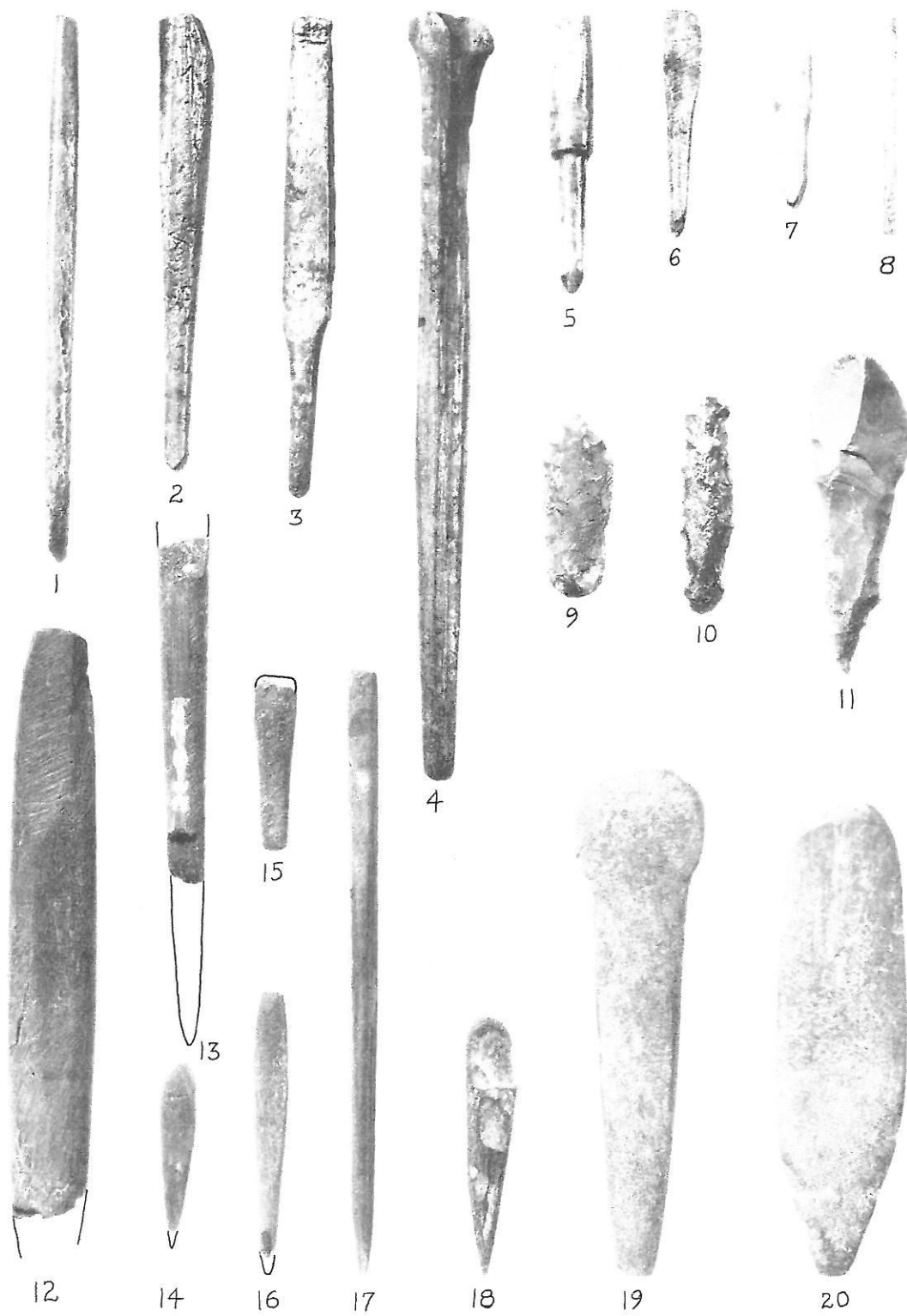


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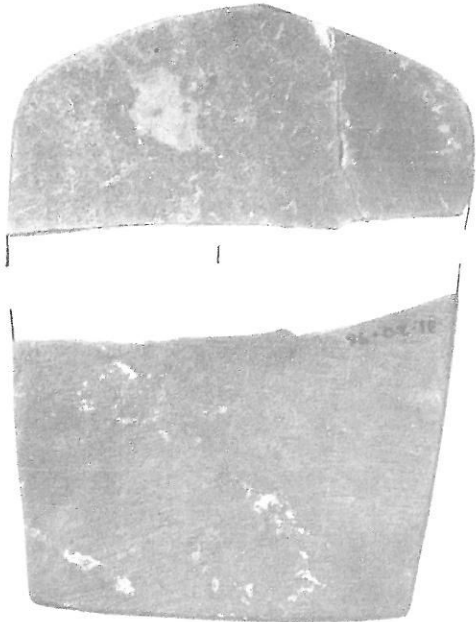


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SCALE 1:1



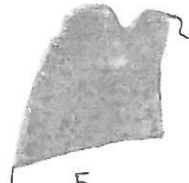
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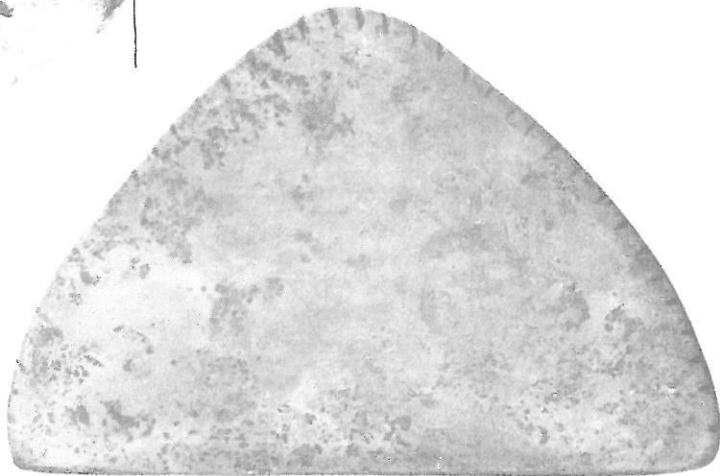
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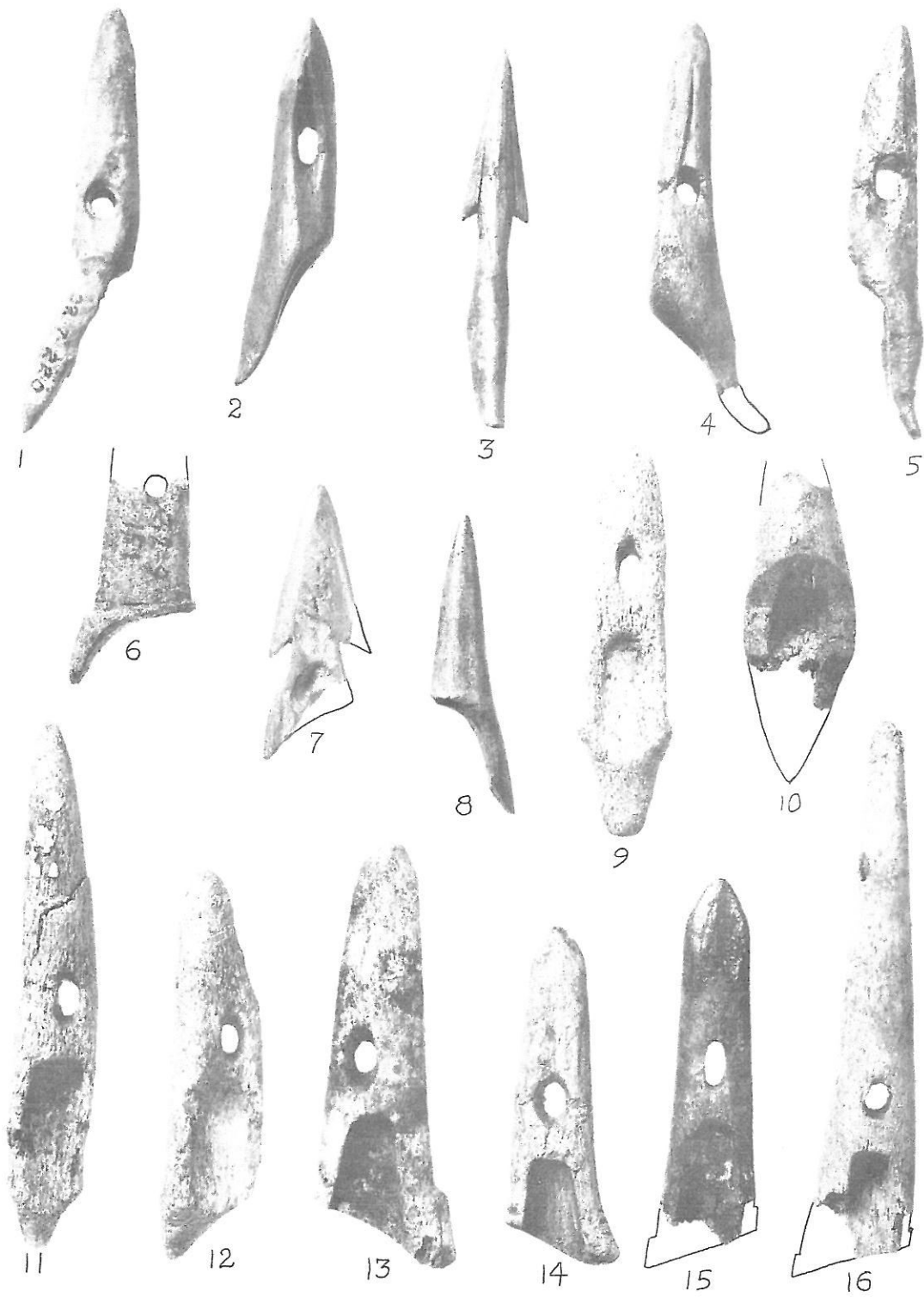


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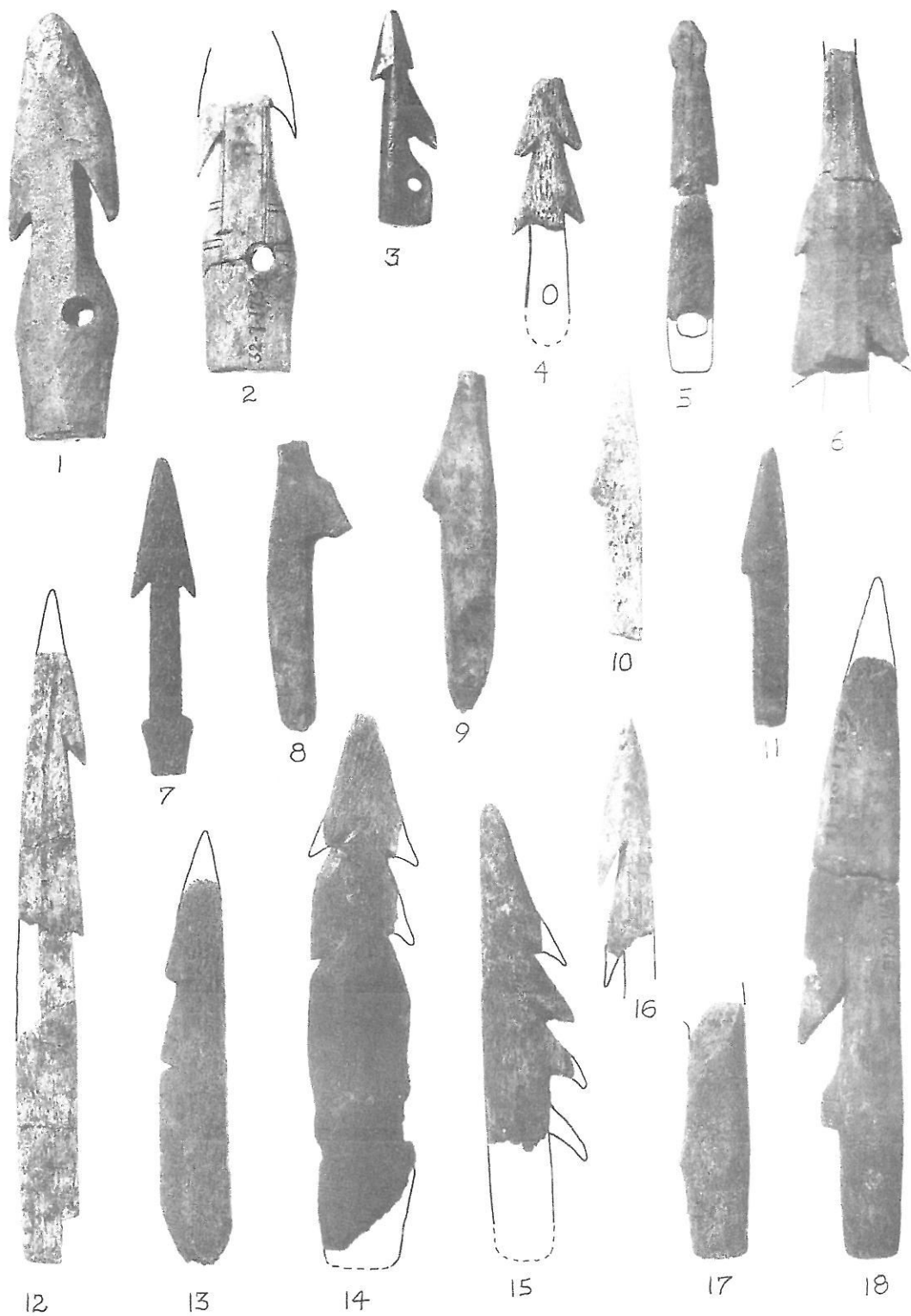


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SCALE 2:3

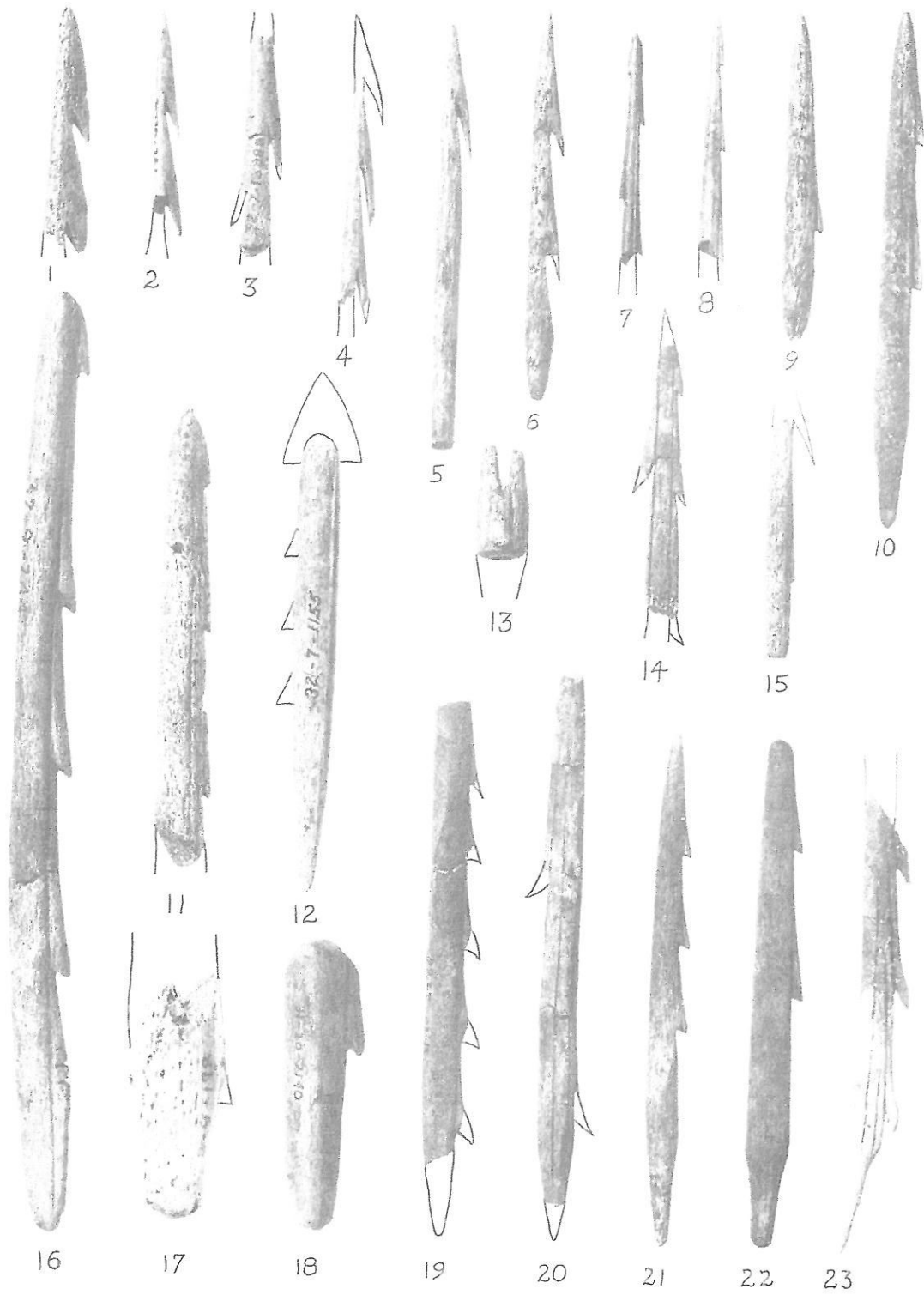




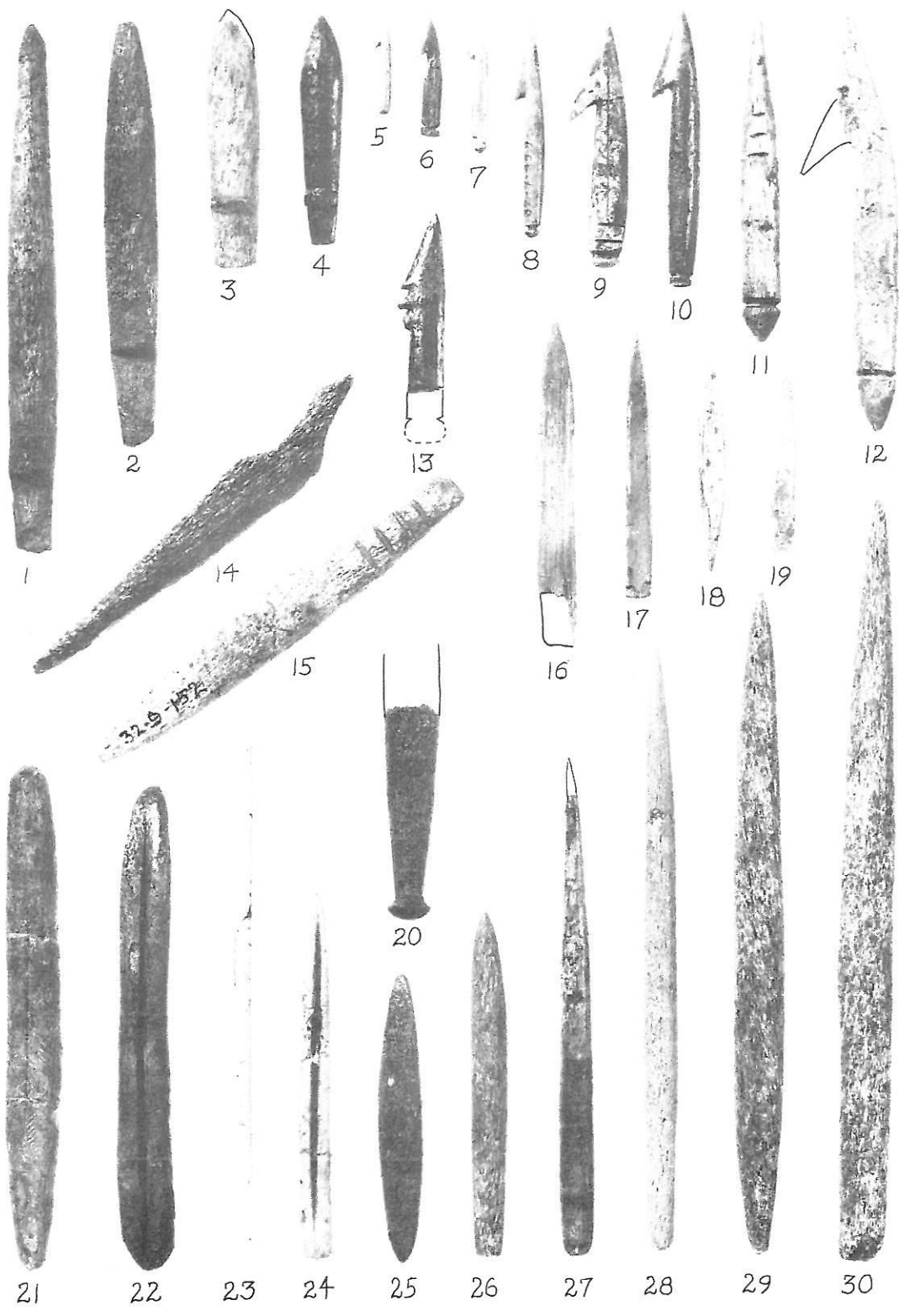
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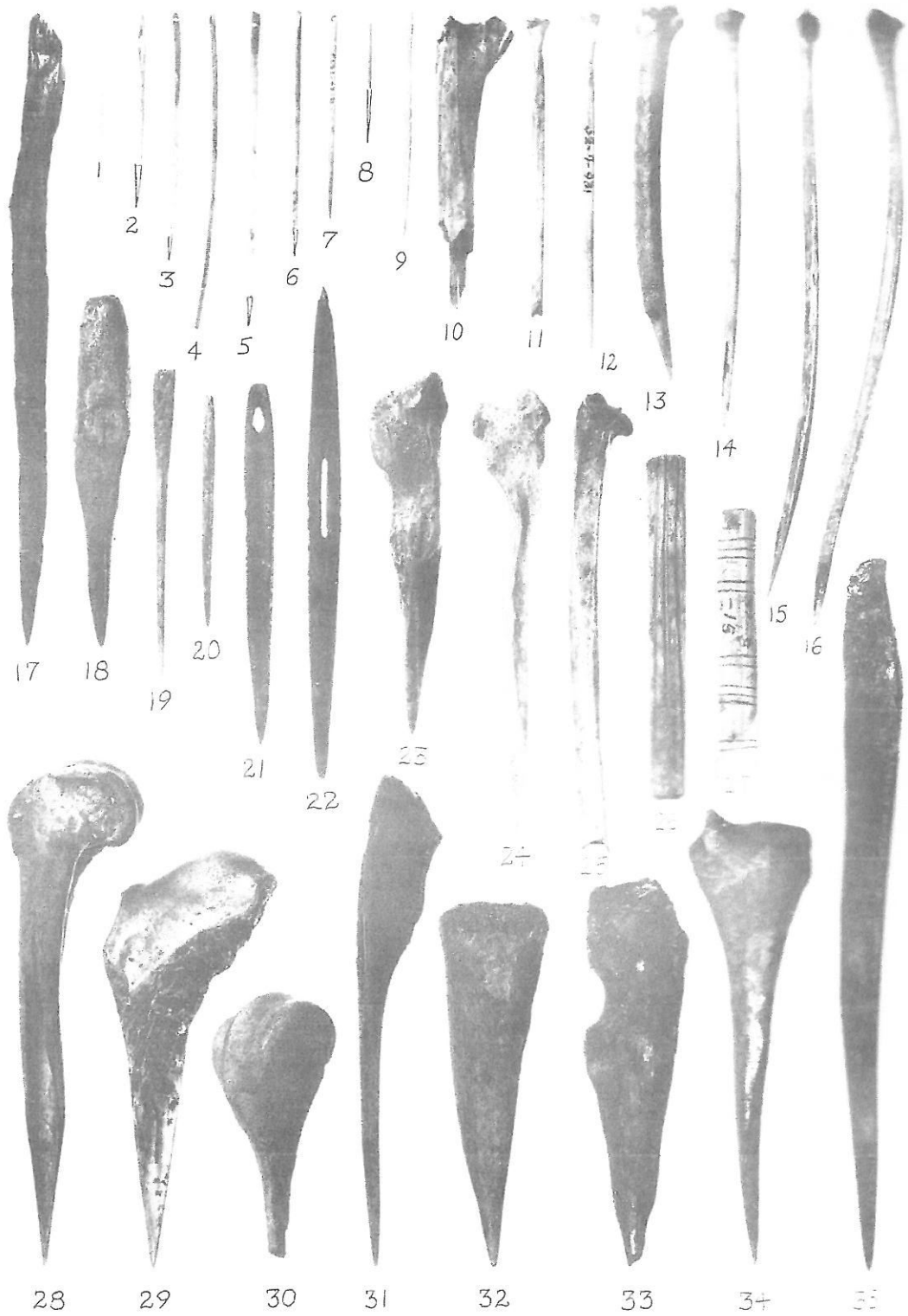
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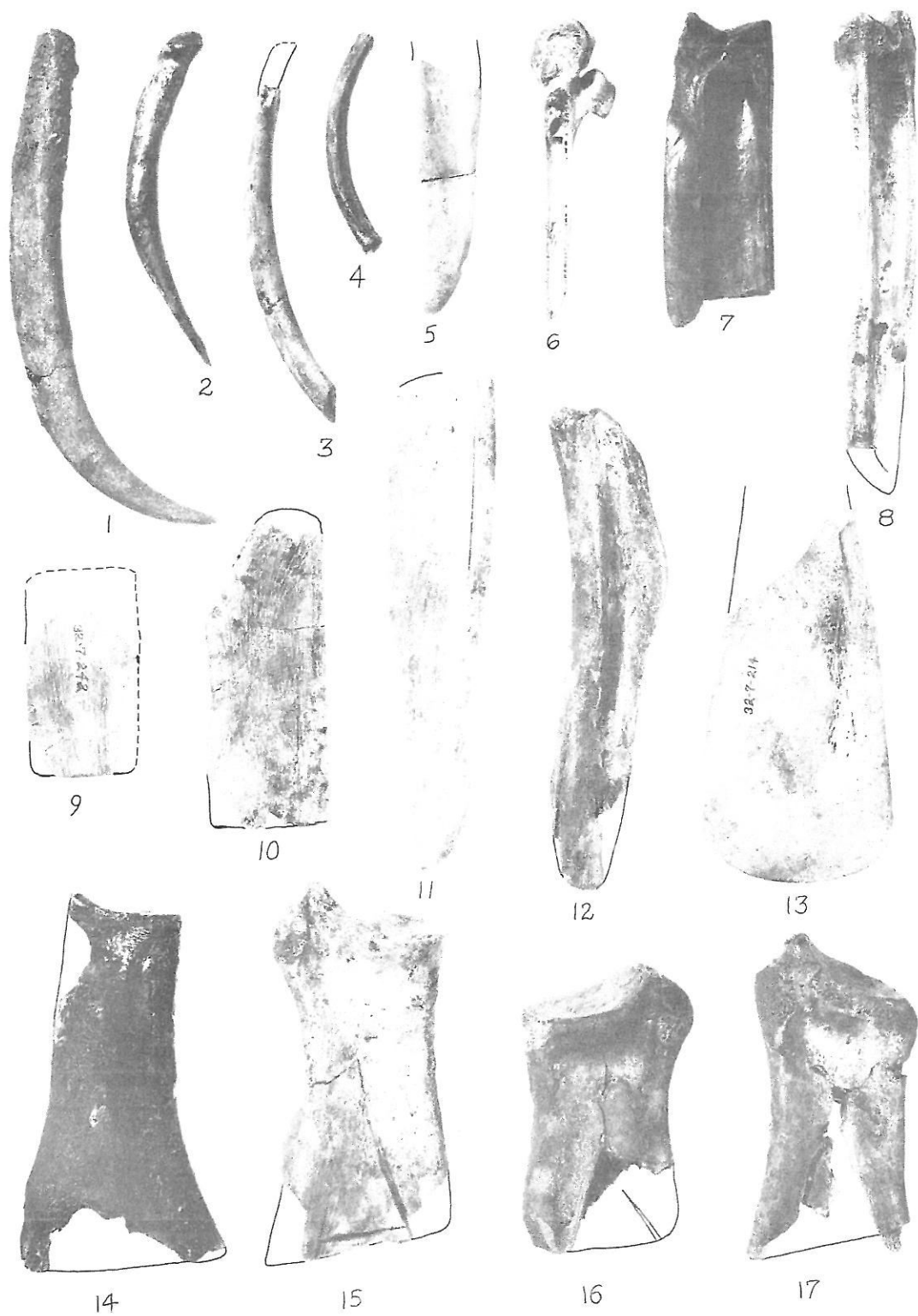
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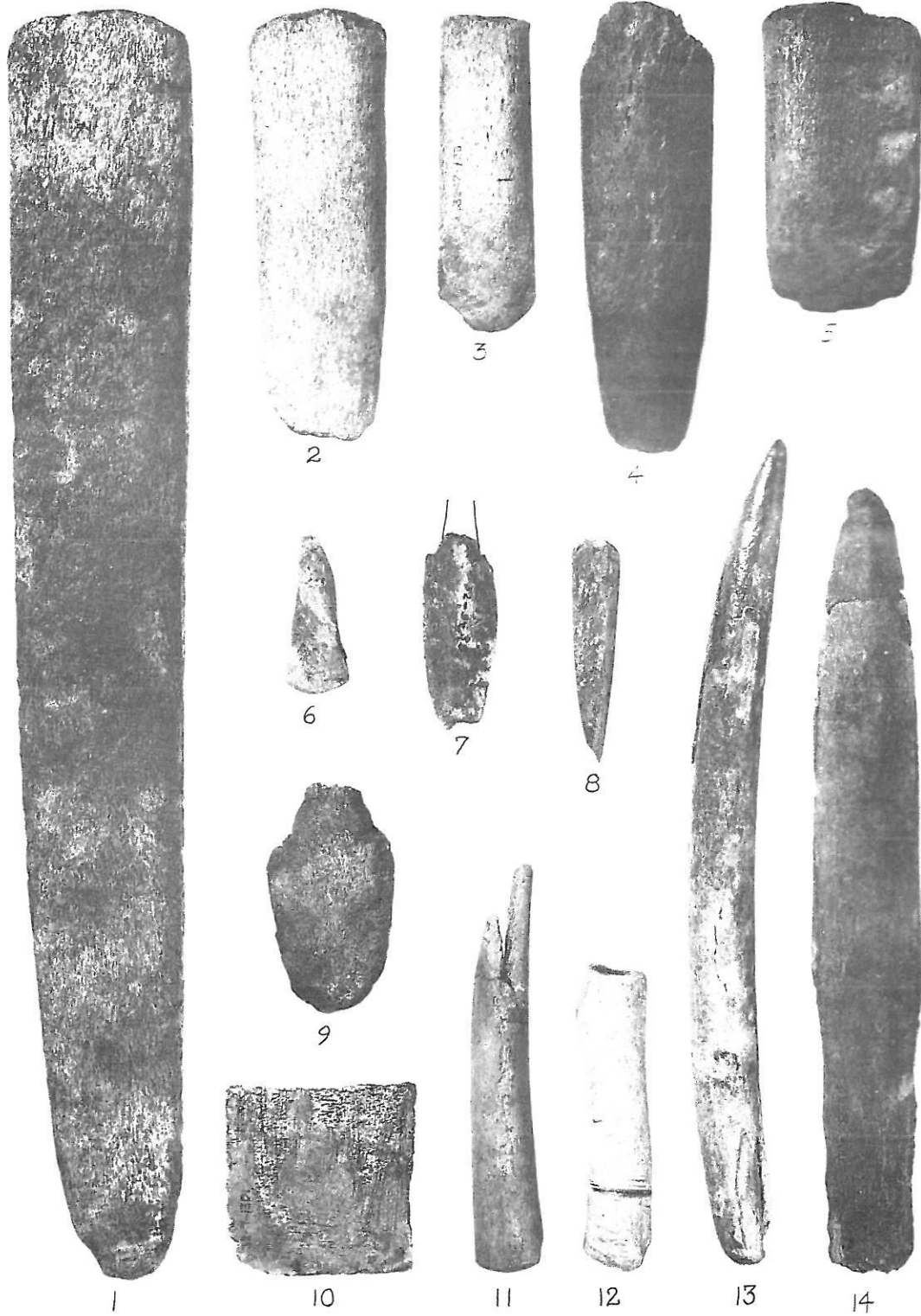
SCALE 1:1



SCALE 3:4



SCALE 1:2



SCALE 1:2



SCALE 1:2

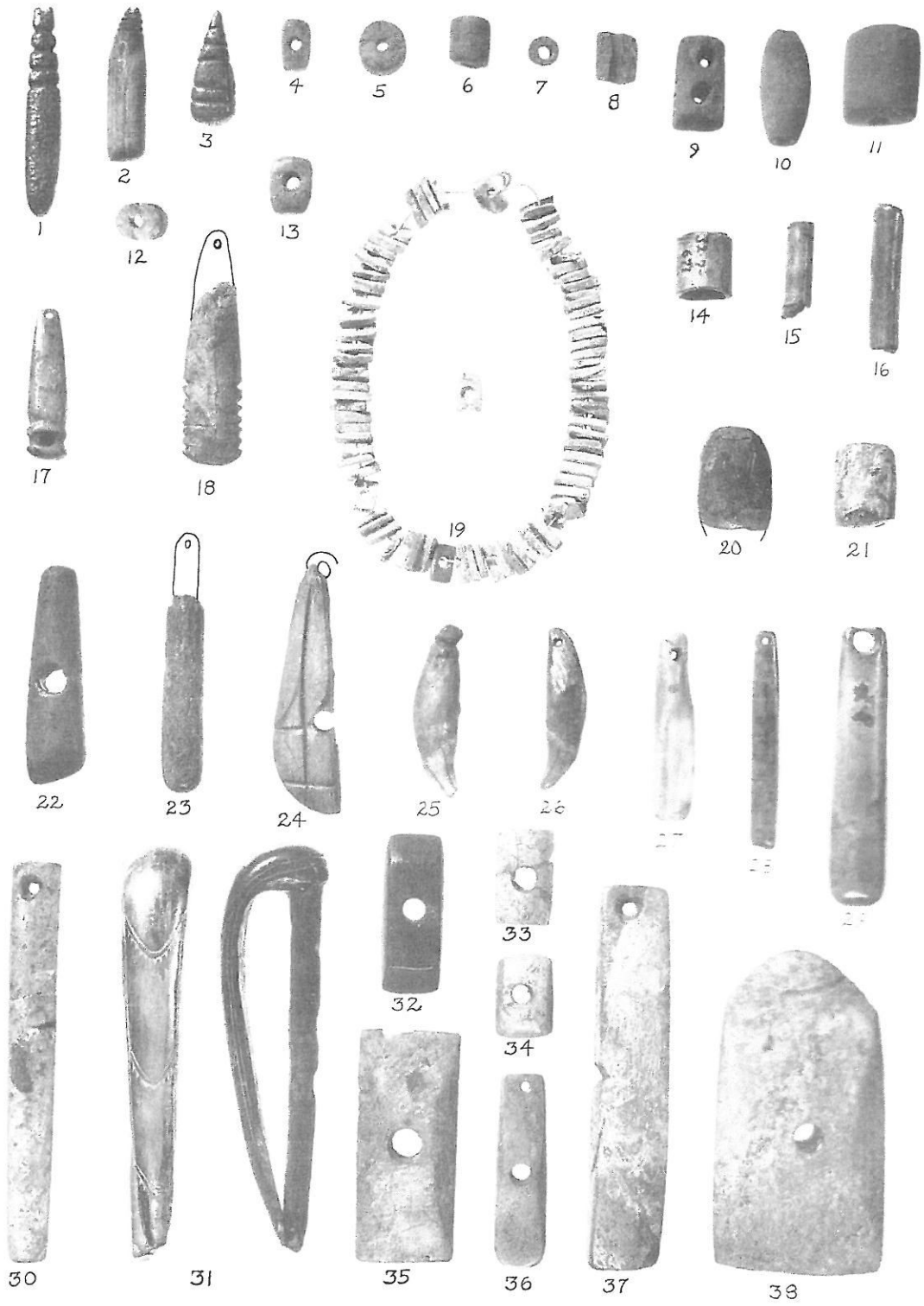




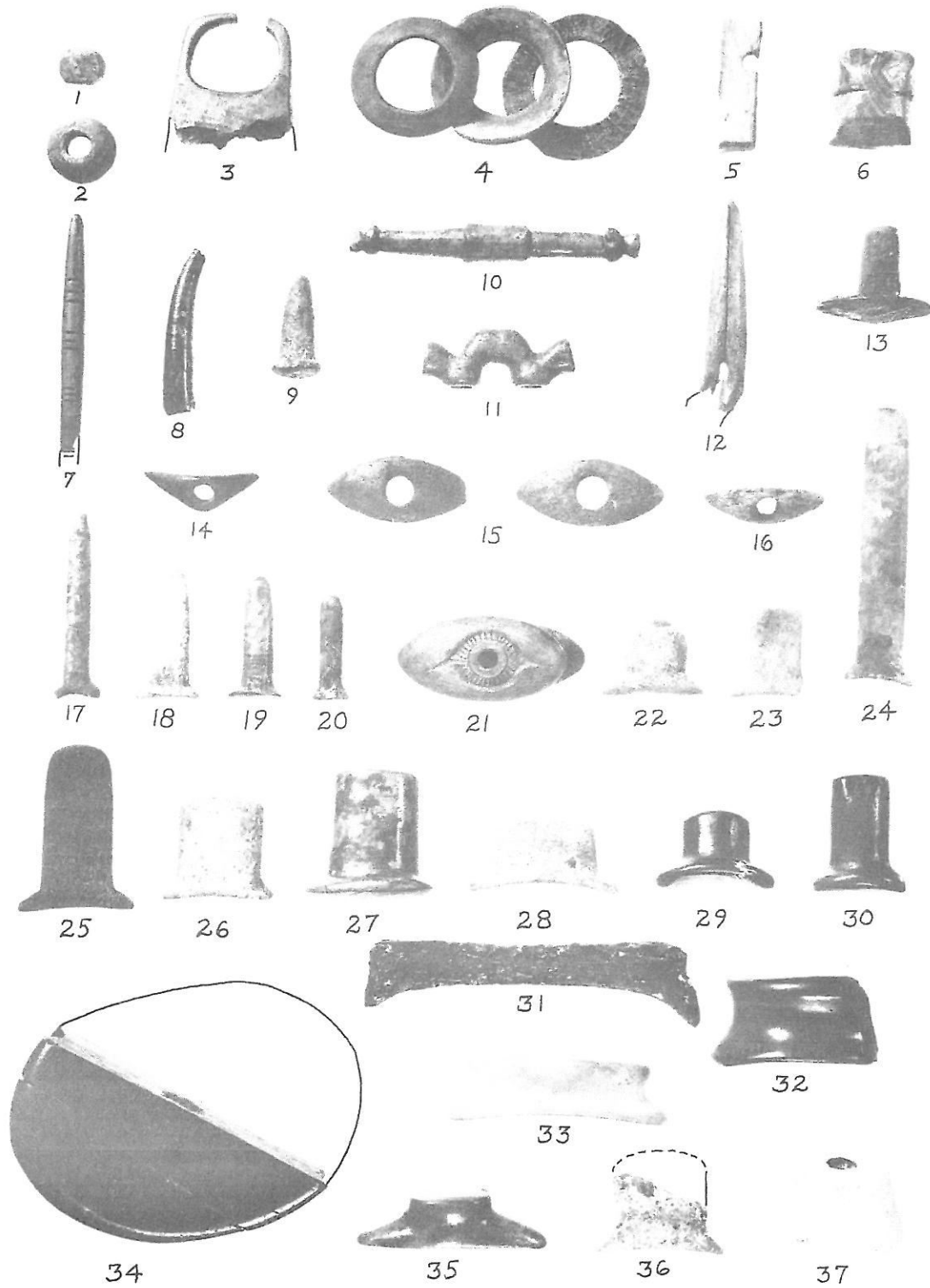
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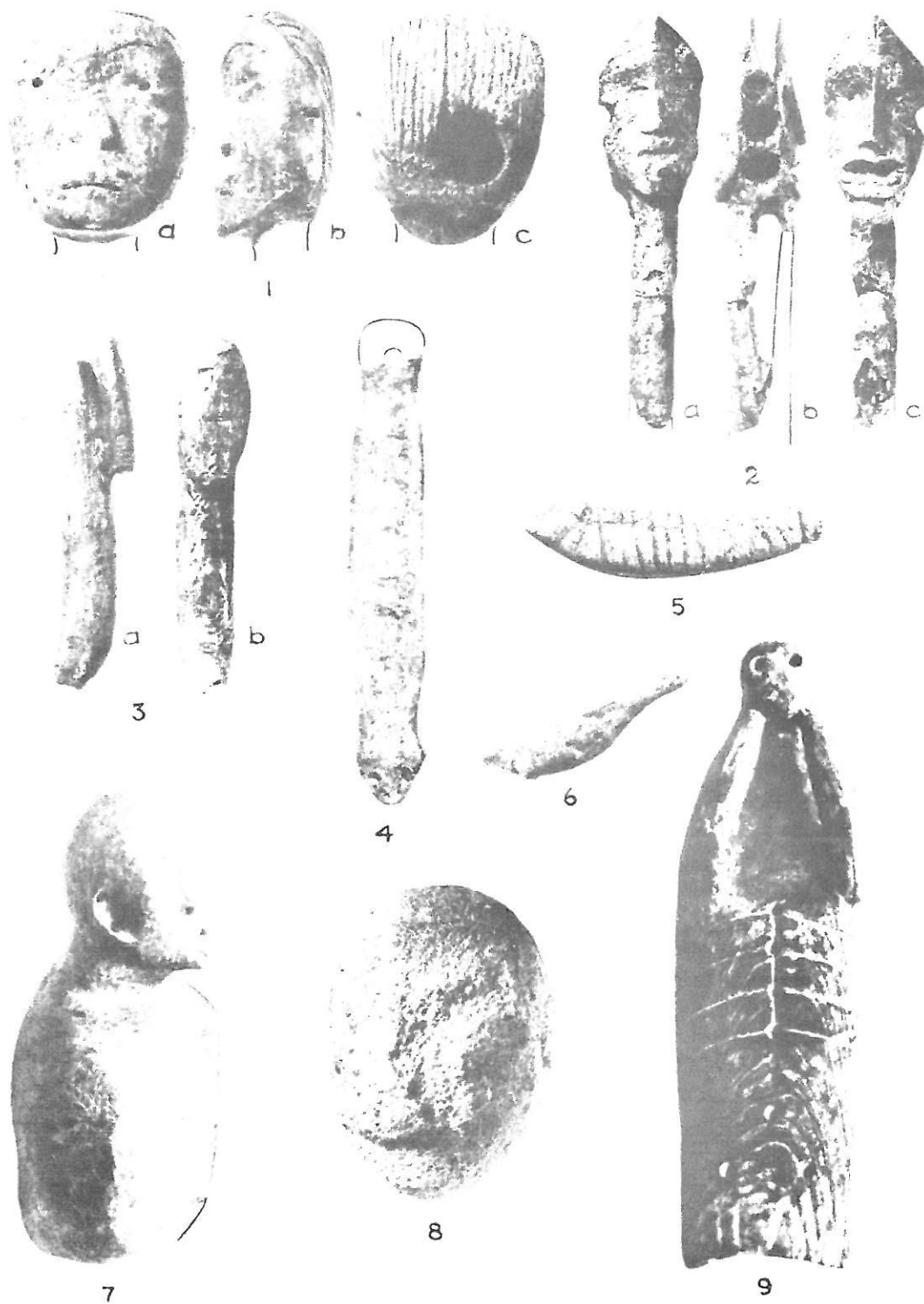
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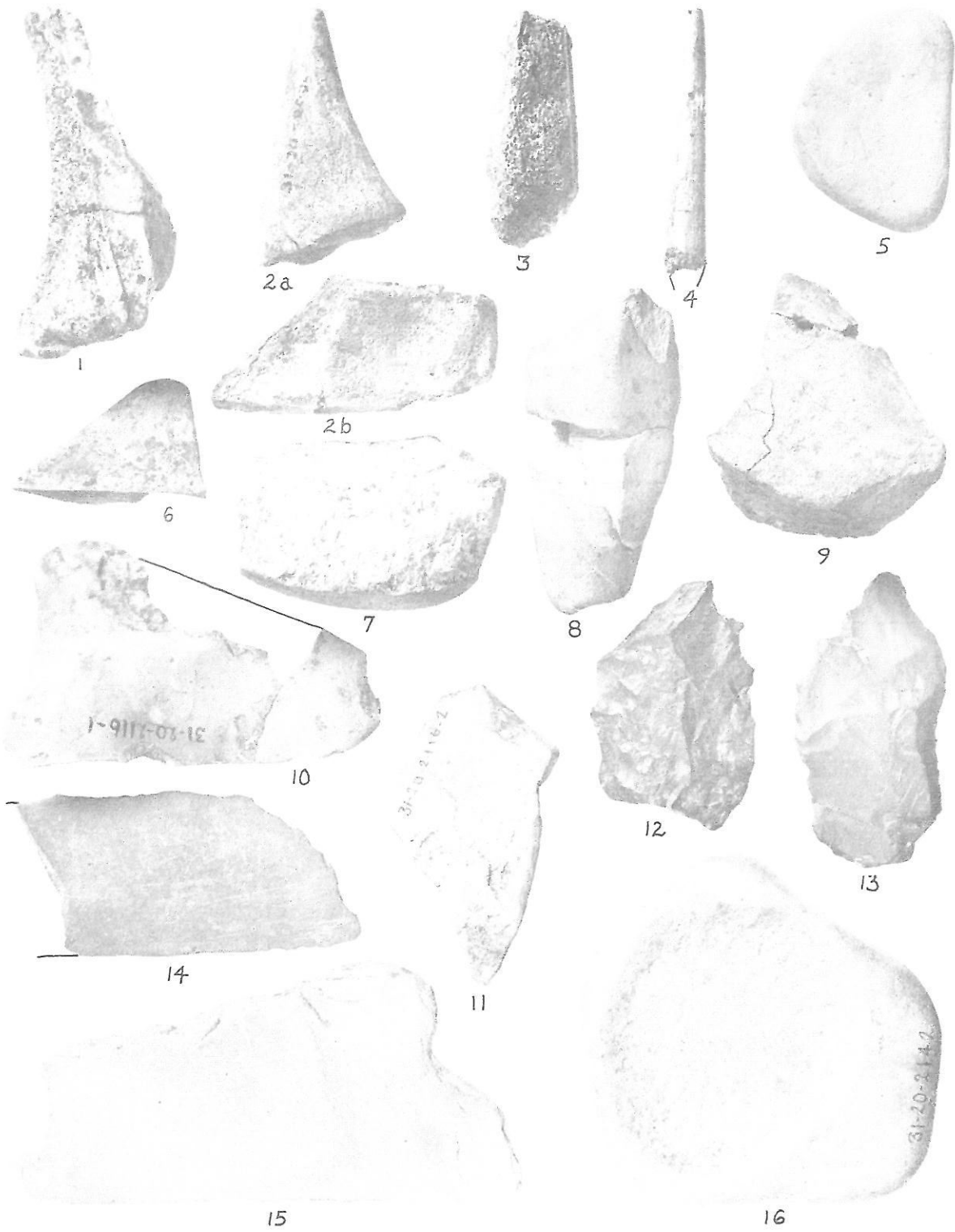
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SCALE 3:4



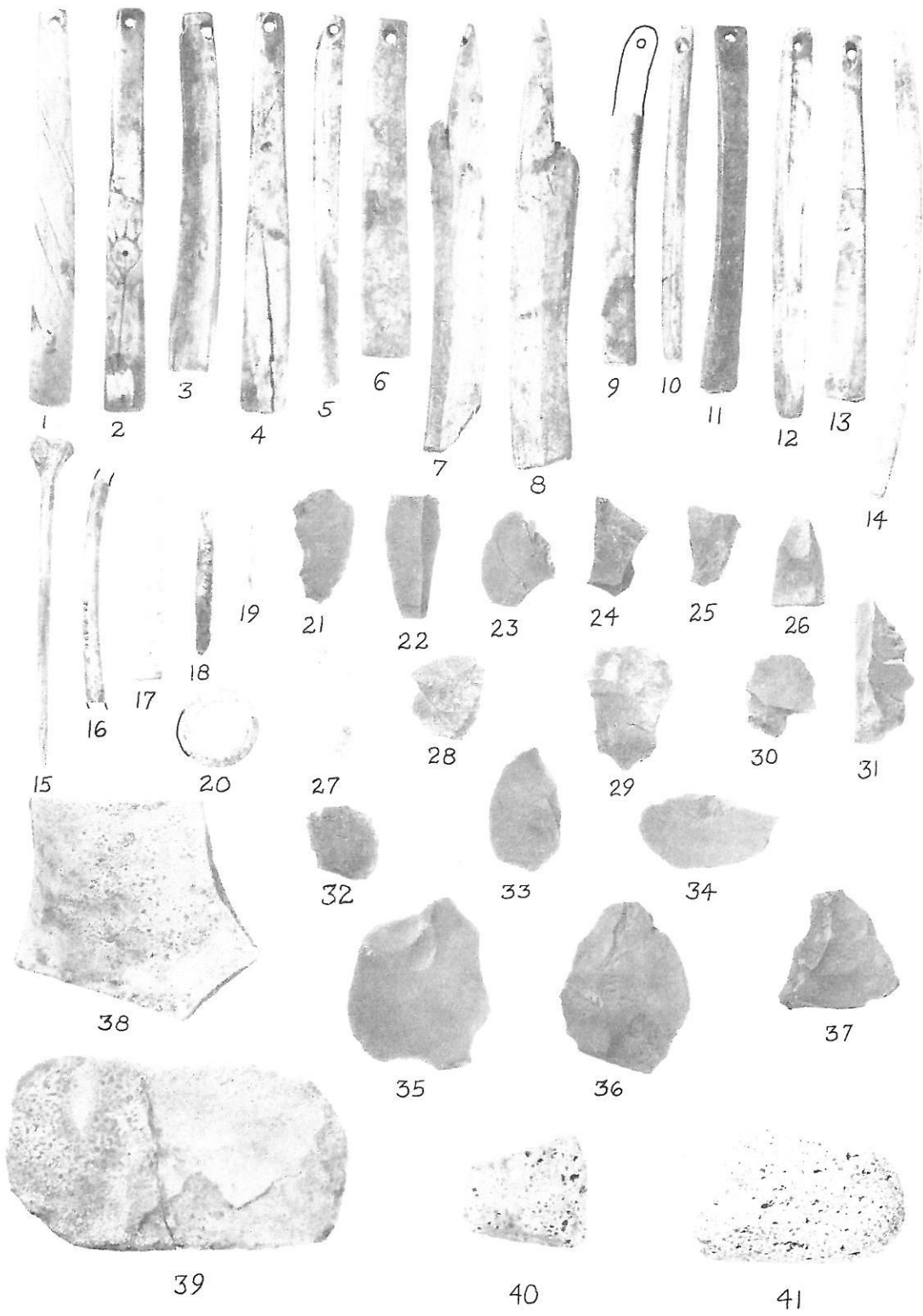
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SCALE 6:7



SCALE 1:2



SCALE 1:2





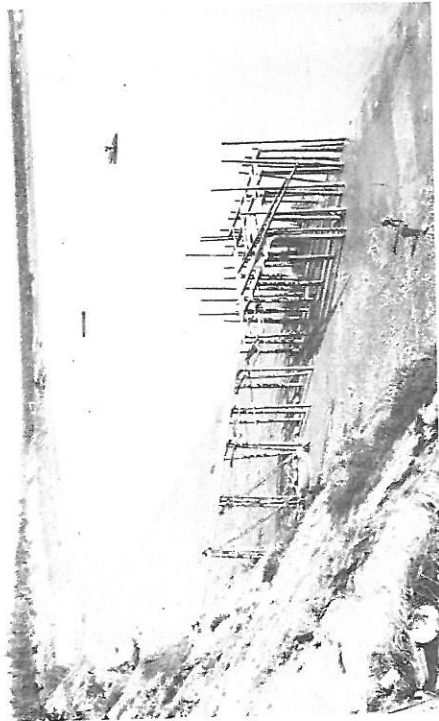
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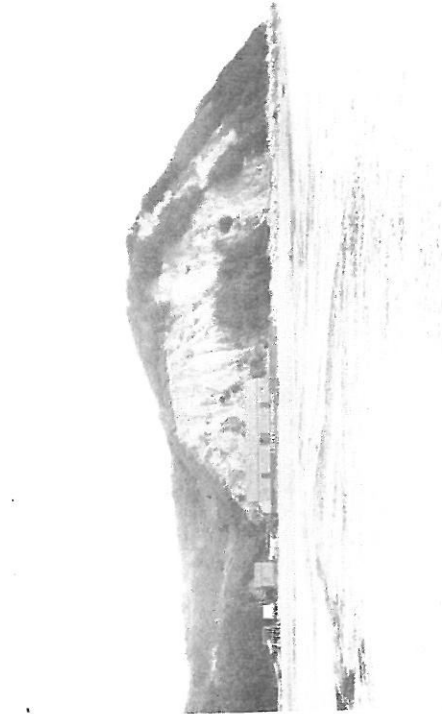
B



D



A



C



B



D



A



C

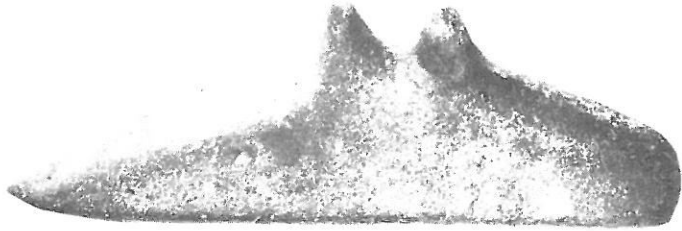


30-25-155

1



2

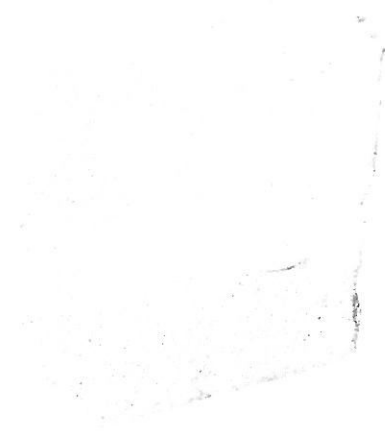


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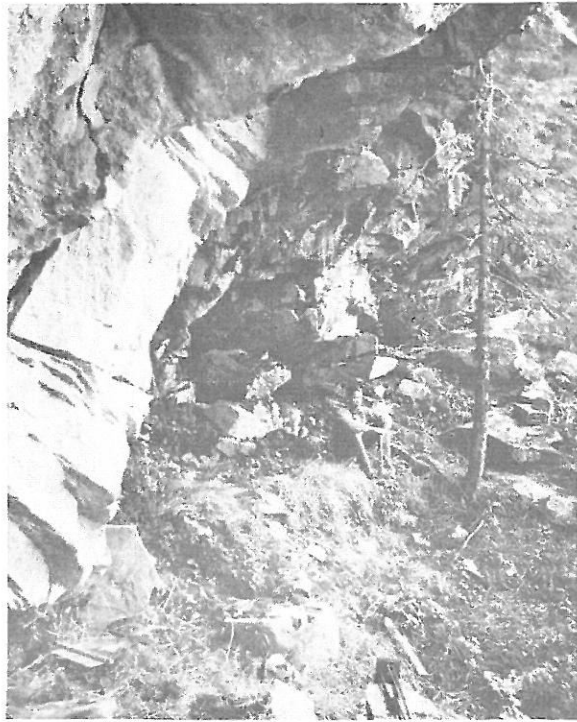


4

SCALE 1:3



SCALE 7:8



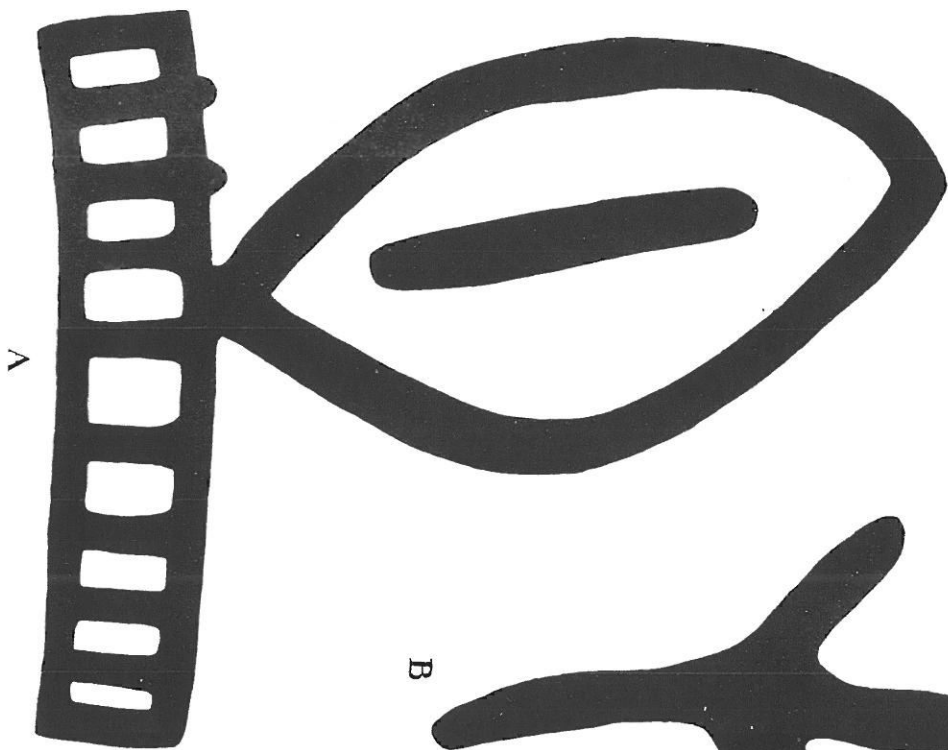
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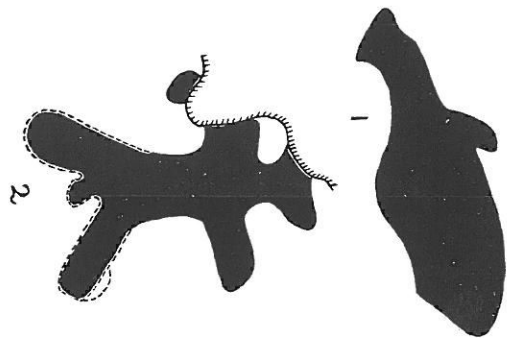
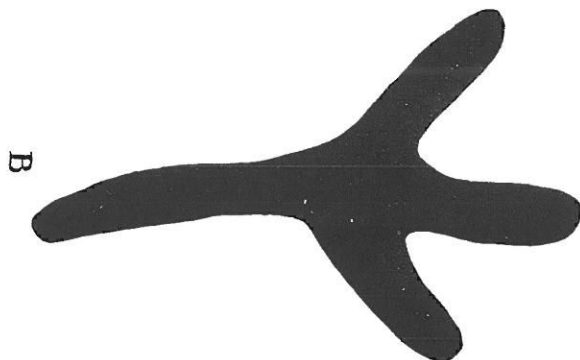
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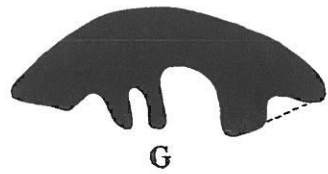
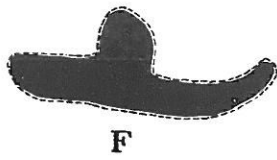
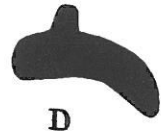
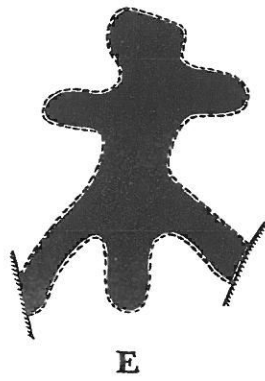
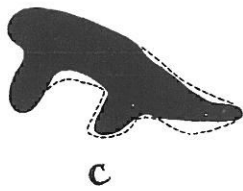
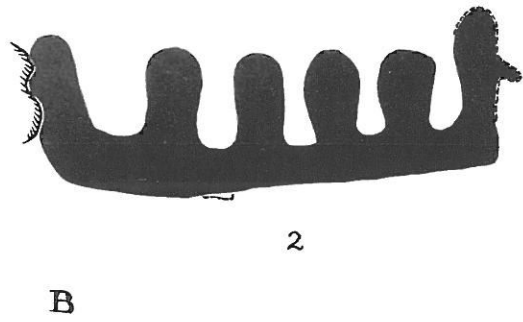
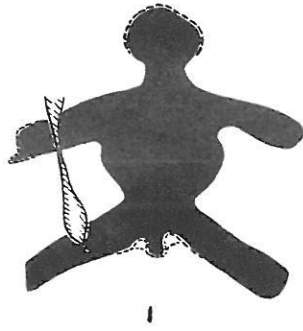
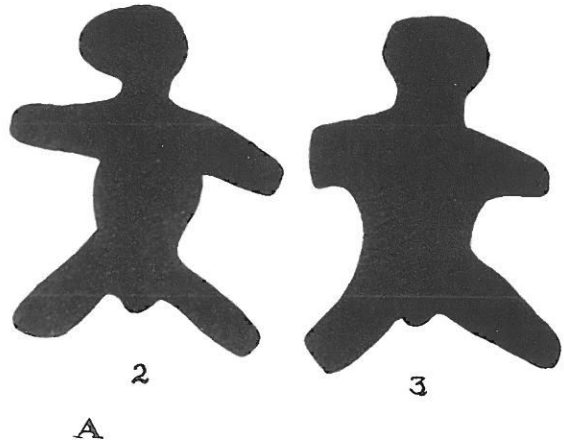
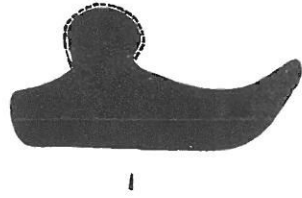


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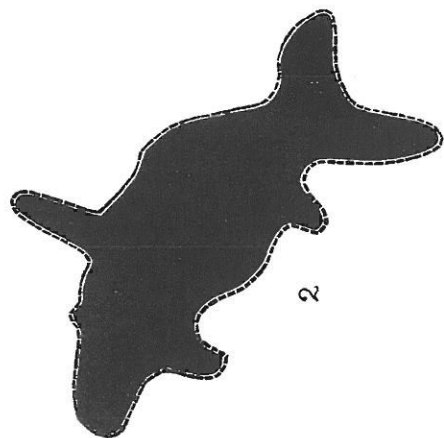
Scale 1:3





SCALE 1:3

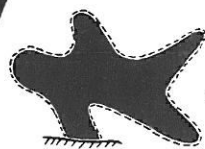




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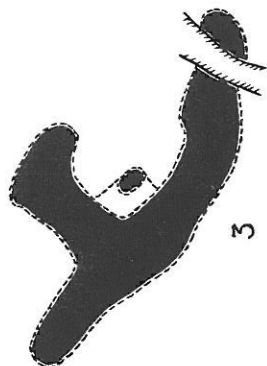
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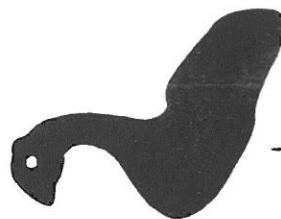
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4

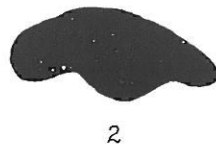
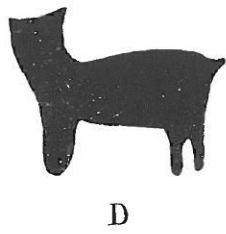
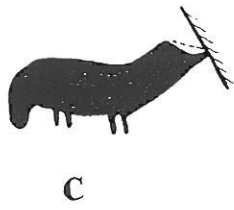
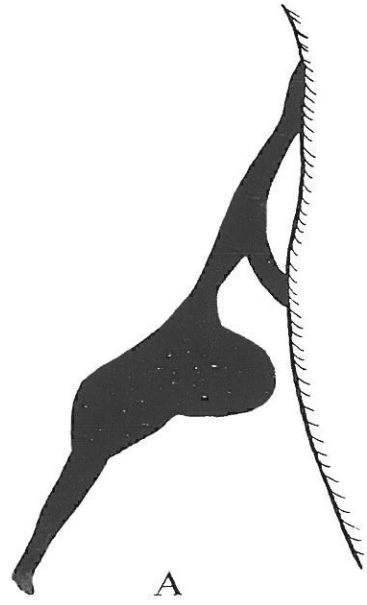


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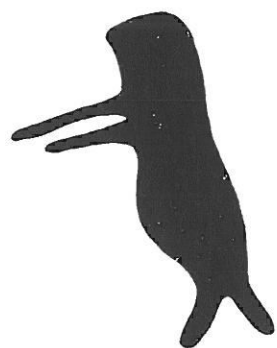
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SCALE 1:3



E

SCALE 1:1



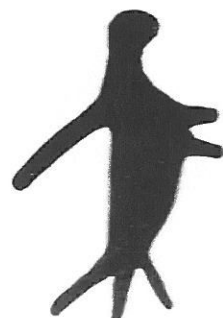
A



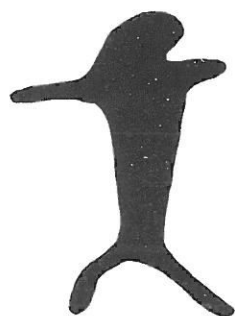
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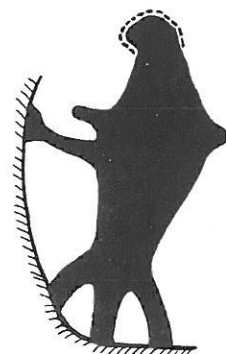
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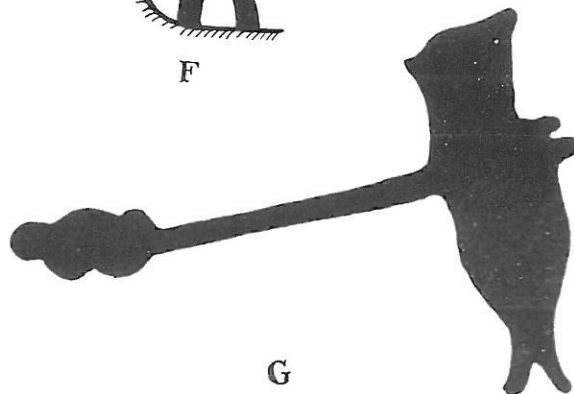
D



E



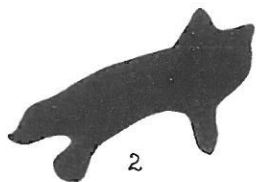
F



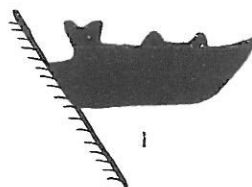
G



H



2



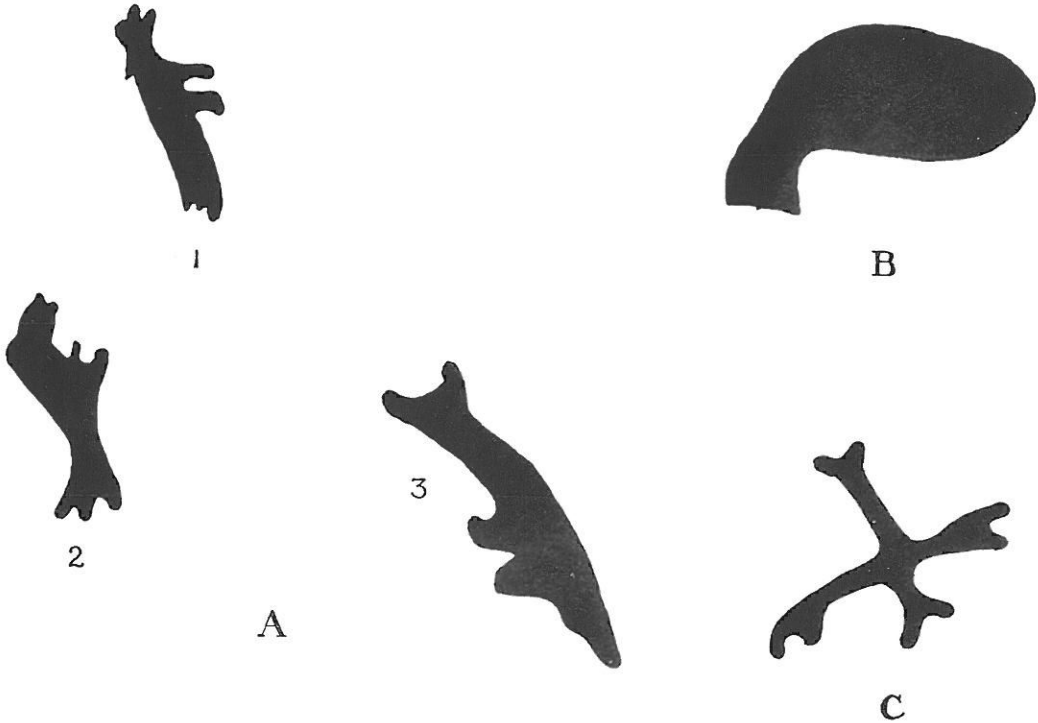
1

I



2

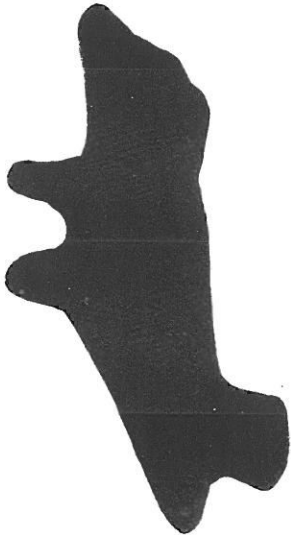
SCALE 1:1



A



D



E

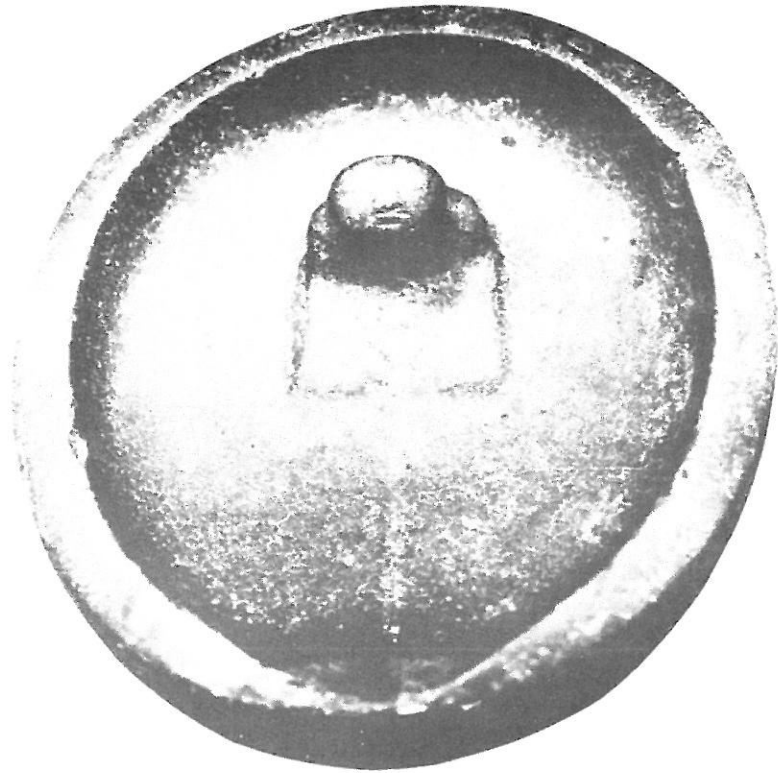
SCALE 1:1



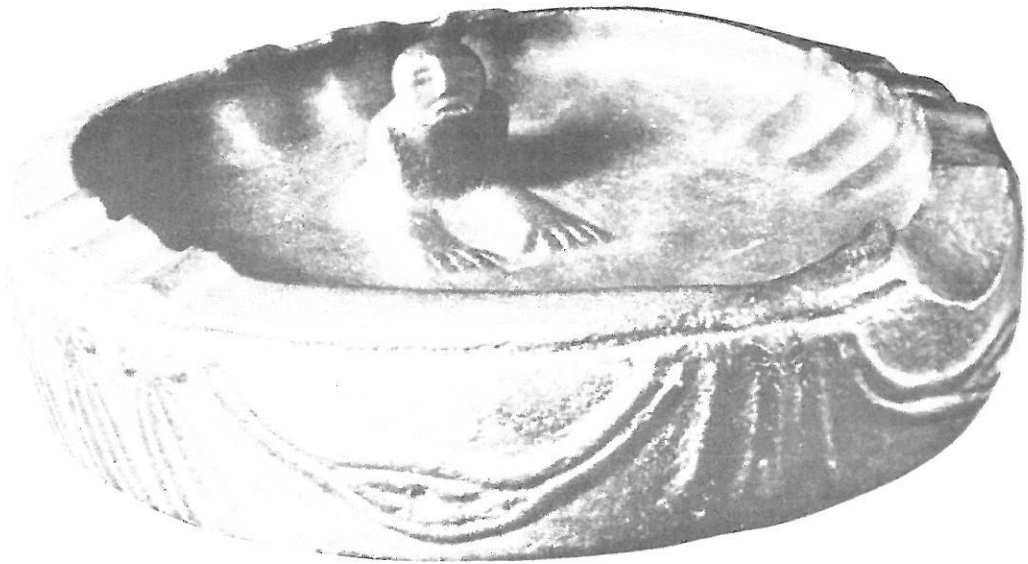
SCALE 1:2



SCALE 1:3

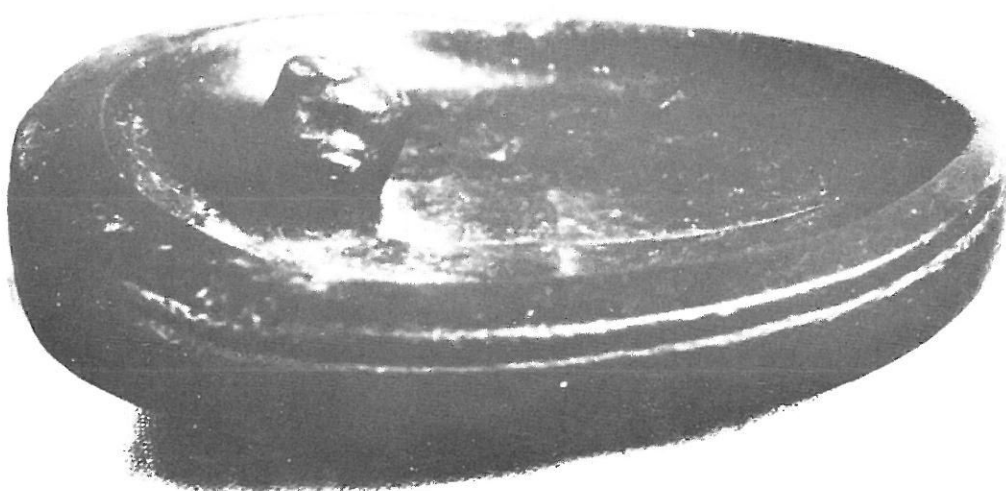
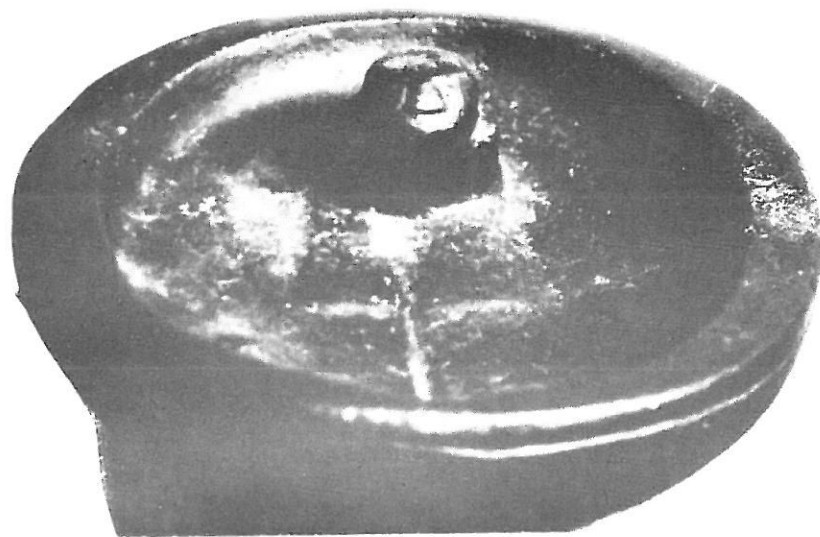


1



2

1. SCALE 2:3 (?) — 2. SCALE 2:3

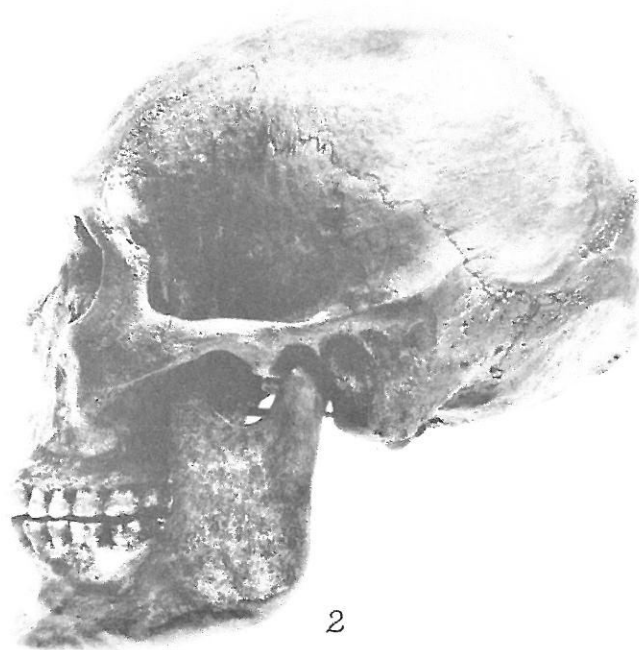


SCALE 5:8



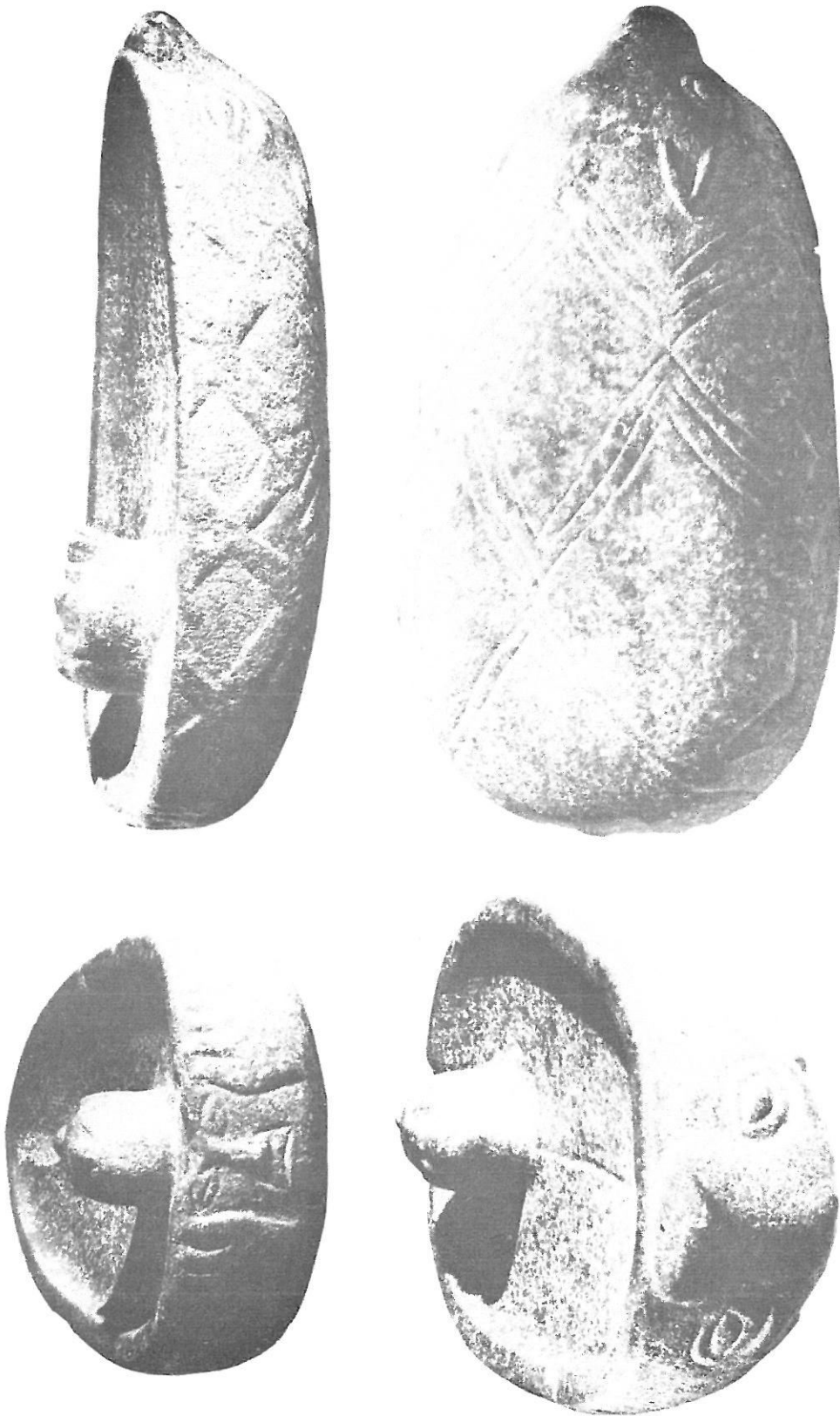


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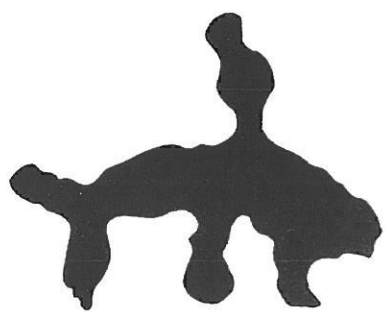


2

SCALE 1:3



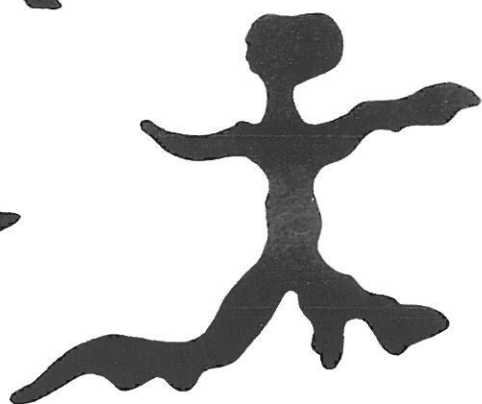
SCALE: SLIGHTLY OVER 1/3 NATURAL SIZE



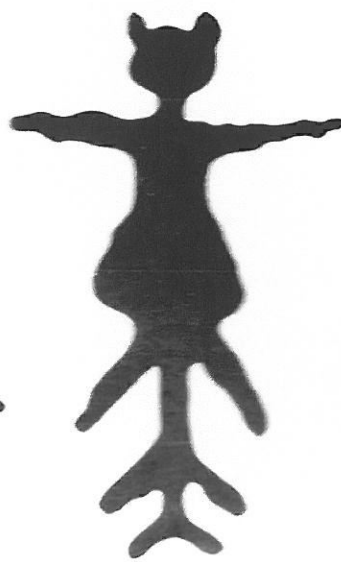
A



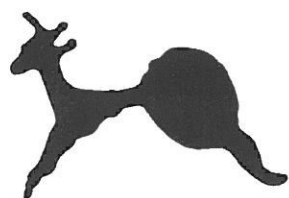
B



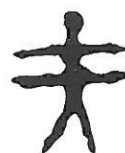
C



D



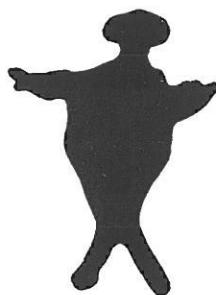
E



G



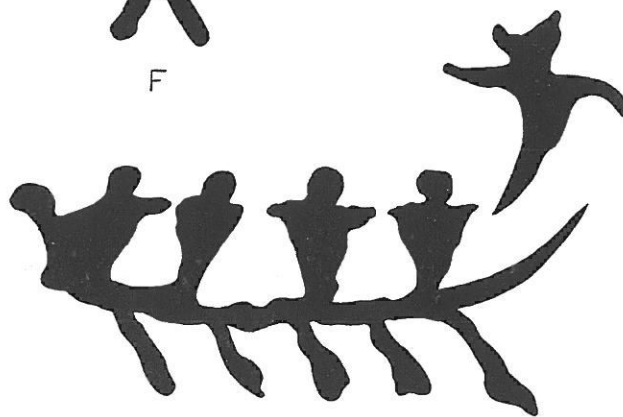
H



F



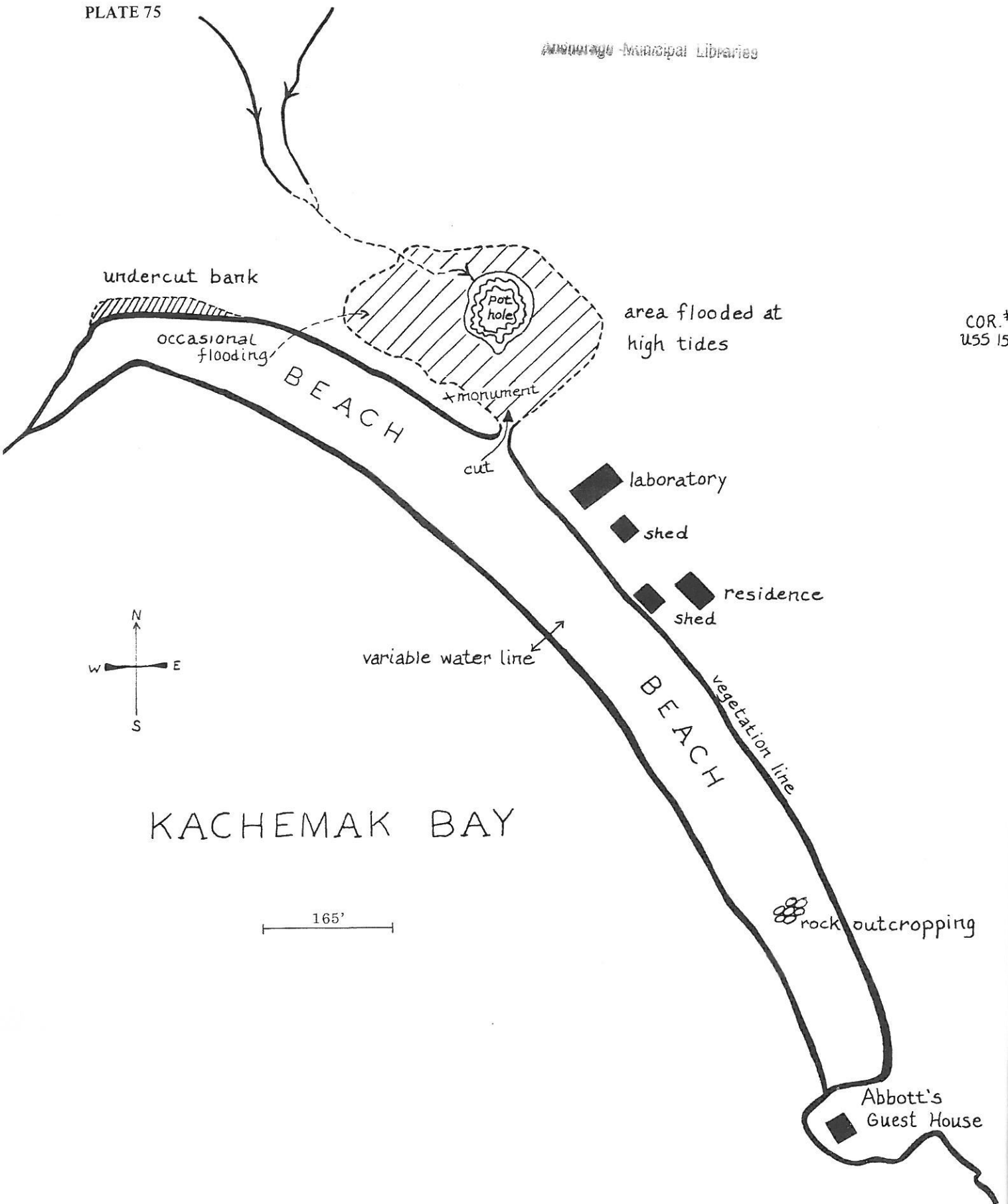
I



J

ANORAGU - Municipal Libraries

COR. #  
USS 150

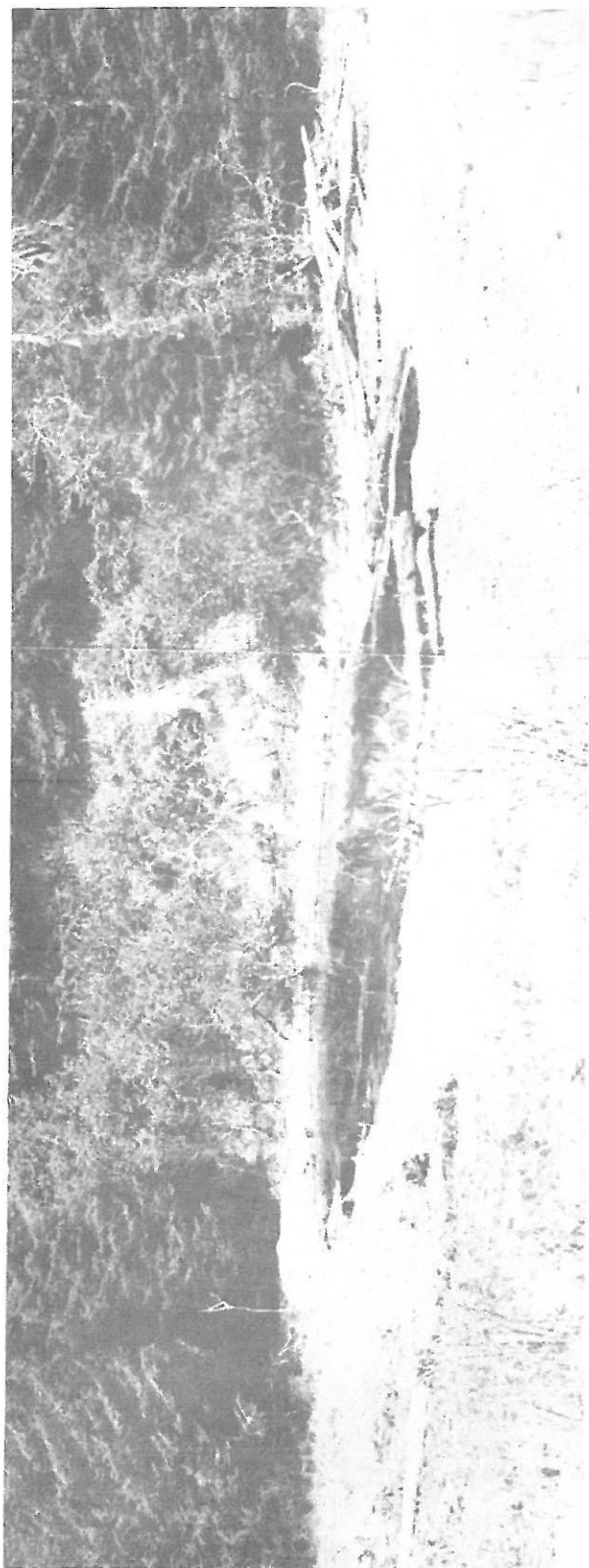


KACHEMAK BAY

165'

YUKON ISLAND

W.M.C.  
USS



A



C



B

#2

5076

#3

50



1



2



3



4



5



6



7



8



9



10



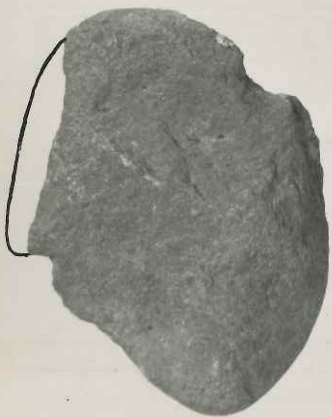
11



12



13



14



15



300

Plate 45 16  
Steel 3/4

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PHILADELPHIA, PA 19104

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neg. 12 259

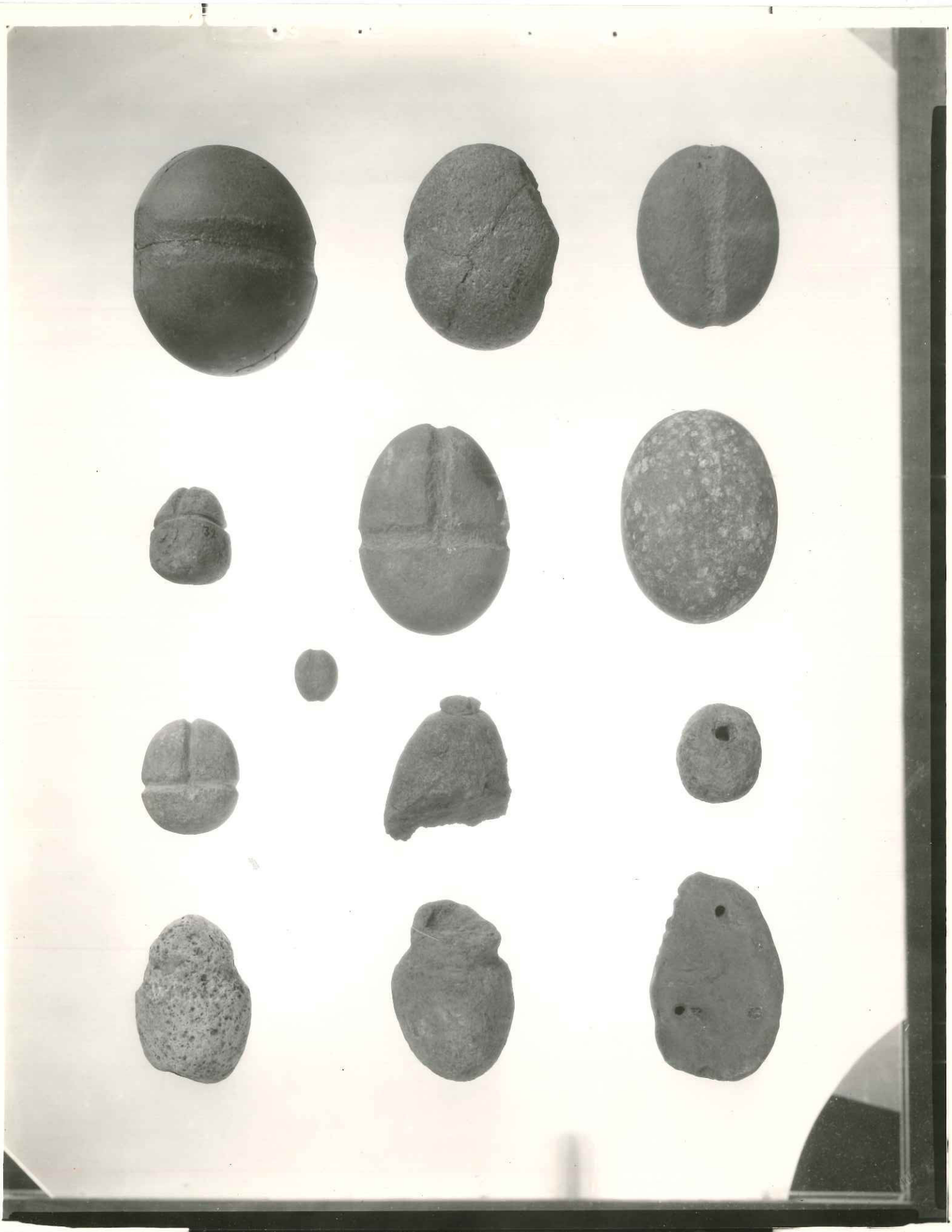
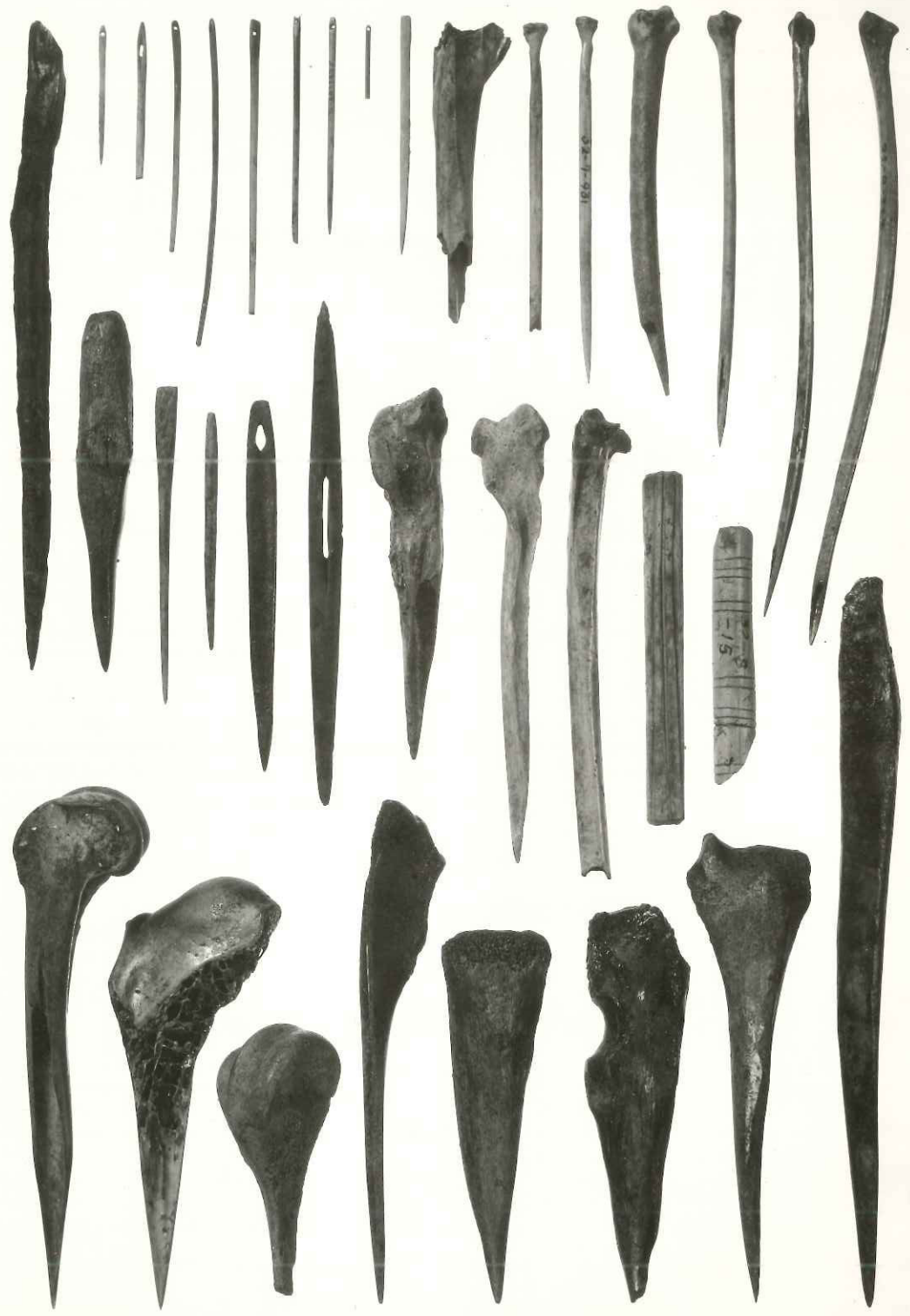




Plate 1/67

Scale 1/2

use the other



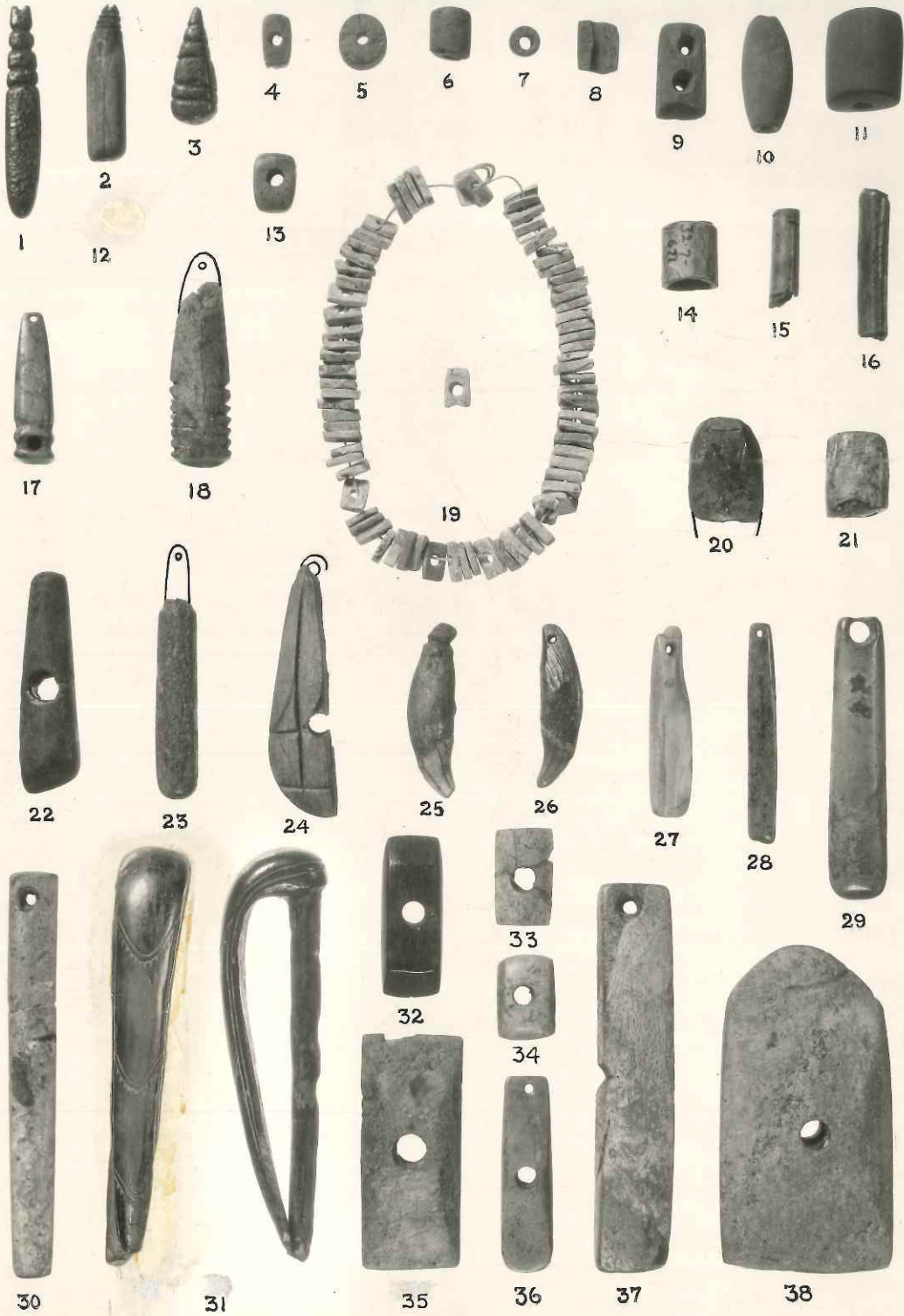


Plate 50

Scale 3:4

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univ. 12325 (excerpt vol 2, 31-20-105)

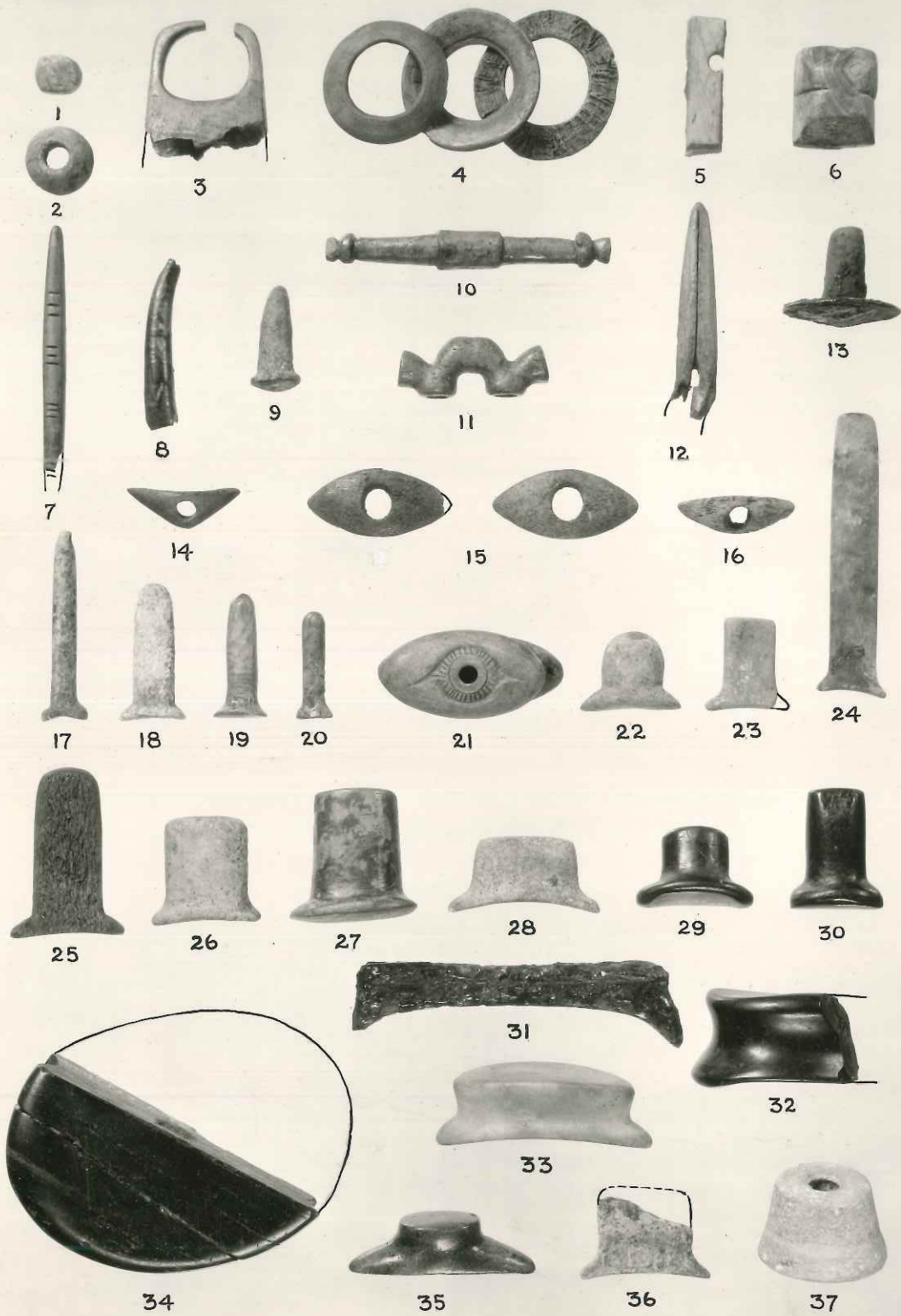


Plate 51  
Page 34

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33RD AND 4TH STREETS  
PHILADELPHIA, PA. 19104  
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NEG. 12328-9

C

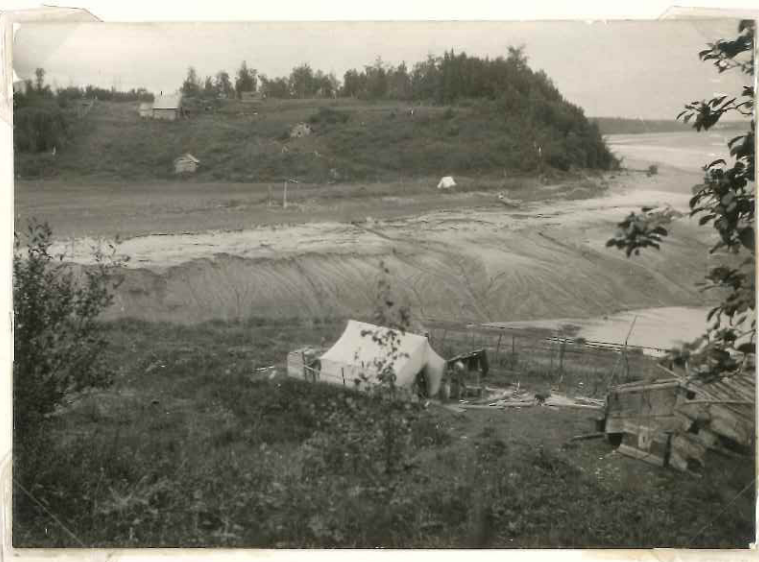


56





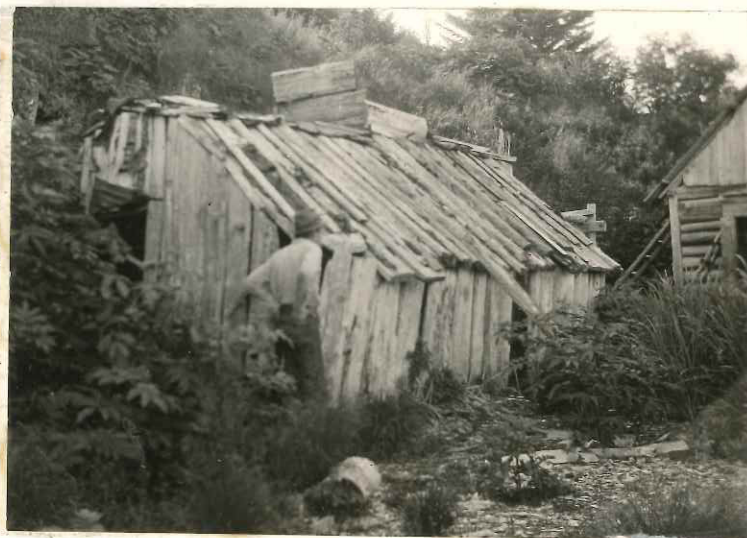
A



B



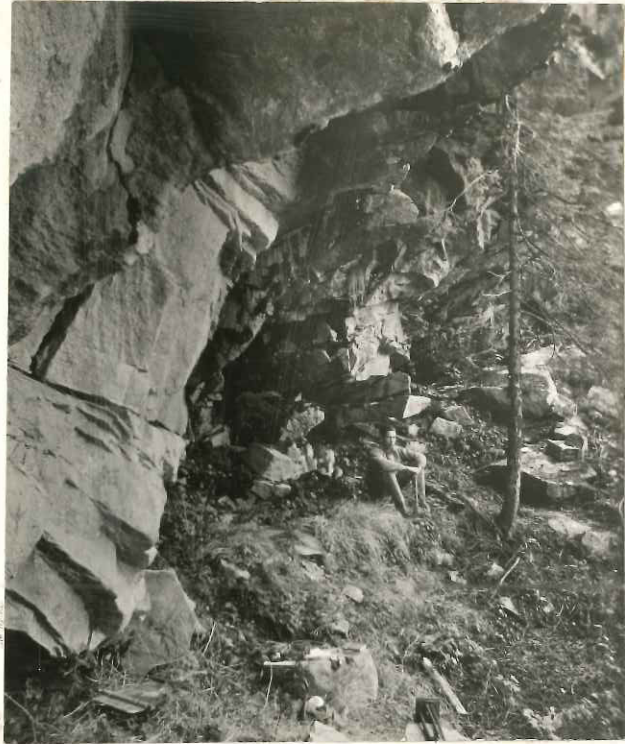
C



D

De Laguna  
'Arch. of Cook Inlet'

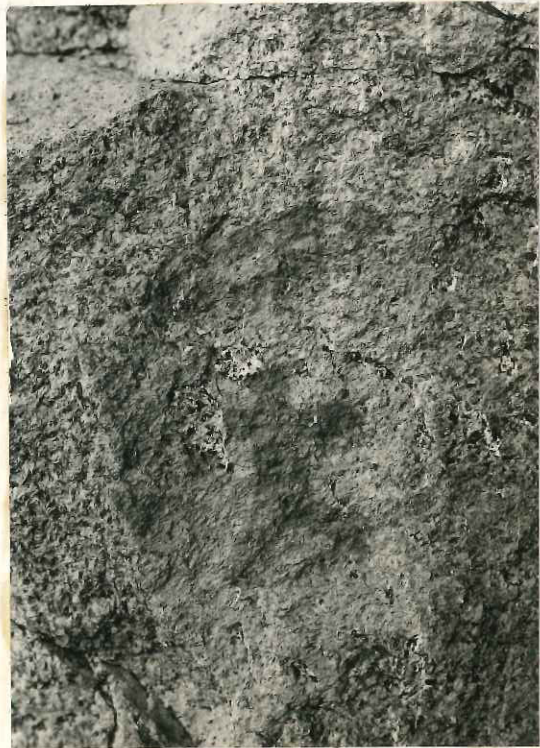
Plate 58



A



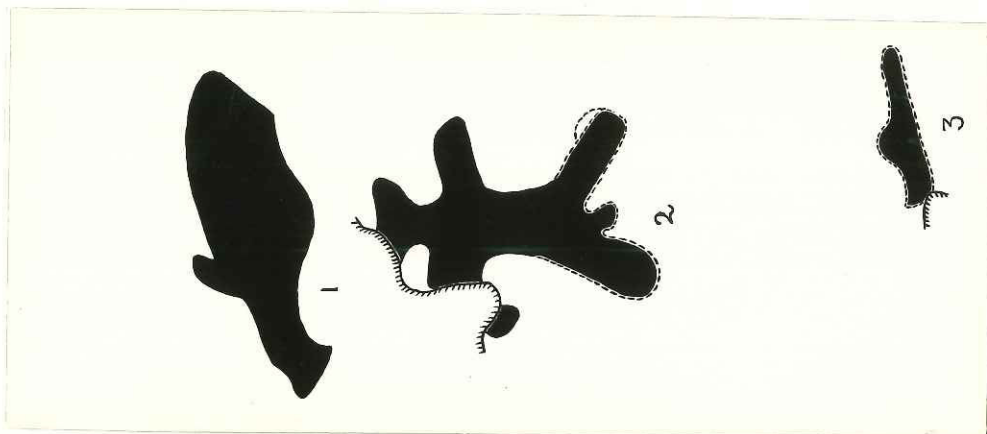
B



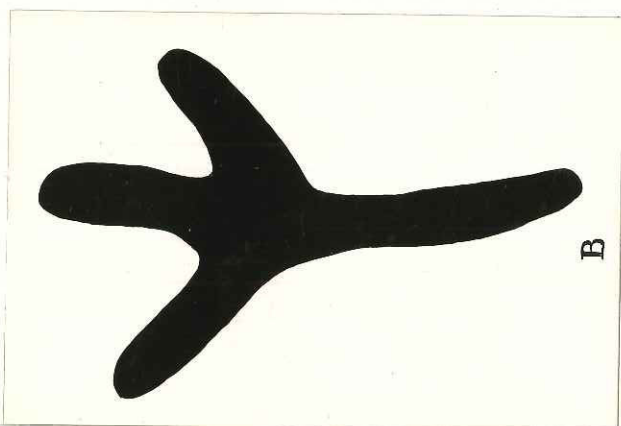
C

de Laguna  
Archaeology of Cook Inlet

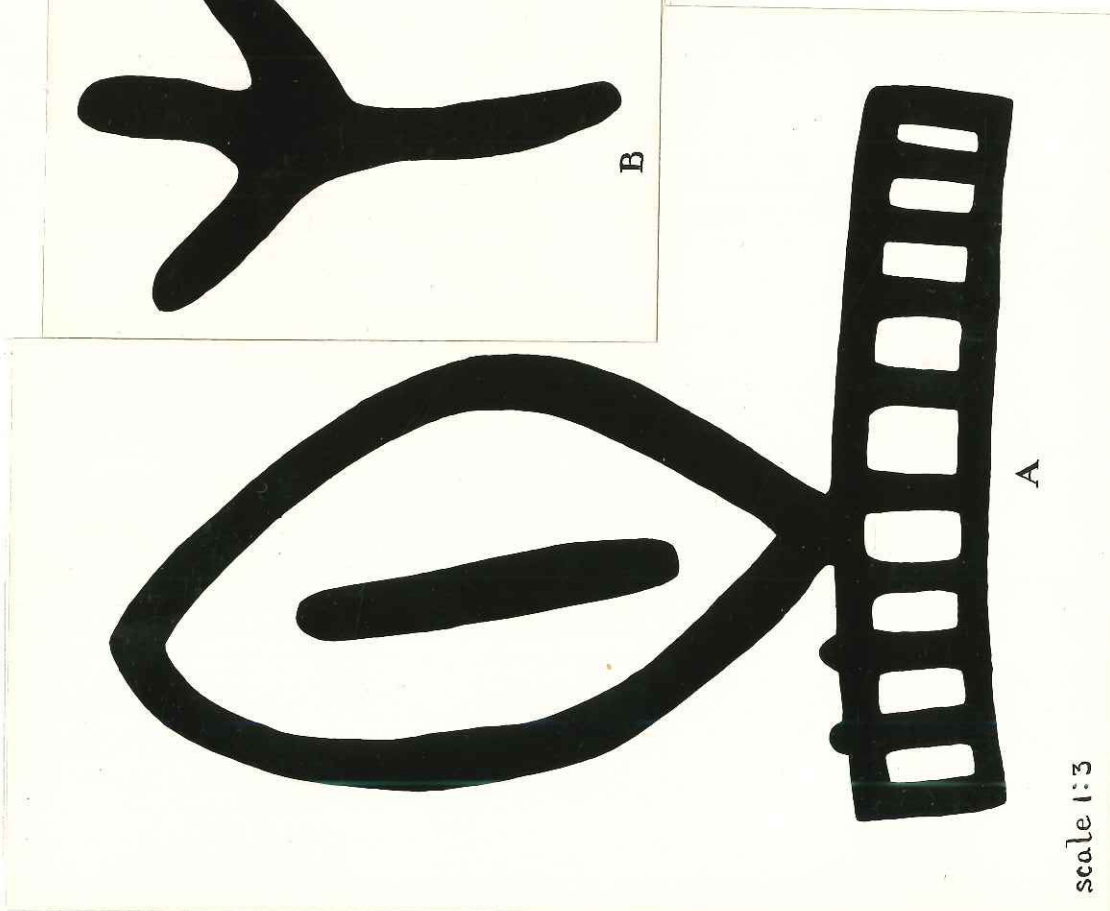
Plate 61



C



B



A

scale 1:3

S.S.

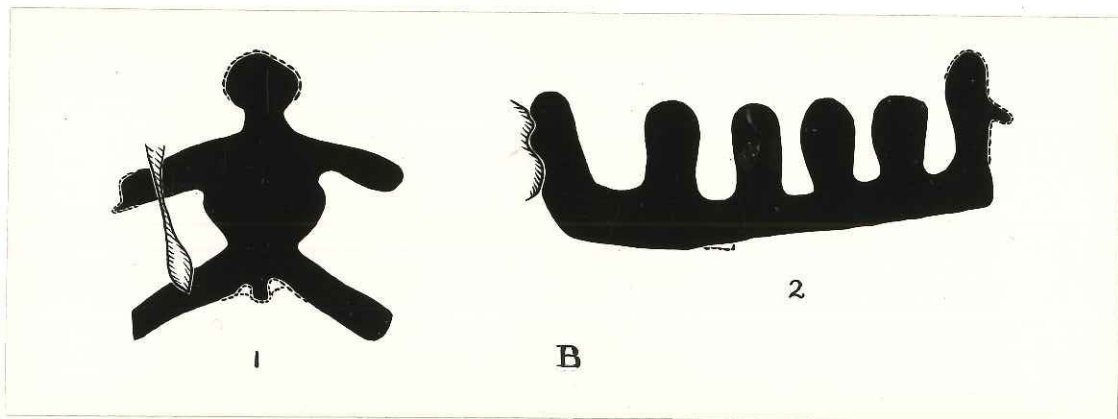
12342

Plot 62 - de Laguna, Archibaldy  
Cook 7/17/18

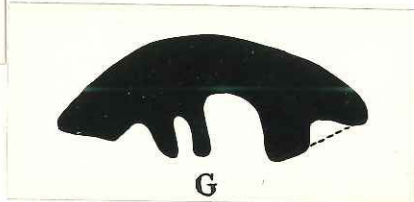
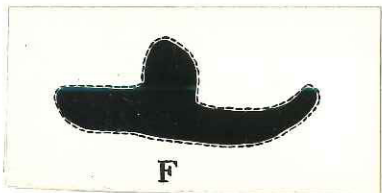
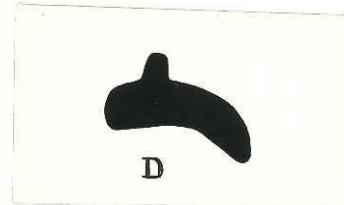
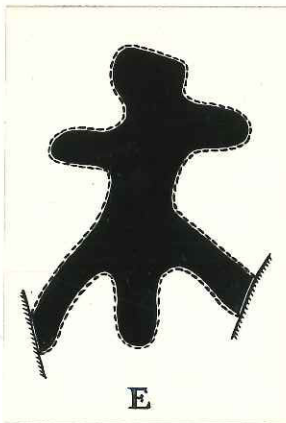
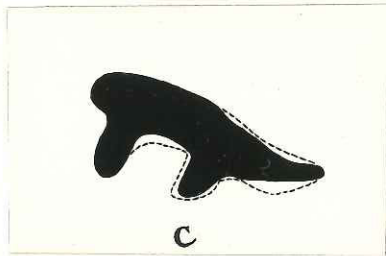
Scale 1/3



A



B



scale 1:3

S. S.

neg. 12346

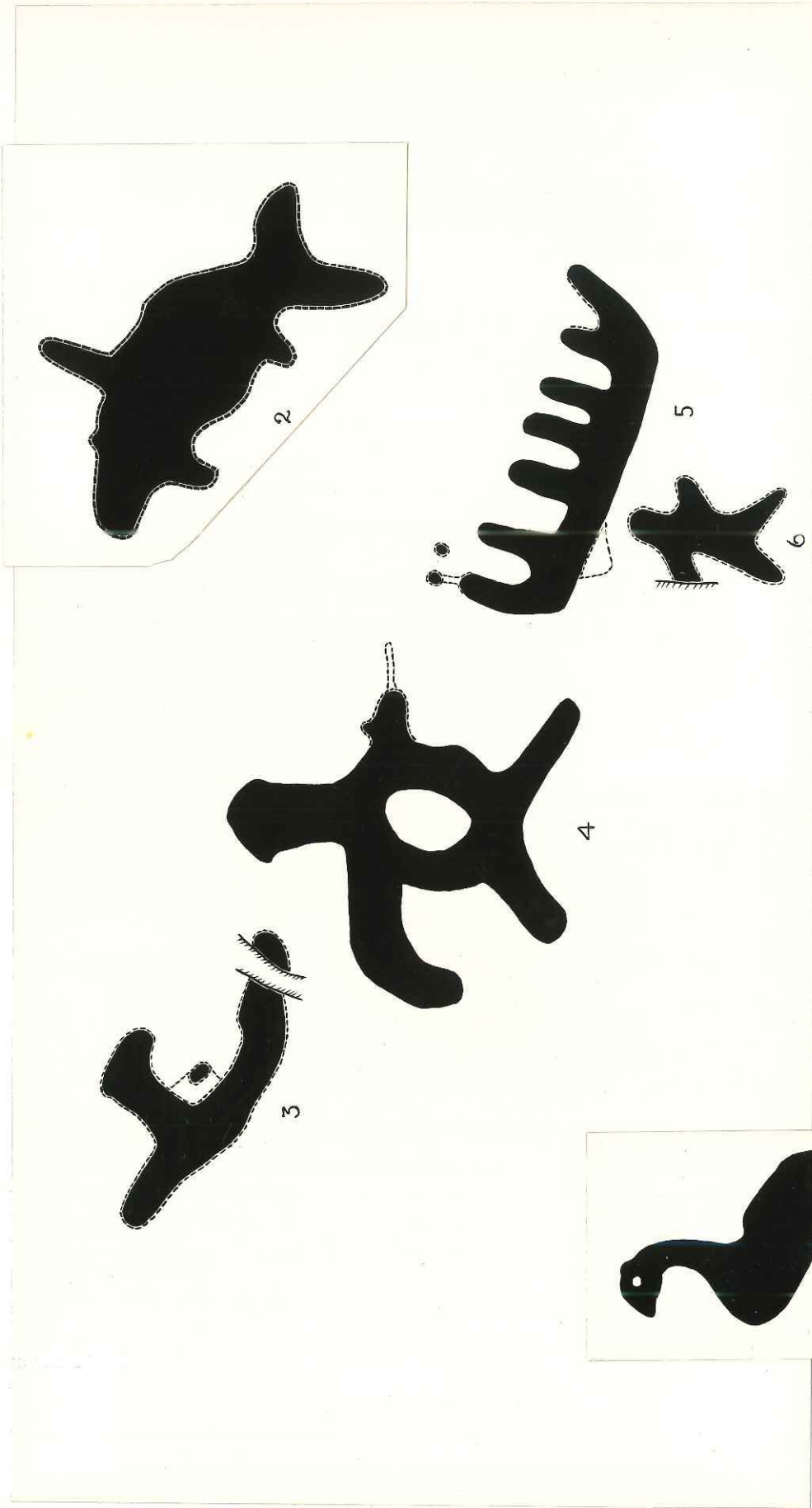
Plats ~~64~~ 63

de Laguna

'Ancestry of  
Cook Inlet'

Scale  $\frac{1}{3}$

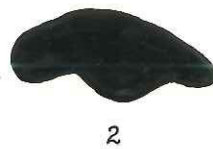
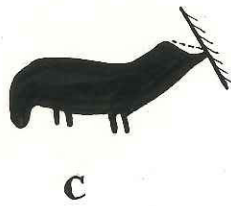
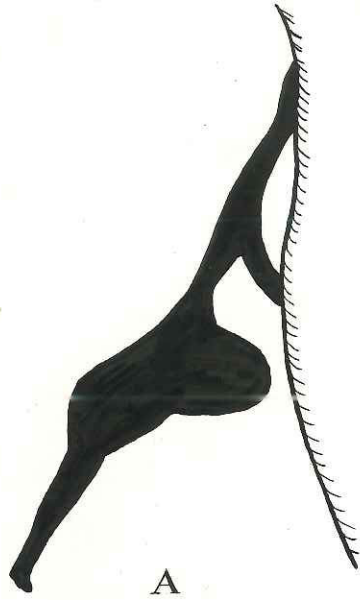




scale 1:3

de Laguna  
'Arche or Cook  
Inlet'

Plate ~~65~~ 64  
Scale 1/3

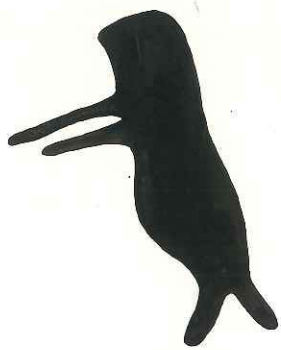


E

scale 1:1

de Laguna

'Archaeology of Cook Inlet'



A



B



C



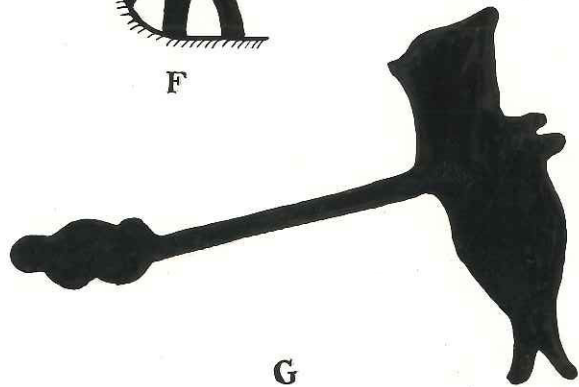
D



E



F



G



H



2



1



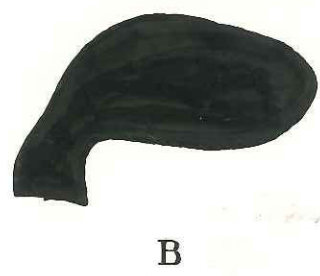
2

scale 1:1

de Laguna, Arch. of Cook Inlet



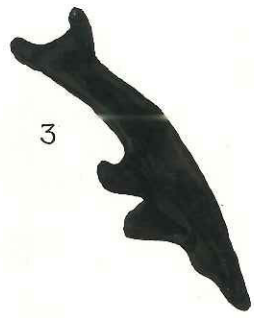
1



B



2



3

A



C



D

scale 1:1



E

de Laguna

(Arche of Cook Inlet)





scale 1:2

de Laguna  
'Arch. or Cook Inlet'

Platt ~~of~~ of  
Scale 1/2

Scale 1:3

PLATE 79 69



12353  
12355

7a 925-1

10

Plate ~~79~~ 69 - de Laguna

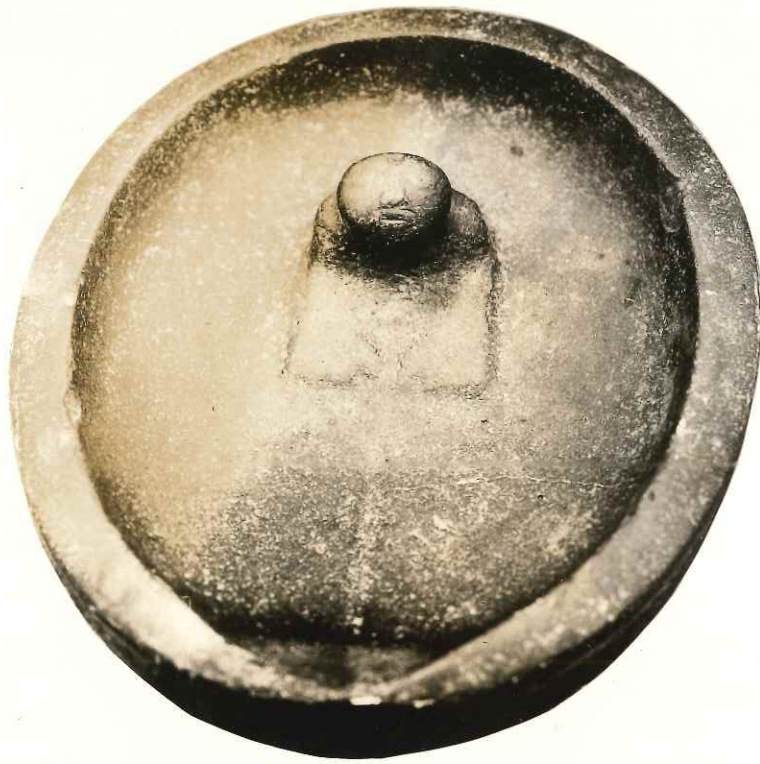
scale  $\frac{1}{3}$

(Arch. of Cook Inlet)

no figures

Scale 2:3

PLATE 80 70



1



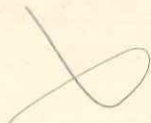
2

Scale 1:3  
Fig. 12357

de Longue

'Arch. of Cook Inlet'

also Mus Jour XIX (2): 176



1 - Scale  $2/3$ ?

2 - scale  $1/3$

Scale 5:8

PLATE 87 71



Plate 81

deLuçura

'Arch. of Cook Inlet'

no figures

X

scale 5/8