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THE NETSI KUTCHIN: AN ESSAY IN HUMAN ECOLOGY.

Louisiana State University, Ph.D., 1963
Anthropology

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THE NETSI KUTCHIN: AN ESSAY IN HUMAN ECOLOGY

A THESIS

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Geography and Anthropology

by
Frederick Hadleigh-West
B.A., Tulane University, 1951
M.A., Louisiana State University and
Agricultural and Mechanical College, 1956
June, 1963
The aim of the work which follows, is to examine the ecological relations of a people whose native habitat lies in the far north of North America. The major focus is upon the cultural responses to a hostile environment.

Although the term ecology is variously applied outside biology, the attempt is made here to apply the concept as originally set forth by Ernst Haeckel in 1869. Haeckel defined ecology to mean,

the body of knowledge concerning the economy of nature -- the investigation of the total relations of the animal both to its inorganic and to its organic environment; including, above all, its friendly and inimical relations with those animals and plants with which it comes directly or indirectly into contact -- in a word, ecology is the study of all those complex interrelations referred to by Darwin as the conditions of the struggle for existence.¹

Such is the orientation of this study. It is realized that the application of biological ecology to man is beset with difficulties. These seem not to be insurmountable, nor to preclude man, or rather populations of men,

from ecological study. It is the possession of culture that makes man's ecological relations different from those of other organisms. A study of human ecology, therefore, must not only take into consideration that aspect of man's behavior but, indeed, must be based upon its study.

The people who form the basis of this study are a group of Athabascan-speaking Indians living in the eastern Brooks Range of northern Alaska. The Netsi Kutchin are one of nine bands of Kutchin Indians who are related by a common language. Their territories formed a continuous band from the Mackenzie Flats of present day Northwest Territories and Yukon Territory westward through the south slope of the Brooks Range, and the great bend of the Yukon River to the headwaters of the Koyukuk River. Even among their Kutchin congeneres, the Netsi Kutchin were unique. Much of their uniqueness is ascribable to their extreme northern location. With the possible exception of the Hare Indians of Northwest Territories, the country of the Netsi Kutchin lay farther to the north than that of any other American Indian group.

It is my pleasure to record my indebtedness and sincere appreciation to the following people: Mr. and Mrs. James Gilbert, Mrs. Alice Peter, Mrs. Sarah Tritt,
Mr. and Mrs. Elijah Henry, Mrs. Nena Russel, Miss Florence Gilbert, Mr. and Mrs. Ezias James, Mr. William L. Russell, Mr. Trimble Gilbert, Mr. George Tritt, and Mr. Isaac Tritt -- informants, interpreters, and friends, all of Arctic Village, Alaska; Mr. and Mrs. Robert Mott and Mr. Frank Stevens, teachers and former teacher, respectively at Arctic Village; Mr. Richard Mueller, linguist for the Wycliffe Bible Translators and resident at Arctic Village; the late Mr. Henry John, invaluable informant of Venetie, Alaska.

In addition, particular thanks are due Dr. Fred B. Kniffen, Department of Geography and Anthropology, Louisiana State University, who first stimulated the writer's interest in a study of this kind and encouraged its progress; Dr. William G. Haag, of Louisiana State University, who guided the work in its final stages; Dr. Ivar Skarland, who as head of the Department of Anthropology and Geography of the University of Alaska, allocated funds for support of the field work; and to my wife, Katherine, without whose help this could not have been written.

It is my sincere hope that none of the above people will find in this work reason to regret their kindly attentions.
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ABSTRACT

The Netsi Kutchin are one of nine related bands of Athabascan Indians of northeastern Alaska and northwestern Canada. Their habitat lies entirely above the Arctic Circle in the southeastern Brooks Range.

Environmentally, the region presents the stringent demands common to the subarctic. But also, in being transitional to arctic tundra, there exist peculiar problems. The objective here is to examine a small ethnic group in relation to its environment.

Field work, primarily interview and observation, was carried out at all seasons on visits of up to two months duration.

The Indians call their country Netsai\textsuperscript{n}. Vegetationally, it is forest-tundra. Open spruce forest occurs along streams and on south-facing slopes. Much of the country is treeless. Extensive areas are carpeted with lichens. Lichens and sedges constitute the principal sustenance for caribou. Willows are abundant as are several plants bearing edible berries. Birch and cottonwood occur sparingly; the former to the south, the latter throughout.
Food uses of plants were relatively unimportant. An extensive medical lore, still followed, involved the use of plants. Techniques ranged from the application of spruce pitch to wounds to the use of various decoctions and inhalants.

Timber is scarce. Modern-day cabins reflect the small size of available trees. Twenty mile round trips from Arctic Village, the present population center, are necessary to secure one quickly-exhausted toboggan load of firewood. Thus, the Indians have had some effect upon the vegetational landscape.

The most important animal of Netsai, numerically and in human terms, is the caribou. The traditional economy was based upon these animals; they are but slightly less important today. Formerly, the principal method of taking was by use of a large corral set with snares. Other old techniques persist to the present day. Since caribou migrations are unpredictable, famines were frequent in the past. Earlier cultural correlatives were nomadism and the absence of large population agglomerations. Caribou provided food, clothing, and housing.

Other mammals and fish were seasonally of some importance. Aboriginally, the usual hunting weapon was
the bow, supplanted now by rifles. The Netsi Kutchin are acute observers of this aspect of the environment. Many stories are based upon behavior characteristics of particular species.

Indian predation upon the fauna of their country does not adversely affect population levels of any species. There appears to exist a dynamic equilibrium between all organisms, including man.

Netsain is mountainous country. The Indians traversed it readily, afoot in summer, on snowshoes in winter. Dog traction, introduced after contact, brought greater mobility. Boats, likewise introduced, allowed the use of rivers for travel. Culturally, the key to the country was the snowshoe since winter is the dominant season. Kutchin snowshoes were the finest in North America.

The climate of Netsain cannot be precisely defined; there are no weather stations present. However, in general, it is microthermal with long, cold winters and short, cool summers. Traditional clothing and dwellings were admirably adapted to the climate. Nowadays, other than boots and mittens, clothing of native manufacture is little used. The effects of this change are sometimes disastrous.

Log cabins and canvas tents are modern counterparts
of the aboriginal skin tent and moss house.

When compared with certain other northern peoples of Siberia and America a broad similarity of adaptation is noted. Additionally, there are a number of specific resemblances. The latter are ascribable to a general community of ideas with the boreal zone. The former are largely ecological in nature -- people on similar technological levels, operating within similar environments, arriving at broadly similar solutions. Of all environmental zones the range of acceptable human responses is perhaps narrowest in the north.
CHAPTER I

INTRODUCTION

Within recent years there has been a great deal of mention of human ecology. Since the most widely practiced forms of ecology, plant and animal ecology, are within the realm of biology, it is perhaps to be expected that practitioners in that field are most vocal in the area of human ecology. Notable among modern writings on the subject are those of Marston Bates and Paul Sears. Almost any standard text in ecology, however, will contain a section purporting to deal with human ecology. As early as 1922, H. H. Barrow suggested that the field of geography should constitute itself as human ecology and that areas of the field as then practiced should be eliminated from the corpus of geography unless they could be related to human ecology. Although there appears to have been no concerted movement among geographers to follow the standard raised by Barrow, it may be assumed that most geographers found in it some merit at least. That is to say, that the relationship between man and his environment, if it does not form the essential core of the field of geography, has

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Biological studies of ecology are characteristically detailed studies of small populations or areas. That seems to be the primary distinction between the traditional geographic study of an area or a region and an ecological study. It appears essentially, then, to be a difference in scope and detail. Another highly important distinction, however, involves the unit of observation chosen. The animal ecologist almost always has as his focal point a particular population of a species. The regional study in geography is usually conceived to have as its basis the region itself. The region may correspond to a political division, or, it may correspond to a "natural" physiographic region as, for example, the Great Basin. Geographical regional studies and ecological studies seem to diverge at that point; species and region are not comparable.

A naive student of animal behavior who wished to apply his techniques to the study of the species Homo sapiens, would quickly find himself dismayed by the diversity of behavior within the one species. The key here is culture. Far and away, the greater part of human behavior is learned, cultural, behavior. In its gross
form it is dictated by the nature of the species. But recognition of this last fact will not explain the range of human behavior in response to its physical and natural environments.

Man does not deal with his environment directly, but rather indirectly, by means of the extra-somatic attribute which is his hallmark -- culture. The writers referred to above are well aware of man's difference from other animals, however, they appear to be unable or unwilling to make what appears to be the logical next step to render the study of human ecology comparable with that of other animals, or at least as comparable as is possible. This logical next step is to let the particular individual culture stand for the species; to let this be the starting point for human ecological research.

The viewpoint here suggested differs too from that of the regional study in that a region may contain a number of different cultures the important ecological differences among which tend to be lost when all are grouped arbitrarily simply on the basis of propinquity. This is not to say that a regional study could not be ecological as that term is here used, but rather that it is unlikely because of the numerous complexities introduced in considering different cultures within a regional frame-
work. At any rate, whether the merits of this approach as opposed to other possible approaches are conceded, it is the procedure followed in this report. The base line for this study is one particular cultural grouping; the region in which they live possesses two well marked boundaries, but is otherwise rather arbitrarily delimited from the territories of their neighbors. The manner of their adjustment to a harsh and demanding environment and the effects which their activities have had upon the landscape and the other creatures inhabiting their country are the major foci of interest.

A number of studies might be defined as part ecological as that term is here used. In addition, ecological data may be gotten from a much larger number of others. It is believed, however, that the present study represents one of the very few aimed specifically at an ecological interpretation of one group of people. Spencer's recent study of the Barrow people, while ecology appears in its title, appears upon examination to be more exactly part ecological and part social anthropological.5

The subject of this investigation is the Netsi Kutchin Indians. As mentioned above, the common bond which allows the Kutchin to be set apart from other
Athabascan peoples of the north is their language, within which, it appears, there are some important dialect differences. They had no political ties and in no way represented a greater tribe or nation. The Netsi Kutchin were primarily hunters, secondarily fishers and gatherers. Their culture was not elaborate and their population was small. They were nomadic within a large, well-defined territory. Their traditional country lay in the foothills and mountains of the southeastern segment of the Brooks Range of Alaska. The country is transitional from forest to the tundra characteristic of the north slope of the Brooks Range. Agriculture and animal domestication were unknown.

While a certain uniqueness may be claimed for the orientation and methodology of this study, its shortcomings are well known to the investigator. The Brooks Range has been subjected to all too little scientific investigation of any nature. There are no weather records for the eastern Brooks Range. Studies of the vegetation are scant. Distributional studies of animals are virtually unknown, even including the caribou. Geological work has been carried out to the south in the Yukon Flats and some rather cursory work was performed years ago in the mountains themselves. It is, in short, a kind of scientific no-man's
land between the relatively well-known Arctic Slope and the areas to the south. These lacks impose certain serious restrictions upon the present study.

The organization of the material is as follows. The actual field data are presented in five sections. The first of these is a summary or ethnographic sketch of the Netsi Kutchin. Following the summary are four sections describing the four separable milieu which in their totality combine to form the environment in which the Netsi Kutchin lived. The four sections deal with vegetation, fauna, physiography, and climate. Under each of these headings are subsumed the activities, practices, and beliefs, which seem most pertinent to the particular category. A concluding summary compares the Netsi Kutchin and their ecology with selected other northern peoples.

As mentioned above, there are imperfections which spring from a lack of data, but just as surely another source of difficulty is the need to categorize data in a way that does violence to the functional unity of the man-nature relationships. The priority of placement with some of these categories seems quite clear; in other instances it may be arbitrary to the extent that some cross-referencing in other categories is necessary. That
such is expectable will, it is hoped, mitigate to some
degree its effect upon the reader. To employ a rough
analogy, the Netsi Kutchin and their country may be con-
sidered as an organism. In order to examine the organism,
it is necessary to dissect it. It is impossible to dissect,
and at the same time maintain the appearance the organism
had in life. It is hoped that for present purposes the
classification of data here followed is the most meaning-
ful of the several alternative ways the same data may have
been arranged.

The first recorded mention of the Netsi Kutchin is
that of Sir John Richardson in which he describes the
country traversed and some of the people encountered in
the course of his search for his late commander, Sir John
Franklin. It is of importance to note that while
Richardson was in direct contact with some of the Mackenzie
River drainage Kutchin he had no direct contact with the
Netsi Kutchin. The information on which he based his
account of the Kutchin or Loucheux in the western portion
of their range was obtained from Alexander Hunter Murray,
who, in 1847, had founded and was manager of the Hudson's
Bay Company post at Fort Yukon. Actually, then, credit
for first bringing the Netsi Kutchin to notice belongs to
Murray, not Richardson. Murray's own Journal of the Yukon contains valuable information on the western Kutchin and the other peoples who resorted to Fort Yukon to trade during his stay there. However, Murray's Journal, edited by L. J. Burpee, was not published until 1910.8

Murray's contact with the Ney et-se-Kootchin, as he termed them, cannot have been too extensive. That inference is drawn both from Murray's own writings and from data gathered in the field in which it was continually stated that only a certain few individuals were engaged in trade at Fort Yukon during the Hudson's Bay Company days. Although his information was gotten from Murray, Richardson rendered the name of the group as Ney et sè-kutchi. Richardson gained access to Murray's Journal through the intercession of Murdoch McPherson, who in the late 1840's was Chief Factor at Fort Simpson. In addition, Richardson was also in correspondence with Murray.

In the interim between 1851 and 1910 there are some few additional references to the Netsi Kutchin: In 1866, Strachan Jones in his article on the Kutchin tribes rendered this spelling Nat-sit-Kutchin. In this same volume Hardisty in his article, "The Loucheux Indians", gives the name as Na-tsik-koo-chin. Both Jones and
Hardisty were Hudson's Bay Company employees, and both were apparently stationed at Fort Yukon in the early 1860's. Another writer of this same period, Robert Kennecott, sojourned at Fort Yukon and likewise recorded a designation for the Netsi Kutchin. His rendering was na-tsit-kutchin. Kennecott's journal, however, did not appear in print until 1942. W. H. Dall, writing in 1870, listed the group as the Natché-Kutchín. He included as an alternative prefix though, Natsit. Following Dall's reference the Netsi Kutchin are not again brought to public notice until the twentieth century. Of the several early sources, by far the best is Murray.

In addition to Burpee's editing of Murray's Journal in 1910, there appeared in 1925 two notes by Donald A. Cadzow containing some ethnographic and distributional data on the western Kutchin. Cadzow follows what was apparently Dall's preferred usage, Natché-Kutchín. Osgood's Contributions to the Ethnography of the Kutchin, to date the most ambitious work upon all the Kutchin, appeared in 1936. Osgood returned to Dall's alternative prefix Natsit. In addition to the foregoing, there are two notes published which deal more or less directly with the Netsi Kutchin in their relation to other western Kutchin
bands. These are McKennan's of 1935 and the present writer's of 1959. 16,17 The latter employed the same group designation as used here; McKennan rendered it NEdse Kutchin.

First hand investigation of the Netsi Kutchin may be said to have been carried out by Murray, McKennan, and the present writer. In each of the three cases the aims were different. That of Murray was in the nature of part of an inventory of his trading domain. So far as is known, all of Murray's information was published in the Journal alluded to above. 18 McKennan's work was ethnographic, carried out in the mid-1930's. To date his material is unpublished.

It may be noted that in addition to the various forms in which Netsi Kutchin is set down, there are other synonyms. The term Loucheux, originally applied by earlier writers to the Kutchin of the lower Mackenzie River was occasionally used to comprehend also all the western Kutchin. More specifically the term Gens du large, the gift of the French voyageurs of the Hudson's Bay Company was applied to the Netsi Kutchin, but possibly also, as suggested elsewhere, that appellation may have included the Dihai Kutchin. 19 Gens du large, it appears, was in the American period corrupted into Chandalar and that is
one of the designations encountered for the Netsi Kutchin. Finally, some variant of the familiar term Dene was early applied to encompass not only the Kutchin but also many other groups in an erroneous assumption of some sort of unity. This may be found rendered as Tinneh by Gibbs in his introduction to the notes by Jones and Hardisty, or as Déne by Petitot.21,22

As is apparent from the foregoing there has been relatively little work carried out among any of the western Kutchin groups. So far as is known, only McKennan and the investigator have aimed at a systematic understanding of any one of the western groups. In addition, it is believed that the present study is the first such directed at an ecological interpretation of a restricted group of northern peoples.

The information to be presented below was gathered in the field on visits of durations ranging up to two months and carried out at all seasons. The techniques employed were those of interview and observation.
CHAPTER II

IDENTITY AND CULTURAL POSITION OF THE NETSI KUTCHIN

The material in this chapter is provided to give the reader an understanding of the total culture of the Netsi Kutchin. Its inclusion is deemed necessary because of the foreignness of the peoples treated. Their customs, beliefs, and practices are quite different from those Indian groups with whom most Americans have some familiarity. This section is in no way to be interpreted as a complete ethnography of the Netsi Kutchin. It is, more precisely, a cultural sketch of those people. It is hoped, however, that taken in combination with the following four sections a relatively clear picture of the people, their country, and the mutual interrelations existing between them might be obtained.

I. NAME AND LANGUAGE

With reference to their name, the people call themselves the Netsi Kutchin. The literature pertaining to these people is sparse, as noted above. There appears to be little justification for perpetuating any of the variants of the designation by which they call themselves.
None of those can be considered entrenched. Chandalar, which might have been an acceptable substitute, is of very dubious value today since pre-eminently it is now a place name designation. The Chandalar mining district centers about Lake Chandalar which lies to the west of the traditional territory of the Netsi Kutchin. The Chandalar River proper lies south of their territory. A village called Chandalar, which may be seen on older maps, was situated on the Chandalar River, again outside the territory of the Netsi Kutchin. In fact, the only occurrence of Chandalar as a place name within the traditional territory of these people is in the name of the river, the East Fork of the Chandalar. The other "forks" of the Chandalar are to the west of Netsi Kutchin territory. These points were raised by the writer in an article published in 1959. In that same article as a further objection to using the word Chandalar as designating the Netsi Kutchin it was suggested that there was some likelihood that Gens du large, from which Chandalar is derived, originally included also the Dihain Kutchin. In the face of these objections it seems unassailably correct to use their own designation for these people.

To speak of the Kutchin is to speak of a language group.
Their differences from other northern Athabascans are exemplified by their use of the suffix Kutchin. In that, they stand alone among the Northern Athabascans. Kutchin may be translated as "people of" or "those who dwell." The term is never used alone, but always with a prefix designating the country in which the particular group lives. Thus, Vante Kutchin refers to the lake country characteristic of the Crow Flats region in which those people dwell. Unfortunately, it was not possible to obtain a clear-cut definition of the prefix Netsi. There was, however, agreement among the many people queried on that point that it refers to the mountains and hill lands which comprise their country.

A recent publication of the Sapir-Whorf-Trager classification of North American Indian languages, shows Kutchin as a language of the sub-family Northern Athabascan, family Athabascan, stock Dene, and of the phylum Nadene. The nine groups of Kutchin-speakers are thus most closely related in their language to such peoples as the Tanana, the Han, the Koyukon, the Ingalik, the Hare, Dogrib, Slave, Yellowknife, Chipewyan, and the other tribes customarily grouped under the rubric Northern Athabascans. Although separated by a great deal of physical distance, their
speech is more closely related to that of the Athabascans of the Southwest, the Apaches, and Navajos, than to the languages of the more nearby Tlingit and Haida.

II. TERRITORY

At the time of contact there were nine Kutchin-speaking bands occupying a relatively extensive portion of what is now northwesternmost Canada and northeastern Alaska. The territories of some of these groups lay wholly north of the Arctic Circle; portions of all the rest cross that line. With their eastern neighbors, the Hare, Bear Lake, and Yellowknife, they share the distinction of being the most northern of American Indians. The territory of the Netsi Kutchin was one of those which lay entirely north of the Arctic Circle. With its northern boundary marked by the crestline of the Brooks Range, they were in addition, the most northerly of all the Kutchin.

Almost without exception the several well known works dealing with distributions of North American Indians err in their placement of the Netsi Kutchin. Driver and Massey show them too far to the south. Swanton places them most largely in the former territory of the Dihai Kutchin, which people he does not indicate. Cadzow shows a similar location and he was evidently followed by Osgood.
The proper setting of the Netsi Kutchin is best appreciated when seen in relation to the topography of northeastern Alaska. They are mountain people, as indicated by their name. They shun as unwholesome the flatlands to the south of them. Their southern boundary corresponds at least approximately to the rather abrupt face of the piedmont where it conjoins the Yukon Flats. The Yukon Flats, and indeed the southern portions of their own territory were considered "too brushy". They much prefered the more open country to the north. It should be noted, however, that Osgood's use of the term "barrens" in reference to the territory of the Netsi Kutchin is inappropriate since it is not treeless tundra. Their northern boundary may be conveniently drawn along the crestline of the Brooks Range although, particularly in the past, they did some hunting in the headwaters of those streams north of that divide. Their western boundary, about which they are not too specific, may be drawn as a line west of, and roughly paralleling, the East Fork of the Chandalar River. The Coleen River apparently represented the eastern frontier of their territory. Although the people themselves are rather vague on this last point, the consensus seemed to be that it represented at least a
good approximation. Netsain was the term by which the
people designated their country.

The territory of the Netsi Kutchin encompassed an
area of approximately twelve thousand square miles. Map 2
shows the locations of all nine Kutchin bands.

III. POPULATION AND VILLAGES

In the past, permanent settlements were unknown. At
the present time those of the Netsi Kutchin still in their
traditional territory may be found in two villages. Arctic
Village (68° 09' N; 145° 34' W) is the principal settlement.
Population of that village is about 110 persons. Christian
Village to the south (67° 21' N; 145° 10' W) presently has
one family resident in it. The population is five. It is
said that in the past the population of Christian Village
ranged as high as twenty-two. Christian Village was named
for "Chief Christian" who started the settlement. It has
not been possible to determine the source of the name
Arctic Village. That name was certainly not conferred by
the people themselves as their designation for the place
is Va shraín k'ón.

The population of Arctic Village is subject to fluctu-
ation, with families from time to time moving to Fort
Yukon or Venetie then back to Arctic Village. During
Map 2. The distribution of Kutchin bands. The map follows Cornelius Osgood's Figure 1 in, *Contributions to the Ethnography of the Kutchin* (Yale University Publications in Anthropology, No. 14, 1936), with these exceptions: (a) Names are rendered as collected from the Netsi Kutchin; (b) the territory of the Dihai Kutchin is included; (c) the boundaries of the latter group are changed. A version of this map appeared as Figure 1 in the article "On the Distribution and Territories of Western Kutchin Tribes" (*Anthropological Papers of the University of Alaska*, Vol. 7, No. 2, 1959) by F. Hadleigh West.
the time of the investigator's acquaintance with it 115 persons was the highest population figure known for Arctic Village. At most then, it appears that today the Netsi Kutchin in their home territory number 120 to 125. There are a number of Netsi Kutchin families living outside their old country, particularly in Fort Yukon. An estimate of the total population of Netsi Kutchin might be 150 to 175 persons.

Older informants repeatedly maintained that in the past their numbers were much higher. As will be brought out below this is probably simply a reflection of changed settlement habits rather than a true indication of a great decrease in population from aboriginal times.

Mooney in his estimates of aboriginal populations north of Mexico gives a figure of two hundred for the Natsit-Kutchin [sic]. 9 Swanton in his more recent publication uses the same. 10 Swanton speaks of these people as inhabiting the Chandalar River area which is quite erroneous. It furthermore casts some doubt upon the 1910 census figure Swanton presents since it seems quite probable that that was the area censused. 11 The confusion that has reigned over the nomenclature of the Netsi Kutchin has already been noted. The present day village of Venetie
was formerly called Chandalar and the Chandalar people were supposed to be Netsi Kutchin which they were not. In view of the possibilities of rampant confusion it seems wisest to forego any further consideration of the population estimates of Mooney and Swanton.

It appears most unlikely that the population in aboriginal times was greater than three hundred. Considering, however, that there was some introduction of disease which cut down the population somewhat, perhaps 250 might represent a reasonable figure for the time of contact. Taking three possible population figures, population densities in aboriginal times might have been one of the following: With a population of two hundred, one person per 60 square miles; population of 250, one person per 48.3 square miles; population of three hundred, one person per 40 square miles.

IV. CONTACT HISTORY

The Nakotcho Kutchin, or Mackenzie Flats Kutchin, were the first of the Kutchin-speakers brought into contact with the western world. That occurred as a result of Alexander Mackenzie's descent of the river later named for him, to its mouth in 1789. The following thirty years saw further exploration along the Mackenzie River both as a result of
trading operations by the Hudson's Bay Company and as a result of the British search for a Northwest passage. The second expedition of Sir John Franklin (1825-1826) was the first to explore the northeast coast of Alaska.\textsuperscript{13} The season of the year in which he carried out that exploration was such that he might have encountered individuals of the Netsi Kutchin near the coast in the vicinity of Barter Island. However, he leaves no record of such a meeting. There is also no record of any of the Franklin searchers having encountered any Indians in that vicinity. It must be presumed, therefore, that the first contact of the Netsi Kutchin with western civilization came as a result of the 1847 establishment of Fort Yukon by the Hudson's Bay Company. The traditions of the people themselves tally with that conclusion. It is of considerable interest that these same traditions indicate that contacts with Fort Yukon and Anglo-Americans in general were quite sparse until the end of the nineteenth century. The people speak of two missionaries coming over, apparently from Canada, and carrying out some conversions in the vicinity of the Sheenjek River. It is not possible to date that event exactly nor to determine who the missionaries were. They were undoubtedly Anglicans, however, and as
well as may be determined that event took place in the 1870's or perhaps early 1880's. Relatively intensive contacts followed well after Americans had taken over the trading at Fort Yukon. A particularly important event in this connection was the gold stampede to Caro shortly after the turn of the century. Some of the Netsi Kutchin found a lucrative trade along the trails to the gold fields selling meat and useful articles of their own manufacture to the miners and prospectors.

While intensive contacts may be said to date from this last event, that is true only in a relative sense, i.e., in relation to the contacts which the Netsi Kutchin had had prior to the Caro stampede. Many important changes were introduced at that time, but the economy was still of a subsistence nature and did not basically alter from that pattern until after World War II.

V. ECONOMY

Since much of the information under this heading is to be found in later sections it is given only cursory treatment here.

The Netsi Kutchin were primarily nomadic hunters of big game. The most important single species was the caribou. Caribou were taken in pounds or corrals and by other
means. Moose hunting, commonly an important economic activity of other Athabascan groups of interior Alaska, was rare among the Netsi Kutchin. Moose occur sporadically in their country and probably more commonly now than in the past, but Netsai\(^N\) is largely beyond their normal range. Full use was made of the caribou, it supplied the needs of food, clothing, and housing. Fishing and gathering were of seasonal importance, but were far subsidiary as economic pursuits to the taking of caribou.

In addition to pounds and fences used for the taking of caribou, a variety of snares, deadfalls, and traps were used for other species including fish. The principal weapon was the bow. A thrusting spear used almost exclusively for bear was present as was a spear used for fish. Aboriginally, knives were made of bone but there were some copper knives gotten by trade. For woodworking a ground stone adze was used. Awls and a variant of the Eskimo man's knife were also in use for woodworking. Skinworking implements included bone fleshers and beamers and side and end scrapers of stone.

VI. DWELLINGS

This subject is treated in more detail in a later section. Dwellings were of two sorts. The hemispherical,
wigwam-like, skin tent was probably the commoner of the two. It was portable and housed two families. A log and slab house covered over with blocks of moss became a permanent fixture, but residency in it was not. Aboriginally, a number of other structures for special purposes were erected. These will be discussed below. Modern day houses are of log, saddle-notched with the door at the gable end. Functionally replacing the skin tent of aboriginal times is the canvas wall tent.

VII. DRESS AND ORNAMENT

Dress is considered in greater detail in a later section. Caribou skin provided the material for clothing. The man's outfit consisted of a pullover shirt without an attached hood. A close fitting hat was worn. Pants and boots were of a piece. The man's shirt was pointed front and back. The yoke, both front and back, the shoulders, and the bottoms of the garment were generally fringed. The women's dress was essentially the same as that of the men's with the exception that the shirt was a good deal longer, reaching to well below the knees.

Anglo-American clothing became widely adopted in the twentieth century and is in most common use today. Mittens, boots, and moccasins are made from skins. No elements
remain of purely aboriginal forms of clothing.

VIII. TRANSPORTATION

Transportation will be considered in detail in a later section. Aboriginally, hand drawn sleds were used in the winter. After contact the toboggan was added as was the basket sled. Snowshoes were an essential item for winter transportation. They too underwent some change as a result of contact. In precontact times there were no boats. Rafts were used whenever they were necessary. At the present time small, light canoes are in wide use and there is some use of river scows with outboard motors. There are no roads about the modern villages and no motorized vehicles. Walking is still the most common way of travelling overland in the summer. Longer trips today, as between Arctic Village and Fort Yukon, are made by bush airplane.

IX. SOCIAL AND POLITICAL ORGANIZATION

Whether it is appropriate to speak of the Netsi Kutchin as having possessed sibs or moieties or moiety-sibs is a question which must be answered by the social anthropologist. There were in any event exogamous kinship groups in existence. Osgood in his discussion of "clans" among the
Peel River Kutchin and among the Crow River Kutchin recorded for each the names of three exogamous groups. These same three names were recorded by the present investigator and, in addition, a fourth. The present writer makes no pretense at offering final answers to a rather confusing situation. Enquiry into this matter was actually extraneous to the major orientation of this study. However, it was so curious that a number of old people were questioned rather closely on it in an attempt to resolve some of the conflicting statements gathered.

As implied above, although the four terms arose consistently in every case when this matter was discussed, it is not believed that there were actually more than two kinship units. There appear to have been instead, two outmarrying groups or sibs. These were called the nat sai^n and the jIt sya. Testimony about the other two groups was conflicting and it may not be possible ever to completely resolve the matter. Therefore, it will not be gone into in detail here. The other two groups were called ten jIr at sya (the third "clan," according to Osgood) and tse nilt sai^n. Osgood noted that while the groups were exogamous, intramARRIAGE was fairly common. The third and fourth groups named were names applied to children of intra-
sib marriages. Osgood noted that ten jirk at sva had the connotation of "friend on both sides"; actually, it is derived from the word meaning in the middle (tEn jir). Under exactly what circumstances of intrasib marriage these terms were applied was not clear. Perhaps for present purposes it will be sufficient to point out that there was no doubt of their not being units equivalent to the sibs themselves, but rather terms applied to offspring of "wrong" marriages. Of the two terms, tse nilt sai^n was the more derogatory. Since the information gotten by Osgood was, according to his own statements, not clear and since the same terms were recorded by this investigator among the Netsi Kutchin with the addition of a fourth, it appears not unlikely that the situation which prevailed among the Netsi Kutchin with regard to these groupings may have applied to other of the Kutchin bands. This would change considerably Osgood's statement on these "clans." It is necessarily open to question then, whether these might not better be termed moieties.

Descent was matrilineal. A number of complementary duties were among the functions of the sibs or moieties. These included such things as performing burials for the opposite group and giving the feast or potlatch for the
opposite group. If a man of one sib was making some kind of trouble members of the opposite group would give a pot-latch for him to show that they thought well of him. This was said to "bring out the good in him." The sibs evidently then functioned in several ways to exert social control.

The basic social unit was the nuclear family, perhaps expanded by a widowed grandmother living with it. Most commonly, however, two families travelled and lived together. Polygyny was rather common. The number of spouses apparently depended upon the man's wealth and ability. Polyandry was also practiced occasionally and though it appears to have been thought a little odd, the woman in such a case was always one who was highly respected for her abilities in the performance of a woman's duties.

The Netsi Kutchin lacked chiefs and any formal sort of political organization. There were individual men of prestige in the old days who upon occasion functioned as chiefs, as in the case of warfare with the Eskimos or with other peoples. Caribou pounds were individually owned. A man who owned a successful caribou pound might gather about him a number of persons whose livelihood depended
upon his corral. He, then, functioned as a chief to the extent that the way the pound was used and other hunting business was under his charge. However, he had no coercive power. The people under him might leave at any time. His position depended upon his maintaining his own prestige. It was demonstrated by his ability in the hunt, in warfare, and perhaps even more importantly, by his generosity. A man in such a position would invariably be wealthy, but if he did not distribute his largess among the people he was no longer a man of stature. Generosity and hospitality were and are admired traits of character.

In contrast to some of their neighbors, e.g., the Barrow Eskimo, as reported by Spencer, the shaman seems to have been admired at least in the main. The shaman generally was a man. He exerted a good deal of influence and hence, functioned also as a leader. The shaman and the owner of the successful corral were often one and the same.

Wars or, perhaps better, skirmishes, seem to have been fairly frequent in the past, especially with the Eskimos. Other former, sometime-enemies were the Dihai Kutchin and more frequently the Kutcha Kutchin. With all of these there were also trading relations leading to some
rather ambivalent situations.

Another category of people who commanded respect were the naturalistic curers. They were invariably women and had at their command a surprisingly extensive curing lore. Their curing practices differed from those of the shamans in that they made no use of magic or animal helpers. By the standards of the people, theirs was entirely a naturalistic practice involving, as it were, a body of scientific knowledge.

Traditional social and political structure of the Netsi Kutchin exists today only in the memories of some of the older people. Although, to judge from the information presented in Osgood they retain a better picture of their matrilineal sibs, no heed whatever is paid today to them. Indeed, many of the younger people must be told to which group they would belong. If their former lack of political control be taken to result from the needs imposed by nomadic existence, perhaps their present political organization is equally well in accord with their now settled status. Arctic Village today has a first chief, a second chief, and a council composed of seven men. Elections are held annually, generally around New Year's. The system which they now use is common in interior Alaska.
at least, and is believed to have been introduced by the Bureau of Indian Affairs in the 1930's. The people seem to have retained some of their independence from the old days, though, since positions on the council and those of first and second chief seem to be primarily in the nature of honoraria.

X. LIFE CYCLE

Birth.

At the birth of the first child, when labor started, the woman was put in a spruce hut (described below) which was erected away from the settlement. It was felt to be bad luck to have the baby in the camp. There would be women present to help. The husband was there to gather wood and keep the fire going. After the baby was born it was put inside the woman's dress with her. A depression was scooped out by the husband in fresh snow and a clean caribou skin with hair on was laid in the depression. The woman was put on the skin. She was then covered with another caribou blanket, tucked under the bottom one. Following this she was covered completely with piles of snow by the husband. The women and the husband then went home. Before daylight the baby would start getting cold and crying. At that time the husband would come back and
ask, "Is the baby still living?". The mother would answer, "The baby is cold." The husband then built a fire, dug his wife out of the snow and took her to the fire. The husband next went home to fetch food. A special path was then dug through the snow back to the settlement. The woman could walk only on it. She entered the skin tent by the back, it being lifted for her. She could not use the entryway. The woman then occupied a corner of the skin tent with a caribou skin curtain around it. She would stay there for about one month. Food was brought in to her. A number of food taboos were observed both by the wife and her husband. Her hair was combed for her by her husband. The object of the avoidances and taboos was to insure the child's health. Subsequent births would take place in the dwelling but behind the caribou skin curtain.

Puberty.

There were no specific observances marking the transition of a boy to the man's estate. For girls there was sequestration at the first menses. The girl was expected to live in a hut away from the settlement for a considerable length of time -- no less than one month. The girl at this time was thought to be dangerous, especially to game animals.
The girl was not supposed to see any game animal or hear anyone discussing game animals. She wore a pointed hood with very long flaps which hung down over the front of her face and in theory prevented her from seeing anything but the ground immediately at her feet. Bear claws were attached at the side of the hood. If the girl accidentally heard some men discussing game she was to strike the bear claws together with her hands to mitigate the possible harm of her having heard such things. There were a number of food taboos and other avoidances connected with this period in the girl's life.

At the present time some few families still observe the custom of isolating a girl at her first menses. Most families have in their possession a menstrual hood which is used for that purpose. Instead of isolating the girl apart from the village, however, now she is isolated in a corner of the house with a curtain about it. It appears that most young women who are presently in their twenties underwent that experience. In 1959, much to the dismay of the Bureau of Indian Affairs school, then newly established, one man insisted upon isolating his girl at this time. Women whenever menstruating were thought to be dangerous but isolation obtained only at its first occurrence.
Marriage.

Aboriginally, there was no formalization of marriage. Since mates were hard to obtain for men, commonly in the past a man might declare his intention to marry a girl when she was still a baby. This he did by taking a stick, putting feather moss on the end of it and poking it into her family's tent. The moss was for her diaper. The act itself signalized his intent to take care of her. Thereafter he was expected to leave part of his pack of game with her family. In cases where the girl's parents might be killed, the girl might be brought up by the family of her husband-to-be. As mentioned above, both polygyny and polyandry were present. The latter was rare, however. The levirate was also present, but apparently was at the option of the late husband's brother. The brother-in-law might take her as a wife or he might take her into his house as jik keIn dak -- translated as "slave." The latter gives some indication of the kind of treatment the widow would undergo. The object of that procedure, it is said, was to keep her from being married and having pleasure again.

With the breakdown of the sib system with its exogamic regulations, plus the cessation of a former occasional
pattern of female infanticide, finding mates is no longer
the problem it once was for men. Not infrequently one
observes today a man married to a woman who may be ten to
fifteen years his senior. These are evidently thought of
as good marriages. One may observe in such unions a good
deal of mutual respect and affection. The husbands in
these cases are frequently quite jealous of their wives.
One man, whose wife was in her seventies, was known on
several occasions to cut short hunting forays and return
to the village thinking that his wife might be "playing
around." Nowadays, marriage is sanctified by the church.

Death.

The treatment which a person received upon his death
was generally dependent upon his position. A leader might
be dressed in his finest outfit and wrapped in two sections
of hollowed out tree trunk. The body might be placed in
a tree. Apparently it might either be left there indefi-
nitely or at the end of a period of a year taken down and
the remains cremated. If the man had a lot of wealth in
the form of dentalia shells or later, beads, these might be
placed with him. The common pattern was to cremate the
remains. This was done on a large log pyre. The mechanics
of disposing of the body fell to individuals from the
opposite sib. In some cases, a kind of log crypt might be built directly on the ground and the body placed upon it.

Grave houses, taken over by some interior peoples after contact, are unknown to the Netsi Kutchin. Inhumation is practiced today using a plank coffin of local manufacture. Above many graves at the present time may be observed a pole with a figure of some kind in wood on top. In Arctic Village there is one of these which is said to represent a star, another a fish, still another a duck. Exactly what the significance of these grave markers have could not be determined. Most people insisted that is was only "for fancy."

XI. RELIGION

Little information was obtained under this head since today most of the people are devout Episcopalians and are therefore reluctant to talk of any such matters and secondly because it is a good bit removed from the objectives of this study. For fuller information on the subject the reader is referred to Osgood's Contributions to the Ethnography of the Kutchin. 17

A number of songs and myths refer back to a time when
animals could speak like people. Many of these are about the raven. The wolverine seems to figure rather heavily in such stories also. A number of giants lived in those days too. Some of their legends relate the adventures of one of the first Netsi Kutchin with these giant beings. Na In, or bushmen, are believed in to the present day. Bushmen are thought to be real men but nonetheless they have some supernatural characteristics. They are said to have been men who, in times of starvation, were driven to cannibalism and afterward took to living in the bush since they could no longer stay with their own people. They are said to have medicine animals and steal babies and young girls, the latter in former times when they were isolated at first menses. They are feared. If strangers are encountered in the bush who don't make their presence and their business known in the ordinary way, they are apt to be put down as bushmen. Bushmen, or things taken for bushmen, were occasionally shot at. In the summer of 1958 two women and several children had established a fish camp up the East Fork of the Chandalar River from Arctic Village. An older child reported seeing a canoe with some men in it who, even though they must have seen the tent occupied by the people, nevertheless took their canoe
from the water and portaged onto a lake upstream from them. The fact that there should have been no strangers there and that these strangers did not announce themselves was sufficient to cause the women to break camp and return to Arctic Village. It was later established that the men were a small party of oil prospectors who had flown into the Brooks Range.

According to Osgood, the Kutchin in general believe in certain beings who occupy the stars (or specifically the evening star) and the moon. About the latter, he says, "there is a vague feeling of deity" but he notes that this may be due to recent Christian influence. No information was collected by this investigator on any beings inhabiting stars. Tsuk, the boy in marten skin pants, is the being who is said to occupy the moon and if there is a feeling of deity about him it is indeed vague. Under the head "Spirits" Osgood mentions a number of monsters living in lakes and in the woods. The investigator was told by one Indian of a number of fabulous flying animals that according to that informant occupied a particular lake. As far as could be determined, he viewed these in the nature of natural phenomena. It seems questionable whether or not they should be referred to as spirits. In
addition, the middle parts of Old John Lake (about twenty
miles from Arctic Village) are avoided because the surface
is said to go up and down in an alarming fashion and there
are believed to be exceptionally large fish almost with a
supernatural character about them living there. Again,
whether these are to be considered spirits seems question­
able.

As mentioned above, the shaman was usually a man.
Since he might also be one of the "chiefs" or owners of a
good caribou pound, he could be a man of considerable
prestige. Ordinary people might have animal helpers or
might not. A shaman always had such helpers. A powerful
shaman might have a number of different animals as his
spiritual aides. Different animals had different degrees
of power. The spider was thought to be especially good
in this connection since he could travel over water, up
trees, walls, over ceilings, et cetera. The beaver also
was powerful. The shaman acted as a curer using super­
natural help and as a diviner. Shamans and shamanistic
practices persist today to some degree although few people
are willing to talk about it. The reason for that reti­
cence, however, appears to lie more in their recognition
of the effect that such knowledge might have upon white
Christians than upon any deep seated conviction that such practices are wrong or unchristian. It appears that not uncommonly the shaman and the lay reader for the Christian church are one and the same man. The ambiguity of such a situation seems to disturb no one. It is probably felt that both offices demand much the same characteristics.

XII. CULTURE TYPE

Throughout the boreal forest zone of North America there is a general community of culture. As noted by Spaulding in his discussion of general cultural trends within the world's boreal forests, to a great extent this community is adaptive in nature. Although the region is not richly populated in plant and animal species, there is nonetheless, considerable variability in their occurrences and hence in the possibilities of their exploitation.

Broadly considered, the eastern portion of the American subarctic is occupied by Algonkin speakers; the western, with the exception of some of its southern and eastern peripheries, by speakers of Athabascan. Subsistence is based not upon agriculture but upon hunting, fishing, and gathering. Population densities are quite low and nomadism is generally present. Winter is the
dominant season and all groups show a marked adaptation to snow cover of many months duration and the bitter cold of microthermal climates.

Wissler suggested that the main unifying trait for the whole region was dependence upon caribou and the products derived from it. Accordingly, in his classification of food areas of the New World, all of that region was listed under his Caribou Area. The same author in his scheme of North American culture areas subdivided the subarctic into a western and eastern portion. The latter he called the Eastern Woodland Area; the former the Mackenzie Area. The distinction was based primarily upon differences in the nonmaterial cultures.

Kroeber divided the coniferous forest zone into three areas, that which he called the Northern Great Lakes, the Eastern Subarctic, and the Western Subarctic. The first named of these may be excluded from our consideration since it is at best a transitional area both in the sense of a natural province and in the sense of a culture area. For the true subarctic this excision then leaves again a dual division corresponding roughly to the distributions of the main bodies of Algonkin and Athabascan speakers.

Kroeber, somewhat questionably, considered the boreal
forest generally an attenuantion of a culture type which characterized the entire eastern United States and which had its hearth or center of major development in the southeast. He did note, however, that there were certain traits distinctive of the boreal zone which had little or no effect upon areas to the south. Among these he listed several which he considered derived from subarctic Siberia. Included were the toboggan, the snowshoe, birch bark vessels, conical tent houses, tailored clothing, and scapulimancy. The last he questioned as aboriginal.

It should be noted that Wissler's schemes were those which he published in 1917. Kroeber's were worked out about 1930, although not published until 1939. Specifically of importance in the present connection is his inclusion of data from Osgood which were published between the time of his writing Cultural and Natural Areas of Native North America and its 1939 publication.

A much more recent classification of North American culture areas is that of Driver and Massey. The same classification is repeated in Driver. In both these works the subarctic constitutes a culture area comparable to that of the Northwest Coast, the Plateau, the Plains, et cetera. However, for reasons that are not made too
clear, the subarctic is divided into three sub-areas, "rather than the more common two." The areas thus delimited are these: the Eastern Subarctic, the Mackenzie Subarctic, and the Yukon Subarctic. Although, apparently, no note has yet been made of it, it is of no little interest that these two writers go so far to deny the cultural unity of the Kutchin-speakers suggested by Osgood as to split off the easternmost Kutchin and include them in their Mackenzie Subarctic culture sub-area. The reasons for this are apparent. The Yukon Subarctic is said to lie west of the Continental Divide and in the Yukon drainage. Strict adherence to such a definition could not fail to split off the easternmost Kutchin since the areas in which they live do indeed drain into the Mackenzie River. While this may be a rather trivial point, it nonetheless seems a rather odd mistake for two anthropologists to make. The Yukon Subarctic is delimited by Driver and Massey for the reason that it is said to share "a considerable number of traits with the western arctic and the Northwest Coast." Although such an attempt would be quite beyond the scope of the present essay, it would be of considerable interest to know what these traits are to which groups in the Yukon
Subarctic they adhere. One may speculate, however, that perhaps unwittingly Driver and Massey have set off this area on the basis of one group only, the very fully described Ingalik of the lower Yukon and Kuskokwim rivers.29

Perhaps Driver and Massey's threefold division of the subarctic also points up another phenomenon, that what was a simple picture in 1917 and even 1930, had become by 1957 considerably less simple as more and more data became available from the American subarctic. That would appear to be a desirable state of affairs for in this manner accurate knowledge of northern peoples is greatly advanced.

To adumbrate one of the theses of the present writing it may be suggested that should such a time come when our knowledge of cultural differences and complexities of northern peoples are completely known it will likewise be discovered that there exists rather good correlations with variations of habitat. It is suggested that the view which holds that the American boreal forest is essentially uniform from Alaska to Labrador is erroneous by reason of being superficial. Within the boreal forest or taiga there are major environmental differences. Perhaps they are more subtle than those of more temperate zones, but they are, nonetheless, present. Subtle differences and the adjust-
ments to them can spell the difference between survival and nonsurvival in the north.
CHAPTER III

THE VEGETATIONAL MILIEU

In contrast to the American tropical rainforest in which there might be as many as thirty thousand different species of higher plants, the total number of such in Netsai is probably more nearly three hundred. Most of the plants are perennials. Annuals and ephemerals are rare. The active periods for these plants is brief, about three months. While these statements would apply to vegetation throughout the north, there is, nonetheless, considerable variation in occurrences of species. The activities, uses, and practices of the Netsi Kutchin with respect to vegetation are thus a great deal more restricted than would be the case with a more southern people.

I. IMPORTANT ELEMENTS OF THE FLORA

Trees.

There are approximately eight species of trees to be found in Netsai. They are Picea glauca, white spruce, Picea mariana, black spruce, Populus balsamifera, cottonwood, Populus tremuloides, aspen, Betula papyrifera, white
birch, and several species of *Salix*, willow. The visual impression that one receives in the country is that there are even fewer tree species than these. Of the spruces, white spruce is by far the most common but it is almost impossible to distinguish from black spruce. In areas to the south, white spruce can generally be distinguished from black by its appearance. In this area it is noted that white spruce takes on the growth form typical of black spruce. Further confounding the situation is the fact that black spruce is not typical in its growth form. Thus, so far as the aspect is concerned there is but one species of spruce. Aspen is not common in the greater portion of Netsai but is more characteristic of the south. Its appearance is frequently that of a shrub. White birch is in like manner restricted to the southern portions of Netsai and in the "heartland" of the area is simply not present. Cottonwood is quite restricted in its occurrence and appears as an important part of the landscape only in a few restricted localities. Finally, willow is represented by perhaps three species most of which have a shrub-like appearance and are not notably different from one another.

**Shrubs.**

Among the shrubs are *Alnus*, alder, *Betula glandulosa*,

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dwarf birch, *Ledum decumbens*, and *Ledum groenlandicum* both called Labrador tea, *Salix alaxensis*, felty-leafed willow, and *Salix glauca*, white willow, and *Vaccinium uliginosum*, bilberry. Except for alder, which under favorable circumstances may attain a height of eight to ten feet, shrub growth is characteristically low in Netsai, usually under three feet. White willow may attain a height of six feet. Spruce seedlings form an element of shrub.

**Ground Cover.**

lichens *Cladonia rangiferina*, reindeer moss, and *Cetraria* spp. (no common name).

**Vegetation Associations.**

Although limited in its extent and occurrence, one of the dominant aspects of the vegetational landscape is that which Dansereau terms the lichen woodland. The trees which make up this woodland are for the most part white spruce. The lichen woodland association is best developed on well drained uplands. Individual trees are relatively small and rather widely spaced. Breast height diameters (fifty-four inches above ground) seldom exceed eight inches. Individual trees are usually under forty feet in height. Underbrush in such situations is generally low and the total impression is that of a very open woodland. *Salix* spp. occur as does Labrador tea. Commonly forming an extensive carpet is reindeer moss and the other lichen, *Cetraria*. When sufficient moisture is present these lichens form a springy mat. When an extended period of dryness has occurred they become quite dry and brittle and may be easily powdered in the hand. Openings between trees or groups of trees are characteristically occupied by low brush consisting principally of dwarf birch, *Salix* spp., and seedlings of spruce.
Spruce, the northernmost of the needle-leaved trees of Alaska, is characteristically a grayish-green in color and develops a spire-like habit. Individual branches in the lower portions of the tree curve slightly downward then up a bit at the ends. The trunk tapers rapidly. Toward the base of the tree there will generally be a great number of dry, dead branches. Stands of dwarf birch, although low, may be sufficiently dense as to make walking through them almost impossible. Their summer aspect is a deep green and their habit almost hedge-like. Willow forms a number of shoots which diverge outward. Leaves are pale green or gray-green. Reindeer moss is quite dense and usually pale yellow in color and thus, contrasts quite strongly with other vegetation.

Poorly drained lowland areas will be occupied by widely-spaced spruce trees, generally of a very scrubby appearance. Intervening areas will be occupied by alder and willow. While such localities should represent typical conditions for black spruce, it is by no means certain that stands of this kind observed were indeed black spruce. Tree heights are not great, generally on the order of twenty feet or less. Willow and alder may reach their maximum heights under such circumstances. Most character-
istic of the ground cover is sphagnum moss of various kinds. The latter may be very deep, very spongy, and will ordinarily harbor a great deal of water.

Cottonwood is of quite limited occurrence. It is found sparingly along some of the major rivers in areas of recently deposited alluvium. Trees of this species are ordinarily rather stunted but still attain greater breast height diameters than other species. Those few noted by the investigator did not exceed twenty feet in height.

Birch, as noted above, is restricted to the southern portions of Netsai. Even there, there are not pure stands of birch but rather it is mixed with white spruce. Birch occurs on well drained sites only. The investigator has seen only a small portion of southern Netsai but has nowhere seen birch which he takes as an indication of its sparseness even in the general area of its occurrence.

As elsewhere in the subarctic, lakes and ponds occur by the thousands. Lakes form by slumping caused by the melting of masses of ground ice. A constant feature in association with these is their filling in by the encroachment of vegetation. Sedges and rushes gain a foothold about the edges of one of these ponds. As peat is
deposited beneath these plants they march outward toward the center of the lake and are followed by sphagnum and eventually, as the process continues, by spruce trees. Lakes in all stages of this succession may be seen in Netsai. The trees which enter are generally of scrubby appearance and widely spaced. As noted by Dansereau there is a strong tendency in this succession for the grassy aspects to dominate — in contrast to the situation which obtains in more southerly portions of the subarctic.

These extensive, flat, wet lands are the breeding grounds for millions of mosquitoes.

Bare areas, completely devoid of higher vegetation, are characteristic of the hill tops and the mountains. The only vegetation seen in such places may be lichens clinging to the rocks. Below and about such bare areas will be low herbaceous vegetation dotted occasionally by very low clumps of willow. Alpine meadows may also have this aspect and be covered with thousands of tiny flowering plants. The rock-strewn areas known as fell-fields occur as do mossy heaths in which the dominant plant is arctic heather.

As expected in view of the latitude, exposure is all-important in the development of vegetation. On south slopes timber line occurs at about two thousand five
hundred to three thousand feet elevation. A peculiarity of timber-line trees, as noted by Jordal, is that spruce in these localities is essentially the same physiognomi-
cally as it is well below timber line. Dwarfed spruce, "krummholz" do not occur.

Permanently frozen soil occurs in most of Netsai at depths ranging from a few inches to three feet from the surface. Expectably this condition finds expression in the vegetation. Depth of seasonal thawing is conditioned by the kind of vegetation present. Soil which is virtually bare thaws deepest. As vegetation in the form of shrubs, mosses, and herbs come in the effect is to insulate the surface causing the permafrost table to rise. Eventually the rise is sufficient to cause even the shallow rooted spruces to topple over which may result once again in bare ground and the onset of another cycle. The frequently-noted "drunken forest" with spruce trees tilted at all angles results from this situation.

The accompanying sketch, Figure 1, is taken from Dansereau and illustrates the vegetation typical of Netsai under three different conditions of drainage.

The Forest-tundra Ecotone.

From the standpoint of its vegetation Netsai is
transitional from forest to tundra. Many plant ecologists, however, express the conviction that such a transitional zone is as much an entity itself as is either of the two types which there interdigitate. The term "ecotone" expresses this concept. Allee, Emerson, O. Park, T. Park, and Schmidt say that the term covers "a more or less sharply defined competitive zone between two self-supporting communities." The same authors further state that

![Figure 1. Typical vegetation profile of forest tundra ("taiga" in Dansereau's terminology). Taken from P. Dansereau's "Biogeography" in Geography of the Northlands (Fig. 22).](image)

"the ecological reality of the ecotone is attested by the fact that, in addition to organisms penetrating this boundary area from both communities involved and living therein for all or a regular part of their lives, there are other organisms that find the biotic and physical
environment of the ecotone more stimulating than conditions prevailing in either community."9 One such difference has been alluded to above, the dominance of grassy aspects in filled-in lakes. J. W. Marr refers specifically to this as the forest-tundra ecotone.10 Jordal, who worked in the area of the south slopes of the Brooks Range, referred to it as tundra forest.11 Dansereau also sets the area aside but calls it the taiga which he then differentiates from the southward boreal forest.12 Most authors use those two terms synonymously hence no attempt will be made here to employ Dansereau's wayward usage. Rousseau speaks of the same area as the hemi-arctic.13 Hare and Hustich both use the term forest-tundra which taken with Marr's usage of the same term, plus its obviousness, argue for its employment here.14,15

The accompanying Map 3 taken from Sigafoos indicates the limits of forest growth in Netsai.16 The unshaded areas are labeled by Sigafoos as undifferentiated. They would, however, be classified as tundras of one sort or another. Thus, it is seen from a vegetational standpoint that Netsai is approximately as much tundra as it is forest. In addition, those areas which are forested are for the most part quite open. The total aspect of the
MAP 3.
country, then, is unlike that of interior Alaska to the south. As may be judged from the map the occurrence of timber is associated with streams and south slopes.

II. USES OF PLANTS

The material which follows aims primarily at indicating the range of plant uses by the Netsi Kutchin. Since most of the end products of these uses are more pertinent under other headings (e.g., houses under Climate, et cetera) they are merely listed here. The actual objects themselves are described in those sections where they are appropriate. The one major exception to this procedure is that section which deals with medicinal uses of plants. Naturalistic curing among the Netsi Kutchin depended heavily upon the use of plants. However, some portion of their pharmacopoeia included materials other than plants and they are here included since they do represent a relatively minor portion of the total area of naturalistic curing.

Building.

In the past and at present a number of structures for various purposes were made. One of the principal building materials was wood, but the kind of wood employed depended upon the type of structure. Aboriginally two types of
dwellings were made. The portable skin tent utilized a framework of willow. While the bent members of that house framework were retained, straight pieces were cut upon each new camping. The tent was floored with spruce boughs or occasionally with spruce bark. Since it is dominant in terms of numbers, undoubtedly white spruce would be most used for this purpose. Occasionally when camping in places where spruce was absent or not sufficiently abundant, dwarf birch was used for the same purpose. The modern counterpart of the old skin tent is a commercially-made white canvas wall tent. It is floored in the same manner although the use of spruce bark seems to be rare to the point of being nonexistent today. Still another plant was used in conjunction with the skin tent. Feather moss, Hylocomium spp. (?), was set around the base of the tent to keep mosquitoes out. The same practices are occasionally followed with the modern white wall tents.

The kwant, or moss house, was framed with spruce. Inasmuch as size of the timbers used was not an important criterion as it was in later houses one may safely assume that either white or black spruce was employed depending upon the availability. The framework was covered with feather or sphagnum moss which was cut into rectangular
blocks for that purpose.

The defensive structure called hya was built of spruce logs laid up in a tipi-form. The core of the hya was a living spruce tree. Again, on the basis of its relative abundance, it may be assumed that white spruce was the species most commonly used for this purpose.

When a woman bore her first child it was within a special hut made of spruce logs erected away from the settlement. This was a three sided, open ended structure of cribbed logs. There was no roof. Since the structure itself was small it may be assumed that there was no particular preference for white spruce.

Except for one or two special and temporary sorts, most caches also utilized wood. Almost without exception the wood used was spruce. The size of caches in the past and those presently in use is such, however, to make it fairly certain that either white or black spruce could be used. An aboriginal cache type used as its base three live trees. The trees were topped to the same level, and a platform put thereon. The trees and the platform were of spruce. Ascent to the platform was by means of a notched spruce log ladder.

In the past a kind of burial crypt of spruce saplings
was used. The investigator has not seen one of these nor do there seem to be any left in the country today. The description indicates that the saplings were cribbed, that the plan was square, and the top flat with a covering of saplings laid side by side. There was no floor. It appears that this structure was uncommonly used. One instance of its use occurred apparently in the 1860's or 1870's when a fairly large number of people who had gathered together about a caribou pound died in an epidemic. The implication was that there were too many people to bury in the proper manner and too few to perform the burials, hence the use of this structure. Since saplings were specified, white or black spruce could have been used. A possible continuation of this style of structure may be represented by some of the dog houses to be observed at the present time. Their construction style seems to tally with the description of the former burial crypt. Presumably the current dog houses are somewhat smaller and in addition, of course, they are provided with an entry for the dog. Most likely, the resemblance is accidental.

Bridges over creeks consisted of several logs laid side by side. If it were a fishing creek, moss would be
put on top of the logs so that menstruating girls could cross the creek without affecting the fish.

The log cabin in use today was taken over from the Americans in about the first decade of this century. The house plan is rectangular. Its longest dimension is clearly restricted by the size of logs available. The biggest cabins are seldom much in excess of twenty feet long. The wood used is always spruce and since size is always an important consideration white spruce is the species used. The rapid taper from butt to end makes it necessary that the logs be laid alternately in building. Only by this means may level walls be maintained. Village cabins are well made and have plank floors. Trapping cabins and other outlying cabins are generally much smaller, lower, use smaller logs, and commonly have earthen floors. Their design is like that of cabins in the village. Log notching is seldom done with an ax. In the recent past a "Swede saw" (similar to the bucksaw; see Plate XV, Figure 2) was most commonly used; today the chain saw serves the same purpose.

In the old days preferred camping places were in timber, on small streams whereas in recent times the primary consideration is accessibility to rivers for transportation.
When camping in the mountains as when sheep hunting, people usually camped by creeks where there were willows. There would be no timber elsewhere and this meant camping down fairly low.

**Woodworking Techniques.**

The principal woodworking implement of the past was the adze of ground stone. The hafting of the adze was of an elbow type employing a piece of spruce in which there was a natural bend as from trunk to a branch. There may have been other stone tools in the inventory of the Netsi Kutchin, but no tradition of them remains today. Copper was apparently available in small quantities prior to contact and was used for knives and adzes.

Aboriginally a hafted drill or awl using a beaver tooth or occasionally a muskrat tooth was employed. An important use of that implement was in drilling holes for snowshoe netting. Today two sizes of hand drills are employed. Each has a wooden handle designed to fit the palm of the hand. The point is of steel and is chisel-shaped. A crooked knife with a curved steel blade set into caribou rib is an important woodworking tool today. It is unlikely that there existed an aboriginal counterpart for that tool. It is used in the manufacture of
snowshoe frames, boat frames, and for other similar operations. The blade is always drawn toward the worker.

Although some of the modern appurtenances of carpentry are now available, all woodworking is still a hand operation. The two chain saws in Arctic Village receive heavy use when logs are to be cut as for new houses. Logs are frequently cut in the winter or early spring. They are allowed to lie where cut or nearby and in a still later operation are peeled. House logs are not available near to the village which means that transporting them involves a considerable amount of labor. However, the previous cutting before spring when the sap rises, the peeling, then allowing them to dry for some period of time means that the logs will be much lighter. In the summer of 1958 when logs were to be brought in for a new church building two river scows were lashed together by two logs set athwart joining both boats. Logs were then stacked on these parallel to the gunwales of the boats.

Some of the most important source areas for house logs are indicated on Map 4.

Boards are manufactured locally from logs which are placed on a whip saw frame of frontier American origin. This is a two man operation with one up on the frame, the
Netsain
Timber Source Areas

House logs □□□□ Firewood □□□□

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other down on the ground. The rough boards, if they are then to be planed, are taken to a planing table which is made from a half log twelve to fifteen feet long having sapling legs to support it. One end of the board is then butted against a wooden stub on the top of the table and planing is done by hand using the modern hand plane. Flooring, doors, window frames, screen door frames, and toboggan planks are thus manufactured.

The adze was supplanted in the days of early trade with the whites with the distinctive single-bitted Hudson's Bay Company ax. A few of these are still in use. Far more common, however, is a double-bitted ax with which tool the people display extreme proficiency.

Each house has before it a saw horse made from a short section of log left round in which holes have been drilled to accept sapling legs. At either end on the upper surface are two short sections of sapling which serve to keep the piece being sawed in place. The saw horse is mainly used in conjunction with the Swede saw and that primarily for fire wood. Working with wood either in the initial cutting of logs and fire wood, or in the final manufacture of objects from wood consumes a great deal of the peoples' time.
The manufacture of canoe frames, paddles, snowshoe bows, and the like, is essentially a whittling operation using the crooked knife.

Crafts and Manufactures.

In the past, two types of hooks were made from willow utilizing the trunk section and a branch of a sapling. The resulting hook was of a piece and "J" shaped. One of these, still in occasional use when camping out, was used to suspend meat over a fire. Later, pots were so suspended. In the old skin tent the meat hook dangling from its caribou skin line was a permanent piece of equipment. The old style fish hook called hsaq was made in the same manner but was smaller and had a sharpened point. They are seldom, if ever, used today.

Vessels of birch bark at least in the form of buckets, were known and occasionally used for stone boiling. No example of this bucket has been seen by the investigator, but it is described as having been round and was set on the ground when in use. Apparently it was rare and possibly gotten by trade rather than of local manufacture. It was said also, that dishes were made of spruce but apparently none of these exists today. Another bucket, probably more common than that of birch bark, was made
entirely of spruce having a wood bottom and the sides were made of green spruce, split and bent with heat. The sides were sewn with spruce root. The bucket, or pot, is said to have been one to two feet high and about two feet in diameter. It seems that no example of this vessel exists today. Pemmican was mixed in a hollowed section of log which must have borne some resemblance to the log mortars common in the Eastern Woodlands. Stone boiling was also done in the same container. Again, no example has been seen. No data were available on the size of the log mortar nor upon its construction. Undoubtedly it was hollowed by the use of fire.

Wooden spoons or perhaps what should be termed small shovels, were made from spruce and were used for digging snow to be utilized for drinking purposes. As with the containers above, no example of these spoons were seen, however, they were described as having handles about eight inches long or longer, and having had bowls the size of one cupped hand, larger models the size of two cupped hands.

The bow was generally made from willow. Birch, the common material to the south, was used when available, but the Netsi Kutchin maintain that willow was as good as birch.
Spruce was never used for making bows. The wrist guard attached to the bow, seemingly a peculiarity of northern Athabascans, was apparently in optional use among the Netsi Kutchin. It was made of spruce. Arrow shafts were made from good straight spruce. The shaft for the bear spear was also made from spruce. Fish spear shafts in the aboriginal form were relatively short, on the order of ten feet, and were also made from spruce. Modern fish spears utilize the same material but may be up to fifteen feet in length.

The aboriginal sled employed both birch and spruce preferentially. The runners were of birch as might be the slats which formed the bed of the sled. The members which supported the bed, however, were made from root sections of spruce in which there was a natural bend to form the ninety degree angle which was necessary to tie in both the runner and support the bed. Modern-day toboggans may be made entirely from spruce but they are the least esteemed. Of Alaskan materials, birch is most desired for the toboggan bottom. Spruce does not wear nearly as well as birch for that purpose. Some few individuals nowadays send off for hickory which is used for the toboggan bottom. It is thought to be superior even to birch. The few modern basket sleds,
usually of racing type, are made entirely from birch.
Either the raw material or the finished product is generally
gotten from Fort Yukon.

Rafts, the common means for traversing rivers in the old days, were made from spruce logs tied together with green willow shoots. The latterly adopted "ratting canoe" (so called from its important use in the taking of muskrats) has its fragile framework manufactured from both spruce and willow. A still later boat type, the river scow, is generally manufactured from spruce planks cut in the village. Caulking is with commercially-made oakum. Some few individuals today order plywood which must be cut down from its usual four by eight foot dimension in order to be transported in the small bush aircraft that service Arctic Village. The framework for the temporary skin boat, a scow form, was of willow sometimes combined with spruce.

The frame of the old style back pack probably most often utilized willow rods but this preference was probably based upon the frequent occurrence in willow of pieces of the proper diameter rather than upon any other characteristic of the wood. Occasionally in mountain climbing a long birch staff was used. Birch saplings were gotten from the south especially for this purpose. Older people
frequently carry staffs, but these seem to be from willow for the most part. The upper end of the staff may be decorated with a carved knob.

Snowshoes in the past (and at present) were commonly made from willow although birch was preferred. In former times, birch might be collected in the southern part of Netsai\textsuperscript{n} and hauled north in the rough by sled. Birch was also gotten from people of the Yukon Flats. Birch is said to wear better than willow. Willow, however, is said to be quite resilient and springy and in some ways preferable to birch. Willow snowshoe frames are usually made from a sapling whose circumference approximates that desired for the frame. They are usually rather irregular in outline due to the natural irregularities of the wood. Willow is used most often for trail shoes, least often for hunting shoes.

There are a number of small game snares used. Customarily a person keeps all of one kind on a willow stick as a kind of filing device. Thus, on one willow stick there might be several grouse snares, on another several ptarmigan snares, and so on. Spring poles are used in conjunction with some snares. These are generally thin, willow saplings which are bent over for the purpose. In former
times, a fish snare was in use which utilized as its loop a green, willow shoot. The loop was tied to a long pole of willow. There is one style of ground squirrel snare which employs a split willow stick, the two points of which are set in the ground, the snare loop in between. It functions to keep the squirrel from chewing the snare. Some snares utilized a kind of trigger device consisting of a short billet of wood which served to give the snare extra snap. The piece of wood involved was about two inches long and one-quarter inch in diameter and was usually whittled from spruce. Willow leaves were rubbed on snares to remove the human scent.

Easily one of the most important constructions of the Netsi Kutchin was the caribou pound. It consisted of a series of tripods closely spaced and joined by horizontal members. Spruce was the material used but of such a size, that is sapling size, that either black or white spruce could be employed. The tripods were tied together with willow shoots. A series of free standing spruce posts led into the caribou pound. Atop them might be put clumps of feather moss or the tussocks of grass, Eriophorum spp., called "niggerheads."

For smoking skins a frame of pliant willow was made.
The willow rods were usually about one inch in diameter. The frame varied in form from hemispherical to subconical. Used in conjunction with the smoke frame was rotten or punky spruce which would smolder and produce a great deal of smoke but virtually no flame.

Conical fish traps were made from willow having a diameter of something less than one inch. Box traps employed this same material. The downstream end of the fish trap from which fish were removed was tied with willow root. A recently observed use of pliant willow of about the same diameter was in the construction of fences about the few small garden plots which some of the people put in at the behest of the Agricultural Extension Service. The fences roughly resembled a series of overlapping croquet wickets. Their purpose was to keep out dogs and children.

House furnishings are for the most part of local manufacture. Beds are made from locally cut planks. Tables and shelves have the same origin. Chairs are rarely seen. Instead, one sees stools and benches made from half logs drilled to accept sapling legs. Seldom are these items more than ten inches wide since trees of greater diameter than that are rarely encountered. Until 1959 when a small prefabricated school house was flown in in the winter, the
benches and tables used by children in school were of the sort described.

Relatively short lengths of spruce log come in for a variety of other uses. An upright post is used for fleshing hides. A leaning post is used for beaming hides. Lines for drying clothes and hides are suspended between spruce posts. For scraping hides, a horizontal pole set on two upright posts is employed. About the present day village one sees a number of what can only be called masts, that is, very long spruce poles some of which function as radio aerials, others of which have no apparent function. In the past, short lengths of spruce logs were used with deadfalls.

When out camping a simple tripod may be erected from which meat is suspended for roasting. The tripod may be made of willow or cottonwood, but in either case of green wood. The meat or a pot is suspended over the fire by means of the hook mentioned above. For light cuts of meat such as ribs, a single willow pole with one end stuck in the ground may be employed.

Formerly a game called the floater, ne hi lag, was played. The floater itself consisted of two circles of bent willow about one-quarter inch in diameter. They were
joined together at right angles forming thus a sphere. The floater was put in a fast narrow stream. The players, who were equipped with small hooks of willow made as those above were made, and attached to the player by a line, threw their hooks at the floater and tried to retrieve it from the stream. The hook was called ne hi laq zran. Both children and adults played the game. In a game called slider, hi tse, the slider was a spruce stick pointed at one end about three feet long which was struck with a bat made of spruce about three inches in diameter and two feet long. The object of this game was to knock the slider through a bank of snow over a given distance. It is said that there was also a hockey-like game played with a wooden ball made from spruce which was struck with sticks. A present day use of short lengths of spruce planks is in the manufacture of very short skis which are provided with a single strap which catches the toe. On these the smaller children propel themselves about the village in the winter. They are usually no more than one foot long. The only sort of musical instrument used aboriginally was a child's whistle made from a willow bark tube cut appropriately with a portion of the willow wood reinserted. The pin of the ring and pin game played
among the Netsi Kutchin as among so many other northern American peoples, was carved from spruce.

The bull roarer called nin nya combined two woods. The handle was of a short section of willow rod; the vibrating part of spruce. It was used in rain magic.

In former times decoration on clothing and other skins consisted mostly of porcupine quillwork. The color was imparted to the quills through the use of either willow, cranberry, or blueberries. These were first boiled, then the quills put in. Another principal source of porcupine quill dye, but not vegetal in nature, was red ochre. At the present time quillwork decoration is virtually nonexistent. When it is done, commercial dyes of purple and orange are used.

Miscellaneous Uses of Plants.

Aboriginally, fire was initiated with flint and iron pyrites or "fire rocks" as the Indians called them. A common tinder material especially in the summer were the fuzzy tops of the grasses. Birch fungus, Formes spp., was also used for fire tinder. The fungus was boiled a long time until eventually it is said to have looked like cotton. Birch fungus was gotten from the south and carried north. It seems to have been the preferred tinder material.
Another material used for tinder, but presumably only on those occasions when the people were in southern Netsai or some other suitable area, was the thin, dry, white, outer bark of birch. In conjunction with it a small bunch of thin, dry grass would be used. The grass was ignited from the tinder and waved back and forth until finally it caught. It was then placed under dry twigs.

Smudge fires to ward off mosquitoes were made from green spruce boughs, rotten wood, or green grass. A common sight in the summer is one of these very small, smudge fires burning before a white, wall tent. When walking in the summer, a willow shoot with the leaves on, or a spruce bough might be carried to fan over either shoulder to keep mosquitoes away. The latter practice is still observed to some extent. People commonly burn in their houses or tents the commercial product Buhach and few people would think of going off today without first applying one of the newer and very effective insect repellants.

Spruce wood is the universal fuel used. This also was the case in the past when open fires were burned in the dwellings. Today all houses are equipped with either drum stoves, which are manufactured from fifty-five gallon fuel drums, or Yukon stoves. The Yukon stove is used
primarily for cooking. In their heating stoves the people customarily use a combination of dry and green wood which gives a longer lasting fire. When camping out in localities where spruce is available it is used for camp fires as well. If it is wished to keep the camp fire going through most of the night, a long, dry log may be fed in a bit at a time. When camping in the mountains as on sheep hunts where there is no spruce, an effort will be made to camp by a creek on the banks of which there will be growing willow. Willow then becomes the principal fire fuel. When it is necessary to camp high up away from even willow, or when stopping for noon day tea, the common fuel is dry arctic heather called q?al kl?ia. This same plant will be used for starting fires above timber line. Since spruce occurs at lower elevations, willow at intermediate elevations, and arctic heather up high, it may be readily seen that one is seldom in a situation in which a fuel is completely lacking. Initiating the fire may be a problem, especially in very cold weather, or in the summer when it is raining. A candle is frequently used for getting a fire started under difficult conditions. In the old days, fat was used for the same purpose. When in spruce timber the dry under limbs and twigs are invariably used since
they ignite quite readily under most conditions.

Sphagnum moss was used in the past for baby diapers and menstrual pads. In those two instances the moss was first dried. It may be used casually when in the bush for toilet paper and for cleaning pots and pans. A willow rod bent into a "U" shape was used for picking up hot rocks when stone boiling. This practice has gone out of use although a few of the middle-aged men have tried it simply to see if they could do it.

For smoking fish, especially whitefish, willow in combination with punky alder may be used.

Spruce, particularly black spruce, often develops a kind of rounded topknot at its very top due either to the action of parasites below that point or perhaps squirrels. This topknot has the appearance of being foreign to the tree. As an informant expressed it, it was "the stuff that grows on top of spruce." Portions of this material were boiled and used in a particular manner to keep either rain or snow away. In conjunction with a fish head, a willow rod also figured in rain magic.

Trails were marked by taking small, dead, spruce trees or snags and sticking them upside down in the ground so that they pointed in the proper direction. Trails were
also blazed by breaking willow branches. When a person was on a trail and caught in a rain too heavy to allow continued progress, shelter might be taken under a spruce tree and a fire made of dry spruce branches. Ordinarily the growth of branches on spruce is sufficiently heavy to render it an adequate shelter. The spire-like habit of growth carries rain out to the ends of the branches so that the base of the tree will remain dry.

Honored persons might be "buried" in spruce trees. The body was placed in two scooped out half-logs and then wrapped. The tree was then limbed to keep anything from getting to the body. After a year or so the body might be taken down and cremated. From the information gathered on this point, it does not seem that trees were topped or any sort of stage erected.

In conjunction with the old style fish dam, a sweep made from willow shoots was used. It was used by a person upstream to scare fish down into the dam.

A caribou call consisting of two dry spruce sticks which were struck together was used when a man was hunting alone. The sound produced was like that of caribou hooves.

The frames of skin boats were not retained but were more generally used as fuel once the destination was
reached.

For occasional packing of small items when a skin bag was not present, a number of willow rods might be laid down. The items involved, perhaps ground squirrel carcasses, were laid on them and the whole then rolled up and tied with willow root or willow shoots.

As pointed out above, the list of uses set forth here is not exhaustive. There were a great many other uses of wood and plants in conjunction with other materials. It is hoped that the material here presented is at least suggestive of the range of uses in Netsi Kutchin life.

One final bit of miscellany may be appended here: There is a tradition among the people which states that long ago when they first came into the country there were no trees, no willows, or any other sort of major growth along the streams which drain Netsai. It is said that at that time along Christian River there were a few little willows but that was all. Spruce grows along these streams today. Since such would be the normal course of succession following glacial conditions this makes a fascinating piece of speculation. However, the dangers of placing too much weight upon a primitive people's traditions are too well known to be here engaged in.
Food Uses.

Except for a few berries which were used more or less constantly, not much use was made of plants for food. The most important items of vegetal food are berries which are gathered in the summer.

The felty-leafed willow, *Salix alaxensis*, is called *gait su*. The buds may be eaten in the summer in a casual way. They are said to be sweet and according to Heller are an excellent source of vitamin C. The crowberry, *Empetrum nigrum*, called *di trIE jak* is occasionally eaten. The Indians say the Hudson's Bay people made whiskey out of this. The American red currant, *Ribes triste*, called *ne? yu* may be eaten raw or at the present time boiled and mixed with other ingredients such as dried apples. After the time of contact a kind of whiskey was made from this at Fort Yukon. The wild rose, *Rosa acicularis*, or rose hips formed another occasional item of diet. They are called *nIt chi*. They may be eaten raw when ripe or sometimes boiled and mixed with flour. A jelly is sometimes made with rose hips. Rose hips are said to be one of the richest known food sources of vitamin C. The nagoonberry, *Rubus arcticus*, is said to occur but quite rarely. The berry is eaten raw. No name was given for the plant. The American
red raspberry, *Rubus idaeus*, is given the name *de nat kat1*. Apparently it is rare and little used as no further information about it was gained. The bog bilberry or bog blueberry, *Vaccinium uliginosum*, is called *jak*. It is eaten raw, cooked with flour into a gravy, mixed with dried fruits, or made into a jam. According to Heller it is a fair source of vitamin C.\(^{19}\) Wild chives, *Allium schoenoprasum*, are used sparingly. They are never eaten raw, but are sometimes fried with fish or meat. The roots and stems are cut up for that purpose. The plant is called *tlo drIt*. Reindeer moss, *Cladonia rangiferina*, is called *ch?qo he zhu^n*. Reindeer moss is sometimes taken with the stomach contents of caribou. Reindeer moss is also called *vad zai shi?* or *vad zai ya a*.

Labrador tea, *Ledum decumbens*, was used but the name collected is at least partly from the French. It is called *IE di^n ves qIt*. It may be drunk as a hot beverage, the tea being prepared from the leaves. The medicinal applications of this plant are said to be pre-contact. It seems most likely that the beverage use is another of those traits left by the Hudson’s Bay Company.

Two species of bearberry plants were utilized. These were *Arctostaphylos alpina* and *A. uva-ursi*. Its food uses
were rather restricted; occasionally it might have been added to pemmican. Low-bush cranberry, *Vaccinium vitis-idaea*, called nat llat, was utilized extensively in pemmican and might be eaten casually raw. Old spruce pitch may be chewed as gum but can scarcely be said to represent a food stuff.

The root of the plant called tri, *Hedysarum alpinum*, is occasionally eaten in the spring. It may be eaten raw or boiled. Bears are fond of these roots also. It may be that this is the same plant utilized by the Upper Tanana and reported by McKennan. McKennan was not able to collect a specimen of the plant but surmised that it was *Hedysarum mackenzii*, the wild sweetpea. That identification seems rather unlikely inasmuch as that plant is said to be toxic.

**Medicinal Uses of Plants and Naturalistic Curing Methods.**

The greater part of the naturalistic curing methods listed below involve the use of plants. The practitioner was usually an old woman who had learned her trade from another old woman. However, to some degree these methods were general property and under circumstances in which the usual curer was not present, might be applied by anyone. Only the old woman, however, had the whole battery of
methods at her command. The entire body of medical prac­tice of the old women is included here since in the minds of the people it existed as a coherent body. Some of the usages to be described below undoubtedly had some real efficacy. The effect of others was probably at least in part psychological. In any case, this kind of curing was sharply differentiated from that practiced by the shaman whose usages were strictly supernatural.

The lists that follow have as their heads the kind of ailment or illness involved. Under each of these will be found the popular name of the plant involved followed by its scientific binomial which is in turn followed by the native name for the plant and its translation if known. Where, as is frequently the case, the same plant has several uses, this information is not repeated.

**Pains in Joints.**

---, *Pyrola minor*, sE dzE, "beaver's ears". Found on the tops of low hills associated with willow and with dwarf birch. A decoction was prepared by boiling the leaves of this plant. Among its other uses was its application to painful joints. For that purpose it was not made too strong and was applied to the affected spot. If the joints involved happen to be the ankles the whole foot might be immersed in
the solution. Soaking was for a period of about ten or fifteen minutes done on two consecutive days.

Another treatment for joint pains involved the use of pyrites, kl?ia k?u. A little water was put on the flat surface of a pyrites pebble and it was rubbed with another rock. This produced a black liquid which was then painted on the sore spot. Still another treatment involving pyrites liquid called for the use of a white caribou string which was soaked in the pyrites liquid. The patient then held one end of the string in his palm using his thumb. The woman treating him then rolled the free end up to that point. After that it might be tied at the wrist, or ankle, or knee, depending upon which joint was affected. Its efficacy increased in proportion to the length of time it was kept on. A specimen of what the investigator thought was iron pyrites used for these purposes was collected. It was identified in the field by a member of a U. S. Geological Survey party as arsenopyrites. Whether in any of its many uses arsenopyrites has any real curative value is not known. There would appear to be some possibility of such, however, inasmuch as arsenic is derived from arsenopyrites.
Pains in Chest.

For pains in the chest resulting in labored breathing, a very similar procedure to the last mentioned above was followed. A piece of caribou skin string was soaked in pyrites liquid. The patient held one end under his tongue while the woman practitioner rolled up the free end. After it had been rolled up it was then cut into two pieces, one of which was tied around the neck, the other around one wrist.

Crowberry, *Empetrum nigrum*, de trat jak, "crowberries" were combined with alpine bearberry, *Arctostaphylos alpina* or *A. uva-ursi* (?), shot jak "bearberries" which were then boiled together. The resulting decoction was drunk. Crowberries are said to grow on low hills. Bearberries occur similarly.

Ailments of the Digestive Tract.

For a long standing stomach-ache willow bark was boiled and drunk. This was not made too strong though. The willow collected for this purpose was *Salix glauca*. White willow is an extremely rich source of ascorbic acid and as well, of course, contains low quantities of salicylic acid. Another treatment for stomach-ache was to drink a mixture of powdered spruce charcoal and water. Bearberries were eaten raw for stomach-ache. The stems of the bearberry plant
might be pounded, boiled and drunk for the same ailment. Gas pains and constipation were evidently either rare or considered unimportant since no information about treatment of either of these was collected.

For diarrhea the root stock of the plant licorice root, *Hedysarum alpinum*, called *tri* (no translation) was taken either raw or cooked. The root of *tri* was also eaten raw for intestinal worms, *gyu*\(^n\). The willow bark broth used for stomach-ache was likewise used for intestinal worms. There appears to have been no recognized treatment for the swallowing of foreign objects. Poisoning seems to have been extremely rare, although informants said there was a "grass" in the country that would make one sick enough to die. Apparently in the case of poisoning the medicine man would be consulted. It is not known for certain what the poison grass is. The death camas, *Zygodenus elegans*, occurs in the country and since it has a grass-like appearance it is not unlikely that this is the grass referred to.

Sores in Mouth.

In former times it appears that the mouth was scraped lightly with a chipped stone knife. Following this procedure the mouth was rubbed with a mixture of spruce charcoal and fat. Today, for the same condition the in-
side of the mouth is rubbed with a piece of gunny sack.
The second step is the same as before.

**Boils, Sores, and Other Local Skin Infections.**

Spruce gum, zi 'kəlu, is commonly used for minor infections. It is applied directly onto the infection which may then be wrapped with soft, white caribou skin. Spruce gum is also used as a poultice on infections and boils. A decoction made from the plant called beaver's ears was used for sores anywhere on the body, especially for boils. A particular use for that plant was for sores on the hand that were not to be scratched. It is said that washing the sores with this material stops the itching. In all these cases it is used to wash the boils, sores, or whatever, and is used warm. In all cases the infected area is loosely bandaged after being washed. Soft, white caribou skin is still frequently used for that purpose. The ashes from burned birch knots (jI di ch'i) were applied to sores on the face and hands.

A curious use of plant material in this connection may be recorded. If one has boils on the face (impetigo?) he may search until he finds two willow branches or perhaps even spruce which have rubbed against each other in the wind and in so doing have made a scraping noise. Both
branches are cut off above and below the places where the bark has worn off. They are then held next to the boil and rubbed together in the way that they did naturally. As an alternative, a hole may be put in one and the other branch run through it, again to produce a noise. It is said that the noise scares the boil away.

Generally, sores which were infected would be opened and drained. Spruce gum might then be applied to the open infection. Depending upon the extent of the infection, the spruce gum would either be applied directly, or placed first on a piece of white caribou skin, warmed a bit, and then wrapped on.

Wounds.

One of the most common remedies for cuts and wounds was the application of spruce gum. It would usually be applied as mentioned above, i.e., first put on a clean piece of white caribou skin, warmed a bit to make it flow, then wrapped on the affected spot. Another common remedy was the use of spruce charcoal mixed with fat. This was said to be especially good to stop bleeding. After contact, at least, a large wound would be sewn up first, using a steel needle and human hair. Once closed in that manner, charcoal and fat and/or spruce gum would
be applied. If it was particularly serious the shaman might be consulted also.

Another way of treating a cut such as might occur when one was skinning caribou was to take a strip of fresh caribou skin and wrap the cut with that with the hair side out. A post-contact method of treating cuts called for the application of tobacco. Apparently in pre-contact times the effort was made simply to close a large wound and seal it with spruce pitch.

Fractures and Sprains.

Broken bones were set immediately, or at least, as the Indians put it, "straightened out." Apparently no splints were used. The broken member was wrapped with caribou skin after having been first daubed with spruce gum. The object of applying the spruce gum was to take the infection out. A sprained ankle might be soaked in a cooled decoction made from the plant beaver's ears. Another treatment for a sprained ankle, the efficacy of which is not quite clear, was to cut the skin at the joint with a knife. Though such was not stated, presumably it was then daubed with spruce gum.

Burns.

Any one of three methods to treat burns, gwat ch?a,
might be employed. If the burn was relatively small in extent, melted and cooled caribou fat might be applied and then wrapped with white caribou skin. Another treatment for a small burn was to use spruce charcoal mixed with fat, *ch?u vIt I E hoi*, and apply that and then wrap it. If the burn was extensive with the skin coming off, powdered charcoal, *ch?uf*, would be applied dry. Evidently in the latter case the burn was not wrapped.

**Headaches and Earaches.**

For what was described as a "big headache" a short incision was made at the temple. For this purpose two small pieces of wood were used to pinch up the skin which was then cooled with ice. In former times, evidently a stone blade was used to make the incision; latterly a knife or razor blade would be used. For headaches of lesser intensity a piece of white caribou hide used in conjunction with pyrites liquid was employed. The procedure was exactly the same as that used for chest pain; a string was tied around both neck and one wrist. It was said that for headache this would last for three years.

In another treatment for headache, the plant *Boschniakia rossica*, called *de a shi*, was placed fresh on the head beneath one's cap or later beneath a scarf.
Of the two methods for treating earache, *did zi gwilt sIhör*, one would appear to have had some real efficacy while the other seems somewhat dubious. One treatment called for the lobe of the ear on the affected side to be punctured with a needle. The other, which probably was effective in some cases, was to take hot ashes and roll them in a clean, white caribou skin and apply it to the ear.

**Muscle Cramps and Swollen Extremities.**

The same decoction of the plant beaver's ears, was used for soaking swollen feet and swollen legs. As with joint pain, treatment called for ten or fifteen minutes soaking two times on two consecutive days. Muscle cramps and what were called "face cramps" were treated similarly. Pyrites liquid was applied to a thread and the thread sewn into the skin of the area affected. The thread was not left in. The sewing itself caused a swelling and was sore for a time, but it was said to effect the necessary cure. Although no statement on the point was obtained, presumably in aboriginal times sinew was used for the same purpose.

**Backache.**

Two means of treating backache, *di nan ilt sIhör*, existed. The first procedure tried was the application spruce gum. A somewhat more drastic measure involved the making of a
small incision vertically about an inch long at the point of soreness. The cut was made with a stone knife.

**Anemia.**

*Boschniakia, de a shi,* when pounded and boiled into a decoction was said to be good for all kinds of sickness. It might be mixed also with other plants such as crowberries. General symptoms such as might accompany anemia, *dinji vIn jIt din qwil ziun,* "man not feeling well" were often so treated. Another treatment for a general malaise that in some instances may have been caused by anemia employed the branches of crowberries, bearberries (usually the stems of the latter), and perhaps blackberry leaves, *Juniperus horizontalis, de nEt ch?un dan.* These were all placed in a pan together with water and were boiled. The patient was made to sit over the pan of boiling water with a blanket completely about his shoulders. This same remedy or a variant of it, was used for a number of general sorts of conditions. Rarely, it appears, reindeer moss might be boiled and eaten for general malaise.

**Snow Blindness and Other Eye Ailments.**

To treat snow blindness the practitioner sharpened a knife and made tiny cuts on the inside of the lids of the victim's eyes. Blood from the nose was then put inside the
lower lids previously cut. It appeared that aboriginally there was no effort made to prevent snow blindness except avoidance of exposure. After contact and at the present time one may wear a red scarf cloth mask with eye holes cut in it. Sore eyes, di In dE gwilt s1k, aboriginally were treated by the application of mother's milk. Since the time of contact very strong tea has been applied in the same fashion.

Frostbite and Freezing.

Both frostbite and freezing were treated similarly. The victim was made to stay outside. The affected place, or places, which would usually be hands, feet, or face would have snow packed on them continuously until circulation was restored. A slight variant on this procedure involved having the patient put his hand or foot in a basin or bucket which was filled with snow and water. Restoration of circulation was aided by having the person continuously exercise the foot or hand. A dog which turned up with a paw so affected might be treated in much the same way and if on the trail would be put in lead position so that he would be breaking trail. As would be expected under this heading, the major aspect was prevention of such occurrences. If a person got his feet wet in the winter he...
made every effort to dry them immediately using dry snow. If they were soaked through, he would immediately build a fire to dry his boots and keep his feet warm. There were, however, always accidents which might befall a man on the trail.

**Rabies.**

There apparently existed no treatment for rabies although it may occur in most of the mammals inhabiting the area. As affecting people, one must conclude that it was rather rare. Some of the Indians maintain that animals did not start "going crazy" until after the practice of wolf poisoning. Dog bites were first washed with warm salt water and were then rubbed with spruce gum. The use of salt water is obviously post-contact.

**Insanity.**

According to the testimony of the natives, insanity was rare to non-existent. There also apparently existed no "Arctic hysteria." One informant stated that he had seen a man running wild and that the man was allowed to run away. After ten days he returned and was all right.

**Fever, Chill, Exposure, and Drowning.**

For colds, crowberries were used as an inhalant. The whole branch was placed in a pan with a fire under it. The
stool was placed over that and the sick person was made to sit on the stool having about him a blanket from his head to the floor. He would breathe the steam and perspire freely. Periodically he would take his head from under the blanket. The sick person was then put in bed and was covered with the same blanket and allowed to cool off. It is said that he would then get well. Sometimes for influenza and perhaps pneumonia, the same kind of treatment as just described was employed except that the stems of bearberry might be added to the water and the leaves of blackberry. The leaves of the plant called ko ch?o^n dai^n were said to be good for colds. They were chewed raw.

In cases in which the steaming of plants seemed to be of no avail for influenza and perhaps pneumonia, occasionally old dog scat, hlaing trIn, were collected and put on a fire and the sick person made to sit over it while it steamed and gave forth smoke. This kind of cure is attributed to the "down river people" who were non-Kutchin, but apparently was also practiced occasionally among the Netsi Kutchin. The grandmother of one informant had an illness which caused her to sleep for several days; she was cured of it by drinking the water in which some old dog scat had been boiled.
Various means existed to treat coughs which might accompany colds, flu, and so on. Spruce gum might be put on a cloth, or formerly a piece of skin, and placed on the chest. Or spruce gum might be mixed with water, boiled a little, and drunk. The latter was said to be good for colds also. Spruce needles might be boiled in water and the resulting strong decoction drunk for coughs. For a heavy cough, the leaves of blackberry were boiled and the water drunk. Mixed with crowberry, it might be used for general cold symptoms as well. A tea made from a species of Labrador tea, *Ledum decumbens*, was used to treat coughing. The leaves of the plant called *ko ch?o n dai n* used for colds, are also said to be good cough medicine. Roots of the same plant would be chewed for a long time and eventually swallowed and that was also said to be good for coughs. *Boschniakia* was pounded and boiled for cough medicine.

The only treatment accorded exposure was apparently rest in bed. Without doubt, some of the other cures listed above might also be employed if it appeared warranted.

A drowning victim was lain on the ground in such a way that his head was down and his feet higher. His stomach was then rubbed in an effort to get the water out. Sometimes
a finger might be put in his mouth as an aid in that objective.

Heart Disease.

Di dri izyu^n, "bad heart" might be treated in any one or all of three ways. A piece of caribou string previously soaked in pyrites liquid might be put in the mouth. Some was then rubbed on the hands, some on the chest, and some rubbed on the neck. As a final stage of this treatment, the string was tied around the person's neck. Another way of treating heart trouble was to take an iron awl or previously, a loon mandible awl, and place it on the patient's tongue. It was then removed. Apparently such was the extent of this curious treatment. Finally, the liquid obtained from rubbing arsenopyrites might be simply drunk.

Kidney and Bladder Ailments.

Kidney or bladder trouble usually manifested itself in difficulty of urination. It was called di tro izyu^n or di tro ilt s\text{ik}. The only naturalistic cure recorded was that of taking all the plants customarily combined so (see above) and burning them in a hole in the ground. The patient either stood or sat over the fire as it burned. In addition, the shaman would probably be called in.
Respiratory Tract Ailments.

To judge from the variety of treatments that existed for it, nose bleed, *di In jÍk da*, must have been considered one of the most besetting of the peoples' medical problems. For persistent nose bleed, all of the methods that follow might be used. (1) Allow blood from the nose to drip on hot coals. (2) Blood from the person's own nose might be painted on his forehead. (3) A piece of caribou string might be tied to the little finger on the same side as the bleeding nostril. (4) Caribou string might be tied on both little fingers and little toes also. (5) Ice might be applied to the back of the neck. (6) A crescent of charcoal might be put on the forehead and a little charcoal on the bridge of the nose. (7) Pyrites liquid was applied to forehead and bridge of nose and occasionally to the back of the neck. If the first six methods fail, it is felt that the last will be successful.

In addition to the treatments for cough listed above, a sore throat would be treated by the application of hot coals and ashes wrapped in caribou skin.

Prior to the coming of Anglo-Europeans in the nineteenth century, tuberculosis did not exist as a health problem. Since that time, as with most other Alaskan native
groups, tuberculosis has become the principal hazard to health. A number of traditional cures have been adapted in recent times for tuberculosis symptoms. Spruce gum mixed with water was given persons showing early symptoms of the disease. A decoction of moderate strength was made from the crowberry plant to be given to people who were coughing blood. Branches, needles, and berries were all pounded together and boiled in water. The tonic was drunk when cool. When a person was doing a great deal of coughing as with tuberculosis, blood might be let from the patient. This was done from one or two places and was aimed at getting the "bad blood out of the lungs." The vein under the tongue might be cut with a knife or the large vein at the top of the wrist might be probed with a steel point like an awl. Blood was drained until they were past that which was dark. Apparently a considerable amount of blood might be let in one of these operations. Following it the patient was made to lie down for a long time. In former times the mandible of the loon was used in place of the steel point.

Sanitation.

It is said that before Anglo-American contact a soap was made in the following manner. A cottonwood tree, 't?a,
was first cut down. It was then burned. The ashes were put in a sack and taken home. After the ashes were boiled in water for some time, the water and ashes were poured through a cloth which was held at all four corners. The ashes, of course, were caught in the cloth. The water was then put in a bucket and boiled for a long time. During this period, about a cup of spruce gum would be put in the water and some caribou fat added. The mixture was stirred the whole time until it thickened. Afterwards it was put away to cool. Once it had cooled the soap was cut up into squares and pieces set out separately to dry further. This soap so manufactured was said to be very strong and was not used on the face. Its color was black. Cottonwood soap, called d?a da tli, is still occasionally made. Despite informants' statements that this soap was used aboriginally, it seems quite dubious.

Miscellaneous.

An account given by one informant told of what may have been a smallpox epidemic striking some people who were gathered at a caribou pound. The informant's grandmother who was there at the time was a curer. She and her family survived because, according to the informant, of her insistence that her family drink bone water, i.e., a broth.
made from boiling bones instead of drinking regular water. Of the disease, it was said that people were hemorrhaging and dying, that they stopped eating, and ran very high fevers. According to the story, the people with high fevers would go out and sit in the snow, put snow on their heads, and eat snow. Although at one point during the epidemic the grandmother had to resort to the use of steaming some of the plants mentioned above, she and her family did survive. It seems not unlikely that part of their success may be attributed to her insistence that they continue to take nourishment where others did not.

Summary.

While the total number of plants involved in medicinal uses is not great, the uses to which they were put is relatively large. There can be little doubt that some of them must have had real efficacy. Unfortunately the quantitative kinds of data one might wish on these points are not available. Few, if any, studies have been made of northern plants with a view to understanding their actual chemical properties. The presence of salicylic acid in willow is, of course, known. It is also known that many of the plants utilized contain varying amounts of vitamin C. Some of them also contain pro-vitamin A. The needs of these
vitamins in human nutrition are well known. There appears to be some dispute, though, about the actual therapeutic value of vitamin C. That is to say, that while presumably most people concerned with human nutrition would agree that there is a minimum daily requirement for the vitamin C, the dispute arises as to whether amounts greater than this minimum daily requirement have any actual curative value. It is pertinent in the present connection to point out, however, that there are those that do maintain that vitamin C is highly important for all sorts of diseases.

III. EFFECTS OF MAN UPON THE VEGETATION

The effects which the Netsi Kutchin had upon their vegetational landscape, compared with similar effects in an area such as the continental United States, are exceedingly subtle. They are present, however. Primarily they consist in cutover areas in the rather sparse spruce forests. As an example, in the area of present day Arctic Village, firewood cannot be obtained any closer than a radius of nine miles from the village. Any stands of trees suitable for house logs that might have existed in the immediate area of Arctic Village are likewise depleted. As a result of this, one observes in the vicinity of that village only very scrubby spruce, mostly seedlings and saplings which
cannot be put to any use. Much more characteristic are clumps of willows. This effect may be seen in Plate I, Figure 2 in the contrast with Figure 1 of the same plate. A somewhat similar area exists around Old John Lake, especially in the vicinity of the northeast corner where a successful caribou pound operated for many years. Although today no one lives in that area, it nonetheless bears very distinctly the mark of man upon it. Spruce of any size are scarce, but one of the most striking things is the evidence there that spruce was once more abundant. This evidence is in the form of grey weathered stumps which are encountered on all sides. What makes them particularly interesting is that many of them are rather high, about three feet from the ground, and they are "beavered", that is, the top of the stump resembles a cone. This is said to result from the use in the old days of stone tools. Whether or not that is exactly true is not known, but it seems likely since even weathering could scarcely have that effect upon stumps cut with a steel ax. In any case, the area is paradoxical in that one has both the impression of empty spaces and at the same time that of an area long lived in. That impression results solely from the effect the Netsi Kutchin had upon the vegetational
Figure 1. The general association of tree growth with stream valleys may be seen in this picture of the East Fork of the Chandalar River. View is northwest. Note also the open character of spruce growth.

Figure 2. Arctic Village represents an area of disturbed vegetation. Grasses dominate the village proper; virtually no trees are present in the immediate vicinity of the village. The clumps are willows. View is north.
IV. ASSESSMENT OF THE CULTURE TYPE
ACCORDING TO VEGETATIONAL USES

Inasmuch as the area in which the Netsi Kutchin live is transitional, the question must arise whether they are to be considered forest people or tundra people. On the basis of the kinds of plants they used, it me be suggested that the Netsi Kutchin are also transitional. They make very extensive use of willow which is more characteristic of the arctic and very little use of birch which is characteristic of the Alaskan taiga. It would seem that one of the most telling arguments for these Indians being a conformable part of the forest-tundra ecotone is their ability to make fire under virtually any circumstances. Of particular interest in this regard is their use of arctic heather when in treeless areas. Their medicinal uses, with the exception of spruce, could be transferred onto the North Slope where essentially the same possibilities of use would occur. The Netsi Kutchin then, appear to be well in accord with their status in a vegetational ecotone.
CHAPTER IV

THE FAUNAL MILIEU

Paralleling the situation with regard to flora, the number of animal species present in Netsai is not great when compared with the temperate and tropical regions of the world. Considered in terms of resources for human use, however, the situation with respect to animals is much richer, and much more varied than in the case with vegetation.

The annotated list appended below presents representatives of each major group of the fauna. These lists are exhaustive only in the sense that those animals important to the Netsi Kutchin should all be present. Native names for each species, when known, are presented also.

I. REPRESENTATIVE FAUNA OF NETSAI

Mammals.

The information presented in this category is taken principally from Burt and Grossenheider, Rausch, and the two reports by Buckley and Libby.¹,²,³,⁴
Arctic cinereous shrew, **Sorex cinereus ugyunak; glok gwe E tha.**

The cinereous shrew is widely distributed in North America. Optimum living conditions for them is supposed to be provided by areas which are damp and wet. The Indians corroborate this to the extent that they say the shrew is not found in the mountains. It is seen occasionally along the trail but not in winter when it is beneath the snow. According to Rausch, the tundra saddle-backed shrew, **Sorex tundrensus,** occurs also in Netsai\(^n\).\(^5\)

**Least weasel, Mustela rixosa eskimo; char.**

The least weasel is found throughout Netsai\(^n), but their numbers vary in accordance with the availability of mice upon which they feed. To the Indians it is good luck to find a least weasel in his winter, white pelage. The skin is kept in one's pocket for the rest of the winter much in the way some people carry about a rabbit's foot.

**Short-tailed weasel or ermine, Mustela erminea arctica; a vi.**

Ermines are distributed throughout the area but their abundance is again determined upon their food supply which is the same as that of the least weasel. The ermine in winter pelage is called **a vi da kai** and in summer **a vi chE tru.**

**Mink, Mustela vison ingens; chi tziu.**

The mink is apparently fairly rare in Netsai\(^n) but does
occur. Being dependent upon fish, it stays about the rivers and lakes throughout the year. Rausch's statement that "the Arctic Village people know nothing of the occurrence of the mink in the Eastern Brooks Range" must be interpreted as simply a misunderstanding.  

Marten, Martes americana actuosa; suk.

The marten occurs in relative abundance in the spruce woods of Netsai.  

Arctic hoary marmot, Marmota caligata broweri; tse.

The hoary marmot occurs relatively abundantly in Netsai at elevations over two thousand feet. They are seen around rock slides and extensive areas of rock outcroppings. They hibernate from about the middle of September until about the middle of May. The Indians call the marmot the whistler.  

Arctic ground squirrel, Citellus undulatus parryi; tha.

Ground squirrels show some affinity for the mountains but their major requirements seem to be well-drained soil which is free of permafrost and suitable for their burrows. They are dependent upon herbaceous vegetation for food. They are frequently observed on the crests of small hummocks and knolls.  

Mackenzie red squirrel, Tamiasciurus hudsonicus preblei; dth lak.

The red squirrel is a resident of the spruce forests and
its range coincides with the distribution of that forest. Red-backed vole, *Clethrionomys rutilus dawsoni*. Red-backed voles occur throughout Netsai\textsuperscript{n}. They are found associated with many different habitats and will occur well above timber line as well.

Meadow vole, *Microtus pennsylvanicus tananaensis*. According to Buckley and Libby "the preferred habitat of the meadow mouse is meadows with dense grass, but they are quite adaptable and some are found even in deep forests."\textsuperscript{7} Indian informants said that they would be found "all over."

Brown lemming, *Lemmus trimucronatus trimucronatus*. The brown lemming apparently occurs throughout Netsai\textsuperscript{n} but evidently is not numerous. Violent fluctuations of population have been recorded in the brown lemming north of the Brooks Range. Buckley and Libby are of the opinion that such fluctuations probably occur on the south slopes of the Brooks Range as well.\textsuperscript{8}

Collared lemming, *Dicrostonyx groenlandicus rubricatus*. Apparently the southernmost limit of the collared lemming coincides with the southernmost limit of Netsai\textsuperscript{n}, that is, the foothills and piedmont of the southern slopes of the Brooks Range. They seem not to be numerous as no name was collected for this animal. They are very closely associated
with the cotton grass, *Eriophorum* spp.

**Flying squirrel, *Glaucomys sabrinus; dat than nyu a trak.***

As evidenced by the name, the flying squirrel is known but it is said by the Indians not to occur in Netsai\textsuperscript{n}. That coincides with the distribution as shown by Burt and Grossenheider.\textsuperscript{9} Flying squirrels are generally found associated with white spruce forests as are red squirrels. Apparently the factor militating against their occurrence in Netsai\textsuperscript{n} is the relative rarity of tall trees since their mode of getting about involves gliding from the top of one tree to the base of another.

**Muskrat, *Ondatra zibethicus spatulatus; tsan.***

Muskrat are common about the lakes and rivers of Netsai\textsuperscript{n}. They feed primarily on herbaceous aquatic vegetation and roots. Their numbers may fluctuate sharply in response to the various conditions which may cause lakes to freeze to the bottom. Under those conditions their food supply is not available. A dry summer, meaning low water at freeze up, is one of these conditions. Another is a light snowfall in the winter since snow acts as insulation on the tops of frozen lakes and ponds.

**River otter, *Lutra canadensis yukonensis; tria.***

The river otter occurs only in the southern portions
of Netsai, although one informant reported having seen one at Junjik River north of Arctic Village. Since they feed primarily on fish, their distribution is limited by the availability of fish. The Indians say that they are found sometimes under ice on streams where there is no water present. In the winter also they habituate the few open spots to be found in rivers and streams. They are said to be more common on the Sheenjek than on the East Fork of the Chandalar River.

Snowshoe hare, *Lepus americanus dalli* and *L. a. macfarlani*; qE.

The two species of snowshoe hare intergrade in Netsai. They probably occur throughout Netsai, but generally at elevations below three thousand feet. That they do not occur above that elevation is due to the general absence there of the food and cover upon which they are dependent. In the winter they subsist most largely upon the twigs of *Salix* spp., *Betula* spp., and *Populus* spp. In its dark brown summer pelage the snowshoe hare is called qE chi tru. The population of snowshoe hares appears to be subject to cyclic oscillation. From a low point they will build up to a peak in about five years and then decline rapidly from that peak. As they represent the major source of food for the lynx, the population of that species varies directly with that
of the snowshoe hare.


Porcupine are probably to be found throughout most of the wooded area of Netsai\textsuperscript{n}. They feed upon the bark and twigs of white spruce and aspen. Buckley and Libby suggest that another control upon the number of porcupine is the abundance of wolverine in any given area.\textsuperscript{12} Wolverine apparently prey upon porcupine with great ease. Since the wolverine population in Netsai\textsuperscript{n} is relatively high, presumably it is for that reason that porcupine are not quite as common as they might be.

Beaver, *Castor canadensis*; tsyE.

Beaver are found about still and slow moving water which is not subject to freezing to the bottom in winter. Their preferred diet consists of aspen and cottonwood, but other species may be utilized as well. They are occasionally found above timber line subsisting entirely upon willow. They are relatively common in Netsai\textsuperscript{n}.

Alaska red fox, *Vulpes fulva alascensis*; nE go\textsuperscript{n} tso.

The red fox is probably found scatteringly throughout Netsai\textsuperscript{n}. Since one of the major items of prey is the snowshoe hare their abundance varies pretty much in proportion to that of the hares. The native name given above refers
to the red fox in its red phase. In its silver (black) phase, it is called nE go^n zhrai^n. The cross phase is called nE go^n nItl zhrai^n. Red fox is found in a variety of habitats and at virtually all elevations.

Continental arctic fox, Alopex lagopus innuitus; jIk kya.

The arctic fox is rare in Netsai^n but it does occur. To some extent its distribution is limited by that of its major prey, the lemming. Farther north, at least, arctic fox populations vary in proportion with those of the lemmings.

Wolverine, Gulo luscus luscus; naтрIa.

Wolverine are found in relative abundance throughout Netsai^n. They seemingly prey upon all the other smaller animals present. They also attack caribou although that is probably more likely when an individual caribou has gotten itself into deep snow or is otherwise incapacitated. To the Indians the wolverine are known as trap-robbers.

Coyote, Canis latrans; zo tsa^1.

According to the natives the coyote is rarely, if ever found in Netsai^n today. It was said that it appeared as a newcomer some fifty years or so ago, but even then was relatively rare. That the animals was new and different is attested by the native name which means "little wolf."
Wolf, *Canis lupus tundrarum; zo.*

Wolves are found in relative abundance throughout Netsai
. They are the major predator upon caribou. In its grey coloration the wolf is called *zo? drIn;* in the white phase *zo? dakai;* and in its black coloration *zo? zhrai;*

Canada lynx, *Felis canadensis canadensis; nIn ji.*

The lynx is probably present in sparse numbers throughout Netsai
. They are said by the natives to be more frequent around rivers and in brushy areas. Occasionally one is found which has a blue-grey fur. They are called *nIn ji ve* and are rare. The lynx population varies directly with that of the snowshoe hare since the latter is its principal item of diet.

Black bear, *Euarctos americanus americanus; sho.*

Of the black bear Rausch notes that it is not found near Arctic Village, but is "numerous near Christian Village." Buckley and Libby state that for all practical purposes "that [their range] can be set at the vicinity of Arctic Village." According to informants there are no black bears in Netsai except in the very southernmost areas. They are very specific on this point. Rausch's statement as to the occurrence of black bear in the vicinity of
Christian should possibly be qualified to indicate that they are not numerous, but do occur. Probably the major reason for their scarcity in Netsai\textsuperscript{n} is the presence of the grizzly bear.

**Grizzly bear, *Ursus horribilis; shi tho.***

Throughout Netsai\textsuperscript{n} grizzly bears are numerous and they must be accounted one of the dominant species of the region. In contrast to the black bears which seem to favor forested and brushy areas, the grizzlies, or brown bears as the natives call them, are more frequently encountered in the open, higher situations. As with the black, they are omnivorous, do a good deal of scavenging, but also prey upon caribou, especially calves.

**Moose, *Alces alces gigas; dIn jIk.***

Moose are not common in Netsai\textsuperscript{n}. They do, however, occur and are taken occasionally. In general, moose are associated with river bottoms, lakes, and ponds. They move about a good deal, though, and may be found at one time or another in almost any type of habitat.

**White mountain sheep, *Ovis dalli; dE vi.***

Mountain sheep may be found in appropriate localities throughout the northern half of Netsai\textsuperscript{n}. Except for occasional forays into the timber in the winter, mountain
sheep remain above timber line characteristically in rocky, steep areas. They are especially common in the mountains twenty miles or so north of Arctic Village.

Barren ground caribou, *Rangifer arcticus; vat zai.*

Of the large mammals occurring in Netsai, caribou are by far the most numerous. Caribou exist in herds consisting of several tens of thousands of individuals. Surprisingly little is known of the movements of these herds anywhere in Alaska. The herd which habituates northeastern Alaska, called the Porcupine herd by Buckley and Libby, according to Rausch "apparently migrates partly northwest and southeast and partly east and west." The popularly held notion of caribou habituating the tundra in the summer and moving into the forest in the winter, always along the same lines of migration, is palpably false. During a recent winter, personnel of the U. S. Fish and Wildlife Service flew along the Arctic slope and estimated that there were one hundred thousand caribou wintering there. Their occurrence within any one part of the very large area which constitutes the range of one herd is not predictable.
Summary.

The list above is representative of all the mammals that occur within Netsai. All are parts, therefore, of the total faunal environment. They are not all of equal importance to the Netsi Kutchin, however. In the economic life of the Netsi Kutchin the most important animals were caribou, mountain sheep, ground squirrel, snowshoe hare, moose, muskrat, beaver, and porcupine. The primary importance of the animals just named lay in their use as food. Other members of the assemblage of mammals above are important but for different reasons. The grizzly bear and the wolverine might be singled out as the two most despised animals of the country. They and their depredations must be constantly guarded against. Many of the smaller mammals may be said to be important only as they figure in the legends and lore of the people.

Birds.

The following section has two objectives. On the one hand it aims at presenting a representative picture of the avifauna occurring in Netsai. On the other, it hopes to give some notion of bird recognition by the Netsi Kutchin. Since very few of the birds presented can be considered important in the native economy, their recognition and 

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naming by the Indians may be considered as a form of intellectual appreciation of this aspect of their environment. Using a check list of birds for the Fairbanks area as a guide, appropriate illustrations in Peterson were shown to informants in Netsai. Other bird names were obtained in the field by pointing out a particular bird and asking its name.

Permanent Residents.


Several other species may be year-round residents in limited numbers; Downy woodpecker, Dendrocopos pubescens,

Migratory Birds.

Common loon, Gavia immer; dat sai^n
Pacific loon, Gavia arctica pacifica; ts?a t1 viIt
Red-throated loon, Gavia stellata; tI?E tshe
Holboell's grebe, Podiceps gnisegena holbollii; te kwe?
Horned grebe, Podiceps auritus cornutus; no tsIk
Whistling swan, Olor columbianus; da zhai
Lesser Canada Goose, Branta canadensis leucopareia; hye
Brant (black), Branta nigricans; tse kak
White-fronted goose, Anser albiros frontalis; de tsh ?a
Lesser snow goose, Chen hyperborea hyperborea; kwI ke
Mallard, Anas platyrhynchos platyrhynchos; ne t?ak tsho
Pintail, Anas acuta; ch?I rin cha
Green-winged Teal, Anas carolinensis; chI tsIn
Baldpate, Mareca americana; cha'l vi
Shoveller, Spatula clypeata; de chIk
Canvas-back, Aythya valisineria; d?a vi
Greater scaup duck, Aythya marila nearctica; tain cho?
Barrow's golden-eye, Bucephala islandica; chi k?i
Old squaw, *Clangula hyemalis;* aha lak or I hya
White-winged scoter, *Melanitta deglandi;* ncha (?)
Surf scoter, *Melanitta perspicillata;* de che?a
Red-breasted merganser, *Mergus serrator serrator;* cha^n
Sharp-shinned hawk, *Accipiter striatus;* ch?a zha^l tslt
Golden eagle, *Aquila chrysaetos canadensis;* ch?I zhIn
Bald eagle, *Haliaeetus leucocephalus alascanus;* chiu^n din
Osprey, *Pandion haliaetus carolinensis;* thak cho
Duck hawk, *Falco peregrinus anaturm;* ch?I kew chan tsIk
Pigeon hawk, *Falco columbarius;* tsi cho
Sandhill crane (little brown), *Grus canadensis canadensis;* ncha
Golden plover, *Pluvialis dominia;* tsa laik
Wilson's snipe, *Gallinago gallinago delicata;* zhe zha
Hudsonian curlew, *Numenius phaeopus hudsonicus;* no
given but recognized as present
Lesser yellow-legs, *Totanus flavipes;* di^l
Least sandpiper, *Erolia minutilla;* te hye? tsa^l tsa^l
Dowitcher (long-billed), *Limnodromus scolopaceus;* den cha
Long-tailed jaeger, *Stercorarius longicaudus;* tse
Herring gull, *Larus argentatus smithsonianus;* vyu
Bonaparte's gull, *Larus philadelphia*; ha cha zhai

Arctic tern, *Sterna paradisaea*; ch?I chu

Horned owl, *Bubo virginianus*; vi?i tse

Hawk owl, *Surnia ulula caparoch*; jI chi dru

Great grey owl, *Scotiaaptex nebulosa nebulosa*; na ta

Richardson's owl, *Aegolius funerea richardsoni*;

    ch?a chr?i

Short-eared owl, *Asio flammeus flammeus*; kwI ki chi

Northern flicker, *Golaptes auratus luteus*; chyan

Downy woodpecker, *Dendrocopos pubescens*; dat chan chya

Arctic three-toed woodpecker, *Picoides arcticus*; siya

Say's phoebe, *Sayornis saya saya*; ni vya n chi?

Bank swallow, *Riparia riparia riparia*; shya tso

Cliff swallow, *Petrochelidon albifrons albifrons*;

    shya tso

Robin, *Turdus migratorius migratorius*; syu

Gray-cheeked thrush, *Hylocichla minima*; tsIn chi

Yellow warbler, *Dendroica petechia rubiginosa*;

    chi tro at sa sa°1

Myrtle warbler, *Dendroica coronata*; ch?a kai da hlu?

Rusty blackbird, *Euphagus carolinus carolinus*;

    sa°1 ch?a

Tree sparrow, *Spizella arborea ochracea*; no name given
but recognized as present

White-crowned sparrow (Gambles's), *Zonotrichia leucophrys gambelli*; ne ch? Ik

Lapland longspur (Alaska), *Calcarius lapponicus alascensis*, dtha tsi?

Snow bunting, *Plectrophenax nivalis*; kwIk E zhu

Trumpeter swan, *Cygnus buccinator*; da zhai

Black-bellied plover, *Squatarola squatarola*; tsa lai

Fish.

In common with much of Alaska, many of the shallow lakes and ponds lack any sort of fish life due to the fact that such bodies freeze to the bottom in winter. That is especially true of lakes lacking stream outlets. Fish, then, are generally confined to larger streams and lakes that provide food and are of sufficient depth to avoid complete freezing.

Anadromous fish reach only the lower Sheenjek River and perhaps the lower Coleen. For most of Netsai these fish are not present. When it is realized that southern Netsai was little used by the people, it will be seen that these fish, the salmon so important elsewhere, were in that sense simply not available.

The situation with respect to the occurrence of fish species in Netsai has not been studied. It is not known,
then, to what extent the list below represents actual total species occurrences.


II. METHODS OF TAKING

Caribou.

It probably would be no exaggeration to say that caribou were of greater importance in the economy of the Netsi Kutchin than all other game species combined, including fish. Accordingly, the larger proportion of the economic activities were those which related to the taking of caribou and working with the products therefrom.

Aboriginally, the most important means of taking caribou was by use of the caribou pound, or fence, or corral, as they are variously called. They are no longer in use today,
but the remains of some are still to be found in Netsai. The pound consisted of two basic components, a funnel composed of two converging fences and secondly, the head, usually of an ovate shape into which caribou were funneled. The resulting plan of both components was roughly that of a keyhole. The construction of fence and head was identical, consisting of a series of tripods of saplings with saplings laid horizontally between and connecting them. An important difference between the head and the fence was that whereas the latter was continuous without break, in the head were numerous breaks, in each one of which would be set one or more snares. The accompanying sketch, Figure 2, is based upon an air photo of a caribou pound at the northeast corner of Old John Lake.

The Indians made a distinction between two types of caribou pounds. The construction of both was essentially the same, except that one was of a more temporary nature. The more permanent caribou pound was called vat that. The vat that was for use in the fall and was thought of as the "real corral. That used in the spring was called vIn nE gwak go that, which meant approximately "fence used when the snow disappears from the ground." The permanent fall corral was called by the name of the owner. Thus,
the corral mentioned above at the northeast corner of Old John Lake had belonged to a man by the name of Trot sya and that pound is called Trot sya vat thal. The spring pound

![Figure 2. Sketch of caribou pound, based upon that owned by Trot sya at Old John Lake. Dimensions are approximate.](image)

was neither as big nor as well-made at that used in the fall. The caribou pounds were set in such places as to take advantage of the usual route of migration of the herds. Caribou in the spring tend to move along the rivers and the lower slopes of hills. In the fall they generally follow the timber line. Each type of pound was set in an appropriate location to take advantage of these movements. One further difference may be noted between the spring and fall caribou pounds: The spring corral was apparently frequently
a one family affair, whereas that used in the fall almost always involved two or more families. Some families had both a spring and fall pound.

The head or surround portion of the pound might be as much as a half mile in its long axis. The fences leading into it might run for three miles or so. Some informants maintain that fences might run as much as five miles or more and that their widest points of divergence might be on opposite sides of a mountain. Frequently, at the outer diverging ends of a fence before the continuous fence itself took up, a series of posts or topped trees would have clumps of moss or cotton grass set atop them. These were said to have somewhat the appearance of men, and at any rate, looked sufficiently foreign in the landscape to make the caribou shy away from the, thereby shunting them into the funnel. Groups of caribou were sometimes frightened into entering the fence. Several men might station themselves on the outskirts of a group of caribou and by showing themselves, waving their arms, and making noises like wolves would "spook" the group of caribou in the desired direction. Animals that were struggling in snares were dispatched with spears called tok. Animals that were milling in the surround and were perhaps on the
point of breaking through the fence were shot with arrows.
Men stationed near the juncture of fence and surround stood
ready to prevent animals from wheeling about and leaving
by the way they had entered.

The operation of the caribou pound called for a great
deal of rapid and hard work on the part of both men and
women. They were stationed on the outside of the surround,
the men shooting those caribou that needed to be shot, re­
moving carcasses, throwing them out to the side and the
women busily butchering and caching. Most of the haste was
occasioned by the fact that more caribou would be coming
and that those already in had to be got out of the way.
The men would sometimes help with the butchering and cach­
ing. No skinning or butchering took place inside the
surround. The reason for that prohibition is not clear.
Evidently, also, it was against regulations to walk inside
the caribou fence. It was said that the caribou would scent
the human odor. It is thought that particular prohibition
may have applied only to women. A person in approaching a
caribou pound always took note of wind direction and came
in from the downwind side.

Placed conveniently to either side of the pound were
special cache structures in which freshly butchered meat
was hastily thrown. Two of these caches still stand at Trot sya's pound. They were placed just out from the point where the fence joins the surround proper. These caches were of tipi-form made of small spruce logs set closely together. They were provided with a triangular entryway, which could be covered up with additional logs if need be. The cache was called shya and is no longer in use today. Apparently other types of cache structures might also be associated with the caribou pound. Just outside one portion of the fence of the same pound, a cache of the type dat chan tsi qIt (described below) was discovered. There was little doubt of its association with the corral. The particular interest in that cache will be brought out below.

The fall caribou pound constituted the closest approximation there was in aboriginal times to a permanent settlement. While it was actually owned by one family it was almost invariably worked by at least two families. Some pounds were conspicuously successful, the Indians today refer to them as "lucky" corrals and the owner might accrue a following of several families. The take from a luck corral at which there were a number of families working was equally divided among all who worked. A rich man might
order a corral built and pay for its construction with big blue glass beads. At such times the owner functioned as leader of the group. The owner then gained prestige by reason of his ability to support such a group. The ownership rights to the caribou pound were respected. There would be no trespassing unless in an emergency. The moss house, or kwant, was constructed near such corrals for this was the only occasion that demanded a semi-permanent dwelling. The group camped about the corral of whatever size it was, would come together in late September or early October and would possibly remain together through March. The people say that if the corral were really successful, there would be no need to do any other hunting.

The caribou pound went out of use about the turn of the century. Trot sya's pound, which was an exceptionally good one, is said to have remained in operation until his demise in 1908. The investigator took a section of log from the dat chan tsi qIt mentioned above and submitted it to J. L. Giddings of Brown University in an effort to obtain a tree ring date on it. The reply from Dr. Giddings indicated a cutting date of 1923. Possibly then, that particular pound was in use as recently as that date. Fear of game wardens may have made the people reluctant to
mention such a recent use. In Plate II may be seen portions of Trot sya’s pound and the cache, shya, associated with the caribou pound.

**Caribou Fence.**

In addition to the pound, a simple fence was also used on occasion to take caribou. This consisted of one line of tripods interconnected with sapling poles with openings in which snares were set. Women might be stationed to either side of the fence forming an extension of it in order to direct caribou into the fence. The men would chase the caribou toward the fence. This fence was called gai that. They were easily set up on the spur of the moment and were quite temporary in nature.

**Other Old Means of Taking Caribou.**

When hunting partners went out and encountered a group of caribou they tried to assess the situation in terms of what direction the caribou would take when they were shot at. One partner then stationed himself along the route they figured the caribou would take. The other partner shouted and scared the caribou into moving. They knew that if more caribou were down valley from the group they were hunting, it would head that way. The partner stationed on the route between the caribou being hunted and the down-
Figure 1. Aerial view of a portion of Trot sva's caribou pound.

Figure 2. Detail of construction of fence tripods. Tripods are tied with willow.

Figure 3. The shya cache used in association with the pound. This one is at the head of Trot sva's pound.

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valley group did the shooting. This is an old hunting method, but is probably the one most commonly used today.

Another means applied aboriginally involved not only the use of men, but women and children also. They would form a loose circle about a group of caribou and keep marching around it in ever decreasing circles during which time the men shot. The animals were continually milling and being thrown back upon themselves. It is said a whole group of caribou could be annihilated in this manner. That generally was not done, however, and some caribou would be deliberately let through the ring.

Another method said to be old was as follows: Several men would go out. When they came upon a herd of caribou, men would station themselves on all sides. Then a single man would enter the herd and start firing. This would set the herd in motion, at which point the men on the periphery of the herd would also start firing. The theory was that no matter in which direction the caribou ran, they would be shot at and turned back. This resulted in a great deal of milling and a great deal of slaughter. After a while one or two might break through the loose ring and be followed by others. This was said to be a winter technique, but was occasionally used in the summer. This may not be an aborigi-
nal method, but in any case, it was used after the introduction of firearms.

In times past, a single man hunting caribou might take two small spruce saplings and sneak up on a herd using the saplings as a shield. He would occasionally strike the branches together which sounded like caribou hooves. If no trees were available he might use his snowshoes as a substitute. A man could get within fifty feet of caribou this way. It is still occasionally practiced.

Another device sometimes employed by the single hunter was to rattle caribou hooves strung together for that purpose in imitation of the sounds made by the caribou. This would allow the hunter to approach the herd, or if he remained still, the caribou might plod toward him with their heads down simply following the familiar sound. A single man hunting always took note of wind direction and would come in downwind of the caribou. The man would pack in what he could and the rest would be picked up by women. Caribou hoof decoys are still occasionally used. Map 5 shows the probable major movements of caribou through Netsai⁷ and the locations of some known caribou pounds.

Commonly in the winter men periodically scan the mountain sides with telescopes and binoculars for caribou or
NETSAIN

Movements of Caribou and Pounds

- Fall migration
- Spring migration
- Pound

MAP 5.

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fresh tracks. When they are sighted, a cry goes up and the men hitch up their teams and take off in pursuit. Areas of modern hunting are shown on the following Map 6.

After the time of contact, the skin boat was introduced among the Netsi Kutchin. It is a technique quite important in hunting. Two or more men might walk up river to a location to hunt. After they have killed some caribou they will spend one day building the frame of the skinboat, cover it with the fresh hides from the animals that were killed, and float back down to the village or their destination, carrying their meat with them. This is the only use made of the boat, as it is immediately dismantled and the hides used for other purposes.

**Moose.**

Moose were sufficiently scarce in Netsai that they were relatively unimportant in the food economy of the people. Nonetheless, upon the occasion when one even was taken, there was available a great deal of meat. It would not have been possible to base any kind of economy upon moose, but the occasional taking of one could be of crucial importance. Since moose occur singly or occasionally in pairs, the methods of hunting them are quite different than those employed in hunting caribou.
NETSAIN
Principal Hunting Areas

Caribou

Mt. Sheep

MAP 6.

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Moose Fence.

A fence similar to that described above for caribou was occasionally hastily thrown up for the taking of moose. As with the fence above, it consisted of a single line of tripods set with snares. The fence would be put up near where a moose was known to be. Up to four men would be stationed at either end of the fence at about a forty-five degree angle to the axis of the fence making a kind of funnel into it. No women were needed on this fence. It was said they were needed on the caribou fence because caribou were so fast. Once these arrangements had been made, other men would circle around making noise and drive the moose towards the fence. The moose fence would be the only quiet spot around. As the moose approached close to the vicinity of the fence, the men at either end would start making noises also. The moose would then head for the quiet spot in the middle and there meet his demise.

Other Means of Taking Moose.

Moose were and are frequently trailed; they are either sighted or fresh tracks are encountered. Occasionally, when caribou fail, men may seek out moose in the few localities where they are known to occur. An old method which is sometimes still applied today involved running
the moose down on snowshoes. Stalking is a commonly used method in summer and winter.

A moose call which is in common use in the Yukon Flats is occasionally used also among the Netsi Kutchin. This consists of a moose scapula from which the spines have been removed and cartilage left on the distal end. When this is scraped on willows at the beginning of the rutting season it sounds very much like a bull moose taking the velvet off his antlers. It may bring either a bull or a cow, but usually the former.

Moose were also snared using large babiche snares like those used in the caribou corrals. In recent times, multi-strand wire snares have been used for the same purpose. They are set over moose trails.

Bear.

Although the black bear possibly occurs in southern-most Netsai\textsuperscript{h}, the people virtually never speak of it. When they speak of bears they mean the grizzly. Grizzly bears do not constitute a food animal. Today and presumably stretching back into the past, grizzly bears are shot on sight. It appears that they are seldom, if ever, hunted as such, but are rather considered something more than a great nuisance which is to be got rid of whenever
encountered. In an attenuated form there seems to have been some bear ceremonialism among the Netsi Kutchin. Several older informants spoke of a man hunting bears in the winter at their caves. As one older man put it, a man might be out hunting and find a den. He would then go home and tell one other man, his partner. After that all the men were told, but no women or children. On the following day the men would go to the cave together and would put mittens or pack sack in front of the cave to wake the bear up. When the bear awoke, poked his head out, he was struck with a stick and then killed with a spear which had a caribou antler point. The butt of the spear was placed on the ground to take up the force of the bear's charge. This was the same thrusting spear used to dispatch caribou in the pound. Only the two men, the original finder and his partner, could kill the bear. Another older informant recalled an instance of men using an ax on a bear at its den.

**Sheep.**

Sheep hunting methods, both in the past when the bow was the weapon used, and at present with the rifle, are essentially the same. Men hunted singly by stalking sheep; the technique was to get above the sheep because that animal
when frightened will seek higher ground. Since sheep are skittish, usually one shot at a time was possible and hence only one animal was down at one time. There was no deliberate driving of sheep off cliffs, although, on the occasion when that happened it was considered good luck provided the meat could be retrieved.

Sheep were occasionally snared. The snare was set over a game trail secured to a rock. This technique was apparently rarely practiced.

Other Animals.

With the exception of the ground squirrel, animals other than those enumerated above, have traditionally been of considerably less importance. Animals that might be shot as encountered in the past include the wolf, wolverine, fox, porcupine, coyote, lynx, and muskrat. In their several ways the products of each of these would be used.

In aboriginal times the ground squirrel was snared. Snares are still used to a great extent. Small traps are also used today. Ground squirrels are usually taken in August and September when caribou are in short supply. They furnish a very important supplement to much diminished larders. A large number of ground squirrels may be taken in a fairly short period of time.
Snowshoe hares were snared in the past, and likewise functioned occasionally as a fairly important supplement to the diet. They are still snared today, frequently in the winter and in a rather casual manner.

Aboriginally, the beaver was hunted occasionally, but was considered primarily a food animal. After trade in furs with Anglo-Americans got under way, the beaver assumed a different importance along with the marten, mink, muskrat, lynx, and occasionally the river otter. Most of these animals were then trapped, with the exception of the muskrat which was, and is, most frequently shot.

Birds.

The taking of birds is pre-eminently a summer occupation. The most important birds to the Netsi Kutchin are the various ducks and grouse. Grouse and ptarmigan were formerly snared. They are more frequently shot today with small caliber rifles. Ducks were formerly shot with the bow and arrow, the arrow being fitted with a special type of point. Though the latter weapon has been in occasional use until relatively recent years, it has been much more common to employ twelve gauge shotguns and .22 rifles for taking ducks. Apparently the taking of ducks while they were in molt was only occasionally practiced. Loons were
taken like ducks in the past, but are seldom molested today. The sharp shinned hawk and the golden eagle were occasionally taken in the old days, but virtually never today. One informant spoke of an eagle snare being used, the loop set on top of the nest, but not further details were forthcoming.

Fish.

The taking of fish was also primarily a summer occupation. It would take place concurrently with the taking of ground squirrel, muskrat, ducks, and grouse. Fish were taken with hooks and lines, by use of the fish trap, by spearing, by the use of a rock dam, and more recently by the use of nets. The modern rod and reel is used by some few individuals, but not in a manner that has any relation to subsistence.

Salmon reach into southernmost Netsai on only one stream, the lower portion of the Sheenjek River. Anadromous fish, so important among some of the other Kutchin bands, are therefore nonexistent among the Netsi Kutchin.

Aboriginally, the conical fish trap was apparently sometimes used in conjunction with a weir constructed of spruce saplings driven down into the bed of a stream. The fish encountering the weir found only one way out which was
at the center and into the fish trap. The fish trap was fitted with a smaller cone at its face. The smaller cone functioned to funnel fish into the trap itself and to make it difficult for them to swim out, once they had entered the trap. The forward end of the trap was held down in the bottom of the stream by a stake driven in the front of it. To remove the fish, the lower end of the trap was lifted up, untied, and the fish removed. The trap was made of willow and tied with willow root. According to one description, the trap proper was about five feet long, the cone fitting into its face about three feet long. The trap was also occasionally simply placed in the narrows of a small stream. The information gotten about fish traps was equivocal. Some older informants maintained that it was introduced after contact with the whites, while others said no. One must conclude, therefore, that it simply was not an important device in the subsistence economy of the Netsi Kutchin.

Fish dams were sometimes built in the shallow waters of a stream. A number of rocks were set to form a kind of half ellipse pointing downstream. The dam was built up slightly above the level of the stream. At least two people were required to operate the fish dam. One person
was upstream thrashing the water with a sweep made of willows, driving the fish downstream, while another, or perhaps several persons might be downstream just outside the dam. The fish could not swim over and could easily be seen. The persons at the dam would reach over, grab the fish by hand and throw them up on the bank. Fish dams were set up on any shallow riffle on creeks and on the back sloughs of rivers.

Besides modern hooks, three other types of hooks were utilized by the Netsi Kutchin. One of these mentioned above, was simply a piece of willow which utilized the shaft of the plant as the shank, and a branch as the hook itself. These were, of course, unbarbed. Willow hooks were used primarily for ling cod (loche) and pike. They were used as a set hook being baited with a piece of caribou haunch and tied to a short pole with a wide piece of babiche line. The pole was stuck hard into the bank. The willow hook was called **hsag**. Another hook called **hlan** was a composite consisting of a shank of wood to which was joined a point made from the splint bone of the caribou. The bone point was tied on in such a way to the shank that it is said when the fish pulled on the hook, the point would swivel and act to gorge the fish. The **hlan** was used
in conjunction with a caribou string line, a cross stick, and might be set overnight in an ice hole. It was used for grayling and lake trout. Customarily a small fish was used as bait set on the hook head down in such a way that the hook itself was virtually obscured. An older informant also mentioned a composite hook which consisted of a wooden shank and an owl's claw for the point. It was used to take small grayling. No further information was obtained on it.

Jigging for grayling through the ice was occasionally practiced. The hook used was composite consisting of a shank or lure of dense bone into which was placed a short steel point, barbless. For bait, a piece of the soft flesh from the underjaw of the grayling was used. The hook and this form of ice fishing are recognized to be Eskimo traits and date from the time of trade with the Eskimos. The hook is a duplicate of those used by the Eskimos. An ice chisel was made with a caribou antler point. The latter was a section of the main antler beam. It was hafted onto a spruce shaft. It was used gently.

The aboriginal fish spear with leister point of caribou antler is said to still be in occasional use, although the investigator has never seen one. A simple cylindrical bone point was set in the end of a spruce shaft, while
lashed to either side were two longer barbed points of antler. The modern day version of the fish spear utilizes the commercially obtainable trident point set on the same sort of spruce shaft as used with the old spear. Fish spear shafts are generally quite long, fifteen feet being not uncommon. They may be used either in lakes or small streams. The technique employed is similar in either case. The point of the spear is carefully placed below the surface of the water in the vicinity of some fish which have been seen. The spear is either then urged gently toward the fish or in the case of the stream, the fish themselves may come within proximity of the point. In either case, there is a quiet waiting period and then a sudden, smooth lunge and the fish is impaled on the point. Pike and grayling have been observed taken in this fashion. The fish spear is probably most used in June when the fish are coming out of the lakes and into the small streams that flow out from them. A fish spear in use is shown as Figure 3 of Plate VII.

Fish nets of local manufacture are sometimes set under the ice today. Using a modern ice chisel with a steel point (old rifle barrels are frequently used), two holes will be chipped into lake or river ice. The distance by
which they are separated is determined by the length of the pole used to start the setting of the net. A rope is tied onto one end of the pole, the pole inserted in one hole and pulled up through the other. The rope which then spans the under-ice distance between the holes is secured to one end of the net and the net is then drawn between the two holes by means of it. One end of the rope is left out on the surface of the ice. A similar piece from the other end of the net is also secured on the surface. The net is weighted. Nets in the winter may be checked every two weeks or so. The catch is usually reserved for dog food.

One final note on fish traps: One elderly informant maintained that the old type of fish trap was a simple cone tied with willow roots and that it had no center cone leading into it. According to this woman, the type described above may have come in about 1880. Another informant spoke of a later type of trap said to have resembled a box with a lattice work top of willows. No further information could be obtained upon this.

Whitefish, pike, grayling, and suckers, in that order, were the most important fish taken.

Weapons.

The most important weapon aboriginally was the bow.
It was a simple self bow generally made from willow. Apparently, depending upon the owner's preference, it might or might not be fitted with a wrist guard. The latter was a spatulate piece of spruce wood set in the middle of the bow on the string side at right angles to the axis of the bow. Its function was to catch the string before the wrist was struck by it. They were usually about three inches long. There were at least three types of arrows used, and possibly four. The big game arrow, called k?i lIq, was about five inches long, triangular in cross section and serrated along one edge to form barbs. The points of these arrows were said to detach upon striking an animal. The one specimen collected of the k?i lIq did not seem to be so arranged. A blunt arrow was used for small game on land. It was not detachable, and was called tat\(^1\). A twin barbed point was used for ducks, muskrat, or other game shot in the water. The points curved inward and were barbed on the inner edge. This arrow was sometimes fitted with a central cylindrical point as well. They were not detachable, but the arrow would float. This arrow was called chu\(^n\) got\(^1\)h. One informant spoke of a special duck arrow for which he gave no name, the point of which was said to be flattened on two surfaces and grooved along each of these. The reason
for the flatness is said to be that it kept the arrow from skipping over the surface of the water as another type of point might. The informant said the arrow with this point would dive in and then float again to the surface. Arrows were fletched with two to four eagle feathers tied with sinew. The blunt head was usually unfletched. The bow string was of babiche and was drawn back with two fingers, the nock of the arrow between them. The bow when shot was held at a forty-five degree angle from the axis of the body. The bow guard, if used, was also sewn with babiche. Until fairly recently the bow was still in use by young boys. Using the bow they usually hunted for caribou calves. All arrow points were made of caribou antler. Figure 3 illustrates some of these items.

Figure 3. The bow and arrows formerly used in hunting.
The bear spear mentioned above, was a thrusting spear with a wrapped handle. No example of such a spear was seen by the investigator. They are said to have been about five and one-half feet long with apparently a simple cylindrical caribou antler point. Another name, in addition to that given above, for this spear was tal. The only other spear mentioned as having been in use is the fish spear described above.

In addition to some probable, but unconfirmed, uses of flint blades for skinning, there apparently existed aboriginally two other types of knives. One of these was made from the rib of a caribou which had been ground to take a point and an edge, and had a handle of wrapped caribou string. The second, if indeed aboriginal, was not manufactured in Netsai but was got by trade. The earlier forms of this knife were of copper and were apparently traded up from the Copper River area. Later forms were made locally from steel files but followed the design of the copper prototype. The knife had a double-edged blade and was of a very distinctive design. The top of the handle was adorned with two lateral spirals which were made by first making a very long tapered tang and splitting it evenly down several inches. The two pieces were then
bent outward and each curled in upon itself. The knife and handle were thus all of a piece. The handle was wrapped with white caribou string. The copper version of the knife apparently was never very common in Netsai. This knife of whatever material was called \( k^2 \text{Esh} \text{go}^n \). Both it and the caribou rib knife were originally carried in a plain sheath made of untanned caribou leg skin to which was attached a shoulder strap. Both knives were thereby slung under one arm and above the waist. Other knife sheaths were occasionally made of tanned dehaired caribou hide and sometimes decorated with porcupine quillwork. A still later form of knife sheath worn on the belt employed at its bottom a caribou hoof in which the point of the knife would ride. Sheaths of this type are usually decorated with beadwork. A still more recent innovation in belt knife sheaths has been to make the bottom portion from a flattened section of tin can. The purpose in using both the caribou hoof and tin can was to keep the knife from punching through the bottom of the sheath which it would readily do. All men today use commercially made hunting knives. Some examples of these knives are figured in Plate III.

One informant told of an antler club used primarily
The three metal knives are examples of the *k'lešh go*³. Large knife at left, from Fort Yukon, is copper. Next left is steel made from file and is from Rampart. Knife on right was made for investigator at Arctic Village from a piece of strap steel. The man worked from memory having never made one previously. Occasionally, pieces of bone were set in handle; in this specimen plastic was used. Case to latter knife at bottom; tip is caribou hoof, decoration porcupine quill. Knife in middle was made by an elderly informant.
for warfare which he said was called jit ji ha. He was not able to describe the club. Osgood makes mention of such a club being used among the Peel River Kutchin and those of Crow River. Osgood also mentions the same club being used occasionally to kill bears. This would parallel the story mentioned above of men using an ax for that purpose.

Some of the first guns gotten by trade were said to be double barreled flint locks, and a bit later, percussion guns. Guns probably were not obtained before the 1860's, and from the stories told, they were scarce items throughout the rest of the nineteenth century. Bullets and powder for muzzle loaders were generally in short supply and hence were used sparingly. In order to conserve ammunition, a man might cut a ball in half and load the half. By wrapping it in caribou skin, round side down with the ends of the caribou skin tied above it, the right diameter would be approximated. In those days guns were used almost exclusively in the summer because it was said to be too far to go to Old Rampart in the winter to trade. When a caribou was shot an effort was made to recover the bullet. Side arms have never been favored.

Since cartridge rifles became generally available
about the beginning of this century, favored calibers have been the 30.30, 30.40 Krag, 35.20, and most recently the 30.06. The .22 rifle is heavily used, even occasionally for caribou. In shotguns, most men appear to be happiest with a twelve gauge pump model. They are not fond of double barreled shotguns. Guns are generally left outside during the winter with most of the oil removed from them. If a gun is brought into the house it will be taken apart, wiped with a cloth, and then put back together and oiled lightly. It is then put close to the stove to dry and is later put in a corner of the house to become cooler, after which it will be put outside and left outside for the rest of the winter. Guns are never carried under the arm since if this were done in the winter the firing pin would freeze. Characteristically, guns and rifles are carried over the shoulder with the hand on the barrel.

Snares, Traps, and Deadfalls.

As has been observed, snares have been used for all types of land animals. For some of the smaller animals the snare was virtually the only device used for taking. The three most commonly snared animals were the ground squirrel, the hare, and the ptarmigan. Setting a number of snares allowed a man to get a relatively high yield of
meat with a fairly low investment of energy. The three animals just enumerated are of such size that taking one only would be of virtually no use even to a single individual.

Most small game snares were made of several strands of twisted sinew. Sinew snares are still in use, but are being supplanted by the use of picture wire.

Ground squirrel snares. Tha gya. Ground squirrel snares were usually made of sinew, occasionally of thin babiche. They were generally set before the burrow or on a squirrel trail. A common form had a small stick about an inch and one-half long and one-quarter inch in diameter tied onto the line above the noose. When the snare was set, a branch or stick was placed horizontally above the trail and the snare secured lightly to it and suspended from it by means of the stick. The small stick and the manner in which it was set against the limb gave to the snare a kind of snapping, or trigger, action which resulted in a quicker throttling of the ground squirrel. The trigger stick was not felt to be absolutely necessary by all people. Another feature of the ground squirrel snare was that it was made from very few strands of sinew in order to maintain thinness. Its thinness functioned to choke the squirrel
faster also. The noose was more or less rested in vegetation growing to either side of the trail or burrow, and was thus made to retain its shape. The reason for the desire to choke the ground squirrel quickly was that if this were not accomplished, the squirrel would quite rapidly gnaw himself free. In conjunction with the ground squirrel snare, a split stick might be set over the trail with the top of the noose at the apex of the split. The ends of the stick were planted firmly to keep it from being pulled up as it is used in conjunction with the spring pole. When the squirrel was snared it was brought up sharply against the stick and was by it prevented from gnawing the sinew. As ground squirrels were taken only in the summer, a thin sapling might be bent over to act as the spring pole. The spring pole when used without the split stick acted to raise the animal high enough off the ground that he would strangle quickly and not be able to free himself.

A hand snare was also used to take ground squirrels. The total length of the line might be eight to ten feet. One would use this snare after observing a squirrel enter his burrow. The noose was set up next to the hole and a rock or several rocks, set over the line near the noose end. The person held the free end of the snare line and watched
the hole closely. When the squirrel emerged, the hunter gave a sharp tug on the line thereby snaring the ground squirrel and pulling him up quickly against the rocks. This snare form was said to be quite old and apparently is little used today.

Human scent was removed from ground squirrel snares either by rubbing the snare with willow leaves or by rubbing the snare with some of the dirt the animal had dug out of its burrow.

**Rabbit snare. GE gya.** The snowshoe hare might be taken at any season. This snare was also made of babiche and was also used generally in conjunction with the spring pole. The trigger stick arrangement might also be employed. Snares were set up along rabbit trails. The noose was held open lightly by two sticks. For winter use, at least, the spring pole instead of being a live sapling which might freeze in the down position, was usually a section of sapling set on the branch of a tree beside the trail and counterweighted in such a way that when the snare was sprung the hare would immediately be drawn up into the air and strangled. A clod of moss or a clump of grass might be used as the counterweight. Rabbits, perhaps more even than the ground squirrel, have the reputation of very
rapidly gnawing free from babiche snares. One of the means
to circumvent that action was to rub the snare with dog
scat that was old and white, and carried along for this
purpose. Picture wire is much preferred today for rabbit
snares.

Ptarmigan snare. Daqonqya. The ptarmigan snare was
tied to the middle of a stick about one foot long which was
set along with the snare. Ptarmigan are found in willows.
A small fence would be constructed to either side of the
trail funneling in toward a central point which was on the
trail. At various points along the fence, snares would be
set up, including the point directly over the trail. The
snare stick might be set up either horizontally or verti­
cally according to the dictates of a particular situation.
The noose was held open by being set into the willow fence
to either side of it.

Grouse snare. Daiqy. The grouse snare was hand
operated since it had to take advantage of the spruce grouse
in their most frequent type of occurrence, namely, perched
on a branch in a spruce tree. The snare consisted of a
babiche line tied onto a long, thin stick. The babiche was
quite narrow and had previously been allowed to dry to the
extent that it would maintain its loop form. If approached
carefully, the spruce grouse are sufficiently tame to re-
main on their perch until one is beneath them. The hunter
thus approached the grouse and cautiously presented the
snare to the bird while its head was drawn back -- one of
its characteristics. When the head was thrust forward,
as it is when the grouse is about to take flight, the snare
was pulled down. The use of the grouse snare involved a
great deal of patience and no little skill. It is seldom,
if ever, used today.

_**Fish snare.**_ Kai vya. The name means "willow snare."
The snare proper was made from a very thin, green, willow
shoot fashioned into a noose and attached to a long pole.
One would stand on the bank of a small creek, observe a
fish facing upstream feeding. The snare was then slipped
very carefully behind the fish and up and over its body and
then given a sharp jerk. Even greater skill was demanded
here than in the use of the grouse snare. These are never
used today.

_**Caribou snare game.**_ K1El gya. Children would play
this game. A length of thin caribou string about one and
one-half feet long was wetted, doubled, and then rolled
about a short stick by applying the loop end to the center
of the stick and rolling both fall ends outward until they
reached approximately to either end of the stick. A number of these might be made at one time and then hidden at various points about the house. After a couple of hours the "snares" were checked by unrolling the line. If it was found that the loop was now astride the stick it meant that caribou had been caught. The interesting aspect of this game and the reason for its inclusion here is that it was felt to have some attractive value for caribou and that if caribou were "caught" in this snare there would be many caribou in the hills.

Other snares. The snare used for caribou was made of several strands of twisted babiche; it might have a total length of ten to fifteen feet. The same snare might be used for moose or bear. At the present time, caribou snares are still occasionally set on game trails and they are sometimes still set for moose. Instead of the babiche vya of old, however, a cable snare of commercial manufacture is used. As mentioned above, sheep were apparently occasionally snared and perhaps eagles as well. The only details obtainable on the eagle snare were that it was made of sinew like the rabbit snare, and that it had a big loop and was set on top of the nest.

As noted above in another section, each type of snare
is kept on a stick as a kind of filing device. All ptarmigan snares might be on one stick; all rabbit snares on another, and so on. Snares were usually left outside where, after a time, they turned white. Snares not properly cared for would bring bad luck.

**Deadfalls.** Two types of deadfalls were made. The *dat chan hya*, "log trap", was used primarily for marten, wolverine, and wolf. The fox was also caught in it but it was not set for him. It consisted of two log platforms, the larger one of which lay flat on the ground. The upper had one end on the ground and the other suspended above the other platform. The upper platform was, of course, the fall. The fall might consist of several poles lashed together and reinforced with logs atop, or two or three logs only. The *dat chan hya* was set up over a game trail and might utilize two live trees to help support the fall. To the rear of the deadfall, several small posts were set up in a semicircular palisade to prevent the animal getting so far in as to be missed by the fall. A baited trigger was suspended down at about a forty-five degree angle from the fall. The animal in taking the bait would pull on the trigger thus bringing the fall down on himself. Extra logs increased the effectiveness of the device. Lynx might also
be taken in the dat chan hya.

Apparently the only other deadfall used was one called shi hya "rock trap." It was used for ground squirrel, marmot, and sometimes mice. It too was set up on a game trail. A slight excavation was made in the trail and two flat rocks placed to either side over the trail bracketing the excavation. A third flat rock would be set off the trail at ninety degrees from the first two and joining them. Over this structure at right angles to the game trail was set a very large flat rock which formed the fall. One end was on the ground, the other held up by a short rock post which in turn rested upon a trigger set so that it slightly overrode the excavation. The high end of the fall had another rock leaning against it and the sides were covered with grass in such a way as to funnel the animal across the trigger. It was required only that the animal hit the trigger to bring down the fall. An informant said he knew of a man who caught twenty ground squirrels in one day using the shi hya.

On neither of the two deadfalls was any effort made to eradicate human scent. It was not thought to be a problem.

Traps. Aboriginally it appears the only traps used were those for fish. They have been described above. Per-
haps an anecdote illustrating the resourcefulness of the people may be entered here. The story is told of an old woman who was alone in the mountains on the north slope and had run out of food while waiting for her relatives to come back for her. She took off her pants and set them in the water like a fish trap and then chased fish into them. The spot where this event occurred is commemorated with the place name that\(^1\) chu\(^n\) gli, meaning approximately, "trouser trap in water."

For the last fifty years or so, and particularly in the 1920's, 1930's, and 1940's, commercially-made steel traps have been used. They have been employed particularly in the taking of the valuable fur-bearing animals of the region; beaver, marten, mink, ermine, lynx, fox, wolverine, wolf, and the hoary marmot. In the years between 1920 and 1940 fur prices were high and many people responded by setting up trap lines in various parts of central Netsai\(^n\). Particularly popular trapping areas have been the valley of the East Fork of the Chandalar and the lower Sheenjek River. A man might have a trap line that would take a week or more to check by dog team.

The length of a trap line was determined by the number of traps a man had, by the topography, and also by the
signs of game seen when the traps were being set. Five hundred traps was considered a large number. Most people set fewer. According to individual preference the trap line might be a circuit, starting and finishing at the "home cabin", or it might approximate a straight line. In the latter case a man went out and returned by the same route checking traps on both legs of the journey. When a particularly good area was found, offsets from the main trap line might be made. With the irregularities that existed on any line, plus the variations in numbers of traps, et cetera, it is somewhat difficult to arrive at an average length for a trapline; they ranged, however, from twenty to seventy-five miles. There might, or might not, be more than one cabin on the line. If there was only the home cabin, a tent would be used while checking the line.

Very little trapping has been done in the past fifteen to twenty years due to the depressed prices on furs. An interesting and somewhat anomalous situation resulted from high fur prices. Around the turn of the century the Netsi Kutchin, in response to economic and cultural changes, began to settle at Arctic Village. As a result of becoming aware of a money economy, however, and the fact that using
old skills, money was to be made, the village was seasonally abandoned at times, and the population once more dispersed about the countryside almost as it had in former times.

Caching.

In earlier times, the Netsi Kutchin were nomadic. The one factor which allowed some security in a land not providently supplied with game was the practice of caching supplies of meat, foodstuffs, and equipment where they could be gotten at in times of need. No cache, however, was inviolable, and most were subject to predation by various kinds of animals which accounted for a good deal of invective and bad feeling being directed toward the species involved. In order of their importance, the worst violators were the grizzly bear, wolverine, red fox, wolf, and the raven. The latter generally was able to rob a cache only after it had been opened by one of the others. Concordant with the importance of the practice, there existed several different ways of caching food. These are enumerated below.

Dat chan tsi qIt. This cache consisted of a rectangular log platform laid on the ground with low notched log walls covered over with a flat roof. There was no door. Once erected, it was covered with sod, moss, and then trees felled over the whole. Bears were able to enter the
dat chan tsi git.

**Kit tsi git.** This was a rock cache usually employed high above timber line in places where loose rock occurred. A hole was dug of irregular shape and was lined with willows, moss, or perhaps skins. After the meat was deposited in the hole it might be covered with skins and then rocks piled on. Sometimes the rocks were mounded. Occasionally the *kit tsi git* was marked with a pole so that it could be found after a snowfall. If used in the summer, generally dry meat was deposited in it; if in the winter, fresh meat. The latter was said to spoil somewhat and was usually reserved for dogs.

**Dzra.** The *dzra* was a high cache which employed for its posts three or four trees found growing sufficiently close together. They were topped and the ends saddled. Poles were then laid across joining each to the other. Loose poles were then placed atop these to form a platform. Meat might be suspended from the platform poles by means of green willow sticks inserted through the meat as, for example, through the tendon on a ham. The *dzra* is used in Arctic Village, but is lower and on posts. Figure 1 of Plate IV illustrates this cache as it is used in a settlement. A slight variation of the *dzra* with a frame and a
parachute cover may be seen in Figure 1, Plate VII.

**Di tsi.** The *di tsi* is the small gabled house on stilts which many people associate with the north woods. It is fitted with a door at one gable end. In the village the *di tsi* may be as big as eight by ten feet and will be set on low posts. On trap line the *di tsi* is generally smaller and set up high. The reason for the difference, of course, is that animal depredation in the village is no problem, while it is anywhere out from the village. The *di tsi* is not an aboriginal form. A typical village *di tsi* is shown in Figure 2, Plate IV.

--- *(no name).* A temporary cache. A hole was dug through the snow to the moss. Small spruces would then be laid in to form a flooring. The shape was irregular. Meat was scattered over the spruce floor and covered over with skins. Spruce trees would then be laid over the whole in a heap. The latter procedure was to discourage birds and foxes for the most part. This was used for fresh meat as when a person was out hunting and could not at that time pack the meat in. It might be safe for a week or so.

**Dan ji.** Two trees were selected and a pole laid between them high up. In former times a caribou leg skin bag with dry meat might be suspended from the pole. Both trees were
PLATE IV. CACHES

Figure 1. *Dzra*, or open cache, in Arctic Village. Beyond, to right is tent being occupied year round. View is northwest.

Figure 2. *Di tsi*, typical of those in the village. View is south.
then limbed and barked to make them unclimbable. It was said that most animals seeing limbed and barked trees would avoid them. The bear was the only exception to that rule, but the dan ji was said to be the one cache the bear could not violate. In order to retrieve one's meat, one of the trees was cut down or a knife tied to a pole and the line from the bag to the transverse pole cut.

— (no name). A leg skin bag or a caribou ham might be attached to one end of a long pole, such as a spruce snag. The pole was raised and leaned against a tree. The tree was then barked and limbed. This was said to be a temporary cache, but a good one.

Dan ji. Since it had the same name as the cache described above, it was necessary in conversation to describe which one a person meant. This dan ji consisted simply of hanging meat on a rather high tree limb. The limbs and bark below were then removed. One retrieved the meat by cutting the tree down.

III. THE USES OF ANIMALS AND ANIMAL PRODUCTS

Food.

The Netsi Kutchin were, of course, non-agricultural. They live in an area rather poorly supplied with vegetal foods which could be gathered. Their subsistence economy,
therefore, was based upon the taking of game animals. This situation still holds largely true today, even though now a partial money economy does exist. Nomadism and small agglomerations of population were virtually dictated by the rather sporadic occurrences of game animals in Netsai.

Principal sources. Under ordinary circumstances from September through May or June, the principal source of food was the caribou. Generally in the summer, caribou were scarce, but when they were present they were hunted. Caribou was more important than all other food sources put together. Probably second place in importance as a dependable food source in the lean summer months was held by the lowly ground squirrel. Third in importance was the mountain sheep hunted in late summer. Moose were scarce but could, upon occasion, become quite important, usually in the summer. Fish, caught in the summer, since they are relatively abundant, were of greater economic importance than either the moose or the hare. The hare, when populations were at a high point in their cycle, could rival the ground squirrel in importance. Usually their numbers were too small, however.

Of lesser importance than the animals already named, but still enjoyed for the variety they offered, were ducks, grouse, ptarmigan, beaver, porcupines, and lynx. One of
the favored localities for the hunting of sheep was
*kwa zhat* (Philip Smith Mountains). Most meat taken in the
summer was either sun-dried and/or smoked to preserve it.
In addition, a few individuals today have underground
storage cellars in which meat may be kept frozen usually
at least through July. After that time the warmth and
seasonal thaw makes them too dank and meat will mildew
rapidly in them. Food sources of today and their relative
importance is much the same as in the past.

It is most difficult to arrive at a figure which would
approximate the number of caribou used annually by an
average size family at the present day. The responses one
receives to this query are usually either evasive or
palpably false. In the minds of the people, at least,
there is good reason for evading such a question. With
modern game laws and regulations they live in no little
anxiety that "the government" will either take away, or
otherwise restrict their use of caribou. One person said
that in one year he had used twenty-five to thirty caribou.
There were six in his family. The same person had half
of one moose for the year. Another man queried on this
point said that he used twelve caribou last fall and winter
and three in the summer. There are about eight in his
family. One man with a family of five said that he used about fifty caribou a year and that a big family uses much more and that he could use more himself. In the previous year he had had, in addition, one moose. According to this man, one caribou lasts from three to seven days depending on how one holds back. Each family has dogs, usually no less than five and sometimes up to seven or eight adult dogs and occasionally, of course, a litter of puppies. Seven dogs will use two caribou per week. Using usage rates such as these, plus approximate information as to when and for how long a given family was out of caribou, it would seem that these figures should more nearly be double those given, or approximately eighty caribou per year for a family of five. That approximation was confirmed by the one permanent white resident of Arctic Village.

Muskrat hunted in May and June generally are taken for their skins which are sold, and their carcasses, dried, are used for dog food. In one period noted, three men took two hundred muskrat in about one week.

The most important fish taken, ranked according to their importance, are whitefish, pike, suckers, and grayling. For human consumption whitefish are far more important than all of the others. Whitefish are dried by splitting them
down the middle to the tail, making shallow transverse cuts in the flesh at about one inch intervals, and hanging them over poles on an open cache, the dzra. When they are to be smoked, some willow and some punky wood will be used in combination. At such times the top of the cache may be covered with canvas to retain the smoke. Pike are taken primarily for dog food and are seldom consumed by people. Pike, or jackfish as they are called, are also split, dried, and stored for use by the dogs. Procuring dog food constitutes one of the main reasons for summer fishing. Seldom are enough fish taken and dried to carry over very long into the fall, however.

A number of animals which might seem worthy additions to the larder are never eaten. Notable among these are the grizzly, wolverine, wolf, coyote, fox, dog, ravens, and eagles. One man when asked about the grizzly bear said that it was "too strong" but he did admit some people ate it. He meant people other than Netsi Kutchin, though. This same man said that once when hunting caribou he got "pretty hungry", shot a grizzly bear and cooked it well. He said he ate some, but it came up later. He did say that he would do it again if a similar situation arose. This informant and others when pressed on the point suggested that perhaps
the reason for avoiding the grizzly, wolverine, eagle, and raven was that these animals eat men. It is of some interest that the tabooed animals are also the ones noted as being the worst cache violators.

Preparation. Since caribou is the mainstay of the diet, a few special remarks will be directed to it. If the skin of the caribou is to be saved, it will be removed entire. The head of the animal is removed first, and the skin slit from the neck to the anus and down the inner portion of all four legs. The skin is then peeled back. The caribou is generally butchered into the following pieces: The head, ja_E_ki, is severed directly back of the atlas. The neck, ja_ko, separated before the shoulder. All four legs are severed from the body at the joints, then the lower legs are cut off. The shank and shoulder are called jink KyEn. The lower foreleg is called jan dont kwatl. The haunch, or ham, is called ch_at_dtho. The lower back leg is called jI drIt. What would roughly correspond to the plate in beef butchering is separated from the ribs and is called jat_to. The flank, also separated, is called jat tsae E qain. The back strap is kept separate, the ribs cut off from it. It is called cha_han. The rump is called dran chan. The ribs are called jIt_shIt.
Traditionally two meals were eaten a day. The first was early in the morning and the other towards evening when the camp was set up. Still later, there might be a snack. If food was scarce, bone broth might have to suffice. Meat was commonly roasted or boiled. Heavier cuts of meat were suspended above the fire by means of a wooden hook. Lighter cuts of meat might be roasted directly on hot coals. For stone boiling, in the absence of a wooden bucket, caribou paunch might be used suspended with water and meat in it. Meat was usually boiled by itself. Dried meat was, and is, an important item of diet. It is called nE li gai. Bone broth, or bone grease, is called ch?u hwa woi. When dried meat is being consumed by itself it may be spread with bone grease. Bone broth is made by breaking up long bones, and especially knee joints, on an anvil rock, using a hatchet now and boiling the resulting pieces. Caribou feet, with hooves on, were roasted under the ashes and coals of the fire. The tips of caribou antlers, when in velvet, may be roasted over a camp fire. When they pop open they are eaten. They are considered a great delicacy.

The ingredients for pemmican or jIt sya as it is called, are dried meat, bone grease, marrow, and back fat. The meat was pounded into a powder, the marrow pounded and
these were added to the fat and slowly stirred. Gradually the mixture becomes white and at which time it is set off to the side and cooled. It solidifies into one big chunk. The strips of back fat were prepared by being first cut into lengths of about a foot and one-half long, after which they were impaled upon sticks and partially roasted next to the fire. Berries may be added to \textit{jIt sya}. Cold frozen pemmi-can is called \textit{ne no hot tlat}. Some people refer to it today as "Indian ice cream."

Formerly, caribou head and heart were both cooked by suspension over the fire. The head was suspended by means of a willow hook passed through the nasal cartilage. The mouth was tied with willow root. The head was turned frequently with a long stick. A similar method is used for cooking moose head in the Yukon Flats and is probably occasionally used also in Netsai\textsuperscript{n}. In the case of moose head, however, the cavities within the head are filled with water so that the head in effect roasts on the outside and boils on the inside. The head is considered the choicest part of the caribou. Today they are frequently baked in the oven of a Yukon stove. The brains are generally not eaten since they are reserved for other uses. One of the reasons given for the preference for the head is that the
meat is fatter. Probably the second greatest delicacy is the ribs. They too were formerly roasted but are more usually baked today, unless in camp.

Ground squirrels are cooked by first singeing them to remove the hair. They are then gutted, impaled on a stick and leaned over a fire.

Porcupines, when they are to be cooked, are first singed to remove their quills.

The name dan dai hwai was applied to two dishes. One consisted of whitefish which was cooked and ground, mixed with fat and berries. The other dish was simply rendered fat to which berries were added.

A tea or broth made from marrow was also used in the old days.

A mother who had just returned to the village after having had her first baby was, as is noted in another section, restricted to one corner of the dwelling. During that time she was not allowed to use her hands to eat with, but used instead, a pointed stick. The food that she ate had to be cold and she was allowed no flesh. She was made to eat liver and kidneys almost exclusively. During the same time her husband was allowed no hot food, no caribou head, heart, nor any other body parts, no legs and no marrow. He was
thus restricted to cold ham. These food avoidances lasted about one month during which time no fresh meat could even be brought into the dwelling. Ham, it may be pointed out, is generally considered dog meat.

Among the first items gotten by trade with the whites were metal pots and, it is said, cast iron skillets. The latter were said to have been particularly valued. At the present time the skillet is heavily used in cooking. Caribou meat is frequently fried, as is fish. From the small cooperative store in the village the people may buy flour, tea, sugar, and some canned goods. Despite the presence of the store, however, the people still live off the land. Meat taken in the winter is said to be better than that got at any other season. That most appreciated is a cow unaccompanied by a calf. If a cow which has a calf is shot, the calf will be shot also.

**Starvation.** The possibility of hard times with famine befalling seemed to have been a constant specter in aboriginal times. Many stories and legends are either specifically about or refer to "starvation times." The cause was always the same, failure of the caribou supply. It was particularly bad if a number of families had been gathered about one caribou pound and were dependent upon it for their liveli-
hood. An interesting attempt at using an abundantly occurring resource under such circumstances may be noted here. It is told that a man who was starving, exerted himself and caught many mosquitoes which he put in a cup and boiled. He ate them but found he was still hungry.

Although caribou are generally not in the country in the summer, it would appear that starvation periods struck in the winter when other resources were not as readily available as in the summer. This points up again the fact that needs to be most strongly brought home, namely, that the movements of caribou are not predictable. They do not invariably migrate from the tundra into the forest in the winter and reverse that course for the summer. As Pruitt has pointed out, the migration and behavior of caribou must be quite largely determined by snow conditions. Snow conditions, of course, may vary from year to year and obviously within the course of one winter.

Cannibalism is often mentioned in connection with starvation. Even though it may not have occurred more than quite rarely, it is constantly referred to. The chief bogey-men of the country, the bushmen, were said to be people who had practiced cannibalism in starvation times and then in shame had gone off to live in the bush. Bushmen
steal women, especially girls sequestered at their first menses. They live in caves, believe in medicine animals and it was said that they could kill men or animals by using their medicine.

Skins.

If the uses of animals as food was primary, then certainly second in position of importance would be the uses to which the skins were put. Skins provided clothing, bedding, and tent covers. Expectably, the most commonly used skin was that of the caribou. Moose hide is highly valued, but as mentioned, the supply is not dependable. Sheep skin was occasionally used for clothing also. Other species used in clothing manufacture were beaver, wolverine, fox, wolf, and lynx.

Hide tanning. This important process was performed by the women only. The following steps were involved:

1. The fleshing of the hide is carried out using a bone flesher called nI’dtha. The flesher is made from the lower leg bone of a moose from which one articular end has been removed. Half of the shaft of the bone is removed up to a point about three inches below the remaining articular end. The opposite end is then ground into an ellipse form and is serrated. The articular end is drilled for the attachment...
of a thong. The whole implement would be about fourteen inches long. The hand was put through the thong and the articular end grasped as the handle. One struck down with the implement. For this operation, the hide was hung over a single upright pole in the manner of a wet rag. Fleshing of a caribou hide takes about four hours. The flesher, \textit{nI dtha}, depends to some extent for its effectiveness upon its weight. More portable versions of the \textit{nI dtha} were made by cutting off the lower five inches or so of the flesher and inserting that in a wooden handle when it was needed. (2) Dehairing was accomplished by reversing the position of the hide on the upright post. The implement formerly used was probably a semi-lunar side scraper of sandstone or similar rock, \textit{(chi dtho or tci tho of archaeological literature)}. Today a big butcher knife is the implement used. One hand holds the skin stretched tightly, while the other applies the butcher knife as a side scraper. Dehairing takes less than one hour. (3) Once the hair itself has been removed, the next problem is to remove the hair follicles remaining on the hair side. The hide is put over a three foot post, flat on one side and rounded and smoothed on the other. The post is leaned against something at about a forty-five degree angle,
e.g., a house. The smooth round side is up. The implement used for this beaming operation is a bone draw knife called jE kva. It is made from the split lower leg bone of the caribou. The incurving upper edge of the draw knife has been ground to some degree of sharpness. This is said to be the hardest part and takes about two hours. (4) The hide is then soaked overnight in plain water. (5) On the following day, the hide is removed from the water and wrung out. The hide is folded in upon itself lengthwise. It is then folded in such a way at one end as to secure it to the upright post. The end left free then has a stick inserted in it which is used for twisting the hide. The hide will be twisted first one way and then the other. The object, of course, is to remove the water. Once the hide is wound as tightly as it will go in one direction it may be left in that position by bracing the stick. That may be done several times. The actual manipulation in this operation involved only about twenty minutes. Moose hide, because of its size, is furnished with a series of holes at head and hind end. Into these a pole is put for the wringing operation. (6) The hide is hung out on a line to dry in the wind. A fairly long hanging time is considered best. The hide is then brought into the house to dry further.
It is usually folded and placed on a rafter. Apparently during this time there is further breakdown of the tissues. The people say the longer it can be kept that way, the better. At this point the hide is very stiff and dry.

(7) The hide is next put into a wash tub in which there is a mixture of water and fermented caribou brains. It is left in the solution overnight, then wrung out, stretched, and hung out to be dried again. This operation may be repeated three times. The hide may be scraped while a little wet. The scraper used now is a metal version of the semi-lunar rock scraper mentioned above. It has a serrated edge and is called de dtho. The hide is placed over a horizontal pole with both ends tied. The several implements used in these operations are shown as Plate V.

The result of the several steps enumerated above is at zi da kai^n, "white skin". White caribou skin tanned in this manner will be very soft and flexible. It may be used for string, as a base for beadwork, and for many other purposes.

Caribou brains are kept in a can, covered, and near the stove. When they are used they are usually about one week old. In their preparation, two to four brains will be boiled in water and set aside. It is said they will
PLATE V. SKINWORKING TOOLS

Left, flesher (*nI dtha*) of moose femur; cloth loop fitted around wrist. Middle top, a metal end scraper made from spring of modern trap. Metal side scraper (*dE dtho*). Below latter a *chi dtho* (*tci tho*) of igneous rock as used aboriginally in most of interior Alaska. Specimen is not from Netsai*. Right, a beamer (*jE kya*) of caribou leg bone.
keep up to one month if they are put in a cold place after the period of fermentation.

If the skin is to be smoked, a smoke frame of bent willow withes of dome shape is constructed. It is called je tho k?et. Formerly, a slight excavation was made in which the fire was made. At the present time, a small wash pan or an oil can may be used. Into it is put very punky wood which will smoulder and smoke a great deal, but will not flare. Flaring would ruin the hides. Skins are stretched over the smoke frame and may be left there two to four hours to achieve a light brown color. The effect of smoking is also to further soften the hide. Today, once the hides are in place, the whole smoke frame may be swathed in canvas which is usually tied down to keep it from blowing away. Skins are not turned over. A very heavy hide such as moose or bull caribou, may be soaked four times in the solution of brain water and may be smoked four times as well. Moose hide, after a third soaking, is usually scraped rather thoroughly with the dE dtho and is then put back into the brain water solution. For such heavy hides, a knife may be used to smooth the skin. The end product is called at zi da hat dtho, "smoked skin." Plate VI shows two phases of skin processing, smoking and the scraping of a skin.
Figure 1. Caribou skins on smoke frame.

Figure 2. A moose hide being scraped with the dE dtho.
Heavy hides, such as moose, which are to be dehaired, will sometimes be soaked a bit so that the hair, after an interval of a few days will begin to slip off quite easily. The all-pervading stench from such hides appears to bother visitors only.

If hair is to be left on a hide, the basic operations are fleshing, then a great deal of scraping with just a little moistening to aid the scraping operation. An end scraper is used to scrape the hide on which hair is to be left. A common form today is made from the tongue of a steel trap, one end bent over and serrated. This scraper is called *chan o wa* (see Plate V).

The sewing of skins in former times, was accomplished without the aid of a needle. The two pieces of skin to be joined were held together and a hole punched through them with an awl. The woman then drew sinew through her teeth and inserted the stiff end of the sinew into the hole made by the awl. If furred skins were being sewn, the fur was tucked down with a knife blade while they were held together.

At the present time, sinew is still preferred in skin sewing, but is used with a needle. Steel awls are also used. Awls in aboriginal times, were made from either a
loon mandible or a caribou splint bone, the latter the same bone that was used in making the composite fish hook mentioned above. Awls of the latter type were called \textit{jan \text{ch}^2\text{?o than}}. Scissors and knives are also used in skin-working. A short bladed knife with a wooden handle and rawhide binding is sometimes used. It is called \textit{vi \text{chi} \text{i thaq}}.

Caribou string is generally made from the white tanned hide and is called thaq. The whole hide may be cut into string of maximum length by following a spiral pattern from outer edge to a point in the middle of the hide. Rawhide or babiche is called \textit{kli}^1\text{t}^1 and is cut in the same manner.

\textbf{Miscellaneous Uses.}

The purpose of setting down some of the uses of animals and animal products is to suggest the extent of the influence this aspect of the environment had in all aspects of Netsi Kutchin life. The list is by no means exhaustive.

Porcupine quills were used to decorate clothing. Sinew line was made from the sinew along the back of the caribou. Moose hide is the most commonly used and most highly regarded material for boot bottoms. The skin from the lower leg of the caribou is used in the manufacture of boots. An old style "toboggan" (skin drag) called \textit{j\text{I} tr\text{E va}^1\text{l}} was
also made from leg skins sewn together while flexible (see Figure 4). A person's sleeping robe was made of four caribou hides with the hair left on. The ground cloth one slept on was usually one caribou hide with the hair on. The ground cloth could also function as the sack of the aboriginal back pack. The head of the jackfish was used in a particular way to "scare away" rain. The temporarily-used skin boat may be covered with hides of moose or caribou. Babiche might be wrapped around the handles of poles or spears to provide grips. Sheep skins are sometimes used in boot manufacture and occasionally also for other clothing uses. Strips of white, tanned caribou skin are used for dressing wounds. This same kind of material serves as the retainer for a baby's diaper. When a person was to be bled in curing, the loon mandible awl was used. Wolverine tails might be used for parka ruffs. Fox tails were similarly used. Gun cases are generally made from moose hide, or that of bull caribou. The piece of skin which is also a part of the ring and pin game is white, tanned caribou skin. The rings are made from six phalanges of the caribou (see Plate XVII). A buzz toy is made from the astragalus of the caribou. Rabbit fur cut into strips was wrapped about the feet as duffel.
IV. BELIEFS ABOUT ANIMALS AND ANIMAL LORE

Following are beliefs and notions about animals presented without qualification in much the manner in which they were collected.

In the old days, young moose and young caribou were not eaten. Informants say there was no strength gained from young animals. A person who ate such could not run fast after game. One who violated this rule was called jI tri E, "lazy." People today are not as strong as they used to be. Too many people eat young moose, young caribou, and too many different kinds of food. In the old days, they ate less and the people used to be bigger and stronger. Old people would become grey only at a very great age and their teeth never troubled them until they were very old, at which time they simply came out.

September is the best month for meat in both caribou and moose. They are fat at that time. Sheep are best in October. The best date for caribou skin to be used for winter clothing was August 15th. Both calves and cows were taken then. It is said that within one week after that white spots begin to show on the hides of calves.

Porcupine quills may be removed from a dog's face, throat, or body by urinating on them. This is said to "kill"
the quills and they may then be pulled out without diffi-
culty.

According to one informant, when he was young, forty or so years ago, caribou did not move around so much as they do today. The same informant said these were the daily habits of caribou: At mid-day they lie down. In the afternoon they walk slowly. At night they stay in one place and in the morning they move rapidly.

Exactly where the caribou go when they are not in Netsai is not known by the Indians (movements of caribou herds are likewise little known by the several governmental agencies concerned with them). One man gave these as his opinions: In the early summer the caribou are high up in the mountains to the north. They take trails then over onto the tundra. At the time of this questioning (mid-August, 1960) he thought the caribou were probably somewhere over east toward the Crow River Flats. He thinks they also go southwest to Chandalar Lake. Calving, he said, takes place in mid-May to mid-June high in the mountains. According to this man, the caribou then rest there all summer until the young are able to walk well and they then come south into the valley of the East Fork of the Chandalar River. This same informant was asked why caribou failed
to move south sometimes. He related that both to depth of
snow and weather conditions. He said that deep snow and
very cold weather cause the caribou to halt. The opposite
conditions, according to him, make for movements in the
herd. Asked why he thought the Arctic Village area was
such a good locality for caribou, he replied that it was
because the country was not too brushy and that there was
a very small human population.

The generic term for caribou is vat zai. There exist
other names for particular kinds of caribou, however, which
are based upon real or fancied behavioral characteristics,
age, sex, and other distinctions.

There is a caribou called to ko tso. These are said
to be thin caribou with "narrow" necks. They fool the other
caribou by telling them that men are coming. The other
caribou will run for awhile, but will soon discover they
have been fooled. They then take revenge on the to ko tso
by rubbing their antlers on his neck until the hair comes
out. After that it is said, that they do watch for men.
The to ko tso is usually a bull with small antlers.

On the basis of antler size, the following bulls are
recognized: Vat zai ch?o, ta zo cho, and ta zo tso. The
bull with the very smallest antlers is called hai qi I lik.
which means "he carries his antlers all winter" which apparently is true. Two categories of calves are smaller than the last. Next down in size is ha da than which is antlerless. The smallest calf, presumably virtually newborn, is called jIk ki.

A female caribou will be called by one of three different names depending upon the season and her condition with respect to calves. In the spring she is called tsI gwIl ti, "calf inside." In the summer and early fall she is called ji at thok, "calf still sucking." In fall and winter she is vat zai. Whereas she will not be molested when bearing the previous two names, when she becomes vat zai again she can be hunted. The prime target for the hunter is the cow called vat zai In ja, "oldest caribou." The vat zai In ja is a barren cow, or at least one which does not have a calf inside in the spring. She is always fat. The people say that vat zai In ja may take another cow's calf and raise it. That is done after the calf has already started eating. Sometimes she may even get away with two calves. This she is said to do so she will have young. Finally, an old, antlerless, caribou cow with no calves is called tr?i ji. The Indians say other caribou laugh at this one. The name means something like "I wish I had some
calves."

A great-grandfather of one informant was a shaman whose principal medicine animal was the caribou. He had a song with which he called the caribou in. It was sung only in times of severe distress when everyone was discouraged, and the people were threatened with starvation. The informant's grandmother who raised her said that she witnessed this performance: The medicine man was called upon to sing his song which he did. The next morning all the hunters went out with the shaman leading. He would reach down with his hand and bring up a live caribou. He would let that one go and it would disappear. That was done several times. Soon the men came to a group of caribou and started shooting and the threat of famine was over.

The designs on skinwork formerly made with porcupine quills were simple geometric designs. After the coming of the Hudson's Bay Company into the Yukon Valley or perhaps later, the people began using glass beads. With the new medium, they also took on new curvilinear, floral designs derived apparently from central Canada. The designs used are highly conventionalized; it is quite easy to recognize flowers, leaves, and stems. The Netsi Kutchin have a series of names for each design, but they are not flower names.
Rather, they are named for animal tracks. Thus, one design is called wolf track, another dog track, still another ptarmigan track, and so on. A frequently used fringing device in their beadwork consists of a triangle formed by three beads. These are called mouse tracks.

Most legends of the Netsi Kutchin date from a time when animals could speak as men. Some of the songs and legends are still recited today. Many are of the type which give explanations of the origins of morphological characteristics of various animal species. A long story about the ling tells of a potlatch he gave for other fish. The items which the fish got from the potlatch became some of their distinctive characteristics. There are similar stories about other animals. For example, the marten's white face results from his having been struck in the face with a piece of frozen pemmican.

A man having medicine animals was said to know all the characteristics of each of the animals which was a familiar to him. He was then able to make use of those characteristics. It was also said that a person might show in his own actions or personality some of the characteristics of his animal helpers. For example, it was said that one who "knows" the fox does everything quickly with rapid motions.
A person who knew the porcupine was slow, slept a lot, and wanted to eat most of the time. A shaman could neither kill nor eat his medicine animal. As it was put, "he can't eat himself."

Of the sandhill crane, it is said that if a person sneaks up behind him and starts singing an Eskimo song while striking his hands together in such a way as to sound like the Eskimo drum, the crane will begin to dance using his wings in the way the Eskimos use their arms when dancing. They say that if he sees the singer he will stop, but as long as he doesn't, he dances and makes the noise "ui ui" as the Eskimos do when they sing. It is said that if there are two cranes together, they will follow each other in rhythm with the singing.

When there are no caribou in the summer and people are trapping ground squirrels they will take a piece of ground squirrel intestine, set it down in a particular way and look at it daily. If it bends in a certain way near the very end towards the left, that means that caribou are very close. If it bends at the very tip end it means that caribou will be present next day.

When the camp robber (Canada Jay) makes the sound, "chuk chuk chuk" which sounds like a flesher being used on
a hide, it is interpreted to mean many caribou will be killed. When it is heard every day for a long time, it means that everybody will have sufficient meat.

If caribou are moving from east to west in the summer they will be preceded by a raven calling "guk\textsuperscript{lh}" to let everyone know. When the raven flies over some people, folds his wings into his body and cries "go luk", it means someone will be packing meat the next day. When two ravens are seen to fly up in the air together, "scratching at each other", it means there will be no more food for the people.

The actions and antics of camp robbers, and ravens, as well as a good many other animals provide a great deal of amusement. The habit of the camp robber to boldly steal bits while people are working with meat around the house, is thought very humorous. Camp robbers are thought to be capable of luring young dogs away from a cache by deliberately leading them on. The dogs are said to follow the camp robbers away from the cache because the birds taunt them and lead them on. Finally, when they have drawn the dogs well away from the cache, they suddenly disappear and become quiet. The dogs, by this time, are lost and the camp robbers are, of course, back at the cache.
Ravens are thought to be capable of combining forces in order to thwart the will of men. Thus, it is said that when caribou have been killed and covered temporarily with their own skins, ravens will remove the skin by having one raven grasp the skin in his beak, another raven will grasp that raven's feet with his beak, another one grasps that one, and so on, until finally they are sufficiently strong to pull off the skin.

The hawk owl called jì chi dru may be sitting on a pole near a person's house. If he is called by his name and asked "which way is the stranger coming", in reply the hawk owl looks in the proper direction.

The crying of the owl may give news of weather changes and disasters.

If a loon, just before diving, says "ahhh wa t₁" it means he has seen an animal of some kind, otherwise he would simply dive silently. A man still-hunting near a lake may observe a loon in order to obtain this kind of sign.

The rock ptarmigan is familiar with snares. He always goes around them.

The loche, or ling, will lie in the mud in the bottom of a stream on his back with his chin barbel projecting up. When a small fish comes along such as a small grayling, the
loche says "my son, eat this." Upon approaching, the smaller fish is eaten by the loche.

When a fish net in a creek is taken up and a sucker is found to be chewing on it, it means there are many more fish coming. When the loche is taken up in the net, it means there will be no more fish. This is said to be especially reliable in spring ice fishing for grayling.

V. DOGS

Dogs and their uses will be discussed at greater length in another section. Perhaps it will be sufficient to say here that they were not part of the original cultural equipment of the Netsi Kutchin. Aboriginally, there were no dogs. Therefore, uses, practices, and procedures connected with these animals are all of recent origin.

Most families have between five and seven dogs. They are kept on the perimeter of the village, chained to stakes or to their small houses. They are fairly variable as to physical appearance. Most would be classified as huskies, which is in itself a notoriously variable category. Even though dogs were not present aboriginally, they are so completely integrated into the native culture today that it is difficult not to think of them as an older facet. They are, of course, quite necessary, therefore, the diffi-
culties of caring for them, feeding them through lean times, were tolerated with no thought of doing otherwise. Very rarely are any dogs treated as pets. A dog which will not pull in harness is destroyed.

The background noise of dogs is as characteristic of the modern village as are its distinctive odors. When one gets loose the event is usually heralded by even greater tumult, as a loose dog virtually always means dog fights. Some typical dogs may be seen in Figure 2, Plate VII. The dog houses are variants of those mentioned above under Vegetation as apparently resembling an occasionally used mortuary structure.

VI. MISCELLANY

Arctic Village in the winter is characterized by the odor of cooking caribou. If it has been a good year, caribou may be seen in all the open caches. The summer village adds to the characteristic winter odor several new ones. The village is found to be liberally dotted with exposed midden pits, most of which seem to be burning or smoldering, and most of which inevitably contain feathers, caribou hairs, or pieces of skin. In the place of caribou hanging in the caches, one sees some amount of dried meat, but particularly such new elements as drying fish, muskrat
PLATE VII. MISCELLANEOUS

Figure 1. Hunter depositing newly-killed caribou in open cache. View east.

Figure 2. Dogs and dog house on outskirts of Arctic Village. View is northwest.

Figure 3. Using a modern trident spear for pike to be used to feed dogs. View southeast.
carcasses, ground squirrel carcasses, and so on.

VII. THE NETSI KUTCHIN AND THE FAUNAL MILIEU

Some of the differences which existed between the people of the Yukon Flats and the Netsi Kutchin were of the sort which sprang directly from differences of the faunal environment. The people in the Yukon Flats got virtually no caribou and hence, made extensive use of rabbit skins for clothing, exhibited a heavy dependence upon fish, and many used moose skins for house covers. The people of the Flats were interested in trading for caribou skins with which to cover their tents. It is said that in the area of present day Fort Yukon there would frequently be two families to a tent, whereas in Netsai each family had its own.

The Netsi Kutchin appear to have been well adapted to the peculiar faunal milieu of their country. The most notable feature of that milieu was the dominance of one species, the caribou. As it dominated the country in terms of numbers, so it dominated the lives and activities of the people. Unlike other Indian groups of Interior Alaska, the moose here was relatively unimportant. Moose were rare; caribou were not.

That caribou occurred abundantly was not fortuitous,
but was rather directly related to the nature of the land.

The lichens (Cladonia spp. and Cetraria spp.) are a dominant element of the ground cover in Netsain. Lichens and sedges are the principal items of sustenance for caribou. The extensive occurrence of lichens is one of the characteristics of forest tundra. This reinforces the contention that the Netsi Kutchin were well adjusted to conditions peculiar to the forest tundra ecotone.

It is to be doubted that the Netsi Kutchin have had any discernible effect upon the fauna of Netsain. The human population is too small and that of the dominant species too large and migratory for such to be expectable. There is no evidence of any depletion or displacement of any other species as a result of their activities. The Indians have never used fire to drive animals nor do they burn areas to create "moose pastures" as is sometimes done to the south.

The people are predators to be sure. But their predation must be accounted of minor importance as far as survival of other species is concerned.

At the present day, armed with modern weapons, the Netsi Kutchin probably do not take more than one to two thousand caribou annually. Wolves probably make deeper
incursions in the Porcupine herd, although their predation is more selective in that sick and lame animals apparently account for most of their kills.

Probably fewer than ten moose are taken per year and probably not a great many more mountain sheep today.

Muskrats and ground squirrels are taken in quantities probably in the thousands and hundreds respectively, but there is no indication of real pressure upon them. Other species are of much less importance. The people then, constitute a relatively innocuous part of the faunal landscape.
CHAPTER V

THE PHYSIOGRAPHIC MILIEU

Netsai is a land of marked surface relief. It is made up of the hill lands and mountains which form that portion of the southeastern Brooks Range. The hill lands lie to the south and merge gradually to the north with the mountains of the Brooks Range proper. Netsai stands in strong contrast to the Yukon Flats lying south, an extensive area virtually devoid of any kind of relief.

I. GENERAL DESCRIPTION

The Brooks Range is the northernmost extension of the Rocky Mountain system. It forms a huge crescent across northern Alaska, but actually consists of several individual mountain groups. Prominent among these are, in the west, the DeLong Mountains and Baird Mountains, in the central section, the Schwatka and Endicott mountains, and in the east, Philip Smith, Franklin, Romanzof, and Davidson mountains. While there are no elevations in the Brooks Range over ten thousand feet, nonetheless, the mountains are quite rugged. In addition, they have the distinguin
of being the highest mountains within the Arctic Circle. The two highest points in the Brooks Range lie directly north of Netsai on the north side of the drainage divide. These are Mt. Chamberlin at 9,131 feet and Mt. Michelson at 9,239 feet. They are in the Franklin and Romanzof mountains respectively. In general, the highest elevations in the Brooks Range are found in the east and the lowest at the extreme western end.

**Surface Geology.**

The geology of the Brooks Range is rather poorly known, but the major parts of the picture are clear. Considered structurally, the Brooks Range is an uplifted geanticline. The spine of the range is composed largely of rocks of Silurian, Devonian, and Mississippian ages. Some of the representative rock types in this group are Skajit limestone which outcrops at various points in the valley of the East Fork of the Chandalar River. Skajit limestone is Silurian in age. Also outcropping extensively in the same area are quartzitic sandstones, and slates of middle and upper Devonian ages. Flanking the Sheenjek River to the east are extensive areas of Devonian or Mississippian chert and slate. Mississippian rocks are exposed on the surface north of Arctic Village notably in the mountain shown on
topographic maps as Nichenthraw. These are quartzites, conglomerates, and slates of the lower Mississippian.

The materials above are younger rocks, sandstone conglomerates, shales, and others. These are of Permian, Triassic, Jurassic, and early Cretaceous ages. Representative of these formations is the Lisburne limestone which outcrops northeast of Arctic Village extensively. It is of upper Mississippian age. Quaternary deposits are relatively extensive and are associated with the major stream valleys. They consist of stream alluvium, glacial till, and reworked glacial debris.

Initial uplift leading to the formation of the present day Brooks Range occurred in Jurassic times. When the former Silurian seaway was elevated, uplift continued slowly until the mid-Cretaceous when it was accelerated. The mid and later Cretaceous was marked by strong faulting and folding. At that time there occurred a metamorphosis of the older marine sediments and they were also intruded by igneous materials. Periodic uplift was followed by erosional leveling. The early Tertiary was marked by another period of strong uplift followed again by erosion which virtually levelled the former mountain range.

The Brooks Range as it presently exists results from
a period of renewed uplift in late Tertiary times, plus
the extensive carving action of Pleistocene glaciation.
All of Netsain was glaciated at one time or another during
the Pleistocene. Glacial features are abundant in Netsain.1,2

Physiography.

In the recent *Landscapes of Alaska* there is presented
a map of physiographic provinces of Alaska.3 According to
the scheme there presented, Netsain would be divided between
the Brooks Range Province and that labeled Highlands of
Interior Alaska and Western Alaska. The line separating
the two follows generally a northeast course through Netsain
and appears to be in such position as to bisect present-day
Arctic Village. Unfortunately, no discussion of the total
scheme is presented. It appears, however, that the division
is based upon the work of J. B. Mertie, a geologist with
the U. S. Geological Survey, who published in 1927 on the
geology of the Chandalar-Sheenjek District.4 Mertie in his
discussion of relief, delineated three provinces within the
district with which he dealt. To the south was that of the
Yukon Flats. Lying between the Yukon Flats and the higher
mountains of the Brooks Range was what Mertie called an
intermediate zone or the "piedmont province."5 Mertie defined
the piedmont province as reaching from the "mouth of the
East Fork of the Chandalar River, upstream to the south side of the group of high mountains west of Arctic Village, and from this point ... east-northeastward, passing south of Titus Mountain, at the head of Tritt Creek, and south of Index and Table mountains, in the upper Sheenjek valley. As noted by Mertie, there is no sharp line of cleavage separating the piedmont from the alpine province. The present investigator has no quarrel with this division unless it be misunderstood by the reader to the extent of thinking that there truly exists a perceptible difference between the two. It appears to him that the unity of the hill lands and mountains here is of far greater importance than any differences between them.

As mentioned, Netsai is sharply set off from the Yukon Flats. Southernmost Netsai is made up of rolling hills with relief differences on the order of two thousand feet being quite common. Valley bottom elevations in southern Netsai are on the order of eight hundred feet above sea level. Summit elevations run between two and three thousand feet with high points at about four thousand feet. In the vicinity of Arctic Village the elevation of the East Fork of the Chandalar River is twenty-four hundred feet. The surrounding hills attain heights of three, four,
and five thousand feet. The valley of the Sheenjek River in southern Netsai has an elevation of about fourteen hundred feet. At a point on about the same latitude as Arctic Village, elevation of the valley is in excess of two thousand feet. The floor of the valley of the Coleen in southernmost Netsai is about nine hundred feet with adjacent summits running between two and three thousand feet above sea level. Along the crest of the Brooks Range, valley elevations of the three streams mentioned will be on the order of three thousand to thirty-five hundred feet with summits frequently running in excess of five thousand feet.

Mertie says of the region, "... a surface joining the average crest lines in this piedmont province approximates in form a plane that slopes southwestward from the south front of the Brooks Range to the Yukon Flats." The drop of the valleys is similar. The plans of the valleys of the Sheenjek and the East Fork of the Chandalar rivers are notably asymmetrical. The ridges which flank the three streams are asymmetrical vertically. The ridge which separates the Coleen River from the Old Crow and Rapid rivers on the east is higher than that which separates the Coleen and the Sheenjek on the west. That which separates the
Sheenjek and the East Fork of the Chandalar is higher than that separating the Sheenjek and Coleen. With reference to this, Mertie says, "these facts bring to light the anomalous condition that although the average slope of the summits of the crest lines in the piedmont province is southwestward, this old erosional surface, if it is one, is modified by reversals of this slope to a southeasterly direction along the two trunk valleys, thus giving rise to an asymmetrically fluted surface." (Mertie does not deal with the Coleen River in this report.)

While average elevations within the piedmont are relatively low there are eminences which rise above them. Helmet Mountain, in south central Netsai\textsuperscript{N}, has an elevation of 3,343 feet. (The name was applied to the mountain by Mertie in 1926 because of its supposed resemblance to the World War I German helmet.) About twenty miles north-northwest of Helmet Mountain is another eminence, unnamed, with an elevation of 3,785 feet. Fifteen miles due west from Helmet Mountain is another peak of 3,635 feet. It also is unnamed. Index Mountain in central Netsai\textsuperscript{N} has an elevation of 5,411 feet. One of the most notable landmarks in the central part of the country is the mountain called NI\textsuperscript{11} chi d\textsuperscript{11} tha (Nichenthraw on the Arctic, Alaska quadrangle). Its elevation is 6,461 

\textsuperscript{N}
feet, but because of its bulk and symmetry it dominates the valley of the East Fork of the Chandalar River.

Glacial features are especially notable in the northern half of Netsai. These consist of U-shaped valleys, truncated spurs, hanging valleys, cirques, and Matterhorn-like features. Evidences of glacial scouring and deposition are abundant in the vicinity of Arctic Village.

The valley just above Arctic Village is about five miles wide and broadens even more to the north as the mountain NI chi dtha is approached. Lakes, ponds, and cutoff meanders occur by the hundreds. That drainage is impeded is evidenced by the fact that no two of these lakes seem to be at the same elevation. Damming by glacial debris accounts for some of this. The obviously lower gradient of the river abets the situation and there is, without doubt, a considerable effect from the presence of permafrost which prohibits downward seepage of water.

Plate VIII indicates both something of the nature of the country and specifically shows a portion of the East Fork valley in which may be seen some of the many lakes attributed to glacial action found north of Arctic Village.

Three large rivers drain Netsai. All flow southward and contribute to the volume of the Yukon River. The
PLATE VIII. MOUNTAIN AND VALLEY LANDSCAPE

Taken from a dry alpine slope looking westward. Beyond the low ridge in the middle ground is the valley of the East Fork of the Chandalar River. The small linear mountain at right is $\text{dI kin sa}^t_1$.  

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westernmost and the largest is the East Fork of the Chandalar River. While it is a tributary of the Chandalar River, which is in turn tributary to the Yukon, it can hardly be thought of as a branch of that river. Its volume alone is probably as great as the Chandalar's to the point of their junction. The East Fork of the Chandalar River from head to mouth is about two hundred airline miles long. In river mileage it is probably twice that. Important tributaries of the East Fork are the Wind River to the south and the Junjik to the north. Both of these enter from the west; there is no large eastern tributary. This gives rise to the asymmetrical appearance of the river in plan. From its head to the vicinity of NI chi dtha the East Fork is a typical braided mountain stream. Upon entering the valley at this point it becomes a meandering stream for a distance of some twenty-five airline miles. Below this point, the stream is again, for the most part, braided. The current is relatively swift and downstream from the Wind River there are many large boulders.

The Sheenjek is a smaller river and is braided for most of its course. Its drainage pattern is asymmetrical in the same way as that of the East Fork of the Chandalar River. There are no major tributaries coming in from the
east. Several rather large creeks enter from the west and one stream of sufficient size to be dignified by the title river. This is the Koness River. The Sheenjek River flows into the Porcupine River about ten airline miles up the Porcupine from Fort Yukon. The smallest of the three rivers is the Coleen. Like the Sheenjek it is braided for most of its course. Unlike either of the other two, however, its pattern of drainage is symmetrical with tributaries of equal size coming in from east and west. The Coleen enters the Porcupine just upstream from the place called Burnt Paw.

Particularly on the outsides of meanders on these streams one sees banks being undercut, trees, willows, other vegetation, and peat moss slipping into the streams. Frozen soil may be seen at such places and frequently masses of ground ice. Christian River on which the settlement of that name is located in southernmost Netsai is actually more nearly a creek and virtually disappears when it enters the maze of the Yukon Flats. With the exception of the last, all of these streams are navigable by small boat some distance above their mouths. The facility with which that is accomplished, however, depends upon the stage of the river and some lining or tracking of boats is always necessary.
The soil types present in Netsai will vary depending upon drainage conditions. Although little of a definitive nature is known of soils on the southern slopes of the Brooks Range, these would probably be representative: Arctic Brown, Upland Tundra, Meadow Tundra, Half Bog, Lithosols, Regosols, Polar Desert, and Bedrock. These soils represent parts of the "drainage catena" that Tedrow and Cantlon suggest is present in the Arctic. They suggest that at higher elevations in the north, soil forming processes almost cease to exist. "At higher altitudes in the Arctic, as in the Brooks Range, the soil-forming process in the well-drained sites becomes so feeble that it is questionable whether it actually should be designated as a process. The solum in well-drained areas may be only a few inches thick. These soils resemble those assigned to polar desert by Gorodkov (1939)."  

There may be some podzolization present. According to Tedrow and Cantlon the podzolic process weakens north of the zone of maximum podzolization. However, it continues to operate on well-drained, stable sites. "As mean summer temperatures become lower and precipitation decreases, the process operates at a very much reduced intensity." A characteristic brown color in the upper horizons may be
produced. Soil flow, a common phenomenon of slopes in permafrost regions, operates to upset normal soil forming processes.

There has been some prospecting in Netsai, but a very small amount. Some valuable minerals such as gold do occur. Exact locations of such are not known, however. The one prospector who has been most diligent in searching the country for gold, Amirow Alfred, claims to have located a "ledge" of sufficient magnitude to "make a camp." That, however, was some fifty-odd years ago and Mr. Alfred has since then been unable to relocate his ledge.

II. RELATED CULTURAL ELEMENTS

Settlement.

As stated in an earlier section, it is unlikely that the aboriginal population of Netsai exceeded three hundred. Their traditional territory, as well as it may be reconstructed, encompassed an area of some twelve thousand square miles. Combining these two figures gives a population density average of .025 persons per square mile or one person per forty square miles. Some of the elder Indians seem oddly insistent that in former times there were a great many more people than there are at present. As one
man expressed it, "today is like only two left." The recurrent theme heard when the question of aboriginal population was brought up was that in the old days when people travelled there were so many that they made three parallel trails. When they camped, the people in the middle had a hard time finding wood to burn and the snow was so trampled that it was difficult to get snow for water. It was said that these unfortunates would have to dig under the hard-packed snow.

The significance of this kind of testimony is difficult to assess. It seems to fly in the face of all other lines of evidence. The investigator is somewhat inclined to regard it as an exaggerated reminiscence of older people, a kind of harking back to the good old days.

There is the possibility that as contact and trade with white outposts of the late nineteenth century increased, there may have been larger agglomerations of people travelling together. Such indeed may have represented a nascent stage of permanent settlement. It is a fact that at least one informant spoke of these conditions as having obtained in her grandmother's day which would have been well after the beginning of the American period (1867 - ). Another factor to be considered is that today due to settlement in the two villages of Arctic and Christian, the rest of the
country appears empty. In former times, a total population of between two hundred and three hundred persons would have been scattered throughout the whole of Netsai\textsuperscript{n}, most commonly in groups of two families only. One travelling in those days along traditional trails would presumably pretty commonly have encountered other people, whereas today, one might travel for days or weeks along these same trails and encounter no one else.

There appears to be no tradition of the first Netsi Kutchin to encounter white people. There is, however, a very well known story of an Indian whose name was Tlo that who is always cited as the first man to see whites. He, however, was a Tetlit Kutchin of Peel River. This would suggest that the Netsi Kutchin knew of whites by hearsay for a relatively long period before they first themselves encountered them. When they did, it apparently was not a sufficiently novel situation to give rise to a tradition comparable to that of Tlo that. This story relates that Tlo that was fishing with a trap near the head of Porcupine River. He heard chopping and people who "talked funny." He apparently ran away and it is related that the whites threw the gear that he left behind him into the river, his fire kit and other things. Tlo that is supposed to have
said later that he almost cried at the loss of his fire kit. In any case, he was frightened. The whites gave him things he had never seen before and he went back to his people. A fuller version of this story was collected by Douglas Leechman from Old Crow. The details, as collected among the Netsi Kutchin, tally very well with those of Leechman. According to Leechman's version, the whites threw Tlo that's gear in the river and then proceeded to re-outfit him completely in white style clothing, matches, and even gave him a gun, all of which he took back to his own people to show them. In the Old Crow version of the story, Tlo that was on the Mackenzie River. A Netsi Kutchin informant who died in 1962 at the age of slightly over one hundred years, related that his father had heard the story of Tlo that as something that happened when the father was a little boy.

As stated elsewhere, the Netsi Kutchin were formerly a highly mobile people. No villages as such existed aboriginally. The closest approach to such was the aggregation of several families about a "lucky" corral. That settlement, however, was at best seasonal, lasting through the fall and into the winter. If the pound were not sufficiently successful then some of the families gathered there would leave
and go elsewhere, perhaps in the pursuit of caribou or other game. While there were a number of "lucky" corrals in the country, the more usual pattern was for two families to spend the year together and work cooperatively at gaining subsistence.

It would appear that the seeds for permanent settlement were pre-existent in the culture, however, in the form of the well established pattern of settling about successful caribou pounds. The greatest urge to permanent settlement came about from the introduction of new ideas from the south, but aided importantly too by acquisition, around the turn of the century, of a partial money economy. While there were no chiefs as such, there were, as pointed out previously, always men who were recognized leaders. The principal means of becoming such was by owning a "lucky" corral. In that way, such a man would accrue a following. The establishment of Arctic Village as a permanent settlement in 1908 seems to have followed naturally from that cause plus other factors.

The first cabin built at Arctic Village was that of the man who became known as Chief Christian. He was such a leader. The place he chose was a traditionally good fishing spot on the creek called Va shrai^n k?o^n. Nearby
to this same creek was a lake which also was noted as being good. The lake is called va shraïⁿ van. Va shraïⁿ k?oⁿ was a place where people used to "spring out." Relatives and friends of Chief Christian followed him in rapid succession. Steel axes permitting relatively easy work with logs had been available for some time. In view of the pre-existent pattern of semi-permanent settlement about the caribou pounds, it is of some interest that when true sedentarism did come, it did not take place about one of the "lucky" corrals, but rather on a river. If all that had been required for sedentarism to take hold had been a leader establishing himself in a permanent residence, then Arctic Village might not exist today, at least not in the location in which it is found. Chief Christian's house was the first in present day Arctic Village. It was not the first permanent house built in Netsaiⁿ, however. Trot sva built the first log house in the vicinity of his well-known caribou pound at the northeast corner of Old John Lake. There had existed previously in that area several of the aboriginal semi-permanent houses called kwants. Only one other permanent log house was ever built in the vicinity of Trot sva's and it was built by Old John and abutted that of Trot sva. The ruins of both these cabins are still stand-
ing. No permanent settlement developed about them, though. The reason for this must be sought in other changes entering the culture, notably in water transportation. By the turn of the century the Netsi Kutchin were beginning to feel at home on the rivers of their domain. They were by that time making use of skin boats, which, it is suggested, changed quite completely their view of their country. Prior to the introduction of boats, rivers had not been viewed as arteries of transportation, but rather as a kind of necessary evil. The change thus induced was a fundamental one and persists to the present day. It must be noted before leaving this point, that the upper valley of the East Fork of the Chandalar was known to be a good area for caribou. That cannot be discounted as a factor leading to the establishment of Arctic Village.

Christian Village was apparently founded about 1915, probably in response to the trapping possibilities in the adjacent Yukon Flats, plus the proximity to Fort Yukon. Undoubtedly a contributing factor to the stability of Arctic Village as opposed to Christian was the building there in 1918 of an Episcopal chapel. If the people perhaps lack some understanding of their religion, it cannot be said that they lack fervour. The building is of log, still in use,
and was built by natives under the supervision of the first Episcopal lay reader among the Netsi Kutchin, a very remarkable man named Albert Tritt.

During the period between the two World Wars, there were times when a relatively large number of Netsi Kutchin people would be living in Fort Yukon and trapping in the area of the Yukon Flats. In the same period commercial trapping became of some importance to the people who remained in Netsai. There were some times when Arctic Village was practically without human population, with all families out on tralines. The village was never abandoned, however.

In the early 1930's several families established themselves in small cabins on the Sheenjek River, just above the point where Konesse River enters it. This the people refer to as Sheenjek Village although it was never more than seasonally occupied. People would trap at Sheenjek Village in the fall and winter, but would return in summer to Arctic Village for ratting, caribou hunting, and fishing. The few cabins at Sheenjek Village are little used today.

Arctic Village as it appears today is shown in Map 7. As will be seen, there appears to be no especial orientation of village houses other than the fact that the majority face on the river.
Origin of the people. The Netsi Kutchin do not claim to have always lived in Netsai. On the contrary, they say that their ancestors came from a place to the southwest "across some water." The place from which they came was called Kwo hel which was translated to mean something like "secrets disappearing." The first couple to come were Natsai. The name is said to signify "he came across and started building up." The JIt sva came later from the same direction and acted as servants to the Natsai already established. The name JIt sya signifies "servant."

The first Natsai brought with them a little piece of metal (copper?) which was used for a knife. That first knife was said to have been gotten from a bushman who had stolen it from Kwo hel.

Uses of Rocks and Minerals.

An aboriginal trait which lingers to the present day is the keeping about the house of a flat rock which is used as an anvil for various purposes. Bones which are to be broken up to be boiled for "bone grease" are pounded on this anvil. In former times a stone maul was used, at present, a hammer or the poll of a hatchet may be employed. A man who manufactured an example of the old style metal knife called k?1Esh ga (shown in Plate III) used a small fire
outdoors to heat the piece of strap, his anvil stone, and a hatchet.

One's fire kit consisted of flint, or more precisely chert, and pyrites which was obtained from among pebbles on one of the tributary streams of the East Fork of the Chandalar River north of Arctic Village. After the time of contact when steel became available in some amounts, steel was used in the place of pyrites in conjunction with flint. The flint was held between the index finger and the thumb of the left hand and the tinder held against the rock with the thumb. The piece of steel was said to have been bent back, presumably to prevent its taking too deep a bite into the flint. The steel was struck to the rock and when the tinder ignited, it was blown upon and put in with more tinder which had been left on the ground. When that caught, short pieces of dry grass were added and this was waved back and forth until it caught. The technique employing pyrites must have been essentially the same as this. Flint and pyrites were usually secured upon those occasions when the people were in the northern mountains hunting sheep. Tinder, flint, and steel or pyrites were carried in a small pouch worn at the belt.

Chert outcrops on some of the ridges adjoining the
valley of the East Fork of the Chandalar, and occurs abundantly in the Sheenjek valley. Arsenopyrites, as noted above, was used extensively in curing.

Red ochre or hematite is called saijh. It was put on the wet end of a small stick and then applied to the seams of boots, parka seams, and formerly was applied to the face. The word for red, as imparted by red ochre, is dat sIh. Since commonly along seams a welt of skin is added, and it is to this that the color was applied, it seems more likely that the mission of keeping moisture and cold out along the seam was performed by the welt, than the addition of red ochre. Today red felt, or felt of some other color frequently serves this purpose. One locality from which red ochre was taken was on the creek called saihI njIh, which is translated as "Dye Creek." Red ochre was also applied to snowshoes, toboggans, and bows.

Semi-lunar side scrapers of the type known in archaeological literature as tci tho (an Athabascan word from further south) were made from sandstone or similar rock. Just how extensive a flint industry might have existed aboriginally was not at all clear from statements made by informants. There probably was some use of flint blades as well as flint being used in the fire kit. Evidently,
when compared with North American Indians elsewhere, the flint industry among the Netsi Kutchin must not have been well developed. Certainly many of the common uses of flint elsewhere were supplied by antler and bone here.

Under this heading may be mentioned a modern day phenomenon. There are three or four men in Arctic Village who frequently spend a portion of each summer prospecting for gold, or other minerals of value. They are men of an age to remember the gold stampede to Caro in the Chandalar Mining District in 1907, and the presence of white prospectors from time to time since then. A quite important influence also has been the one white prospector mentioned above, Amirow Alfred, who has been in and out of the area of Netsain for the past fifty-four years. These prospectors frequently cover long distances in their quest and return heavily laden with specimens. Two of them, at least, are given to wearing the campaign hats formerly affected by white prospectors. So far as one can tell, only rarely do their bags of samples contain any minerals of any sort.

Travel and Transportation.

Transportation. In aboriginal times there were no dogs and no boats. Similarly, the toboggan was unknown aboriginally. The most important means of getting about then, in
all seasons, involved walking; afoot in the summer and on
snowshoes in the winter.

The aboriginal sled was drawn by means of a line
around the shoulders of one person. It was of built-up
construction with two runners, flat bed, and no basket.
According to Osgood the sled was of double ended construc-
tion for all the Kutchin. McKennan concurs with Osgood.

One of the best informants used by this investigator, a
man in his nineties at the time, made a model of the sled
he remembered as a youth. It was of single ended con-
struction. It is possible this man’s memory betrayed him.
Since that was the only description obtained of the aborigi-
nal sled, it appears impossible to resolve this dilemma.

Whether or not the sled runners went up both fore and aft,
the sled, called hat¹, was made in two sizes. A smaller
one was drawn by the man who, as he moved with his family,
ranged rather widely hunting, setting snares, and so on.
The larger was pulled by the woman and children, and on it
was the skin tent knocked down and other household equip-
ment. The design of both was the same. Sled runners were
made from root sections of spruce already possessing the
proper curvature. The stanchions and supports for the bed
was likewise of root sections of spruce which turned the
ninety degree angle necessary to join runners to the bottom of the bed. In the lower right hand corner of Figure 4 is a sketch based upon the model collected.

Figure 4. Miscellaneous transportation devices. From left to right; the hunting snowshoe, the recent trail shoe, a skin drag, and lower right, the aboriginal sled.

Another device used in the winter was a skin drag, or as it was translated, a "leg skin toboggan." This was made of moose or caribou leg skins sewn together raw while still fairly flexible. The hair side was out. The description suggested that when the skin drag was frozen its shape was approximately like that of a modern toboggan and that it
was about six feet long. It was called jI trE va^1. A large leg skin bag, which was collected in Fort Yukon, was said to have been used in the same way. It was round, about three feet in diameter, about two feet high, and had a flat, round bottom. There were drawstrings at the top. This particular specimen had been dragged over from the Peel River country to Fort Yukon many years ago. The bottom of it certainly gave every evidence of having been dragged. The skin drag pictured in Figure 4 is based upon the latter specimen.

In former times, the people did not travel on rivers. Water generally was feared. Rivers and streams were simply crossed when they had to be, and it was done as painlessly as conditions would allow. If it were feasible the stream would be waded. If that was impossible, then a raft was constructed. A common aboriginal form consisted of logs lashed together in the form of the letter "A". Willow root was used for the lashing. The raft was poled, keeping the apex into the current. The person poling stood on the crossbar of the "A". The pole used might be temporarily wrapped with babiche to keep the hands from slipping on it. Neither the pole nor the raft was retained. Thirty to forty years ago, rafts were still in common use.
The old style snowshoe is still manufactured, but not in the range of sizes made aboriginally. Formerly, there was made a hunting shoe for men which might be up to six feet in length to provide maximum flotation. And in the same style there was made a woman's snowshoe, snowshoes for children, and a trail shoe for men which was about the same size as the short, woman's shoe. This traditional style of snowshoe was made of two bow pieces, half oval in section, which were joined at the rear in such a way as to create a tail and overlapped in the front creating a round toe. The toe was upturned. Babiche netting created a fine mesh at toe and heel. The mesh of toe and heel was hexagonal; that of the central section was quadrangular. There were two cross bars morticed into the bows before and behind the portion on which the foot rested. Toward the tail of the shoe is another smaller bar. The snowshoe was parallel sided before the foot, gently tapering behind it. Maximum width was about one foot. The webbing upon which the foot rested was of heavier babiche strips and the binding was of white tanned caribou skin arranged to catch the toe with a loop around the heel.

Women's snowshoes were painted red and might have beads down the center of the toe webbing. Men's were painted only
at the toe and heel which was said to bring luck in hunting. The large hunting snowshoe for men was called ai? cho. Those made for children were called ai? sa? l. Willow often served as a substitute for birch in Netsai? n. It was said not to last as well and the resulting frame would show the irregularities that existed in the willow of small diameter. Some people say the resilience and flexibility of the willow makes up for its other deficiencies.

Replacing the rounded toe style is the trail shoe called hi In Et sEt li ai. These are short and have a pointed upturned toe. Trail shoes are invariably of this style today. Again, this was said to be one of those traits introduced by the Hudson's Bay Company. Women and children may use the trail shoe or a smaller version of the rounded toe design called ai? sa? l. Both these snowshoe types are shown in Figure 4.

At the present time, three tools are used in the manufacture of snowshoes. Carving of the wood is done with a curved knife (crooked knife) called vi kwit tsi. A specimen collected had a steel blade about three inches long which had been curved and was set in a handle of caribou rib. The vi kwit tsi is a standard tool used in carving wood and is
always drawn toward the worker. A small hand auger is used for making the holes for babiche. It has a metal blade with a chisel end, and a wooden handle. A specimen of one of these collected was rather old. The wooden handle was carved in the likeness of a porcupine paw. This tool is called sat’h. The third tool, another hand auger, is on the same pattern as the foregoing, but larger. It is used for drilling the holes for the webbing on the foot section of the snowshoe. It is called tsi’ho?. These tools may be seen in Plate IX.

A back pack called hwa ra cha was used aboriginally. It consisted of a simple frame which was easily made and a single caribou hide ground cloth into which were rolled the articles to be carried. The bag was slung horizontally so that the ends protruded slightly beyond the carrier’s shoulders. Two willow sticks tied in the form of an "X" were at the rear of the pack. The pack was carried by means of a braided caribou line which crossed around the shoulders and chest and a tumpline of white, tanned caribou skin. Fixed in the center of the tumpline was a wider piece of caribou skin with the hair on to make its use more comfortable. An older informant said that people would back pack up to one hundred pounds. Both men and women
Top, curved knife, *yi kwit tsi; left, small hand augur, *sat-h; right, large augur, *tsi 'ho?; bottom, ground stone adze from Kaltag on the Yukon River. Aboriginal adzes in Netsai apparently resembled this specimen, none, however, was collected.
used the pack. Among other things carried by the women would be the curved house poles. No cradle board was in use in Netsai. The baby was carried on the back pack wrapped in a fur blanket. In later times, pots and pans might be hung over the crossed sticks in the back.

A more rough and ready sort of back pack might be made by taking a number of straight sticks, laying them together on the ground side by side with lines under them, then rolling up whatever was to be carried, tying it and securing it onto the back.

After the time of contact, the devices used in connection with transportation altered radically through the introduction of dogs, dog packs, toboggans utilizing dog traction, and boats. All of these were well integrated into the culture and are in use today.

The toboggan, called cha va{l, is the universal form of transportation today. They may be up to ten feet long, but are generally no wider than about eighteen inches. It may consist of two to three planks, each about six inches wide held together with cross pieces, nailed in or tied with babiche. The forward end is curved up and back and is held back by means of babiche lines leading down to the bed of the toboggan. The back is fitted with a framework.
and handles (in Fort Yukon plow handles used to be sold for this purpose) and the sides of raw moose hide lashed on. Throughout the season of the toboggan's use the sides will, of course, be quite stiff. The dogs are hitched in tandem to the toboggan. The team usually numbers five to seven dogs.

In more occasional use are the following: There is a wood toboggan which may be made especially for the purpose, but probably more usually is an ordinary toboggan which had gotten old and is converted to this use. It is used for hauling firewood or very short logs. There are no sides. There is apparently no special word for the wood toboggan. A wood sled called tra hatl consists simply of two rather heavy runners joined by transverse pieces. Four upright corner posts serve to keep the load in place. It is used for hauling firewood and small logs for building. It is the device most used for the latter purpose. A variant of the foregoing which has the same name, seems to be of somewhat heavier construction and consists of two pieces, both of which are made alike. They are tied four to five feet apart with ropes and used for hauling big logs. They appear to be seldom used as only one piece was seen and it was being used as a ladder into a cache.
There are very few Yukon basket sleds in use. They are called ha'1. They see little real use except in the fall and spring on trails which are already well broken. Somewhat similar to the foregoing is the child's sled called trIn nIn ha'1. Young boys use these with one or two dogs for hauling water in five gallon cans and occasionally baggage or simply for play.

Birch is preferred for the manufacture of toboggans. Spruce is used when it is unavailable. One or two individuals have managed to obtain hickory and have used it. The driver of the toboggan, when he is not running, stands on a small rear platform (simply an extension of the bed of the toboggan) and grasps the handle bars. Every toboggan is fitted with a commercially-made steel claw brake. The brake may be flipped down when one wishes to stop and the driver stands on it with his full weight. The brake is hinged so that the claw may be kept up on the platform when the toboggan is in motion. The toboggan is used in hunting, in hauling meat, in hauling wood, water, people, and as a general transportation device. Optionally, a family may own a child's sled, a wood sled, or even one of the basket sleds depending upon personal taste. Every family possesses at least one good serviceable toboggan. The toboggan was

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another introduction of the Hudson's Bay Company. Plate X shows the toboggan and the basket sled. The child's sled is similar, but less carefully made.

Dogs were apparently introduced at the same time as the toboggan and from the same source. To judge from the testimony of the older informants, it would appear that these traits were taken on in about the 1870's. Up until about 1900 families had few dogs, two or three at most. Dogs' tails were formerly docked to about six inches. That custom, presumably also part of the complex derived from Hudson's Bay Company people, is no longer followed.

Along with the introduction of dogs and dog traction came, as part of the same complex, the dog pack. The dog pack here is apparently unlike those used elsewhere in the north in that it does not consist of two bags, or panniers, as such. In plan it is a rather large (about four feet long), oval bag made from raw caribou skin, generally with the hair left on and the hair side out. It is equipped with a drawstring around the top. When it is packed it is laid on the ground and the gear to be put in it placed to either side, while the middle is left empty so that the bag may then be fitted over the dog's back. It is hitched with a braided caribou skin line. When the dog pack is to be used, the
PLATE X. WINTER TRANSPORTATION

Figure 1. The cha va l, toboggan, the universal means of winter transportation today. Note moose hide sides and brake at rear.

Figure 2. The basket sled called ha l. Infrequently used in Netsai n.
dog's chain is taken along also, wrapped around his neck and the free end put in the pack. This is done so that the dogs may be tied up on the trail at night. Dogs may pack up to fifty pounds, or perhaps more, depending upon the distance involved. Generally, twenty-five to thirty-five pounds would represent a good load. The dog pack in use may be seen in Figures 1 and 2 of Plate XI.

The form of the dog pack seems to resemble to a degree the skin drag described above. It appears possible that the form is derived from that. The dog pack is called 'hlaing o hwa. Dogs were allowed to drag the curved tent poles. This was not a travois arrangement; one dog might carry only one pole. Care is taken to balance the load on either side of the dog pack. Dogs formerly were used occasionally in hunting, at least to the extent that they would occasionally be used to run down a wounded caribou or moose.

Skin boats, called cha dtha t?ri (with cho added if large), were a trait taken on from the people of the Yukon Flats. One informant said that the Netsi Kutchin started using skin boats when he was six or seven years of age. If that is correct, it would place the introduction of this trait at about 1870. The skin boat is made in the form of
PLATE XI. DOG PACKING

Figure 1. Slinging the dog pack.

Figure 2. Dogs with packs lining out properly and well-behaved.
a scow usually about fifteen feet long, or perhaps a bit longer, and three to four feet wide. As mentioned in a previous section, the skin boat is usually a temporary device used to return home after hunters have gone up river and have taken their bag of game. The skin boat needs constant bailing. It is said to be quite resilient and well able to withstand the shock of hitting rocks. At night the boat is pulled up, emptied, and turned over. Animal fat is rendered in a frying pan and is put over the sewn seams to keep them watertight. This must be done daily in order to keep the skins from splitting at the seams. The investigator has seen only one of these boats in use and that on the Chandalar River outside Netsai. There were four men and a load in that particular boat and there was very little freeboard. The frame of that boat appears as Figure 1 on Plate XIII.

The ratting canoe, do shot tr?i, was likewise an introduction from outside. The source, undoubtedly, was again the people of the Yukon Flats. The prototype for these canvas covered canoes was the birch bark canoe used aboriginally in the Flats. They are usually twelve to fifteen feet long, flat bottomed, and eighteen inches to two feet wide at the widest point. They are usually little
more than one foot high. The bow section will be decked over for a distance of about three feet. They are almost always painted green. The framework is exceedingly light. The whole craft may weigh no more than thirty pounds. Canvas to cover the canoe is usually obtained from the Arctic Village store or from Fort Yukon. A highly useful craft and easy to construct, it apparently was not adopted by the Netsi Kutchin until sometime after the turn of the century. It was said that even as late as 1938 there were only two ratting canoes in Arctic Village. That can only be attributed to the long standing aquaphobia which characterized the people. Nowadays, there is hardly a man without a ratting canoe. A single bladed paddle with a keel down one face of the blade is used. A man will stroke twice on one side and switch to stroke twice on the other side. The paddles are carved from a piece of spruce. The paddler may kneel in the canoe or stretch his legs out before him and sit in it. Although they are used primarily on lakes, the men think nothing of crossing the swift flowing East Fork of the Chandalar River in one of them. Parenthetically it may be noted that not a single person of this group of Indians knows how to swim. Figures 1 - 3 of Plate XII show a ratting canoe at the beginning of its construction, with
Figures 1 - 3. Three stages in the manufacture of a "ratting" canoe.
the frame completed, and finally on its trial run. The builder of this particular boat was about seventy-five when these pictures were made.

A more recent introduction, and probably the most desired of all boats, is the "river boat." The river boat is a wooden scow of American origin (?) in very common use on the rivers of interior Alaska. They are commonly of quite shallow draft, rather wide, and are always fitted with outboard motors. They are quite common at Fort Yukon where some will be as much as forty feet long. Because of their draft, they are well adapted to river travel. Though river boats have been known to the Netsi Kutchin for some time and used by individuals who have lived at Fort Yukon, it appears that only since World War II have any of these boats appeared at Arctic Village. This may be attributed to the influence of those sophisticated individuals plus better transportation facilities allowing for shipment of materials into the village. The boats are usually of local manufacture and are considerably less pretentious than those at Fort Yukon. The longest river boats would be slightly over twenty feet. They are commonly powered with ten to thirty-five horsepower "kickers." On some of them too, it is obvious that the principle of the river boat with its
broad beam for stability, has been missed. One such boat that the investigator had occasion to ride in seemed to be about as cranky as a canoe. The advantages of the river boat for hunting upstream and downstream are numerous and well recognized. It is possible to travel up the river carrying a ratting canoe on the river boat and to stop at various points, carry the canoe overland a bit, and employ it in hunting waterfowl and muskrats on the lakes. The Indians are quite adept at maintaining outboard motors and at making necessary repairs on them. Figure 2 of Plate XIII shows two river boats being loaded for a trip.

Prominently painted on the side of a river boat belonging to a man who speaks virtually no English is the notice, "Welcome to the Family of Evinrude."

The sleeping robe was an important piece of equipment used by the traveller. The old style robe was made from four caribou skins trimmed to rectangular shape. Two were sewn side by side with the remaining two placed at ninety degrees top and bottom and sewn to the first two. This created a large rectangle. A person caught out and unable to get home at night might utilize fresh caribou skins for sleeping. The Indians say that if that were done in any other type of skin a person would freeze. The
Figure 1. Frame of a skin boat of type used by Netsi Kutchin. Taken at Venetie on Chandalar River.

Figure 2. Two river boats being loaded in the creek called va shrai^n k?o^n.
sleeping robe was always used in conjunction with a ground cloth of one caribou skin which was laid hair side down.

The old style back pack is seldom if ever used today. Most individuals own commercially made pack boards. One individual was observed to use a burlap bag tied at each bottom corner and at the top as a pack with which to carry fish. (See Plate VII, Figure 3.)

**Bridges and trails.** Streams of small enough size that they could be bridged, usually were. The bridge consisted of several logs laid side by side extending from one bank to the other. If the bridge was over a fishing creek, the top of it might be covered with moss. This was done so that menstruating girls could cross the creek without affecting the fish. Girls who were menstruating had to crawl across these bridges. The bridge was called de t?o. Today, instead of moss, a blanket might be laid over the bridge to allow a girl to cross.

There are a number of well marked trails in the country. They are usually no more than a foot to a foot and one-half wide. They are often worn down as much as two and a half to three feet. To one not adept at walking such trails, they can be rather uncomfortable in that one is forced to put one foot directly before the other. Many of these trails are
said very emphatically to date from a very long time ago.
One of the most notable trails in the country is that which
goes south from Arctic Village to Fort Yukon. It was laid
out formally in 1924 under the supervision of Albert Tritt.
While its course is somewhat irregular in Netsai, once it
drops into the Flats it has the appearance of having been
laid out by transit. In the featureless Yukon Flats it
is often used as a landmark by pilots.

A trail which was to be followed apart from one of those
well marked through many years of use, would be blazed. A
spruce snag might be stuck upside down upon the proposed
route, or branches broken in the direction of travel. Trails
are sometimes named as, for example, that from Arctic
Village to Old John Lake which is called *van cho tza tai* "trail to big lake."

_Travel._ The Indians when travelling in Netsai constantly use mountains as landmarks. One person when asked
about the possibility of getting lost, replied indignantly,
that it was impossible. The people do not feel the same
confidence about the Yukon Flats where, they say, with no
landmarks it is all too easy to become lost. Distances
formerly were reckoned in terms of a day's walk, a week's
walk, and so on. From Arctic Village to Christian, about
sixty miles (airline), was a three day walk. The same trip by dog team in the winter would take five days. In this latter connection, it may be noted that sled trails will commonly follow low ground and low passes between hills and mountains, whereas in walking, usually the shortest route is taken. The Netsi Kutchin are prodigious walkers.

When travelling one was not supposed to pick or eat blueberries. To do so would bring bad luck and starvation. If caught in the rain while travelling, people would take shelter under a spruce tree and build a fire.

A very definite code of etiquette was expected of the traveller. Upon approaching a dwelling one did not walk in close without first announcing oneself. The traveller stood off at a distance and called his name, where he was from, and upon what business he was. This was done in a very loud voice. The stranger might then be asked to come in. The reasons given for this procedure had to do with the protection of the visitor: Thus, there existed the possibility that the people were not friendly and the stranger would be warned by the manner of the reply. Too, since starvation was relatively common, a stranger might happen upon a person practicing cannibalism, in which case, were he simply to walk in without greeting, he might be
harmed or killed by the guilty one. The warning apparently served the best interests of both parties. If the person had been successful in gaining entry to the house after calling, and perhaps had stayed several days, there were still other rules to be observed. If the stranger was outside the dwelling and saw coming in the distance another member of that household whom he had not previously met, it was required that the stranger go into the house so that he would not meet this person outside. He was required to stay inside until he was introduced. When the two people in this situation were introduced, they again shouted at each other.

If upon approaching a dwelling it was seen that the door was open, the stranger was not supposed to look inside. If in his approach the traveller was observed by people standing outside of the dwelling, he was to announce himself as soon as he came within hearing range, but only if he were seen. If he had not been observed, he would hide himself until the people were back inside the house, then go through the routine outlined above.

If in calling there was no answer, the stranger was not supposed to open the door with his hands, but was required to use a stick to push the door aside and look in. If inside
he saw a person whom he thought was dead, he would poke him with the stick to make sure and take a closer look, then leave to tell others, perhaps nearby relatives of the person who would come and bury him. If the stranger encountered a person who was starving or sick, he would leave whatever food he could with the person and go immediately to the nearest camp from which the fastest walking boys would be dispatched with food.

Though the conditions for walking, both in the terrain and the footing, leave much to be desired according to the usual standards, the Netsi Kutchin seem to be fond of taking summer trips. There is, in fact, a fair degree of travelling done which cannot possibly be related to any economic motives. As examples, in 1938 Albert Tritt took two of his grandchildren over the crest of the Brooks Range onto the north slope simply to show them the country. On that particular occasion, they took a wrong route on the north slope and encountered what they called "ice hills" and turned back. (There are extensive naled areas in some of the valleys on the north slope. It may have been these which caused the travellers to turn back.) Apparently that was the last trip anyone made into the arctic drainage.

One of the favored routes onto the arctic slope was by
way of the head of the Sheenjek River and thence into the Hulahula River drainage. A trip made in 1918 which occupied two months of the brief summer, had for its objective a search for what apparently was an Eskimo archaeological site that was supposed to be near the head of Firth River. The trip was made on the basis of reports of old people in the village who had seen material from that place.

In addition to travelling all over Netsai, the people would frequently go into the Yukon Flats, down to the Porcupine River, east to Crow Flats, and out onto the north slope in an area bracketed by the Canning River on the west, and Hershel Island on the east. With the exception of travelling up Wind River and Junjik River, there does not appear to have been a great deal of movement to the west in the Brooks Range.

Today, Arctic Village is served weekly by bush aircraft from Fort Yukon. Aircraft in the winter land on the ice of the river at Arctic Village, and in the summer on a very small strip across the river from the village. Most of the orientation today is to Fort Yukon and there is a fair degree of travel by air between the two points. There are, however, several people in the village who have never been so far south.
Trade.

The traditional enemies of the Netsi Kutchin were the Eskimos whose territory lay to the north. Nevertheless, there existed a well organized system of trade with the Eskimos. Trading with the Eskimos took place annually in the month of August. At that time, family groups of the Netsi Kutchin would be in the north hunting mountain sheep. The men would leave their families just on the north side of the Range and would go down to the coast to a place which they called kle re ti da't1, "meeting place." Some informants spoke of this place as being near Hershel Island, while others maintained that it was nearer to Barter Island. The latter seems more likely. At this place, the Indians would meet Eskimos from Barrow, Barter Island, and perhaps points farther east. One informant spoke of some "little Eskimos" from Peel River (?) who engaged in this trade likewise. Most of the Indians spoke some of the Eskimo language, but it was said these "little Eskimos" could not be understood. It has not been possible to pinpoint the location of kle re ti da't1. An older informant who had been there five times described it as a place where the Eskimos landed their boats. While that doesn't necessarily mean that the location was directly on the coast, it appears
probable.

Although trade with the Eskimos was an annual affair, the same individuals did not participate every year. Each Indian had a trading partner and there was said to exist between them considerable cordiality. In fact, they called each other "friends." If one member of a partnership was absent, his place could be taken by someone else. In addition to the trade, there was opportunity for socialization and it was said that there were parties and feasts. This trade continued irregularly until 1928. It is possible that trade with the Eskimos was a post-contact phenomenon, or at least was heightened after the time that the Eskimos began getting white goods from the whalers. It was for such goods that the Indians traded.

The Indians brought to the trade raw hides of wolverine, wolf, caribou, and sheep. They also traded in caribou leg skins and sinew. One informant spoke of their trading parkas to the Eskimos, but that seems rather unlikely. In return, the Netsi Kutchin received ivory grayling hooks, cylindrical beads of swan feather, and the blue, glass beads they called nak kyu. The latter word was said to be derived from the Eskimo word meaning "dear" or "precious." They also received black powder, tobacco, pots, pans, stoves,
and other items. It is related that one man who went over in about 1910 received for two wolverine skins, pots, pans, a stove, a tent, reloaded ammunition, and the whole outfit for setting up as a newlywed. Some of the Indians say that before 1929 their commerce with the Eskimos was more advantageous than that with the traders at Fort Yukon. The first cartridge rifle in Netsai, obtained apparently in the early 1890's came from the Eskimos. The first guns and tea were said to have come in like manner, not from Fort Yukon, but from the north. In the last bit of this trade in 1928 the Indians obtained pots, pans, shells, and stoves.

In the early 1930's there were a number of Eskimos established in a very small village on the Sheenjek River which the Indians called "Husky Village." In July of about 1932 some of the men of Husky Village came into Arctic Village to trade for tobacco, ammunition, and tea. Apparently there were occasional visits from coastal Eskimos as well. At least one man travelled out to the coast just before World War I to trade with a white trader by the name of Martin who was apparently set up on Flaxman Island, just out from the Canning River delta.

An old informant spoke of an ax which was obtained from the Eskimos in trade which was said to be soft "like
lead." This same informant spoke of a Russian (?) boat which broke down at Point Barrow. He said that the Eskimos stripped the boat and traded metal from it widely. Perhaps the ax he spoke of was made of copper sheathing, or some similar material. Other bits of metal were also gotten by trade. The same man said that a standard unit of trade with the Eskimos was a seven inch box filled with black powder.

The Eskimo are called jE kwoi for which no translation was obtained, but which is apparently scurrilous, or chu'n van Kutchin, meaning "ocean people." When they speak of them in English, it is invariably as "husky." The latter is another legacy from the Hudson's Bay Company.

There was a certain amount of commerce with the Kutcha Kutchin. They were interested in obtaining tent covers of caribou skin. There were no caribou in the Flats. The Han who lived along the Yukon in the vicinity of present day Dawson and Eagle, were evidently intermediaries in trade between the Copper River people and those of the Yukon, Porcupine, and farther north. From Copper River came dentalia shells, what was described as a "little knife" apparently in copper and the elaborate copper knife (described in an earlier section) called k?1Esh go^n. Evidently only a few individuals of the Netsi Kutchin knew any of the
details of the trade with the Han and they kept it secret. Dentalia shells were called *gat dthan*. Even though they had no direct contact with them, the Netsi Kutchin referred to the Copper River people as the *te dran jik* Kutchin. The name was said to be taken from the big river that goes into the coast where those people lived.

About the same time that the Hudson's Bay Company set up at Fort Yukon, the Russians began trading up the Yukon as far as the mouth of the Tanana River. There evidently was little influence from Russian trade in Netsai, but one informant maintained that the Dihai Kutchin, whose territory lay west of that of the Netsi Kutchin, did secure some Russian goods. It was said that they obtained stoves of some sort which they used in their skin tents. This same informant spoke of an adze which had an iron head as coming from the Russians. The adze was called *ch?a horsh*.

The Hudson's Bay Company post at Fort Yukon was established in 1847. There was probably some indirect trade at least, with Netsi Kutchin from the very beginning. Hudson's Bay Company steel axes of distinctive design were probably available to most people by the 1860's. A number of families still have the heads of these axes and the old people, without exception, are vehement in their praise for the Hudson's
Bay Company ax. Nevertheless, the double bitted ax is in universal use today. Double barreled guns, flintlocks, and percussion models were got from Hudson's Bay Company, but apparently rather sparingly. Copper kettles were also obtained from them. Cast iron skillets were said to be another early item of trade from Fort Yukon. The Hudson's Bay Company after removing from Fort Yukon following the purchase of Alaska by the United States, relocated up the Porcupine River at Old Rampart. (At the time, 1869, Old Rampart was thought to be in Canada.) Americans then took over the trade at Fort Yukon. There were those Indians who preferred dealing with the Americans at Fort Yukon, and those who preferred trading with the English at Old Rampart. The English were aided by the fact that the missionaries in the area at the time were Anglicans and were to be found at the Hudson's Bay Company post. It is said that the Hudson's Bay Company people told the Indians that the Americans at Fort Yukon were, among other things, sinners. The Hudson's Bay Company traders obtained from the Indians dried caribou meat. They were interested in jerked meat from hams and forequarters, but especially in dried tongues and dried boneless ribs. Apparently they also traded for bone grease. An account was given of some Netsi Kutchin men who had gone
to Fort Yukon toward the end of Hudson's Bay Company tenure there and who, upon their return to Netsai\textsuperscript{N}, introduced what may have been scarlet fever.

When the gold stampede into Caro in the Chandalar Mining District took place, many of the Indians from Netsai\textsuperscript{N} went down and traded and sold items to the traders. By this time, however, they were becoming rather interested in obtaining money. The women made gloves of caribou skin and gold pokes of the same. The Northern Commercial Company had a store at Caro which was supplied by a small steamboat which came up from the Yukon. The people also sold meat to the miners. A caribou ham would bring five dollars; a moose ham, twenty dollars. There was even a school at Caro and one or two people who were children at the time were exposed to their first (and only) schooling there. The people got better equipment down there then they had had previously; good stoves, tents, and so on.

Arctic Village was founded after the strike at Caro. It became customary around World War I and thereafter, for people to make one or two trips to Fort Yukon in the winter. They would buy a little tobacco, tea, and sugar. In the summer they might go down by skin boat and return packing dogs. Within the past ten years there has been established
in Arctic Village a cooperative native store which is administered by the Bureau of Indian Affairs. All such stores in Alaskan villages buy on a cooperative basis from Seattle. Each, however, does its own ordering. That in Arctic Village is frequently short of staples and carries little else. There is still a good deal of buying from Fort Yukon either through the Northern Commercial Company there, or one of the independent traders. Goods and supplies of this nature are today flown in.

There had been no permanent settlement of any description at the site of Fort Yukon prior to the coming of the Hudson's Bay Company. Inevitably the presence of the trading facility there drew Indians from many quarters of the central Yukon. Some of the people from Netsai^n were drawn to the post in the nineteenth century and remained there.

Relatively frequent reference is made to warfare in the past. As stated above, the major enemy so far as the Netsi Kutchin were concerned, were the Eskimos to the north. They would occasionally make raids onto the north slope, just as the Eskimos would occasionally make raids into Netsai^n. It is said that it sometimes happened that a man would encounter in one of these skirmishes his trading
partner and that they would avoid each other. The only other groups which were mentioned in this connection were occasionally the Dihai\textsuperscript{n} Kutchin to the west, but much more frequently, the Kutcha Kutchin to the south. In general, their most amicable relations were with their eastern neighbors, the Vante Kutchin.

Classification of Physiographic Features.

The following list of terms was obtained by direct questioning on this point, and from the translation of some place names.

The head of a lake, i.e., end into which a stream feeds -- \textit{te lai}\textsuperscript{n}

Lower end of a lake from which a stream flows out -- \textit{chat lai}\textsuperscript{n}

The middle portion, or main body, of the lake -- \textit{van te tlan}

The stream that goes into a lake -- \textit{vin lai}\textsuperscript{n}

Stream flowing out of the lake -- \textit{van tsan hat lai}\textsuperscript{n}

A mountain with a pronounced linear ridge -- \textit{di k?i}\textsuperscript{n}

A mountain with a sheer face of rock from top to bottom (applied to a particular mountain) -- \textit{ve ti kin li}

Pointed mountain -- \textit{ki triu tr?ok}

A more gently pointed mountain -- \textit{ki triu \textquoteright ho}
Lateral morainal ridges (this term applies particularly to their terrace-like profile in the East Fork Valley) — **tE ni gwil tIk**

Valley between two hills — **ni tak**

A flat topped mountain — **va ki dIk dE gwa^n 'cha**

Round mountain — **ki triu 'ho cho**

A frost crack or rock stripe down a slope with a gully cross section — **gwin thIn gwin E**

The same in finer grain material caving in at the sides and widening — **gwi kli kIt**

A round knoll (a general term, but heard applied to a small drift feature near Old John Lake) — **tai^ 'ho**

A low hill with a long axis (applied to some morainal features) — **tai It sIk** (if this feature is small, the diminutive **sa^l** is appended)

A swale or small valley between two hills — **tai It E tak zak nEk on di^n**

A low center polygon (dykes of peat surrounding sedge, in geometric form) — **tlo kat gat^l tra nan tsiK nan E**

Tussock heaths, or niggerhead, topography — **tlo han sha**

River in a gorge — **gwat i I njIk**

A rough, rocky point — **than I kai^n**
Headwaters of a stream — **trat lIt**

A bare mountain top surrounded with timber — **vE ne tat chan thE E**

A rugged, rocky mountain — **ki dri**

A spire feature on top a mountain (expressed as "mountain on top another mountain") — **ne k?at dl yIl tai^n**

Aufeis or stream overflow — **qIt**

**Territoriality.**

The extent of Netsai^n as it existed in aboriginal times, was determined by direct questioning of older people upon that point. It is believed that the boundaries as herein depicted, are as correct as is possible to determine. It was apparent that of the four frontiers of Netsai^n, only two were truly of concern to the people. One was the crest of the mountains to the north, and the other was the edge of the piedmont to the south. They did not feel strongly about the eastern and western boundaries. The Coleen River on the east represented an approximate frontier between the Netsi Kutchin and the Vante Kutchin.

Today, the Netsi Kutchin no longer make use of their entire country. Seldom do any journeys take anyone as far east as the Coleen River. The people are very fond of the
Sheenjek River valley, but still are most largely confined now to the valley of the East Fork of the Chandalar River above Wind River.

While territoriality appears to have been respected by all people in this section of Alaska and Canada, occasional incursions were not a subject of dispute unless disputation had been the occasion for the incursion. If the Vante Kutchin came into Netsai for hunting, the Netsi Kutchin thought of such a situation as giving in need. The same was said to apply even to the Eskimos. Apparently no umbrage was taken over the settlement of Husky Village on the Sheenjek.

People were asked on numerous occasions what they thought of their country, whether they thought it was beautiful, and so on. The reply, when it came, generally was preceded by a certain amount of wonderment, but was invariably pragmatic. The people thought of Netsai as good country, as country they were adjusted to. They thought of it as a land good for fish and for game animals. They like the openness of their country and prefer it to all other places. Its scenic values do not appear to make too much impression.

The extent to which the Netsi Kutchin are adapted to
their mountainous environment is evidenced by the willingness and agility with which they attack it. Hiking trails usually take the shortest route between two points. This always entails some climbing. Another evidence is inherent in their knowledge of the country; it is "impossible" to become lost in Netsai. Hunting mountain sheep, nowadays viewed as a kind of family outing, often demands of the hunter an agility approaching that of the quarry. In this connection, too, the former use of a special climbing staff, surely is indicative of a mountaineering people.

Netsi Kutchin place names and trails are shown on Map 8 (in pocket). It is believed that the reason for the paucity of place names in the extreme east is due to the lack of use which that portion has received in the past fifty-odd year. Presumably, had these data been collected around 1900, the appearance would be different.
CHAPTER VI

THE CLIMATIC MILIEU

There are no climatic data for Netsai\textsuperscript{n}. There are, in fact, few data for any of the eastern Brooks Range. Accordingly, there are presented below some general remarks on the climate of northern Alaska followed by such climatic information as is available from the stations nearest to Netsai\textsuperscript{n}.

I. CLASSIFICATIONS OF NORTH ALASKAN CLIMATE

Conventional world classifications of climates agree in placing the boundary between the microthermal (or taiga) climate of central Alaska and the tundra climate of the north squarely in the Brooks Range. Attention is directed to classifications of Köppen, Trewartha, and Thornthwaite as shown in Trewartha.\textsuperscript{1} Since reporting stations are all but nonexistent, this procedure must be based upon the approximate northern limit of trees in this area. The theory is, of course, that the tree line and the generally accepted boundary between D and E climates, the fifty degree isotherm for the warmest month, should coincide. A procedure
of this kind is not only approximate, but is as well fraught with possible error. The tree line firstly is only approximately established, and secondly, it cannot be viewed as static, i.e., in climax state, but must be understood as dynamic. Postglacial succession is still in progress in the Brooks Range. It is both unsafe and unwise to imagine the present tree line as representing the limit to which forest may advance. Climatic influences upon vegetation are not the only ones to be considered. Edaphic controls on common northern tree species which may be of relatively minor importance in the center of the species' range become, at the poleward limits, of determining importance. As Hustich puts it,

[as the poleward limits of conifers is approached]
"we find a marked decrease in the edaphic amplitude of all species. ... species are limited to certain habitats. The distinct selectivity with regard to edaphic conditions of a given species near its northern limit is very noticeable in the forest-tundra where trees grow only on south facing and well-drained slopes, in the valleys of rivers, in sheltered depressions, or on calcareous soil."  

It is realized, of course, that a worldwide scheme of climates necessarily glosses local variations. Nonetheless, when brought down to the local level these discrepancies must be pointed out. It is perhaps not generally known, as an example, that spruce trees occur in the Firth River
valley within just a few miles of the arctic coast. Eventually, it may be assumed, these conditions may be taken into account in any climatic classifications which involve Alaska.

C. E. Watson, State Climatologist for the U. S. Weather Bureau, presents a fourfold division of Alaskan climates of which two are pertinent here, the Interior Basin Division, and the Arctic Drainage Division. Unfortunately, this was evidently conceived as a generalized scheme, for no map showing boundaries is presented. Of the Brooks Range, Watson speaks only of its effect as a topographic barrier in reference to the influence of the continental interior upon the arctic slope. There is, according to this author, some influence of air drainage upon the adjacent interior recorded at such stations as Fort Yukon, but the same apparently does not apply on the north side of the Range. The annual range of temperatures is, of course, greater in the interior than in the arctic. Fort Yukon holds this record having recorded a high of 100° and a low of minus 75°.

II. A CONSIDERATION OF SELECTED WEATHER STATIONS

The stations chosen for presentation below were selected for one of two reasons, they are either in situations which

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are similar to that of Netsai\textsuperscript{n}, especially Arctic Village, or they are relatively close by. The stations chosen are Fort Yukon, Barter Island, Wiseman, Umiat, and Anaktuvuk. With the exception of Fort Yukon, for which twenty-six year averages are presented, the rest are characteristically short reporting periods and fragmentary as well. Anaktuvuk is closest in latitude and elevation to Arctic Village, but is the shortest and most fragmentary of the five stations. These data may be interpreted then as suggestive only of climatic conditions existent in Netsai\textsuperscript{n}.

As may be seen from the accompanying graphs (Figure 5) Barter Island is a good representative ET (tundra) station. Summers are cool and short with no month as high as 50°F. Umiat, on the other hand, while it is apparently usually grouped with the latter climates, seems more distinctly continental with quite low average winter temperatures and one summer month averaging above 50°. It would appear that Umiat should be grouped with Dfc of the Köppen system.

Fort Yukon and Wiseman, especially the former, are clearly representative Dfc stations with relatively warm summers (three months of temperatures above 50°) and long cold winters.

Precipitation characteristics are similar at all
Figure 5. Temperature and precipitation averages from four stations. Upper line — mean maximum temperature; middle line — mean temperature; lower line — mean minimum temperature. Precipitation is read on outer scale.
stations to the degree that all are low. Umiat and Fort Yukon are close in this regard averaging 5.95 and 6.53 inches respectively. Precipitation data for Barter Island are fragmentary, but appear to average about an inch higher than Fort Yukon.

The sixteen year record for Wiseman reveals precipitation rates are higher, a reflection of its mountainous setting. Average precipitation for Wiseman is 11.50 inches. A two year complete record for Anaktuvuk (1954 - 1955) shows an average of 12.36 inches. The value of such a record is questionable, especially since the amounts in many months of that two year period were estimated. However, it is of some interest that the figure approximates that of Wiseman. It is believed the precipitation characteristics of the Arctic Village area of Netsai would be similar to both Wiseman and Anaktuvuk.

Climatic data for Anaktuvuk are presented in Table 1 below. Several cautions should be observed in reading these figures: Virtually every month is average with several days (never as many as ten) missing. Precipitation data are frequently estimated. Finally, December and January temperatures for the mean, mean maximum, and mean minimum are a two year average, as are the means for February.

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through May and the months of October and November. The
June, July, and August temperature figures are eight year
averages. The remaining are five year averages except the
March mean maximum and mean minimum which are four year
averages.

The temperature for the warm month, July, it will be
noted, is above 50°. Therefore, it should be grouped with
the D climates, specifically Dfc. Forest (forest tundra)
occurs just south of the Anaktuvuk recording station. As
suggested for precipitation above, it is believed the
Anaktuvuk temperature data would approximate those for the
Arctic Village area of Netsai. The climatic conditions
of the more southerly portions of Netsai might be approxi-
mated by those data from Wiseman.

Snowfall.

Average snowfall in the mountains is higher than that
of such areas as the Yukon Flats and arctic slope. Again,
data are unsatisfactory not only from the two mountain sta-
tions, for they are almost as unreliable from Barter Island,
where, because of wind conditions, it is frequently difficult
to obtain an accurate measure. The Anaktuvuk figures are a
two year average; those from Barter Island are for four years.

Snowfall values for Netsai should approximate those
of Wiseman and Anaktuvuk. An additional subjective observation concerning snow may be made: Snow, in the vicinity of Arctic Village, at least, has a lower moisture content than that of the Fairbanks, Alaska area. In the latter place,

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean Maximum</th>
<th>Mean</th>
<th>Mean Minimum</th>
<th>Precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>-0.8°</td>
<td>-8.6°</td>
<td>-16.3°</td>
<td>.73&quot;</td>
</tr>
<tr>
<td>February</td>
<td>-6.7°</td>
<td>-20.5°</td>
<td>-27.1°</td>
<td>.75&quot;</td>
</tr>
<tr>
<td>March</td>
<td>-0.8°</td>
<td>-4.6°</td>
<td>-17.6°</td>
<td>1.14&quot;</td>
</tr>
<tr>
<td>April</td>
<td>11.3°</td>
<td>2.7°</td>
<td>-7.5°</td>
<td>.56&quot;</td>
</tr>
<tr>
<td>May</td>
<td>38.3°</td>
<td>26.7°</td>
<td>19.8°</td>
<td>.98&quot;</td>
</tr>
<tr>
<td>June</td>
<td>57.4°</td>
<td>47.1°</td>
<td>36.9°</td>
<td>1.08&quot;</td>
</tr>
<tr>
<td>July</td>
<td>60.3°</td>
<td>50.5°</td>
<td>40.6°</td>
<td>1.15&quot;</td>
</tr>
<tr>
<td>August</td>
<td>53.9°</td>
<td>45.5°</td>
<td>37.1°</td>
<td>1.05&quot;</td>
</tr>
<tr>
<td>September</td>
<td>38.5°</td>
<td>31.7°</td>
<td>24.9°</td>
<td>1.69&quot;</td>
</tr>
<tr>
<td>October</td>
<td>14.5°</td>
<td>11.4°</td>
<td>12.2°</td>
<td>1.06&quot;</td>
</tr>
<tr>
<td>November</td>
<td>-2.5°</td>
<td>-4.1°</td>
<td>-12.3°</td>
<td>1.20&quot;</td>
</tr>
<tr>
<td>December</td>
<td>-11.4°</td>
<td>-17.8°</td>
<td>-24.2°</td>
<td>.95&quot;</td>
</tr>
</tbody>
</table>
about sixteen inches of snow is required to equal one inch of water. While that ordinarily would indicate a very light powder, snow on trails does form compactive surfaces. Such does not seem to be true of winter conditions in Nets'ai^n, where snow on toboggan trails will scuff up like powder. If sixteen inches is approximately correct for Fairbanks, and vicinity, then the value at Arctic Village must be on the order of twenty inches.

**TABLE II.**

**AVERAGE ANNUAL SNOWFALL FROM FIVE STATIONS**

<table>
<thead>
<tr>
<th>Station</th>
<th>Snowfall in Inches</th>
<th>Years of Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barter Island</td>
<td>41.8</td>
<td>1954 - 1959</td>
</tr>
<tr>
<td>Umiat</td>
<td>30.8</td>
<td>1947 - 1953</td>
</tr>
<tr>
<td>Fort Yukon</td>
<td>45.6</td>
<td>1922 - 1938, 1943 - 1952</td>
</tr>
<tr>
<td>Wiseman</td>
<td>80.4</td>
<td>1936 - 1952</td>
</tr>
<tr>
<td>Anaktuvuk</td>
<td>88.0</td>
<td>1954 - 1955</td>
</tr>
</tbody>
</table>

Snow may fall in Nets'ai^n in any month. Summers are cool and brief. Breakup of streams in the Arctic Village area occurs about two weeks later than at Fort Yukon, or toward the very end of May. Freezeup takes place in early October.
Winter Wind.

Netsai\textsuperscript{n} shares with interior Alaska that quality of stillness in the winter. Winter winds are probably more frequent in Netsai\textsuperscript{n}, but do not generally occur with extremely low temperatures. During one of the investigator's winter sojourns there, the temperature fell to about minus 60\textdegree and stayed in that vicinity for almost one week. No sign of wind was detected the whole time. Sounds carried long distances and one was inclined to agree with the Indians that the aurora did indeed make crackling noises.

Temperature Inversion.

Another phenomenon of the weather is particularly noteworthy. With the combination of very short days, low (or no) sun, and the stillness which predominate in winter, there will commence a build up of cold air near the earth's surface. Ideal conditions for the build up of the temperature inversion are found in a prolonged period of clear skies permitting a maximum of radiation from the surface. Because the coldest air is densest and heaviest, it is lowest. Air drainage and subsidence of cold air will result in pools of extremely cold air occupying topographic lows. There are, hence, marked differences in temperature on a microclimatic scale.
Cloud cover, acting as a thermal blanket, will halt the process. Windy conditions may break up the layering of cold air and cause a general mixing thereby warming the atmosphere close to the ground surface. Both those conditions are sufficiently rare that the temperature inversion is the expectable state of affairs in the winter.

The effect as felt by humans can be quite striking. Thus, as one proceeds along a winter trail, the temperature at a given point six feet above the surface may be minus forty degrees. A drop in the trail across a pond or river bed may find, at the same height from the surface temperature being twenty degrees colder. In like manner at any one point, one may find gross temperature differences over a short vertical distance — as between a man's head and his feet. It is possible to have one's head in air of minus forty-five degrees while that most vulnerable part of the anatomy, the feet, may be in air of minus fifty-five degrees temperature, or even colder. Under conditions of varied topography, it is virtually impossible to predict temperatures from one point to the next.

Other Meteorological Phenomena.

Auroral displays are frequent in the cold months and seem to have an especial affinity for extreme cold. Generally,
the aurora is white, tinged with a greenish-yellow. Upon occasion, however, other colors are seen. Two common forms are those called "curtains" which generally whip back and forth, and the corona, the rays of which seem to achieve an apical form above the observer's head.

Halos about the sun and moon are fairly frequently seen. Depending upon atmospheric conditions, the complete circle may be seen or, more frequently, portion only of it on the same horizontal plane as the sun. The latter are properly sun dogs or parhelia. They are usually reddish-yellow and are a common winter phenomenon.

Miscellaneous.

Although the modern settlement of the Netsi Kutchin lies over one hundred miles north of the Arctic Circle, there is no day in the winter in which there is complete darkness. On the shortest days the effect, especially to the south, is that of a prolonged sunrise which never quite materializes. There is actually quite a bit of light. The high reflective value of the snow surface must account for some of the effect of light. Certainly on brightly moonlit nights that quality is realized, for it is possible to carry on some activities, such as travelling, which otherwise would be out of the question. In the summer, the midnight sun is much in evidence as it wheels about the
III. RELATED CULTURAL ELEMENTS

Clothing.

In a climate such as characterizes Netsai, one of the most important human responses is in the form of clothing. In contrast to some temperate regions of the world, there is no season in Netsai when clothing may be dispensed with. The efficiency of clothing is not merely a matter of comfort, but is one of survival. Of all the cultural equipment then of the Netsi Kutchin, clothing is possibly the most important. Since aboriginal times there have been some important modifications in clothing. It is the purpose here to present these.

Aboriginal clothing. Aboriginal clothing was called ja dai. It was still in common use in Netsai until possibly the 1880's and perhaps a bit beyond. The style of both summer and winter clothing was the same. The man wore a pullover shirt, the bottom of which was pointed front and back. Boots or moccasins, as such, were not worn. Rather, trousers and boots were of a piece. The upper garment was not hooded. A close fitting cap in the form of a hood was a separate item of apparel. Its style was similar to that
of the western Eskimo parka hood. A flap of skin at the back of it covered the neck and the cap was secured under the chin by means of caribou string. The woman's outfit was similar to that of the man's. The woman's upper garment was more dress-like in being considerably longer than the man's. There were no points at its bottom. The woman wore a trouser-boot arrangement like that of the man's. The cap worn by the woman was similar to that worn by the man. Decoration for clothing was in the form of fringing, porcupine quillwork, dentalia shells, and, depending upon the wealth of the person (and after contact), with large beads that were combined with the fringes. The upper garment of both men and women had dolman sleeves creating a cape-like effect around the shoulders. This cape was generally fringed and if the individual were wealthy enough, it might be decorated completely around with dentalia. The bottom edges of the upper garment were also fringed. The man's trousers were adorned with a strip of porcupine quillwork along the outer side of the leg from the top of the pants to the ankle. Below the knee there might be another band of porcupine quillwork and another girdling the ankle. Fringe was sometimes combined with quillwork along the outer seam of the pant leg. The foot part of the garment
was of soft tanned skin, just as was the rest of the outfit. There may have been a tie around the ankle which went in and out of the foot portion. At least this was done with children's and it makes sense. The trousers were belted by means of a strip of white, tanned caribou skin which had a loop at one end allowing the belt to be easily cinched up tightly. This belt was called k?lai i k?ya. A similar belt, the belt worn on the outside of the jacket was of smoked caribou skin. It was called tha. A head band was worn by the man which went around the top of the head to the back of the neck. The hair was worn long and on the outside of the lower portion of the head band. The hair was gathered at the back of the neck by means of another decorated collar from which jutted one to three hawk feathers. Grease and duck down were put in the hair. The woman's hair was worn long and straight but sometimes a head band resembling the man's was used. Both sexes pierced the septa of the nose, into which were put dentalia shells. These protruded out horizontally to either side of the nose. Both sexes might have vertical lines tattooed on the chin. At the belt, the man carried a pouch in which was his fire kit. A knife, often the k?lEsh goN, was worn in a sheath attached by means of a strap to the shoulder.
The summer costume was made of smoke tanned caribou skin which was hairless. The winter outfit of the Netsi Kutchin was apparently distinct from that of other Kutchin speakers. The basic design was the same, but whereas other groups in winter used the single trousers-jacket combination of one layer of caribou skin with the hair turned in, the Netsi Kutchin wore both an inner and an outer suit. The inner, or under suit, had the hair turned in; the outer suit had the hair side out. The feet were wrapped in rabbit fur duffel. Old style mittens were not of the gauntlet type, but were short, made of caribou skin with the hair turned in. They were attached to each other by the means of a long, white, caribou string worn over the shoulders. The caribou string allowed one to remove a mitten without having to set it down, or possibly lose it. The mittens might be trimmed at the wrist with a strip of beaver fur. The winter cap was usually made from the head skin of the caribou with the hair left on. The orifices for eyes and ears were sewn closed. The cap was trimmed with a ruff of fox tail. The summer cap was smoke tanned caribou skin. It lacked the ruff, but might be trimmed at the forward edge with a fringe of beads. The accompanying sketch, Figure 6, illustrates by means of the summer outfit, the
basic form of these garments. The upper portion of the trousers is conjectural.

Figure 6. Aboriginal summer clothing of the man. The decoration consists of porcupine quill-work in geometric design and fringing. The form of the winter outfit was almost identical.

Seams were painted with red ochre. The primary reason apparently was simply because it was colorful. The fringe might be painted with red ochre also. The fringe was non-utilitarian or, as one informant put it, "for fancy."

Porcupine quills were dyed blue, red or brownish-red with blueberries, cranberries, and willow respectively. As late as the 1880's at least, older people were still wearing
dentalia in their noses.

Children's clothing was much like that of adults, but simpler. The most important functional difference was that instead of separate mittens, the ends of the sleeves were closed, but had a slit at the wrist through which the child could put its hand. The importance of the sleeve arrangement for children's clothes was that it obviated the possibility of mittens being lost.

In the old days, clothing, especially that worn in the winter, was closely cared for. Winter clothes were left outside to keep the hairs from falling out. During the summer, winter clothes would be cached.

Apparently for the summer outfit, when available, moose hide might be used for the foot portion of the trousers. The wearing characteristics of moose hide are said to be superior to those of caribou. Lacking moose hide, bull caribou hide would be used.

One informant spoke of woven rabbit skin having been used for shirts and vests. It was not possible to ascertain at what period these might have been in use. In view of other statements, it seems rather unlikely to have been in aboriginal usage, but that is possible.

The thermal characteristics of caribou and reindeer...
skins are well known. Clothing so constructed is quite light, probably warmer per unit of weight than any other type with the possible exception of eider down. Growth of caribou hair is quite thick -- to the extent that it is virtually impossible to part the hair with the fingers and find hide. In addition, and perhaps more important, the individual hair shafts have air cells within them and have the appearance of being completely hollow. The presence of entrapped air in each individual hair undoubtedly imparts insulative value to it and as well, reduces its weight. The often-noted difficulty of caribou skin clothing is the tendency of the hairs to come out and break off.

Clothing of the Anglo-American period. Although the clothing of the Netsi Kutchin did not change from the aboriginal pattern until some years after the British quit Fort Yukon and Old Rampart, the term Anglo-American is used here advisedly. Some of the changes at least, which entered Netsi Kutchin culture came about as a result of the lingering influence of the Hudson's Bay Company. It is not possible to pin an exact date on the time that these changes took place, as they undoubtedly occurred piecemeal. Thus, until quite recently, children in the winter time were
attired in essentially the same outfit used aboriginally. It may be safely assumed that by 1900 the adult Netsi Kutchin were completely out of the aboriginal costume.

While the ultimate cause of many of the changes that came about was in part the Hudson's Bay Company, the immediate source for the Netsi Kutchin was Fort Yukon. The Indians there served as models. Summer clothing above the ankles will not be discussed, since by this time it consisted most largely of manufactured clothing obtained from Fort Yukon. Winter clothing was another matter.

One of the most notable changes occurred in men's clothing. In place of the old upper garment, or shirt, a parka was worn. The parka was of very distinctive design, and at the time, was probably the most widely worn winter garment among the men in Fort Yukon. It was copied from that worn by the French Canadian half-breeds in the employ of the Hudson's Bay Company. The body of the parka was of caribou skin with the fur out. It had a pointed hood, usually of dark blue cloth, lined sometimes with cotton flannel. The ruff was usually fox fur. The parka was not a pullover, but rather opened down the front. Tanned caribou string ties served to close it. The edges of the garment to either side of the opening were trimmed with a strip of white rabbit fur. The bottom edge was straight.
and trimmed with a scalloped strip of smoke tanned caribou skin about an inch and a half wide. The cuffs were finished off with narrow bands of lynx fur. A fringe of smoke tanned caribou skin was sewn in at the shoulders. There was some variation in the detail, as beaver might be substituted for the rabbit fur strips down the front. The parka was called tI zo Ik. Caribou skin pants which reached to about the calves were worn with this parka. The pants were fitted with draw strings on the legs and belt loops. A pair of these made for the investigator also had a button fly, but it is not known how general this was around 1900. Caribou leg skin boots, the tops of which reached above the lower end of the pants, were worn with this outfit. The bottoms were of smoke tanned moose hide, or occasionally bull caribou hide. This outfit is shown in Figure 7 below and in a contemporary version in Plate XVI, Figure 2.

Probably about this time the people started manufacturing skin socks of caribou skin with the fur turned in. Interestingly, the construction of the skin sock is like that of the lower end of the aboriginal boot-trouser combination. Caribou skin gloves, apparently mostly ungauntletted, have probably been made for the past sixty years or so.
About this time, pullover parkas of caribou skin, mountain sheep skin, and sometimes rabbit fur came into use. These were more usually worn by the women. These parkas generally had close fitting hoods, fur ruffs, and were decorated along the bottom edge, which was straight,

![Diagram of man's clothing](image)

**Figure 7.** The man's clothing of the Anglo-American period. Pants and parka of caribou fawn; boot uppers of caribou leg skin. Mittens of moose hide.

with a checkered strip. The latter was made by using cut out pieces of skins of different colors arranged in a mosaic. Sometimes the bottom might merely be trimmed with a fur of a different color. Strips of wolverine fur
placed vertically on the back and front of the parka were frequently used by women. The design of these parkas was evidently Eskimo. It is apparent that about 1900 a fair degree of Eskimo influence reached the central Yukon River. It was in the 1890's that the village of Beaver on the Yukon was settled by Eskimos from Point Barrow under the leadership of Frank Yasuda, a former Japanese trader at Barrow. It is possible that the idea of skin socks and leg skin boots were also due to Eskimo influence of the time. Both sexes, when dressed for cold weather in the above outfits would wear long underwear. Woolen sweaters and shirts were in use by this time too, and they might be used in conjunction. Some of the older people may have adopted the woven rabbit skin parkas which were so popular with older people at Fort Yukon during this period. They were said to be exceptionally warm.

Summer foot gear of this period was generally a pointed toe moccasin with a wrap-around top having serrated edges, a beaded instep, and a seam down the center of the toe. The bead work designs were floral in type. The moccasins are matched by those apparently aboriginally used by the Chipewyans. There can be little doubt that this moccasin was taken over in toto from the Hudson's Bay Company.
According to Birket-Smith, the style is similar to that of the Cree (Figure 8, f). In rainy weather moccasins were frequently taken off and a person would go barefoot to save them.

These same moccasins came to be used in the winter, but probably not for extremely cold use, nor in conjunction with caribou skin pants. The winter version was identical in design, but was necessarily larger to accommodate skin socks, duffel, or several pairs of woolen socks. It will readily be seen that characterization of the clothing of the Anglo-American period is difficult. The items enumerated above were in common use, but not invariably so. This was a period of increasing hybridization between various Alaskan native forms and Anglo-American white forms of dress.

Dress of the present day. At the present time, the major source of influence for ideas of dress, among other things, is still Fort Yukon. The people of Arctic Village wear exactly the same sort of clothes as are worn in Fort Yukon. A low-cut moccasin referred to as a "slipper" with bead work across the whole upper portion of the foot is the most commonly seen moccasin today. They are worn by both men and women and are differentiated on the basis of
the trim around the ankle. Women invariably wear slippers that are trimmed in white rabbit fur, while men's are invariably trimmed in beaver (Figure 8, b). A few older individuals still prefer the pointed toe moccasins and they are now thought of as an old form. In the summer, one commonly sees a person wearing moccasins with rubber overshoes over them. Moccasins, or slippers, are also commonly worn around the house and about the village in the winter. The most common footgear used in the winter on the trail is what is called a canvas boot. The boot has a very high top of white canvas usually trimmed at the top with scallops of colored felt. The bottom and a strip around the side of the foot are of moose hide. A drawstring is at the top usually with yarn dangles at the ends. Two caribou strings attached at either side of the foot are wrapped about the ankle, then again about the lower leg usually, and tied (Figure 8, h). In conjunction with the canvas boot, skin socks may be worn, felt innersoles used, woolen socks, or U. S. Army surplus pile socks.

Another item of local manufacture that is in common use are mittens. They are usually made from moose hide and are commonly lined with blanket material. Most commonly they are gauntlet forms, although some shorter mittens are
still made. Occasionally the upper part of the gauntlet and the upper part of the hand may be beaded. They are almost always trimmed with fur of some kind, most frequently beaver for men and white rabbit for women. If they are of the gauntlet type, there is generally a strip of fur completely encircling the wrist and another at the upper edge of the gauntlet. Mittens of this type are shown in Figure 7 and Plate XVI, Figure 2. Seams of mittens today frequently have a strip of red or green felt sewn in as a welt. They are attached to each other usually by means of a brightly colored, braided, yarn string which is worn over the shoulder. The string on children's mittens usually, in addition, has a string across the chest connecting the mitten strings; this creates a kind of yoke and makes it more difficult for the child to lose the mittens. Men out hunting today will wear cotton gloves inside their mittens to avoid frostbiting the hands when operating their rifles or performing other tasks requiring manipulation of the fingers.

Virtually no fur or caribou skin garments are worn today. Cloth parkas, usually in bright colors with a wolf ruff, and zipper closing are usually seen. They are frequently decorated with rick-rack. Very occasionally an
older man may wear one of the Hudson's Bay parkas. Generally, all clothing is on the white pattern today. In the winter the men wear woolen trousers, long underwear, and the woolen shirts along with the items mentioned above. One sees a great deal of U. S. Army surplus clothing being used. There can be little question, but that the present adaptation in terms of clothing is far inferior to either that of the aboriginal period, or the Anglo-American period. One must assume that the breakdown of this aspect of the material culture is due to the greater prestige that white style clothing is felt to bestow. Some individuals, especially younger people, do not even wear the locally manufactured canvas boots in the winter, but depend upon items of U. S. Army surplus, or similar things. A striking and tragic example of just how poor is the present day adaptation in clothing was provided by the death, in the winter of 1961, of a young man who attempted to make a rather long trip by toboggan when actually quite improperly dressed for the weather. The man died on the trail of exposure. Such happenings are rare, but they do occur.

Footgear. An especial brief note may be appended here on footgear. In addition to the common, recent forms of footgear which utilize hides, there are a number of others.
For very young children, a boot of smoke tanned caribou hide sewn like the skin sock, is made. The tops extend a short way above the ankle. The top may be trimmed in rabbit fur which is thought fitting for a small child (Figure 8, d). One occasionally sees moccasins which utilize the toe style of the modern slipper, but have the wrap around tops and ties that went with the older pointed toe moccasin (Figure 8, c). Examples of these have been seen with a plain, unbeaded instep, but with a narrow band of geometric beading around the moccasin toe (Figure 8, a). The canvas boot form is sometimes seen utilizing brightly colored corduroy instead of white canvas. These have been noted on both children and occasionally on old people. Another style of boot seen is the man's dancing boot which has a moose hide bottom like that used on the canvas boot, and an upper of calfskin which is ordered from the states. The border of the boot will have a beaded band completely around it about four inches deep. They are sometimes seen with zippers on the side. There is a female counterpart in the girl's dancing boot. It is made after the style of the slipper except it is made with a higher top and is laced up the front like a conventional shoe. They are always heavily beaded around the sides and on the toe, and
are trimmed off with white rabbit fur. Dancing boots are used when the people do the jigs and reels that were introduced by the Hudson's Bay Company and remain quite popular.

Caribou leg skin boots are also still seen. A variant of these boots may be made of alternate vertical strips of caribou leg skin and mountain sheep. Except for the soft moose hide bottom, this is probably also an Eskimo style. The boots shown in Figure 8, g and Plate XVI, Figure 2 are of this type. Occasionally, too, one may see a high boot for men made entirely of moose hide. The construction of the boot is essentially like that of the old pants-boot combination. It has a drawstring top and may be trimmed at the top with beaver (Figure 8, e).

There are other variants as well as those mentioned. To separate these out today as to their origins would be tremendously complex in view of the lack of data for the rest of interior and coastal Alaska. The winter boots that are used are, in general, far superior for the intense, dry cold, than would be any boot commercially available to the Indians. Most of the people are well aware of this. Only a few of the more fashion conscious younger people are prone to forget the importance of efficient footwear. The important implications of the temperature inversion
have been mentioned above. This fact, combined with another, that the vulnerability of the extremities, particularly the feet, is greater than any other parts of the body indicates the high importance of efficient footgear.

Figure 8. Some recent and contemporary footgear. Top row left to right (a) variant of the slipper with modified wrap-around top, (b) "slipper" moccasin, (c) slipper with wrap-around top, (d) child's boot. Bottom row, (e) moose hide boot, (f) pointed toe moccasin, (g) caribou leg skin boot with strips of mountain sheep skin (h) canvas boot.

Dwelling and Other Structures.

If adequate clothing was important in Netsai, adequate housing was no less so. Adequate clothing without adequate housing would allow neither an individual nor a culture to
survive. There is probably no clothing made of any design which would allow a person to survive if long inactive in extreme cold. In humans, as with other organisms, activity must be alternated with rest. The importance of shelter follows from these requisites and limitations.

**Aboriginal dwellings.** The Netsi Kutchin constructed two different kinds of dwellings aboriginally. The kind of house used depended upon the kinds of activities the people were engaging in.

The **kwant**, or moss house, so far as could be determined, was associated only with the caribou pound. It evidently was not always erected there even, but since work at the caribou pound represented the only semi-permanent settlement that existed, it was probably only under the circumstance of the pound's use that the kwant was built. Another factor which suggested its use at that time was that the caribou pound was worked in the fall and winter. The kwant was undoubtedly a warmer and more comfortable dwelling, hence the logic of its use at that time. The basic plan of the kwant was a rectangle. Four corner posts, five to six feet high, were set in the ground and each saddled to accept stringers. In the long axis of the rectangle at each end, mid-way between the corner posts, were set two higher posts,
perhaps eight feet high. They were also saddled. These last two posts were to accept a ridge pole, for the kwant was a gabled structure. Two stringers were placed on each pair of corner posts parallel to the ridge pole. From each of the four corner posts, a stout pole of the proper length was laid up to the ridge pole posts. The foregoing constituted the framework of the kwant. The covering for the framework might be of poles, but was preferably of split logs. The latter were used if facilities and time were at hand. Split logs of the same length were leaned from the ground up to the stringers on either side. They were butted as closely as possible. The gable ends were similarly closed in with appropriate lengths of split logs. At one gable end, a place was left for a doorway. Finally, the kwant was roofed by more split logs, or poles, laid from each stringer to the ridge pole. A space was left in the center for a smoke hole. The kwant was then covered with rectangular slabs of moss which were taken up when the ground was first freezing. After the first snowfall, snow might be thrown up around the kwant as further insulation. Snowshoes were used to perform this task. The door was of caribou hide draped from the top and the fireplace was on a raised rectangle of earth in the center of the kwant.
Information on the placement of the door was somewhat equivocal. A model of this house made for the investigator, placed the door at the end, but there was some indication that it might, as well, be set on one side. Figure 9, based upon two models shows the structure and plan of this dwelling.

Figure 9. The kwant or moss house of aboriginal times.

The kwant was floored with spruce boughs, or dwarf birch. It was said that occasionally two kwants might be conjoined, but apparently not interconnected by a passageway. In such a case, there would be two or more families present. The sleeping area in the kwant was at one gable
end. If a man had two wives, he slept in the middle with his feet toward the fire, and if the entryway was on the left hand side from that position, the number one wife was on his left and the lesser wife in the right hand corner.

Probably the most important dwelling structure of the Netsi Kutchin was the skin tent. There might have been people who would never sleep in a kwant, but all families owned a skin tent. Setting forth a description of the framework for the skin tent is difficult. Perhaps the following means may be adopted. The plan of the one family skin tent was roughly that of a Norman arch, i.e., two parallel sides joined at one end by a curve. In longitudinal section the tent was a half crescent. The reader is asked to visualize two parallel rows of vertical poles, three each, set about eight feet apart. The distance between poles in one row might be three feet. At one end of the two parallel rows were set another series of five poles forming a crescent (the curved portion of the Norman arch). The opposite eight foot end was open. The poles forming the crescent were curved inward forming part of the roof, and of sufficient length to extend beyond the last vertical poles at the open end. The outermost of these poles were tied with caribou string to the vertical poles of each
parallel side. A shorter curved member was set transversely under the longer curved pieces and tied on to the vertical posts and to the outermost curved pieces. The frame was then covered with caribou skins sewn together. The hair was left on and turned inward. At the open end of the tent the skins hung down to the ground making a flat wall. It took sixteen skins to cover the one family tent. Since the tent was apparently seldom used in the form here presented, it was not clear just how access was gained to the tent, or how smoke would be allowed to escape from it. It was said that the fireplace, again raised two and a half feet from the floor like that in the kwant, would be set at the open or flat walled end of the tent. While it is true that the tent in this form was rarely used, nonetheless, this did constitute one tent, and if one family was by itself, it was this they lived in.

The more common pattern was for two families to camp and work together. In that case, the two skin tents were joined together and the two families shared a common fire. The joining of the two tents was accomplished by joining and tying the outermost curved members. The other longitudinal curved members did not meet. Rather, a gap was left there to allow smoke to escape from the conjoined
tents. Another pole was laid transversly across the tent and tied on to the joined outer curved pieces. It was directly over the fire. A wooden hook, used in cooking, was suspended from it by a caribou string. The entryway was to one side in the center of the longitudinal axis of the house. A total of thirty-two skins were required to cover the whole two family dwelling. They were not sewn together. Each family retained its covering made up of sixteen skins. The flooring of the tent was as that for the kwant. The foregoing description was of the skin tent as used in winter. A further touch consisted of piling moss and snow up around the sides of the tent. Snowshoes were used to shovel snow. The accompanying Figure 10 was made from a photograph of a model collected.

According to one informant, in the summer only the top part of the two family skin tent would be covered. The sides were left open and the skins used might be hairless. According to this man, the skin tent as used in the summer was called ni vya; as used in the winter, ni va zhE. The latter, at least, must be a generic term for the skin tent since all other informants used it constantly.

The ni va zhE was said to be very smokey inside for which reason the children played outdoors a good deal. The
ni va zhE was still in use until about 1900 or so, or perhaps the time of the Caro stampede. There are yet people around who were born in them and some older women who bore their first children in the skin tent. Dwellings were considered the property of both man and wife. The curved members of the frame were always retained, but vertical poles might be cut anew at each camping. It was said that

Figure 10. The framework of the skin tent or ni va zhE. The more common two family form is shown; each half of this structure constituted a single tent. All points of which poles join were tied with caribou string.

the year the skin tent was abandoned was the same year that a Captain Ray's steamboat froze in at Fort Yukon. It has
not been possible to determine just what year is referred to. Many of the people had gone down to Fort Yukon because of famine in Netsai.

On those occasions in very cold weather when a person was caught out and unable to return home, a special emergency house was constructed. Using the snowshoes as shovels, a big mound of snow was heaped up. The person then burrowed into the center of this throwing snow out of the orifice he had created. In the center, dry under-branches of spruce and small spruce boughs were set and fired. This served to enlarge the cavity that had been created by burrowing and created an icy glaze over the interior surface. If it was sufficiently cold, the man, before starting this operation, would build a fire and periodically march around it to warm himself. No fire was built inside the snowhouse, hence, there was no smoke hole. Any cooking that needed to be done was done on the outside fire. Spruce boughs were used to sleep on and heat for the interior was obtained by putting three fist-sized rocks in the fire and placing them on a flat rock inside the snow house. A door might be constructed in one of two ways; the man might take his coat and prop it against the entrance with two sticks and then pack snow around it, or a block of compacted snow
might be brought in and loose snow put around it to seal it. The outside fire was kept going with rocks in it. In the morning the fire would still have hot coals in it and the rocks in it would still be hot. They would be brought in and the cold ones put in the fire which was built up again. People who have used this snow house say that far from requiring a blanket in it, one perspires inside. The snowhouse might be large enough to accommodate two men.

Two names were collected for this structure, shi E and tsIt j?a kwan. The meaning of the first term is unknown. TsIt refers to a crusted snow surface left after wind has taken off loose snow. Kwan is the same as that name used for moss house. A ground squirrel burrow is called j?a kwan. A beaver lodge is also called by a term using the word kwan. Apparently whenever it is used it refers to the tumulus appearance of a structure.

The Netsi Kutchin also built a curious kind of defensive structure. It was of tipi form created by leaning a number of saplings set close together around a living tree. The saplings were tied at the top. Apparently too, they might occasionally be split if time were available. This structure was made only in expectation of war. At the first indication that Eskimos were coming into the country
the 'hiva might be thrown up. They are described as having been quite big, large enough to accommodate at least one large family and possibly more. Near the top of the structure was a pole platform of some sort on which one man could stand and act as a lookout. Enough equipment and food was taken in to withstand a siege. What were described as large, flat, thin rocks were laid up over the outside of the entire structure leaving only a few cracks here and there to shoot through. It was said that the reason for using a living tree as a base was to prevent the Eskimos from knocking down the structure with a battering ram. The Eskimos did not make these fortresses.

A common furnishing of all dwellings were caribou skin sleeping robes and ground cloths for each member of the family.

To round out the discussion of precontact structures, reference is made to two others. That structure which was set up for the birth of a woman's first child has been described above. Little information could be obtained about the menstrual hut formerly used. It appears to have been made like the single family ni vya, but smaller.

Post-contact dwellings and structures. The almost universal dwelling today is the log cabin. They are of
notched log construction, but the notching is frequently done with a saw rather than an ax. Sphagnum moss is used for chinking. Sometimes at the beginning of winter chinking will be reinforced on the outside with mud applied with the fingers. These are gable roof structures with a door on the gable end. All are fitted with windows. Roofs are commonly constructed of poles about three inches in diameter laid side by side up to the ridge pole. Sod is laid over the poles to complete the roof. The biggest log cabins are about twenty-four feet long and sixteen feet wide. Most commonly they are smaller than that. Flooring is of locally cut board, as are doors, door frames and window frames. Every house is equipped either with a drum stove or the rectangular Yukon stove. Lighting is by means of kerosene lamps, Coleman lanterns, and candles.

For the most part, beds are locally made of board with a solid board bottom and board sides. Most people seem to have commercially-made mattresses. Some beds are equipped with springs. The sleeping area within the cabin is usually curtained off, sometimes just around the bed, and sometimes the whole back of the house. Stools and benches are generally half logs with sapling legs. The holes to accept the sapling legs are drilled completely through. The legs
are thrust in and sawed off flush with the seat level. Tables are locally made of planks. Bed posts are sometimes carved. A diamond design is common.

The present house is called dat chan zhE. The basic style seems to be the same as that of most of the log houses characteristic of interior Alaska. These cabins, however, generally lack the long, overhanging "sunbonnet" roof seen so frequently on old log cabins elsewhere in central Alaska. The style was probably taken from Fort Yukon, or perhaps from Caro. In either case, it is genetically related to the most common style of Alaskan log house. Some individuals append to the front a small anteroom in which winter clothing and other equipment may be kept. It is unheated.

Associated with each cabin are two other structures. The gable roofed cache set on low posts called di tsi has been described above. Caches are generally quite close to the house, in some cases abutting directly on it. Removed from the cabin, usually by fifty feet or so, is an outhouse. Outhouse construction varies. The excavation is usually fairly shallow because of permafrost. The floor may be of rough boards or simply beaten earth. The seats are of rough boards. The teardrop shape common to such openings
is usually faithfully copied, but occasionally reversed from
the normal position. Some outhouses consist of a rather
crude frame covered with flattened five gallon Pearl Oil
or Blazo cans. Other outhouses are more conventionally
made with the whole building consisting of butted vertical
boards. Some are made from vertically set, unpeeled spruce
poles, and others combine a number of these construction
features. Most have gaps of varying widths between the
boards and poles. All have a flat roof which slopes rear­
ward and a door which opens in the front. Attention is
directed to the map of Arctic Village (p. 227) in which
the relationships are brought out.

The first log house built in Netsai still stands, in
ruins, near the northeast corner of Old John Lake. It was
built by the man called Trot_sya sometime between 1869 and
1882. Trot_sya had seen an English cabin on the Porcupine
at Old Rampart and decided to duplicate it. He evidently
made a fairly close study of the house on the Porcupine.
The logs are not notched, but rather are joined by mortice
and tenon into four upright corner posts. All of the work
on that house was done with an ax. The logs were hewn to
rectangular cross section. (This trait lingered for a
time after the American cabin was adopted.) The door was
on one side and it was said that the house originally had
a mud-stick chimney which the Indians called vi zhat hat lai ji (roughly - "smoke inside goes out of it"). Vertical posts on the inside of the cabin supported the ridge pole. These posts were pegged into the horizontal wall logs. The floor was of beaten earth and the roof was sod. The Indians today refer to Trot sya's cabin, and any other one which shows some of its construction detail, as an en qllIs zhE or "English house." Even though that was the first log house, except as noted above, neither the style nor the construction of log houses seems to have caught on until Arctic Village was founded. Trot sya was evidently ahead of his time.

The word zhE used generally to refer to any domicile may be derived from the French chez. There seems to be a certain amount of confusion over its use with the skin tent. One person maintained that the one family tent was called ni vya only. It may be of some significance in this connection that zhE is not used with the word for the aboriginal moss house. There are a number of other loan words from French. Tea is called le ti^n, older people still refer to coffee as le cafe, and the most common way of expressing thanks is ma si? cho, literally, a "big merci." Plate XIV, Figure 1, shows a portion of Arctic Village. Figure 2 of
of the same, is a closeup of one of the cabins. Plate XV, Figure 1, of a portion of the interior of one cabin, shows the pole roof construction. Figure 2 of Plate XV shows the log sawhorse upon which fire wood is reduced to proper lengths. It is an important adjunct of each dwelling.

The functional counterpart of the aboriginal skin tent is the white, canvas, wall tent in use today. It is used when people are outside the village, and also, within the village during the summer. There are also two or three individuals who live year-round in these tents. In the latter case they are equipped with Yukon stoves, and a sturdy frame. One was seen set in a notched log base. Their use in the village in the summer is probably in part to relieve the crowdedness of the small cabins, but probably equally, the people feel the need to get out. They may be set directly in front of the owner's cabin. Some people in the summer, because they find cooking in the house too hot, move their cook stoves outside and set them up. Tent flooring is of small spruce boughs or dwarf birch. Folding camp cots are usually used in them, although some people put a mattress on the ground. Mosquito bars are used and commonly a small smudge fire burns before each tent and Buhach burns inside. Figure 1, Plate XVI
Figure 1. Late winter in Arctic Village. The view is north-northeast.

Figure 2. A recently constructed log cabin typical of those in Arctic Village. Note the Yukon stove set up in front for the summer cooking. The owner of this cabin collected all outgoing mail in the box attached to the front of the house.
PLATE XV. CABIN ROOF CONSTRUCTION AND SAWHORSE

Figure 1. Poles set side by side form the roofs of all cabins. Over this is sod. Some of the wall logs here are hewn. They were taken from an earlier house. Note the modern cloth parka hanging by the door.

Figure 2. The log sawhorse is placed near each cabin. Its primary use is in cutting firewood to the proper lengths. The "Swede" saw, as shown, is used with it.
is of a wall tent set up for summer use about half a mile from Arctic Village. Its occupant was an older woman who wanted to get away from the children.

Meteorological Phenomena.

Time and cardinal directions. Time was told by the sun. The distinctions made were morning, mid-morning, early afternoon, late afternoon, and night time. The time of day was in some measure equated with directions. The probably results from the summer time condition when the sun is always completely above the horizon, or nearly so, and time may be reckoned throughout the twenty-four hour day by reference to the sun. Thus midnight, to\(^n\) tlan, is thought of as north. Sunrise equates with east and is called shr\(\text{E}\) ha \(\text{a}\) k. Mid-day is south, called drIn tlan. Sunset is west and called 'ha dthat. The terms sunrise and sunset, as used here, were probably one of those unfortunate approximations of translation. Early morning was called vat \(?\) ai. Morning, roughly from 6:00 A.M. to 12:00 noon, was called a \(\text{v}\) an. Afternoon is called e rIn dan ge\(^n\) da. Night was called do\(^n\).

The cardinal directions are the following: North, nan chi dIk; South, yEt ti; East, yEn ji\(?\); West, zhEk tsai\(^n\).

The period in the winter when the sun was below the
PLATE XVI. CANVAS TENT AND WINTER CLOTHING

Figure 1. The wall tent of canvas functions today as did the skin tent of the past. Note the stove inside and the fish suspended from the ridgepole. View is east-northeast.

Figure 2. The model here wears some important elements of winter clothing of the style popular between 1900 - 1940. Shown are caribou leg skin and sheep skin boots, gauntleted moose hide mittens, smoked caribou skin gun case, and hunting snowshoes.
horizon was called ha zak. Spring was called she\textsuperscript{d}It. The summer was called by a term meaning approximately "sunrise all night", to\textsuperscript{n} dat thak vrIn ozri a a.

Note may be made here in the difference in sleeping periods between summer and winter. In the winter, fall, and spring, people generally go to bed between 8:00 P.M. and 12:00 midnight. They rise relatively early, but usually no one is stirring about in the village before 9:00 A.M., or so. In the summer, people most usually stay awake all "night", and sleep most of the day. In the summer it is rare indeed to see anyone abroad until well after mid-day. When on the trail in the summer, most people prefer to sleep in the daytime and travel at night because it is cooler.

The Netsi Kutchin in common with many other northern Athabascan peoples had a calendar which consisted of twelve lunar months. These terms and their approximate translations are presented below. The suffix ozri signifies moon, at least in this context.

December, ni zyu sai\textsuperscript{n} chan sa\textsuperscript{t}1, "pole on right"
January, chak ozri, "cold moon"
February, ve kwa ha that, "pole on left"
March, jǐ zhEn ozri, "eagle moon"
April, jE che ozri, "hawk (?) moon"
May, gu lu ozri, "icy moon" (refers to snow getting crusty)
June, va nan chi 'ho, "ducks lose feathers on wings"
July, van nan E nat syu ozri, "feathers grow"
August, van nan di chi li, "taking velvet off"
September, nit zyu ozri, "white all over" (first frost)
October, vat zai ozri, "caribou moon"
November, de vi ozri, "sheep moon"

It was said that in former times the poles of the skin tent were called by month names. At least this seemed to be the case for the winter months. As one stood inside the tent, the pole on the right side of the door was called December; the middle of the door was January; and the pole on the left was February. It was further said, in a sense, the whole house represented the full year. The small opening of the door was to indicate the short days of the three cold months. The significance, if any, of this is not clear.

Snow terms. As might be expectable in a people who spend most of their lives dealing with snow, there exists a large vocabulary of words relating to snow and similar phenomena. Some of the terms presented here were collected by the investigator, some by Dr. William O. Pruitt, of College, Alaska. The latter are used with his kind permission.

Snow on ground -- za
Snow on trees -- de za
Rime -- sho
Aufeis -- qIt

Crystalline compacted snow used for water -- sai? I zha

A thin crust which breaks under sled runners -- sai? I zha

Naled or ice mass from a spring -- kE rai chu^n

Hard surface snow after loose snow has been blown off -- tsIt

Anchor ice -- cho gwEt\(^1\) hl\(^1\)u

Deep snow on ground as in forests -- nan kat za

Smooth surface fine grained snow - ja dri

Wind blown snow adhering to sides of trees -- sEt\(^1\) de hl\(^1\)u atzi

A heavy snow storm -- gwIn tro a shi

Sun crust. Thick soft crust in spring -- gu lu kak

Crust resulting from freezing rain -- gwE hl\(^1\)u

A crust with light fresh snow on top -- va kat tre a\(^{t1}\)

A heavy snowfall in a short period of time -- nE chE

Big snowflakes -- qE tsi cha

Big snowflakes drifting down slowly -- za cho a gwan tlo a shi

Wet heavy snow -- da an 'tlo

Frosted moss at the beginning of freeze up -- de hait za god li

Ablation needles -- god\(^1\) lu
Ice fog -- te hlat

The bowl shaped depression beneath a spruce tree, almost devoid of snow -- za shon ja

Frost, in general, in the fall -- qa sho i va

A light snow, no apparent clouds, when very cold -- chI I re

Soft snow -- chat dyo

Little snow on the ground -- ch?E It sIk

Melting snow -- nE ku nE zhri

The snow used for water is sai? I zha. It may exist as a crust and/or as corn snow. In aboriginal days a wooden scoop was used to gather the snow. Today, a dinner plate may be used to collect it. It is put in a can and packed down. The high water content is, of course, fully recognized. The Indians say that a can packed with powder snow will yield only one-quarter can of water. Sai? I zha will give three-quarters of a can. In late spring, snow melt-water is used.

Beliefs about meteorological phenomena and weather lore.

Some of the material listed below as weather lore is not, in a strict sense, that. As will be seen some of these beliefs involve interpretations from the physical phenomena of what the future held for the people. They are included here both because of convenience and because in the minds
of the people these beliefs existed as a coherent body.
The sun is called *jrIn ozri*. The stars are called *sa?*
Rain is called *tSin*. The aurora is called *yik kai*. The
rainbow is called *she vya*, "sun snare." Cloud cover is
called *zhE 'ko^n*.

A red aurora, *yE kai dat tzik*, meant war.

When the auroral lights move rapidly with a whipping
motion ("curtains") it means that caribou are under that
place. *yik kai* is making a snare to catch them.

When the aurora first shows in the fall, it means
there will be no more rain and it will turn cold. When the
aurora forms a peak (corona) overhead, in some direction
there will be a dark opening. That will be a good direction
in which to go for hunting.

When the aurora whips back and forth it emits a whistling
noise.

When the moon emerges from an eclipse "backwards",
(perhaps referring to a partial eclipse) it means bad luck
in hunting. When it emerges facing the opposite direction,
hunting luck will be good. When the latter happens, the
people would put on their pack sacks with a little meat in
them, and sing and visit everyone. They would act as if
the packs were very heavy. In the opposite condition, the
people would be downhearted.

The people were told about interpreting luck in eclipses by the legendary boy who wore martenskin pants and ascended to the moon. Either the name of the boy or the legend was $\text{to}^{\text{n}} \text{ozri}$, "night moon."

When coronas (small rings) appear around the moon in the winter, there will be snow.

When the new moon comes out in clear weather with its points turned up, there will be great cold in that month.

When the new moon can't be seen, it will be warm in that month.

When the moon sets facing west, there will be a lot of meat. When it sets facing east, hunting luck will be bad.

The occurrence of sun dogs (parhelia) means there will be wind.

The occurrence of sun dogs with light colored halos around the sun means there will be wind and rain together.

Where there is a "little piece of rainbow" (crepuscular rays ?) under the sun, the weather will turn warm.

If the sun has horns above it (anticrepuscular rays ?) there will be a strong wind.

When there is a "rainbow" all around the horizon
(probably refers to colors on the horizon in winter) with little rings (parhelia), many people will die.

When the sun has a beard (i.e., crepuscular rays), it will be very warm and stay that way a long time. This is said to apply in summer and winter.

Colored coronas around the sun mean wind and rain.

The occurrence of a true rainbow means there will be no more rain. "The sun has set a snare for the rain."

Rain meant people would starve.

Wind blowing from the south for a long time meant many people would die. Wind from the north meant the opposite and was therefore desired.

Very black clouds coming from the south mean it will rain a long time.

When the sky to the north is clear and becomes white, fair weather will follow. If it becomes clear to the south, it will be so for only a short time, then start raining again. All summer rains come from the south.

There appears to be some feeling that clouds that come in from the south bringing rain in the summer, continue on their journey to someplace in the north. The people say that in the fall, all the clouds come back down and it is then that it starts snowing. Just as summer rains come
from the south, so winter snows come from the north.

Thunderheads arriving in a series meant war with the Eskimos.

When the lesser yellow legs flies up and down, it means he wants wind. When wind is seen on a lake, it was made by him. When the loon cries, it is going to cloud up.

When a certain small bird called 'trIn ("rain bird"; no further identification) calls, he is calling the rain. When he is heard it means there will be rain the next day.

When the merganser (?) flies in the air crying "ah, ah, ah", a certain phrase is spoken to the bird and the next day there will be sunshine.

Rain is predicted by watching the behavior of the ground squirrel. When it is going to rain they go into their holes and plug the entryways with nesting materials to keep out the water. When it is going to rain a long time, the ground squirrel covers a great amount of territory picking up food which he "caches" in his cheek pouches, sometimes, the Indians say, to the extent that his teeth won't meet. He then returns to his burrow and plugs the entryway.

As may be seen above, rain was greatly disliked. A part of that dislike undoubtedly stems from the fact that neither clothing nor housing was suited to rainy conditions.
There existed a number of means of warding off rain, some of which are still in use. If the rain is coming toward a person, the person may light a match and throw it in another direction. The rain will take that direction then. A hot coal from a fire may be thrown toward the rain to ward it off. A person may take a willow rod, tear the bark in shreds, so that they hang, stick the rod in the ground and point it toward the rain. That is said to keep the rain away. If available, the dried head of a pike may be impaled on the end of a stick with its mouth propped open toward the rain. This scares the rain away. If it has been raining for a long time, a "top knot" of black spruce may be boiled and thrown around the horizon while still hot. At the same time one says "zhE 'ko\textsuperscript{n} ho\textsuperscript{h} kwa", "there shall be no more clouds." The only use of the bull-roarer, called nin nya, is as a device to scare away the rain. Anyone may use it for that purpose. (The bull-roarer and several other small items mentioned in text may be seen in Plate XVII.) A certain kind of small, woolly, caterpillar is found and turned over on its back. Another, more extreme method is to catch a Canada Jay and singe off its feathers. The pike head is said to be used especially to dispel heavy rain clouds. A nin nya is used especially for misty fog.
Left to right: Knife sheath of current manufacture with bottom from tin can. Ring and pin game. (Bottom) Large composite set hook with caribou splint bone point. (Top) Grayling hook with bone shank and steel point. Lead sinker on line above hook. At far right, the bull-roarer or nin nva. Colors are orange and black.
Occasionally, the black spruce boughs may be boiled (outside only) and thrown about the horizon to stop snow.

Miscellaneous observations: Except in extreme emergencies, dogs are not run at temperatures below minus sixty degrees. It is dangerous and can cause freezing of the dogs' lungs. Most human activities are slowed down by temperatures in excess of minus forty-five degrees. People do not absolutely cease outdoor activities until about minus sixty degrees is reached. Even then it may be necessary to haul wood for the stoves, or perform some other outdoor work. One informant, living in Fort Yukon at that time, was out with his team in 1934 when minus seventy-eight degrees was unofficially recorded. He relates that he lost one dog and almost didn't make it in himself. Due to differences in clothing, there is probably more consideration given to temperature than was the case formerly. Although the Netsi Kutchin are brown eyed people, most, especially the men, show a ring of blue or grey about the periphery of the lens. This is said to result from excessive exposure to the glare of sun on the snow.
CHAPTER VII

COMPARISON OF THE NETSI KUTCHIN WITH CERTAIN OTHER NORTHERN PEOPLES

In this section it is proposed to present data from four other northern groups with the objective of comparing their cultural adaptations with those presented for the Netsi Kutchin. The task set is not as simple as it would appear. Ideally, the groups chosen should occupy environmental positions similar to that of the Netsi Kutchin, but they should also be as far removed physically from that people as possible. The combination of these two desiderata obviously imposes certain restrictions in choices. Still further restriction results from another necessary condition, namely, that each group chosen should be on approximately the same level of technology as the Netsi Kutchin.

Two groups were found which approximately meet these qualifications, the Kety, or Yenisei-Ostyak, of central Siberia and the Naskapi of eastern Canada. Two groups of inland Alaskan Eskimo were selected as well, despite the obvious violation of one of the imposed conditions -- that of distance. These are the Kobuk River Eskimo of north-
western Alaska, and those of Anaktuvuk Pass in the central Brooks Range. Both occupy interior locations and the territories of both are at least partially in forested country. The rationale in selecting the latter groups was, simply, that if physical distance was lacking, there should be a great deal of cultural distance to make up for it. The remaining qualifications are met by them. Properly speaking, both are Nunamiut, "inland people" but as that term is more commonly applied only to the Anaktuvuk people, it will not be used in reference to the Kobukers.

The material to be presented will be considered under the main headings: Responses to the biotic environment, and responses to the abiotic environment. Under the first of these will be subsumed the major means and techniques of subsistence, and under the second, housing, clothing, and transportation. It is these elements that seem most essential to northern adaptation.

I. SOURCES OF INFORMATION AND LOCATIONS OF GROUPS

Kety.

Information on the Kety comes from three primary sources, Donner's "Ethnological Notes about the Yenisei-Ostyak", Shimkin's article, "A Sketch of the Ket, or Yenisei-Ostyak", and Popov's "The Kety" which appeared
originally in Levin and Potapov's *Narody Sibiri*. Some additional notes are to be found in Donner's *Among the Samoyed in Siberia*.

The traditional territory of the Kety lay in the Yenisei drainage of central Siberia centering chiefly on the Podkamennaya Tunguska, the Lower Tunguska, the Turukhan, the Kureika, and Yenisei rivers. Part of the Kety also lived on the headwaters of the Taz River. Their territory formed roughly a triangle of which the apex reached slightly north of the Arctic Circle, and the base, bounded by the eighty-fourth and ninety-third east meridians, touched latitude sixty degrees north. The present city of Turukhansk (65°55′N., 88°30′E.) is in the northern part of the Kety domain.

Naskapi.

The two most important sources on the Naskapi are Turner's "Ethnology of the Ungava District" and F. G. Speck's *Naskapi*. The territory of the various bands comprising the Naskapi took in the greater part of the Labrador Peninsula. Some bands adjoined the coast of southern Hudson Bay but for the most part, the Naskapi were inland with the coasts occupied by Eskimo. The great body of the Naskapi are in an area bounded by the parallels of
fifty and fifty-eight degrees north and the meridians sixty and eighty degrees west. Most of the data presented here applies particularly to those Naskapi of the southern Ungava Peninsula.

**Nunamiut of Anaktuvuk.**

Information on the Nunamiut is derived from the excellent article by Rausch, "Notes on the Nunamiut Eskimos and Mammals of the Anaktuvuk Pass Region, Brooks Range, Alaska", Ingstad's work, *Nunamiut*, the article by Solecki, "New Data on the Inland Eskimo of Northern Alaska", and sections of Spencer's "The North Alaskan Eskimo". Incidental information on the Nunamiut has been gained from conversation from time to time with several people who have in one way or another, been associated with Anaktuvuk Pass. Notable among them have been Dr. Laurence Irving, Dr. Robert L. Rausch, both of Arctic Health Research Center, Anchorage, Alaska, and Mr. Simon Paneak of Anaktuvuk.

The extent of Nunamiut territory in former times is not known. The present community of Anaktuvuk is in the pass by that name in the central Brooks Range. Anaktuvuk is located at 68°10'N., 151°46'W.

**Kobuk River Eskimos.**

The main sources of information on these peoples are
three publications by J. L. Giddings. They are, The Arctic Woodland Culture of the Kobuk River, Forest Eskimos, and Kobuk River People.11, 12, 13

The Kobuk people dwelled formerly in a series of quite small "villages" (or neighborhoods) on the Kobuk River inland from Kotzebue Sound, northwestern Alaska. They are now concentrated in three villages, Shungnak (66°53'N., 157°05'W.), Kiana (67°02'N., 160°38'W.), and Noorvik (66°50'N., 161°00'W.).

II. RESPONSES TO THE BIOTIC MILIEU

The Kety.

Although there was some regional variation in the economic habits of the Kety, including one band, neighbors to the Samoyed, who adopted reindeer breeding of a marginal nature, the Kety traditionally were hunters and fishermen. The principal weapon was the bow, and arrow points were tipped with poison. In the summer the Kety fished, gathered pine nuts, and hunted moulting ducks. The fish were caught by means of scoop-nets and weirs. The latter were made of cedar and pine stakes interlaced with thin slats. A trap in the center of the weir served to catch the fish and they were baled out with the net. The Kety also practiced fishing at night using a fish spear and a
fire in the boat. Fish were boiled, dried over a fire, and stored for winter use in birch bark boxes.

The hunting of wild reindeer was more common among the northern Kety. Reindeer hunting was generally a cooperative affair involving a relatively large group of men. The hunt started in the open spaces of marshes between fingers of forest. The reindeer were driven from these areas into the forests. There, in the deep, soft snow, they became mired. Hunters followed them on skis and then came in and killed the animals they wanted either using the bow, a spear, or a knife. There was no use of fences or pounds set with snares. There appears to have been no snaring of big game animals along game trails.

Elk (*Alces* spp.) were relatively common and were hunted in a number of ways. In the fall, pits were dug along elk trails. In the spring they were commonly hunted from dug-out canoes, shot as they swam across rivers.

Squirrel hunting among some of the Kety bands is said to form the basis of the economy. Squirrels were hunted from the middle of October to the first of January. The bow was used in squirrel hunting. It was said that a hunter might make a circuit of thirty kilometers and return with ten to fifteen squirrels. Squirrels were boiled and
During the intense cold of the month of January, little hunting was done. The Kety subsisted during this time primarily on food which had been stored, but also engaged in some ice fishing. A hook and line was used through a hole in the ice. There also was some use of a special fish trap during the winter, but the manner of its use is not clear. From February until April there was a great deal of hunting activity. Squirrels, hares, ermine, foxes, elk, and bears might be hunted. Elements of bear ceremonialism are present in the Kety method of hunting bear. They were located in their dens where hibernating, and were speared. A number of special observances and circumlocutions were necessary.

Fishing occupied second place in importance in the Kety economy. Mention is made of a "hooked snare" but no description of it is furnished. It was more common among the southern Kety. In the north, a closely woven net was used for fish. It was set in still places in a stream, but left only a short time. A set line on which were thirty to forty barbless hooks was allowed to trail in the current of a river. It is not clear whether the latter was an aboriginal trait among the Kety or one introduced by the
Russians. The fish weir was in common use in the summer. Birch bark torches were also used in the spearing of fish from boats, an autumn activity. Fish were dried on special stands. The dried fish were then pounded to a powder called porsa. Porsa was stored in bags of fish skin. Fish and ducks were the primary foods of the summer.

Apart from the gathering of pine nuts mentioned by one author, and the digging of the bulbs of liliaceous plants in the spring, the Kety made very little use of vegetable foods. The only berry they used was the cloudberry which was cooked with fish fat.

Naskapi.

Like the Netsi Kutchin, the Naskapi were caribou hunters. The Naskapi employed three principal means of taking the caribou. First, and most important, was that practiced in the fall. At that time caribou of all sexes are together as the hunt was staged at about the beginning of the rut. The caribou gathered about the rivers and crossed them in great numbers in their fall migration. The Indians would estimate where on a given river the caribou would be crossing in greatest numbers and establish a camp there. Lookouts kept a constant eye out for the caribou and the rest of the men had their canoes in readi-
ness. After a small group of caribou had launched itself into the stream travelling in a compact mass, one or two canoes would be pushed into the water and they would rapidly and noiselessly follow the caribou, eventually placing themselves downstream, and at the rear of the herd. Care had to be taken to avoid frightening the animals, in which case they might disperse in all directions. The occupants of the canoe endeavored to herd the animals upstream toward the shore where their camp was located. The actual killing took place as the animals neared the shore. Spears were used for the purpose. The animals were speared, the spear withdrawn, and used again and again. The caribou then had just sufficient strength to pull themselves up on shore where they collapsed. If the hunt were successful, the whole group might be slaughtered.

In addition to caribou being eaten fresh at this time, a good deal of the meat was dried in the tent by exposure to smoke and hot air from the fire. Dried meat was stored for the winter. Long bones were utilized for the extraction of marrow and for the manufacture of broth. Caribou brains were used for tanning skins.

The second means of taking caribou was that practiced in the spring. The caribou were at that time migrating
to their calving grounds. Upon learning that the caribou were approaching, the Indians would station themselves along the sides of a narrow defile and on the adjoining ridges. Another group of men would come up behind the herd and urge it into the defile. As the caribou rushed in, they were shot at from both sides.

The third way in which the Naskapi took caribou was employed in the winter. A small group of caribou might be sighted and if the location was appropriate, they would be surrounded and driven into a deep snow bank. The hunters, in this case both men and women on snowshoes, followed them up and using spears, killed the floundering caribou.

Other animals of importance to the Naskapi were ducks, geese, ptarmigan, hares, porcupines, beavers, and occasionally, the lynx. It was said that ptarmigan were taken by the thousands, but that appears to have been a contact situation when the feathers of the ptarmigan were used as a trade item. Hares and rabbits were taken with the bow. The porcupine was eaten, the quills and hair being first singed off. Bears were rare and unimportant in the diet. Wolverine, wolves, and foxes were not eaten.

Fishing was of some importance among the Naskapi.
Both hooks and nets were used. One fish hook used was a composite with wooden shank and a bone point. It resembles to some degree the composite hook used by the Netsi Kutchin. Ice fishing for trout was engaged in. In the summer, salmon, whitefish, suckers, and trout were taken.

Otter and beaver were shot in the water. Deadfalls were used for mink and marten. The lynx was snared. A spring pole was used in conjunction with the snare and was of sufficient strength to lift the forward part of the animal's body from off the ground.

Vegetable foods seem not to have been too important among the Naskapi.

Nunamiut, Anaktuvuk Pass.

Nunamiut are Eskimos who live year-round inland away from the coast. Those of Anaktuvuk Pass probably spend most of their time out of the few forested valleys that occur in the area, but they do make use of them also. It is on that basis that they are included here.

The Nunamiut of Anaktuvuk are caribou hunters. One of the principal means by which the Anaktuvuk people hunted caribou in the past was through the use of a pound identical in its purpose to that used by the Netsi Kutchin. The design of the pound and the placement of the snares in it
was quite different, however. The pound itself was constructed of piles of rocks and willow branches. The pound was broadly open at the point where the two converging fence lines met it. Snares, instead of being set around the periphery of the head, were set in four concentric crescents, the outermost of which was the closed end of the pound. Caribou being driven forward had then to go through four of these before escaping to freedom. The success of the corral depended upon having a group of men herd the animals into the fences and thence into the corral. The fence was not a continuous affair, like that of the Netsi Kutchin, but rather consisted of a series of low piles of sod serving the same function as the posts at the outermost end of the fence of the Netsi Kutchin. At either side of the pound proper were blinds behind which men stood to prevent the caribou escaping by reversing their directions. The bow was used by these men.

Another means employed by the Nunamiut also involved the use of converging rows of sod piles, but instead of leading to a pound, they simply converged upon a site which was favorable for the killing of the caribou. Most important of the latter was a lake into which the caribou were driven and in which they were speared by men in kayaks.
The brains of caribou were not used in tanning, but were instead, eaten raw, frozen, or cooked. Long bones were cracked for marrow, and the ends were boiled for the rendering of fat or bone broth. Caribou meat was dried in spring and fall for use at those seasons when the hunting was not good.

At times when caribou were scarce, there was considerable dependence upon ground squirrels which occur in some abundance. Ground squirrels were snared. There was a taboo against boiling other meat in the same pot in which ground squirrel had been boiled until a suitable length of time had expired.

There was some dependence upon moose in times of caribou shortage also. The Nunamiut would frequently, at such times, move into the forested areas where moose could be secured in some quantity. Of some interest is the fact that the Nunamiut word for moose is tutuvuk "big caribou." Moose formerly were snared, but also might be hunted by one or more men using bows.

Grizzly bears were hunted by the Nunamiut somewhat in the same fashion as by the Netsi Kutchin. Bears were searched out in their dens, were awakened, angered, and finally killed with a spear. Particular phrases were
used in bear hunting at this time and there were other ob-
servances suggestive of bear ceremonialism. Some grizzlies
were shot with arrows. This was generally in other seasons.

Mountain sheep were formerly snared, the snares being
set along their trails. They were probably also hunted
individually, but information on this point is wanting.
Cooked sheep head was considered a particular delicacy,
and the long bones of sheep were split for the extraction
of marrow.

Snowshoe hare was taken occasionally by means of a
snare, but was relatively unimportant as a food item.
Marmots were of occasional importance as a supplement to
the diet. They were taken by means of rock deadfalls.

The principal weapon of the Nunamiut was the bow. A
plain, or self bow, was made and a sinew-backed bow also.
Spruce was the preferred wood for bows. Arrows were made
of birch when available. The Nunamiut made both blunt
points and a barbed point for big game. The Nunamiut also
used a leister spear with a throwing board and the thrust-
ing spear mentioned above, for bears.

The Anaktuvuk people gathered berries which were added
to pemmican, mixed with caribou fat, or soaked in seal oil.
Apparently the most frequently used were bilberries and
cloudberries. Seaweeds from the coast were obtained by trade. Licorice root, called masu, was also eaten.

**Kobuk River Eskimos.**

The Kobuk Eskimos who lived in the spruce and birch forest of the Kobuk River were also Nunamiut, or inland people. Salmon and caribou were the mainstays of Kobuk Eskimo subsistence. Salmon were taken from the middle to the end of the summer. The most important device used in salmon fishing was a willow bark net made up to seventy-five feet long. The net, or seine, was not set, but was played out from a boat into the river while one end remained on shore. This was done only when a school of salmon was seen to be approaching. The salmon were beheaded, split to the tail, and hung to dry. The viscera were kept to be boiled for oil. The eggs were also kept. The heads of the salmon were buried to be consumed in a putrid state at a later time. Fishing was primarily an occupation of the women. During the salmon run, the men were away in the mountains hunting. Other fish were taken by means of the seine but they were of minor importance compared with the taking of salmon.

In connection with caribou hunting, a pound was used constructed of piles of rocks. It is not possible to
determine exactly what plan the Kobuk caribou pound had. Two converging lines of rock piles led to a circular area set with snares. Snared animals were dispatched with spears. Caribou were also taken in narrow mountain passes. A somewhat similar means was that of driving caribou into a lake in which there were hunters in boats waiting.

Caribou taken in the fall were frozen for use through the winter. Those taken in the spring which were not eaten at once were dried for use in the summer.

Stalking was a technique used by single hunters for caribou, bear, and occasionally moose. Beavers, muskrats, and mink were also taken using the bow. Hare, ermine, fox, and grouse were snared by men. Women set snares for ptarmigan and rabbits. For the former, brush or willow "fences" were constructed. Marmots were taken by means of a rock deadfall very much like that of the Netsi Kutchin. Foxes were snared, but the free end of the snare, instead of being tied to some fixed object or to a spring pole, was held by the hunter who concealed himself in a small blind constructed of snow. Foxes were also taken in pits dug in deep snow and set at the bottom with a sharp bone point.

Whitefish were trapped in the fall as they moved downstream. A conical fish trap was used for taking whitefish
in the spring. Fish hooks, fish spears, and possibly fish arrows were also used. The grayling hook was a small lure of antler provided with a single barb of antler, and later, metal. Fish line was twisted sinew, or baleen, the latter gotten by trade.

Blueberries were gathered by the women and kept in birch bark baskets. A favorite dish consisted of blueberries and beaten fat. Other plant foods included polygonum roots (*Polygonum* spp.), willow buds, the young, tender leaves of willow, wild onions, and other berries. Kobuk Eskimos used the oil lamp, but primarily as a source of illumination. Cooking was done over an open fire. Pottery was present and some boiling of food was done in it. More commonly, boiling was accomplished using hot rocks in a birch bark basket. Bent sprucewood pots were formerly made. They were also used for boiling. Roasting of various kinds of meat was quite common.

**III. RESPONSES TO THE ABIOTIC MILIEU**

**The Kety.**

**Dwellings.** The Kety formerly made two basic types of dwellings. There was a certain amount of regional variation. The more common type of dwelling was a conical tent or small tipi. Among some bands of the Kety, the tipi form
was used year-round. Among others, it was used only during the second half of the winter, spring, and in the summer. The framework of the tent was made up of as many as thirteen poles. The basic support, however, was made by three poles of fir. Depending upon the season, the tent was covered either with birch bark or reindeer skin. Among the more northern Kety, the latter was used through the winter. In modern times, felt has been used to cover the tent frame. If the tent was covered with reindeer skin, the doorway into it was also of the same material suspended from a horizontal piece downward to the floor of the tent. If the tent was of birch bark, the door also was of birch bark hung in the same fashion but of a double thickness. The hearth was in the middle of the tent and over it a tripod with a wooden hook suspended from it from which were hung kettles and teapots. The birch bark was especially dressed and sewn. It was called *tiski*. It was said to be both light and waterproof. The framework of the summer tent was reinforced with a wooden hoop attached to the poles by means of a rope at a height of about four and a half feet from the ground. The Kety slept in "sheets" of softened birch bark using a reindeer skin as a ground cloth.
The second basic Kety dwelling was what was termed a "mud hut" which was semi-subterranean. These were put up in the autumn at the time when the rivers were freezing. Square pits were excavated one and a half feet deep and six to seven feet wide. Above the excavation were, evidently, four corner posts. Joists were set upon them and poles leaned inward somewhat to the joists. The roof was flat, covered with brush wood or strips of birch bark. Openings were left to allow some light to enter and for the escape of smoke. The whole was then covered with mud. Several families might occupy one such hut. Near the huts were tipi-like storehouses made of poles covered with the bark and branches of conifers. Game, implements, and other objects were stored in these. The Kety apparently moved from the mud house in February and it was not returned to.

When camping out in winter a hunter dug a hole in the snow and set up a brush screen around the edge on the windward side, usually the north. Inside he built a fire. There was no further protection besides this and the clothing he wore.

Special huts were sometimes constructed in the summer at fish camps. They were made of light willow poles set in the ground in two parallel rows which were then bent
over and tied. The ground plan of this house with its arched roof was subrectangular. The framework was then covered with birch bark. There was no smoke hole as the fire was made outside this dwelling. The storage structure used in the summer was a small gable roofed log house set on pilings. They would generally be set on small eminences to protect them from inundation. In these, winter equipment was stored. Donner, in his work on the Selkup Samoyed, shows a similar structure used by that people. This structure appears to be raised from the ground about six feet and has a door at one gable end. It resembles quite closely the house-style caches used by the Netsi Kutchin and almost universal throughout the rest of interior Alaska. The Kety also constructed open caches consisting of a platform set on posts about four feet high.

**Clothing.** The literature is not too clear on this point, but it appears that at least three types of upper garments were used by the Kety in the winter. One, of caftan style, worn by both sexes, was of reindeer skin with the hair out. It reached to the knees. It is said to have been like a summer coat and to have wrapped from right to left. On this garment, mittens were of a piece with the sleeves. A slit at the wrist allowed the hand to
be thrust out. Seemingly, hare skins might also be used to make this coat. It was secured at the waist with a belt, had no hood, and had an open neck.

The *malitsa*, evidently a parka-like coat, was made from reindeer skin with the hair in. It was fitted with a hood. Over it a cover of coarse, brightly-colored, woolen cloth was worn. The cover might have a border of fur at the bottom. The *malitsa* was used especially on the trail. Another parka-like garment, the *sokuy*, was occasionally worn over the *malitsa*. Like the latter, it was of reindeer skin, but in this case, the hair was turned out. It was bigger than the *malitsa* and longer. Sleeve treatment was as with the first garment above. The *sokuy* also had a hood.

With the coat first mentioned, a squirrel skin cap was worn. Apparently less common was what is described as a cap with long flaps which were turned up in front made from the headskin of a reindeer calf.

The Kety have, for many years, obtained cloth from the Russians and others with whom they have been in contact. Cotton kerchiefs were sometimes worn in the winter by both sexes. Both sexes wore short woolen trousers. Winter boots were high, made of reindeer leg skin. Speci-
ally combed soft grass was used as an innersole. Boots with woolen tops were also worn.

Summer boots were high and made of hairless reindeer skin. They were sometimes used also as winter boots. Some were apparently sufficiently high that keeping them up was a problem. They were therefore fitted with a strap at the top of the boot which looped onto the belt at the waist. Summer dress for the man featured a short cloth coat or robe, again of the caftan style. Cloth trousers were worn and the boots previously mentioned. The women wore short separate trousers and a skirt, both of which apparently were made of cloth. There seems to be no fuller information available on strictly aboriginal forms.

Transportation. For water transportation the Kety used primarily a dugout canoe. The canoe was made of aspen and used a short, single bladed paddle fitted with a cross bar at its end. The dugout was of double-ender construction. Both stem and stern were straight, canted slightly outward. A series of sticks were set athwart at the gunwales. Their function is not clear unless they served to set off compartments within the boat. The dugout was generally used by one person. Aspen was apparently the preferred wood for the dugout, but poplar or larch might
also be used. The Kety are also said to have made a plank boat, but no description of it could be obtained. It may be assumed that the plank boat was either recent, or relatively rare and comparatively unimportant. One other boat has been characteristic of the Kety, at least in recent times. These were large river craft about thirty feet long, fitted with a mast and sail usually, but apparently primarily propelled by oars. They were rather broad beamed with a rounded stern and a straight, slightly slanting bow. They were fitted with a cabin constructed somewhat after the manner of the sometimes-used rectangular summer tent of the Kety. This boat probably came into use in the Czarist period.

As stated above, reindeer breeding was a late trait incompletely assimilated by even those Kety who adopted it. It was not characteristic of all the Kety, in any case. For that reason, the sled used with reindeer will not be discussed.

The small Kety sled is described as being snub-nosed and having a brake on the right side. The sled was not of such a size that a person could ride on it. (Nor did the Kety ride on the reindeer sled.) Although the Kety are said not to have raised dogs as draft animals, evidently
each family owned one or two. During the winter one dog might be harnessed to the small sled and pulled it follow­ing the hunter who went ahead on skis breaking trail. More often than not, the hunter himself helped pull the sled also. Boots were sometimes made to protect the dog's feet. The harness used consisted of a loop around the dog's belly, with a strap going back between its hind legs to the sled. In the summer, the dogs were sometimes harnessed to the boat to help pull it along shore. Dogs were also used in the hunting of moulting ducks. The Kety used a drag sled of reindeer skin. It was not an item deliberately manufactured for the use, but rather simply a reindeer skin in which articles were put and which was then bound up so that it could be drawn over the snow.

The Kety made two types of skis. The long narrow skis were pointed at both ends and were used for hard snow con­ditions. A shorter ski was more commonly seen. It was about three feet long and about ten inches wide. The short ski was also pointed at both ends, the toe being turned up. The binding consisted of a toe strap tied onto the ski by means of holes drilled through, and a strap which caught the heel. A piece of birch bark was glued onto the top of the ski serving as a moisture-proof foot rest. The
undersides of the skis were covered with reindeer leg skin so arranged that the hair slanted to the rear. The skins thus gave traction for climbing and would allow the person to slide forward easily. The short ski was used for soft snow conditions. It was made sufficiently thin that it was able to flex in surface irregularities. As the foot was again raised, the ski snapped back to its original shape which action served to throw off any adhering snow. A staff resembling the modern ski pole was used by the Kety. It had a circular basket at the lower end and a crook handle at the upper end. One only, was used.

**Naskapi.**

The Naskapi used primarily one type of dwelling. This was a conical tent supported by a number of poles. They were usually ten to fourteen feet high and ten to eighteen feet in diameter at the base. The size varied according to the number of people living in the tent. The tent was covered with caribou skin, apparently with the hair removed. The hearth was in the center of the tent, set on rocks. The apex of the cone formed by the tent was left open as a smoke hole. A transverse pole tied onto the lodge poles was used for cooking. A pot, or meat to be roasted, was suspended from that pole. The tent was floored
with spruce boughs. Caribou skin robes were used for sleeping.

The Naskapi also erected sweat baths which were hemispherical in form usually made of willow or alder. Caribou skin coverings were used when the sweat baths were in use.

Clothing. The basic clothing of the Naskapi consisted of a coat, short pants, leggings, moccasins, mittens, and a head covering. The summer and winter coats for men were similar except the former opened completely down the front and was made of hairless caribou skin. The coat reached to the middle of the thigh. Gores were pieced into the skirt of the coat to allow greater freedom of movement. The winter coat was a pullover made of caribou skin with the fur turned in. The winter coat might, or might not, be fitted with a hood. Those which were, were generally made from the head skin of caribou fawn with the hair turned out, and a long flap of skin extending down onto the shoulders. A deerskin cap was often worn. After the time of contact, at least, a high conical cap was also used.

The short breeches worn were of caribou skin and reached to the upper thigh. They were kept up by means of a drawstring. Leggings were of smoke tanned caribou skin. They
were secured at the waist by means of a string and covered the leg from the upper thigh to the ankle.

The moccasins worn were similar to the pointed toe moccasins of the Cree and Chipewyan that were adopted by the Netsi Kutchin. The construction was not identical, however. The wrap-around tops were tied in place by means of long strings wrapped twice around the leg and tied. The insert which made the instep of the moccasin, after the time of contact, was sometimes fitted with a piece of cloth and occasionally beaded. Apparently duffel socks were used with the moccasins.

Naskapi mittens were not fitted with gauntlets and hence reached only a bit beyond the wrist. Summer mittens were made of hairless caribou skin, while winter mittens were often lined with the skin of fetal caribou on which the hair was left. After contact, the mittens were trimmed at the cuffs with cloth and a little beadwork. On the back of the mitten there might be a series of beaded tassels. The mittens were provided with a yoke of caribou string which fit over the head of the wearer.

The coat worn by men was heavily decorated on the sleeves and at the lower hem by painted designs. In addition, a fringe might set off the bottom edge.
The dress of the woman was essentially the same as that of the man. The leggings were somewhat longer, the decorations on the coat a bit different, and the coat itself somewhat longer, reaching below the knee. A conical hat was worn by the women, but probably not in pre-contact times. The leggings of both sexes were fringed on the outer seam.

A mantle of caribou fawn was worn about the shoulders for additional protection against the cold.

**Transportation.** The Naskapi shared with other Indians of northeastern America the trait of manufacturing the birch bark canoe in the style that became the prototype of most commercially-made canoes of the present day. The canoe was of double-ender construction with no differentiation between bow and stern. Both ends were high and curved inward. The paddle had a single large blade and a short handle.

The standard means of winter transportation was the toboggan. The size varied according to the owner's wishes and the uses to which he planned to put the toboggan. Thirteen feet was the maximum length. The toboggan generally consisted of two boards joined by a series of cross pieces lashed on with babiche. The sharply upcurved front
was held in position by babiche thongs attached to the first cross piece. The toboggan tapered both front and rear with the maximum width of about eighteen inches reached somewhat forward of the middle. The toboggan was not enclosed in any way and was not fitted with handlebars. In general, it was hand drawn, but occasionally a small dog might be hitched to the sled by means of a thong to aid in drawing it along. The toboggan was used for hauling the tent, household equipment, and the like.

Naskapi snowshoes were well made using babiche netting. The most common form was the bear paw type of single bar construction. Two variants on the bear paw snowshoes was also made. One of these, with a short, pointed heel was called the "swallow tail" and the other, of roughly a diamond shape, was called a "beaver tail." The "round end" snowshoe was a kind of cross between the beaver tail and the swallow tail, being slightly constricted at the heel, but rounded off rather than pointed. All of the latter utilized two cross bars. Snowshoes were equipped with a binding of caribou thong which caught the toes and looped around the heel. Some of the Naskapi upon occasion, made plank snowshoes of spruce. They were made of two spruce planks sewn together with babiche and held rigid by means
of two cross bars. They were generally of the beaver tail pattern with the greatest width forward of the foot area, but were not so wide as the netted beaver tail snowshoes. A strap binding was like that of the ordinary snowshoe. They were used for soft, wet snow conditions, such as would ordinarily obtain in the spring.

Nunamiut, Anaktuvuk Pass.

Dwellings. The best known house type of Anaktuvuk Pass is the round to oval skin tent. The framework was of willows obtained to the south a bit, where they grow tall and slender. In recent years, the custom has been to cover the tent with about twenty caribou skins, the hair being turned out. The tent was then further covered with canvas. A model of this tent made by Mr. Simon Paneak of Anaktuvuk Pass in the collection of the University of Alaska Museum, shows the hair turned in. This was probably the older pattern.

The willows once set in the ground were bent over upon each other and tied. They were all of approximately the same length. The resulting structure superficially resembled the two family dwelling of the Netsi Kutchin, but the framework was actually quite different. A transverse rod, tied over a pair of the upright frame members, served to hang the door from. The Nunamiut preferred using
grizzly bear hide for the door flap, with the fur side in.
Lacking grizzly hide, a heavy bull caribou hide was used.
These tents, called *itchelik*, were sometimes equipped with
a window made from strips of the small intestine of the
grizzly bear.

The Nunamiut also made a more substantial, more permanent dwelling called *ivrulik*. The *ivrulik* was octagonal
in plan, and had a short entryway. Eight main posts supported stringers which in turn supported roof members. In
the center of the octagon were four higher posts set about the fireplace. Stringers set on these four accepted the
roof poles. Above the four central posts was a space left for the escape of smoke. The house was covered with sod.
The *ivrulik* was primarily a coastal form rarely used in Anaktuvuk Pass.

**Clothing.** The clothing of the Anaktuvuk people was essentially like that of the coastal Eskimos to the north.
In the winter, an inner parka made of female caribou, or fawn skin, was worn with the hair next to the skin. The outer parka was somewhat heavier with the hair turned out. The hood was close fitting, trimmed either with wolverine or wolf. Wolf was more generally preferred by men.

Caribou skin trousers were worn, but whether a double
or single layer, is not known. They were fitted with a draw string at the waist and draw strings on either leg.

Boots were usually made of caribou leg skin, or from other portions of the caribou hide. The bottoms were usually made of the thick skin from the neck of bull caribou, with the hair turned in. The result was a soft sole like, in its function, to that employed by the Netsi Kutchin, but different in its design. Boots and parkas were frequently trimmed with the skin of mountain sheep.

The clothing of both sexes was essentially the same. For summer use, lighter skin clothing in one thickness only, was used, or older winter garments worn thin from use.

**Transportation.** The two boats formerly used by the Nunamiut are those usually associated with the Eskimos, the umiak and the kayak. The umiak evidently saw little service. Its primary use came in the summer when the people of Anaktuvuk and elsewhere in that region, went down the Colville River to engage in the summer trade with the coastal Eskimos. Umiat, on the Colville, is so called because it was near that place that umiaks were kept for the river journeys. The major use of the kayak was in hunting swimming caribou. It had a single cockpit and was
of the type used at Barrow. A double bladed paddle was used with the kayak.

Good information on the aboriginal sled of the Nunamiut is not available. Ingstad describes it as being relatively small and like a toboggan (Rodelschlitten). The Nunamiut formerly had very few dogs and the small sled, or toboggan, was drawn by the woman and man with perhaps one dog serving to help. It seems rather unlikely that this was a true toboggan, but no further information is available. Today, rather large basket sleds of north coastal style are made. Ten dogs is not an unusual number for a team.

At the present time, the Nunamiut make two types of snowshoes. One is the rounded toe hunting snowshoe similar to that made by the Netsi Kutchin. The webbing is not as fine, nor is the general workmanship. The other type of shoe is the pointed-toe trail shoe. It is not known whether these forms were aboriginal with the Nunamiut or not. Without doubt, they have been made by the Nunamiut for some time.

Kobuk River Eskimos.

Dwellings. The principal dwelling of the Kobuk River Eskimos was the ookevik, or "winter house." It is described with admirable terseness by Giddings. His description is
"[The house] had a 'four-post center' construction. The center posts supporting a pair of strong roof timbers in line with the direction of the entrance tunnel, and separated by the width of the tunnel. Between these four posts lay the fireplace, which was rock-lined and oval to circular, or made of logs and rectangular. Above the fireplace, in a frame supported between the roof timbers, was the gut or oiled deer skin membrane that afforded light. The window frame could be removed or tilted to allow smoke to escape. The outer walls of the rectangular house were made of whole or split poles laid at a slight angle against roof beams leading between the tops of four corner posts, and between the corner posts and the center posts. The roof also consisted of poles, laid close together. The whole structure was covered with sod blocks and plastered with loose soil from the house excavation. On either side of the fireplace were the bed spaces, usually outlined with logs, and sometimes slightly raised. These beds were covered with small willows, the rods of which furnished some resilience, but mainly served to keep bedding off of the damp ground. Excess gear was stored at the end of the house opposite the tunnel and by hanging from the walls and rafters. The house tunnel has not retained its coastal function of 'cold trap,' although archaeology shows us that Kobuk winter houses of some centuries past boasted this feature. Instead, the tunnel floor began at house level and proceeded slightly upward to ground level, and it was high-roofed enough for a man to walk in with but slight stooping. The tunnel was seldom more than ten feet long. Skins covered tunnel openings at either end."16

The ookevik seems to have been occupied for one season
only.

A temporary winter house was made by the Kobuk people which, in cross section, resembled an inverted "V", consisting of a pair of posts which supported a single rafter. One end was enclosed with upright posts. The other end was covered with a skin and served as a doorway. The house was covered with moss. There was a small fireplace and a smoke hole was provided for it.

In the summer, the Kobuk people built a house of gable roof construction which consisted of two posts supporting a ridge pole, four corner posts which supported a pair of stringers aligned in the same fashion as the ridge pole. Thin poles connected stringers to the ridge pole and were roofed over with large slabs of spruce bark. Poles were laid over the bark to keep it in place. The walls were a loose wattle-work of willow and were likewise covered with spruce bark. There was no fireplace in the summer house and hence, no allowance for a smoke hole. Cooking was done out-of-doors in the summer.

A caribou skin tent was sometimes used in the spring. It was hemispherical in form with the framework made of bent willows. This tent was identical to that used by the Anaktuvuk people.
For hurried use the Kobuk people made a tipi form covered with skins or, alternatively, one which consisted simply of young spruces with their foliage left on. The latter was known as a "poor peoples camp." Each of these tents would have a fireplace inside.

**Clothing.** The clothing worn by the Kobuk people was similar to that worn by the Eskimos on the nearby sea coast. Among the items obtained by trade from the coast was oogruk skin to be used for boot soles and seal skin, from which trousers were made. The parka was worn with an attached, close-fitting hood. Both inner and outer garments were worn in the winter. The inner parka with the fur next to the skin, the outer parka with the fur turned out. Only the outer parka had the hood. The ruff was characteristic­ally of wolf hide. Trousers were of seal skin made tight fitting. The woman's parka was equipped with a belt from which she suspended the accessories necessary for her daily work. The belt also allowed her to carry a baby in the back of her parka.

Boots were made of caribou skin (probably leg skins) with stiff oogruk hide soles. Skin socks were worn, made of either caribou skin or seal skin, with the hair turned in. Mittens were short. They were made of caribou skin
with the hair turned in and were worn both winter and summer.

Summer clothing frequently consisted of winter clothing worn thin and no longer of use in that season. Otherwise, caribou skin parkas were worn, but generally of a lighter weight than those worn in the winter. Children’s parkas were made of bird skins. Parkas, boots, and mittens were frequently decorated with bordering designs made of cut out pieces of skin.

Transportation. Kobuk River boats were made of the bark of both spruce and birch. The familiar dichotomy between types of Eskimo boats was present here. The functional counterpart of the kayak, however, was a small canoe similar to that used by the Yukon Flats people. It was decked from the bow back, about one-quarter of the length of the boat. These canoes were usually eight to ten feet long. They were used exclusively by hunters.

The larger boat was used by the women in fishing and for general transportation. It was of double-ender construction with a flat bottom. They evidently were at least fifteen feet long. The preferred material for both styles of boat was birch bark, but when it was wanting, spruce bark was used as a substitute. Single bladed paddles were
used with both boats.

Some of the Kobuk people had true umiaks which were obtained by trade from the coast. They were covered with walrus hide.

Skin boats covered with fresh moosehide are reported to have been in occasional use by Kobuk Eskimos when moose hunting in the headwaters of the Kobuk River. More commonly, downstream travel, other than that involving the two above mentioned boats, was by means of an "A"-shaped raft.

The sled in use on the Kobuk River was apparently like that used in the region of Kotzebue Sound. This was a basket sled, the basket being formed by the enclosed back of the sled and the rails at the side which sloped down to meet the upturned front of the sled. The bed was made up of parallel slats. Bone sled shoes were used on the runners of the sled. Dogs were used in pulling the sled, but they were primarily in the nature of helpers, as the basic work of moving the sled was accomplished by the woman pulling the sled, while her husband pushed from the back. Large-scale dog breeding in the Kobuk River drainage is a recent phenomenon. Dogs were occasionally harnessed to boats in the summer to help pull them upstream.

The snowshoes used by the Kobuk people were of the
type characteristic of the interior Athabascan people, including the Netsi Kutchin. They used both the rounded toe and the pointed toe snowshoe. The latter was used as a trail shoe. Apparently one of the only differences between these snowshoes and that of the Netsi Kutchin and other Athabascan groups was that the netting, rather than being sewn through the frame, was attached to a vane on the inside of the frame.

IV. DISCUSSION

Similarity of Culture.

As is easily seen, the adaptations characteristic of the five groups considered, are basically similar. Similarities exist even between the two most widely removed peoples, the Kety and Naskapi. Thus, the driving of caribou and reindeer into deep snow where they floundered and could easily be killed was practiced by both peoples. Both the Kobuk Eskimos and the Naskapi used the technique of driving caribou into a defile where they were shot by men stationed to either side.

The pound or corral was used by the Kobuk people, the Anaktuvuk Eskimos, and the Netsi Kutchin. Of the many ways caribou could be taken, this seems the most efficient and might be suggested as the highest development of hunting.
techniques employed for northern herding animals. The pound, or variants of it, was fairly widespread in northern North America. 17

The tipi, in one form or another, was in use among all groups except the Anaktuvuk Nunamiut, and for them data are too sparse to dismiss the possibility of its occurrence. Among the Kety and the Naskapi, the tipi functioned as an important dwelling type. Among the Kobuk people it was an occasionally used dwelling. The Netsi Kutchin used it as a cache (shya) in association with the caribou pound and again as a defensive structure, the hya. There is an interesting correspondence between the Netsi Kutchin tipi cache and the same used by the Kety. It must be emphasized that the tipi form never functioned as a true dwelling among the Netsi Kutchin.

Boots of caribou leg skin were used by the Kobuk Eskimo, the Anaktuvuk Eskimo, and more recently, by the Netsi Kutchin. Reindeer leg skin was the preferred material for the Kety boot. The wearing qualities of leg skin are supposed to be superior to any other portion of the hide. With the exception of the Kobuk people, all groups employed a soft sole. The Netsi Kutchin, even after adopting new styles of footgear, never deviated from that usage. The
hard oogruk sole favored by coastal Eskimos and retained by the Kobuk people is particularly well adapted to use on sea ice where the surface is rough and there always exists the possibility of getting wet feet. (To a limited extent, oogruk hide is impervious to water.) The soft sole, on the other hand, would appear to be a better response to the generally soft snow conditions and prolonged intense cold in which the possibilities of wet feet are virtually nil. The soft sole provides traction which is demonstrably lacking in the oogruk sole.

The use of caribou or reindeer head skin for a head covering common to the Kety, the Netsi Kutchin, and the Naskapi, appears to defy any utilitarian explanation -- unless it be that the head skin would otherwise be unusable. The fact that it had already some of the desired conformation may, likewise, have been a factor. Despite these practical possibilities, its use has the arbitrary appearance of a trait whose main basis lay in tradition. That is to say, it seems not unlikely that this trait had one center of origin and that the reasons for its occurrence anywhere must be sought in historical connections of some sort.

The gabled log or pole house-like cache was adopted
after contact by the Netsi Kutchin. The source of this introduction is not clear. This style of cache occurs in America only in the western subarctic. Among some Alaskan groups it was aboriginal. Perhaps after contact, when a great deal of movement occurred on the Yukon River, it simply became a common possession. The house-style cache is probably Siberian in origin and was used, as mentioned above, by both the Kety and the Samoyed, and presumably others. The open cache, or elevated stage, was probably universal in the boreal zone. Of the groups discussed, it was used by the Kety, the Netsi Kutchin, and probably the others, although complete information is lacking.

Among all groups, sleds or toboggans were essentially hand-drawn. The Netsi Kutchin lacked dogs aboriginally. The other groups appear to have had them, but in small quantities. The dog, amongst these groups, served only as an aid in pulling the sled. True dog traction came late to all the American groups considered. Among the Kety there apparently has been no such development, although, as mentioned, some of them took up reindeer breeding.

The general similarity of cultures within the boreal zone of the Old and New Worlds has often been noted. The
lunar calendar of twelve or thirteen months was characteristic, not only of the Netsi Kutchin, but also the Anaktuvuk Nunamiut, the Kobuk Eskimos, the Naskapi, and the Kety. According to McKennan, such a calendar is characteristic of most Northern Athabascans. In all cases, the manner by which months are named is similar. They are named for natural events such as the re-appearance of certain birds, ducks moulting, and so on. If full information were available, there is little doubt that this trait would be found in the areas intervening America and the region occupied by the Kety. The possession of the lunar calendar with such specific resemblances can hardly be put down as a trait arising naturally in man. More likely, it is one of considerable antiquity that had one center of origin.

D. S. Davidson's study of snowshoes presents convincing evidence of the ultimate relation between skis and snowshoes. Moreover, for this trait too there is suggested a single point of origin. Birket-Smith, in his discussion of the origin of Eskimo culture, speaks of the general unity of boreal forest culture. Birket-Smith distinguishes an ancient ice-fishing culture and a later snowshoe culture. The ice-fishing culture he considers earlier, since, in his
view, prior to the invention of the snowshoe, ice-fishing was the only possible manner in which the taiga could be exploited. With each culture there is delineated a number of traits forming the complex. Whether this theory is plausible or no, the tremendous importance of the snowshoe is at least brought out by it. The purpose here, however, is not to assess the worth of Birket-Smith's speculations, but merely to point out that in them there exists corroborative evidence of the existence of genetic connections throughout the boreal zone.

John Teal, in a discussion of this point, mentions the following similarities: The Ostyak ptarmigan snares resemble those of the Chipewyan. The fisher Lapps and the Mackenzie Flats Kutchin (Loucheux) both employed the technique of beating the surface of river ice to knock out fish beneath, which were then retrieved downstream. Bears were hunted in much the same fashion by the Karelians and the Lapps, by allowing the bear to impale itself upon a spear, the butt of which was planted on the ground. The latter trait may be further extended by reference to its use by both the Netsi Kutchin and the Anaktuvuk Nunamiut. As mentioned previously, this trait represents part of an attenuated form of bear ceremonialism among the Netsi Kutchin.
Special treatment accorded the bear in hunting is well known among circumpolar peoples and reaches its fullest development among those of northeast Asia of whom the Ainu provide the best known example.\textsuperscript{29}

The traits enumerated above are sufficient to suggest that any comparison of northern peoples which would discount or ignore the effects of historical connection could not fail to arrive at erroneous conclusions. There are too many specific similarities over too large an area to be explained by any other means.

Before leaving this point, attention may be briefly directed to the two Eskimo groups. In several important ways they differed from the relatively nearby Netsi Kutchin. The use of spruce wood for the bow by the Anaktuvuk people surely is a coastal carry-over. On the sea coasts of northern Alaska spruce is almost the only drift wood found. Hence, it was universally used there for making bows. The Kobuk people retained the use of the oil lamp which was originally a source of heat and light in woodless areas. The Anaktuvuk people made use of the spear thrower, a weapon unknown to the interior Athabascans, but used by all the coastal Eskimo. The Kobuk people used baleen line, seal skin for pants, boots, and socks, and the coastal
umiak -- all of which had to be obtained by trade with their coastal congeners. In like manner, the Anaktuvuk people retained the true kayak and umiak of the seacoast. Both inland groups considered seal oil an important item of trade. The canoe used by the Kobukers was Athabascan, as were the hunting snowshoes. The Anaktuvuk people also adopted that snowshoe.

In short, and here is the point of enumerating these differences, the inland Eskimo have the appearance of outlanders in the interior. Both groups remained tied to the sea coasts by their needs for articles which could only be obtained there. At least part of the adaptation they made to the interior environment seems to have been by means of taking on some typically Indian ideas and developments. This would suggest a lack of real time depth as inland folk. Obviously some coastal adaptations would be easily moved into the interior. Others would require change. That the Kobuk people adopted Indian canoes, while the Anaktuvuk people did not, may be laid to the different economies followed by each. It is of great interest that both groups adopted the finely netted Athabascan snowshoe.

Other similarities between the several groups could be pointed out even from the relatively narrow range of
cultural phenomena considered here. It seems of rather greater importance in the present context, however, that all were able to answer the pressing problems of living in the subarctic while on a relatively primitive level of technological development.

**Similarity of Environments.**

All five groups lived in similar environments. One partial exception is provided by the Anaktuvuk people, who today are beyond the limit of trees. They, however, still make use of timbered valleys in their district and used them even more extensively in the past.

Climatically each area is Dfc in the Köppen system, although both Netsai and the Anaktuvuk district may be borderline cases. In Thornthwaite's classification, each would be D (taiga) except the Naskapi, most of whom would be in E (tundra). Vegetationally, most of the latter region is forest or forest-tundra.

The Netsi Kutchin, Anaktuvuk Nunamiut, and the northern Naskapi were in ecotonal areas of forest tundra. The territory of the Kobuk Eskimo is mainly spruce-birch forest with ecotonal aspects as ascent is made in the mountains and westward to the tundra. The dominant trees of the Naskapi territory are spruce, balsam fir, jackpine, and aspen.
The region occupied by the Kety is dominated by the Siberian larch (*Larix sibirica*), but important areas contain extensive stands of birch (*Betula spp.*). Siberian spruce (*Picea obovata*), European spruce (*P. excelsa*), Siberian fir (*Abies sibirica*), and Scotch pine (*Pinus silvestris*) are other important components of the taiga of central Siberia.\(^{34,35}\)

The fauna of the several areas were likewise similar. Wild reindeer of the Kety region (as well as elsewhere in Siberia) may be specifically identical with the American caribou. The elk is closely related to the American moose. Other aspects of the fauna are also similar.

The faunal landscape of the American groups was dominated by the caribou. Moose were present in all areas and were utilized. The fish of each region were of some importance, especially among the Kobukers and Kety. The other groups were primarily hunters of big game.

Probably some of the greatest constraints between the five areas were provided by physiography. Of all the separable elements of the total environment, however, the need for adjustment to physiography was probably least important.

Essentially, the same conditions existed in all areas and had to be met by the human inhabitants.
Ecology and History.

The Netsi Kutchin, the Kety, the Naskapi, the Kobuk Eskimo, and the Nunamiut of Anaktuvuk all lived in substantially similar environments. Upon examination it is found that there existed a substantial similarity in culture as well. To explain the latter, similar origins, historical contacts, or diffusion must be called into account. There are, beyond these specific similarities, those of a more generalized nature -- nomadism, loose organization, and hunting-fishing-gathering economies, as well as similar adaptations in clothing, housing, and transportation.

To admit the importance of history in the boreal forest zone must not be, at the same time, to deny any influence of the environment. If, for example, any one of these groups had, at some point in its past, located in a different environmental setting, it would be expectable there should be first, some cultural change, and second, that some part of that change could be ascribed to environmental response. After all, culture is largely an adaptational mechanism. The difficulty comes about in trying to separate out the influence of historical accident.

It would appear that given a hunting-foraging level of technology in an area not richly endowed by nature, that the
results, in the general sense, are predictable. Large agglomerations of people must be ruled out; the country will not support such. Following from this, the need, or perhaps the possibility, for elaborate political or social organization is lost. The emphasis must be upon flexibility and fluidity. No social institutions which run counter to these necessary characteristics can be tolerated.

The same problems must be met throughout the boreal forest zone. In order to efficiently exploit the country, vast areas need to be covered. With snow conditions of long duration, with prolonged periods of extreme cold, it follows the responses, given the conditions suggested above, will be likewise substantially similar.

Cold must be met with adequate clothing and shelter. The margin of allowable variation is relatively narrow. Forms may vary, but certain kinds of protection must be provided by all. That which is inadequate is quickly discovered with results that are drastic in the extreme.

With conditions of relatively deep snow, lasting for six to seven months of the year, some means must be available to make progress upon its surface. Functionally, whether the response is a ski, a wooden snowshoe, or a
finely netted frame snowshoe, makes actually but little difference if it has become possible to travel over the snow. It can be shown, of course, that some of these devices are superior to others, but that difference appears quite a minor one when weighed against the fact that the basic necessity has been met. This is not to be interpreted as meaning that necessity was the mother of invention in the case of the snowshoe. Its discovery may have come about by any of a number of odd "happenstances" or accidents. It does appear possible to suggest, however, that had some such discovery not been made and applied, then it is most unlikely that any real exploitation of the subarctic would have been possible for primitives. Clothing and housing made it possible for man to withstand the rigors of the environment; snowshoes/skis rendered it economically feasible to do so.

Perhaps it may be suggested that, in the case of northern peoples, history is reinforced by ecology. Successful cultural adaptations tend to be perpetuated and to extend themselves, by diffusion, to the limits of the range of their utility. They tend to be retained over long periods of time -- as long as the basic economic level is not altered. To put this in more concrete terms, those
traits shared throughout the boreal forest zone which are pertinent to the environment, represent, for this level of culture, the climax stage.

To this point similarities have been stressed, but it is obvious that differences of important kinds existed between the several groups. The Kety were not yet the Netsi Kutchin, and so on. The notable lacks in aboriginal Netsi Kutchin culture serve to set them off from others. There were no boats and no dogs, yet these were apparently not serious lacks for in terms of the possibilities offered by their environment in aboriginal times, theirs was fully as successful an adaptation as any other. The main food sources were, by and large, fully exploited. The pound undoubtedly was a highly efficient means of taking caribou. Caribou, in turn, were numerous in the country due to the nature of the country -- its lichen woodland aspect. Without doubt the reasons for the relative non-importance of fishing in the economy were related (1) to the relative abundance of land game, especially caribou, and (2) to the fact that Netsai\textsuperscript{N} is not salmon country. In like manner, the heavy dependence of the Kobuk Eskimo upon fishing is related to the abundance of that species there. While these facts appear quite obvious, they nonetheless require state-
ment. They serve to emphasize a point suggested earlier, that differences between peoples of the subarctic do exist and that these differences may largely be accounted for by different ecological settings. To be sure, the main themes of nature are similar, but within the broad zone of the subarctic there exist rather important, though subtle, differences. People who successfully occupy such areas appear eventually to reach a point of balance or equilibrium with that area. That is to say, that eventually they come to exploit as fully as possible, within the compass of the technological level, the limited possibilities of their particular areas.

Even though they are more gross because of the greater talent of the species, there do exist in the boreal forest, in human terms, a number of ecological niches. Adjustment to them implies, in broad terms, ways of life which must, of necessity, be somewhat different from those of peoples occupying other kinds of niches.

Conceived in broad terms, it is seen that the possibilities held forth by the subarctic are not many. Brought down to any local situation it develops, in virtually every case, that the range of possibilities has become even narrower. Accordingly, it appears, the range of cultural
response likewise narrows. Such appears to be the nature of human existence in the north.
FOOTNOTES

CHAPTER I

1 Marston Bates’ recent The Forest and the Sea, subtitled "A Look at the Economy of Nature and the Ecology of Man", may serve as an example. The sections dealing with human ecology are concerned with the population problem and conservation.

2 Paul Sears is well known for his concern with similar questions. His series of lectures published under the title The Ecology of Man exemplifies that interest. These themes seem to dominate the works of both Bates and Sears.


9 Ibid. p. 36, et passim.


15 Ibid., Habitat of Loucheux Bands. p. 177.


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5 Ibid.


8 Osgood, op. cit., Fig. 1. (Map of Kutchin Territory.) p. 14.


10 Swanton, op. cit., p. 538.


12 Mackenzie, Sir Alexander. Voyages from Montreal on...
the River St. Lawrence Through the Continent of North America to the Frozen and Pacific Oceans, in the Years 1789 and 1793, etc. 1802.

13 Franklin, Sir John. Narrative of a Second Expedition to the Shores of the Polar Sea in the Years 1825, 1826, and 1827. 1828.

14 Osgood, op. cit., pp. 107, 122-123, and 128.


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17 Ibid., pp. 153-162.

18 Ibid., pp. 155, 161.

19 Ibid., p. 155.

20 Ibid., p. 154.


23 Ibid., pp. 233-238.


27 Driver and Massey, op. cit., p. 172.
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Dansereau gives this value for the eastern Canadian arctic. (Dansereau, Pierre. "Biogeography" in G. H. T. Kimble and Dorothy Good, Geography of the Northlands, 1955. p. 84.) The number of species collected during botanical work at Cape Thompson, Alaska, approximates the same. The number of species on the south slopes of the eastern Brooks Range is probably similar. (Dr. A. W. Johnson, viva voca.)


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10 Ibid., p. 168.

11 Ibid.


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1 Trewartha, Glenn T. An Introduction to Climate. 1954. Plates I, II, and III.


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7 Ibid., p. 6.


10 Ibid., p. 54

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20 Rausch, op. cit., p. 192.
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APPENDIX A

Phonetic Note

An effort has been made to cast native words into as simple an orthography as possible while still preserving essentially correct pronunciations. The values of the letters and symbols used are as follows:

Vowel Sounds.

a, as in father
e, as in late
i, as in seen
o, as in role
u, as in ruth
E, as in met
I, as in sit

Consonant Sounds.

d, as in English and the unaspirated t dth, as in that
th, as in thin
ng, as in sing
n, (superior), indicates nasalization
?, glottal stop
', initial, heavy stress
Other superior letters indicate clearly audible, but lightly stressed sounds.
## APPENDIX B

### Plant Names

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alder</td>
<td><em>Alnus</em></td>
</tr>
<tr>
<td>Aspen</td>
<td><em>Populus tremuloides</em></td>
</tr>
<tr>
<td>Arnica</td>
<td><em>Arnica alpina</em></td>
</tr>
<tr>
<td>Bearberry (alpine)</td>
<td><em>Arctostaphylos uva-ursi</em></td>
</tr>
<tr>
<td>Bilberry</td>
<td><em>Vaccinium vitis-idaea</em></td>
</tr>
<tr>
<td>Birch (white)</td>
<td><em>Betula papyrifera</em></td>
</tr>
<tr>
<td>Birch (dwarf)</td>
<td><em>Betula glandulosa</em></td>
</tr>
<tr>
<td>Bilberry</td>
<td><em>Vaccinium uliginosum</em></td>
</tr>
<tr>
<td>Bedstraw</td>
<td><em>Galium boreale</em></td>
</tr>
<tr>
<td>Bluebells</td>
<td><em>Mertensia alaskana</em></td>
</tr>
<tr>
<td>Chickweed</td>
<td><em>Stellaria longipes</em></td>
</tr>
<tr>
<td>Chickweed (mouse-ear)</td>
<td><em>Cerastium maximum</em></td>
</tr>
<tr>
<td>Cottonwood</td>
<td><em>Populus balsamifera</em></td>
</tr>
<tr>
<td>Cinquefoil (shrubby)</td>
<td><em>Potentilla fructicosa</em></td>
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<tr>
<td></td>
<td><em>Potentilla nivea</em></td>
</tr>
<tr>
<td></td>
<td><em>Potentilla pennsylvanica</em></td>
</tr>
<tr>
<td>Cranberry (high-bush)</td>
<td><em>Viburnum edule</em></td>
</tr>
<tr>
<td>Campion (moss)</td>
<td><em>Silene acaulis</em></td>
</tr>
<tr>
<td>Crowberry</td>
<td><em>Epetrum nigrum</em></td>
</tr>
<tr>
<td>Plant Name</td>
<td>Scientific Name</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Dryad</td>
<td>Dryas intergrifolia</td>
</tr>
<tr>
<td>Dryad (yellow)</td>
<td>Dryas drummondii</td>
</tr>
<tr>
<td>Dryad</td>
<td>Dryas octopetala</td>
</tr>
<tr>
<td>Dogwood (red-osier)</td>
<td>Cornus stolonifera</td>
</tr>
<tr>
<td>Dandelion</td>
<td>Taraxicum ceratophorum</td>
</tr>
<tr>
<td>Fleabâne</td>
<td>Erigeron caespitosus</td>
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<tr>
<td>Fleabâne</td>
<td>Erigeron hyperboreus</td>
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<tr>
<td>Fireweed</td>
<td>Epilobium angustifolium</td>
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<tr>
<td>Fireweed (alpine)</td>
<td>Epilobium latifolium</td>
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<tr>
<td>Grass of Parnassus</td>
<td>Parnassia kotzebuel</td>
</tr>
<tr>
<td>Groundsel</td>
<td>Senecio atropurpureus</td>
</tr>
<tr>
<td>Harebell</td>
<td>Campanula losiocerpa</td>
</tr>
<tr>
<td>Heather (arctic)</td>
<td>Cassiope tetragona</td>
</tr>
<tr>
<td>Horse's tail</td>
<td>Equisetum arvense</td>
</tr>
<tr>
<td>Horse's tail or scouring rushes</td>
<td>Equisetum scirpodes</td>
</tr>
<tr>
<td>Horse's tail</td>
<td>Equisetum varigatum</td>
</tr>
<tr>
<td>Indian paintbrush</td>
<td>Castilleja hyperborea</td>
</tr>
<tr>
<td>Jacob's ladder</td>
<td>Polemonium pulcherrimum</td>
</tr>
<tr>
<td>Knotweed (alpine bistort)</td>
<td>Polygonum bistorta</td>
</tr>
<tr>
<td>Knotweed</td>
<td>Polygonum viviparum</td>
</tr>
<tr>
<td>Lady's slipper</td>
<td>Cypripedlum guttatum</td>
</tr>
<tr>
<td>Lupine</td>
<td>Lupinus arcticus</td>
</tr>
<tr>
<td>Lousewort</td>
<td>Pedicularis labradorica</td>
</tr>
</tbody>
</table>
Laurel (bog)  
Monkshood  
Marigold (marsh)  
Moss (reindeer)  
Nagoonberry  
Parsley (hemlock)  
Phlox  
Phlox  
Rhododendron  
Shinleaf (arctic)  
Shinleaf (boreal)  
Scottish asphodel  
Spruce (white)  
Spruce (black)  
Sandwort  
--  
Saxifrage  
Saxifrage  
Tea (Labrador)  
Tea (Labrador)  
Twinflower  
Vetch  
Willow

Andromeda polifolia  
Aconitum delphinifolium  
Caltha palustris var. arctica  
Cladonia rangiferina  
Rubus arcticus  
Conioselinum gmelini  
Phlox hoodii  
Phlox sibirica  
Rhododendron lapponicum  
Pyrola grandiflora  
Pyrola secunda  
Tofieldia pusilla  
Picea glauca  
Picea mariana  
Arenaria capillaris  
Arenaria macrocarpa  
Saxifraga bronchialis  
Saxifraga tricuspidata  
Ledum groenlandicum  
Ledum decumbens  
Linnaea borealis  
Astragalus spp.  
Salix spp.
<table>
<thead>
<tr>
<th>Plant Species</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willow (felty-leafed)</td>
<td>Salix alaxensis</td>
</tr>
<tr>
<td>Willow (white)</td>
<td>Salix glauca</td>
</tr>
<tr>
<td>Wallflower (wild)</td>
<td>Erysimum cheiranthoides</td>
</tr>
<tr>
<td>Yarrow</td>
<td>Achillea borealis</td>
</tr>
<tr>
<td></td>
<td>Androsace chamaejasme</td>
</tr>
<tr>
<td></td>
<td>Cetraria spp.</td>
</tr>
<tr>
<td></td>
<td>Crepis nana</td>
</tr>
<tr>
<td></td>
<td>Eritrichum aretioides</td>
</tr>
</tbody>
</table>
**APPENDIX C**

Animal Names

<table>
<thead>
<tr>
<th>Fishes</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Burbot (loche or ling)</td>
<td><em>Lota lota leptura</em></td>
</tr>
<tr>
<td>Grayling</td>
<td><em>Thymallus arcticus</em></td>
</tr>
<tr>
<td></td>
<td><em>signifer</em></td>
</tr>
<tr>
<td>Pike (northern)</td>
<td><em>Esox lucius</em></td>
</tr>
<tr>
<td>Salmon (dog)</td>
<td><em>Oncorhyncus keta</em></td>
</tr>
<tr>
<td>Sculpin</td>
<td><em>Cottus cognatus</em></td>
</tr>
<tr>
<td>Sucker</td>
<td><em>Catostomus catostomus</em></td>
</tr>
<tr>
<td>Trout (lake)</td>
<td><em>Salvelinus namaycush</em></td>
</tr>
<tr>
<td>Whitefish (river)</td>
<td><em>Coregonus spp.</em></td>
</tr>
<tr>
<td>Whitefish (round)</td>
<td><em>Prosopium cylindraceum</em></td>
</tr>
</tbody>
</table>

**Birds**

<table>
<thead>
<tr>
<th>Birds</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baldpate</td>
<td><em>Mareca americana</em></td>
</tr>
<tr>
<td>Brant</td>
<td><em>Branta nigricans</em></td>
</tr>
<tr>
<td>Blackbird (rusty)</td>
<td><em>Euphagus carolinus</em></td>
</tr>
<tr>
<td></td>
<td><em>carolinus</em></td>
</tr>
<tr>
<td>Bunting (snow)</td>
<td><em>Plectrophenax nivalis</em></td>
</tr>
<tr>
<td>Crane (sandhill or little brown)</td>
<td><em>Grus canadensis</em></td>
</tr>
<tr>
<td></td>
<td><em>canadensis</em></td>
</tr>
<tr>
<td>Canvas-back</td>
<td><em>Aythya valisineria</em></td>
</tr>
</tbody>
</table>
Curlew (hudsonian)  
Chickadee (black-capped)  
Duck (greater scaup)  
Dowitcher (long-billed)  
Dipper  
Eagle (golden)  
Eagle (bald)  
Flicker (northern)  
Grouse (ruffed)  
Grouse (spruce)  
Grosbeak (pine)  
Goose (lesser Canada)  
Goose (lesser snow)  
Goose (white-fronted)  
Grebe (Hoelbell's)  
Grebe (horned)  
Golden-eye (Barrow's)  
Gull (Bonaparte's)  
Gull (herring)  

Numenius phaeopus hudsonicus  
Parus atricapillus turneri  
Aythya marila nearctica  
Limnodromus scolopaceus  
Cinclus mexicanus unicolor  
Aquila crysaetos canadensis  
Haliaeetus leucocephalus alascanus  
Coraptes auratus lutens  
Bonasa umbellus yukonensis  
Canachites canadensis osgoodi  
Pinicola enucleator  
Branta canadensis leucopareia  
Chan hyperborea hyperborea  
Anser albitrons frontalis  
Podiceps gnisegena holbollii  
Podiceps auritus cornutus  
Bucephala islandica  
Larus philadelphia  
Larus argentatus smithsonianus
Hawk (duck)  Falco perigrinus anatum
Hawk (pigeon)  Falco columbanus
Hawk (sharp-shinned)  Accipiter striatus
Jaeger (long-tailed)  Stercorarius longicandus
Jay (Canada)  Perisoreus canadensis
Longspur (Lapland)  Calcarius lapponicus alascensis
Loon (common)  Gavia immer
Loon (red-throated)  Gavia stellata
Mallard  Anas platyrhynchos
Merganser (red-breasted)  Mergus serrator serrator
Owl (great grey)  Scotiaptex nebulosa nebulosa
Owl (hawk)  Surnia ulula caparoch
Owl (horned)  Bubo virginianus
Owl (Richardson's)  Aegolius funerea richardsoni
Owl (short-eared)  Asio flammeus flammeus
Old-squaw  Clangula hyemalis
Osprey  Pandion haliaetus carolinensis
Ptarmigan (rock)  Lagopus mutus
Ptarmigan (willow)  Lagopus lagopus
Pintail  Anas acuta
Plover (golden)  Plurialis dominica

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Plover (black-bellied)  \textit{Squatarola squatarola}
Phoebe (Say's)  \textit{Sayornis says saya}
Redpoll (common)  \textit{Acanthis flammea}
Robin  \textit{Turdus migratorius migratorius}
Raven  \textit{Corvus corax principalis}
Snipe (Wilson's)  \textit{Gallinago gallinago delicata}
Sandpiper (least)  \textit{Erolia minutilla}
Scoter (surf)  \textit{Melanitta perspicillata}
Scoter (white-winged)  \textit{Melanitta deglandi}
Shoveller  \textit{Spatula clypeata}
Sparrow (tree)  \textit{Spizella arborea ochracea}
Sparrow (white-crowned or Gamble's)  \textit{Zonotrichia leucophrys gambelli}
Swallow (bank)  \textit{Riparia riparia riparia}
Swallow (cliff)  \textit{Petrochelidon al bifrons al bifrons}
Swan (trumpeter)  \textit{Cygnus buccinator}
Swan (whistling)  \textit{Olor columbianus}
Shrike (northwestern)  \textit{Lanius borealis inuictus}
Teal (green-winged)  \textit{Anas carolinensis}
Tern (arctic)  \textit{Ster na paridisaea}
Thrush (Gray-cheeked)  \textit{Hylocichla minima}
Warbler (yellow)  \textit{Dendroica petechia rubiginosa}
<table>
<thead>
<tr>
<th>Bird Species</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warbler (myrtle)</td>
<td>Dendroica coronata</td>
</tr>
<tr>
<td>Woodpecker (arctic three-toed)</td>
<td>Picoides arcticus</td>
</tr>
<tr>
<td>Woodpecker (downy)</td>
<td>Dendrocopus pubescens</td>
</tr>
<tr>
<td>Waxwing (Bohemian)</td>
<td>Bombycilla garrullus pallidicaps</td>
</tr>
<tr>
<td>Yellow-legs (lesser)</td>
<td>Totanus flavipes</td>
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</tbody>
</table>

**Mammals**

<table>
<thead>
<tr>
<th>Mammal</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear (black)</td>
<td>Ursus americanus americanus</td>
</tr>
<tr>
<td>bear (grizzly)</td>
<td>Ursus horribilis</td>
</tr>
<tr>
<td>Beaver</td>
<td>Castor canadensis</td>
</tr>
<tr>
<td>Caribou (barren ground)</td>
<td>Rangifer arcticus</td>
</tr>
<tr>
<td>Coyote</td>
<td>Canis latrans</td>
</tr>
<tr>
<td>Fox (continental arctic)</td>
<td>Alopex lagopus innuitus</td>
</tr>
<tr>
<td>Fox (Alaska red)</td>
<td>Vulpes vulpes alascensis</td>
</tr>
<tr>
<td>Hare (snowshoe)</td>
<td>Lepus americanus delli and L. a. maciarlai</td>
</tr>
<tr>
<td>Lemming (brown)</td>
<td>Lemus trimucronatus subarcticus</td>
</tr>
<tr>
<td>Lemming (collared)</td>
<td>Dicrostonyx groenlandicus rubricatus</td>
</tr>
<tr>
<td>Lynx (Canada)</td>
<td>Felis lynx canadensis</td>
</tr>
<tr>
<td>Marmot (arctic hoary)</td>
<td>Marmota marmota broweri</td>
</tr>
<tr>
<td>Marten</td>
<td>Martes americana actuosa</td>
</tr>
<tr>
<td>Moose</td>
<td>Alces gigas</td>
</tr>
</tbody>
</table>
Muskrat \hspace{2cm} Ondatra zibethica spatulatus
Mink \hspace{2cm} Mustela vison ingens
Otter (river) \hspace{2cm} Lutra canadensis yukonensis
Porcupine \hspace{2cm} Erethizon dorsatum
Sheep (white mountain) \hspace{2cm} Ovis dalli
Shrew (arctic cinereous) \hspace{2cm} Sorex cinereus ugnak
Squirrel (arctic ground) \hspace{2cm} Citellus undulatus parryi
Squirrel (flying) \hspace{2cm} Glaucomys sabrinus
Squirrel (Mackenzie red) \hspace{2cm} Tamisciurus hudsonicus preblei
Vole (meadow) \hspace{2cm} Microtus pennsylvanicus tananensis
Vole (red-backed) \hspace{2cm} Clethrionomys rutilus dawsoni
Weasel (least) \hspace{2cm} Mustela nxosa eskimo
Weasel (short-tailed or ermine) \hspace{2cm} Mustela erminea arctica
Wolf \hspace{2cm} Canis lupus tundrarum
Wolverine \hspace{2cm} Gulo luscus luscus

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MAP 8.

NATIVE PLACE NAMES, TRAILS, AND TOPOGRAPHY
NETSAN
Native Place Names, Trails
and Topography

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EXAMINATION AND THESIS REPORT

Candidate: Frederick Hadleigh-West

Major Field: Geography

Title of Thesis: The Netsi Kutchin: An Essay in Human Ecology

Approved:

[Signature]
Major Professor and Chairman

[Signature]
Dean of the Graduate School

EXAMINING COMMITTEE:

[Signature]

Date of Examination:

15 August 1962