ARCHAEOLOGICAL INVESTIGATIONS AT PEDRO BAY, ALASKA

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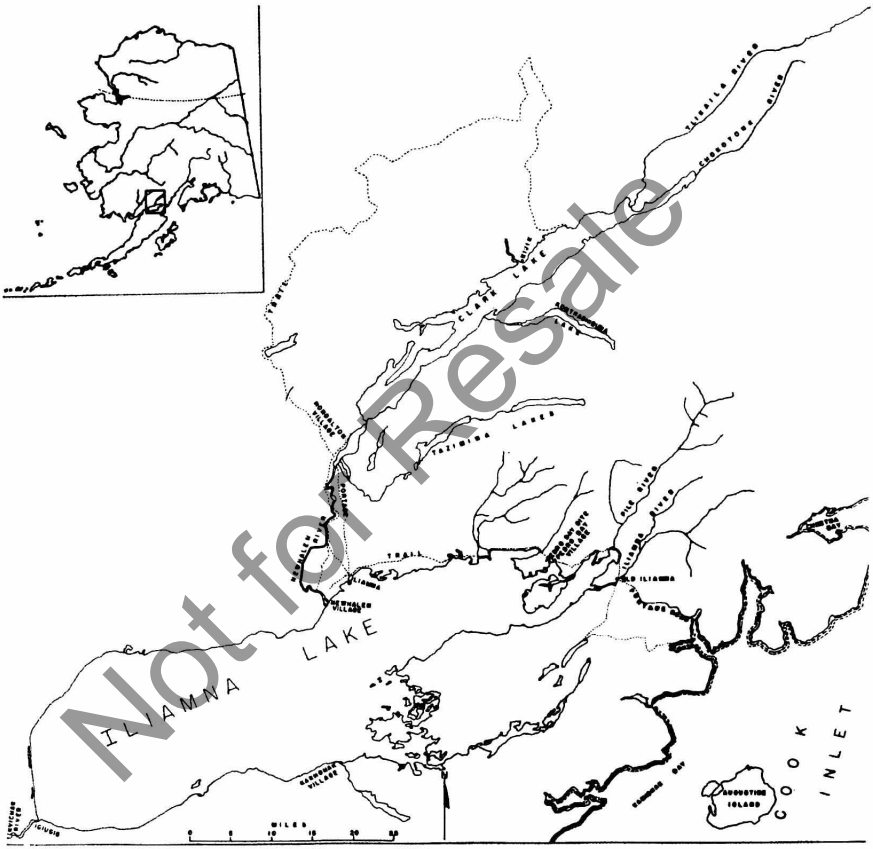
Introduction[1]

During the summer of 1960, a preliminary site survey of the north shore of Iliamna Lake in southwestern Alaska was conducted by the authors. One particular site, located at Pedro Bay, was selected for excavation. The Iliamna region was chosen for study because it is inadequately known archaeologically and ethnographically. Alex Hrdlicka was at Iliamna Lake in 1931, visiting Severson's (the present village of Iliamna), Big Mountain, Knudson Bay, and Old Iliamna. Hrdlicka excavated several burials in the area, but little archaeological information is available from this work. Cornelius Osgood was also at Old Iliamna for one or two weeks in the summer of 1931 (Osgood, 1937, p. 5), collecting ethnographic information for his monograph, *The Ethnography of the Tanaina.* This represents the only ethnographic work in the Iliamna Lake area, while Frederica de Laguna's *The Archaeology of Cook Inlet, Alaska* (1934) provides the only archaeological material related to Tanaina prehistory. No other modern material of anthropological significance exists for this region.

The Iliamna Lake area is of particular interest because it was, in prehistoric times, a zone of Eskimo and Indian occupancy. Later, the lake was on the periphery of the Russian encroachment into Alaska, and some Russian documents exist from this period. Today Eskimo and Tanaina Indians compose the basic Iliamna Lake population. Eskimo inhabit three of the five settlements on the lake, Europeans are concentrated at Iliamna village, and Tanaina are at Pedro Bay. One large Tanaina settlement, Nondalton, is located twenty miles up the Newhalen River on Sixmile Lake. It has been possible, therefore, to combine data from archaeological excavations, historical documents, and recent ethnography with information of the present inhabitants of the lake to obtain a more comprehensive picture of the Iliamna region through time.

Setting

Iliamna Lake, the largest in Alaska, is approximately 80 miles long and 20 miles wide (Fig. 1). It is in a basin surrounded by 4,000 foot peaks in the northeast and relatively flat terrain in the southwest. Fed by many smaller lakes and rivers, Iliamna drains into Bristol Bay through the Kvichak River. The lake, subject to severe eastern winds, is extremely treacherous for small craft, and people seldom venture far from shore in their skiffs.



ILIAMNA LAKE AREA, SOUTHWESTERN ALASKA

FIGURE 1.

In the eastern sector of the lake, flora is moderately dense spruce forest interspersed with cottonwood, birch, alder, and willow. Thick tundra moss covers the soil, and during August the area abounds in many kinds of berries. Toward the western portion of the lake, the mountains recede from the shore and the forest decreases in density near Iliamna village, becoming a taiga. Further west, cliffs rise abruptly from the water without forming a suitable beach to land a boat.

Moose, caribou, black and brown bear are the predominant large land mammals, and mountain sheep are found in adjacent mountain areas. Pacific harbor seals are reported in the lake, and aquatic and game birds are plentiful. Red salmon run from June through August. Other important fish include pike and trout. On the whole, a rich sub-arctic faunal assemblage prevails.

European Contact and Exploration

After Bering's voyage in 1741, documentary information begins to be available concerning European contacts with the inhabitants of Alaska. However, many scholars, including Jochelson (1933) and de Laguna (1956), have suggested earlier contacts between Asia and southwestern Alaska. On Kayak Island, Bering left several articles, including beads of Chinese manufacture and two iron knives (Birket-Smith and de Laguna, 1938, p. 350, note 2). Soon afterward, Siberian fur hunters began to take advantage of fertile sea-otter grounds, trading glass beads, iron, and other items for furs.

Glottof reached Kodiak in 1762 and traded glass beads of different colors to the Koniags. A boy reported that his people traded with the Alegmiuts (Ogulmiut), Tanaina, and Kolosh (Tlingit) but had no knowledge of white men (Bancroft, 1886, p. 144). Five years later, when Krenitzin explored the coast of Alaska beyond False Pass, he found people wearing wooden caps decorated with beads of various colors. We may assume, therefore, that these items were already a medium of exchange outside the immediate Russian sphere of contact, reaching Iliamna Lake.

When Cook explored the southwestern Alaska coast in 1778, Russian trade items were encountered among most of the inhabitants. The Chugach wore "many beads of European manufacture, chiefly of pale blue colour" (Cook, 1784, Vol. 2, p. 305). Cook used white beads in his trading transactions. On the west shore of Cook Inlet, near Kustatan, people came out to the ship in canoes to trade furs. Cook noted lip ornaments were less frequent among people than among the Chugach, while nasal septum ornaments were more common and considerably longer. They had more embroidered work on their clothes, quivers, and knives in cases (Cook, 1784, Vol. 2, p. 335). Petrof (1884, p. 25) states that many of the Tanaina hunting clothes were "embellished with porcupine quills

and grass braiding, head embroidery and fringes while both nose and ears of the men are pierced for insertion of the white shells." Later Osgood (1937, p. 52) reports bead and porcupine quill work. Based on Cook's description and later comments of Osgood and Petrof, it appears that these people were Tanaina. This is the first recorded contact with them. Cook mentioned no European articles specifically for these people, but we may assume they possessed some. When Cook reached Cape Newenham on Bristol Bay later the same year, he found people resembling the Eskimo of Prince William Sound, but they "seemed unacquainted with any civilized nation . . . nor did we observe in their possession any foreign article unless a knife may be considered such. It was a piece of common iron fitted to a wood handle" (Cook, 1784, Vol. 3, p. 16). Russian influence would seem very slight in 1778 on the southern coast adjacent to Iliamna Lake, while northwest of the lake, on the north shore of Bristol Bay, apparently neither white men nor their trade goods were known.

Shelikof settled on Kodiak Island in 1784, but his forces were not yet strong enough to investigate much of the mainland. In 1785, a party was sent to explore the coast adjacent to Kodiak and learned of Iliamna Lake with its several portages to the west side of the peninsula which were supposed to exist. This is the first record of Iliamna Lake (Bancroft, 1886, p. 228).

When Portlock visited Cook Inlet in 1786, there were signs of strife between the Russians and the Eskimo and Indian populations. Many Indian settlements were deserted and the surrounding areas were almost drained of furs.

Meares, in 1788, was approached by two canoes in Cook Inlet from the direction of Smokey Bay (just southwest of Cape Douglas) and presented with a mangled sea-otter. He inferred the people thought he desired the meat rather than the fur. They had no beads and when given some, admired them with a "kind of admiration which is awakened by objects never or seldom seen" (Meares, 1791, p. 311). Apparently lacking contact, the people were presumed to live inland and to have descended one of the rivers that empties into Smokey Bay. These people may have been from the area just south of Iliamna Lake. Although Russian oppression was increasing among the coastal Tanaina, the Iliamna area population seemed little affected at this time by Europeans.

In 1789, Izmailov surveyed the southwest portion of Cook Inlet and Kamishak Bay. Although Iliamna Lake is only a few miles inland from Kamishak Bay, Tikhmenef (1861, p. 32) records no reference by Izmailov to the lake.

Sauer, in 1790, learned of a river that ran from a lake (Iliamna Lake or Naknek Lake ?) into the sea. By this route and a portage over a moun-

tain, an inlet was reached which led to Bristol Bay. This was a frequently used trade route of the Eskimo and Indians.

Bocharof explored some of the northern part of the Alaska Peninsula in 1791, attempting to set up friendly relations with the inhabitants. People on the west side of Cook Inlet from Katmai north had thus far successfully opposed Russian attempts to settle among them. Scant references suggest he reached Iliamna Lake. Friendship with the Indians and Eskimo of the Iliamna area was desired because of a portage that was believed to exist across a narrow neck of land separating Iliamna Lake from the Kvichak River (Bancroft, 1886, p. 325). This was supposed to be one of the main routes of access to Bristol Bay from the Pacific side of the Peninsula. The location of this route is uncertain since there is no land barrier between Iliamna Lake and Kvichak river. References to portages across the Alaska Peninsula in the vicinity of Iliamna Lake are fairly common in the literature. Specific portages are vaguely described, and it is difficult to pin-point them. This is to be expected, however, since the Iliamna region was very poorly known until after 1900.

The Iliamna Lake people experienced their first taste of European violence when conflicts arose between the Shelikof and Lebedef-Lastochkin companies. During their struggles for control of the Cook Inlet area, countless robberies and outrages were perpetrated against Indians and Eskimo. Of the four villages in Iliamna and Nushagak which Bocharof had befriended, the Lebedef-Lastochkin men, in 1792, plundered two and carried the people into captivity. The continued mistreatment of the people in the vicinity of Cook Inlet by the men of the Lebedef-Lastochkin company and Baranof's company during the next eight years led to violent uprisings. In 1798, the Kenai people attacked Russian crews at Iliamna[2] (Lake Clark ?) and Tounak (Tyonek ?) (Tikhmenef, 1861, p. 71). Bancroft (1886, p. 392) lists these two establishments as Iliamna and Kodiak. Approximately 100 Indian and Eskimo loyal to the Russians and 21 Russians were killed (Tikhmenef, 1861, p. 71). This is the first specific reference to Russians, other than Father Juvenal, in the Iliamna region.

Father Juvenal was sent by the Russian Orthodox Church to contact non-Christian tribes of Iliamna Lake in 1796. When Father Juvenal and his guides left Redoubt St. Nicholas for "Ilyamna country," the trader Laduiguin sent glass and coral beads for barter with the Iliamnas. Apparently, trade was being conducted sporadically with the Iliamnas but travel in the area was then too difficult and uncertain to maintain regular contact (Juvenal, 1952, p. 46). After a month in some village in the area, he was killed by Indians. Based on comments in Juvenal's Journal, the authors tend to believe that he may have reached a Lake Clark Tanaina village, believing this to be Iliamna Lake, and was killed there. However, this matter will be explored further in a forth-coming paper. A Kenai Tanaina told Lisiansky, in 1805, their great hatred for Russian missionaries

began when a missionary (Juvenal) preached too zealously against polygyny. The authors feel that this reason for his murder is suspect.

The Russian American Company was established in 1799, eliminating conflict of commercial interests, but problems with the Indians and Eskimo continued. In a letter to Larionof, agent on Unalaska in 1800, Barancf stated that in July on "Kenai Bay at Iliamna Lake" (location of this bay is unknown) three Russians were killed by rebellious tribes (Bancroft, 1886, p. 394).

During the first 20 years of the 19th century, sporadic expeditions by Davidof, Malakhof, and others were made inland from Cook Inlet. An expedition under Kroasakovsky in 1818, proceeded through Lake Iliamna, down Kvichak River to Bristol Bay, establishing Alexandrovsk at Nushagak.

In 1821, a letter from the Board of Directors mentioned a trading post on Iliamna Lake and its trader, Eremei Rodionov. This post may have been located at Old Iliamna because Glasanov's map of 1834 showed a post on the east shore of the lake. In 1844, Etolin and Bishop Innokenty mentioned the Iliamna post (Alaska Historical Documents).

From 1836 to 1840 Alaska was swept by a smallpox epidemic which dessicated the population. Bancroft (1886, p. 562) mentioned that the disease spread inland from coast villages. From the magnitude of the epidemic in southwestern Alaska, we may assume that the Iliamna Lake population was also seriously affected by the disease.

In Tikhmenef's summary of the inhabitants of Alaska (1863, p. 376), he stated that a company trading post and native settlement was located at "Iliamna Lake on the river of the same name where there are 340 inhabitants." This village may have been Old Iliamna.

Alaska was purchased from Russia in 1867, and for a decade afterward, the Alaska Commercial Company maintained a post at Iliamna Bay, on Cook Inlet 15 miles from Iliamna Lake (Gorman, 1903, p. 299).

Petrof (1884, p. 17) listed two Athabascan settlements, Chikak and Iliamna, on Iliamna Lake, Kaskinakh, an Eskimo settlement, on Kvichak River near its junction with Iliamna Lake, and Kichik, an Athabascan village, on Kichik Lake (Clark Lake).

By 1898, the Russian Church had a firm hold over the Indians, and people looked to Russia through the priesthood for leadership and protection. (Compilation of Narratives of Exploration, 1900, Elliott, p. 741).

The Site

Pedro Bay is located on the northeastern shore of Iliamna Lake. The bay extends one-half mile in a northerly direction, forming a semi-circle

surrounded by mountains on three sides. The site selected for excavation occupies the top of a 25 foot ridge which projects some 250 yards north from the base of Pedro Mountain (Fig. 2). Below the ridge, the marshy grassland has some standing water throughout the year and a few small meandering streams. Flora on the top of the ridge includes spruce, birch, alder, and cottonwood trees. The ground is covered with tall grass and a mat of tundra moss 6 inches to 12 inches thick.

The Collection

The artifact descriptions which follow have been grouped under eight headings: house construction, fishing, land hunting, tools and manufactures, household, personal adornment, ceremonial or medical, and miscellaneous. Under these headings the artifacts are first described and then compared with other finds from Kachemak Bay in Cook Inlet, Kaflia on the Alaska Peninsula, and Uyak on Kodiak Island. Although comparisons are made with other sites where pertinent, the major comparisons have been limited to these three sites for several reasons. First, the Kachemak Bay sequence is clear, covers a considerable time span, and represents the only other excavations within Tanaina Indian territory. Second, Kaflia and Uyak represent the only other thoroughly excavated sites in the area.

Since references are made in the comparisons to ethnographic materials collected by Cornelius Osgood, some statement should be made which summarizes the position of the Pedro Bay site. The Pedro Bay site is considered to be a Tanaina Indian community dating from around 1750 to 1800 A.D. The period of occupancy is judged to have been brief because of the slight midden accumulation within the houses and the small number of artifacts. The site probably was abandoned prior to direct Russian contact with the Iliamna Tanaina on Iliamna Lake.

For additional artifact distributional information interested readers should consult Birket-Smith (1929), de Laguna (1934), Birket-Smith and de Laguna (1938), Oswalt (1952a), and Van Stone (1955). For any particular distribution within the six major Tanaina groups, readers may consult Osgood (1937). Supplementing the descriptions and illustrations is an artifact trait list identifying the house in which each artifact was found and relating the artifact to the plate on which it is illustrated.

House Construction

The Pedro Bay site consists of four semi-subterranean house structures and four subterranean fish storage pits (Fig. 2). Three of the houses have two rooms (Fig. 2; 3; 5); one house has only one room (Fig. 2; 4). The smaller rooms are connected to the east wall of the larger rooms by a short semi-subterranean tunnel. The larger rooms have central fireplaces, but Room B, the only small room excavated, did not. The houses have en-

trance passages oriented in a westerly direction probably because of prevailing easterly winds. Organic preservation was poor in all of the structures excavated (House 1, Room A and B; House 2; House 4). Only four wood house log fragments, four bone artifacts, and fragmentary mammal bones were found. No postholes were located. The excavated houses are described in the following paragraphs.

House 1 (*Fig. 3*)

Both rooms in this house are nearly square in outline. The rooms are designated A and B, the former being the larger. The entrance tunnel is located mid-way along the western wall of Room A. The floor level in both rooms is as much as 44 inches below the present ground surface. The entrance tunnel, as it progresses in a westward direction, gradually slopes down 5 inches below the floor level. Scattered throughout the house are large protruding sections of bedrock which rise one foot above the floor level. A short tunnel, located mid-way along the east wall, connects the two rooms. Room A contained more artifacts than any other structure (Trait List). The dimensions of Room A are: length, 20 feet; width, 20 feet; tunnel length, 10½ feet; tunnel width, 2 feet and 9 inches (maximum). The dimensions of Room B are: length, 12 feet; width, 12 feet; connective tunnel length, 2 feet; connective tunnel width, 2 feet.

House 2 (*Fig. 4*)

House 2 is unique, being the only structure with one room. The house is roughly square in outline. An entrance tunnel is located mid-way along the west wall and both the tunnel floor and the house floor are a maximum of 48 inches below the present ground surface. Large sections of bedrock protrude two feet above the floor area in some places. The dimensions are: length, 17 feet; width, 20 feet; tunnel length, 7 feet; tunnel width, 2 feet.

House 4 (*Fig. 5*)

The two rooms of this house are roughly square in outline. The east walls are slightly curved, and the unexcavated smaller room is connected by a short tunnel mid-way along the east wall. The entrance tunnel is located mid-way along the west wall. Both the tunnel floor and the house floor are a maximum of 40 inches below the present ground surface. Bedrock projects two feet above the floor in some places. The dimensions are: length, 17 feet; width, 19 feet; tunnel length, 5 feet 3 inches; tunnel width, 2 feet.

Cache A (*Fig. 2*)

One subterranean fish cache, designated as Cache A, is square in outline. Only one artifact was found in the cache (Trait List). The dimensions are: length, 5 feet; width, 5 feet; depth, 4 feet.

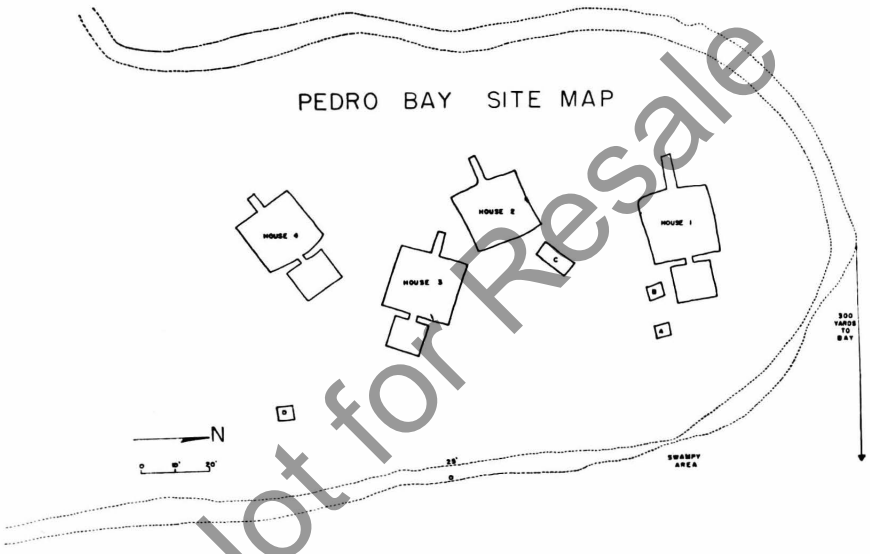


FIGURE 2

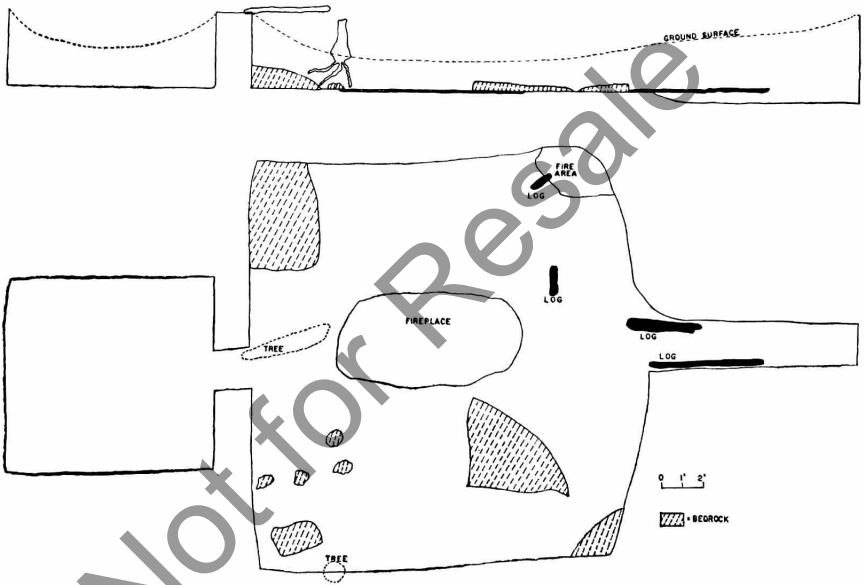


FIGURE 3, HOUSE I.

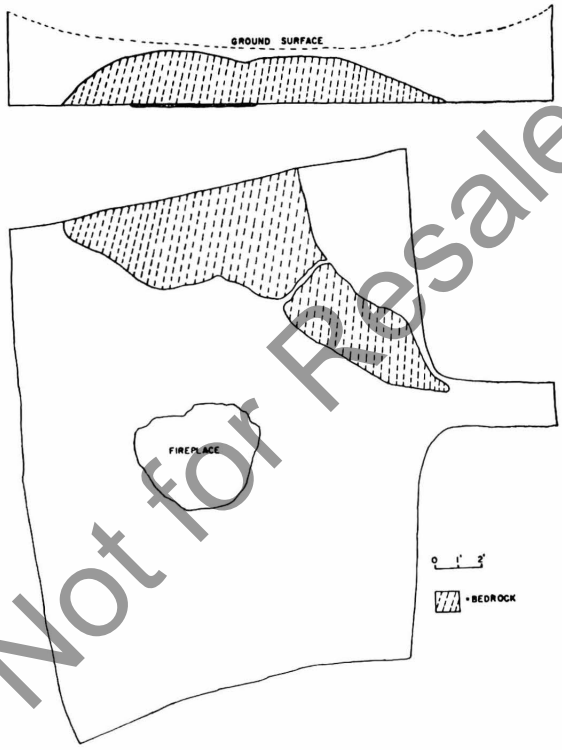


FIGURE 4, HOUSE 2.

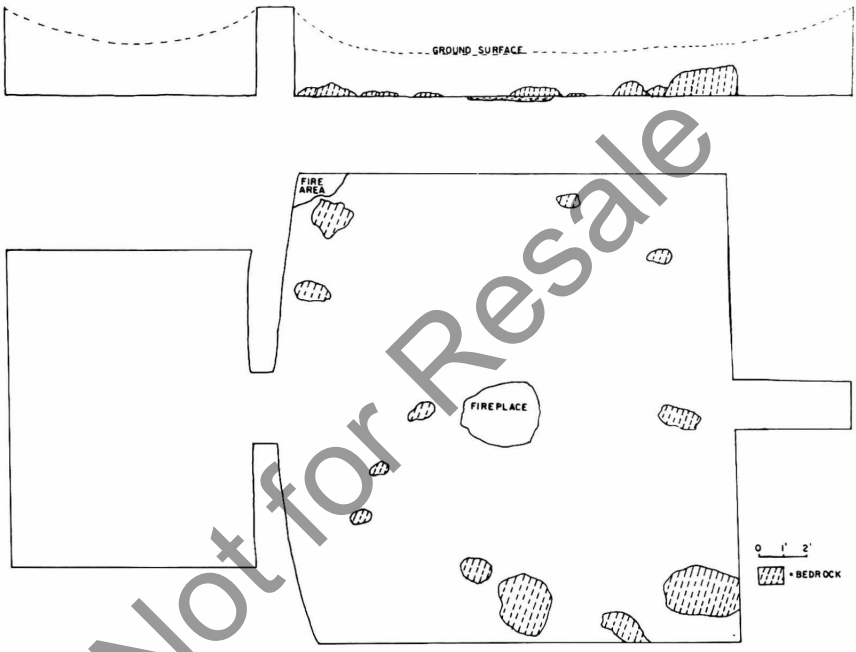


FIGURE 5, HOUSE 4.

Analysis and Comparisons

Since organic preservation was poor throughout the Pedro Bay houses, it is not possible to reconstruct the house types from archaeological data alone. The general characteristics, however, conform with Osgood's (1937, pp. 55-62) ethnographic descriptions of aboriginal Tanaina Indian dwellings. It will be sufficient for the purposes of this paper simply to list those characteristics. They are: semi-subterranean house with semi-subterranean entrance tunnel, central fireplace, and adjoining room. The adjoining room is considered by Osgood (1937, pp. 60-61) to be a bath house. This type of house was a winter dwelling; during the summer months the people moved to favorite fishing places and constructed smaller, less permanent dwellings (Osgood, 1937, p. 59).

Houses similar to those at Pedro Bay are reported from Kachemak Bay III (de Laguna, 1934, p. 142), Susitna Valley late pre-contact sites (Irving, 1957, p. 41), Platinum South Spit and Chagvan Bay sites in Bristol Bay (Larson, 1950, pp. 178-181), and Uyak on Kodiak Island (Heizer, 1956, pp. 17-25). De Laguna notes that the smaller rooms in back of her houses were utilized for bathing and sleeping. The Pedro Bay houses, unlike the Kachemak Bay III houses, contained no fire cracked rock. The late pre-contact Susitna Valley houses are attributed to late Athabascan groups (Irving, 1957, p. 46). The Platinum South Spit and Chagvan Bay houses are very similar in every detail to those found at Pedro Bay. Houses at the Uyak site are generally smaller and differ, having rock lined firepits and short entrance tunnels. For additional discussion of house types see de Laguna (1934, pp. 157-162).

The subterranean fish cache is reported for the Kachemak Bay, Upper Inlet, and Kenai Tanaina but has not been reported for the Iliamna or Lake Clark Tanaina (Osgood, 1937, pp. 42, 56), Kaflia, Platinum South Spit, Chagvan Bay, Uyak, or Kachemak Bay III sites. Rectangular storage pits are found, however, at most of the Susitna Valley sites (Irving, 1957, p. 46). The one larger subterranean structure which we have considered as a fish storage cache may have been a menstrual house, since Osgood (1937, p. 162) reports the practice of seclusion of a young girl at puberty in a special structure which may or may not be connected with the main house.

The four excavated houses may be considered to be contemporary. The same approximate floor depth below the present ground surface is maintained in all the houses; the house types are consistent. Structures are adjacent but neither rooms nor tunnels overlap. Artifact types are reasonably uniform throughout the site. All cultural materials were found beneath a 3 to 6 inch volcanic ash layer which probably represents the 1912 Katmai volcanic eruption.

Fishing

Evidence of fishing is limited to one unilaterally multibarbed antler *fish spear dart* (Pl. 1, 1). It has a wedge-shaped tang with a line hole drilled in the base.

Analysis and Comparison

The fish spear dart head with square to rounded tang and line hold has a wide distribution in southwestern Alaska, being reported from Kaflia (Oswalt, 1955a, Pl. 7), Kachemak Bay (de Laguna, 1934, Pl. 9), Uyak (Heizer, 1956, Pl. 57, s, t), Bristol Bay (Larsen, 1950, Fig. 55), and ethnographically from the Tanaina (Osgood, 1937, Pl. 11).

Fishing, especially red salmon, was probably very important at Pedro Bay, but because of poor preservation and Tanaina technology, this is not reflected in the artifact inventory. The environment provides an excellent salmon fishing opportunity since this fish occurs in large numbers during June and July of each year, and there is no reason to believe that the opportunity was not utilized to a considerable degree. Indeed, from ethnographic information collected by Osgood (1937), the Tanaina utilized weirs, basket traps, dipnets, fishhooks, and bone fish gorges in their fishing activities as well as the fish spear dart head. Poor preservation may explain the absence of fishing implements since only four artifacts of bone or antler were found in the entire site.

The importance of fishing is indicated also by the presence of four underground fish caches in the site, one for each house (Fig. 2). Other indications, such as fish cutting knives, will be discussed under tools.

No fish bones were recovered from any of the houses or cache A. Local informants stated that in the "old days" the people would throw the fish bones back into the water.

Land Hunting

Arrowheads of antler include two specimens (Pl. 1, 2-3), one of which is barbed. Both are round in cross-section and have wedge-shaped tangs without definite shoulders. Chipped arrowheads include three specimens with shouldered tangs (Pl. 1, 4-6). One specimen has a blunt tip (Pl. 1, 5). Two are made of slate; one is of jasper (Pl. 1, 6). Three ground slate *arrowpoints* have center grooves parallel to the edges (Pl. 1, 13, 14).

One bone *lance blade* has a shouldered wedge-shaped tang near the base (Pl. 1, 7). Two chipped slate lance blaces have no tang and are leaf-shaped (Pl. 1, 8, 9). Ground slate *lance blades* include 21 specimens; 8 are fragmentary and unidentifiable types (Pl. 1, 10-12; 15-19). Two have shouldered tangs (Pl. 1. 10 11); one is shoulderless and has a tang (Pl. 1,

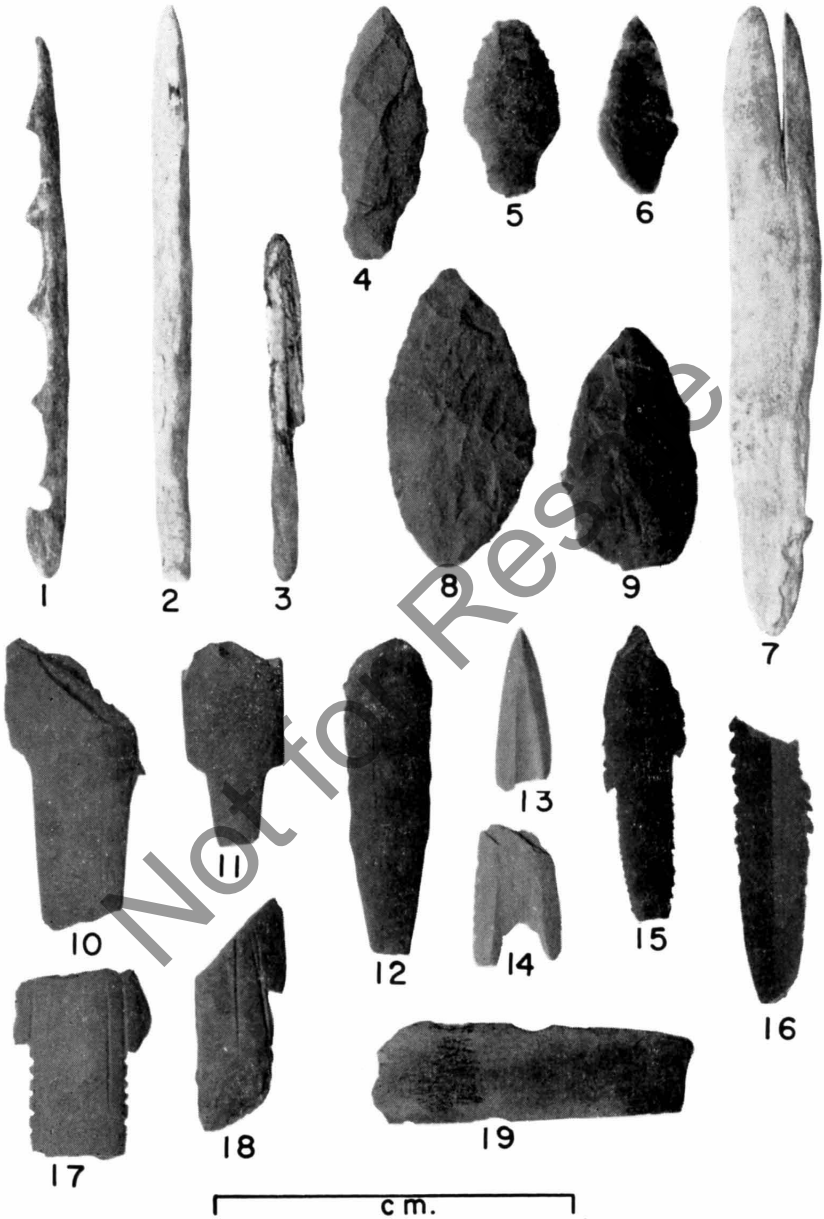


PLATE I

PLATE 1

1.	fish spear dart head	8, 9.	chipped slate lance blades
2, 3.	antler arrowheads	10-12.	ground slate lance blades
4, 5.	chipped slate arrowheads	12, 14.	ground slate arrow points
6.	chipped jasper arrowhead	15-19.	ground slate lance blades
7.	bone lance blade		

12); five are bilaterally barbed with seriated parallel edges (Pl. 1, 15-17); one is bilaterally barbed with seemingly straight edges (Pl. 1, 18); one has edges which converge slightly forming a tang (Pl. 1, 19). All of the specimens have bilateral cutting edges.

Analysis and Comparison

According to ethnographic information, land hunting was very important among the Tanaina. Spears, bows and arrows, pitfalls, deadfalls, snares, and dogs were utilized in this subsistence activity (Osgood, 1937, p. 33-37).

Both arrowheads and lance blades show a great diversity in type. Arrowheads include bone points with or without barbs and chipped slate and jasper points. The chipped type is numerically more common. All of the arrowheads are similar to types found at Kachemak Bay II and III (de Laguna, 1934, Pl. 30, 41, 42), but there are no similarities to Kaflia. One jasper point was found at Uyak (Heizer, 1956, p. 48).

The one bone lance blade with a shouldered wedge-shaped tang is not found at Kachemak Bay, Kaflia, or Uyak, but has been reported ethnographically for the Tanaina (Osgood, 1937, p. 86). It is said to have been used in bear hunting. The tip has a slit which may have been for the insertion of a blade. However, this cannot be definitely determined because of the weathered condition of the bone.

The two leaf-shaped chipped slate lance blades found at Pedro Bay are similar to ones found in Kachemak Bay II (de Laguna, 1934, Pl. 30) and Kaflia (Oswalt, 1955a, Pl. 2), but are not found at Uyak.

Ground slate lance blades are numerically predominant and have their closest affinities with blades from Kachemak Bay III (de Laguna, 1934, Pl. 31, 32) although they are also similar to blades from Kaflia (Oswalt, 1955a, Pl. 1). This is certainly in agreement with de Laguna's statement that the territorial expansion of the Athabascans at the expense of the Eskimos in late times is accompanied by an increase in the importance of ground slate implements. However, late precontact Athabascan Susitna Valley sites have no trace of a ground slate industry (Irving, 1957, p. 46). Pedro Bay specimens which have distinct lateral barbs occurring at the base of the blade are not found at Kaflia but are common at Kachemak

Bay (Oswalt, 1955a, p. 40; de Laguna 1934, Pl.;31), and Uyak (Heizer, 1956, Pl.;44,;45,;46), while specimens with a diamond-shaped cross section are found at all these sites.

A distinctive type of ground slate arrowpoint (Pl. 1, 13, 14) has a triangular groove parallel to the cutting edges on both sides of the blade. This type, which gives a "bayonet" appearance, is found at Pavik in Bristol Bay (Larsen, 1950, Fig. 55, A, 14, 15) and in Kachemak Bay III (de Laguna, 1934, Pl. 31, 5), Uyak (Heizer, 1956, Pl. 46, N), and Kaflia (Oswalt, 1955a, Pl. 31).

A number of assumptions may be drawn from the analysis of ground slate blades. The slate was probably derived from a distant source by trade since no local source of the material was reported by Pedro Bay people. Osgood (1937, p. 75) states that trade was extensive between the people of Iliamna Lake, Cook Inlet, and Bristol Bay. As mentioned earlier, a Kodiak boy stated, in 1762, that the Eskimo of Kodiak traded with the Alegmiuts, Tanaina, and Kolosh (Bancroft, 1886, p. 144). All the materials recovered (with the exception of a slate lance blank) seem to have been finished when broken and left in the houses. This would suggest the artifacts were roughed out before being traded to the Pedro Bay people and then finished at the site. It must be mentioned, however, that there was an abundance of grinding slabs and slate flakes in the site, but there were no stone saws. The quality of workmanship of the finished product is not high since most of the artifacts give a technologically unfinished appearance showing coarse abrasion scratches, saw marks, and secondary seriated edges (Pl. 1, 17, 18). The wide variety of types would suggest that the people had not reached a high degree of technological competence in the form and medium utilized. However, one specimen with a diamond-shaped cross section (Pl. 1, 16) and one "bayonet type" (Pl. 1, 13) do show a more finished appearance than the other points.

Faunal remains and ethnographic information indicate caribou, moose, brown bear, black bear, beaver, muskrat, lynx, sheep, goat, fox, mink, wolverine, squirrel, porcupine, and other small land mammals. The faunal remains included seal bones although no artifacts connected with sea mammal hunting were found. Osgood (1937, p. 37) reports that sea mammal hunting was practiced by most Tanaina groups; the inland Iliamna Lake group conducted expeditions to Kamishak Bay in Cook Inlet to obtain sea mammals.

Tools and Manufactures

Twenty six *ulu-like knives or scrapers* were found (Pl. 2, 1-8). Outstanding features are the wide variety in tang shapes, size, and cutting edge. On the basis of outline, these scrapers have been divided into eight types as follows:

Type 1—two boulder chip (Tci-Tho) specimens retouched along one edge, one oval and one irregular in outline (Pl. 2, 1).

Type 2—blunted sides converge to a flat top which is shorter than the cutting edge in five specimens (Pl. 2, 2).

Type 3—three scrapers are roughly square in outline; the top and cutting edge are parallel and the same in length (Pl. 2, 3).

Type 4—three specimens are rectangular in shape having sides twice as long as the cutting edge (Pl. 2, 4).

Type 5—the sides converge to a point at the top forming a distinct V-shaped tang in three specimens (Pl. 2, 5).

Type 6—three specimens have expanding and then converging sides which meet and form a flat top (Pl. 2, 6).

Type 7—of these three specimens which are oval in shape, struck from platform cores, and chipped along all edges, two retain part of the platform along one edge (Pl. 2, 7). This type may have been used as men's knives.

Type 8—one specimen, rectangular in outline, shows chipping and grinding on three edges (Pl. 2, 8). The two long sides are parallel and straight; the two short sides are convex, and only one of the edges was used. The top has a hole drilled through the center which served for hafting or suspension.

Three fragments of broken scrapers are made of beach pebble, slate, and schist respectively. The schist fragment is unique, in this collection, since it is the only one which has a notch in one side forming a tang.

Three *end scrapers* are made of flinty material and three are made of slate (Pl. 2, 9-11). One specimen was struck from a prepared core retaining a portion of the platform along one edge (Pl. 2, 11).

One *side scraper* or knife of slate is retouched along all edges and probably was used unhafted (Pl. 2, 12).

A *man's knife blade* of ground slate has bilateral expanding cutting edges and is lenticular in cross-section (Pl. 2, 13). This specimen could have been a lance blade.

Whetstones include seven specimens (Pl. 2, 14-16). Five are roughly rectangular in shape, ground on both sides, and on two or more edges (Pl. 2, 14, 15). One is rectangular in outline and has rounded ends (Pl. 2, 16).

All nine *grinding stones* are beach pebbles with one or more abrasion surfaces (Pl. 3, 1-3). They are irregular in shape; three specimens, which have pitted ends, could have been used as hammerstones (Pl. 3, 3).

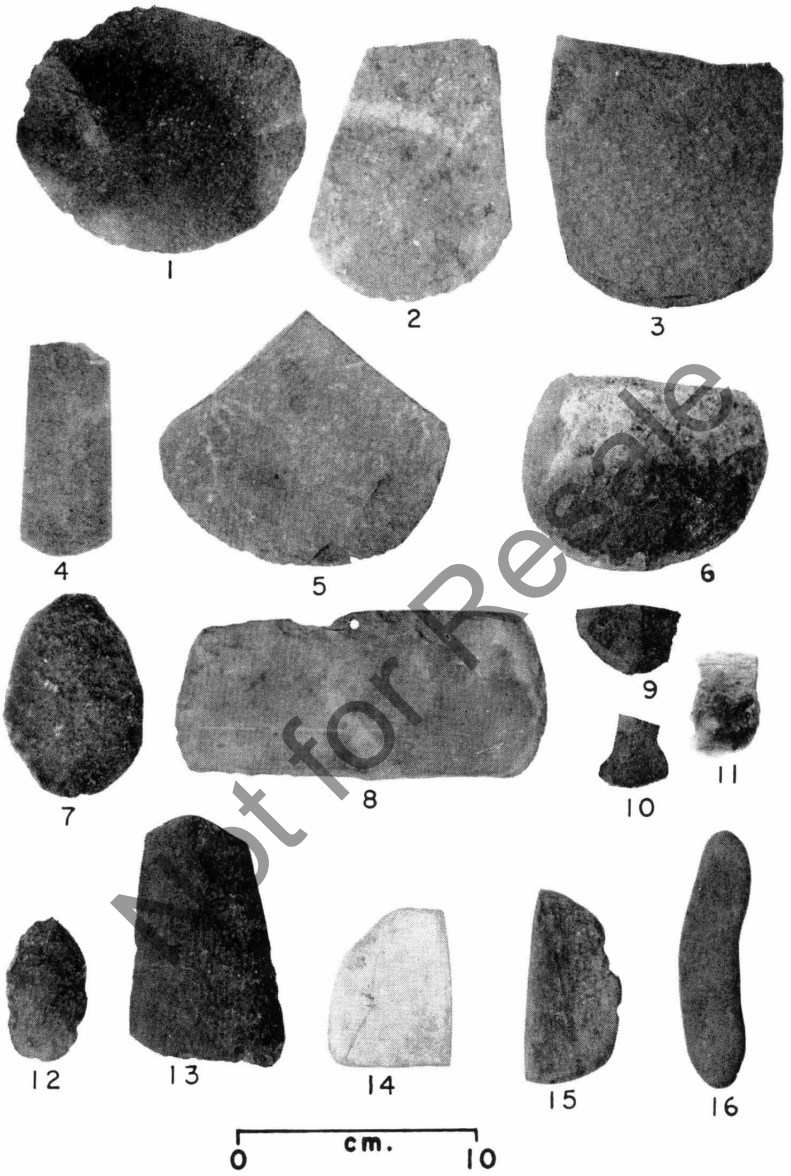


PLATE 2

1. ulu-like scraper, Type 1
2. ulu-like scraper, Type 2
3. ulu-like scraper, Type 3
4. ulu-like scraper, Type 4
5. ulu-like scraper, Type 5
6. ulu-like scraper, Type 6
7. ulu-like scraper, Type 7
8. ulu-like scraper, Type 8
9-11. end scrapers
12. side scraper or knife
13. man's knife blade
14-16. whetstones

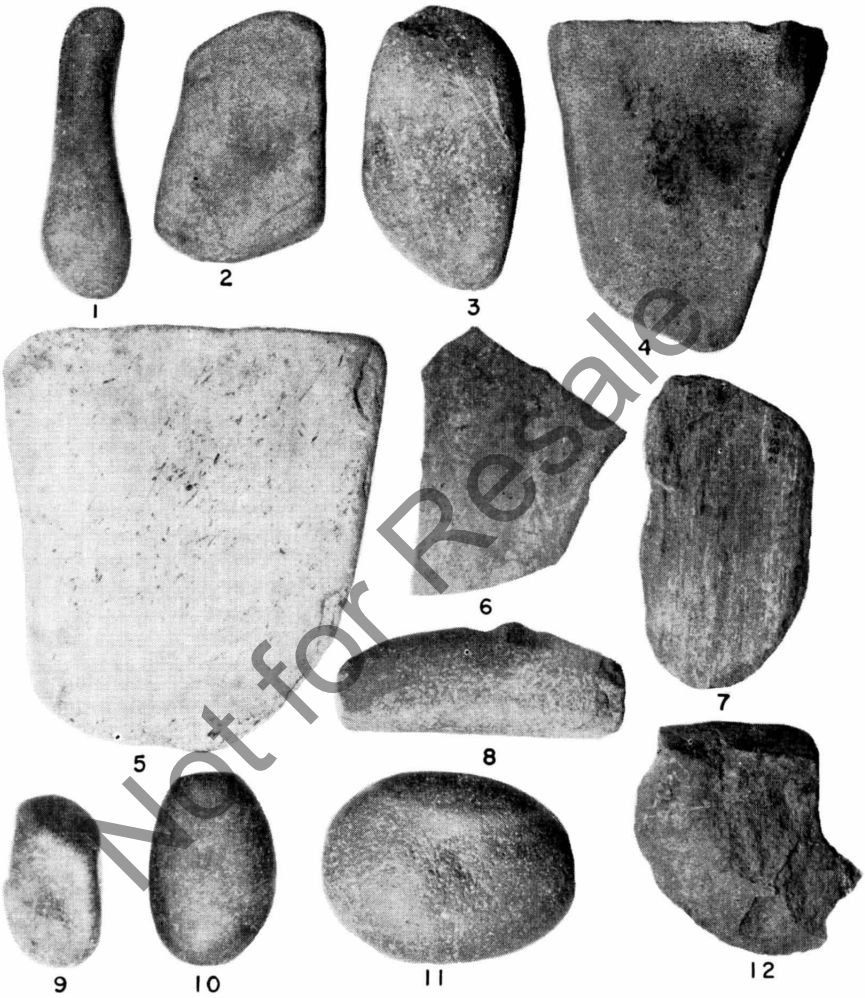


PLATE 3

1-3. grinding stones
4-7. grinding slabs
8. maul
9-11. hammerstones
12. chopper?

Of the ten *grinding slabs*, nine are sandstone and roughly rectangular in outline (Pl. 3, 4-7). Four show traces of red ocher (hemitite); three show signs of extensive use (Pl. 3, 4-6).

One *maul* head of slightly pecked beach pebble has a one-quarter central groove for hafting and blunt, flat ends (Pl. 3, 8).

Four of the five *hammerstones* are beach pebbles; one is basalt (Pl. 3, 9-11). One has been pecked on both ends and two sides (Pl. 3, 11). One hammerstone has smooth ends and was probably used for finer work (Pl. 3, 10). Another has ground surfaces on two sides and is pitted on one end (Pl. 3, 9). This specimen may have been used as a grinding stone. Two are roughly rectangular in outline and show little use.

The *chopper* has an irregular shape and a convex cutting edge (Pl. 3, 12). The top extends beyond the sides and has been ground along the platform end. This specimen may have been used also as an axe or scraper.

Red *ocher* (hemitite) was found throughout the four structures and was probably used extensively as a paint for personal adornment and on artifacts as decoration.

Analysis and Comparison

Ulu-like knives or scrapers are the most numerous single class of artifacts. These were divided into eight types on the basis of outline. While the use of Type 1 (Tci-Tho) is well established, the wide diversity of forms and tang arrangements of the other seven types seems to indicate some specialization in use. Each type has a considerable size range (Type 8, with only one specimen, is an exception). The collection of scrapers may be divided visually into two major groups, larger and smaller. On the basis of information obtained from a Kuskokwim River Eskimo, Oswalt (1955a, p. 31) suggests a specialization of use based on size; the larger scrapers or knives are used for salmon preparation and the smaller used in household tasks. Three Tanaina informants, when asked the function of these specimens, said that the larger scrapers were used in fish preparation, but they had no specific knowledge of the use of the smaller knives.

Pedro Bay ulu-like scrapers occur at Kaflia (Oswalt, 1955a, Pls. 1, 2, 3), Uyak (Heizer, 1956, Pls. 39, 42), and in all stages of Kachemak Bay culture including pre-Russian Indian culture (de Laguna, 1934, p. 61; Pls. 20, 33, 53, 56).

End scrapers occur but are not numerous at Kaflia (Oswalt, 1955a, Pl. 3) and Kachemak Bay (de Laguna, 1934, Pl. 30). They are not reported from Uyak. Pedro Bay side scrapers, differing from those found at Kaflia, were purposely manufactured. Some Pedro Bay side scrapers are similar to one found in Kachemak Bay III (de Laguna, 1934, Pl. 30). No side scrapers are reported from Uyak.

The one man's knife blade found at Pedro Bay is unlike those found at Kaflia (Oswalt, 1955a, Pl. 3) and Uyak (Heizer, 1956, Pl. 35). This artifact exhibits finer workmanship than any other single specimen in the collection. It is similar to those found in all periods of Kachemak Bay (de Laguna, 1934, Pl. 32).

Grinding stones have been divided into three major types: whetstones, grinding stones, and grinding slabs. This division was made on the basis of size and form; it is quite possible that many of the specimens may have served more than one purpose.

Whetstones are widely distributed in southwestern Alaska and occur at Kachemak Bay (de Laguna, 1934, Pls. 22, 53, 55), Kaflia (Oswalt, 1955a, Pl. 6), and Uyak (Heizer, 1956, Pl. 35).

Grinding stones similar to Pedro Bay specimens also occur at Kaflia (Oswalt, 1955a, Pl. 6), Kachemak Bay (de Laguna, 1934, Pl. 21), and Uyak (Heizer, 1956, Pl. 35). They are all beach pebbles which have been modified.

Grinding slabs occur in Kachemak Bay III (de Laguna, 1934, Pl. 18) but are not found at Kaflia. Four of the Pedro Bay specimens show traces of red ocher and were probably used in the manufacture of this pigment. Three stone objects with hemitite stains were reported from Uyak and discussed under paint mortars (Heizer, 1956, p. 53).

Hammerstones are common to all stages of Kachemak Bay (de Laguna, 1934, Pl. 21). One Pedro Bay type, which has been pecked in the middle of both sides, was not present in the Kachemak Bay sequence. Hammerstones were also found at Uyak (Heizer, 1956, Pl. 34) and Kaflia (Oswalt, 1955a, Pls. 5, 6).

Choppers are found at Kaflia (Oswalt, 1955a, Pl. 3) but were not reported from Kachemak Bay or Uyak.

Red ocher is found at Kachemak Bay (de Laguna, 1934, p. 117) and Uyak (Heizer, 1956, p. 53) but was not reported from Kaflia.

Household

Pottery is limited to two black, crude sherds (Pl. 4, 1). The two sherds found at Pedro Bay were fired in a poorly controlled oxidizing atmosphere. The core color is 2.5Y 2/0 on the Munsell color chart and the surface is 10 YR 3/2 to 2/1 on the Munsell color chart. The surface is not consistent in color and the finish is slightly smoothed. The fracture is crumbling. The temper is coarse and very coarse sand (Wentworth gauge mica) with a few particles of grass. The thickness is 0.6 cm.

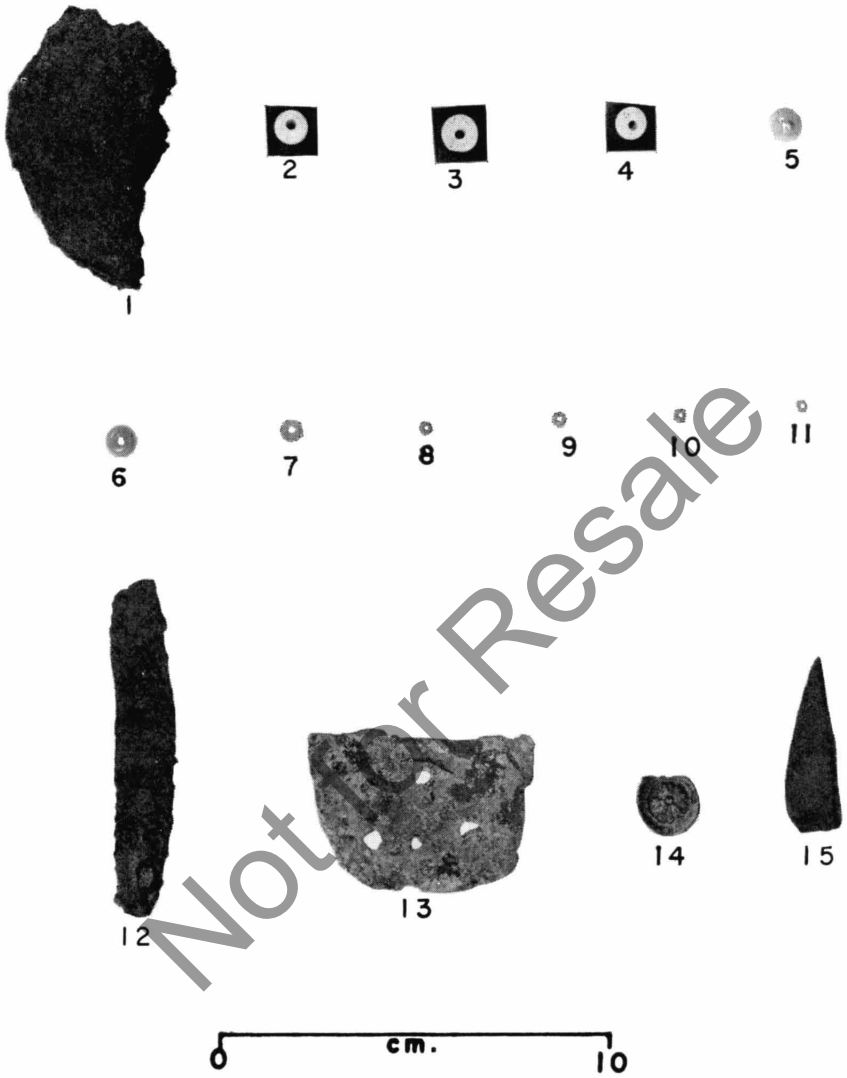


PLATE 4

1. pottery sherd
2, 3. glass beads, Type 1
4. glass bead, Type 2
5. glass bead, Type 3
6. glass bead, Type 4
7. glass bead, Type 5
8. glass bead, Type 6
9-11. glass beads, Type 7
12. iron fragment, use unknown
13. copper object, use unknown
14. copper button?
15. lancet

Birch bark, which was probably used for household containers and roofing materials, was found in all four structures. Because of poor preservation, no particular designs or shapes could be distinguished.

Analysis and Comparisons

No pottery was found at Kaflia or Uyak, but two sherds were found at Kachemak Bay (de Laguna, 1934, Pl. 29). The Kachemak Bay sherds are not similar to the Pedro Bay sherds. Pottery has been reported from the Bristol Bay sites of Pavik, Snag Point, Platinum South Spit, Chagvan Bay, and Nanvak Bay (Larsen, 1950, pp. 178-184). The Pavik thin ware (0.5-0.8 cm.) closely resembles the two Pedro Bay sherds which may have originated at Pavik. It is also interesting that "bayonet" type grooved points, glass beads, iron, and a predominance of ground slate objects as well as similar house types are found at both Pavik and Pedro Bay. Osgood (1937, p. 77) reports that pottery was found only among the Kachemak Bay Tanaina, who may have manufactured it themselves or gained it in trade with the Ingalik at Anvik.

For additional discussion of Alaskan pottery, interested readers may consult Oswalt (1952b, 1953a, 1953b, 1955b), de Laguna (1947), and Van Stone (1954).

Birch bark containers are reported for the Iliamna Tanaina (Osgood, 1937, p. 104) in additional to containers of wood and skin. The use of stone lamps by the Iliamna Tanaina is also reported (Osgood, 1937, p. 108) but has already been shown to be absent from the Pedro Bay collection. Father Juvenal (1952, p. 50) noted that, in contrast to the coastal peoples, the Iliamna (or Lake Clark ?) people used no oil except for oiling bidarkas and the article seemed quite scarce. It may then be inferred that the stone lamp was not used. This might suggest that the introduction of stone lamps into the Iliamna Lake Tanaina culture was after the abandonment of the Pedro Bay site and after 1800.

Personal Adornment

Fifteen *glass beads* of European manufacture were found at Pedro Bay (Pl. 4, 2-11). They have been divided into seven types on the basis of size and color. There are three main sizes: large, medium, and small which are 0.8 cm., 0.6 cm., and 0.4 cm. respectively.

Type 1—two beads are large, opaque white, and irregular in outline (Pl. 4, 2-3).

Type 2—two beads are large, opaque white, and circular in cross-section (Pl. 4, 4).

Type 3-two beads are large, opaque light blue, and circular in cross-section (Pl. 4, 5).

Type 4—one bead is large, opaque dark blue, and circular in cross-section with the sides converging slightly at the top (Pl. 4, 6).

Type 5—one bead is medium, translucent blue, and has been ground flat at both top and bottom (Pl. 4, 7).

Type 6—one bead is small, opaque blue-green, and oval with flat ends in cross-section (Pl. 4, 8).

Type 7—six beads are small, translucent blue, and oval with flat ends in cross-section (Pl. 4, 9-11).

One *bear tooth pendant* was badly deteriorated but may have had a hole drilled in one end for attachment.

Analysis and Comparison

The fifteen glass beads found at Pedro Bay present interesting problems. The distributional and chronological implications of glass beads in the southwestern Alaska area have been discussed by de Laguna (1956, pp. 60-65; p. 211), and it will not be necessary to reiterate the literature.

In the excavations at Pedro Bay, the fifteen beads recovered from three houses are divided into seven types since it is felt that each type is distinct and may have chronological implications for future archaeological work in the area. De Laguna's "Cook" type blue glass bead has been classified as Type 3 in our classification, and the "Glacier Island" (Prince William Sound) black and white type beads were not found at Pedro Bay. Types 1, 2, 4, 6, and 7 are not found at Prince William Sound.

Glass beads were not found at Kachemak Bay, Kaflia, or Uyak, but blue, red, and white glass beads were reported from Pavik in Bristol Bay and are considered to date from the nineteenth century (Larsen, 1950, Fig. 55, A, 12, 13).

De Laguna (1956, p. 64) suggests four cultural stages in Prince William Sound. On the basis of glass beads alone, the Pedro Bay site would resemble her protohistoric stage. In conclusion, it seems probable that glass beads were in the Tanaina, Chugach, and Bristol Bay area before 1741 and certainly before Cook's arrival in Cook Inlet in 1778.

Pendants of bear teeth are found at Kachemak Bay (de Laguna, 1934, Pl. 50, 56) but not reported from Kaflia or Uyak.

Ceremonial or Medical

One ground slate *lancet* knife has bilateral cutting edges, semi-lunar outline, and is flat in cross-section (Pl. 4, 15).

Analysis and Comparison

This lancet is not found at Kachemak Bay, Uyak, or Kaflia, but Osgood (1937, p. 116) reports that lancing was practiced by the Tanaina in order to remove "bad blood." The knife Osgood described, however, is larger and different in form from the Pedro Bay lancet.

Miscellaneous

Two fragments of *iron* were found but are so badly deteriorated that their use could not be determined (Pl. 4, 12).

One circular *copper button* (?) has a flat back and a sunflower design on the front side (Pl. 4, 14). One edge of the button appears to have been broken and there is no apparent means of attaching the object to anything.

One *copper object* has four drilled holes for attaching or hafting (Pl. 4, 13). It is 0.1 cm. in thickness.

Analysis and Comparison

The distributional and chronological implications of iron and copper have been discussed by de Laguna (1956, pp. 60-65). It will be sufficient to point out here that probably both iron and copper were in the area before 1741. On the basis of iron, copper, and beads, the Pedro Bay site would fall between the *later pre-historic* and *protohistoric* of Prince William Sound.

Copper objects are found at Kachemak Bay (de Laguna, 1934, Pl. 49) but are not reported from Kaflia or Uyak. The Pedro Bay people could have secured copper in trade from the Copper River Indians as the Cook Inlet Athabascans did (de Laguna, 1934, p. 118). They also could have secured it from a local copper source reported at Knudson Bay on the north shore of Iliamna Lake or from another source located 15 miles east of the Newhalen River (Martin and Katz, 1910, p. 197).

Comparative Summary

From the text comparisons, it is obvious that the archaeological material from the Pedro Bay site most closely approximates the Kachemak Bay III material. The following is a list of comparable traits from Pedro Bay and Kachemak Bay III:

hammerstones
grinding stones
grinding slabs
boulder chip scrapers
whetstones
pottery (two sherds from each)

chipped stone blades: leaf-shaped with straight base
leaf-shaped with round or pointed base
oval
chipped stone blades: lance blade
end scraper blade
oval scraper
polished stone blades: barbed
with tang
leaf-shaped
triangular lance blade
ulu: curved edge, back notched, unnotched, or with hole
man's knife-like ulu: hafted or unhafted
chipped slate scraper or ulu
dart head: barbed on one side, without blade
bone arrowhead, without blade
pendant: tooth ?
paint: hematite
copper
semi-subterranean house, with semi-subterranean tunnel
central fireplace inside house

Traits which are present at Kachemak Bay III but are absent from Pedro Bay are:

notched stones
splitting adze
planning adze
stone saw
stone lamp
hunter's lamp
ulu: straight edge
double-ended slate scraper
drill
harpoon head
socket-piece
bone shaft
fishhook
bone pin
bone needles
awl
bone scraper
rib flint flaker
wedge
ice-pick
spoon
ornament complex: nose pin, labret, ear plugs
burials

The beaver-tooth draw knife, awls, and bark peeling tools, which are widespread among many northern Athabascans, were not present at Pedro Bay. The absences may be explained in part by the poor organic preservation of the Pedro Bay site since Osgood (1937, p. 103) reports the use of beaver-tooth draw knives at Iliamna as well as the utilization of the bark peeling tool in securing spruce bark for roof covering (Osgood, 1937, p. 56). The stone lamp, although reported from Iliamna (Osgood, 1937, p. 108), was not found at the Pedro Bay site, but local informants knew of its use in the past.

Sea mammal hunting was important at Kachemak Bay, Kaflia, Uyak, and Bristol Bay sites, but not one artifact was found at Pedro Bay which would indicate its practice. Sea mammal hunting, however, does seem to have been practiced by the Iliamna Tanaina since Osgood (1937, p. 37) reports that they often conducted excursions to Cook Inlet to hunt sea mammals and gather shellfish. The Pedro Bay site contained several sea mammal bones. In conclusion, it seems that sea mammal hunting, although practiced, was of little economic importance.

Summary and Conclusions

From the standpoint of local (Iliamna Lake, Clark Lake, and surrounding territory) Indian and Eskimo culture in southwestern Alaska, we have divided the historic period into four parts: *Early Russian*, *Middle Russian*, *Late Russian*, and *American*.

Early Russian—1741 to 1784

This period was initiated with the voyage of Bering in 1741 and ended with the establishment of a permanent settlement on Kodiak Island by Shelikof in 1784. A few glass beads of European manufacture were present, and there was a limited use of European iron and native copper.

Middle Russian—1784 to 1799

Shelikof's settlement on Kodiak Island initiated the Middle Russian period, and the founding of the Russian-American Company in 1799 ended the period. The time was characterized by intensive Russian-Indian and Russian-Eskimo interchange and conflict, struggles among Russian fur trading companies for control of the rich fur market, and the introduction of the Russo-Greek Orthodox missionary activity. Glass beads, iron and other European articles increased in abundance, but the Russo-Greek Orthodox religious beliefs found little acceptance as evidenced by the killing of Father Juvenal in the Iliamna region.

Late Russian—1799 to 1867

With the establishment of the Russian-American Company in 1799 the Late Russian period began and ended with the sale of Alaska to the United States in 1867. A relatively peaceful relationship between the Russian-Indian-Eskimo components characterize this period coupled with the unified exploitation of the fur resources by the Russian-American Company monopoly. It marked the end of serious organized native resistance to the Russians. Russo-Greek Orthodox religion was finding acceptance among most of the Iliamna Lake people.

American—1867 to Present

The American period was initiated in 1867 with the sale of Alaska to the United States. Political authority changed, and a different philosophy toward aboriginals became a new basis for administration. This change of administration had little immediate effect upon native life, but through the years the transition from aboriginal culture to Russian subject to American subject to American citizen to State of Alaska citizen has altered the way of life to a considerable extent.

American material goods were substituted for Russian goods, and Protestant and Roman Catholic missionary activity was initiated and continues today. The American missionary activity has found little acceptance among the Indians and Eskimo of Iliamna Lake; the Russo-Greek Orthodox religion is widely accepted and practiced. The majority of the people seem to prefer "the religion that the priests brought."

The Pedro Bay site would fall between the Early and Middle Russian periods, probably around 1750-1800. The site was occupied briefly by a group of Tanaina Indians and was abandoned prior to direct Russian contact on Iliamna Lake. Because of the few trade beads, copper articles, and two iron fragments, the site should be placed between the *later prehistoric* and *protohistoric* described by de Laguna for Prince William Sound.

The task of future archaeological work in this area would now seem to be the delineation, description, and comparison of those *prehistoric* cultues, both Indian and Eskimo, which surely occupied the Iliamna Lake region. Only then will we have a much needed picture of the aboriginal composition and development in this vast and important central region of southwestern Alaska as well as an evaluation of their role within the larger sub-arctic area.

Trait List

	H-1	H-2	H-4	Total
Fishing				
dart head, multi-barbed (Pl. 1, 1)			1	1

	H-1	H-2	H-4	Total
LandHunting				
arrowhead, antler, barbless (Pl. 1, 2)		1		1
arrowhead, antler, with barb (Pl. 1, 3)		1		1
arrowhead, chipped slate, with tang (Pl. 1, 4-5)	1	1		2
arrowhead, chipped jasper (Pl. 1, 6)		1		1
arrowhead, chipped chert, fragment	1			1
lance blade, bone (Pl. 1, 7)	1			1
lance blade, chipped slate, without tang (Pl. 1, 8-9)	2			2
lance blade, ground slate, shouldered tang (Pl. 1, 10-11)	2			2
lance blade, ground slate, with tang (Pl. 1, 12)	1			1
lance blade or arrowpoint, ground slate, center grove (Pl. 1, 13-14)	2	1		3
lance blade, ground slate, bilaterally barbed, seriated lateral edges (Pl. 1, 15-17)	3	2		5
lance blade, ground slate, bilaterally barbed fragments (Pl. 1, 18)	3			3
lance blade, ground slate, converging lateral edges (Pl. 1, 19)	1			1
lance blade, ground slate, unfinished	1			1
lance blade, ground slate, fragments	7			7
Tools And Manufacture				
ulu-like blades or scrapers				
Type 1 (Pl. 2, 1)	1	1		2
Type 2 (Pl. 2, 2)	2	2	1	5
Type 3 (Pl. 2, 3)	1	1	1	3
Type 4 (Pl. 2, 4)	2		1	3
Type 5 (Pl. 2, 5)		2		3*
Type 6 (Pl. 2, 6)	2		1	3
Type 7 (Pl. 2, 7)	2	1		3
Type 8 (Pl. 2, 8)			1	1
fragments, not classified	1	2		3
end scrapers (Pl. 2, 9-11)	7			7
side scraper or knife (Pl. 2, 12)	1			1
man's knife blade (Pl. 2, 13)	1			1
whetstones (Pl. 2, 14-16)	2	5		7
grinding stones (Pl. 3, 1-3)	3	3	3	9
grinding slabs (Pl. 3, 4-7)	5	5		10
maul (Pl. 3, 8)	1			1
hammerstones (Pl. 3, 9-11)	2	2	1	5
chopper ? (Pl. 3, 12)	1			1
ocher, red	X**	X**	X**	
Household				
pottery sherds (Pl. 4, 1)	2			2
birch bark containers	X**	X**	X**	
Personal Adornment				
glass beads				
Type 1 (Pl. 4, 2-3)	1	1		2
Type 2 (Pl. 4, 4)	1	1		2
Type 3 (Pl. 4, 5)	1	1		2
Type 4 (Pl. 4, 6)	1			1

	H–1	H–2	H–4	Total
Type 5 (Pl. 4, 7)		1		1
Type 6 (Pl. 4, 8)		1		1
Type 7 (Pl. 4, 9-11)	5	1		6
tooth pendant?	1			1
Ceremonial Or Medical				
lancet, ground slate (Pl. 4, 15)		1		1
Miscellaneous				
metal fragments, iron (Pl. 4, 12)		1	1	2
metal fragments, copper (Pl. 4, 13)	1			1
metal fragment, copper button ? (Pl. 4, 14)	1			1
wood fragments, use unknown	3			3

* denotes one item found in cache A.
X** denotes traces present but not salvaged.

Notes

[1] The authors wish to express their sincere thanks to the many residents of Iliamna Lake who were so helpful throughout the course of the field work. Gratitude is expressed especially to Mr. and Mrs. Robert Walker, Mr. and Mrs. Holly Foss, Mr. and Mrs. Nels Hedlunds, Mr. Arsene Mulognok, and the staff of the Federal Aviation Authority at Iliamna. We are especially indebted to Dr. Wendell Oswalt, of the University of California at Los Angeles, who suggested and supervised the project and made helpful suggestions concerning the manuscript.

[2] The present Lake Iliamna was named Shelekof on maps until 1844, and some maps retained this name until after 1857. The present Lake Clark was named Ilima on maps through 1857. On later maps it was included with Iliamna Lake under the name of the latter or was not named at all (Alaska Boundary Tribunal, 1904, vols. 1, 2). Petrof (1884, pl. 17) referred to Lake Clark as Kichik Lake and the village then located there as Kichik. Wilfred Osgood (1904, p. 329) stated that Kichik (or Keeghik) was also named Nikhak. Lake Clark received its present name after its modern discovery by J. W. Clark of the Alaska Commercial Company in 1891 (W. H. Osgood, 1904, p. 326). Because of the change in the name of Iliamna Lake and the similarity of the name Ilima (Lake Clark) to it, there is often doubt as to which lake is being referred to in the literature, and care must be taken in utilizing historical information concerning this area.

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