THE FISHERMAN LAKE SLAVE AND THEIR ENVIRONMENT — A STORY OF FLORAL AND FAUNAL RESOURCES

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ABSTRACT

The past uses of the flora and fauna and methods used for making artifacts were recorded as described and demonstrated by the Slave Indian informants from Fisherman Lake, near Fort Liard, Northwest Territories. The area in which these Slave lived was described in terms of the geography, soils, climate and vegetation. Animals formed the base of subsistence and provided raw materials for use in technology as well as most of the food. Plants provided a variety of foods, medicines and were used extensively in technology. An understanding of plant and animal interactions was indicated by the Slave in their description of plants as animal foods, and the use of plants in attracting animals to their traps. Efficiency of plant use was high (the species they used were compared with those species found in the area that were used by other human groups), with most species being those of boreal forest origin. Species used for food and technology were largely those of common occurrence in the area, however some of the species used for medicines were of more restricted distribution. Plant use was restricted by seasonal availability, with only limited storage occurring. Use of fauna was also highly efficient with greatest use being of boreal species with those of alpine areas providing an alternative. Species availability varied with abundance cycles as well as with seasons. Slave classification of environmental components seemed restricted to plants and animals useful to them.. Nomenclature tends to indicate an emphasis on the fauna (particularly mammals) in Slave cognition.

ACKNOWLEDGEMENTS

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The photographs were reproduced by John Waddington, formerly of the Biology Department, at the University of Saskatchewan. I would like to acknowledge his excellent work.

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PREFACE

The objective of this project was to salvage from the Slave of Fisherman Lake, Northwest Territories, knowledge of past uses made of environmental components. Although the people of the area have been under the influence of acculturation for well over one hundred years, some of the aboriginal uses and knowledge of the natural resources and their processing have been retained. Slight modifications have naturally occurred, the most significant being the use of metal tools and utensils. In many aspects of their present life-style the connections with an outside economy is obvious; the link with the past is still strong in the older generation, but obviously becoming weaker in the younger. To illustrate —— Slave terminology familiar to the older people is not understood by their children, and the children sometimes use different terms from those used by their parents. Changes in language are often the result of changes in life style and/or cognition of the environment by a people, in this case due to acculturation.

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INTRODUCTION

People of European origin first made contact with the native people of what is now the southwestern Northwest Territories soon after Alexander Mackenzie's voyage of discovery in 1789. The Hudson Bay Company established a trading post at Fort Liard in 1805 (Usher, 1971:66) which still exists as the present Fort Liard. Since Fisherman Lake lies only 15 km (9 mi.) from Fort Liard it would be expected that the people living there would have been greatly influenced by acculturative forces. Such, however does not appear to have been the case. Dr. J.F.V. Millar (personal communication) found these people to be among the least acculturated of any of the native people with whom he had had contact in the area occupied by Indians of the Athabascan language group (see fig. 1, page 2).

Although the reasons for delayed acculturation in this area are not known, it was obvious that the older generation had retained a good deal of knowledge of aboriginal ways and the Fisherman Lake Archaeology Project (F.L.A.P.) became concerned with trying to salvage that knowledge in addition to surveying the numerous archaeological sites found around Fisherman Lake. The need for immediate salvage work was emphasized by a developing trend in the younger generation away from the traditional way of life in the bush. This trend was no doubt influenced by the recent invasion of the north by exploration crews searching for gas and oil reserves and by southern technological advances, as well as by the schooling of children by foreign teachers in day schools which often separated the children from their families for lengthy periods of time.

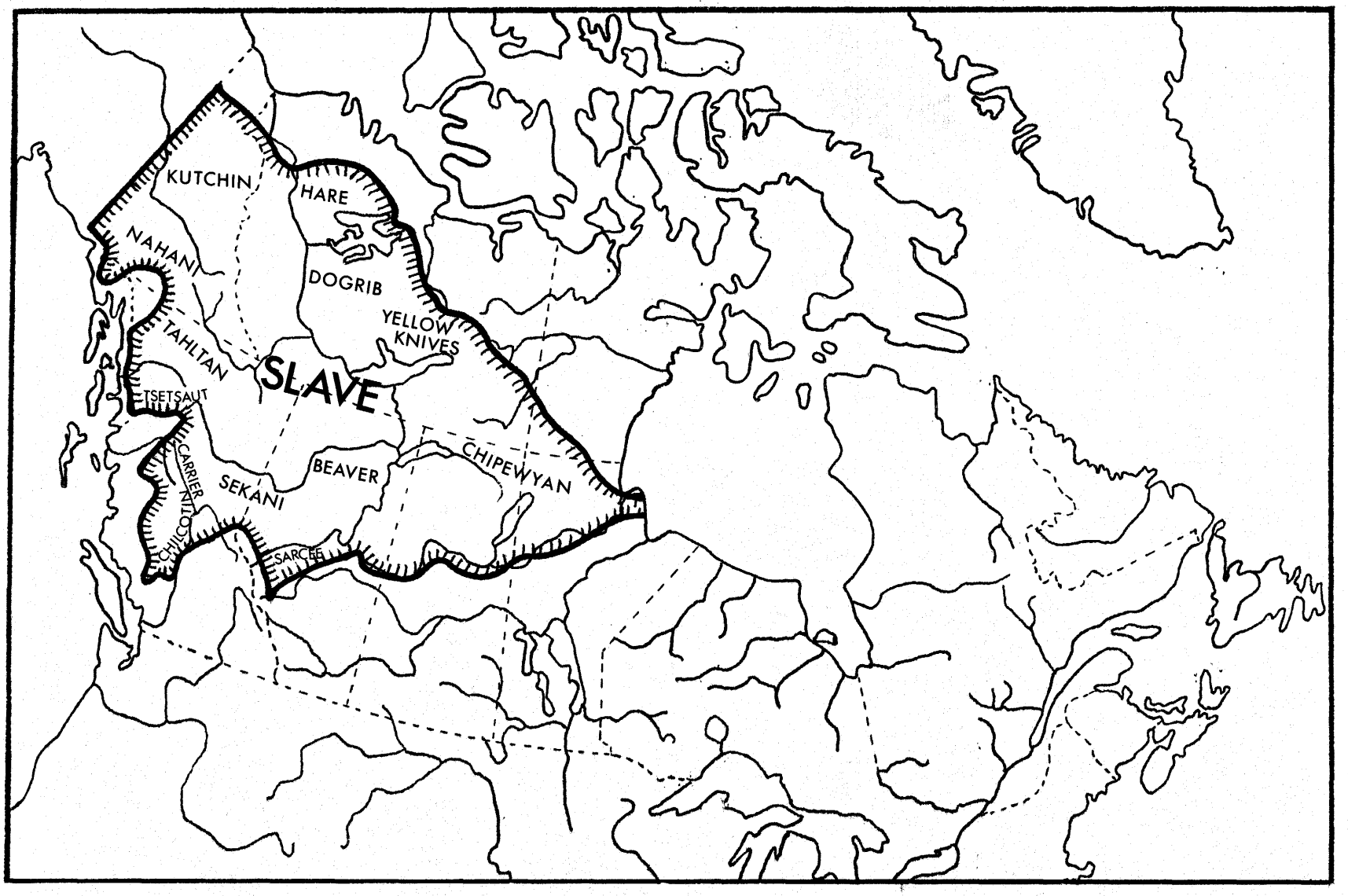


Figure 1. Distribution of the Athabascan Indians in Canada, after Jenness (1972).

Descriptions of the Slave, the tribe in which the people of Fisherman Lake are placed, in early journals gave a general picture of Slave ethnography but complete, detailed information on the material culture was lacking. The Slave were hunters and fishermen basing their subsistence primarily on the faunal components of the boreal forest environment. They depended on snares to capture game and hunted with spears mounted with points of bone and antler (Jenness, 1972 ed.:391). The importance of animals to the Slave is an accepted fact, but their use of plants as a source of subsistence and medicine has generally been unrecorded, though their value as a source of raw materials could not be ignored. Wentzel (1889:80) listed the fruits available in the area, and other authors mentioned a few roots and greens used for food (usually unidentifiable with the names and information given). Keith (1890), Bompas (in Cody, 1908) and Mackenzie (1970 ed.) stated that the Indians along the Mackenzie River lacked knowledge regarding the use of plants for the treatment of illness, instead relying upon "sucking and blowing" upon the patient. Hearne (1795:189) also mentioned this type of treatment for sickness.

The only major work dealing specifically with the reconstruction of Slave ethnography and ethos is that of Honigmann (1946) who described the people of Fort Nelson. He obtained valuable information on technology and the methods of capturing and using animals, brief notes on the uses of plants for subsistence, but again medicinal uses were lacking.

Dr. J.F.V. Millar and other members of the F.L.A.P. crew found through

their association with the Slave at Fisherman Lake that these people knew a great deal about the uses of plants in addition to procedures in artifact construction, etc. Through their interest the project on ethnographic salvage was initiated. The following report records the information gathered at Fisherman Lake from Slave informants on the uses of plants for food and medicine, as well as information on technology and animal resources. A greater emphasis is placed on plant resources in an attempt to give complete coverage, since use of animal resources was formerly better known. Quantitative data obtained for the abundance of plant species also permitted a more detailed analysis of plant use in addition to simply recording it. The environment in which these Slave lived is also characterized with respect to soils, climate and vegetation.

The area

The Slave of Fisherman Lake are uniquely situated, as the lake is found at the junction of the Mackenzie Lowlands and the Liard Range of the Franklin Mountains. They therefore are in a postion to exploit resources from two quite different biomes, the boreal forest and the alpine tundra.

The 'band territory' of the Fisherman Lake Slave (see fig. 2, page 17) apparently extended form Fort Liard ($123^{o}29'$ W) on the east, across the LaBiche Mountains (referred to by the natives as the "Grass Mountains") in the Yukon to Whitefish River (about 125° W) on the west. Northern and southern limits were less clearly defined, but seemed to include the Jackfish ($60^{o}55'$ N) and Beaver Rivers (60°N) respectively. The members

of the band occasionally wandered even farther, as Johnny Klondike had also visited the Toobally Lakes (126°20' W).

Fisherman Lake itself is about six miles long by one mile wide, and runs northwest to southeast. It is situated in the extreme southwest of the Northwest Territories in a valley with arms of the Liard Range on the west, north and northeast sides (60°20' N, 123°45' W), and the Liard River to the southeast. At present the lake is fairly shallow and eutrophic supporting a great deal of aquatic vegetation and an important fish population.

According to Johnny Klondike the annual post contact activities included up to four trips to Fort Liard for supplies ("September, New Year, April, June"). The winters were spent trapping west of 124°15' longitude in the Yukon. The April trip for supplies was made before the snow melted and before the opening of streams and rivers which initiated an intense concentration on beaver hunting. In June moose-hide boats and spruce-bark canoes were built to carry the people down the Beaver River and the Liard River so they could trade their furs at Fort Liard. September brought many families to Fisherman Lake to catch and store a supply of fish for winter use. The life-style of the people was to a great degree controlled by this seasonal cycle of activities.

It should be noted that this centralization of activities on Fort Liard is most certainly not aboriginal, however the spring movement in boats and the concentration at a fishing place in September may be a part of the old culture.

The informants

Johnny Klondike acted as the main informant. Information on his life was pieced together from various sessions, and statements were sometimes made that conflicted with earlier information, or with information of others who know Johnny. Johnny said that when he was little he lived on a river of which he does not remember the name. He had no recollection of his father, and his only brother and sister died young. Several times he stated that he had lived for some time in a mission house. He also said that he had lived with his grandfather when he was a boy. Willie McLeod of Fort Liard told us that Johnny was born at Trout Lake and lived with his step-father, William Eda. Johnny did refer to Philip Eda as his cousin, but the actual relationship was not given, and in Slave kinship systems cousin does not necessarily mean the child of one's parents' brother or sister (Helm, 1961).

For twelve years, when he was a young boy, Johnny carried mail between Fort Liard and Fort Simpson (the exact dates and number of years were not checked). In summer he used a canoe on the river; in winter he travelled by dog-team. He reported that the trail was about 200 miles long and that he had spent five nights on the trail each way, with three days at each post between trips. If the snow was deep then it would take "seven nights" to make the trip. It was during the period when he was carrying the mail that Johnny met Margaret Fantass. (Johnny said that she was Fantass Suza's daughter and that Harry Fantass was her brother). Johnny had no moccasins and Margaret made a pair for him. Twelve years later the two

became a couple and they lived for a time with her family in the Beaver River area.

Johnny's trapline on the Beaver River was about 90 miles long, and was based at a house they had built on the river. Game was plentiful in the area and Johnny kept a six-dog team. (The number of dogs kept appeared to be a measure of wealth.) After Laura (one of the youngest children) was born Johnny moved his trapline to the LaBiche River. Ten years were spent in this area of the Yukon, where game was also abundant. It was while they were there that Margaret became sick with fever, necessitating a "six night" trip with a team of four dogs to enable Margaret to be taken to the hospital in Fort Nelson.

Johnny related that when he first came to Fisherman Lake many people camped all around the lake in September to fish and hunt ducks. He recalled a time when many of these people died, possibly due to "flu". The people had "lots of cough". (It may have been after this that Johnny stayed to live at the lake, because he reported that Old Codeille, or "Fisherman", the person after whom the lake was named, died at this time too.)

Margaret Klondike also acted as an informant, but since we did not understand each other either Johnny or their son Jimmy served as an interpreter. Johnny stated that Margaret was more "Slave" than himself. By this he meant that she knows more about aboriginal ways than he does. He attributed this to the fact that her family lived on the Beaver River, and they had limited

communication with Fort Liard. The fact that intercourse with the whites was usually through the men and not the women may also be of influence in this matter.

Johnny said that he and Margaret had "two families". The first consisted of three girls and one boy, all of whom died very young. One girl died of whooping cough; the boy died of appendicitis (according to Johnny, in spite of the services of doctors); a baby girl died of fever one day when they were on Pointed Mountain and the third girl died of an affliction which Johnny referred to as a "sore leg and hip". The second family consisted of Maryanne, George, John Jr., Jimmy, Julian and Laura. Maryanne is the oldest child of the second family. Johnny cannot remember where she was born. George was born "100 miles" up the Beaver River. Jimmy was born about nine miles up the Beaver River. The family was on the Kotaneelee River when Julian was born and at the end of Fisherman Lake when Laura was born.

Jimmy Klondike also served as an informant on a few occasions. Observation of the family groups in their daily activities was also instructive.

Other families were also members of the Fisherman Lake 'band', and were present in the area when the Fisherman Lake Archaeology Project (F.L.A.P.) was initiated, but they have gradually moved away. There appears to have been a trend toward living in Fort Liard throughout the year. This is probably due to the facts that the older people can no longer lead as active a life and the younger ones are somewhat reluctant to stay away

from the store and social life in the village and to leave their children at the school.

Due to this trend, information was obtained only from members of the Klondike family and affines, with a few additional comments from Willie McLeod of Fort Liard. Although others in Fort Liard could have served as informants, corroborating and adding to the information contained herein, time spent in the settlement was not sufficient to meet those persons who were presented as being knowledgeable about what Johnny Klondike aptly called "Slave talk".

CHAPTER 1. METHODS

Initial work on the project was a literature survey for three purposes. The first was to draw up lists of species which could be expected to be in the area. These lists were in turn used to prepare a set of cards containing information taken from the literature on the uses of these species by other North American tribes. Additional works on 'economic' plants were consulted. These cards were used as a guide in the questioning of informants. Thirdly familiarization with ethnology of Slave and related tribes was necessary, as well as the determination of methods for obtaining ethnological information in the field. Consultation on field methods was with Charlie Schweger of the Anthropology Department at the University of Alberta, Alex Johnston of Canada Department of Agriculture at Lethbridge, and Nancy Turner of the Botanical Garden at the University of British Columbia.

Information was obtained in both formal and informal sessions with the informants. Discussion of different subjects was initiated by drawings, pictures, or botanical specimens. Pictures in the following books were used: A *Field Guide to the Mammals* by W.H. Burt and R.P. Grossenheider, *A Field Guide to Western Birds* by R.T. Peterson, *Freshwater Fishes of Northwestern Canada and Alaska* by J.D.McPhail and C.C. Lindsey, *Flora of Alaska and Neighboring Territories* by E. Hulten. A copy of *Wild Flowers of British Columbia* by L.J. Clark was available only in July 1975, during which period only a few hours were spent with the informants.

As each species of plant, fish, bird or mammal was recognized by the informant, the Slave name was given and a discussion followed on the uses and/or properties of that species. Discussion of the processing of raw materials provided by the species was initiated by asking specific questions.

Informal questioning was possible when the construction of artifacts or processing of resources were being observed and recorded. These situations provided a more relaxed and comfortable atmosphere for both informant and recorder and in general were the preferred method for gathering information. In addition a few field trips were made with Johnny Klondike in the area around the camp and one on the north ridge of Pointed Mountain, on which additional information on plant uses was given. Trips into the field for the purpose of gathering raw materials for artifact construction, or for checking the fish nets also provided a chance to glean additional data.

Artifacts mere made and raw materials processed by Johnny, Margaret, John Jr., Jane (John Jr.'s wife)Klondike, and Maryanne Bertrandt (nee Klondike). Johnny Klondike made the following artifacts: spruce-bark canoe, model fish weir, birch-bark baskets, string and willow-bark fish nets, mouse or weasel trap, small bird bow or "stick gun", snow shovel, poplar 'dishes', both webbed and wooden snowshoes, scrapers, bone fish hooks, bone spoons, moose-bladder container, pipes and smoking materials, beaver castor container and moose call. Johnny also skinned two bears and a moose while under observation, demonstrated the making of medicines and dyes,

marten deadfalls and rabbit snares, the cooking of fish over an open fire, and helped Margaret in the wringing, stretching and scraping of moose hides. Although he admitted that the tanning process was normally women's work, Johnny said that Margaret's arms are no longer strong enough for the the heavy work involved.

Margaret was observed beading and sewing moccasins, lacing a moose hide in the frame for drying and dehairing, tanning and smoking moose hides, and preparing fish for drying.

Jane fleshed and scraped the hair from a moose hide. John.Jr. helped Jane with the dehairing process and he also made a hatchet and other minor artifacts which he sold to the F.L.A.P.

Maryanne fleshed a bear hide and laced it in a frame to dry. She was preparing to make mittens with the hide but it was lost when one of their dogs ran away and lost his pack on a trip to Fort Liard. Maryanne also made several birch-bark containers and a woodchuck hat for the F.L.A.P.

Julian helped Johnny to skin and butcher a moose that was shot in the waters of Fisherman Lake and towed ashore not far from camp.

Daily activities such as the setting and checking of fish nets, gathering spruce boughs for mats, gathering berries, drying and cooking meat were also observed.

Botanical specimens were collected of species found in the area. Field trips were made in the vicinity of Fisherman Lake and on nearby Pointed Mountain for this purpose. A brief visit to the LaBiche Mountains was made to verify the presence of some of the plants said by Johnny to grow there. An attempt was also made to collect the "medicines" that Johnny said were to be found in "Grass Lake" (see fig. 2, page 17), but since the helicopter could not land only one specimen, sweet flag,(*Acorus calamus*) was collected by reaching from the luggage racks.

Nomenclature for plant species was taken from *Flora of Alaska and Neighboring Territories* (Hulten,1968) and *Flora of Alberta* (Moss, 1959).

Vegetation analysis was carried out by sampling species' frequencies in a grid of squares one half meter in area, set up in plots 25 m square within uniform stands of vegetation. For the purpose of this report it was considered adequate to choose the basic vegetation associations by dominant tree species and sample the understory vegetation within a representative stand. Limitations of time and weather necessitated choosing the most easily accessible stands of each type known to occur in the area. Difficulty in choosing representative uniform stands was encountered, especially on the alpine tundra where variability was great.

Descriptions of the vegetation associations of the area are based on frequency data obtained from the quadrats (see Appendix X). The vegetation map denoting the areas occupied by each association (Appendix XI) is drawn from air photos. Mapping outlines only those areas of sufficient size to

be recognized at a scale of about 1:48,000. Not all areas have been ground checked as the air photos were not received until field work had been terminated.

By combining frequency data from stands sampled with area of each vegetation type within a few miles of the shores of Fisherman Lake (derived from the vegetation map, Appendix XI), a relative frequency has been obtained for about one third of the species recorded in the area. This is used in section 6.2 to analyse the abundance of the plant species (other than trees and tall shrubs, for which the quadrat size was unsuitable) used by the Slave.

Efficiency (here meaning the percentage use of total useable species) of use of available vascular plant species is analysed in section 6.1 using the data organized on filing cards during the literature survey with regard to use by other American Indian tribes and other human groups to whom the same species of plants were available.

Taxonomy of vascular plants, mammals, birds and fish by the Slave has been analysed in Chapter 9, following the outline of folk taxonomies given by Berlin et al. (1974). Implications toward cognition drawn from Slave nomenclature are discussed in section 9.2.

Within the text the use of quotation marks denotes terminology used by Johnny Klondike (half quotation marks are those of the author). This is included because it is believed that it more correctly represents the

manner in which the Slave regard their environment than if correct English or scientific terminology were employed. In addition technical botanical terms have been included in parentheses. Any terms for which a more general term could not be substituted are defined where they first appear in the text or can be found in the glossary of terms included.

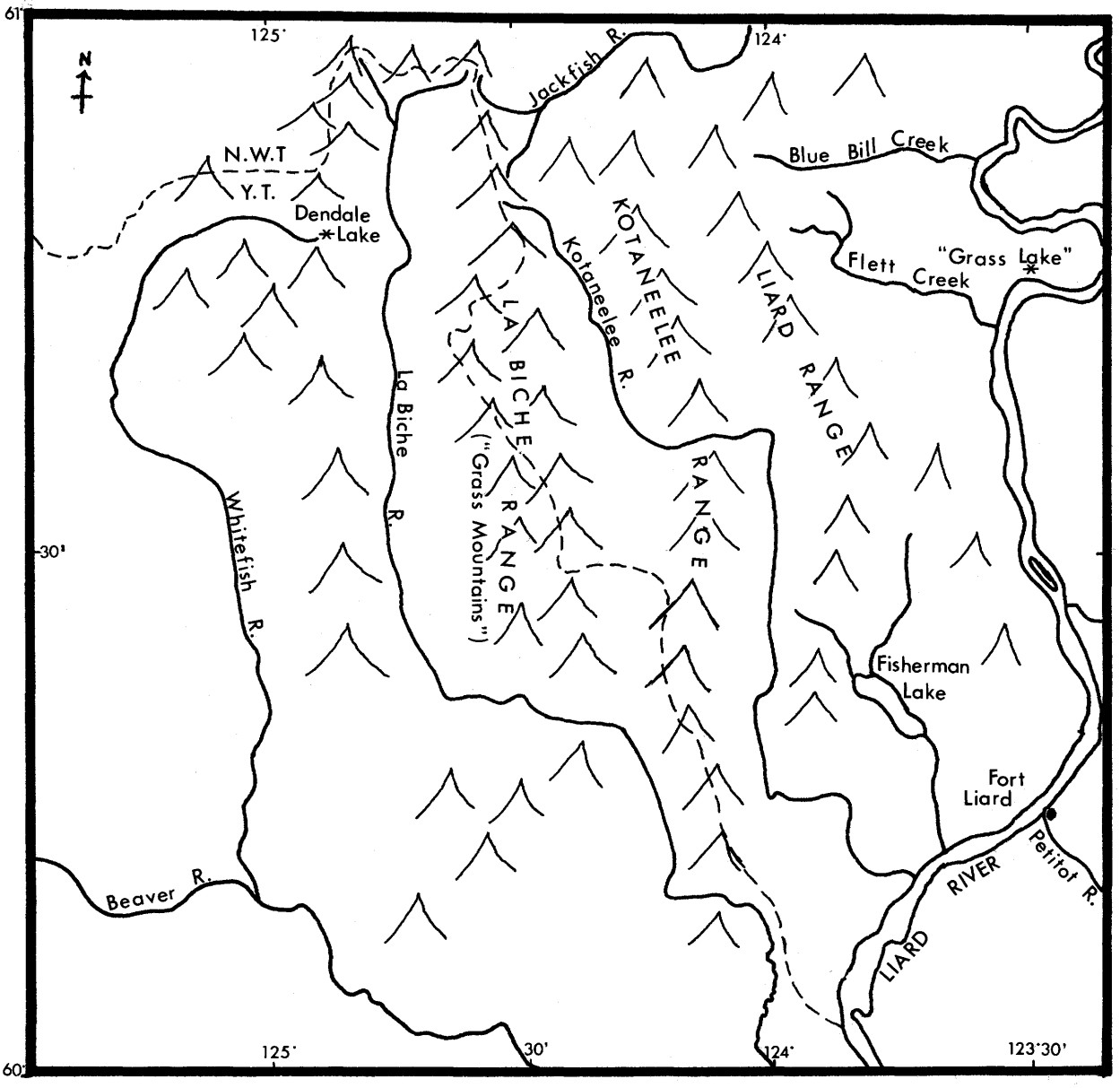
CHAPTER 2. THE FISHERMAN LAKE AREA

2.1 Geography

Two topographic provinces are represented in the Fisherman Lake area, separated by the Liard River which runs in a northeasterly direction to the southeast of the lake, then slightly west of north to the east of the lake (see fig. 2). East from the Liard River stretch the level, gently rolling Mackenzie Lowlands, while to the west and north lie the ranges of the Mackenzie and Franklin Mountains.

The Liard River and its many tributaries were of prime importance as travel routes for the native peoples. Tributaries, found within the area travelled by the people of Fisherman Lake, include the following in the order in which they enter the Liard from source to mouth: Beaver River, LaBiche River, Kotaneelee River, Petitot River (at whose mouth Ft. Liard is situated), Muskeg River, Rabbit Creek, Flett Creek, Blue Bill Creek, Netla River, and the South Nahanni River. Also of importance were the Whitefish River, which flows into the Beaver, and the Jackfish River, which flows into the South Nahanni. Johnny also on occasion mentioned the Flat River which is another tributary of the South Nahanni River.

Fisherman Lake lies in the basin formed between the two southern fingers of the Liard Range of the Franklin Mountains. It receives most of its water as runoff from these mountains, and in turn drains by means of a small creek, called "Fish Creek" by the local people, which flows into the Liard River.



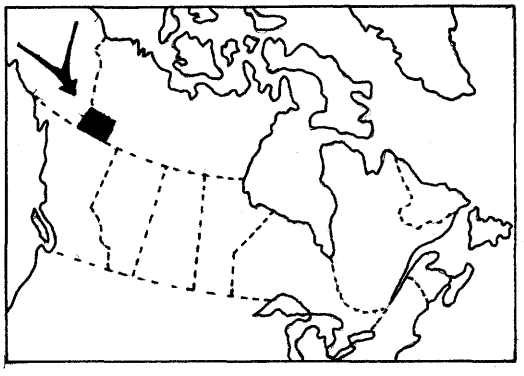
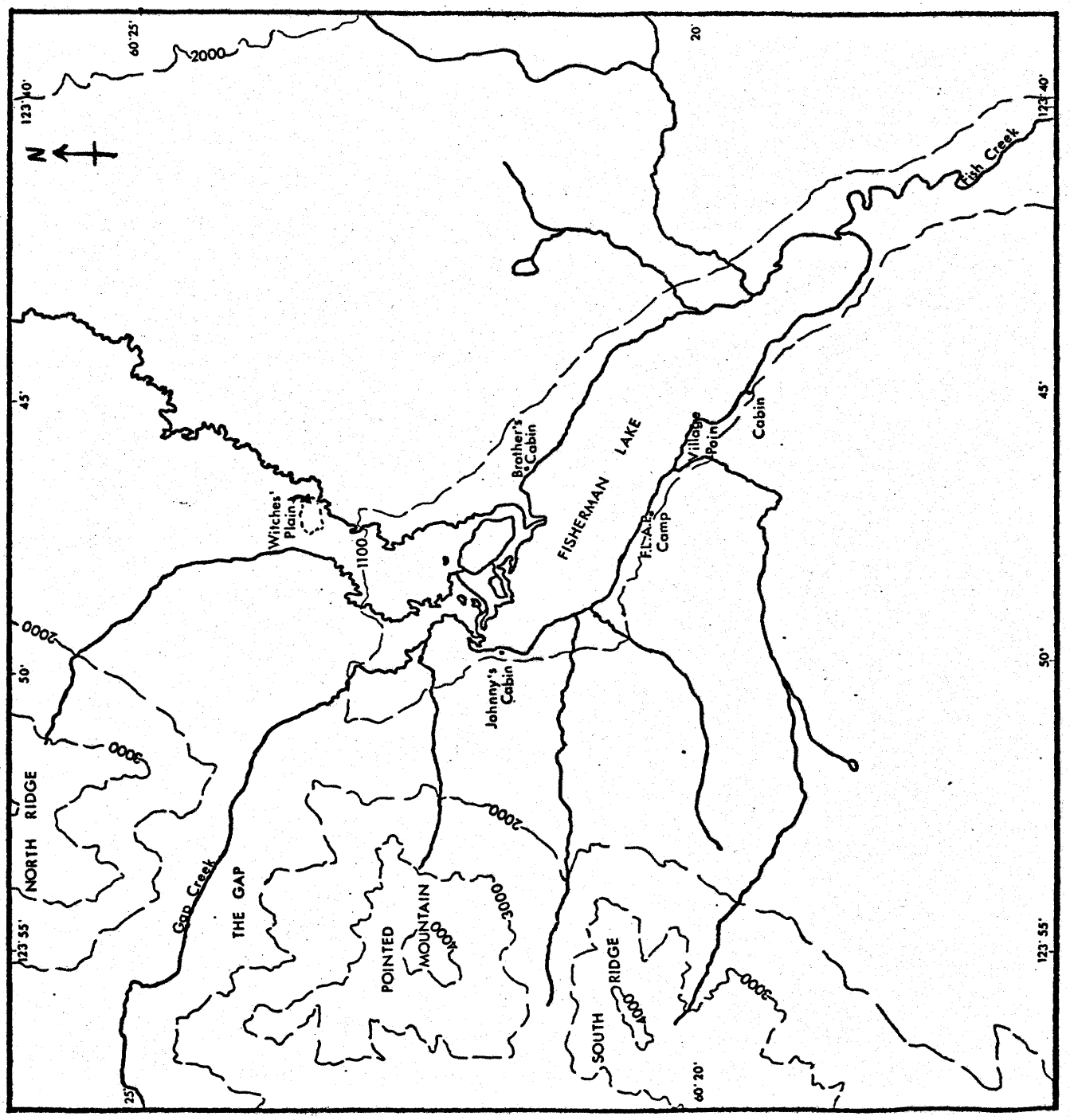


Figure 2. Geographic features of the area. The small map to the left indicates the location of the area in Canada.

Figure 3. Fisherman Lake. Prominent features in the immediate vicinity.



The mountain ranges in the area include the Liard, the Kotaneelee and the LaBiche (the former of the Franklin Mountains, the latter two of the Mackenzie Mountains). Mount Coty lies to the east of Fisherman Lake and Pointed Mountain to the west. In discussions of the area the mountain to the north of Pointed Mountain is referred to as the north ridge of Pointed Mountain, and the one to the south as the south ridge (see fig. 3, page 18); although neither is classed as such on the topographic maps this terminology was used as a matter of convenience in identifying the area being discussed.

Other areas mentioned by Johnny (see fig. 3, page 18) are as follows: "Grass Mountains"("other side Kotaneelee") refers to the LaBiche Range. "Grass Lake"is a small body of water on the north side of the Liard River where it makes a bend to the east a short distance downstream from the mouth of Flett Creek (about 60°45' N 123°30' W). "Witches' Plain" is a small grassy area which lies a short distance north of Fisherman Lake. The break in the chain of mountains which is just north of Pointed Mountain has been referred to as the 'Gap', and for convenience the creek flowing through it will be called 'Gap Creek'.

2.2 Geology and soils

The origin and type of soils are important factors in determining the vegetation that can succeed in an area, hence indirectly affecting the animal complement. It was therefore deemed necessary to briefly describe the soils found in the area.

Bedrock in the area is mainly Cretaceous sandstone and shale. The Liard Range contains sandstone, shale and limestone of Carboniferous and Permian age. Glacial till deposits to the east are a stony, gravelly loam or clay loam (Day, 1966:17). The Fisherman Lake Valley, the site of a glacial lake, contains lacustrine deposits, hence the soils are glacial in origin (Jeffry, 1961:41). Recent soil reconnaissance work has shown that the soils in the valley differ from those of the surrounding area (Bob White, personal communication) but the effects of this on the vegetation are not known.

The following information on the soils of the area is summarized from Day (1966). Great soil groups represented in the Fisherman Lake Valley include Gray Wooded, Humic Gleysol and Organic soils. Land types (according to Day's use of the word) include rocky mountain slopes and water bodies. The most common soils (occupying the greatest area) are the Gray Wooded of the Orthic subgroup. The Gros Cap series covering most of the area is well-drained loam. Organic litter is found over brownish platy loam, over brown blocky silty clay, over greyish-brown calcareous silty clay loam. Humic Gleysols of the Rego subgroup are represented in the area by the Flett series. The thin organic surface litter overtops a dark gray mineral-organic horizon on mottled dull-colored, stratified, stone-free silty clay or silty clay loam parent material. These soils develop on fine-textured fluvial deposits and are found in depressional areas which are poorly drained.

Organic soils in the area are of the Grainger series. Peat hummocks

are underlain by a thick layer of reddish brown, decomposing peat. At a depth of about 18 inches permafrost may be found. The frozen layers are over a dark brown saturated muck, streaked with silt. Although these soils are very poorly drained, often little surface water is visible.

2.3 Climate

The climate of an area has direct effects on both the flora and the fauna. In this regard extremes may be of more importance than the average conditions. The climate of the area is influenced by both Arctic and Pacific air masses. Maximums of about 35°C (95°F) and minimums lower than -45°C (-50°F) are characteristic, and illustrate the wide range of yearly variation. The frost free period is about 60 days. Average total precipitation per year ranges between 30 and 45 cm (12 to 18 in.). Tables 1 and 2 give data on mean daily temperatures (mean, mean maximum and mean minimum) and average total monthly precipitation (rainfall and snowfall) for the three nearest weather stations to Fisherman Lake. Data from Ft. Liard has only been recorded for the past two years (R. Hagen, Northwest Lands and Forest Service, Ft. Liard, personal communication) and hence means calculated from the data would likely not present a true picture.

Break-up of the Liard River occurs in early May, with smaller streams and rivers breaking earlier. In 1974 ice began to break on Fisherman Lake on 13 May and was mostly gone by 21 May. Last snowfall that year

Table 1. Temperature data[1] from the three closest weather stations to Fisherman Lake, N.W.T.

Mean Daily Temperature (°C)

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ft. Nelson, B.C.	-23.0	-16.9	- 9.1	1.2	9.6	14.4	16.6	14.7	8.7	1.2	-12.2	-20.5
Ft. Simpson, N.W.T.	-26.7	-22.8	-13.6	-2.8	7.0	14.3	16.7	14.3	7.4	-1.1	-14.4	-23.0
Watson Lake, Y.T.	-25.1	-18.1	-10.4	-0.6	7.3	13.0	14.8	12.9	7.7	0.1	-13.4	-22.3

Mean Daily Maximum Temperature (°C)

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ft. Nelson, B.C.	-18.6	-11.6	- 2.6	7.3	16.0	20.7	22.8	21.0	14.5	6.1	- 8.3	-16.7
Ft. Simpson, N.W.T.	-22.6	-18.3	- 7.6	3.1	13.3	20.7	23.0	20.7	12.2	2.1	-11.3	-19.1
Watson Lake, Y.T.	-19.8	-11.6	- 2.6	5.7	13.8	19.3	21.0	19.1	12.9	4.3	- 9.0	-17.7

Mean Daily Minimum Temperature (°C)

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ft. Nelson, B.C.	-27.3	-22.2	-15.5	-0.5	3.2	8.0	10.3	8.4	3.0	-3.8	-16.1	-24.3
Ft. Simpson, N.W.T.	-30.9	-27.3	-19.6	-8.7	0.7	7.8	10.3	7.9	2.5	-4.3	-17.4	-26.9
Watson Lake, Y.T.	-30.3	-24.7	-18.2	-6.9	0.8	6.7	8.6	6.7	2.4	-4.2	-17.9	-27.0

[1]The figures were converted to metric (°C) using data in degrees Fahrenheit that was kindly supplied by J. J. LaBelle, Regional Director, Atmospheric Environment Service, Winnipeg, Manitoba. Approximate locations for the stations are as follows: Fort Nelson Airport - 58°50' N 122°40' W; Fort Simpson, Canada Department Agriculture Research Station - 61°50' N 121°20' W; Watson Lake Airport - 60°10' N 128°50' W.

Table 2. Precipitation data[1] from the three closest weather stations to Fisherman Lake, N.W.T.

Mean Rainfall (cm)

Time period	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Ft. Nelson, B.C.	T*	0.03	0.08	0.50	3.13	6.30	7.35	5.48	3.28	0.73	0.08	T	27.06
Ft. Simpson, N.W.T.	T	0.00	0.03	0.30	2.25	4.18	3.58	5.03	2.95	1.30	0.05	T	19.67
Watson Lake, Y.T.	T	T	0.08	0.35	1.95	4.80	5.23	4.38	3.95	1.40	0.33	0.03	22.50

Mean Snowfall (cm)

Time period	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Ft. Nelson, B.C.	29.8	25.8	27.0	19.0	5.8	T	0.0	T	5.3	18.8	29.0	28.3	188.8
Ft. Simpson, N.W.T.	13.3	15.6	15.6	14.5	3.8	0.0	0.0	0.0	2.5	14.3	20.8	19.8	120.2
Watson Lake, Y.T.	37.8	31.5	25.8	15.3	3.8	T	0.0	T	3.3	22.3	38.5	45.8	224.1

[1]The figures were converted to metric (cm) using data in inches that was kindly supplied by J. J. LaBelle, Regional Director, Atmospheric Environment Service, Winnipeg, Manitoba. Approximate locations for the stations are as follows: Fort Nelson Airport - 58°50' N 122°40' W; Fort Simpson, Canada Department Agriculture Research Station - 61°50' N 121°20' W; Watson Lake Airport - 60°10' N 128°50' W.

*T = trace amounts.

was 4 May, although data in Table 2 indicate that it may occur later with some frequency. In 1974 thundershower activity began on 11 May. Leafing out of trees that year was pronounced by 20 May. Both the summers of 1973 and 1974 were noted by personnel of F.L.A.P. and AMOCO Canada to be exceptionally rainy. Extended rainy periods of over one week occurred. In June 1973 the water level of Fisherman Lake was more than 50 cm higher than normal. Rainfall was characterized by very heavy downpours. Rain accounts for over 50% of total precipitation, with over 60% of total rainfall occurring in June, July and August.

First snowfall in 1974 occurred 20 August (about 10 cm, or 4 in.) although trace amounts had fallen earlier in high alpine areas. Fall frosts occur in late August or early September. Mean maximum snow depths (as per table 2) lie between 117 and 225 cm (47 and 90 in.). It is unlikely that actual levels reach this high however, due to processes of maturation, compaction and melting of crystals, as well as interception by vegetation and wind drifting. Snow melt is complete by late April or early May.

2.4 Vegetation

Coincident with the occurrence of two topographic zones (the Mackenzie Lowlands and the Franklin and Mackenzie Mountains) two biomes are represented in the area, boreal forest and alpine tundra.

The boreal forest extends over the Mackenzie Lowlands. Rowe (1972) subdivided the Boreal Forest Region in this area into two sections, the Upper Mackenzie and the Alpine Forest-Tundra. The Upper Mackenzie section includes the riverine forest along the Liard River, and those forests of the nearby mountain slopes. These forests of the mountain slopes, in the Fisherman Lake area, are similar to other areas of the Boreal Forest Region except for the presence of the mountain tree species alpine fir (*Abies lasiocarpa*) and lodgepole pine (*Pinus contorta*). This difference could be used to further subdivide the area into riverine and montane subsections. The Alpine Forest-Tundra Section, as described by Rowe (1972:63) is not well represented on Pointed Mountain. Treeline is characterized by fairly dense tall shrub growth with intermingled coniferous tree species which are well spaced, as they are described for the Alpine-Forest-Tundra. In only one area on the 'north ridge' of Pointed Mountain do the "open, park-like stands" occur which were referred to by Rowe. This area was only observed from a distance and was not sampled.

The alpine tundra occurs above 1200 m (3600') altitude on the mountain peaks and ridges. Each area of tundra seems to differ from that on other, nearby mountain tops, although some characteristics appear general.

The Fisherman Lake valley and the lower slopes of the Liard Range seem to be characterized by forests very similar in vegetation associations to those of the lowlands and floodplains of the Liard River as described by Jeffrey (1964). He recognized four vegetation types on the Mackenzie Lowlands (mixedwood forest, *Picea mariana* forest, brule and depressional shrub), seven on the older floodplains and terraces (mixedwood forest, mixed broad-leaved forest, *Picea mariana* forest, meadow, shrub channel and inundated areas, brule, man-made clearings), and seven types on the recent floodplains (sand-bar and riverbank, riparian shrub, depressional shrub, *Populus balsamifera* forest, *Picea glauca* forest, other forest vegetation types, and brule).

For the purpose of this study it did not seem necessary to subdivide the forests into as many associations as recognized by Jeffrey. On the valley floor, the terraces of the lake, and the lower slopes of the mountain the following associations were recognized: mixed broad-leaved forest, mixedwood forest, mixed coniferous forest (*Picea* spp.), *Picea glauca* forest, *Picea mariana* forest, open *Picea mariana* bog forest ('muskeg'), shrub association, *Salix*, channels and frequently inundated areas and the 'land type' shallow waters. On the high mountain slopes are mixed coniferous montane forest (*Picea* - *Abies*), *Pinus contorta* forest, timberline forest, shrubby alpine tundra, mesic alpine tundra, stony alpine tundra and scree slopes which support little or no vegetation. Disturbance has been dealt with separately although the effects differ in the different vegetation associations.

PLATE I. Some of the vegetation associations in the Fisherman Lake area.

1. Shrub association at the edge of deciduous mixed-wood, in May.
2. Black spruce (*Picea mariana*) forest.
3. Semi-open bog forest.
4. Sedge-willow (*Carex-Salix*) border on the margins of Fish Creek.
5. Timberline forest on Pointed Mountain.
6. Shrubby tundra on Pointed Mountain.
7. Stony tundra on Pointed Mountain.
8. The "Grass Mountains" (LaBiche Range).


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Table 3. Summary of dominant species in vegetation associations.

Association	Tree Species	Tall Shrubs	Medium Shrubs	Low Shrubs	Tall Herbs	Medium Herbs	Low Herbs	Ground Cover
Mixed broad-leaved	Populus tremuloides Populus balsamifera	Salix spp. Alnus crispa	Shepherdia canadensis Viburnum edule Rosa acicularis	Linnaea borealis		Cornus canadensis	Pyrola spp.	litter
Mixed wood	Populus tremuloides Picea glauca	Salix spp. Alnus crispa	Shepherdia canadensis Ledum groenlandicum Rosa acicularis Viburnum edule	Vaccinium vitis-idaea		Cornus canadensis		litter
Mixed coniferous (Picea spp.)	Picea glauca Picea mariana		Rosa acicularis Viburnum edule Shepherdia canadensis Ledum groenlandicum Salix myrtillifolia	Linnaea borealis Vaccinium vitis-idaea Arctostaphylos rubra		Cornus canadensis		Hylocomium splendens Pleurozium schreberi
Picea glauca	Picea glauca	Salix spp.	Ledum groenlandicum Rosa acicularis Shepherdia canadensis Salix myrtillifolia	Linnaea borealis Vaccinium vitis-idaea		Cornus canadensis	Mitella nuda	Pleurozium schreberi Hylocomium splendens
Picea mariana Bog forest	Picea mariana Picea mariana Larix laricina Betula spp.	Betula glandulosa Salix spp.	Ledum groenlandicum Andromeda polifolia Vaccinium uliginosum Chamaedaphne calyculata	Vaccinium vitis-idaea		Rubus chamaemorus		H. splendens & P. schreberi Sphagnum spp. Cladonia spp. Polytrichum juniperinum
		Salix spp.	Ledum groenlandicum Rosa acicularis Salix myrtillifolia Vaccinium uliginosum	Vaccinium vitis-idaea Arctostaphylos rubra			Equisetum scirpoides	Cladonia spp. H. splendens & P. schreberi Sphagnum spp.
Shrub		Alnus crispa Salix spp.	Rosa acicularis Ribes glandulosum Viburnum edule	Linnaea borealis	Epilobium angustifolium	Cornus canadensis Rubus pubescens	Adoxa moschatellina Pyrola asarifolia Mitella nuda	litter
Salix		Salix spp. Alnus tenuifolia	Rosa acicularis	Linnaea borealis	Epilobium angustifolium	Equisetum arvense Cornus canadensis	Mitella nuda	litter
Mixed coniferous (Picea-Abies)	Picea glauca Abies lasiocarpa			Linnaea borealis Vaccinium vitis-idaea		Cornus canadensis	Pyrola spp.	bryophytes
Pinus contorta	Pinus contorta (Picea glauca)	Salix spp.	Rosa acicularis	Vaccinium vitis-idaea Linnaea borealis	Epilobium angustifolium	Cornus canadensis Artemisia arctica	Moneses uniflora	bryophytes
Timberline	Abies lasiocarpa Pinus contorta	Alnus crispa Salix spp. Betula glandulosa	Ledum groenlandicum Spirea beauverdiana Rosa acicularis	Vaccinium vitis-idaea Linnaea borealis	Epilobium angustifolium	Cornus canadensis	Petasites spp.	bryophytes
Shrubby alpine tundra	Picea glauca Pinus contorta	Salix spp. Betula glandulosa	Ledum groenlandicum Vaccinium uliginosum	Salix reticulata Arctostaphylos alpina		Hedysarum americanum	Pyrola secunda	bryophytes
Mesic tundra	Abies lasiocarpa Pinus contorta		Vaccinium uliginosum	Vaccinium caespitosum Arctostaphylos alpina			Equisetum scirpoides	lichens
Stony tundra	Picea glauca Abies lasiocarpa	Salix spp. Betula glandulosa	Betula nana Ledum groenlandicum Vaccinium uliginosum	Salix reticulata		Saxifraga tricuspidata S. hieracifolia	Gentiana glauca Pedicularis capitata	bryophytes lichens bryophytes

Vegetation associations have been described by noting the dominant species in each of the observable layers of vegetation. Layers include tree, tall shrub, medium shrub, low shrub, tall herb, medium herb, low herb and ground cover. The tree layer includes all those species which have the potential to reach tree size, or which are normally trees. The tall shrubs are considered to be those over one meter in height. Medium shrubs range between one decimeter and one meter, while low shrubs are under one decimeter in height. Tall herbs are classed as those over 50 centimeters in height, medium herbs between five and 50 centimeters, and low herbs under five centimeters. Ground cover is that layer of organic (living or dead) material on the ground surface.

2.4.1 Associations of The Upper Mackenzie Section

2.4.1.1 Mixed broad-leaved forest:

The mixed broad-leaved forests cover much of the Fisherman Lake valley and the low mountain slopes. *Populus tremuloides* (trembling aspen) and *P. balsamifera* (balsam poplar) appear as codominants almost throughout. Some ridges have pure stands of *P. tremuloides*, whereas moist depressions and the low lake terrace often are dominated by *P. balsamifera*. *Betula neoalaskana*, *B. papyrifera* and *B.* X *winteri* (birch species) are scattered throughout, at times occurring in pure stands. No association with aspect, drainage or any other particular factor was apparent with these 'groves' of birches.

The tall shrub layer is predominantly of scattered *Salix* spp. and thickets of *Alnus crispa*. Medium shrubs frequently form a dense layer of which *Shepherdia canadensis*, *Viburnum edule* and *Rosa acicularis* are the dominant species. The dominant low shrub is *Linnaea borealis*. The primary component of the medium herb layer is *Cornus canadensis* while *Pyrola* species dominate the low herb layer. The tall herb layer is very sparse or absent. Ground cover is of leaf litter.

Ravines which pass through this forest type are characterized by an increase in the percentages of *Populus balsamifera*, *Alnus crispa* and *Viburnum edule* (which increases in height attained so that it reaches into the high shrub layer). *Cornus stolonifera* is co-dominant in the high shrub layer. Other species becoming important in the medium shrub layer include *Ribes hudsonianum* and *Lonicera dioica*.

2.4.1.2 Mixedwood forest:

Because the spruce has not yet broken through the canopy, the mixedwood area sampled does not show much spruce on the air photos, although white spruce (*Picea glauca*) was co-dominant with *Populus tremuloides*. Other areas recognized as mixedwood on the ground also appear to be broad-leaved forests from the air. This is due to the fact that the aspen overtops the spruce in these areas. Two hypotheses could explain this. A recent invasion of the deciduous woods by spruce would result in this type of forest, or regeneration of mixedwood following fire. Since the spruce is a slower growing species the aspen would overtop it at first, and the spruce would only break through the canopy after the aspen

growth had slowed. The latter explanation is the more likely of the two, although trees were not aged.

The tall shrub layer appears to be largely absent, except for very scattered *Salix* or occasional *Alnus crispa*. The medium shrub layer is alternately dominated by *Shepherdia canadensis* and *Ledum groenlandicum*, depending upon the relative dominance of aspen or spruce, respectively, in the overstory. Other medium shrubs present are *Rosa acicularis* and *Viburnum edule*, and the dominant low shrub is *Vaccinium vitis-idaea*. *Cornus canadensis*, a medium herb, is the primary species of the herb layers, the tall and low herbs being nearly absent. The overall amount of bryophytes in the ground cover is small in comparison to the amount covered with litter, however the frequency of occurrence is high in half-meter quadrats due to the presence of numerous small patches.

2.4.1.3 Mixed coniferous forest:

Mixed coniferous forests are found on low to medium lake terraces. The dominant tree species are *Picea mariana* (black spruce) and *P. glauca*. Poplar and birch may also be present in small amounts. Tall shrubs tend to be lacking. Under a dense canopy a scant medium shrub layer of *Rosa acicularis* and *Viburnum edule* exists, however openings in the canopy are accompanied by the growth of a thick mat of *Ledum groenlandicum*, *Shepherdia canadensis*, *Salix myrtillifolia* and the low shrubs *Vaccinium vitis-idaea* and *Arctostaphylos rubra*. *Linnaea borealis* is the dominant low shrub under the closed canopy, and *Cornus canadensis* is the dominant

herb, but both decrease in abundance greatly where the canopy is open. Again tall and low herbs are sparse. The ground is covered with a carpet of bryophytes, largely *Hylocomium splendens* and *Pleurozium schreberi*.

2.4.1.4 *Picea glauca* forest:

Small stands of white spruce occur in the valley. *Salix* spp. are scattered in the tall shrub layer. Medium shrubs are dominated by *Ledum groenlandicum*, *Rosa acicularis*, *Shepherdia canadensis* and *Salix myrtillifolia*, and low shrubs by *Vaccinium vitis-idaea* and *Linnaea borealis*. Tall herbs are scarce. The medium herb layer is dominated by *Cornus canadensis* and the low herb layer by *Mitella nuda*. Ground cover is 100%, and is predominantly the bryophytes *Hylocomium splendens* and *Pleurozium schreberi*, with local abundance of the lichen *Peltigera apthosa*.

2.4.1.5 *Picea mariana* forest:

This type is usually found bordering the open bog forests. It consists of very dense, closed stands of *Picea mariana*. Little else grows beneath the trees but a thick carpet of *Pleurozium schreberi* and *Hylocomium splendens*, with other bryophytes probably intermingled.

2.4.1.6 *Picea mariana* bog forest:

The tree layer of the bog forest tends to be low and open. *Picea*

mariana is dominant, with some scattered *Betula* spp. (*B.* X *eastwoodae* ?). In the wetter areas is to be found *Larix laricina* (American larch). The tall shrub layer is also very open and consists largely of *Betula glandulosa* and *Salix* spp. Differences in the occurrence of the former could be used to divide the bog forests into two types, possibly occurring due to differences in availability of ground water. The glandular birch seems to be limited to those bog forests on the lower lake terraces, being absent from those at higher altitudes and more distant from the lake. Although more work would have to be done to support such a subdivision, the low shrub layers seem to differ accordingly.

In those bog forests low and near the lake medium shrubs are *Ledum groenlandicum*, *Andromeda polifolia*, *Vaccinium uliginosum*, and *Chamaedaphne calyculata*. The low shrub dominant is *Vaccinium vitis-idaea*. *Rubus chamaemorus* is the dominant herb. Tall and low herbs are generally lacking. Ground cover is a patchwork of *Cladonia* spp., *Polytrichum juniperinum*, *Sphagnum* spp. and some *Pleurozium schreberi* and *Hylocomium splendens*.

In higher areas medium shrubs are predominantly *Ledum groenlandicum*, *Salix myrtillifolia*, *Rosa acicularis* and *Vaccinium uliginosum*. The low shrubs are *Vaccinium vitis-idaea* and *Arctostaphylos rubra*. The most frequent species in the low herb layer is *Equisetum scirpoides* with tall and medium herbs being sparse. Ground cover is predominantly lichens of the genus *Cladonia*, with *Hylocomium splendens* and *Pleurozium schreberi*, and some *Sphagnum* species.

2.4.1.7 Shrub association:

In some parts of the valley and on the mountain slopes extensive areas are dominated by tall shrubs, *Alnus crispa*, and *Salix* species. This association may also be found in depressional areas. No explanation for the existance of this type of association instead of forest could be seen. It would seem that frequent fires would be more likely to result in pine forests (as those that followed the 1945 fire on the west side of Pointed Mountain), but the east slope of Pointed Mountain has an extensive area which has regenerated to shrubs after a fire (likely the same 1945 fire, as the stubs are still standing, some of which are pine).

In some of the depressional areas scattered balsam poplar and birch may be present, but for the most part the tree layer is completely lacking. In the medium shrub layer *Rosa acicularis*, *Ribes glandulosum* and *Viburnum edule* are dominant. The dominant low shrub is *Linnaea borealis*. The tall herb layer dominant is *Epilobium angustifolium*. In the medium herb layer *Cornus canadensis* and *Rubus pubescens* are dominant. The low herb layer is dominated by *Adoxa moschatellina*, *Pyrola asarifolia* and *Mitella nuda*. The ground cover is largely made up of litter, with some *Pleurozium schreberi*.

2.4.1.8 *Salix* association:

A *Salix* dominated association is found in low-lying lakeshore areas which receive infrequent inundation (eg. inundation occurred in June 1973

after heavy rains caused a rise in the lake level). The only tree species observed in this area was *Picea glauca*, which had not yet surpassed the willows in height. The tall shrub layer also contains scattered *Alnus incana tenuifolia*. The medium shrub layer is open, dominated by *Rosa acicularis* with the low shrub being *Linnaea borealis*. The tall herb layer contains scattered *Epilobium angustifolium*. Dominant medium herbs are *Equisetum arvense* and *Cornus canadensis*, with the low herb *Mitella nuda* being the most common in that layer. Ground cover is a very thin layer of litter.

2.4.1.9 Channels and frequently inundated areas:

In areas that receive yearly inundation the vegetation is primarily a *Salix* - *Carex* association. In some areas along the stream channels where heavy deposition of alluvium occurs the sedges are replaced by *Equisetum* species (predominantly *E. arvense*). Other layers are absent in this association.

2.4.1.10 Shallow waters of Fisherman Lake:

The shallow water along the lake edge is dominated by *Scirpus validus*. In certain areas stands of *Equisetum fluviatile* are dominant. The deeper waters are characterized by an abundance of *Potamogeton* spp., *Nuphar variegatum* and *Sparganium angustifolium*.

2.4.1.11 Mixed coniferous montane forest:

On the slopes of Pointed Mountain the coniferous forest is of the *Picea* - *Abies* type, with *Picea glauca* and *Abies lasiocarpa* being co-dominants. Of the shrub layers, only the low one is present with *Linnaea borealis* and *Vaccinium vitis-idaea* dominating. Medium herbs are predominantly *Cornus canadensis* and low herbs are *Pyrola* species. The ground is carpeted with a thick layer of bryophytes.

2.4.1.12 *Pinus contorta* forest:

No mature pine forests were observed in the area. The west slopes of Pointed Mountain are covered with regenerating pine forest following a fire in 1945. Varying amounts of *Picea glauca* are present, from very scattered to amounts approaching co-dominance in some areas. There seems to be no differentiation of the lower layers with the percentage of spruce present. The tall shrub layer contains only a scattering of plants of *Salix* species. The medium shrub layer is dominated by *Rosa acicularis* and the low shrubs by *Vaccinium vitis-idaea* and *Linnaea borealis*. The main tall herb is *Epilobium angustifolium*. The medium herbs dominating are *Cornus canadensis* and *Artemisia arctica*. The most frequent low herb in the area sampled is *Moneses uniflora*. The ground is carpeted with bryophytes, mostly *Pleurozium screberi*, with some *Cladonia* lichens present.

2.4.2 Alpine Forest - Tundra Section

2.4.2.1 Timberline forest:

The limits of the timberline forest are vague but it occurs at about 1130 m altitude. The tree species of the timberline forest are not much taller than the tall shrubs. Scattered specimens of *Abies lasiocarpa* and *Pinus contorta* are present. The tall shrub layer is predominantly *Alnus crispa* with some *Betula glandulosa* and *Salix* species. Scattered plants of *Ledum groenlandicum*, *Spirea beauverdiana* and *Rosa acicularis* make up the medium shrub layer and *Vaccinium vitis-idaea* and *Linnaea borealis* are in the low shrub layer. Dominant herbs are *Epilobium angustifolium*, *Cornus canadensis* and *Petasites* species (sterile shoots) in the tall, medium and low layers respectively. Ground cover is scattered patches of bryophytes, the most common being *Polytrichum juniperinum*. Some areas on the east slope of the north ridge of Pointed Mountain have open park-like stands of *Abies lasiocarpa*, *Picea glauca* and *Pinus contorta* about two m in height. These areas were not sampled, but shrubs are generally lacking and ground cover appears to contain a high amount of bryophytes.

2.4.3 Alpine Tundra

2.4.3.1 Shrubby alpine tundra:

The tree species in this association are few and are not found in a layer differing from the dominant layer here. *Picea glauca* and *Pinus*

contorta are present in a stunted, shrubby form. The tall shrub layer is at a height of about one m, and is made up of *Salix* spp. and *Betula glandulosa*. *Salix reticulata* and *Arctostaphylos alpina* are the dominant low shrubs, with only scattered *Ledum groenlandicum* and *Vaccinium uliginosum* in the medium shrub layer. Tall herbs are generally lacking. *Hedysarum alpinum americanum* is the most frequent species of the medium herbs, and the low herbs are predominantly *Pyrola secunda* and *Equisetum scirpoides*. The ground is covered with a mat of bryophytes.

2.4.3.2 Mesic tundra:

The northern ridge of Pointed Mountain supports a mesic tundra above 1200 m altitude. Although this area was not sampled due to inclement weather and time limitations a general description is given here. *Abies lasiocarpa* and *Pinus contorta* are found up to two m tall in favored spots protected from the wind. (An occasional *Picea glauca* may also be present.) Tall shrubs are generally lacking. Medium shrubs are dominated by *Vaccinium uliginosum* and low shrubs by *V. caespitosum* and *Arctostaphylos alpina*. The herb layers are extremely diverse with no species appearing to be more frequent than others, although sampling might prove otherwise. The ground cover is made up of a diversity of lichens and bryophytes.

2.4.3.3 Stony tundra:

Stony tundra is found above 1200 m on the center peak and southern ridge of Pointed Mountain. The upper two layers of the vegetation are

represented only by very scattered specimens of *Picea glauca*, *Abies lasiocarpa*, *Salix* spp. and *Betula glandulosa* or *B. nana*. The medium and low shrub layers are also sparse with a few plants of *Vaccinium uliginosum*, *Ledum groenlandicum* and *Salix reticulata*. Tall herbs are generally absent. Medium herbs are dominated by *Saxifraga tricuspidata* and *S. hieracifolia*. The most frequent low herbs are *Gentiana glauca* and *Pedicularis capitata*. This appears to differ a good deal with the particular year, with some species being much more abundant one year than others. Ground cover is made up of a diversity of lichens found on and among the stones, and bryophytes which grow between the stones.

2.4.4 Disturbance:

Three main types of disturbance can be seen to have operated in the area. First is fire, second is the native people making camps and trails, and third is disturbance by heavy machinery to create seismic trails, roads, etc. Each of these will be discussed separately, since they appear to have differing effects upon the environment.

The most recent fire of any extent occurred in 1945, and in the following 30 years regeneration has become well advanced. The fire, started by hunters on the west slope of Pointed Mountain (R. Hagen, personal communication) was followed by dense regeneration of *Pinus contorta*. To the southeast of Fisherman Lake along Fish Creek, a dense even-aged stand of black spruce followed a fire there. Many areas now vegetated by a shrub association appear to have been burned in the past, with

standing tree stubs remaining in some areas.

Indian trails appear to alter areas only by changing local moisture conditions (i.e. resulting in the formation of pools in some areas of bog forests), and introducing species from one forest type into another. Compaction of the ground, etc. are no different than on game trails, and when use is discontinued the trails soon are revegetated. Camping areas have a greater effect on the environment. Camps in bog forest tend to result in the compression of mosses and the crushing of fruticose lichens, but these areas rejuvenate well, once abandoned. Camping areas in mixed deciduous woods and shrub communities appear to have a more lasting effect on vegetation. These sites appear to have been occupied for a longer period than the others, which would also be influential in the amount of lasting change. Two cabin sites in the mixed deciduous wood, Johnny's cabin and Brother's cabin, (see fig. 3) had considerable area cleared around them. This apparently had been cleared by seismic crews and AMOCO, and not Johnny, although the present summer campsite of the Klondikes' is gradually being cleared of trees and underbrush (G. Fedirchuk, personal communication). Johnny's cabin apparently had a garden site. In 1973 both of these sites supported dense growth of grasses (*Calamagrostis* spp.) and a few other herbaceous species. Cabin sites on Village Point (see fig. 3) in the *Salix* community also showed this abundance of grasses. One other cabin site, on the middle lake terrace in the transition from shrub community to mixed deciduous woods (southeast from Village Point), supported an abundance of *Ribes hudsonianum* and *Rubus strigosus* as well as the dense growth of grasses.

This site was deemed to be older than the others because the cabin there had reached a state of greater disintegration.

Disturbance by heavy machinery making seismic lines results in a change of the moisture regime, resulting in the collection of water at the surface, and the growth of sedges in moist bog forest. Medium shrubs (eg. *Ledum groenlandicum*) grow thickly where trees have been removed in the mixed coniferous forest. In deciduous mixed wood the tall shrubs become dominant with *Alnus crispa* and (where moisture conditions are adequate) *Salix* spp. soon gaining foothold. Later aspen and black poplar begin to overtop the shrubs. This type of disturbance results in an increase in the proportion of what have been termed pioneer species, due to the exposing of mineral soil. Among these are *Epilobium angustifolium*, *Equisetum* spp., *Rubus pubescens*, *Fragaria virginiana*, *Rosa acicularis*, *Rubus strigosus*. The latter two have become particularly abundant along the ditches of the roads that have been built, adjacent to mixed deciduous woods. One cut-line supports dense stands of *Mertensia paniculata* and *Urtica gracilis*.

On stony tundra disturbance by seismic machinery results in destruction of lichens and overturning of stones. Plants such as *Androsace septentrionalis* and *Campanula lasiocarpa* were noted to increase in these areas.

Revegetation appears to occur reasonably rapidly after disturbance but does not necessarily result in rapid reversion to the pre-existing associations.

Table 4. Areas* of different vegetation associations[1] and land types within the area depicted on the vegetation map (see Appendix XI).

Type	area in hectares	area in acres
Mixed broad-leaved forest	8,257	20,397
Mixed-wood forest	1,992	4,922
Mixed coniferous (*Picea* spp.) forest	1,026	2,524
Picea glauca forest	1,360	3,360
Picea mariana forest	944	2,333
Bog forest	7,373	18,214
Shrub association	5,946	14,688
Salix association	551	1,360
Mixed coniferous (*Picea-Abies*) forest	705	1,741
Pinus contorta forest	1,042	2,573
Timberline forest	78	292
Shrubby alpine tundra	17	42
Stony alpine tundra	279	690
Carex or *Salix-Carex* association	237	586
Water bodies	1,474	3,642
Talus slope or rock	53	132
Cleared areas	59	146
Unidentified	70	174

* Area determined by use of dot grid.

[1] Mesic alpine tundra did not occur in the area around Fisherman Lake represented by the vegetation map.

CHAPTER 3. UTILIZATION OF THE FLORA

Generally speaking, use of the flora, except in basic technology has been neglected by explorers and ethnographers alike. In many cases this may have been due to a lack of the knowledge of plant names; however, in others it must be inferred to be due to either lack of observations or low utilization of plants.

The Klondikes have a store of knowledge on plant use which supposedly has been passed down to them from their grandparents. For ease of presentation, the information that they supplied has been divided into groups of species according to the use to which the plant or part of the plant was put. Plants are grouped according to their use for foods, medicines, charms, tobacco substitutes and pipe-making, and technology. Miscellaneous other uses, and other knowledge of the natural history of plants have been grouped under the heading 'wood lore'. Subgroups included here are animal foods, fire-making, and the preparation of mustems -- the substances used by a trapper on and around his traps, thought to attract the animal for which the trap was set.

Within each section species may be grouped into subsections, according to more specific uses. Each species is listed with latin and common names (if one exists), and a brief description of the use is given. Additional information on status, habitat and where known, the dates of flowering and fruit ripening, is contained in the annotated species list in Appendix I.

3.1 Foods

Food plants can be conveniently classified according to the portion of the plant that was used. That is greens, fruits, underground parts, cambium, sap, or flowers. In addition, those plants that were used to make beverages and seasonings were placed together in one section.

3.1.1 Greens

None of the explorers mention use of greens by the Indians of the area. Honigmann (1946:35) mentions only "wild rhubarb" and wild onions as being used for greens. The use of mountain sorrel by the Eskimos is well documented. Of the eight species mentioned below, the use of two is unlikely (*Pyrola asarifolia*, and *P. virens*), and for another the identity is uncertain (*Oxyria digyna*).

Allium schoenoprasum (wild onion)

Wild onions, reported to grow along the gravelly banks of the Petitot and LaBiche Rivers, were eaten raw with moose meat or boiled in soup. (See the list of additional species at the end of Appendix I for notes on occurrence.)

Angelica lucida (angelica)

The stems of non-flowering ("mother") plants were eaten raw after they had been washed. They were sometimes eaten with meat. Johnny once said

that he had sold some "wolverine rhubarb" to the Hudson Bay store for $2.50.

Heracleum lanatum (cow parsnip)

The inner flesh from the hollow leaf stalks (petioles) of the sterile shoots ("mother") of "Indian rhubarb" was eaten. The stem was split open, then bent backwards upon itself so that the fleshy inner part would break, and the stringy outer skin could be peeled away in a manner similar to that in which domesticated rhubarb is peeled. The fleshy inner portion was eaten and the outer skin discarded. This plant was gathered as a source of food in times of starvation.

Oxyria digyna (mountain sorrel)

A drawing of mountain sorrel[1] was recognized by Johnny to be a plant which was found growing on the LaBiche Range (Grass Mountains). The leaves of this plant were eaten raw at any time during the summer.

Pyrola asarifolia (pink-flowered wintergreen)

There is some doubt as to the status of this plant. Specimens were confused with a "mountain plant" (perhaps *Oxyria digyna*?) and the leaves were once said to be eaten after boiling. Only once was a clear

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[1] Although none was found in a brief sortie on the LaBiche Range, these mountains are within the range of the species, as given by Hulten (1968).

distinction made. Pink-flowered wintergreen was said to have the same Slave name as the mountain plant, but the "leaf" and "berries" (capsules) of the former were not eaten. The leaves of the latter were boiled for eating, and the "berries" (achenes?) were described as "alright to eat" or "good to eat".

Pyrola virens (greenish-flowered wintergreen)

The same confusion is found for this species as for the previous one. At one point it was said that the plant and "berries" (capsules) were eaten. Later this was said not to be so.

Rubus strigosus (wild raspberry)

In the spring the young green shoots were peeled and the inner stem was eaten.

Sparganium angustifolium (bur-reed)

On seeing a drawing of bur-reed, Johnny said that the plant, to be found in "Grass Lake", had been boiled for eating. He said that the whole plant was used. When this species was later found growing in Fisherman Lake, however, Johnny did not make mention of this use when the specimen was shown to him, but when asked if it was the same plant he agreed. Either there is some confusion, or there is a plant which appears similar that grows in "Grass Lake". *Sparganium multipedunculatum* also grows in the lake, and may have been used.

Taraxacum species (dandelion)

The leaves of dandelions were gathered in spring and summer to be boiled for eating. Since sugar became available, a little is added to the boiled leaves.

3.1.2 Fruits

Of the 29 types of fruit said to be eaten by the Slave, one (*Prunus virginiana*, said to occur in the Ft. Liard area) was not seen, and for another (*Oxyria digyna*) the identity is uncertain.

Most fruits were eaten fresh. Some, however were processed for immediate use, or for storage, as indicated in the species accounts below. Those "berries" that ripened in August were said to be picked in birch-bark baskets, placed in holes dug in the ground near the meat caches, and covered over with leaves and moss. Stored in this fashion they would keep fresh, except for a layer on the top which would dry out. No specific associations were made between these caches and areas of permafrost, although the only permanent cache now in existence (noted by members of the F.L.A.P. crew to contain dried fish in the spring of 1974) is found at the edge of a muskeg area where frost was reached about 30 cm below the surface in July. Honigmann (1946) stated that the Fort Nelson Slave did not preserve fruits for winter, although one woman had boiled some raspberries (1946:35). Mason mentions the boiling of blueberries with grease, to be kept until winter (1946:19). These may represent

fragments of the processes employed by the Fisherman Lake Slave for the drying of fruit for preservation, or they may be indicators of the development of this processing during historic times.

Amelanchier alnifolia (saskatoon, service-berry)

The juicy, purple fruits (pomes) were eaten when they ripened in the latter part of July. No mention of the preservation of these fruits was made, and it is unlikely that they were preserved as they were not as abundant as in areas where extensive preservation by native people occurred.

Arctostaphylos alpina (alpine bearberry)

In August, when the fruits (drupes) ripened to a deep black color, they were picked and eaten fresh.

Arctostaphylos rubra (alpine bearberry)

These red-fruited bearberries ripen in early August when they were eaten fresh or they were boiled to make a "good soup". A small amount of sugar is now added to the boiled fruits (drupes).

Arctostaphylos uva-ursi (bearberry, kinnikinnik)

The red, mealy berries (drupes) were eaten when they ripened in late August.

PLATE II. Some edible fruits of the area.

1. Bunchberry *(Cornus canadensis)*.
2. Soapberry *(Shepherdia canadensis)*.
3. Cloudberry *(Rubus chamaemorus)*.
4. Alpine bearberry *(Arctostaphylos rubra)*, red-fruited form.
5. Alpine blueberry *(Vaccinium uliginosum)* among the leaves of alpine bearberry.
6. Alpine bearberry *(A. alpina)*, black-fruited form.


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Cornus canadensis (bunchberry)

The red fruits (drupes) were eaten when they ripened in early August. (Jimmy referred to these as "marten berries", whereas that name was applied by Johnny only to *Geocaulon lividum*.)

Empetrum nigrum (crowberry)

The juicy black fruits (drupes) of crowberries could be eaten in the early spring as well as after they ripened in August. They were described as containing "lots of water" and were used to slake the thirst when on the mountain slopes where no water was near at hand.

Fragaria virginiana ssp. *glauca* (wild strawberry)

These sweet red fruits were available for eating from mid-July until August.

Geocaulon lividum (northern comandra)

The orange-red fruits (drupes) were eaten when they ripened in late July or early August.

Juniperus communis (ground juniper)

The ripened blue "berries" (actually a fleshy cone) were eaten at any time.

Maianthemum canadense (wild lily-of-the-valley, two-leaved Solomon's seal)

Fruits (berries) were eaten when they turned red in late August or early September. These plants were not distinguished by a separate Slave term, from three-leaved Solomon's seal (*Smilacina trifolia*).

Oxycoccus microcarpus (bog cranberry)

The translucent, juicy, red fruits (berries) were eaten in early spring as well as after they ripened in August. Since the stagnant water of muskegs should not be used for drinking, these berries were eaten to quench the thirst when in such places. (Although no specimens of *O. quadripetalus* were found in the area, its presence is highly probable. It would not likely have been distinguished from this species.)

Oxyria digyna (mountain sorrel)

When showed a specimen of pink-flowered wintergreen (*Pyrola asarifolia*), Johnny said that it had the same Slave name as a mountain plant. The "berries" of the mountain plant were "good to eat", but the fruits (capsules) of pink-flowered wintergreen were not eaten. Perhaps the "mountain plant" in question was mountain sorrel (whose fruits consist of achenes enclosed within a fleshy calyx).

Prunus virginiana (chokecherry)

The black fruits (drupes) were eaten when they ripened in late August.

Ribes glandulosum (skunk currant)

The hairy red fruits (berries) were eaten when they ripened in late July.

Ribes hudsonianum (wild black currant)

The black currants (berries) were eaten after they ripened in early August.

Ribes oxyacanthoides (wild gooseberry)

These fruits (berries) were eaten when they were still green in late June. They did not appear to be eaten when they ripened.

Ribes triste (wild red currant)

Red currants (berries) were eaten after ripening in August.

Rosa acicularis (prickly wild rose)

Rose fruits (hips) were described as being "good to the stomach" of one who was starving, and were employed as a starvation food. The hips could be eaten at any time after they became red in late August, but the flavor was thought to be improved by a frost.

Rubus acaulis (dwarf raspberry)

These raspberry fruits (clusters of drupelets) ripened in late July. They were eaten fresh or could be stored in baskets buried in the ground. The fruits were also said to make good jam.

Rubus chamaemorus (cloudberry)

In July the fruits (drupelet clusters) lose their red tinges and their crispness, to become soft and yellow. At this stage they were eaten by the Slave. Johnny said "yellow --- good to eat".

Rubus pubescens (dewberry, running raspberry)

The raspberry fruits (clusters of drupelets) were eaten when they ripened in mid-July. This species was not differentiated from *R. acaulis*.

Rubus idaeus ssp. *melanolasius* (wild red raspberry)

Wild raspberries ripened in late July and were available for eating fresh until about mid-August. The fruits were also boiled and placed in the sun in birch-bark baskets to dry. The dried mass could be stored in the cache. Before eating, this dry material was broken into pieces and boiled.

Shepherdia canadensis (Canada buffalo-berry, soapberry)

Branches were broken off and carried back to camp where they were stuck into the ground. The fruits (drupe-like) could then be picked off at leisure. The berries were boiled before eating. They were also eaten mixed with cooked moose liver or with grease. Since sugar became available, the bitter red berries are sometimes eaten mixed with a little sugar, or boiled with sugar. Soapberries ripen in early July.

Smilacina trifolia (three-leaved Solomon's seal)

The berries were said to have been eaten in July and August when they had ripened to a dark red color.

Streptopus amplexifolius (twisted-stalk)

When they turned red in late August the fruits (berries) were eaten. These plants did not appear to be distinguished from the preceding species, at least not by a Slave term.

Vaccinium caespitosum (dwarf blueberry)

The fruits (berries) of dwarf blueberries ripened in early August, or in some years in late July. Although the fruits are generally smaller than those of the succeeding species there was no distinction made between them.

Vaccinium uliginosum ssp. *alpinum* (alpine blueberry)

The fruits (berries) of alpine blueberry are large and juicy when they grow in the bog forests, but they are smaller on the alpine slopes. In the bogs they ripen in mid-July, but in alpine areas they are sometimes later. Blueberries were eaten fresh, or were cached in birch-bark baskets in holes dug in the ground, covered with leaves and moss. Blueberries were also boiled with a small amount of grease, or mashed with a birch-wood masher. Then they were spread out in baskets and dried in the sun. For eating, the sun-dried berries were broken up and boiled.

Vaccinium vitis-idaea var. *minus* (cow-berry, mountain cranberry)

The juicy red berries were eaten either after they ripened in late August, or in the early spring. It was said they were boiled with sugar to make jam.

Viburnum edule (low-bush cranberry, mooseberry)

Mooseberries ripened in mid-August to juicy, tart, red fruits (drupes). Since they remain on the bushes for an extended period of time, they can be eaten fresh, sometimes even after snow is on the ground. A few berries remain on the bushes until spring.

3.1.3 Underground stems or roots

The use of the underground portions of plants for food is not well

documented in the literature. Mackenzie (1970:215) stated that the Indians of the Mackenzie River did not make use of the roots of sweet vetch (liquorice root), however Honigmann (1946:35) mentions that they were eaten by the Fort Nelson Slave (wild carrots). Mason mentions an unidentified root (1946:19) eaten by the Indians of the Great Slave Lake area. Johnny Klondike gave seven species for which he said the Slave ate the underground portions, and an additional one (*Matricaria matricarioides*) about whose use he was uncertain.

Astragallus americanus (American milk-vetch)

The roots were eaten raw as a starvation food. Johnny said "hungry --- not too much gonna eat --- little bit to eat alright", meaning that only very small amounts should be eaten by starving persons.

Claytonia tuberosa (spring beauty)

Originally identified from a drawing (Hulten, 1968), this plant[1] was said to be found in the LaBiche Mountains. The tubers were described to be "like potatoes", and were sliced and fried to be eaten.

Hedysarum alpinum ssp. *americanum* (sweet vetch)

In September the men, women and children would go up to the mountain tops to dig the roots of these plants, bringing them back to camp by

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[1] This species was found growing on the LaBiche Mountains in the vicinity of Dendale Lake.

packsful. Sticks were used to dig down to the thick horizontal roots, which were gathered. Soup was made from the fresh roots. Birch-bark baskets full of the roots were placed in holes in the ground and covered over with moss and leaves in the same manner that berries were stored for winter use. These stored roots were boiled with meat or sliced to be fried in grease. In times of starvation the roots were dug and eaten raw.

Matricaria matricarioides (pineapple weed)

Upon first being questioned about this plant, Johnny said that the "roots" could be eaten raw or boiled. Later he said that there was no use for the plant. (Since it is an introduced species it is likely that he was initially mistaken.)

Nuphar variegatum (yellow water-lily)

Rhizomes ("roots") could be dug in the fall when the water was low. They were pulled up with a "comb" or the feet were said to be "alright" for digging them. Roots were sliced and fried in fat, or boiled (with a little sugar added). Johnny said that women who ate these roots would "get fat quick".

Pedicularis langsdorffii (lousewort)

In times of starvation the roots of these plants were eaten raw.

PLATE III. Some plants used for food.

1. Alpine bistort (*Polygonum viviparum*) rhizomes were eaten.
2. Fireweed (*Epilobium angustifolium*) flowers were a confection.
3. Sweet vetch (*Hedysarum alpinum americanum*) roots were both edible and medicinal.
4. Wild mint (*Mentha arvensis*) was used as a flavoring.
5. Spring beauty (*Claytonia tuberosa*) tubers were eaten.
6. Ground juniper (*Juniperus communis*) fruiting structures were eaten, and have also been used in the preparation of "brew".


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Polygonum viviparum (alpine bistort)

The rhizomes were gathered in July to be fried for eating. They could also be stored in the ground in the same manner as the sweet vetch roots.

Typha latifolia (cattail)

Rhizomes were dug in the fall to be eaten raw or fried in grease.

3.1.4 Cambium

Populus balsamifera (balsam poplar)

At any time after the leaves came out, usually during June and July, the outer bark could be removed and the inner bark (cambium) scraped off and eaten. This was used as a starvation food, and by hunters if they became hungry while they were trailing game.

Although the cambium or inner bark of other species may have been used in times of starvation, this is the species which was usually sought out, and the only one mentioned by Johnny.

3.1.5 Sap and exudates

Of the three species which provided 'sap' for food, probably the birches were the most important.

Betula neoalaskana, B. papyrifera, and hybrids (white or paper birches)

In May, before the leaves came out, the trees could be tapped for their sap. A v-shaped flap was cut in the outer bark and was propped out to make a "spout" by placing a small stick underneath it, horizontally, near the top of the v. Several cuts were made in the bark directly above the spout and a birch-bark basket was placed on the ground beneath it. The sap oozed from the upper cuts, dripped from the point of the v and was caught in the basket below. The sap was drunk as a beverage or was added to soups. Johnny said "not much soup ..... get birch juice". One man (Mathias Doodah?) was reported to have boiled the sap down to make a syrup for bannock. Willie McLeod said that the "half-breeds" were the only ones that used to boil the sap down for syrup.

Picea species (spruce)

Dried 'gum' was gathered from where it collected on the bark, and was used for chewing. Spruce gum is a resin produced by the tree.

Taraxacum species (dandelion)

The leaves were broken off and the white 'milk' was sucked from the broken ends. This white substance is latex.

3.1.6 Flowers

Flowers were eaten fresh, directly from the plant, as a type of confection.

Epilobium angustifolium (fireweed, great willow-herb)

The mauve flowers were eaten after they opened. They were available from early July until quite late in the summer.

Rosa acicularis (prickly wild rose)

The petals of rose flowers were eaten while they were fresh, throughout June.

3.1.7 Beverages and seasonings

The making of "tea" and other beverages was likely aboriginal, but the making of "brew" (fermented drinks) was said by Johnny to have been introduced by "white men" from Fort Liard, when he was a young boy. Many wild plants have since been employed in the making of "brew", but at the present time the main component is raisins. Other ingredients included sugar, yeast and water. Fermentation varied from two to five days, depending upon the ingredients and the desire for the drink. Of the eleven species discussed below, probably only seven were used by the aboriginals.

Heracleum lanatum (cow parsnip)

Some people used the fruits (mericarps) in making "brew".

Juniperus communis (ground juniper)

The fruits (berry-like, fleshy cones) could be used to make "brew". They were first boiled, then sugar and a yeast cake were added and the mixture was allowed to ferment for three days before being drunk.

Ledum groenlandicum (common Labrador tea) or *Ledum palustre* var. *decumbens* (northern Labrador tea)

The leaves and flowers, when present, of either species were steeped in boiling water to make a "tea". Leaves were dug from under the snow by men out on the trapline.

Mentha arvensis (wild mint)

These plants, recognized by their minty smell, were used fresh or dry to make a tea. Now they are sometimes added to imported tea.

Populus tremuloides (trembling aspen, white poplar)

Ashes from the wood were said to have been the source of "salt" before "white men" introduced the use of rock salt (sodium chloride).

Potentilla fruticosa (shrubby cinquefoil)

The stems, with leaves, were broken up and boiled to make a "tea".

Ribes hudsonianum (wild black currant)

The berries were used by La Fer, Gus Kraus, and Johnny to make "brew".

Rosa acicularis (prickly wild rose)

A drink was prepared by boiling the hips in water. Some people made brew from the hips by boiling a three pound lard pail full of hips in two gallons of water. Sugar and a yeast cake were added and the mixture was left for three days. Although Johnny had told Gloria Fedirchuk (personal communication) that the petals were used in making a "tea", no amount of indirect questioning could induce him to give the same information again. When directly asked, Johnny denied any such use.

Rubus idaeus ssp. *melanolasius* (wild red raspberry)

The older stems (canes), along with the roots, were boiled to produce a dark red-colored "tea". Berries and canes were also boiled together and left for three days after mixing in sugar and a yeast cake, to make "brew".

Salix species (willow)

Willow branches were boiled and the first water discarded; the second water was mixed with a "little flour" (probably sugar was meant) and a yeast cake. After five days this produced a strong "brew".

3.2 Medicines

All the early explorers claim that no herbs were employed as medication in illness or disease. Only charms, 'sucking' and 'blowing' were said to be used (Hearne, 1795:189; Mackenzie, 1970 ed.:245; Keith, 1890:89; Cody, 1908:97). Petitot (1883:639) makes a single mention of the Beaver Indians knowing of the use of sarsaparilla as a febrifuge. Emmons (1911) gives several medicines used by the Tahltans. Honigmann (1964) mentions a few for the Kaska. Richardson gives a single medicine for the Dogribs (1852:429). Whether the slowness of accumulation of knowledge on the use of medicines is due to its absence being replaced by use of medicinal herbs or simply a slowness of foreigners to gain such knowledge cannot be satisfactorily determined. No doubt some of the uses of similar medicines could be the result of the diffusion of knowledge (greatly speeded up in historic times), but what of the unique usage? Could it all be the result of experimentation by 'medicine men' only during the last two centuries?

The Slave of Fisherman Lake gathered most medicines only when they were required, however others were gathered, sun-dried and stored wrapped in thin layers of birch-bark. Moose-hide bags and clam shells could be used as medicine containers. (Willie McLeod noted that he had seen men carrying clam shells in their tobacco bags. Probably most of the "medicines" so carried were charms.) Cylindrical birch-bark containers were used for carrying dried medicines in packs.

Medicine gathering took place in July, after the "grass" was growing on the mountains, and the leaves had grown "big". The "big leaf" criterion applied particularly to the large leaves found on young plants of mooseberry (*Viburnum edule*) and the sterile rosettes of lungwort (*Mertensia paniculata*).

Most of the medicines used were taken in the form of a decoction (the liquid produced when the herb is boiled in water). The plant parts were placed in a container and covered with water. The water was brought to a rapid boil, with more being added as necessary to keep the plant material covered. Boiling continued for varying lengths of time. Medicines were judged to be ready when the water had taken on a strong color, at which point they were removed from the fire and allowed to cool. Decoctions were never taken when hot, as hot food and drink were believed to cause whitening of the hair. Hence medicines were taken warm or cold. Some of the decoctions taken as medicines will be recognized as the same ones that were used as "teas".

Johnny once said that "medicine" comes to him while he is "on pillow" (sleeping). It is probable that what he was referring to was the dreams of shamans or medicine men.

For ease of presentation the medicines described were arranged in sections according to the body part or ailment which they were used to treat.

3.2.1 Backache

Abies lasiocarpa (alpine fir)

A large fir was sought where a break in the bark had resulted in the formation of a lump of 'gum.' When this was broken away the resin would drip down and could be caught upon a piece of material to be used as a poultice. This poultice was used for a sore back, being changed every three days. It was not certain whether this remedy was used by the Slave or not. It seems that it was described to Johnny by Gus Kraus, a former resident of the Nahanni Valley, whose wife is Slave.

Margaret once used this medicine on Johnny. He had slipped and fallen while carrying a heavy pack of moose meat on snowshoes. Blood had come from his mouth. Margaret made poultices with fir 'gum' and applied them to his stomach.

Artemisia arctica ssp. *arctica* (arctic wormwood)

Fresh or dried roots were boiled for about half an hour. Half a cup of the decoction was drunk about three times a day to ease soreness of the back in the pelvic region and hips. The treatment usually lasted about three days.

3.2.2 Bee stings

Rosa acicularis (prickly wild rose)

To relieve the pain of a bee sting the petals of the rose were chewed and placed upon the sting.

3.2.3 Cathartic

Lonicera dioica (twining honeysuckle)

The roots were peeled and used fresh or dried, in the preparation of a decoction. About an hour of boiling was necessary. When the liquid had cooled a third of a cup was taken to relieve constipation. For use as a cathartic the "sticks" were always peeled "down", in the direction away from the stem.

3.2.4 Cough

Achillea millefolium (yarrow); *Achillea sibirica* (Siberian milfoil); *Artemisia tilesii* ssp. *elatior* (wormwood)

Green or dry heads from any of the above species could be used to prepare this medicine. The clusters of flower heads (corymbs) were usually gathered whole and only when needed. Lots of material was used, and it was boiled for about an hour and a half, until the color was strong. About one quarter to one half cupful was taken for a cough.

Petasites species (flowering plants) were designated by the same Slave term as the above species. When questioned about this, Johnny said that these plants were used in the same manner for preparing cough medicine.

Acorus calamus (sweet flag)

The rhizome was the source of a "juice for cough". It could not be determined if the juice meant was a decoction, or simply the juice of the rootstock.

Heracleum lanatum (cow parsnip)

A cough medicine was prepared as a decoction of the fresh or dried root, using a small amount of water. About one quarter cupful was taken. This was regarded as a strong medicine and children were given only a very small amount. Johnny said that Margaret's grandfather used to keep a dried piece of the root with him. When he had a cough he would take a small piece of the root and boil it, drinking the water.

Polyporus resinosus

The conks of this fungus are found growing on rotting spruce logs and could be gathered when needed. The conks were boiled for about half an hour to yield a cough medicine. The dose was about one third of a cup.

Ribes hudsonianum (wild black currant)

Freshly gathered stems, with leaves and flowers if present, were broken

into short lengths, covered with water and boiled for about two hours. The reddish decoction was taken warm or cold, about one quarter cupful at a time, for coughs. In winter the stems could be dug from under the snow to prepare this cough medicine. "Everybody" used this medicine. Johnny was observed preparing it for Margaret in June, 1974.

Rosa acicularis (prickly wild rose)

The roots were pulled up, washed and peeled to be used fresh or dried. After they were broken in short lengths they were boiled for about an hour. One half cupful was taken for a cough. Dry roots were stored wrapped in birch-bark.

Salix species (willow)

The willow used to make this medicine was identified by its brown branches. Branches were broken into short lengths and boiled for two or three hours to yield a decoction taken for coughs. Although Johnny prepared this medicine for one of the F.L.A.P. crew members (Fedirchuk, personal communication), he did not mention it until directly questioned about it later. Even then he did not appear to be willing to discuss it.

Sorbus scopulina (mountain ash)

A decoction of the ripe berry-like fruits (small pomes), or the fresh or dried stem and root was used for the treatment of coughs.

Viburnum edule (mooseberry, low-bush cranberry)

The fruits (drupes) were boiled when they were ripe, to yield a cough medicine.

3.2.5 Diuretic

Equisetum pratense (meadow horsetail)

The cleaned fresh or dried "roots" (rhizomes) were boiled half an hour. One quarter cupful of the decoction was taken for a diuretic. Other *Equisetum* species (particularly *E. arvense*) were also called by the same Slave term, and were said to possess the same medicinal properties. However, the species mentioned seemed to be the one sought when the medicine was being discussed, and presumably was the one most commonly used.

Lonicera dioica var. *glaucescens* (twining honeysuckle)

Stems were gathered at any time of the year, broken into short lengths and boiled for about an hour. A dose of about one half cupful, for adults and children alike, was taken when one could not pass urine.

PLATE IV. Plants of medicinal value.

1. Black spruce (*Picea mariana*) cones were used to cure a "sore heart".
2. Wild calla (*Calla palustris*) served as a medicine for a sore mouth.
3. Yarrow (*Achillea millefolium*) could be used for coughs or to treat the liver.
4. Balsam poplar (*Populus balsamifera*). The root and lower trunk of a sapling is shown, from which the inner bark has been taken for medicine to treat a sore stomach.
5. Iceland moss (*Cetraria islandica*). The dark lichen in the photo was used to make a "T.B. medicine".
6. Puffball (here *Lycoperdon pyriforme*) spores were dusted on wounds to promote healing.


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3.2.6 Emetic

Veratrum viride ssp. *escholtzii* (false hellebore)

Although most people consider the roots of this plant to be poisonous (Hulten, 1968), the Slave used a small piece to induce vomiting to clear the stomach. Either fresh or dried roots could be used, but only by adults, the medicine being described as too strong for children. Dry roots were stored wrapped in birch-bark.

3.2.7 Eyes

Hedysarum alpinum ssp. *americanum* (sweet vetch)

The thick horizontal roots of sweet vetch were dug up using a stick. When sun-dried the roots could be cut into small pieces (less than 5 mm in diameter) and burned on a small fire. A cover placed over the head and the fire would concentrate the smoke so that it would relieve sore eyes. The treatment usually lasted about half an hour. Roots were dried in the sunshine till the inner parts turned "white", then stored wrapped in birch-bark to be used to treat sore eyes.

3.2.8 Fever

Potentilla fruticosa (shrubby cinquefoil)

When fever was accompanied by "sore" chest, arms, legs and perhaps a cough, then a decoction was made from the stem, leaves and roots of this plant. The decoction was drunk as a tea (one or two cupsful).

Shepherdia canadensis (soapberry, Canada buffalo-berry)

The freshly gathered roots and lower stems were used in the preparation of a decoction to reduce fever, especially in babies. The larger stems and roots were peeled and broken in short lengths, with the root sections being split in halves. Smaller stems (near the bases) were also used, but were not peeled. Any dry, dead portions were discarded. All parts were boiled together for one and one half to two hours, until the water became red. The dose was one quarter to one half cupful of the liquid. This medicine could be made at any time of the year.

3.2.9 Headache

Cicuta douglasii (western water hemlock)

The tuberous roots of the species were dried, cut into small pieces and smoked, mixed with tobacco, for the cure of headaches.[1]

Cicuta mackenzieana (water hemlock)

Specimens of water parsnip (*Sium suave*) were likely mistaken for this species. (Only one specimen of *C. mackenzieana* was collected, and it, unfortunately, was one which Johnny did not see.) The plant was

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[1] It is not known what would be in the smoke from the dried roots, but when taken internally they are extremely poisonous, since they contain cicutotoxin (Hulten, 1968:699).

considered to be a strong poison[1], but like the western water hemlock it was cut into small pieces and smoked to relieve a headache.

Ledum groenlandicum (common Labrador tea); *Ledum palustre* var. *decumbens* (northern Labrador tea)

Either of these species could be used for the preparation of this medicine. The leaves (and flowers if present) were steeped in boiling water to prepare a "tea" of which one or two cupsful were drunk to treat a headache.

Pedicularis lanata (woolly lousewort)

Small pieces (less than 5 mm diameter) of sun-dried roots were mixed with tobacco and smoked in a pipe to relieve headaches. This cure was used only by adults. Dried roots were stored wrapped in birch-bark.

Fomitopsis pinicola

The conks of these bracket fungi were found on the trunks of willow and poplar. The fungus was cut into small chunks, mixed with tobacco and smoked in a pipe to treat headaches. Only adults used this treatment.

Sium suave (water parsnip)

See the comments on this species under *Cicuta mackenzieana*.

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[1] The rootstocks of *Sium suave* are edible.

PLATE V. Plants of medicinal value.

1. Arctic wormwood (*Artemisia arctica*) roots provided medicine for a sore back.
2. Wild black currant (*Ribes hudsonianum*) was used to make cough medicine.
3. This bracket fungus (*Polyporus resinosus*) was boiled for a cough medicine.
4. False hellebore (*Veratrum viride escholtzii*) roots were used as an emetic.
5. Johnny Klondike preparing buffaloberry (*Shepherdia canadensis*) roots for the making of medicine.
6. Shrubby cinquefoil (*Potentilla fruticosa*) was used in the treatment of fevers.

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3.2.10 Heartburn

The informants told about an ailment which they referred to as a "sore heart". This may have meant something like heartburn, but the exact meaning could not be determined.

Cornus canadensis (bunchberry)

Jimmy Klondike pointed out this species as medicinal, saying that it was used to make a tea for heartache, however he called it marten berries, which was a name applied by Johnny only to northern comandra (*Geocaulon lividum*).

Picea mariana (black spruce)

Black spruce cones, green or dry, were boiled one half to one hour, until the liquid became red. A dose of about one half cupful was taken daily for a sore heart. Anyone could use this medicine.

Sagittaria cuneata (arum-leaved arrowhead, wapato)

Margaret said that the "root" was boiled to yield a medicine for a "sore heart". It was not clear what part was meant, but it would most likely be the tuber.

Sorbus scopulina (mountain ash)

A decoction of the root, stem or fruits (small pomes) was taken for a

"sore heart".

Zygadenus elegans (white camas)

The bulb-like underground portions provided a strong medicine for a "sore heart". A very small piece of the fresh or dried "root" was boiled and a teaspoonful of the juice was taken. The decoction could also be rubbed upon the chest. When he initially talked about this medicine, Johnny said that not everyone could use it. He stated that because he was a medicine man he could eat the "root" with impunity but some people could not. He then proceeded to bite a small piece from the bulb of the specimen, which he chewed and swallowed.

The bulbs of this plant are considered extremely poisonous by some authors. Hulten (1968:305) states that they contain the poisonous alkaloid zygadenine. The extremely small amount used may not have been enough to affect a grown person.

3.2.11 Legs

Utricularia vulgaris (common bladderwort)

For soreness of the legs the "root" was boiled and the legs were washed with the water. Likely the stems or the whole plant were meant, rather than the true root, as common bladderwort is a submersed plant with only a very fine, non-extensive root system.

3.2.12 Lice

Androsace septentrionalis (fairy candelabra)

Whole plants were gathered and boiled in water for about half an hour. The decoction was used for washing the hair, or any body part which was inflicted with lice, for the purpose of destroying them.

3.2.13 Liver

Achillea millefolium (common yarrow); *Achillea sibirica* (Siberian milfoil); *Artemisia tilesii* ssp. *elatior* (arctic wormwood)

All three of these species could be used to prepare this medicine. Heads were gathered green or dry. A large number of heads were boiled together for about an hour and a half to make a "strong tea". About one quarter cupful was taken daily for ailments of the liver. This was considered a strong medicine.

3.2.14 Mouth or throat

Calla palustris (water arum, wild calla)

The fresh or dried rhizomes were chewed to soothe a sore mouth. The juice could be swallowed but the pulp was rejected. This was considered a strong medicine, much too strong to be used for babies.

This may be what Willie McLeod referred to as "rat root". He said that it was found around beaver houses and was used for treating sore throats.

Shepherdia canadensis (soapberry, Canada buffalo-berry)

The roots and lower stems were used fresh. Roots and larger stems were peeled before they were broken into short lengths. Root sections were split into halves. Smaller stems were simply broken into lengths. Dry, dead portions were discarded. The sections were covered with water and boiled for an hour. The liquid was rubbed on sore lips, or a small amount was rinsed through the mouth for a sore tongue (or throat?). This medicine was often used for babies. In early spring (May) the flowers were also put into the decoction.

In initial discussions of this medicine it was said that the stem was chewed, particularly for babies, to treat a sore mouth (perhaps for teething children?). However all subsequent discussions resulted in the reiteration of that which is presented above.

3.2.15 Poison

Cicuta douglasii (water hemlock)

The tuberous roots of this plant were considered to be poisonous. It was said to make a person "crazy" who had eaten some. The person would become dizzy and "fall down in twenty feet", and then die. It may have been used for suicide.

Cicuta mackenzieana (western water hemlock)

Specimens of water parsnip (*Sium suave*) were given the same attributes as were given for the preceding species. At one time it was said that this species was even stronger than *Cicuta douglasii*. It is believed that the specimens of water parsnip (whcse rootstocks are edible) were mistaken for *Cicuta mackenzieana*, of which the single specimen collected was not seen by Johnny.

3.2.16 Stomach

Andromeda polifolia (bog rosemary)

When sickness at the stomach was accompanied by soreness of the chest (also the arms, back and leg muscles) and perhaps a cough, then the stems and roots of this plant were gathered. They were broken into short lengths, then boiled one half to one hour, until the water had taken on a good color. The dose of this medicine was about one half cupful.

Boschniakia rossica

The "root" (the thickened basal portion of the stem) was used fresh or dried. It was boiled until the water was a "good color", cooled, then less than one third cupful was taken to ease a sore stomach. This was regarded as a strong medicine.

Populus balsamifera (balsam poplar)

For the purpose of making this medicine, a young balsam poplar was sought out. The upper part of the root system and the lower portion of the stem (about 30 cm) of the sapling were peeled of the outer bark. The inner bark was then cut into strips about 2 cm wide, and then peeled from the wood. Cut into chunks (about 2 cm square) this inner bark was boiled about half an hour. Less than half a cup of the liquid was taken for a sore stomach, as it was considered a strong medicine. The inner bark strips were also dried and stored, wrapped in birch-bark for later use.

Salix species (willow)

Meat cooked over willow wood was said to have the ability to soothe a sore stomach.

Rubus idaeus ssp. *melanolasius* (wild red raspberry) and *Equisetum pratense* (meadow horsetail)

A decoction was made from a combination of the "roots" of these two plants, for the treatment of a sore stomach. The raspberry roots were washed and stripped of secondary roots; they could be used fresh or dried. The horsetail "roots" (rhizomes), after washing, could also be used fresh of dried. Other *Equisetum* species could be used in the place of *E. pratense*.

3.2.17 Tuberculosis

Cetraria islandica (Iceland moss)

This lichen was boiled in water one half to one hour, until the liquid was quite red. A dose of about one third cupful was taken three times daily to treat tuberculosis.

Cornus stolonifera (red osier dogwood)

The ripe, white fruits (drupes) were gathered and boiled about half an hour to give a decoction for the treatment of tuberculosis.

Myrica gale (sweet gale)

Stems, with leaves and fruiting structures (aments) included, were broken in short pieces, covered with water and boiled about two hours. About one quarter cupful was taken daily by persons with tuberculosis. The plants could be gathered at any time of year for the purpose of making this medicine.

Sorbus scopulina (mountain ash)

The fresh or dried stem and root were boiled, yielding a decoction for the treatment of tuberculosis. The dose was about one quarter cupful, taken daily. Margaret Klondike and Gus Kraus were reported to have used this medicine.

3.2.18 Wounds and open sores

Calla palustris (water arum, wild calla)

Willie McLeod stated that "rat root" (tentatively identified as *Calla palustris*) was pounded to give a powder that was put on sores.

Fragaria virginiana ssp. *glauca* (wild strawberry)

The roots were dried and burned on a very small fire. The ashes of the strawberry roots were mixed with a small amount of water and placed on open sores to facilitate healing. Roots were dried and saved for use in the winter.

Larix laricina (tamarack, American larch)

The "root" was boiled and the liquid used on cuts to aid in healing. Only fresh roots were used.

Lycoperdon perlatum or *L. pyriforme* (puffball)

The dry spores of these fungi were dusted upon wounds to aid in the clotting of the blood. (Johnny likened this use to a bandage.)

Pinus contorta (lodgepole pine)

The root was boiled and the water was used to clean a dirty wound. The decoction was believed to promote the healing of the wound. This was

used by Margaret when Johnny cut his knee with an axe.

3.3 Charms

Love charms were used by both men and women. Only one plant specimen was denoted to be a "man medicine". This was a specimen of sweet clover (*Melilotus officinalis*) collected from the roadside. Since this is an introduced species, an attempt was made to decide if it could have been confused with any of the native plants. The only possibility was golden corydalis (*Corydalis aurea*), specimens of which Johnny had already seen, and for which he had given no use.

Three "girl medicines" were said to be used, one of which was identified. The charm which was identified was said to be the mildest (described below). The second, or moderately strong "girl medicine", was smoked in a pipe. The wind would blow the smoke to the girl, who, upon smelling it would be drawn to the spot where her lover awaited her. The third "girl medicine" was said to be very strong, and was regarded with something approaching fear. In Johnny's words "another one, too strong, girl died."

Cypripedium passerinum (northern white lady's-slipper, sparrow's-egg lady's-slipper)

This was the weakest of the three "girl medicines." A single strand of a girl's hair was tied about a stem of this plant. When the plant was

carried next to the heart of her lover, it made the girl "go to him".

3.4 Tobacco substitutes and pipes

The use of pipes for smoking was introduced into this area. Of a group of Slave and Dogrib, Mackenzie (1970 ed.:182) said "We made them smoke tho' it was evident that they did not know the use of Tobacco." The number of tobacco substitutes, and the skill in the making of pipes serves to illustrate the highly adaptable nature of these people at the time of the advent of the Europeans. Below are given the species used to make pipes and tobacco substitutes.

Alnus species (alder)

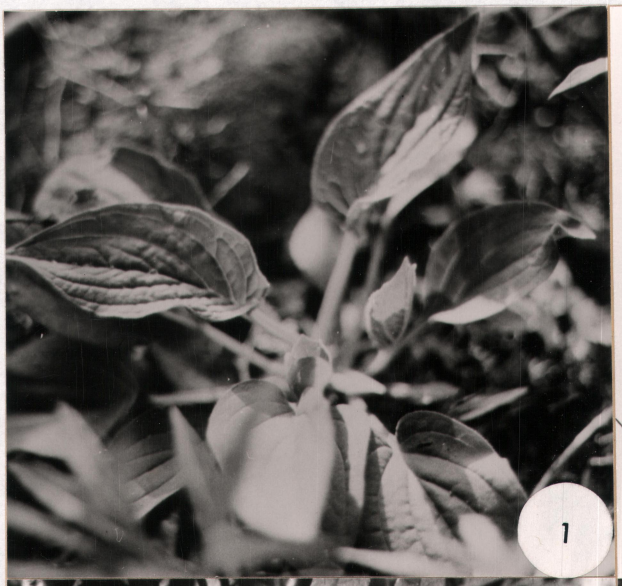
The wood of alder was used in the making of pipes. (See Chapter 5 for the construction details.)

Arctostaphylos uva-ursi (bearberry, kinnikinnik)

Bearberry leaves were dried and rubbed between the hands to break them up for use as a tobacco mix. It was said that a "big root" could be hollowed out with a knife to make a pipe. Perhaps a gall was meant, although no such "big roots" or galls were seen on any of the bearberry plants in the area.

PLATE VI. Plants of miscellaneous uses, a moose, and a fish cache.

1. Tall lungwort (*Mertensia paniculata*) basal leaves provided a tobacco substitute.
2. Stiff-stemmed saxifrage (*Saxifraga hieracifolia*) was used to make mustem.
3. American milk vetch (*Astragallus americanus*) pods provided "baby rattles".
4. Moose (*Alces alces*) were a most important subsistence source.
5. Lower and side views of the bracket fungus (*Fomitopsis pinicola*) used as a cure for headache and as a mosquito repellant.
6. Fish cache at the southeast end of Fisherman Lake.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Cornus stolonifera (red osier dogwood)

These shrubs were cut and carried to camp where the outer bark was carefully peeled away and then the inner bark was scraped off in narrow strips. The dried inner bark was smoked or used as a tobacco mix.

Mertensia paniculata var. *paniculata* (lungwort)

The large leaves of the non-flowering plants (rosettes) were gathered and sun dried. When crushed by rubbing between the hands the dried leaves were used as a tobacco mix. This "tobacco" was stored in moose-hide pouches. When demonstrating the use of this plant Johnny dried the leaves by holding them over the coals of a fire.

3.5 Technology

In the following section the different uses to which the plants were put are only indicated. Detailed descriptions of the making of artifacts will be found in Chapter 5. Not all uses are stated here, especially in the cases of the tree species, but only those which were specifically mentioned by the informants for any given species.

The species are discussed in groups under the headings dyes, processing and manufactured items.

3.5.1 Dyes

Algae

Driftwood or damp, rotting wood often has a green color due to the presence of algae. This was used as a "dye" for moosehide. A fresh wood chip, when rubbed through the punky green wood took up the color and could then be used as a "pen" on the moose-hide. This wood was also boiled with porcupine quills to color them.

Alnus incana ssp. *tenuifolia* (thinleaf alder, speckled alder)

A small barking tool, made from an alder of 2 to 3 cm diameter was used to remove a section of bark from a larger alder for the purpose of making dye. This dye was used for moose-hides, or for porcupine quills. It could also be used to dye wood (arrows), or willow-bark fish nets. The dye produced a rusty color.

Betula species (birch)

The inner bark of young birch trees was used in dyeing porcupine quills a "yellow-red" color.

Carex species?? (sedge)

"Loon-owl grass", found at Fisherman Lake, was used to make a dye for porcupine quills.

Chenopodium capitatum (strawberry blite, Indian-paint)

The fleshy, berry-like, red fruiting heads of strawberry blite were used for marking the designs on moccasin uppers of moose-hide. Fresh "berries" were crushed with a stick in a small amount of water, whereas dried "berries" were boiled in a little water. These"berries" were also used to dye porcupine quills.

Pedicularis lanata (woolly lousewort)

The fresh or dried roots were boiled to give a yellow dye for moose-hides. The hides were dipped in the warm or cold liquid.

Picea mariana (black spruce)

Small green cones provided a red dye for porcupine quills.

Rumex mexicanus (narrow-leaved dock)

The fresh or dried taproots were boiled about half an hour to prepare a yellow dye for moose-hide. The hides were dipped in the warm or cold solution. "Loon arrows" were also dyed by being boiled with the roots in water.

3.5.2 Processing

Alnus species (alder)

Rotten alder wood was used for smoking of moose-hides. Dry alder wood

was said to make "good smoke" for the drying of meat.

Carex aquatilis (water sedge)

"Fish-meat bannock" (described on page 118) was wrapped in this sedge before being cooked next to the fire.

Carex disperma (soft-leaved sedge)

A small portion of the moose brain was wrapped in a bundle of this sedge. The bundle was swirled in hot water and repeatedly 'wrung out' until the brain was washed into the water, yielding the tanning solution. The sedge retained the membranes of the brains.

Populus tremuloides (trembling aspen, white poplar)

Rotten wood of aspen could be used for the smoking of moose-hides. Aspen wood was also used for smoking and drying of fish.

Picea glauca (white spruce)

Rotten wood (punk) and cones were used for the smoking of moose-hides. Spruce gum was used in the caulking of spruce-bark canoes.

Salix species (willow)

Willow wood was used for the 'smoking' and drying of meats.

3.5.3 Manufactured items

Descriptions of the tools and equipment mentioned here will be found in Chapter 5. This section simply lists the items for which each species can be used as a raw material.

Alnus species (alder)

Barking tools (used to remove pieces of bark from trunks of trees or large shrubs) were commonly made of alder. The advantage in using alder was that the trunks are often curved at the base. This curved end was used to make the working edge of the tool, which should be curved to go around the trunk of the tree.

Alder wood was used in making the bottoms and lids of small birch-bark containers, such as the beaver castor container. It was also used in the making of the small bows (or "stick guns") used on birds and squirrels, and for pipes.

Betula neoalaskana, B. papyrifera and hybrids (white or paper birches)

The 'pegged' pole used in the tanning of hides, and in the fleshing of bear hides was usually a birch. The small branches were cut off a few cm from the pole to form the pegs.

Birch wood was used for making the frames for snowshoes and for making toboggans. Berry mashers were made from birch wood.

Baskets, containers and moose calls were made from birch-bark. Thin layers of the bark were used for wrapping dried medicines, and for making funnels used for filling moose bladder containers.

Cornus stolonifera (red osier dogwood)

Withes (tough, flexible twigs) were split and peeled for the 'sewing' of the ends of the pan-like birch-bark baskets. Stems were sometimes used for the ribs of the spruce bark canoes.

Picea glauca (white spruce)

Paddles and poles were made from dry spruce wood. Emergency snowshoes could also be made from the wood.

Bark from large straight trees was used to make the spruce-bark canoe. Tops for fish cleaning tables and mats for sitting upon were also made from the bark of spruce trees.

Picea mariana (black spruce)

Frames and ribs for the spruce-bark canoe were made from black spruce saplings.

Roots were peeled and split for binding the ends of the spruce-bark canoe and for decorative sewing on birch-bark baskets and containers. Spruce roots often served as a substitute for babiche (cord made from rawhide).

Populus balsamifera (balsam poplar)

Buttons, rectangular or square, were made from the thick bark of the older trees of balsam poplar.

Francois Bertrandt, a "B.C. man", made a "stick canoe" (a dugout canoe) from a large hollow tree of this kind, but the native people did not make this type of canoe.

Populus tremuloides (white poplar, trembling aspen)

Wooden "plates" or bowls were made from poplar wood. Snow shovels and makeshift snowshoes could also be made from the wood.

Salix species (willow)

Fine strips of the inner bark of willows were twisted and knotted to make the line used in the construction of fish nets.

3.6 Miscellaneous uses

Alnus species (alder)

Rotten alder wood was used as a 'mosquito repellant'. Smouldering chunks were placed at each of the four corners of the sleeping area. When walking, one carried a stick with one end smouldering. The smoke, drifting back, would keep the mosquitoes away, and periodic waving of the stick through the air would prevent the fire from dying.

Astragalus americanus (American milk-vetch)

In late July or early August the stems, bearing the inflated seed pods (legumes), were broken off and carried home to be given to babies as "rattles".

Betula neoalaskana, B. papyrifera and hybrids (white or paper birches)

Thin layers of the defoliating bark were folded and pieces were bitten out to make the designs for the uppers of moccasins.

Calamagrostis purpurascens (purple reed grass)

Although this species initiated the comment "big one, cut" to make a straw for drinking, it is probable that other graminoid species were used as well.

Picea species (spruce)

Spruce boughs were used for making mats and beds. Young saplings (usually less than 8 cm diameter at the base) were chopped down and the branches were removed. Boughs were laid down in rows, underside up, with the tip ends of each succeeding row overlapping half the length of the preceding row. Spruce boughs could also be used to make temporary shelters. Aboriginal camps were made using spruce bough shelters which Johnny did not describe in detail.

Fomitopsis pinicola

This bracket fungus, growing on the trunks of willow and poplar, was gathered for use as a mosquito repellant. Chunks about 4 cm on a side were placed on the fire and the smoke from them drove the mosquitoes away. On one occasion, one of the conks was observed near the fire and Margaret was asked if she was going to put it on the fire to keep mosquitoes away. She shook her head, but from the puzzled look on her face it appeared that she did not understand the question.

Salix species (willow)

Drinking tubes were made by removing the cylinder of bark from a section of a willow branch. When Johnny was getting spruce bark for making a canoe he became thirsty and went to a nearby stream for a drink. When he returned he was carrying such a drinking tube in his hand, but becoming conscious of it he tossed it away. When he was questioned about its use later, he stated that such tubes were used for drinking.

Sphagnum species (peat mosses)

Peat mosses were gathered to fill the moose-hide baby bags, serving as 'diapers'. In winter it was dug from beneath the snow, and the frozen chunks that were chopped out were thawed and dried next to the fire.

Typha latifolia (common cattail)

'Fluff' from the seed heads of cattails was gathered and mixed with the peat moss in baby bags to increase absorbency and to help to keep the babies warm, especially in winter.

Wood ashes

Willie McLeod said that ashes were used (like soap) to wash the hands.

3.7 Wood lore

In living with nature the Slave gained considerable knowledge about the habits of other animals and the habitats of plants. Some of this was passed on with the information on the Slaves' uses of the plants. Included in this section are animal foods, plant indicators, plants used in the making of mustems used by trappers (scents placed on or near a trap to attract the intended victim), and plants useful in the making of fires.

3.7.1 Animal foods

Actaea rubra ssp. *rubra* (red and white baneberry)

The fruits of baneberry (berries) were said to be eaten by black bears.

Agrostis scabra (hairgrass, ticklegrass)

This grass was called "mountain boss" and was supposedly eaten by caribou, moose, "everybody".

Alnus crispa (green alder)

Moose eat the leaves and the branch tips.

Angelica lucida (angelica)

These plants were eaten by both wolverines and grizzlies.

Betula glandulosa (shrub birch); *B. nana* ssp. *exilis* (dwarf birch)

The fruiting structures (aments) of both species were eaten by spruce grouse, ptarmigan and sharp-tailed grouse.

Calamagrostis canadensis (bluejoint, marsh reed grass)

In September this grass was eaten by moose.

Calla palustris (water arum, wild calla)

The rhizomes were eaten by muskrats. The leaves and the fruiting heads (spadices) were eaten by bears.

Carex dioica ssp. *gynocrates* (northern bog sedge)

"Sheep eat" this sedge. (This is not necessarily a montane species—the specimen for which the information was given was collected in a burned over bog forest. It may have been mistaken for a similar mountain species.)

Cornus canadensis (bunchberry)

The fruits (drupes) were eaten by red squirrels.

Epilobium angustifolium (fireweed, great willow-herb)

Young shoots were eaten by moose, which were said to fatten on this food.

Equisetum scirpoides (dwarf scouring rush, sedge-like Equisetum)

This horsetail was said to be eaten by horses. Although there are no horses in the area at present, cattle were previously kept at Fort Liard (McPherson, n.d.), and likely horses were also. This knowledge could not have predated the introduction of horses to the area.

Equisetum sylvaticum (woodland horsetail)

Woodland horsetails were said to be eaten by geese.

Hedysarum alpinum ssp. *americanum* (sweet vetch)

Grizzly bears were said to eat the roots.

Lemna minor (common duckweed)

It was known that ducks eat these plants.

Nuphar variegatum (yellow water-lily)

The plants, including the rhizomes, were eaten by beaver.

Parnassia kotzebuei (grass-of-Parnassus)

Arctic ground squirrels were said to eat the roots and leaves.

Pedicularis lanata (woolly lousewort)

Bears dug the roots and ate them.

Pinus contorta (lodgepole pine)

The cones were said to be eaten by porcupines and moose.

Plantago major var. *major* (common plantain, white-man's foot)

Plantain leaves were eaten by the "jump deer" (white-tailed deer). Both the plantain and the white-tailed deer may be relatively recent invaders of this area.

Pyrola secunda ssp. *secunda* (one-sided wintergreen)

The whole plant, including the roots, was eaten by red squirrels.

Pyrola asarifolia (pink-flowered wintergreen); *P. virens* (greenish-flowered wintergreen)

Specimens of these species were, on different occasions given the Slave name which translates to mean that they were eaten by hoary marmots. However, it appears that they are just referred to by the same Slave term as *P. grandiflora* (arctic wintergreen), a species found growing on the mountains. It was not ascertained whether the Slave believed that *P. grandiflora* was eaten by hoary marmots.

Ribes lacustre (bristly black currant)

The hairy black fruits (berries) were said to be eaten by dogs.

Saxifraga tricuspidata (prickly saxifrage)

Mountain sheep were believed to eat this plant. Once it was also said that the roots were eaten by hoary marmots, although there is little there to be considered an edible root.

3.7.2 Plant indicators

Lemna minor (common duckweed)

The stagnant water upon which duckweed was found growing should never be drunk, because it would cause the development of an itchy rash, especially on the hands and arms.

Thalictrum species (meadow-rue)

This plant appeared to be used as an indicator of the stability of the ground. Johnny called it a "walk medicine", saying that one would "go back fast" in a manner "same as porcupine quills". It was never clear though whether this was done when the plant was present or when it was absent.

3.7.3 Fire-making

Abies lasiocarpa (alpine fir)

The dry needles were used for tinder for quickly making a fire. This would be important on the mountainsides where it is often windy.

Betula neoalaskana, B. papyrifera, B. X *winteri* and other hybrids (white or paper birches)

The black deposits that are found on the bark of birch trees were used for tinder for starting fires. Bishop Bompas (Cody, 1908:76) mentioned the use of the "touchwood, which consists of a fungoid growth or excrescence on the bark of the birch or poplar."

Birch-bark was also used to quicken a fire that had burned down to coals.

Cassiope tetragona (white mountain heather)

The dry plants were used to build fires on the high alpine tundra where there is little wood.

Lycopodium annotinum ssp. *annotinum* (stiff club-moss)

This was said to have been used to make a fire when no wood was available.

Populus tremuloides (white poplar, trembling aspen)

In rainy weather Johnny would cut down a green aspen, split the logs, and burn them in his stove. It was not determined if this practice was aboriginal.

Lichens and dry grasses

Such materials were used to feed fires built on the bare mountain tops.

3.7.4 Mustems

Draba lanceolata

This plant was boiled with blueberries and the mixture was put on sets (the term used to designate the trap when it is set to capture an animal) for marten.

Geranium richardsonii (wild white geranium)

Ashes from the burning of the roots of this plant were mixed with berries ("strawberries, blueberries, any kind") and the mixture was put on a stick next to sets for fisher.

Oxytropis maydelliana (loco-weed)

Whole plants were burned and the ashes were mixed with water to be put on sets for hoary marmots.

Saxifraga hieracifolia (stiff-stemmed saxifrage)

The plants were boiled and mixed with blueberries to make mustem for marten sets. The mix was put onto the traps.

Saxifraga reflexa[1] (reflexed saxifrage)

Upon seeing a picture of this plant, Johnny said that it was gathered on the Grass Mountains (LaBiche Range) to make fox mustem.

Senecio lugens (groundsel)

Only one of the specimens of this species which was shown to Johnny elicited the information that it was used in the making of a mustem.

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[1] This species was not found on the LaBiche Range near Dendale Lake, nor does Hulten (1968) extend its range that far south. Thus the drawing was likly mistaken for a similar species.

The dry plants were crushed and mixed with powdered dry fish meat. This was scattered about sets for foxes.

Habenaria obtusata (blunt-leaved orchid)

This plant was once identified as the plant used in beaver mustem. It was powdered and mixed with beaver castor, and placed on a stick next to a beaver set. At one point in the discussion of beaver mustem, a plant described as "two-leaf" (with the hands held up, opposite one another, wrists together to demonstrate) was said to be used for making the mustem. The species that comes to mind is twayblade (*Listera borealis*) which was later found to be in the area, but the specimen was not seen by Johnny.

CHAPTER 4. UTILIZATION OF THE FAUNA

The subsistence of the Slave was based on the fauna of the area which they inhabited. Although it is impossible to quantify the relative amounts of animal versus plant matter consumed, it would not be unreasonable to state that over 80% of total food consumption was provided by animal matter. The emphasis on a high protein diet also necessitated high consumption of fats, utilized in the metabolization of the protein.

The three classes of animals, fish (Osteichthyes), birds (Aves), and mammals (Mammalia), which provided most of the food and raw materials used by the Slave have been treated separately. These classes are discussed in phylogenetic order, followed by a very short section on other animals, and a discussion on the methods used in preparation of meats and the storage of meat from larger game.

Due to the fact that each portion of an animal cannot be harvested when required, as in the manner of harvesting plants, it was thought more appropriate to discuss animal uses together in one section under the species, rather than under uses as was done with the plants. Because the nature of the information was different in each of the four groups, there were differences in the method of presentation. Fish were discussed in general because few distinctions as to use or method of processing were made between species. Those few distinctions that were made are mentioned after the general discussion on capture,

preparation and storage, and notes on habits. Additional notes on the species present in the area, and the water bodies with which they were associated are located an Appendix II.

Bird species used are discussed separately where feasible, and in groups where no distinction as to species was made [i.e. loons, swans, ducks and geese, grouse (Gallinaceous birds), and owls]. An annotated list of bird species observed in the area, followed by additional species which Johnny may have seen in the area is located in Appendix III.

Mammal species have not been placed in strict phylogenetic order, but have been arranged into two groups: the first contains species hunted mainly as a source of food, the second, species hunted for their furs. Hunger was the most important need to satisfy and by-products of both groups provided raw materials to meet other needs. Those species included in the second section were of lesser importance than those in the first, and their furs were more often used as charms or as decoration. Emphasis on hunting the species found in the second group was greatly increased by the encouragement of foreign traders. Subjects discussed under each species include hunting methods, use and preparation of meat, use of viscera, bones, hides, etc. and the manner in which the species was regarded. Not every section is discussed for each species as Johnny could not or did not provide information on all aspects for all species. Skinning and butchering are discussed only for moose and black bear, as these were the only species for which these processes were observed. Also discussed is the use made by the Slave

of the domesticated dog. An annotated list of species of mammals is located in Appendix IV.

4.1 Fish

Fish were an important source of subsistance for the Fisherman Lake Slave. They provided an almost sure supply of food at any time of the year. The most permanent camping places appear to have been located at good fishing sites. Although exploitation showed seasonal fluctuation, fish seem to have been resorted to at times when other resources failed. At most times during the year fish could serve as the most dependable resource. However, heavy runoff due to snow melt or high rainfall could induce high water levels and increased turbidity. These conditions could reduce fishing success. This reduced success was noted by McPherson (n.d.) on several occasions.

Nets could be set almost year-round in the lakes or streams to catch fish. Aboriginal nets were made from twisted strands of the inner bark of willow (described in Chapter 5). They were fastened to poles driven into the bottom, with floats of bottle-shaped pieces of wood, and sinkers of stone. (Now string nets are used, and plastic bottles are often seen as floats.)

In summer the nets were easily set and checked from a canoe. However, to set them in winter they had to be drawn under the ice using a line which had been threaded under with the use of a long slender pole.

The pole was pushed along using a forked stick through holes that were "chiseled" through the ice, or melted using heated rocks. Once the line was under the ice the net was fastened to one end and drawn under. To check the net, the end holes were opened up, and the net was drawn up, leaving the line under the ice to draw it back into place. During the processes of setting and checking the nets, the hands were repeatedly washed in the water to prevent ice from forming on them. This same method for the setting of a net under the ice was described by Samuel Hearne (1795:16-17) in his journal of his travels with Northern Indians.

If bad weather prevented the checking of nets for a few days some of the fish had to be discarded as they would already have begun to decompose. This practice may have resulted from contact with foreigners, as some of the early explorers describe the use of putrid meat by the Indians. Fish which were fresh were easily distinguished by their pink gills, as opposed to the white gills of those that had been in the net too long.

In the fall (September) fish traps were built in the streams to catch large numbers of fish to be dried for winter use. The fish traps required several men to build them; a description of their construction is included in Chapter 5.

Fish were also caught with bone fish-hooks, or were snared or speared. The snare was a loop of willow bark or spruce root that was fastened

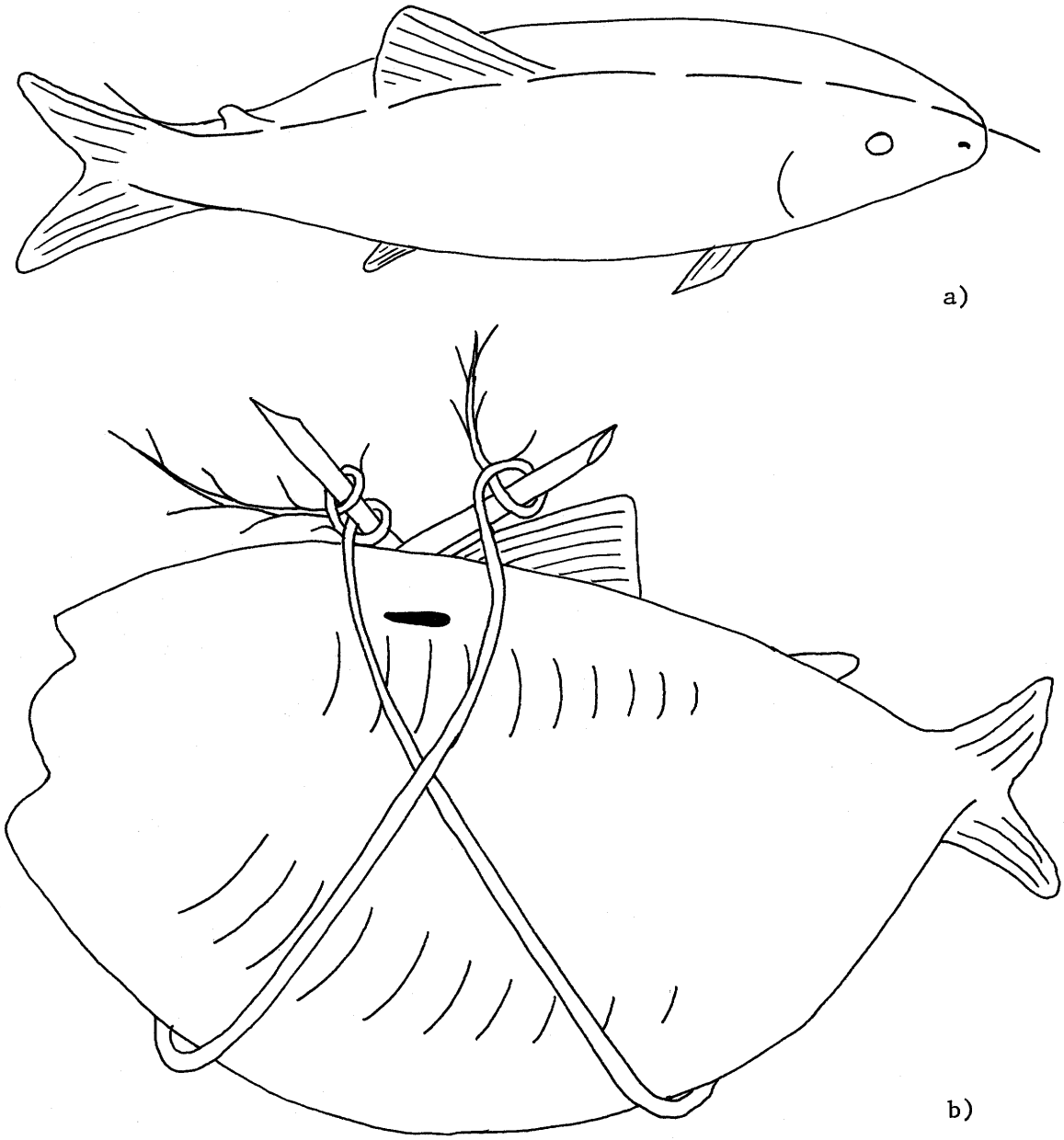

Figure 4. Broiling fresh fish. They were slit open along the backbone (a), and opened out so they could be hung next to the fire to cook. Willow withes (b) fastened around the fish and the broiling stick prevented the cooked flesh from falling into the fire.

to the end of a pole. It was used for "bluefish" (arctic greyling) and "trout" (arctic char?, see the comment in Appendix II regarding this species). Upon seeing a fish, the snare was carefully let down into the water, drawn over the head of the fish and sharply pulled back, throwing the fish out of the water. Snaring was considered a more efficient method than spearing.

Fresh fish were cooked over an open fire. The fish were split open and hung next to the fire by the tail, or were hung by one side with two willow withes about them to prevent the meat from falling into the fire when it was cooked (see fig. 3). Fish stomachs were roasted or boiled. Fish eggs were "fried" and eaten. The heads and eyes were boiled to be eaten.

In May, 1974, when Johnny first arrived at the lake he went to get some fresh fish from one of his sons who was already camped on the lake. The fish were observed being carried on the ends of sticks about 20 cm long, the fork of which had been cut off to make a hook which was inserted in the gills of the fish. When Margaret was preparing to take fresh fish with her to Fort Liard, she carefully stuffed the cavity of each fish with the leaves of fireweed (*Epilobium angustifolium*). No explanation for this could be obtained.

Fresh fish would keep for some time in holes that were dug in the ground and lined with birch-bark. However, when excess fish were being caught, some were dried to be cached for leaner times. In summer more

careful preparation seemed to be done than in the fall. Fish-cleaning tables were constructed with tops of spruce-bark upon which the fish were scaled and prepared for drying. The tail fins were chopped short and the anal fin was cut away. Then the knife blade was drawn across the back to make a cut just behind the head. This cut was then extended along the back of the gills, and the blade was drawn along one side of the backbone, and down, freeing the flesh from the 'rib' bones. This cut extended from the gills almost to the tail. The same cuts were repeated on the other side. This freed the head from the flesh of the sides and belly. Then the backbone was cut through from the back, just behind the head. The head and guts could then be removed together with one pulling motion.

Next a cut was made through the center of the thicker back flesh, angling from the edge of the peritoneum (the silvery lining of the body cavity) to the edge of the skin. Since the cut was not extended completely through, this cut created a flap of flesh attached at the edge of the skin. Shallow cuts were also made both lengthwise and crosswise in the other flesh, especially in areas where there was still peritoneum. Nowadays the fish are rinsed in a salt solution before being hung on poles about 1.5 m above the fire. In the past they were simply rinsed in water. It was emphasized that then they were hung over green sticks —— "green branches with leaves around" (Willie McLeod's translation of Johnny's words). Perhaps this aided in keeping flies away?? Any kind of wood could be used on a fire for drying fish. In a week fish had dried enough that they could be stored,

for a period of up to a year.

In September, when large amounts of fish were caught to be dried for winter use, it was not necessary to prepare them in the fashion described above. They were merely scaled, gutted and hung by their tails upon sticks which were placed on racks above the fire.

Dried fish meat was usually boiled before eating, but it was also eaten without being cooked.

The meat of burbot or ling was esteemed because of the few bones in the flesh. The same was said about "bluefish" (arctic greyling) meat. The liver of one kind of fish, thought to be a sucker, was used aboriginally for washing the hands. This type of use was mentioned by Petitot (1876:43) for washing both hands and face. The stomach of the whitefish seemed to be considered a delicacy. It was split open and roasted over the coals, hung on the end of a stick. When it was cooked the inner layer was scraped away and the remainder was eaten.

"Fish-meat bannock" was made from a small fish, partially digested, in the stomach of a larger fish. It was mixed with flour, then wrapped in a bundle of water sedge (*Carex aquatilis*) before being cooked next to the fire. (Johnny referred to this as being "half flour — half fish".) Whether these semi-digested fish were treated similarly before flour was available, could not be determined.

Attempts to correlate fish movements with those described by Johnny for Fisherman Lake were unsuccessful but fish movements could be correlated with maximum utilization by the Slave.

On June 26, 1974, Johnny stated that the fish would now be in the streams for about two weeks, and that after those two weeks they would return to the lake. However fish species found in Fisherman Lake are either very early spring spawners or late summer to winter spawners. In late June, when Johnny stated that the fish would be in the streams for two weeks, it would appear that none of the fish species were spawning. The arctic greyling is the only fish which is found in the area that spawns near this time (May to mid-June), but it does not inhabit the lake. Burbot exhibit a post-spawning movement into the streams, however, since they spawn in late winter, this migration occurs in early spring. The only species for which it is thought the movements might account for Johnny's statement was the yellow walleye (or pickerel) which was described in general as having "migratory habits" (McPhail and Lindsey, 1970:349).

Since the spawning of some of the lake fish brings them into the shallow water it is possible that their spawning activities made them easier to capture in nets, which were usually set in the shallower water. The period of intense fishing in September at Fisherman Lake may coincide with the beginning of the spawning period of the humpback whitefish (the most commonly netted species in the lake). Netting through the ice during the winter on Fisherman Lake was likely

successful due to the presence of winter-spawning mountain whitefish and burbot, the former spawning near shores from November to January, the latter in shallow water under the ice from January to March. The period of spawning of humpback whitefish also may extend into early winter (November or December). Northern pike and yellow walleye spawn at the time of spring break-up, the former in weedy flooded areas and the latter in sandy or rocky shoals. These species could be netted as soon as the ice was gone.

The building of fish traps in streams in September may also be correlated with spawning of stream fish. Dolly Varden spawn from late August through November, while arctic char (if they were truly present in the Black and Beaver Rivers, see comment in Appendix II) spawn from July through September, or occasionally into October (Scott and Crossman, 1973:296). Observations of inconnu in Great Slave Lake showed that spawning migrations up the streams and rivers were spread out over the late summer months, however, the downstream return migration was described as "rapid and spectacular" (McPhail and Lindsey, 1970:76) and occurring at a definite period. If similar types of migration occur in the Fisherman Lake area the yield of fish would make it well worth the effort required to build fish traps in the streams.

It would seem then, that at Fisherman Lake, fall, winter and spring spawning of various species of fish brought them into the shallower water where they were more readily netted. Observations of the catches of the Klondike family throughout the summer months supported the

conclusion that fish were also readily available in summer. Barring unusual circumstances, fish could be regarded as a constant dependable resource, which was utilized to a greater degree at the time when it was most easily exploited.

Additional information on the kinds of fish found in the area and their distribution is contained in Appendix II.

4.2 Birds

Birds of numerous kinds provided additional variety to the resources of the area. Due to the fall migration of the majority of species away from the area the variety in bird resources was greater in summer than in winter. Spring and fall migrations also introduced species which were not normally present, or were present only in small numbers throughout the greater part of the summer. Late summer and fall were also the times of greatest abundance of species resident the rear round, due to the addition of the young to the population.

Birds were used primarily as a source of meat. When the skin (with attached feathers) was to be used, the bird was skinned, otherwise the feathers were plucked out. Eggs of larger size were gathered to be boiled or "fried" for eating. Egg dates given below are taken from Bent (1961-1965).

4.2.1 Loons

Loons resided on the lakes from late May to mid-October. Special "loon arrows" were of the same blunt types which were used to hunt other birds, but they were dyed with alder-bark dye. Loon meat was eaten and the skins with the feathers still attached, were made into caps that were worn when it was raining. Eggs became available in June and early July, but it is not certain whether the Slave used them.

4.2.2 Swans

Whistling swans (*Olor columbianus*) are present only in migration, but trumpeter swans (*Olor buccinator*) may nest in the area. Swans were killed for their meat. Johnny did not mention the use of swan eggs for food (available from mid-June to early July), but in any case it is unlikely that numbers of nesting swans would be enough to make them a resource of any importance.

4.2.3 Ducks and geese

Migrating ducks and geese reach the area in very late April or early May. Migrants are common in the area throughout May and they pass through to the south again in September. Flocking of ducks breeding in the area during summer, begins in late July or in August.

Ducks and geese were shot during migration. Young and flightless ducks in the moult could be captured in shallow water, or by pursuit in a canoe, in the deeper water. "Fences" were sometimes built in shallow water with openings in them where snares were set. The mountain lakes were said to have "lots of ducks".

When large numbers of ducks and geese were taken in September, the evicerated carcasses were hung whole, by the neck, to dry the meat. All species of ducks and geese were taken for their meat (see Appendix III). Duck fat was used by women on their faces and hands. Eggs of ducks breeding in the area [including mallard (*Anas platyrhynchos*), green-winged teal (*Anas carolinensis*), common goldeneye (*Bucephala clangula*), bufflehead (*Bucephala albeola*) and likely other species of which the status in that area was not definately determined, see Appendix III] were eaten. These were available from about mid-May into July. Egg dates for the Canada goose (*Branta canadensis*, the only goose which might breed in the area) vary from late May to mid-June. When the young children found a nest of a common goldeneye, Johnny mentioned the catching of the young as they jumped from the nest hole several feet up in a tree. Although it was unclear, it appeared that the young were caught to be eaten. One particular kind of duck, the "black duck" seemed to be esteemed as a source of meat. The designation actually applied to two species, white-winged and surf scoters (*Melanitta deglandi* and *M. perspicillata*), which occasionally summered in flocks on the lake.

Wing and tail feathers were used to make the vanes of arrows. Body feathers were used to fill pillows and the moose-hide sleeping blankets (described in Chapter 5).

4.2.4 Eagles

Eagles were shot to obtain their wing and tail feathers which were used to make the vanes of arrows, but no mention was made of these feathers being used as personal decorations.

4.2.5 Grouse or "chickens"

The term "chickens", as used by Johnny, included the following species: sharp-tailed grouse ("muskeg chicken", *Pedioecetes phasianellus*), ruffed grouse (*Bonasa umbellus*), blue grouse (*Dendragapus obscurus*), spruce grouse (*Canachites canadensis*) and willow, rock and white-tailed ptarmigan (*Lagopus lagopus*, *L. mutus*, and *L. leucurus*), all of which may be resident in the area. Each kind was distinguished by a separate Slave term, which would indicate that the Slave did differentiate them.

Grouse could be taken at any time of the year. A small bow ("stick gun") which shot wooden pellets (described in Chapter 5), or blunt arrows were used to kill "chickens". Spruce grouse could sometimes be captured using a snare on the end of a long pole. Ruffed grouse ("partridge") were said to be fat in April. All of the species available were used as a source of meat. When taken in abundance, the

carcasses were cut in half to dry the meat. Eggs were available from May through mid-July, and were gathered for eating. Wing and tail feathers from grouse could be used to make arrow vanes.

4.2.6 Sandhill Crane (*Grus canadensis*)

Cranes migrated through the area in May and again in late August or early September. They were shot for their meat which was considered good when boiled. Cranes may breed in the area, with eggs being laid in May and early June, but Johnny did not state whether their eggs had been used as a source of food.

The skin from the neck of a crane was used to make a hot compress. The feathers were heated by holding them next to the fire, and then were applied to sore leg muscles or the back, or any other body part which could be soothed with heat.

4.2.7 American coot (*Fulica americana*)

Coots appeared to be considered a type of duck, and were shot for their meat, about which Johnny said "good meat —— fat". Eggs of coots were available in late May and June, although numbers may not have been great as this area is near the northern extent of their range (Godfrey, 1966).

4.2.8 Greater Yellowlegs (*Tringa melanoleuca*)

These "muskeg birds" which resided in the area throughout the summer months were shot for food. This was likely fairly easily accomplished, as when their territory is invaded the birds often perch on the bare top of a tree, after circling and scolding at the intruder.

4.2.9 Owls

Owls were available throughout the year as a source of meat and skins (used with the feathers attached). They were said to be "fat" in April, at which time the carcasses were split in half so the meat could be dried. No mention was made of the use of owl eggs, however they are large enough to use, and are available earlier in the year than other kinds. April and May are the months when they are laid, although some may be available as late as June. Skins from owls were used as a towel for the hands and face.

4.2.10 "Whiskey-jacks" (*Perisoreus canadensis*)

The "whiskey-jacks" or gray jays had to be watched as they hung about the camps, since they cleverly stole meat from the drying racks if no one stopped them.

4.2.11 Common raven (*Corvus corax*)

Wing and tail feathers from ravens were used to make arrow vanes.

4.3 Mammals

Moose (*Alces alces*) was the most favored game, with black bear (*Ursus americanus*) appearing to take second place in the Fisherman Lake area. When moose were scarce in the area, sorties were made into the mountains in search of Dall sheep (*Ovis dalli*). Elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*) and woodland caribou (*Rangifer tarandus*) were of importance only in the western portion of the 'band territory', on the slopes and valleys of the Kotaneelee and LaBiche Ranges of the Mackenzie Mountains. Mountain goats (*Oreamnos americanus*) were taken when they were seen, also only in the western part of the range.

The snowshoe hare (*Lepus americanus*) was an important source of subsistence when other game was scarce. Snares could be set and checked by the women or young boys while the men were hunting for larger game.

Beaver (*Castor canadensis*) and muskrats (*Ondatra zibethicus*) appear to have been important in the spring, but this may have been due to recent emphasis on the spring hunt as a good time for taking furs to be traded.

Other game animals such as porcupine (*Erethizon dorsatum*), marmot (*Marmota caligata*), woodchuck (*Marmota monax*), lynx (*Lynx canadensis*) or otter (*Lontra canadensis*), were generally taken when hunters met with them and did not appear to have been actively pursued in the manner applied to the above mentioned species.

The following accounts describe the uses to which each species was put and some of the processing procedures. Further processing of raw materials in the construction of artifacts is discussed in Chapter 5.

4.3.1. Mammals used mainly for meat

4.3.1.1 *Lepus americanus* (snowshoe hare)

"Rabbits" were often an important source of food when larger game was scarce. Women and boys usually set up the "rabbit" lines. Snares of babiche were set on the trails with the loops hung so they were held open. With copper snare wire now available it takes less skill to set the snares. Hares could also be called by 'kissing' on the backs of the fingers to make small squeaking noises (as was described on page 132 for black bears).

Hare meat was boiled or broiled when fresh. To dry the meat the carcasses were split down the belly, or cut in half and hung over poles above the fire.

The fur of hares was cut into strips for the purpose of making blankets (described in Chapter 5). Strips of fur were wrapped about the fingers inside mittens in very cold weather. Hare fur was also used to line baby bags.

4.3.1.2 *Marmota monax* (woodchuck, ground-hog)

Johnny did not describe the hunting of woodchucks, but they were likely shot as they sunned themselves near their burrows. Mackenzie (1970 ed.:295) mentioned wooden traps used by the Indians farther south for taking ground-hogs.

Woodchucks were taken for their meat, which was cooked in a similar fashion to that used for porcupine. Woodchuck fur was used for making hats; one made by Maryanne was round, with ear flaps, and the tail as a decorative appendage at the back. This pattern is probably historic.

4.3.1.3 *Marmota caligata* (hoary marmot)

Although Johnny mentioned mustem being used on sets for marmots, he did not describe methods for trapping or hunting them. They were taken for their meat and the hair was singed off and they were roasted in the same fashion as porcupines. Their meat was considered good eating. No uses were mentioned for bones or hides, although the latter were used by Sekanni for making blankets (Jenness, 1937).

4.3.1.4 *Tamiasciurus hudsonicus* (American red squirrel)

Red squirrels were sometimes taken for meat with the wooden pellets shot from the "stick gun" (described in Chapter 5), or with blunt arrows. Since they were normally of small importance as a food, they were usually hunted only by the young boys. Squirrel meat was said to make good soup. Skins of squirrels were used to line moose-hide clothing, for added warmth in winter.

4.3.1.5 *Castor canadensis* (beaver)

Beaver were taken with snares, babiche nets, or gaffs. Snares were set with up to ten on each pole bedded into the bottom. Dead wood was placed at both sides of the snare with green poles at the front and back serving as bait. Nets were constructed with a drawstring running around the perimeter, so that when a beaver swam into it, the net would close around him. These nets were set in runways near the beaver huts. Nelson (1974) mentions that the use of these nets for taking beaver was believed to have been introduced to the Kutchin since the beginning of the historic era. Because the origins of the practice are unclear it is not known whether or not it was only recently adopted by the Slave. Gaffing, practised in winter, involved breaking open the huts, pulling the beaver out with a "bone hook" mounted on the end of a pole, and clubbing them to death. Jenness (1932:390) mentioned wooden traps used to take beaver in the autumn, but the Slave at Fisherman Lake did not appear to have used such structures.

Beaver meat could be eaten fresh, but the partially dried meat was preferred. It was hung above the fire for one to three days, until it was "half dry" before being cooked and eaten. The head was also used, and was boiled before eating.

Beaver teeth were set in wooden handles and used as awls or wood gouges. The "nails" (claws) were used to make necklaces. Beaver castor was an important ingredient of mustems, and was also used on lynx traps to conceal the man smell.

Beaver fur was used in making hats, "mitts" and parkas. It was also cut into strips and made into warm blankets in much the same manner that Johnny described for rabbit skins (see page 213). Historically beaver were taken mainly for the sale of the fur (which was stretched inside a circular willow frame for drying).

Beaver were also valuable medicinally. Beaver skin was used for bandaging bleeding wounds, being placed directly on the wound and bound into place. Beaver grease was taken as a cathartic (about one half cupful). Another remedy was related to Johnny by a man from Fort Simpson. "Beaver guts" were boiled and a half cup of the resultant liquid was taken to relieve a cough.

4.3.1.6 *Ondatra zibethicus* (muskrat)

Methods of capturing muskrats were not described. They were likely

netted and gaffed in a manner similar to that used for beaver. Muskrat meat was eaten fresh or dried by splitting the carcass down the belly and hanging it on the poles above the fire. Muskrat fur was used to make hats, "mitts" and the linings for baby bags and the moose hide coats of young children. Now furs are sold after being dried and stretched on wooden forms.

4.3.1.7 *Erethizon dorsatum* (American porcupine)

The slow-moving porcupines were clubbed or speared, as their meat was regarded as a delicacy. The capture of a porcupine occasioned an immediate feast and after the quills and hair were singed off, the porcupine was roasted whole over the fire.

A comb could be made from the "hand" of a porcupine by putting a stick through the joints to hold it together. Porcupine quills, dyed several colors, were used for decorating moccasins and jackets. They were also used to decorate the moose-hide head-bands worn.

4.3.1.8 *Ursus americanus* (American black bear)

Before the introduction of guns, bears were stalked with bow and arrow, snared in berry patches, or were hunted with dogs. Sometimes if a den was found in winter the bear would be killed. Bears could also be 'called' by 'kissing' the back of the fingers. By making this slight sucking on the bent knuckles a squeaking noise was produced which

attracted the bear. This strategy was probably used when a bear was located, to lure him within range of the bow. In spring, if other meat was available, bears were avoided because they were thin, and the meat was said to "smell" and to be tough. By mid-July however, bears had become "fat" again, and their meat was then considered good.

Before skinning a bear, tradition dictated that the initial step was to remove the cartilage from the back of the tongue, and hang it in a tree. Although Johnny could not explain why this was done, Willie stated that it had to do with luck in hunting. Skinning proceeded differently if the hide was to be kept for sale than if only the meat was to be used. When the hide was to be sold the paws, head and tail had to remain attached; at other times the foot pads and the skin of the muzzle were cut off. Samuel Hearne reported that the Northern Indians originally singed bears, much like was done with pigs, believing that skinning spoiled the meat (1795:371).

When Johnny began to skin, the bear was positioned on its back and a slit was made in the skin below the anus, and extended along the center of the belly, right to the lip on the lower jaw. The skin was cut across the back edge of the pad on the left foreleg, and a slit perpendicular to this cut was extended down the inside of the leg to meet the one on the underside. This process was repeated on the left hind leg, then the right fore and hind legs. The hide was then peeled from the underside and the legs, in the same order as before. (This sequence of left to right was observed any time that Johnny

skinned an animal. Whether this was from a personal belief or preference, or whether it stemmed from aboriginal custom, or was just coincidental, was not determined.) When the hide had been removed from the inner side of each leg the bones of the wrist or ankle were separated so that the foot remained attached to the hide when it was pulled away from the outer side of the leg. The top of the head was skinned by beginning with the upper lip, peeling back over the eyes and cutting the nose and ears at their bases. The tail was skinned out and the hide was cut away from the back.

When the hide had been completely removed, the body was cut up. First the head was cut free. Next the legs on the left side were cut from the body at their joints. The strip of meat was removed from alongside the left side of the backbone. Then the legs and back meat were removed from the right side. The meat from the lower left side was cut free from the base of the ribs and the upper side of the pelvic bone and the guts were removed through the opening created. The meat was similarly cut free from the lower right side. Beginning again on the left side the ribs were cut free from the backbone and removed in one section. Before the right side of the ribcage was cut away the lungs were removed. Then the flesh was removed from the head and the backbone was cut in half (crosswise). The meat was apportioned among the families present.

Bear meat was eaten fresh or dried. The ribs were usually cooked first. The meat was considered best when it had been "smoked" for two or

three days. Bear meat was aboriginally taboo for women of child-bearing age. Although Johnny could give no reason for this, Willie stated that it had to do with luck in hunting, and with the fact that the bear was often a "medicine" symbol for men.

Bear fat was hung up to dry and the grease which dripped from it was caught in birch-bark pans. Bear fat was described as good for making bannock (the name given to a kind of quick bread that is baked in a frying pan over the fire), because it made "soft" bannock.

The foot pads of bears were eaten after being boiled for two or three hours. The inside lining of the stomach was peeled away and the outer portion was eaten after being boiled or cooked over the open fire. The liver was eaten and blood was saved to be used fresh or dried in the making of soup.

Sinew for thread-making may be taken from the muscles that run along the backbone. This must be removed from the meat and dried. Pelvic bones were used for making spoons and the fibula could be used in the making of bone fish-hooks.

Bear hides were fleshed and lashed into a frame for drying. Mittens were made from bear hide; young bears were preferred for this purpose because they have shorter hair. Hides from bears taken in July were discarded because the hair was loose and would fall out. The making of mittens was the only use of bear hides mentioned by Johnny, although

the hides may have been used as blankets. Judging from the aforementioned singeing of the hides by the aboriginals, it is doubtful that extensive use was made of them.

The gall bladder of a bear was sometimes hung in a tree to dry, for it could be used as a medicine by women. When a woman was losing a lot of blood during menstruation, some of the dried gall was mixed with a small amount of water, or fresh gall was used if it was available, and a few sips were taken through a straw.

The fact that bears were regarded as medicine symbols would seem to imply that supernatural powers were imputed to them.

4.3.1.9 *Ursus arctos* (grizzly bear)

Grizzly bears could be captured in the same fashion as black bears. A young, fat grizzly was said to be all right to eat, but the meat of older grizzlies was said to be tough and to have an unpleasant smell. The same uses could be made from the meat, viscera, bones and hides of grizzlies as for those of the black bears. The people maintained a respectful fear of grizzly bears, because of their unpredictable tempers.

4.3.1.10 *Lontra canadensis* (river otter)

Otters were found mostly along the Kotaneelee and the LaBiche Rivers.

No special methods of capture were given for them. Otters were taken on occasion because their meat was considered good to eat. Now the furs are sold.

4.3.1.11 *Lynx lynx* (lynx)

Lynx were sought for their meat when there was a food shortage but methods for hunting them were not described. The abundance of fat on a lynx was recognized as being of value to people who were starving.

The radius (a bone of the foreleg) of a lynx could be used to make an awl for wood-working. Lynx skins are now prized for purposes of sale. The lynx was previously regarded as a destroyer of "rabbits", which were an important source of food.

4.3.1.12 *Rangifer tarandus* (woodland caribou)

No additional methods of hunting were given for caribou. They were reported by Johnny to be common "in the Yukon". One was seen near the Kotaneelee River about ten years previously. Meat, viscera, etc. were used the same as those of moose. The caribou hide was used for making a swinging cradle for infants. This was the only article for which caribou hide was specified. It is probable that it was used for many of the same purposes as moose hides, although it was not as thick and durable.

4.3.1.13 *Alces alces* (moose)

Moose seemed to be the most desirable kind of meat. Moose were stalked, hunted with dogs, snared or called. The best time for tracking moose was said to be on a breezy day, just following a rain when the litter was soft and the sound of the wind in the trees covered any sound the hunter made in walking. At that time, if the hunter remained down wind from the moose, it would not be able to detect him by either scent or sound. Snares were set along moose trails. A length of babiche of about five armspans was used to set a loop about one meter high with the lower side at about knee height. A good place to set these snares, or to stalk moose was near a "moose lick" where the moose get "salt".

In September, during rut, a cone of birch-bark was used in producing an imitation of the call of a moose (described as "uuuu-a' ")and a scapula was rubbed against a tree to imitate the rubbing of antlers. This attracted the moose towards a hunter. Before the introduction of guns the hunter remained behind a tree until the moose had approached close enough to be shot using a bow and arrow.

When dogs were used, they trailed the moose until it turned at bay. The hunters would then come and kill the moose.

Moose were skinned and cut up immediately. Willow or alder branches were laid upon the ground and the animal was drawn onto this mat. The

throat was slit and the head cut completely off. When this procedure was observed two men did the skinning. One began on the left foreleg, the other on the right hind leg. The skin was slit across at the knee joints and down the inside of the leg to the center of the underside. The skin was split down the center of the belly, from the neck to one side of the anus, then the skin on the other two legs was slit as before. Beginning at the chest, the hide was removed from the underside, a cut being made on the opposite side of the anus to the original one before removing the hide there. Then the hide was peeled away from the legs, sides and back. When skinning was completed fresh willow boughs were piled up to receive the meat as it was cut up. Beginning with the left hind leg, the muscle which joins the leg to the abdomen was cut away, then the leg was cut off at the joint. The muscle over the left shoulder was removed, and the foreleg was cut free at the joint. Then the meat was cut in a strip from along the backbone. The carcass was turned on its other side and these cuts were repeated. A cut made through the flesh at the point of the sternum was continued to the anus. On the left side, following the curve of the last rib and along the backbone, the meat was cut free (essentially the body wall). The pancreas was cut free, connective tissues were cut, and stomach and intestines were removed from the cavity, after cuts were made at the juncture of the esophagus and the first stomach, and around the anus. The kidneys were removed. While one person cut apart, emptied and washed the stomach and part of the intestines, another cut away the diaphragm, and removed the liver.

The ribs of the left side were then cut free along the sternum, down the first rib and along the backbone. Bones were cut through with an axe. The lungs and heart now exposed, were removed. Then, with the right side uppermost, the wall of the abdomen and the ribs were removed from that side. The backbone was chopped through at the center and the job was complete.

If the kill was made near water, the meat could be piled on fresh willow or alder boughs in the bottom of a canoe and transported to camp. If the meat had to be transported overland, it was packed in "net" packs made from babiche.

Ribs were broiled or boiled fresh. The other meat could be cut into strips and dried to be eaten later or cached for storage. Poplar wood was not used on the fire when moose meat was being dried, as it made the meat "smell". Dried meat was sometimes ground and mixed with fat for caching. Fat was dried separately from the meat, and the grease was caught in birch-bark pans. Moose grease, except for that which came from along the back, made "hard" bannock. When put on the hands and face this grease was believed to reduce the attraction of the body for mosquitoes.

Blood was saved, usually stored in a bladder container. When fresh it was added to boiled meat to make a soup. It kept up to one month in cool weather, and longer if it was frozen. Another way to store blood was to dry it in a birch-bark pan. The dried blood was powdered by

placing it in a moose-hide bag and pounding it with a stone. The powder was mixed with grease and boiled with water to make a soup.

Heart and liver were both eaten. Cooked moose liver was often mixed with buffalo-berries before being eaten. Stomachs were cut into strips for roasting or drying. Jimmy Klondike said that a piece of the stomach hung on a branch in a stream would attract fish to the spot. Formerly the stomach contents were eaten after being boiled. Intestines were roasted for eating. It was not made clear if this included the whole of the intestines, or just the upper portions which were observed being cleaned out when the moose was skinned.

Bones were used in several ways. The marrow was eaten raw, or after the bones had been placed next to the fire so that it would cook. Raw marrow could also be used as a soap. The liquid in which bones had been boiled could be used as a hair dressing. Two types of tools for dressing hides could be made from the ulna. The scapula could be used in the 'calling' of moose as described above, or could be cut down to make a bone "knife". Spear heads were also made from moose bones. An awl made from the radius was used in wood-working.

Moose antlers were boiled to soften them so that they could be used to make awl handles. When the antlers were still in the velvet they were roasted in the fire. After the blackened outer portion was scraped off the inner, "white" part was eaten. After being boiled for about two hours the hoofs of a moose could be eaten. The hoofs of a moose calf

were tied together to make a "rattle" for young children.

Eyes were eaten raw or boiled and the "nose" was also boiled to be eaten. The udder of a moose was used to feed broth to babies whose mothers had little milk. The bladder was saved to be used as a storage container for blood, brains or grease. Brains were used in the tanning solution. Sinew was dried and prepared as a sewing element (see Chapter 5).

Hides were fleshed and scraped of the epidermal layers. In this raw state, they were made into babiche for snowshoe webbing, snares, net bags and a binding element. Babiche is a term, of French origin, used to denote line made from raw hide. The Slave recognized linguistically two kinds —— wide and narrow. Up to twelve raw hides were sewn together to make the covering of "moose-hide boats" (see Chapter 5). Hides were tanned in the summer for making clothing, baby bags, etc.

In 1973 a kill site was visited with the group that went to bring the meat to the camp. The moose had been skinned and cut up. The meat was stacked on willow boughs, and covered over with more boughs. On the group's arrival fires were kindled and water was put on to boil to make tea. Sections of ribs were hung over the fires to cook. Since imported tea had been forgotten, leaves of Labrador tea were gathered. One of the women cooked a strip of stomach by spreading it over the coals with a stick. One of the men took a strip of the stomach and put it into the nearby Kotaneelee River on a stick, near where he had

a fish line set. This was said to attract fish. Whether or not the stomach was effective, a fish was soon caught, and was split open and hung to cook next to the fire. It was understood that the meat was going to be cut into strips and partially dried to make it lighter for packing to the base camp.

4.3.1.14 *Oreamnos americanus* (mountain goat)

No specific methods for hunting were mentioned, but mountain goats were taken for their meat when they were seen. The meat was said to smell, a character attributed by Johnny to the fact that the goats "eat trees", but it was not avoided. No mention was made of the use of hides or bones of goats. It is probable that they were taken so infrequently as to preclude extensive use of those articles.

4.3.1.15 *Ovis dalli* (Dall's sheep)

Sheep were ambushed or snared along their mountain trails. Although longer trips were necessary to obtain sheep, it appears that they were an important source of food. On occasion they have been seen on the ridge of mountains on the north side of the Fisherman Lake valley, and more often in the Kotaneelee Range, but they are common in the LaBiche Range. Sheep hides, with the hair on, were valued as 'ground sheets' when camping in the snow, when travelling or when on the trapline, or hunting. When fleshed and scraped free of hair the hides made "good babiche" for use in the webbing of snowshoes. Sheep horns

could be used to make spoons if they were first boiled to make them soft enough to cut.

4.3.2 Mammals taken mainly for their furs

Except for the deadfall, used mainly for marten, Johnny did not mention the methods for capturing fur-bearers that were used before steel traps became available. At that time it seems the taking of animals for furs was more opportunistic, and no specific efforts were put forth to amass numbers of furs more than were needed for clothing or desired for decoration. The meat of most species was discarded unless it was fed to the dogs.

4.3.2.1 *Citellus parryii* (arctic ground squirrel)

Although they were usually found in the mountains, Johnny once shot one on the trail to Fort Liard from Fisherman Lake. Skins of the arctic ground squirrels were used to line moose-hide clothing in the same manner as the furs of red squirrels were used.

4.3.2.2 *Canis latrans* (coyote)

Coyote furs were used for making parkas, but they are now sold.

4.3.2.3 *Canis lupus* (gray wolf)

Wolf furs appeared to have been used only for making parkas. In historic times the bounty that was placed on wolves added to the money that could be obtained from the hides. The Slave did not appear to share the fear and suspicion of wolves that is held by most people of European descent or perhaps it was simply not obvious during the summer field-work period, when wolves are dispersed and not hunting in packs.

4.3.2.4 *Vulpes vulpes* (red fox)

Fox fur was used mainly in the making of parkas and the meat was fed to the dogs. Now their furs are sold.

4.3.2.5 *Martes americana* (marten)

Marten were taken with deadfalls. Marten furs were used for making mittens, and for cutting in strips to be made into blankets (like those made from snowshoe hare, see Chapter 5). An unidentified bone from the marten (likely a leg bone) was used to make the awls used in the 'sewing' of moccasins. Only in times of starvation was the meat eaten. Furs are now sold.

4.3.2.6 *Martes pennanti* (fisher)

Furs from fishers could be used for making mittens, but now they are

sold. Fishers were regarded as the killers of porcupines (an esteemed source of food for the Slave).

4.3.2.7 *Mustela* species (weasel)

Weasels were regarded as good mousers, and hence were allowed to remain about the camps. Now they are trapped for their furs.

4.3.2.8 *Mustela vison* (American mink)

Mink furs are sold and the meat can be fed to the dogs. It was said that "some people eat it", but neither Johnny nor any of the people he knew had ever done so.

4.3.2.9 *Gulo gulo* (wolverine)

Wolverine fur was used for parka trimming; now it is sold.

4.4 *Canis familiaris* (dogs)

Dogs were used in the hunting of moose and bear. In summer they served as beasts of burden, carrying moose-hide packs, whereas in winter they pulled toboggans. This use of dogs for pulling is believed to be a historic development, toboggans formerly being drawn by the people themselves. Dogs were tied up in the camps and fed with fish, moose leg bones, moose liver, fox meat and mink meat.

4.5 Other sources of animal materials

Other types of fauna, such as reptiles, amphibians and freshwater and terrestrial invertebrates were not usually exploited, although exceptions may have occurred, such as the following.

4.5.1 Anodontinae (freshwater clams)

Johnny did not seem sure, but he said that he thought the meat of clams was cut out and cooked on the fire. Willie was of the opinion that clams had not been eaten by the natives.

Shells were used as medicine containers; Willie reported having seen men carrying the shells in their tobacco bags. "Buttons" were also reported to have been made from the shells. Holes were made in them with bone awls. This making of buttons is likely historic, although the shells may have been used to make 'beads' in a similar fashion.

4.5.2 Frogs

Johnny was of the opinion that frogs had sometimes been boiled or cooked over the fire for eating.

4.5.3 Bees

Honey from bees was said by Johnny to have been used the "same as

birch juice" (see page 63 in Chapter 3). It was kept in birch-bark containers.

4.6 Preparation and storage of meat from big game

This section deals with meat from moose, black bear and other large game that was obtained (elk, caribou, sheep, goats) whose meat could not be eaten fresh before it spoiled. The discussion includes different ways of preparing as well as storing these meats.

There were three basic methods for the preparation of meat for consumption. They might be classified as boiling, broiling and frying.

Before metal pots became available, meat was boiled in birch-bark containers. Stones, heated in the fire, were lifted with sticks and placed into the container with the meat and water. Another method was to cover the birch-bark container with a thick coating of clay and set it next to the fire. Enough heat could penetrate the clay to cause the water to boil, but the birch-bark would not catch fire.

The most common way to cook meat was through the use of the broiling stick. The lower end of the stick was sharpened, so that it could be firmly embedded in the earth. The stick was angled into the ground so that the upper end extended over the fire. This upper end was usually peeled and a portion of the wood was turned back at right angles, projecting upwards. This projection prevented the pieces of

meat hung on the end of the stick from sliding down the angled stick. If the ground proved to be too hard for the use of the broiling stick (as was the case in winter), then the fire was laid between the ends of two large logs which were placed parallel to each other. Meat could be hung on sticks which were laid across the logs.

The third method of cooking meat, which might be termed frying, was mainly employed on the mountains. Here an abundance of wood would be lacking, and the fire was often made with "grass". Stones were placed around the fire, and the meat was cooked directly on the surface of the stone. "Moss" was placed over and around the cooking meat.

For storage, meat was dried. Each muscle was cut into one long, thin strip by cutting spirally into the meat, around the muscle. Poles were laid in the crotches of supports that had been embedded in the ground, so that they were about 1.6 m above the campfire. The strips of meat were hung on these poles, and turned daily until they had fully dried, in about a week. Fat was dried separately, and was hung where birch-bark pans could be placed underneath, to catch the grease. "Dirty wood" (i.e. rotten wood or drift wood) was not used on the camp fire when meat was being dried, because it "makes meat smell". Willow, alder and birch were noted as the best woods to burn, because they make "good smoke".

Dried meat was said to be eaten boiled, fried, or uncooked. When uncooked it was often eaten with moose fat. Children were observed

scooping small amounts of lard onto dried meat, and dipping this in salt before eating it.

Sometimes dried meat was ground up by placing it in a moose-hide bag and pounding it with a stone. The powdered meat was mixed with grease and eaten plain or made into soup. This soup was prepared for very young children.

Dried meat was stored in the cache either as strips, or ground and mixed with grease. A temporary cache was made when more meat had been obtained than could be transported to camp right away. In this case the meat was cached in a tree and covered with moss. More permanent caches were constructed of logs, and were covered over with boughs of spruce.

Grease was rendered from the fat either in drying, as noted above, or by "boiling". Heated stones were placed in with the fat, or the fat could be heated next to the fire in a clay-covered basket. When the grease was rendered out it was poured into moose bladder containers using a 'funnel' of a thin layer of birch-bark. When it solidified it could be "put in tree" (cached).

CHAPTER 5. TECHNOLOGY

The following section describes the making of artifacts and the processing of materials as they were observed, or as they were described. Although individual differences in procedures no doubt exist, it is, however, hoped that these accounts will provide a general outline of procedures used by the Slave.

Some of the artifacts that were made for the F.L.A.P. are not described here because the procedures were not observed[1]. These include : cylindrical birch bark containers, webbed snowshoes[2], and the final steps in finishing tanned moose-hides.

A comment would appear to be in order here on the interpretation of what was seen. Where language differences create a difficulty in asking questions and understanding the answers, much information may be missed. Also interpretation from a different viewpoint may cause errors. Because questions as to why a certain step is included were seldom understood, interpretations by the observer may make implications which do not necessarily hold true. In addition, observations made under only one set

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[1] This was because it was desired not to intrude into the life of the informants where they did not appear willing to be observed and because of a few misunderstandings about the time when a process was to be continued.

[2] These appear to have been constructed in the same manner as those described by Honigmann (1946).

of conditions do not take into account variation that may occur under other conditions. For example, was the method of fish net construction in April different from that observed at the beginning of June? Such variations in procedure are thus lacking unless the informant thought to mention them.

Because all artifacts were made using tools now available, that is how the processes were described. Johnny did not seem to be very familiar with the use of aboriginal tools, except for those still in use. When he was questioned about the tools that had been replaced by the metal scrapers used in tanning, he either did not understand the question or did not know the answer. This may also be due to the fact that tanning was normally women's work.

The chapter has been divided into two sections: production of artifacts and the processing of materials. Each of these sections has been subdivided into processes that were observed and those which were only described.

5.1 Artifacts observed being constructed

5.1.1 Spruce-bark canoe

The first step in building the spruce-bark canoe was to obtain material for the frame and ribs. Black spruce, used for the ribs and frame of the canoe constructed in July 1973, appeared to have been chosen for its

flexibility. When it was being sought spruce roots were also gathered to be used as a 'sewing element' in the canoe construction. (For preparation of the spruce roots see section 5.1.3, page 171 .) For the ribs of the canoe that was constructed in June 1974, Johnny used the stems of red osier dogwood[1].

For the frame, four black spruce saplings about 5 cm in diameter were sought. Each was first carefully examined for straightness, and a slab was cut away near the base to check for straightness of grain, and the health of the wood. A usable sapling had clean white wood, while those having wood with a red tint were rejected. The chosen saplings were cut off about 60 cm from the ground, then another 50 cm was removed from the base after the branches had been removed. The length desired was measured off along the trunk and the remaining upper end was cut away. For a two man canoe the length was about three arm spans (nearly 6 m).

For the ribs, about 30 black spruce saplings (or dogwood stems) around 2 to 2.5 cm in diameter and 1.5 m long were cut and trimmed. Each one was checked for suppleness and evenness of bending by curving it across the bent knee. Any saplings with hard, unbending sections could be rejected.

Several pieces of spruce root (1 cm diameter) were sought, by removing the moss ground cover in a small open area and pulling out the roots in as long lengths as could be obtained (usually about 2 m). These lengths of root

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[1] J.F.V. Millar notes that most canoes seen by him had ribs of dogwood stems. The material used may depend on the time of year, or whichever is handiest.

were made into a roll by winding them around one hand, then pulling the hand free, drawing the free ends of the roots through the center of the roll to hold them and prevent the roll uncoiling.

These materials were all transported to the lake shore where the canoe was to be constructed. The spruce roots were sunk in shallow water and held down by a rock, to keep them moist until they were to be used.

Two spruce saplings were chosen for the inner frame. First about 50 cm was cut from the basal end. Then an axe was used to trim down the basal end to the same diameter as the 'upper' end. Starting at the middle, a knife[1] was used to smooth and round the basal end, and to remove the bark from the upper end.

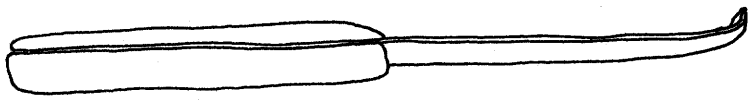


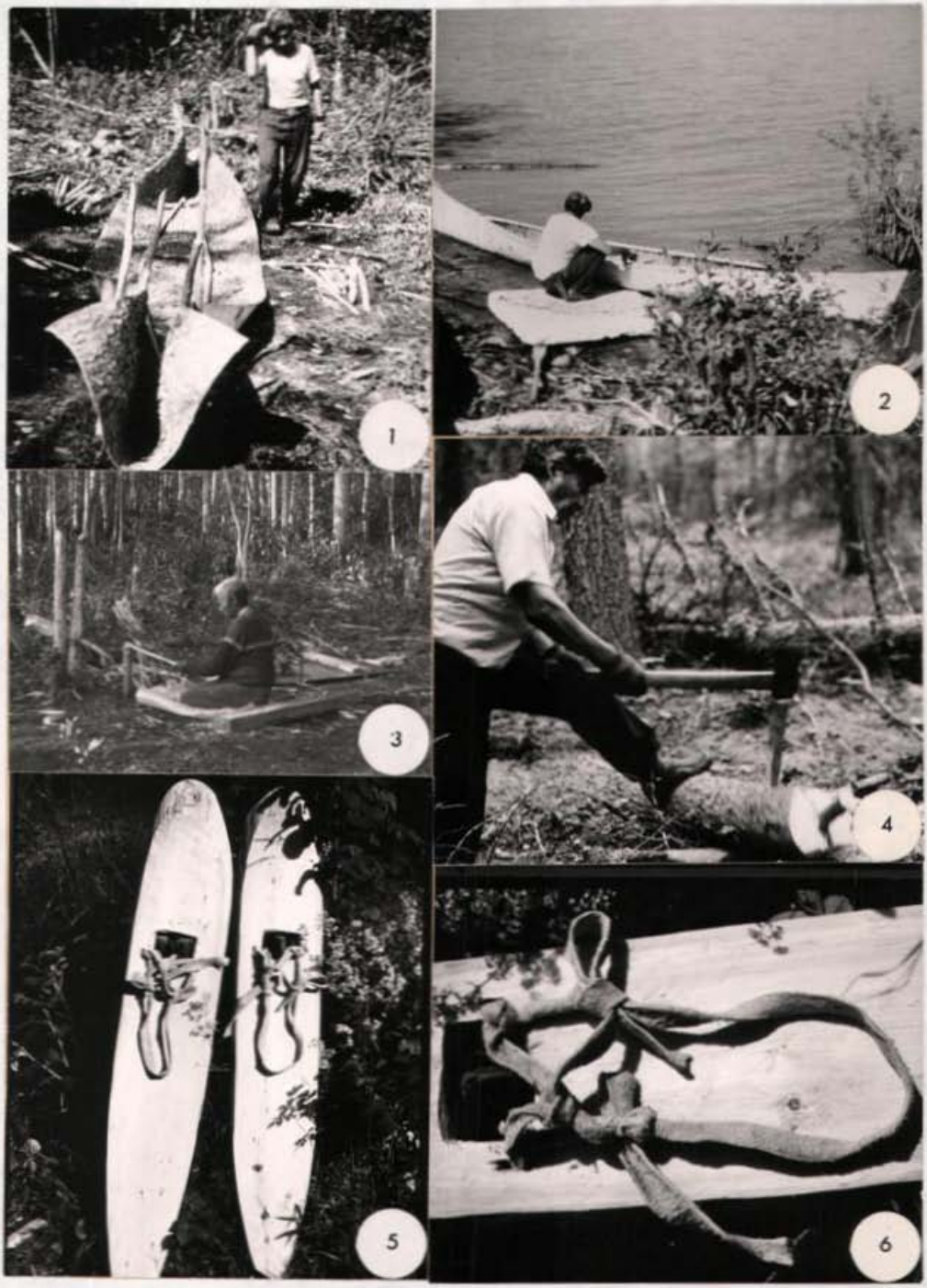
Figure 5. The man's knife or "canoe knife".

About 20 cm of the length was then removed from the upper end. On one side the ends were flattened slightly. When the second sapling had been cut the same length and similarly trimmed and whittled down, the flattened portions of the two poles were placed together. About 12 cm from the ends

[1] This was a metal bladed knife with a curve at the end of the blade. It was called a "canoe knife" by Johnny Klondike and a man's knife by archaeologists.

Plate VII. Technology and artifact construction.

1. During spruce-bark canoe construction, the bark is propped up around the inner frame.
2. Launching the spruce-bark canoe.
3. Johnny Klondike netting with string.
4. Splitting of a spruce log for making makeshift snowshoes.
5. Completed makeshift snowshoes.
6. The moose-hide snowshoe harness.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notches were cut around the two poles and they were fastened together with babiche so that the babiche wrapping fell in the notches.

A piece of sapling about 50 cm long was then cut, with v-notches made at either end. This (hereafter referred to as a spreader bar) was placed between the two sides of the inner frame just formed by the joining of the two saplings, slightly to one side of the center, to spread them apart. The structure was then placed over a slight hollow and a heavy log was put across the center to bow it down.

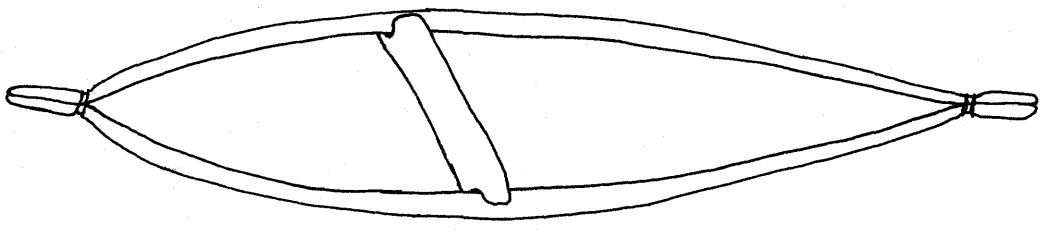

Figure 6. After the inner frame pieces were joined at the ends a notched section of a sapling was used to spread them apart.

The second pair of frame saplings were then measured against the first pair and excess length removed from the basal end. They appeared to be cut about 50 cm longer than the inner frame. Using an axe the basal end of each sapling was cut down on one side. Cuts made every 20 cm up the trunk, part way through, made it easier to cut the wood away, until it was the same thickness as the other end. The basal ends were then roughly squared off to match the proportions of the upper ends. By whittling,

they were rounded and smoothed, and the bark was removed from the upper ends.

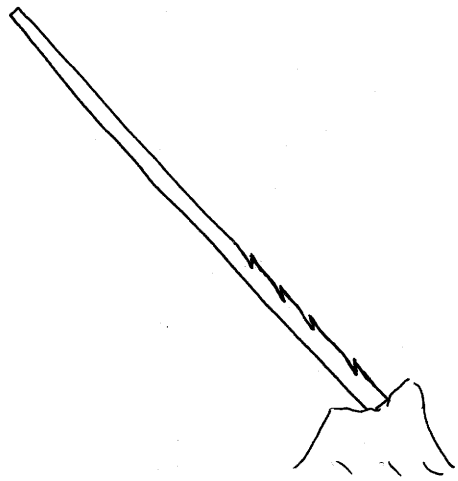

Figure 7. Axe cuts were made in the basal end of the outer frame piece to increase the ease with which it was cut down to the same dimensions as the upper end. A stump was used as a base to work upon.

The saplings to be used as ribs were whittled down on one side, removing the bark and leaving a flattened side. This was not always extended the whole distance to the smaller end, however some of the larger ones were whittled flat on both sides. As each rib was finished, it was drawn across the bent knee, curving it, with the flattened side always on the inside of the curve. When all the ribs were finished they were bundled together and placed in the lake to keep them from drying out. This was not done when ribs of dogwood were used, but perhaps the time of year was also influential, since the canoe made with dogwood ribs was constructed one month earlier in the year than that with the spruce ribs.

Next a tree was selected from which the bark for the covering of the canoe could be obtained. A white spruce was selected that had a straight trunk with no branches on the lower portion. A curved tree made a canoe which did not "go straight" in the water while branches left holes in the bark. A thin sapling (about 15 mm diameter) was used to ascertain the circumference of the tree as far up the trunk as could be reached. By kneeling in the u-shape made by bending the sapling measuring stick, it could be determined whether the tree circumference would be adequate for the size of the canoe required. The ends of the sapling would denote how far the sides of the canoe would rise above the bottom (the depth of the canoe).

Bark with small flakes was preferred as large flakes indicated a bark that would crack. Also trees with large flakes more often had worms under the flakes, which made holes in the bark. The wood of the tree was also checked for color, white being desired; a red tinge indicated that the tree was too dry and that the bark would be difficult to peel away. Flexibility was tested by cutting a slab of bark from the base of the tree and bending it backwards upon itself. After mid-July canoes could not be made as the bark would no longer easily peel from the wood.

When a suitable tree was located a space was cleared in which to fell it. Two logs were placed perpendicular to the path on which the tree was to fall, one laid near the base of the tree, the other about 2 m beyond the the length of the bark required. The tree was under-cut on the side of its intended fall. The direction of fall could be tested by placing the axe head into the cut, with the opposite side from which the handle entered

against the back of the cut. The handle would then point in the direction that the tree would fall. If it was incorrect, more wood was cut away so that the tree would fall directly onto the two support logs laid out to receive it. Now the tree was over-cut on the opposite side to fell it.

Once the tree was down all the branch tips were knocked off with the back of the axe, and the holes were pounded with the back of the axe to loosen the bark around the branch bases. The crown of the tree was cut off about 2 m past the upper support log. No reason for this last cut could be determined.

Just inside the basal support log, the bark scales were shaved off around the circumference of the tree with the blade of the axe. Then the axe was used to make a cut through the bark around the circumference where the scales had just been removed. Up the trunk three arm-spans, plus about one arm length (about 7 m) this process was repeated. Next the scales were removed in a strip along the upper side of the log between the two cuts about its circumference. Beginning at the upper cut the axe blade was then pushed along this strip, slitting the bark between the two cuts about the circumference.

A barking tool (see section 5.1.2, page 170) was made from a 6 to 8 cm diameter alder. The curved end was used to pry the bark away from the tree. A 5 cm width was loosened with each trip up and down the trunk until the bark had been loosened one quarter of the way around the trunk.

Then it became necessary to prop it up with short sticks so that it would not fall back and crack. When the bark was loosened half the way around the trunk, the worker began on the other side, proceeding in the same fashion.

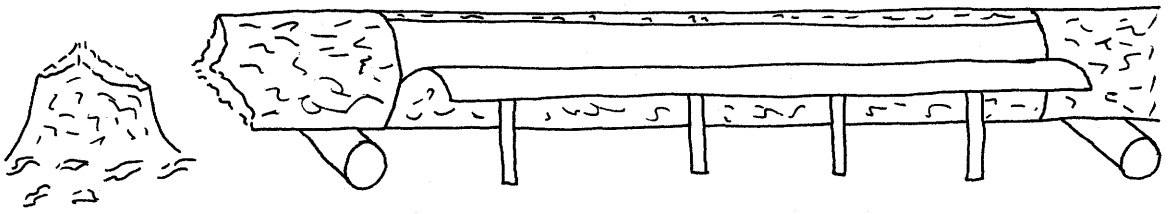

Figure 8. A felled white spruce, showing how the partially peeled bark was propped up to prevent cracking.

When the bark was entirely free, it was pulled out from beneath the trunk and rolled up, beginning at the upper end and proceeding to the lower. A rope was tied lengthwise and crosswise about the roll of bark. A second rope was tied about the center of the rolled bark and it was then hoisted onto the back. This second rope went around the shoulders and across the chest, holding the bark in place. A large piece of moss was put into each end of the roll to prevent it from drying. The bark was thus carried to where the canoe was to be constructed.

It was not likely that the Slave cut down large trees when they had no other tools than stone 'axes'. Johnny did not seem to know what method had been used, however it may be like that described for the Kaska (Honigmann, 1954:28) in which a ladder was used to enable the worker to remove the bark from the standing tree.

Next spruce gum was collected from white spruce trees. For this purpose a makeshift basket was constructed by bending two adjacent corners of a square piece of birch-bark together, and fastening them by placing a partially split piece of alder over the overlapping edges of bark (see fig. 9). The dried bits of gum were simply scraped away from wounds in the bark and caught in the basket.

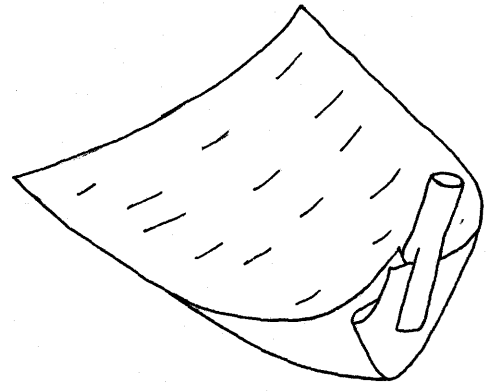

Figure 9. A makeshift container of birch-bark. It was held in shape by a partially split section of alder, and was used to collect spruce gum to be used in caulking the canoe.

When all the materials had been assembled together an area of ground longer than the canoe's inner frame and about 2 m wide was cleared and leveled, with a gentle dip towards the center from the ends. Then the spruce bark was rolled out, outer side up, on this area. After the inner frame had been centered on the bark, pegs, made out of 5 cm diameter saplings, between one half and one m in length, were used to prop the bark up around the frame. When the bark was being propped up, the bark scales were scraped from four rectangular areas, each being located about

one quarter of the length of the frame from its ends (see fig. 10). This was made easier by placing a pole underneath the spot to be scraped. At each one of these spots a fold was made in the bark which would result in the upwards curve of the ends of the bark, and eventually, of the canoe ends. Moss and dirt were pushed under the ends of the bark to hold them up in this curved shape. At the center of each end the bark was also scraped free of scales where it would be later bent.

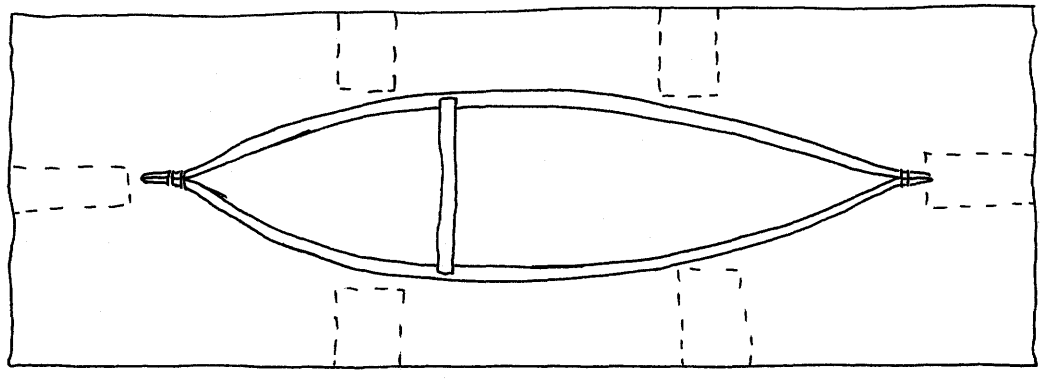

Figure 10. The inner frame was positioned on the outer side of the spruce bark. The dashed lines show the approximate areas where the bark scales must be scraped away.

The exterior frame pieces were now inserted between the bark edge and the pegs. The interior frame was raised up so that it was level with the edge of the bark at the center. It was propped in this position with a peg (about 50 cm long) placed under either end. The outer frame was adjusted so that it extended twice as far beyond the inner frame at what would be the front of the canoe as it did at the rear; it was also made level with

the inner frame and the bark edge between the two folds. An awl (Johnny used the pointed handle of a file) was used to make a hole through the bark just below the frame edge on one side of a fold. A piece of dampened babiche was threaded through the hole and a slip knot was made around the frame pieces. The knot was tightened and the babiche threaded through once again and tied. The piece of babiche was then taken along

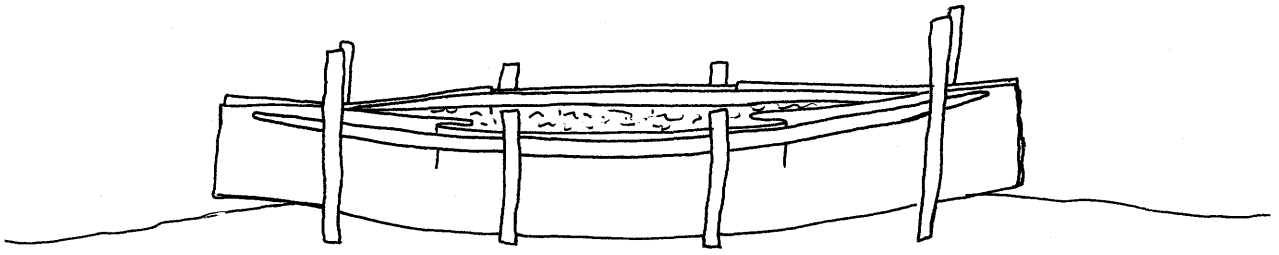

Figure 11. The bark was propped up around the inner frame using pegs. The outer frame pieces were inserted between the pegs and the bark.

the top of the frame to the other side of the fold in the bark. Another hole was punched and the babiche was threaded through from the inside to the outside. The babiche was drawn under the portion extending from the first knot, then threaded back through the hole from the outside. A knot was tied and the end of the babiche cut off (see fig. 12). This process was repeated at each of the other three folds. Often a sharpened stick was put through the hole to hold the frames in place while the babiche was being prepared for tying. If the bark extended above the frame where a knot was to be made it was trimmed away. If babiche was lacking, split

spruce root could be used to tie bark and frame together, however babiche was preferred.

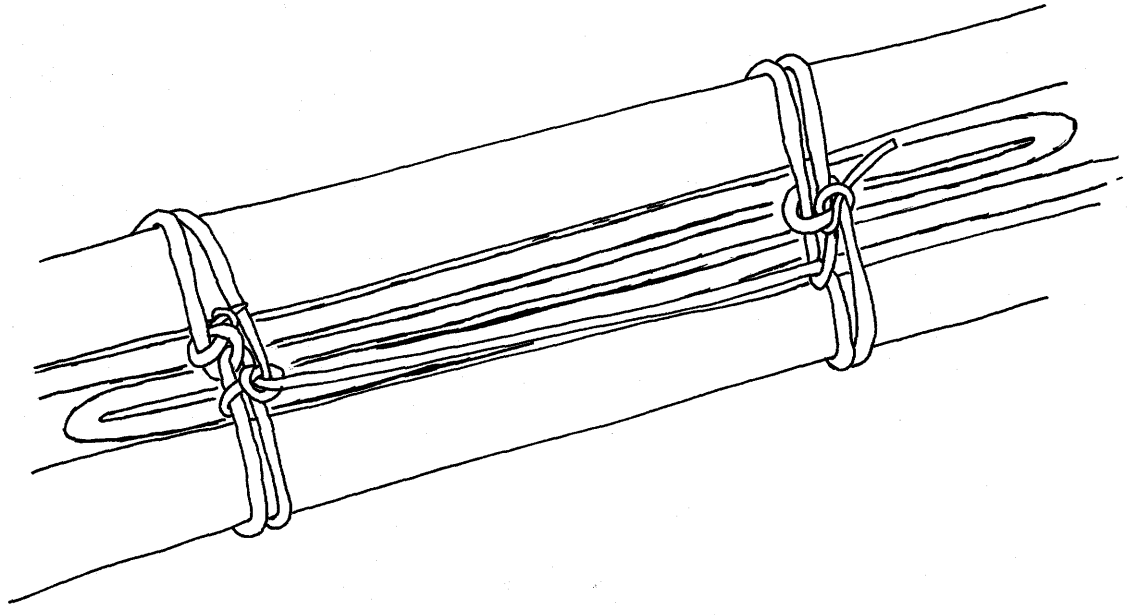

Figure 12. The babiche was drawn along the top of the frame so that one piece was used to tie both of the knots about the frame pieces and the folded section of the bark. Detail of the knots.

Starting at the center of the side, knots were made (using split spruce root in the absence of babiche) about every 15 cm. A slip knot was made first, then the root was drawn back through the hole and knotted about the loops over the frame. As the knotting progressed the supporting stakes were removed from along the outside of the canoe.

At the point where the inner frame pieces met, a whole, peeled spruce

root was used to tie around all the frame pieces. A single piece of babiche was used to tie the knots the remainder of the distance to the end of the frame, running it along the top of the frame between knots. When the end was reached the prop under the inner frame was removed.

When the tying was completed a longer spreader bar was inserted in the inner frame and a heavy log was placed across the center of the canoe. This appeared to be done to increase the width between, and the downward curvature of the gunwales, creating the wide, flat-bottomed shape desired.

The ribs were brought from the lake and again curved over the knee before being used. Working from the center towards the front, inside the canoe, the ribs were inserted from below, between the bark and the inner frame on one side. The basal end of the rib was inserted, and the flattened side was uppermost. With the hands and knees the rib was moulded to the inside of the canoe. At the point where the rib met the other side of the inner frame, it was cut nearly through on the underside (that side next to the bark). The excess portion was used to push the cut end under

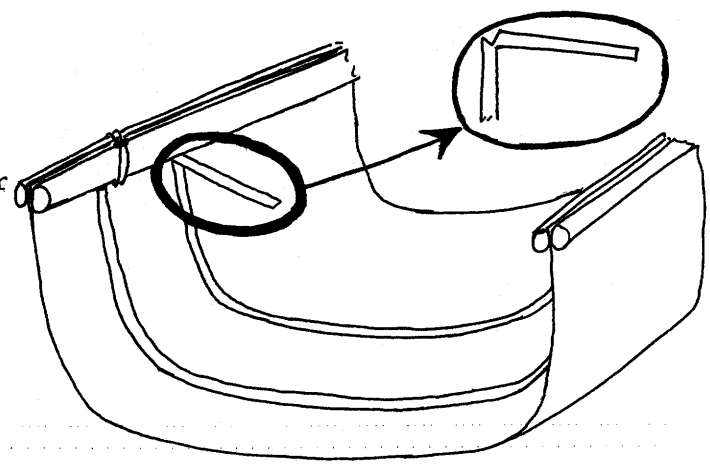

Figure 13. Putting in the ribs. The excess length of the rib is torn away after it has been used to push the rib under the frame. The insert shows how the rib is cut before the end is pushed under the frame.

the frame edge, then it was torn away. The base of the next rib was inserted on the opposite side of the canoe to that on which the base of the previous rib had been inserted. Ribs were placed about 10 cm apart, alternating the side of initial insertion, until the point of junction of the inner frame was reached. The rib here was not cut off, but was looped around to form a circle. Before this process was repeated, working from the center to the rear of the canoe, another heavy log was placed over the canoe and four pegs were reinserted to hold the canoe upright.

Three pieces of moose-hide were used to tie the sides of the frame at the distance apart that they had then reached. The canoe was then inverted over a pole that had been tied up about 75 cm above the ground and the ends of the canoe were pushed down to increase the curvature of the frame. Then two 'clamps' were prepared by flattening four saplings on one side and tying one end of each pair with the flattened sides together. A roll of birch-bark was placed over the end of another stick and set on fire. This was held under one of the open ends of the canoe so that the bark would soften with the heat. The bark was then folded at the center and the clamp was placed over it, just at the end of the frame, following the desired angle of the canoe end. The free ends of the clamp were bound together and this procedure was repeated at the other end.

At the stern of the canoe the extending bark was slit up the bottom (where the bark was bent) to about 3 to 4 cm from the clamp. Two more slits were made about 2 cm to either side of the first. The two strips of bark were then cut off about 3 or 4 cm from the clamp. About 3 to 4 cm from

the edge of the clamp a cut was made parallel to it and the excess bark was broken off on both sides. A knife was used to shave off the bark scales inside the extending strip. A branch 6 to 8 mm in diameter was peeled and smoothed, then inserted between the two sides of bark.

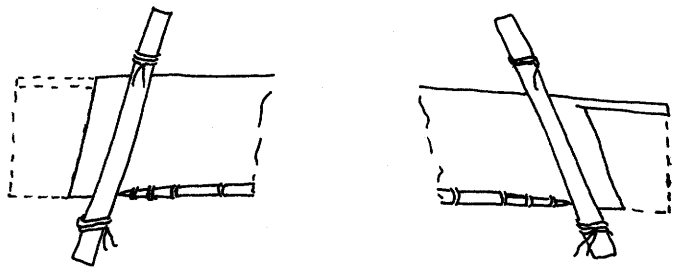

Figure 14. Clamps made from two poles flattened on one side served to hold the canoe ends while they were trimmed and sewn. a) stern, b) prow.

At the prow of the canoe a strip 3 to 4 cm wide was left at the bottom of the canoe, and the sides were cut and broken off as for the stern. Bark scales were removed and a peeled seedling was inserted between the sides of bark, as for the stern. At the basal corners of the tongue of bark remaining, notches were made so that the tongue could be folded down and bent over the raw edges of the bark.

Split spruce root was used for lashing the ends of the canoe. Beginning at the bottom of the stern of the canoe, awl holes were made through the bark so that the spruce root went through the bark and around the stick that had been inserted. The first two loops caught the free end of the root to hold it, so that no knot was necessary. At the upper edge of the

canoe the root was brought through the last awl hole a second time, and then knotted in the last loop made. The prow was similarly lashed with the root passing around the tongue of bark as well as around the edges of the bark and the stick. When the lashing was completed a large rock was put in each end of the canoe to hold the curved shape of the frame. It was left thus about two hours or over night.

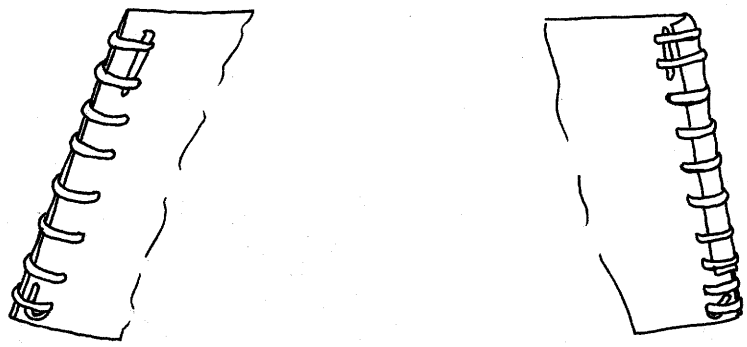

Figure 15. The sewn canoe ends. a) stern, b) prow.

To make the caulking for the canoe the spruce gum was heated with a small amount of water until all the lumps had melted, then it was poured into a basket of water. When it was cool the gum was chewed to increase its pliability, each piece being chewed immediately before being applied. Before it was applied over the seams at the canoe ends a smouldering stick was held next to the seam to heat the bark. Then the chewed gum was pressed on, and the spot reheated. To ensure that the wood of the stick used for heating the bark would keep burning until the job was done, it was periodically waved back and forth through the air. The seams were caulked only about 20 cm up from the bottom of the canoe. This was higher

than the water level would reach. All branch holes in the bark were caulked, with the smaller ones receiving only a piece of spruce gum (again with heating of the bark before and after application of the gum), but the larger holes being first stuffed with bits of moss.

To patch a canoe a piece of birch-bark was sewn on with spruce root and the seams were then caulked with spruce gum in the same manner as that used in treating the original seams and holes.

Mats of spruce bark were added to the interior to be used for seats or to place loads on. Paddles and poles were made from dry white spruce wood.

5.1.2 The barking tool

To make a barking tool a portion 50 to 100 cm long was cut from the base of an alder. The curved basal portion was cut to form the barking end as the tree was cut away. This was done by first flattening a piece on one side, then cutting away the opposite side so that a curve appeared. The tree was then cut away at the bottom of this curve. When the handle had been cut to an appropriate length, the curved end was rounded and smoothed. The size of the barking tool depended upon the use to which it would be put — peeling spruce for canoes, or mats, or peeling alder bark for making dye.

Figure 16. A barking tool. a) side view b) top view.

5.1.3 Preparing spruce root for use as a binding element

Roots could be either peeled first, or split once and then peeled. The outer 'bark' was removed by first peeling down a short distance with the fingers (about 5 cm). The free bark was then wrapped around the root, and grasped firmly with the thumb and fingers at that point. The other hand drew the root between the fingers and thumb which stripped away the bark.

To split the roots a knife was used to start a split. Then one side was taken between the teeth, and the other in one hand. The free hand held the root at the point where it was splitting, between the thumb and forefinger. As the root was pulled apart with the teeth and one hand, the other hand guided the split down the center of the root by alternately bending the root from one side to the other.

For use as a binding element in making the spruce-bark canoe, roots were used whole or in halves. When the root was used in the decoration of baskets, etc., it was split in thin layers which were flat on both sides.

5.1.4 The willow-bark fish net

Aboriginally, fish nets were made in April. Later in the year the bark became "too dry" and "hard". Branches were heated in the fire and a

"chisel" was used to remove strips of bark[1]. The inner bark was peeled from the outer, then it was slit into strips 2 to 3 mm wide. The thumb nail could be used to start a split, which was completed by holding the two new ends with one hand and running the thumb along to slit the remainder. Alternately, the unsplit end could be held in the teeth and the two hands used to pull the two new ends apart. The latter method was often used to make finer widths of bark. Sometimes an awl was used to make the splits in the bark. When Johnny made the net in early June he did not heat the stems before removing the bark.

The strips of bark were moistened (with saliva) by drawing them through the mouth, or they could be placed in a pan of water until ready to use. Then the right hand rolled one end repeatedly up the knee towards the body, while the left hand held the strand, beginning about 15 cm from the end being rolled and slowly working back along the strand as it became twisted. Sometimes a portion 2 to 3 cm long, or an end, was twisted using the two hands. Often during the twisting of a long strand the length of the strand was drawn back and forth over the knee. As each strand was completed, it was knotted onto the end of the last one (see fig. 17)and the ends were trimmed. After each addition the completed twine was wound about the hand, then the end was drawn through the coil and the whole replaced in the pan of water.

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[1] Originally Johnny said "root", but perhaps meant stems, because in April the ground would be frozen and any roots would be very difficult to obtain; branches were used in the demonstration given to us in June.

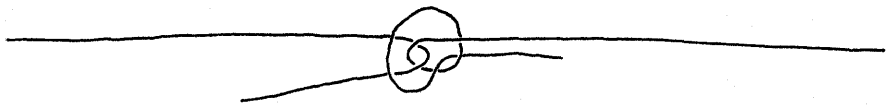


Figure 17. The knot used to join the strands of willow-bark line.

When an adequate amount of line had been made, a shuttle and gauge were made (see fig. 18). The line was wound onto the shuttle as follows: the end of the line was tied around the base of the point made on the inside of the shuttle. The thread then was drawn down around the base of the shuttle, hooked behind the point from the opposite side, then again drawn under the base of the shuttle, behind the point, and so on until the shuttle was filled.

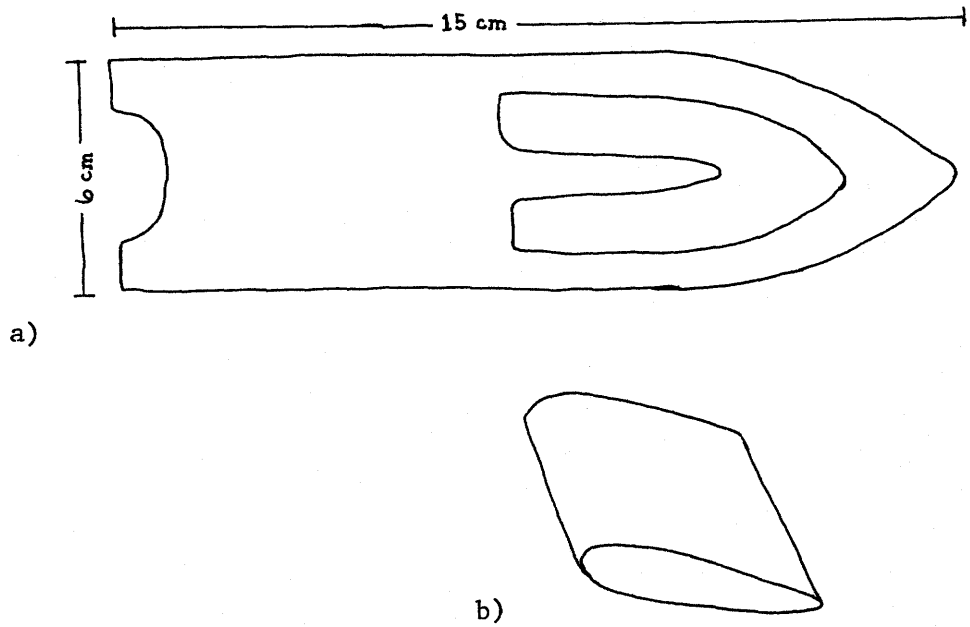
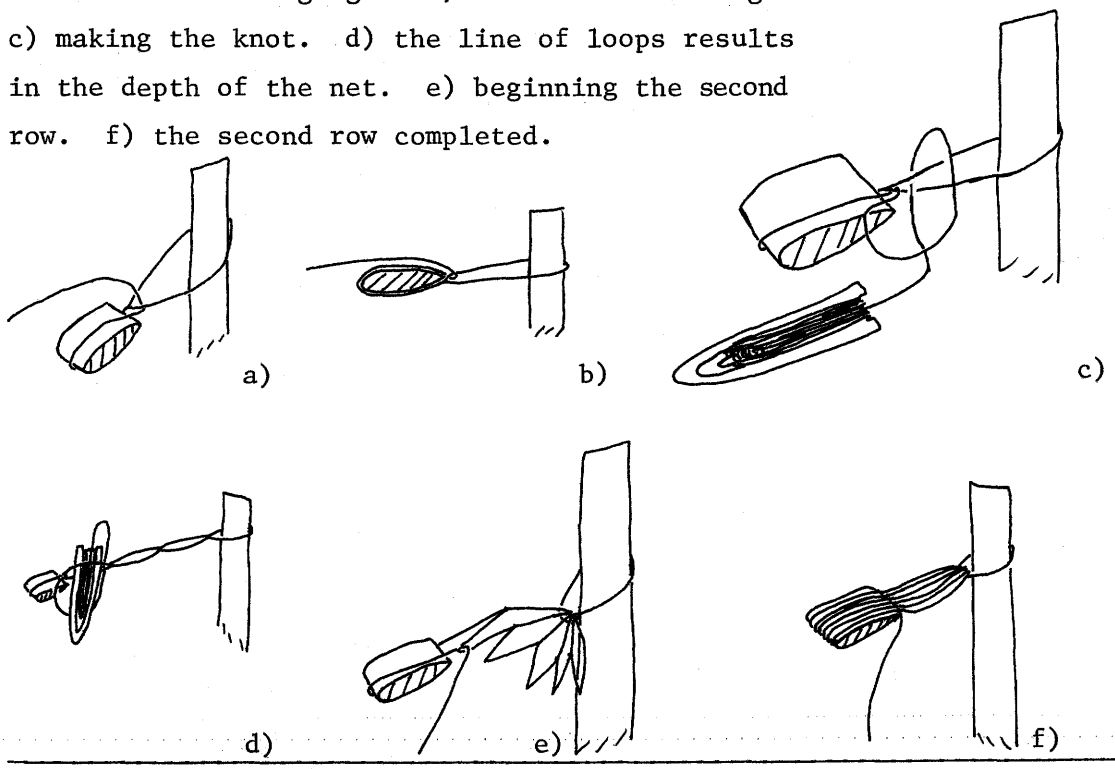


Figure 18. Tools used for netting. Shuttle (a) and gauge (b). The dimensions of the gauge depend on the size of net being made.

Then the netting began. A loop was made in the free end of the line and threaded over a short post (about 30 cm high) that had been set into the ground. The line was wrapped around the gauge, brought through the loop and drawn up so that the end of the loop was at the narrow side of the gauge, which was held away from the body (see fig. 19 a). The thread was drawn back across the gauge and held with the thumb of the left hand.(see fig. 19 b). Then the shuttle was brought to the right, looped to the left over the first loop made, then to the right, through the first loop and over the line coming away from the left thumb (see fig. 19 c). When drawn tight the line then formed a knot about the end of the first loop. The thumb was used to place the knot correctly about the end of the loop, so that there would be no slippage, which would render the net useless.

Figure 19. Steps in netting. a) drawing the thread around the gauge. b) the line drawn tight. c) making the knot. d) the line of loops results in the depth of the net. e) beginning the second row. f) the second row completed.



The gauge was freed and another loop made around it, with the line being drawn through the loop just taken from the gauge and pulled up until the end of that loop met the gauge. The knot was made as before, going around the end of the previous loop (see fig. 19 d). This was repeated until enough loops had been made to make the net the desired depth, then the loops were gathered up and a string was tied through them and around the post. Next the netting worked back and forth along the length of the row of loops (see fig. 19 e). The new loops were retained on the gauge until the row was completed (fig. 19 f). When they were removed from the gauge, the work was turned over and a new row begun using the previous row of loops as the base and always working from left to right. Work was terminated when the net was deemed to be long enough. It was important to keep the material wet by rubbing it with a dampened hand, and the shuttle was repeatedly dipped in the pan of water to moisten the unused line. Bark line broke easily when it was dry, therefore nets that had been rolled up for storage had to be rewetted before they were unrolled.

In an earlier demonstration of how willow-bark line was made Johnny had pulled threads of inner bark from a piece of stripped bark. Each piece was twisted, then two were twisted together. Single pieces of twisted bark were added to the end of each of the initial two by twisting the free ends together. Then the added strands were twisted together. Whether this was an earlier method used, or whether Johnny was unsure of the procedure at this time, and later methods were the result of discussion with others is not known.

5.1.5 The fish weir

In September fish traps were built in the streams. Several men were required for the building of these structures, but large numbers of fish could be caught and dried for winter use. The following description was made of a model made by Johnny Klondike. The first step was to pound four stakes into the streambed. These stakes, placed in a square, held the structure steady as it was being built as well as retaining it in place after. The four stakes held the first two logs put down from being washed downstream. These two logs had been flattened along the top except for a small section at either end. Across them, logs, flattened top and bottom, were placed to make the floor of the trap. They were weighed down with rocks. The sides of the trap were built up using logs notched at their ends so that they fit in log cabin fashion, close enough together so that fish could not escape between them, and the ends were of logs flattened top and bottom, again to allow them to fit closely together. All four sides were made high enough so that they extended above the water. Upstream from the trap a fence of poles was built extending from each shore towards the center of the stream, creating a v-shape which was left open at the apex to admit the sluice-like structure which would convey the fish into the trap. The 'sluice' was made from spruce poles lashed at their ends to two saplings. Each of these saplings was held in a u-shape by means of a babiche cord (or perhaps spruce root) joining its two ends.

When the 'sluice' was fastened into place, fish were funneled into it by the fence of poles, and thence into the trap. Johnny did not tell us by

what means the fish were removed from the trap, except that poles were placed from the shore to the side of the trap to form a bridge to walk upon. Most likely spears or snares were used from the platform thus made.

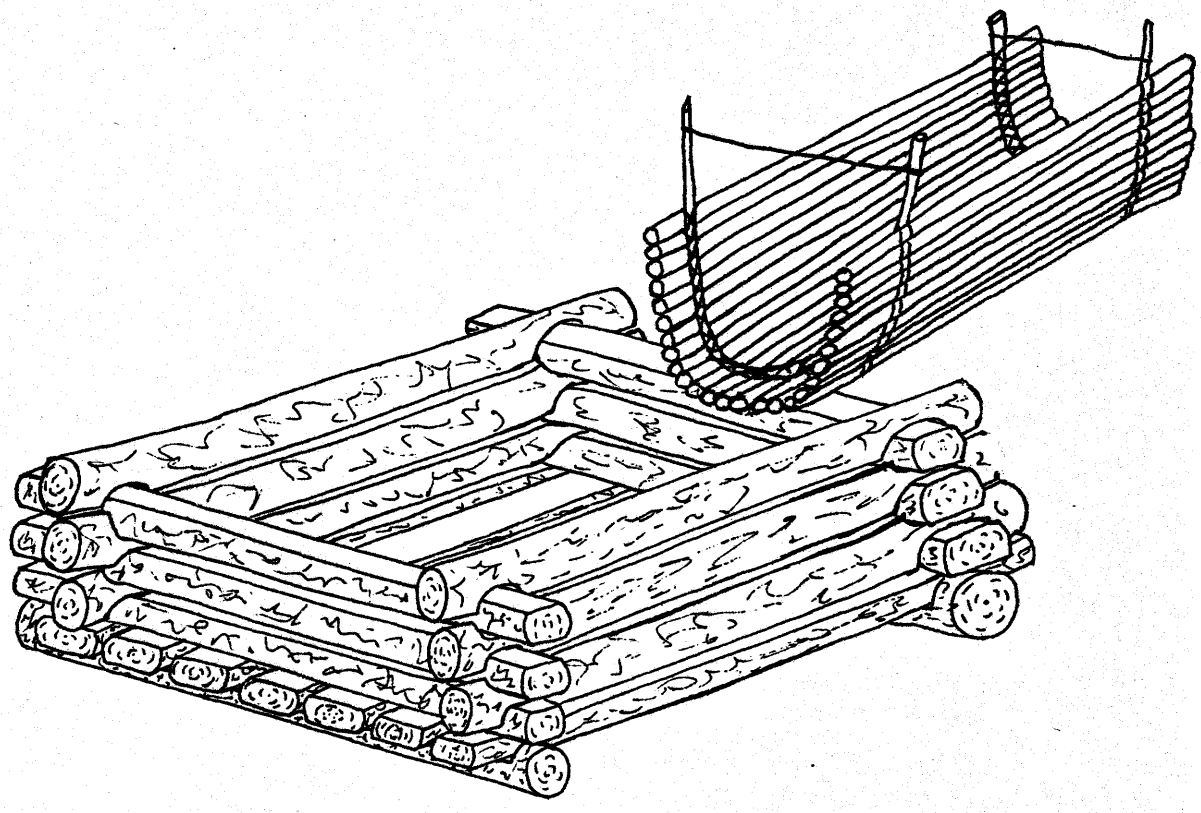


Figure 20. The fish weir.

5.1.6 The deadfall

Johnny demonstrated the construction of a deadfall in much the same fashion as that described by Honigmann (1946). He used small sticks to show us that a circle was made from saplings pounded into the ground. An opening in the side of the circle was left that was large enough to place a large log through. A second log was placed across the lower edge of the opening at a tangent to the circle of stakes. A short post placed upon this second log (the bed log) served to prop up the first (the fall log). The length of this post depended upon the size of the animal to be trapped. A 'trigger' was made from a flattened piece of wood with one end sharpened to hold the bait. The free end of the trigger was placed between the short post and the bed log, so that the baited end was inside the circle of stakes. When the bait was disturbed, the trigger knocked out the post and the fall log dropped, killing the animal. The top of the circle of stakes was covered over with brush and branches to prevent entry to the trap from above. Marten deadfalls were said to have been baited with moose meat.

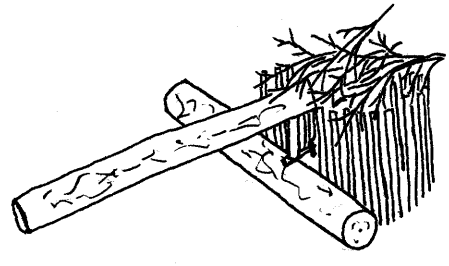


Figure 21. The deadfall.

5.1.7 The mouse or weasel trap

Two green slabs of white poplar about 15 by 25 cm were used to make a mouse trap. One of the slabs had a 3 cm square cut out of each of the corners of one end. The second slab was flattened on the back so that it would lie steady upon the ground. A hole was drilled about 1 cm from one end, midway between the edges of the latter slab, and a twig whittled to make a short peg to be inserted in this hole. The notched slab was placed over the other, flat sides together, so that the notched end was opposite to the peg. A hole was drilled in either corner of the lower slab where the notches of the upper slab exposed the lower one. A peeled branch was curved to a semicircle and its ends inserted in these holes (see fig. 22).

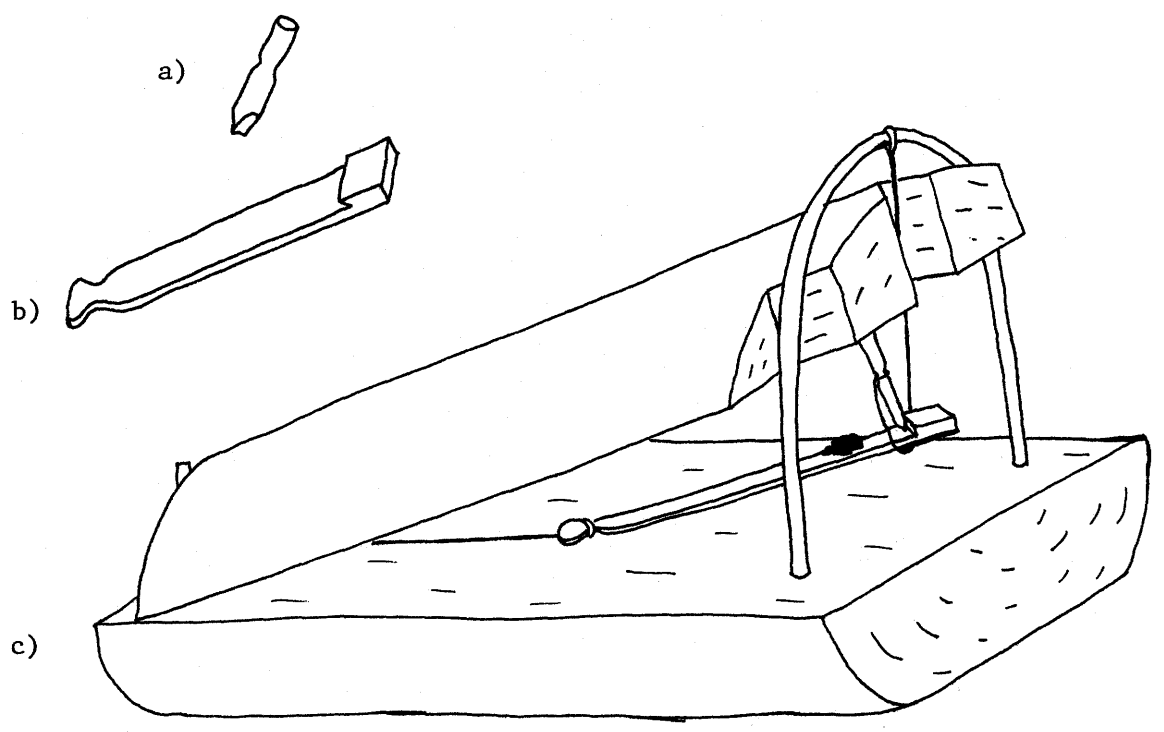


Figure 22. The mouse or weasel trap. a) wedge b) trigger c) the trap completed and set.

To make the trigger a thin piece of wood was cut thicker at one end than at the other. The thicker end was whittled down in thickness except for a few mm at the end which were left at the original thickness. A notch was made in either side near the thinner end (see fig. 22b). A string was tied to the short peg in the lower slab and to the notched end of the trigger. It was adjusted in length so that the free end of the trigger would reach a line drawn between the holes in which the ends of the bent twig had been inserted. A second string was then tied to the top of the arc made by the bent twig, and to its free end was attached a small wedge-shaped peg, notched about the center to accomodate the string (see fig. 22 a). A v-notch was cut in the center of the notched end of the top slab where the string from the arc hung down. The trap was then complete.

To set the trap a piece of grease or bannock was placed on the trigger. The string from the hoop was brought under the free end of the trigger and the pointed end of the peg was put against the edge formed by the thicker portion. The flat end of the peg was set against the top slab. The string was adjusted to the proper length so that the trigger was held at least one cm above the basal slab. The other string helped to hold the trigger in place. When a mouse climbed onto the trigger to take the bait, the peg was knocked out and the top slab fell down. A weasel trap could be made in the same fashion but the proportions were larger.

5.1.8 The bird bow or "stick gun"

First the 'barrel' was made from a piece of poplar sapling about half a meter long. The piece was split in half lengthwise and the core removed from both pieces to a diameter of about 1.5 cm. One half was notched at the center and whittled towards one end to result in a tongue shaped portion extending half the length (see fig. 23). The second half of the sapling had a much shorter tongue because about 20 cm were cut away from the tongue end. In the longer tongue four notches were made a short distance (about 4 cm) apart, with the inner edge of each notch being made perpendicular to the face. With the two halves placed back together (the bases of the tongues and the untouched ends matched), they were notched around their circumference to take the string that was used to fasten them together.

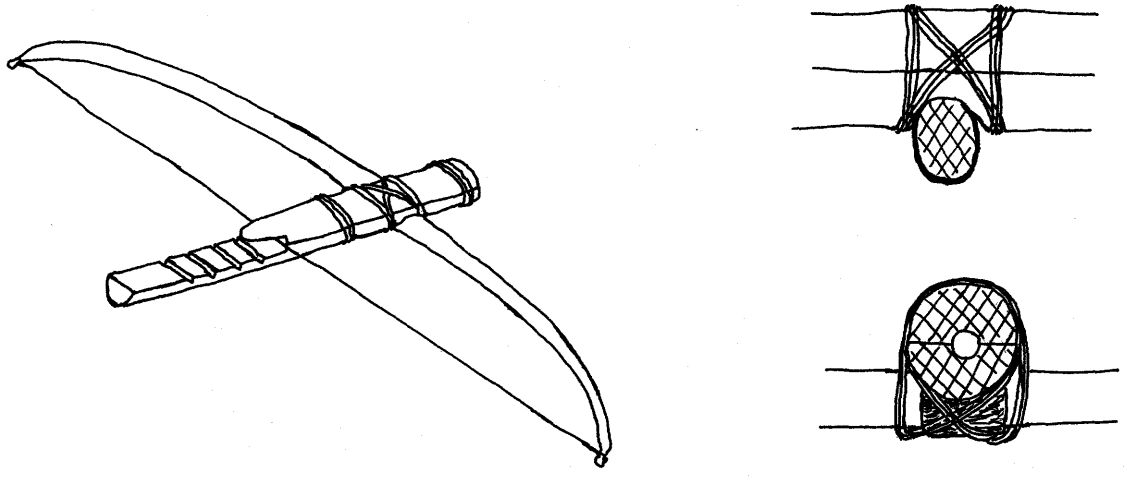


Figure 23. The "stick gun" or bird bow. Detail shows the side (a) and end (b) views of the join of the barrel and the bow.

A piece of alder sapling 5 to 6 cm in diameter was split in half. The half to be used had to be completely free of knots. The split side was whittled down and the piece tested by bending it over the knee. Bark was removed and the outer side whittled smooth, after which the alder piece was bent and strung with babiche like a small bow. A shallow notch was cut in one side at the center to accomodate the 'barrel' previously made. The lower side (that with the longer 'tongue') of the barrel was whittled to fit the notch and a piece of bark was used to wrap the bow before it was bound to the barrel with babiche. The notches were checked for the proper shape and size by 'firing' with no load. The bow-string was pulled back into one of the notches, then released by pushing it up with a thumb on either side.

A green poplar with a diameter slightly smaller than the inner diameter of the barrel was cut into 5 or 6 cm lengths to make pellets for the "stick gun", which was used for shooting "chickens" and squirrels. It was not determined if the use of this kind of bow was aboriginal. Journals of the explorers, and writings of an ethnographic nature do not mention this type of 'weapon' being used by the Slave.

5.1.9 Makeshift snowshoes

This type of snowshoe was made when travel was necessary following a heavy snowfall, and no babiche was available for making the conventional netted snowshoe. Poplar and spruce wood were considered suitable wood to use, but birch was too heavy. When Johnny made a pair of this type of snowshoe

he used spruce. A straight tree between 15 and 20 cm in diameter was cut down, the branches were removed and a piece about 1.2 m long was cut from the base. Two wedges were made from a portion of trunk that was about 5 cm in diameter by making a wedge shape at each end, then cutting the piece in half. A split was begun in one end of the spruce log, using the axe. One wedge was inserted and pounded in to lengthen the split. The second wedge was then inserted into the split from the side and pounded in, causing the log to split in two (see plate VII, photo 4, page 156).

The newly exposed wood of one half was smoothed with the axe and a curve like that on the underside of the front of a snowshoe was made by cutting away the wood from the inside portion of the basal end of the log. The outside of the log was cut away to give an even thickness of about 1.5 cm throughout the length of the wood, the corners were rounded and smoothed and the bark was removed from the sides. To make the second snowshoe the other half of the log was treated similarly (see plate VII, photo 5, page 156). A square hole cut in each snowshoe would accomodate the toes of the wearer, and a slit made a short distance either side of the rear edge of this hole was used to attach the harness. If no moose hide or babiche was available for harness, it could be made of spruce root (see plate VII, photo 6, page 156).

These makeshift snowshoes could be used for sliding down hills if the wearer bent down in a squatting position. If one wished to prevent sliding, as when a heavy load was being carried, the snowshoe was held, front end uppermost, and axe cuts were made on the underside to raise ridges of wood.

5.1.10 The snow shovel

A snow shovel was made from a white poplar about 20 cm in diameter, and nearly 1.5 m long. Most of the length was cut down with the axe and whittled smooth and round for the handle. The shovel portion was smoothed on what was to be the lower side and the top and bottom ends were given a smooth curve. To make the upper side a "canoe knife" (a man's knife) was used to gouge and whittle out the bowl, making what looked like a gigantic spoon. The whole shovel was coated with grease to prevent cracking of the wood.

These shovels were used to remove snow from the ice where holes were to be made for ice fishing. They also served to scoop the broken pieces of ice from the water so that it would be clear to allow the setting of the nets. Other uses were not enumerated.

5.1.11 Birch-bark baskets and other containers

Birch-bark was gathered for the purpose of making baskets in May or June, when it was the most pliable and hence at the best stage for the purpose. A lengthwise cut was made through the outer bark, one end was loosened from the trunk and the whole piece of bark could be turned back and carefully peeled away. If baskets had to be made later in the year, when the bark was "hard", then it was scored on the outer side in areas where it would be bent. Scoring at right-angles created a cross-hatched pattern which allowed the bark to bend without breaking.

For making baskets, the bark was trimmed to the desired size and a cut was made on the inner side, partially through the bark (this cut must follow the grain of the bark, paralleling the edge which formed the circumference) and about 2 cm from each of the two edges.(see fig.24 a, page 186). The portions outside the cuts were then turned against the outside of the bark. Double-ended 'skewers' were prepared from branches of dogwood that were about 7 mm in diameter, by peeling them, splitting them in half (in the same fashion as spruce roots were split, see page 171), and sharpening both ends. One corner of the birch bark was heated over the coals of a fire just until it began to curl. At this point it was pliable enough so that the plain edge could be bent up (towards the inside) and the doubled edge could be bent around it to make a corner of the basket (see fig. 24 b). An awl was used to make a hole through the bark near the end of the doubled over edge and right through the single edge. One end of the dogwood skewer was inserted in the hole from the outside, to secure the corner while the adjacent corner was heated and bent. The other end of the dogwood secured that corner and the sharpened ends were pulled through until the dogwood strip was taut on the outer edge of the basket. A strip of bark of the same width as the folded over edge on the basket was inserted between the corner folds, so that it made a continuous trim with the folded over edge (see fig. 24 c). The awl was used to bore two more holes between the first two, through all thicknesses of bark (and also often through the dogwood). The sharpened ends of the dogwood were threaded through the hole nearest to them and drawn tight. The free ends could then be cut off smoothly at the edge of the basket. The other end of the basket was made similarly, using the other half of the dogwood piece to

to make the second fastening.

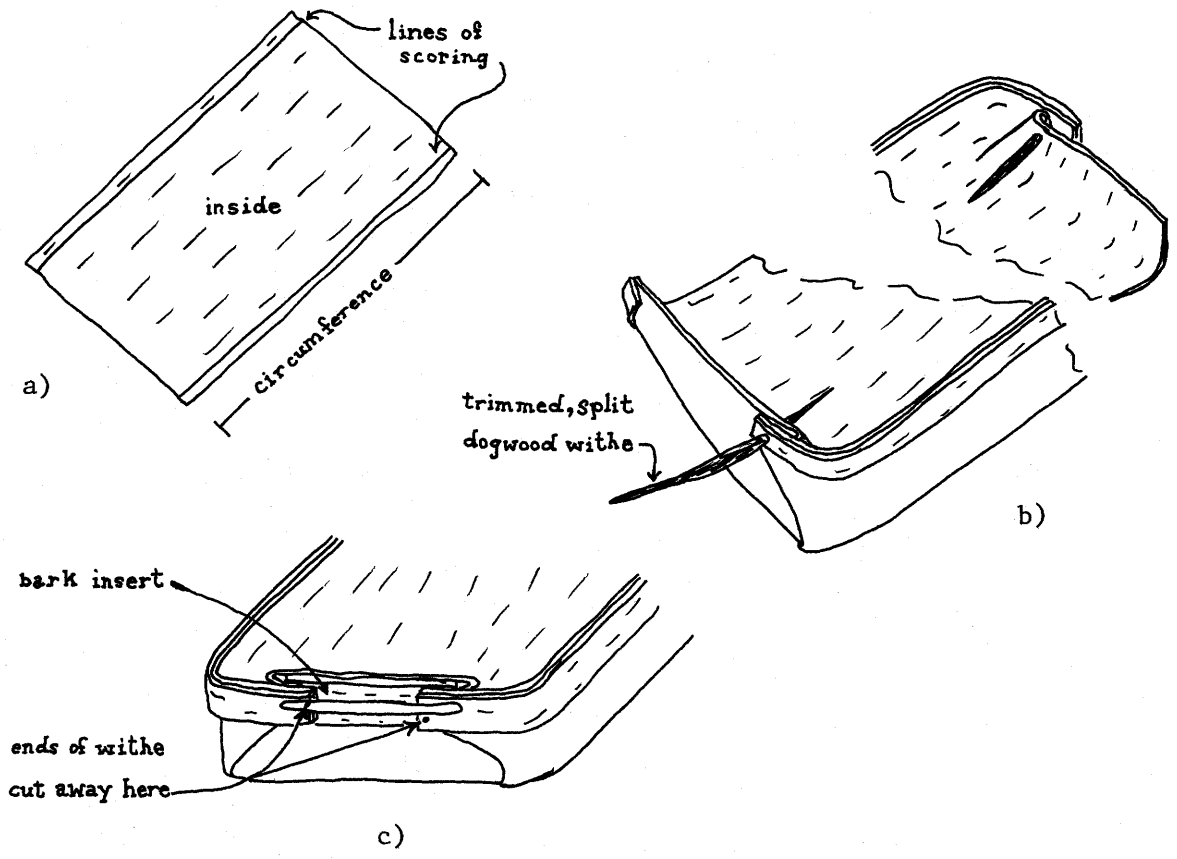


Figure 24. Making a birch-bark basket. a) scoring permits the edge to be folded over for strength and a decorative trim. b) the bark is folded and held in place with a 'skewer' of dogwood. c) the finished end, with the bark insert to make the trim continuous.

These containers could be made more decorative by cutting a toothed edge along the trim which was folded down, before the basket was made (and along the lower edge of the insets for each end), or by decorative sewing with spruce root on the completed basket. The spruce root was peeled and split (see section 5.1.3, page 171)and drawn through holes made with an

awl, to make a decorative stitching around the edge of the basket. The large baskets that were used for tanning moose hides were reinforced around the upper edge by a willow or dogwood withe that was fastened by a stitching of spruce root. Baskets were sometimes treated with a coating of "grease" on the inside, a process which turned the yellow of the inside of the bark to a rich, ruddy brown.

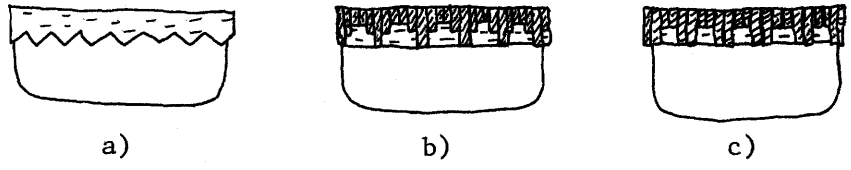
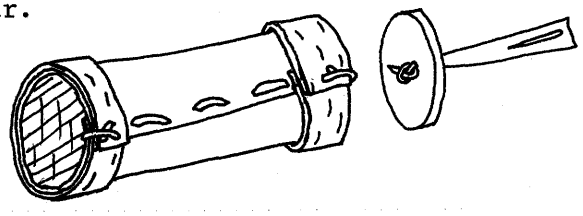


Figure 25. Decorative trims on birch-bark baskets. a) The folded over edge of the bark was serrated. b) and c) Geometric patterns were created with sewing of spruce roots that had been split into thin strips.

Beaver castor containers were made by sewing birch bark into a cylinder with spruce root. The bottom and top were made from discs cut from an alder. A hole bored in the center of the top allowed the insertion of a strip of moose hide (knotted on the underside) used to fasten the container to the belt of the owner. Similar containers were used for carrying medicine in packs.

Figure 26. A beaver castor container. It was made from birch bark, spruce root and alder wood. The moose-hide thong was used to fasten the container to the belt.



The most decorative of the birch-bark containers were cylindrical. Stitching of spruce root fastened the bark in a cylinder, joined to it the circle of bark which formed the bottom and fastened another circle of bark to the top to form a lid. These baskets usually had much decorative stitching, and a handle of moose hide or hide strips and split spruce root woven together.

A simple container was a piece of birch bark which had been folded and the sides sewn together, with one edge left just enough longer than the other that it could be folded over as a lid for the container.

Birch bark was also used, after separating it into thin layers, for wrapping dried medicines, and for making a funnel used to fill the moose bladder containers. Birch bark was also sewn with spruce root into a cone shape to make the "moose call" used in September to attract moose.

5.1.12 Poplar "dishes"

Johnny made bowl-like dishes from discs of trembling aspen which he had cut with a chain saw. The disk was rounded and hollowed out using mainly the "canoe knife" (man's knife). Other 'dishes' made by Johnny, and some made by one of the other inhabitants of Fort Liard appeared to have been made from a section of log split lengthwise. Those made by Johnny had rounded corners and ends, but the others were rectangular with squared corners, a shape which required less of the wood to be removed from the original log. This would more nearly approach the type of dish that

could be made with aboriginaltools than the bowls made by Johnny from the discs of poplar.

5.1.13 The moose bladder container

To prepare the bladder for use as a storage container it was simply filled with air, after any holes in it had been tied off with pieces of sinew thread. The tube was tied off and the bladder was left to dry, after which the tube was simply cut away and the bladder could be folded for storage. Grease, blood or moose brains were stored using moose bladder containers.

5.1.14 Pipes

Pipes were made from green alder wood. One end of a piece about 4 cm in diameter was cut down to a diameter suitable for the inside diameter of the bowl of the pipe. The untouched portion was left as long as the desired height of the pipe bowl. This untouched end was heated a few moments in the coals of the fire. When it was removed from the fire that end was held firmly (Johnny used gloves and a piece of gunny sacking so that he did not burn his hands) while the whittled down portion was twisted and pulled to remove the central portion from the stick. A disc of this central portion was replaced to form the bottom of the bowl. The pipe stem was prepared in a similar fashion from a branch of alder about 1 cm in diameter. It was inserted into a hole drilled just above the floor of the bowl, after first whittling it slightly smaller at that end.

5.1.15 The bone spoon

The innominate bones (which form the pelvic girdle) from a bear were used to make soup spoons. The acetabulum was cut off and the outer curve of the bone was trimmed away with the marrow. The inner projection of the bone was chopped off, the edges rounded and the handle narrowed to finish the spoon.

5.1.16 The bone fish hook

A spruce branch (dry) was cut off with a portion of the trunk. The piece of trunk was whittled down so that only the beginning of the angle which it formed with the branch remained. A fibula (the slender outer bone of the lower hind leg) from a bear was cut down until it was quite thin, a piece 3 to 4 cm long was cut off, sharpened on one end and rounded on the other. The rounded end was inserted into a split made in the basal end of the spruce branch that had been made ready. To bind the pieces together babiche was looped around the split end of the branch then wrapped in figure eights around the bone and the branch where they met; finally it was looped around the bone only and fastened. A moose hide strip, bound to the branch with babiche, served to fasten the hook to a line. If no bone was available, the point of the hook could be made from a sharpened twig of dry spruce.

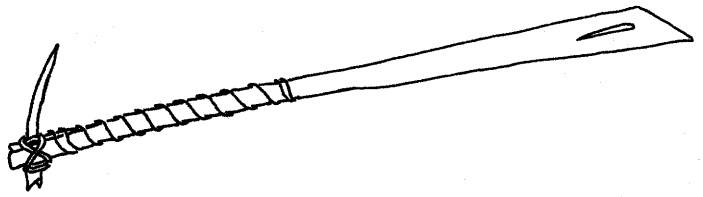


Figure 27. A bone fish hook.

5.1.17 Slipper moccasins

The vamp of a moccasin was cut in a u-shape that was slightly narrowed at the base. Any fancywork done on the vamp was added before the moccasin was sewn together. Originally decorations were made with porcupine quills and moose hair, but since European trade goods became available glass beads and blanket cloth have become the commonly used trimmings. Blanket cloth sometimes covered the vamp entirely, and beadwork was in floral patterns with the background often completely filled in with beadwork as well. Beads were strung on one thread while another thread sewed through the vamp and around the first thread to tack it down.

Formerly the patterns were marked on the moose hide with the red juice from the fruit clusters of strawberry blite (*Chenopodium capitatum*), and were designed using a thin layer of birch bark from which small pieces were bitten after it had been folded. Now the pattern is often drawn on a piece of paper with a pen, or the design cut from folded paper with a pair of scissors.

The lower part or sole of the moccasin was also u-shaped, but it was not narrowed at the rear edge; its size depended upon the size which the finished moccasin should be. When the vamp was sewn to the sole a strip of moosehide about 2 cm wide was inserted in the seam between the smoked sides (which would form the outside) which were innermost. The sole was eased to fit the vamp, so that a greater length of material would be sewn into the seam and thus form the toe of the moccasin. The seam was sewn with sinew that was threaded through holes made with an awl through the three thicknesses of leather. Since the thread was always inserted from the same side, it overcast the seam. The completed seam and the point where the sole would be folded were moistened with water before the moccasin was turned right side out. The teeth were used to bite and flatten the fold around the toe end where the sole turned up to form the sides, after the toe had been turned right side out. The extending portion of the inserted strip of moose hide was trimmed close to the seam.

After the sole had been checked for length a portion was cut from each corner at the rear end, slightly more than a third of the way in from the sides, so that the center flap left was about the width of the heel. The smoked sides were placed together and the seam was sewn to the edge of the portion left uncut. The extending portion was then cut off, curved slightly outward at the center so that the back portion would meet smoothly with the sole. The seam was sewn from the inside and then turned out.

Fur trim was added by sewing the strip along one edge (fur side next to the unsmoked side of the moose hide) to the edge of the moccasin, then folding it over about 1 cm from the sewn edge and tacking it down along the free edge on the outside of the moccasin. Blanket cloth is now often sewn on in the same fashion extending underneath and lower down than the fur trim.

5.2 Artifacts described

5.2.1 Bending birch wood for snowshoes or toboggan

Wood from a freshly cut birch was split, using wedges, into sections about the length and thickness desired, and smoothed with the axe. The wood was warmed over the fire and then smoothed and trimmed with the "canoe knife" (man's knife). The portion which was to be bent was dipped into boiling water and then was bent "between tree" until it was "not hard". (This appeared to mean that the board end was placed between two adjacent trees which acted as a vice while the other end was pulled until the wood began to take on a bend.) Using further treatments of hot water the end was bent up and tied in position using "sticks" on either side, and tying the wood in the correct position with cord. In making snowshoes the sides of the snow shoe were first joined at the ends so that they were bent together, but the toboggan boards were bent separately. After they had dried the three toboggan boards were joined with five cross bars, one at the head and four along the length. Toboggans were covered with moose hide. Snowshoes were webbed in a similar fashion to that described by

Honigmann (1946).

5.2.2 Moose-hide boats

Although Johnny did not describe in detail the construction of moose-hide boats, he made some comments about them. The frames were made of wood and the moose hides, sewn together to make the covering, were lashed on around the rim of the frame. The only one of these boats made by Johnny for the F.L.A.P. collection that was seen by the author had been exposed to wind, rain and sun and the moose-hide covering had shrunk beyond repair, so that the method of construction was not determined.

Up to 12 hides were used in the construction of these boats, which apparently were used mainly for downstream river travel. Johnny stated that the person paddling such a boat sat with his back toward the direction of travel, like a rower. The paddle was used like an oar, with the raised knee serving as a fulcrum and the hand as an oarlock. The other hand drew the end of the paddle back and forth like an oar.

5.2.3 The aboriginal axe

A rock blade, for which the method of shaping was not described, was hafted into the end of a "stick" handle by splitting one end of the stick and inserting the rock in the split. The end of the stick was then tightly lashed with leather and babiche, the leather encircling the split, and the babiche binding it in place. Instead of swinging this type of

axe, a pushing motion was used against the trunk, with wood being chipped from both sides of a tree.

5.2.4 Babiche

Usually two men worked together to make babiche, but Margaret helped Johnny when he cut hides into cordage. A hide which had been fleshed and scraped free of hair was placed in water to wet it. The hide was cut into halves and one half was cut at a time. One man held the skin taut while the other began at the center and cut around the hide in the desired width. The thicker hide was used to make wider babiche, with the thinner hide being used for narrow babiche. The long strips of hide were tied between trees to dry. Johnny was observed tightening strips of babiche periodically as they dried. If the babiche was moistened before being used it would give a tighter binding, as it would then shrink somewhat upon drying.

5.2.5 Sinew thread

Sinew was taken from between the muscles that run the length of the backbone and hung in a tree to dry. Moose or bear sinew was used. When dry, the strips of sinew were rubbed between the hands to loosen the fibers. Strips 1 or 2 mm wide (individual fibers?) were split away, moistened and twisted into thread upon the thigh in the same fashion that the strips of willow bark were made into line for fish nets (see page 172).

5.2.6 Clothing

Johnny described the aboriginal clothing while Willie McLeod interpreted for us. Clothing was made from moose hides. The upper garment was referred to as a "coat", while leggings reached to the upper thigh and each was fastened with three lines to a belt about the waist. The breach-clout (Willie referred to this as a "moss-bag") was also drawn under this belt at the front and back. In winter the moose-hide clothing was lined with furs from red squirrels or artic ground squirrels.

Johnny also frequently mentioned the "mitts" of bear fur that were worn in winter (beaver, muskrat, fisher or marten could be used also) and the strips of rabbit fur that were used to line mitts and moccasins in winter.

5.2.7 Moose-hide sleeping blanket

Hides were sewn together along their sides and duck feathers were placed between them. Leather ties were sewn along the sides so that the edges could be fastened together after the blanket had been wrapped about the body. These blankets were used in winter and were said to be very warm.

5.3 Processes observed

5.3.1 Fleshing and scraping a moose hide.

Jane Klondike was observed fleshing a moose hide. The hide was centered

flesh side up over a tree stub that was about 1 m high. The flesh was moistened with water by dipping a hand into a pan of water and then rubbing it over the hide, or by pouring a small amount of water over the hide and distributing it with the hand. Beginning on one side at the top of the post, the ulna flesher (see fig.28a)was brought down with a chopping motion on the hide. When the flesh began to peel away the chopping worked back and forth across the section facing the worker, loosening a sheet of flesh. The free hand grasped the hide at the point being worked upon, with the thumb being used to help roll the flesh away from the hide. Periodically the hide was remoistened. Working back and forth across the section facing her, the woman peeled the flesh away till the portion she was working upon was too near to the ground for comfortable working. Then the hide was lifted up and the fleshed portion placed at the top of the stub. The fleshing continued until the strip of flesh was removed at the edge of the hide. Sometimes a knife was used to separate the flesh from the edge of the hide. As each new section was completed the hide was recentered and a new section begun until the flesh was all removed. The hide was then ready to be laced into a frame where it would be dried and scraped free of hair.

Four spruce poles were used to build the frame. A support made from a cross pole and two poles with forks about 1.5 m high was made from poplars and was leaned against two trees which were about 3 m apart. The upper end of the frame was leaned against the cross pole. Before the frame was put together, slits were cut around the edge of the hide about 3 cm long and 1 or 2 cm from, and parallel to the edge. These slits were cut

about 20 cm apart and in all corners. The rear edge of the hide was measured with a piece of cord and its width marked with a knot in the cord. The side poles of the frame were leaned against the support, set at a distance apart of about 60 cm greater than the measured width of the hide. The top pole was tied to each of the side poles with a slip knot and several wrappings of string. These strings were then threaded through the slits in the rear corners of the hide and pulled tight so that the hide was raised up, hair side uppermost, and was pulled taut between the poles. The free ends of the strings were tied to the side poles while a third string was tied at one side of the top pole and laced alternately around the pole and through the slits in the rear edge of the hide. Then the strings at the sides were laced around the side poles and through the slits in the sides of the hide to about three quarters of the length of the hide. Here they were tied while the fourth pole was added to complete the frame. The front of the hide was pulled forward to measure its length and the lower pole was tied to the side poles about 25 cm lower than the hide extended. The hide was laced across the front edge so that it was taut, then the lacing was completed down the sides. A knife blade was used to scrape any adhering hair and excess moisture from the underside of the hide before it was left to dry overnight. The angle which the frame made with the ground was about 50 degrees. (A piece of plastic was placed over the hide at night. It was not determined if this was to prevent dew or rain from dampening the hide or if there was another reason.)

The hide was tested for dryness by feeling the underside with the palm of

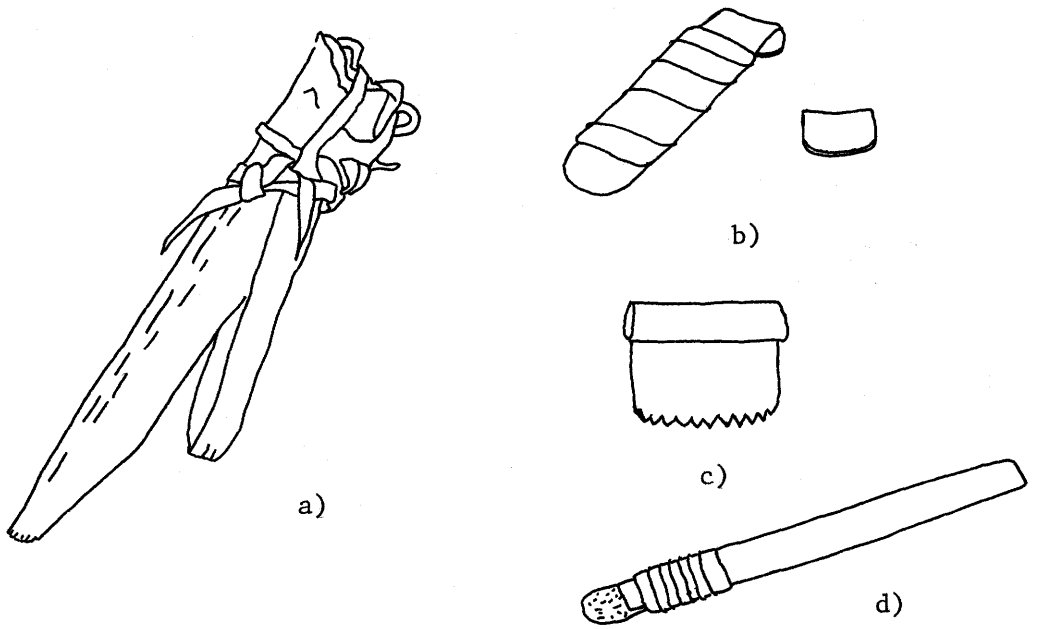
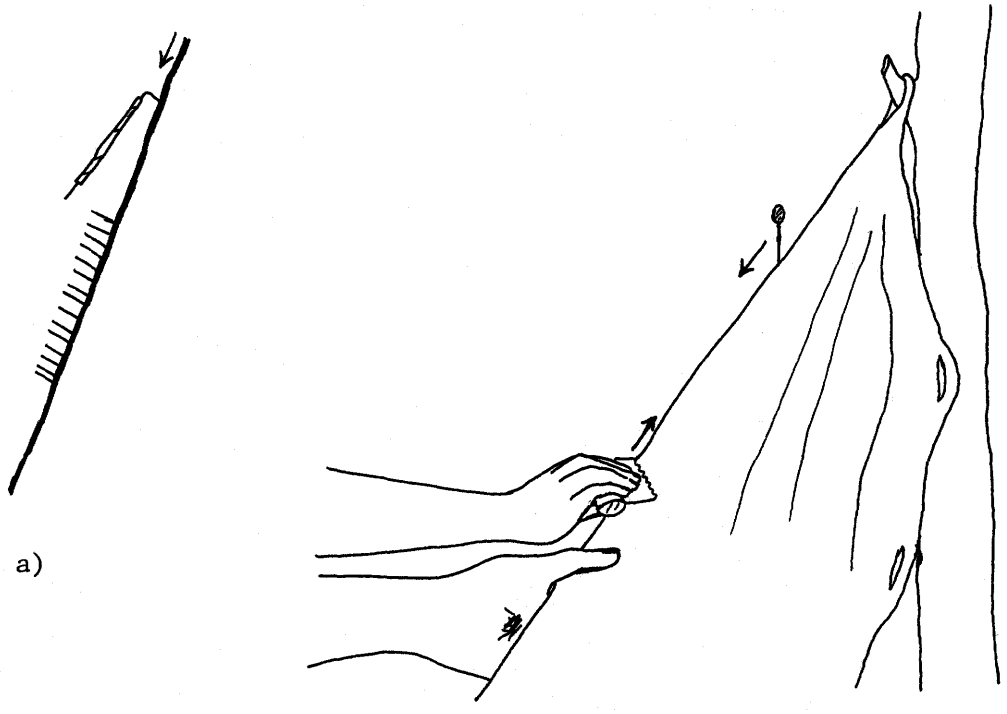


Figure 28. Tools used in fleshing and tanning moose hides. a) ulna flesher. b) angle and side views of metal scraper. c) toothed scraper. d) tsǐ θo used in the final processing.

the hand. If it felt cool, this meant the hide was still too damp to continue processing. When it was deemed dry enough the hair was scraped off with a metal scraper (see fig. 28 b). These scrapers were made from a bar of metal about 4 cm wide, just under 20 cm long and about 3 or 4 mm in thickness. One end was curved at right angles about 2 cm from the end by heating that end in the coals of the fire, then placing it over a rock and hammering it over until it had the desired curve. The edge of the curved end was slightly rounded and was honed to a very sharp edge. On one scraper the ends of the metal bar had been bent opposite ways to give a scraper with two blade edges. A piece of cloth or leather was wrapped and bound about the central portion to make the scraper more comfortable to handle.



a)

b)

Figure 29. Applying the tools (metal scrapers) used in dehairing and softening the moose hides. a) The blade of this metal scraper was held at nearly 90° to the hide when it was used to scrape the hair away. b) The toothed scraper was used as the hide was removed from the tanning solution. It was kept at an angle about 50° to the hide.

The frame was moved upwards on its support so that it was nearly vertical. Standing in front of the hide the worker held the scraper in both hands and pulled the blade down along the hide to remove the hair. The blade was kept at nearly a right angle to the hide. When the hair was removed the hide was further scraped so that the epidermal layer containing the hair follicles was also removed. As this scraping progressed the hide

turned from a greyish color to a yellowish white. The scraping appeared to also have the effect of loosening the outer fibres of the skin. At times the longer, thicker hair (especially in the area over the back of the neck) was cut away near its base using a sharp knife. This made scraping of these areas easier. When the lower two thirds of the hide had been scraped free of the hair the frame was turned over so that it was easier to scrape the hair from the rear portion of the hide. When the hide had been completely scraped and reworked it was taken from the stretching frame. It was then ready to be tanned or made into babiche.

Johnny showed us a small piece of raw moose hide, to be used for the making of a drum, from which Margaret had scraped the hair with a bone scraper. The scraper was a half (lengthwise) of the portion of the ulna between the joints which is of about uniform thickness. The hide had apparently been placed over a short peeled log (about 60 cm long) which was leaned against a tree. The scraper was drawn over the hide where the log formed a base, scraping away the hair.

5.3.2 Tanning a moose hide

The fleshed and scraped hide was soaked in water before the tanning process began. This was done by placing it in the lake, with stones to hold it down, and leaving it thus for several hours until it became completely saturated. The tanning solution was prepared in a large birch-bark basket (or nowadays a metal tub) that had been reinforced around the upper edges with willow or dogwood withes. To hot water

placed in the basket was added about one cupful of moose brain. This was done by placing the brains on a square of burlap and folding them into the center. The burlap was then rinsed through the water and wrung out several times. This procedure allowed the brains to be 'dissolved' into the water without adding any of the membranous matter, which was retained by the burlap. In the absence of burlap, and aboriginally, a bundle of soft-leaved sedge (*Carex disperma*) was used. The folded hide was placed into the solution and kneaded to ensure thorough wetting with the solution, then it was left to stand overnight.

The next day some of the tanning solution was removed from the tub and reheated. The edges of the hide were stretched and scrubbed between the knuckles to work in the tanning solution. The heated portion of the solution was readded and the hide was worked around and kneaded in the solution again. Next the basket was placed beside a tree to which a birch sapling or branch had been tied. The birch was chosen which had many branches so that when these branches were cut off about 5 cm from the trunk they formed a series of pegs about 50 cm apart. Once one of the young boys was sent up into a birch tree to cut off a large branch to be used for this purpose.

One corner of the hide was hung by the slit in the edge to a peg about one m from the ground. Another type of metal scraper was now brought into use. It was about 7 cm by 5 cm in size, with one of the long edges embedded in a wooden handle, which was made by splitting a short piece of a sapling (about 2.5 cm in diameter and 8 cm long) along one side for

the insertion of the blade, and trimming it to better fit the hand. The working edge of the scraper was toothed like a saw blade and the corners were rounded slightly and also toothed (see fig. 28 c). Grasping the hide in one hand about one half meter from where it was hung, the woman worked the scraper up and down the taut hide with the other hand. The blade angle was changed with each change in the direction of the scraping so that it always angled at about 50 degrees into the hide (see fig. 29). When the portion of the hide that was lifted out of the solution had been worked from one edge to the other on both sides the hide was sometimes scraped crosswise or was stretched between the hands. (It could not be ascertained what determined when the hide was thus worked crosswise, as it was not done for all parts of the hide.) When the edge of the hide was being worked the slits were used for holding it taut. The hide was raised upwards and hung from the next peg higher on the birch pole, to expose a new area of the hide, which was then worked. This was repeated until the hide could be hung no higher. Then the worked portion of the hide was draped over the edge of the basket onto the ground (a piece of plastic was placed beneath it to keep it from getting dirt and leaves upon it; likely branches were used aboriginally). A slit in the side of the hide was hung on one of the pegs and the scraping process was repeated until the complete hide had been worked on both sides and removed from the tanning solution. The scraping of the hide with this toothed metal scraper seemed to work the tanning solution through the hide and loosen the fibers.

The edges of the hide were folded inward so that the corner slits matched

up with the next slit over from the corner. Then the hide was folded lengthwise and a peeled birch pole (about 4 cm diameter) was threaded through the slits in one end. The slits on the other end were threaded over a sharpened tree stub about one m high. The hide was partially wrung by squeezing it with the hands, then it was twisted to the right, using the pole, until it knotted up against the stub. The birch pole was wedged against the stub to hold the hide in this position for about two hours. Periodically during the twisting the hide was pulled between the stub and the pole, stretching it. After the waiting period the hide was untwisted and retwisted in the opposide direction to be left another hour. Each untwisting and twisting process was accompanied by periodic pulling of the hide.

Next the hide was unwound and removed from the stub and pole. The slits along one side of the hide were threaded over the stub and the hide was stretched out. Stretching always seemed to begin at the right hand with the edge which had been placed lowermost on the post. Holding on by the slits in the free side of the hide, the worker pulled the hide. Twice he worked across the length of the hide, then it was again removed from the stub, the front edge was threaded over it and the hide was stretched across its width. The second side was then threaded onto the stub and the hide was pulled again across its length. Stretching and pulling of the hide was probably important in the general loosening of the fibers, but may also have been done to prevent the hide from shrinking as it dried.

Now that the hide had been wrung out and stretched it was hung to dry,

flesh side up, with its length along a rough spruce pole supported against two trees by two forked poles about 1.3 m high. To aid drying and to soften the hide it was worked with the curved metal scraper. One hand held the lower edge of the hide while the other drew the scraper down in long strokes from below the support log to as far down as the arm could reach. When a portion had been scraped thus, the hide was repositioned so that other areas could be more easily reached and so that the strip that had been over the pole could be worked.

When the whole hide had been worked with the scraper it was taken from the the pole, the slits in the side were threaded over the tree stub used before, and the hide was pulled and stretched perpendicular to the direction in which it had just been scraped. It was then replaced over the pole with the outer side up and rescraped. Again it was stretched, this time both across the end and along the side. When it was replaced on the pole, the length of the hide was put across the pole and not along it as before, and the flesh side was again placed up. After scraping, it was turned over, placed lengthwise again and rescraped. Twice more threading it over the tree stub, the hide was stretched lengthwise and crosswise. After it had been left an hour to dry this scraping and stretching process was repeated. If any ribboning occurred on the hide the loose pieces were cut away with the scraper.

If the hide was not deemed soft enough it was smoked on the flesh side for about an hour, folded, resoaked and worked in the tanning solution, then wrung out, stretched and dried as before. Some confusion was

experienced after initial observations with regard to which side was smoked first, but in later observations of the tanning process it appeared that the flesh side was smoked before a second treatment in the tanning solution, and the hair side was smoked as a finishing step.

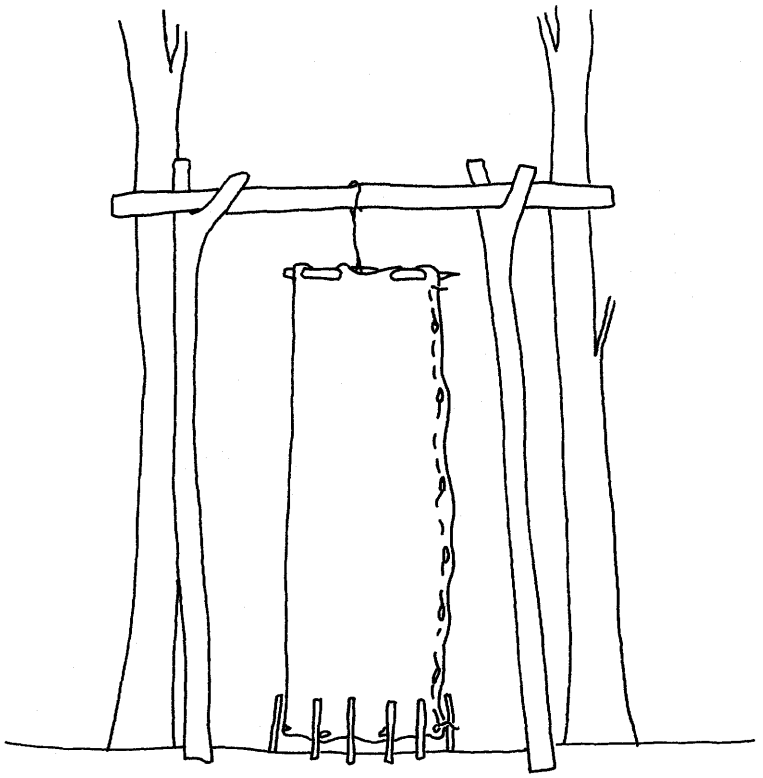


Figure 30. A moose hide hung in position to be smoked.

For smoking it, the hide was folded lengthwise with the side to be smoked on the inside. The sides and one end were loosely basted together. A stick (usually the same one that was used for wringing out the hide) was threaded through the slits along the end that had been basted. By this stick the hide was hung to a cross-pole that was held up against two trees by forked poles placed at either end. The hide was raised up until it was a very short distance above the ground at its

lower edge. A circle about 70 cm in diameter was made from sticks at the base of where the hide was hung. The sticks were on an average about 50 cm high when they had been pushed into the ground. Coals were placed in the bottom of a bucket and broken pieces of punk, bark and spruce cones were added to produce a heavy smoke. The punk could be from spruce, white poplar (trembling aspen), or alder, but was often a combination of the three. The pail was placed in the center of the circle of sticks in a shallow pit that had been dug to receive it, and the hide was draped around it. Any tears or holes in the hide were stuffed with moss. The hide was left thus for one or two hours. If it was to be put into the tanning solution again the basting was removed and the hide was folded with the edges in the center.

After the scraping and stretching process, when the hide was still damp, a final processing was done with a long-handled, stone-bladed scraper called a tsī θo. This process was said to soften the hide and make it less "thick" when it was too hard. It also served to stretch the hide, making it so that it would not stretch after clothing or moccasins were made ("moccasin no get big"). About half the width of the hide was wrapped about the spruce pole used for the scraping and drying. A second pole was fastened between the two trees against which the supports were leaned, and upright poles were placed a short distance on either side of the edges of the hide. This made a frame (when the poles were lashed together where they met) into which the free half of the hide was laced, using the slits in the edge of the hide.

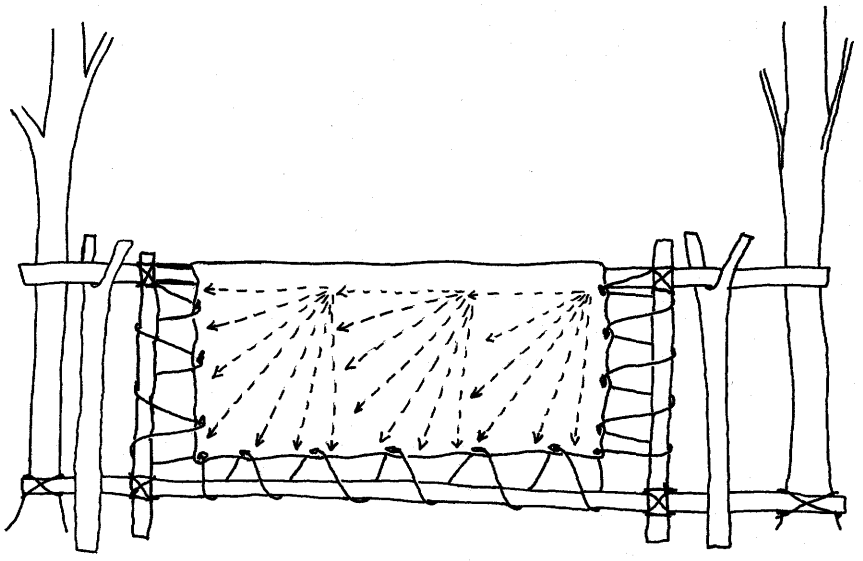


Figure 31. A moose hide lashed into a frame for the final processing with the long handled scraper, the tšī θo.

The scraper (tšī θo) was made by hafting a flat stone, about 10 cm by 6 cm by 2 cm, into a peeled black spruce sapling 4 cm in diameter and about 1 m long. The stone had previously been given a blade edge by pounding it against a larger rock. The split end of the handle, and the edges of the stone at the point of hafting were covered with a piece of leather and tightly bound with babiche.

Scraping began at the top right hand corner. One stroke length was scraped in all directions from the beginning point. Beginning at the point where the first horizontal stroke ended, this was repeated (see figure 31 , the dashed lines indicate the directions of the strokes). Lacing was tightened as necessary. When the side had been scraped completely

across, the lacing was again tightened and the hide was scraped in the reverse direction. The other side of that half of the hide was similarly worked. Either one of the metal scrapers was used to scrape off any ribboning that occurred on the hide, resulting in a smooth even surface. When that half of the hide was done, it was unlaced and the second half was unrolled from the pole. The worked portion was then rolled onto the pole and the other half laced into the frame and scraped with the tǰī θo.

When the processing had been completed, the hide was basted with the outer side in and smoked. The edges with the slits were then trimmed off and the hide was ready to be made into moccasins and other items of clothing.

5.3.3 Fleshing the bear hide

Maryanne Bertrandt (nee Klondike) fleshed a bear hide for making mittens. The method used differed slightly from that previously described for a moose hide. A pegged pole made from an alder was used instead of a tree stub. Beginning at the head end a knife was used to peel away the flesh at the edge of the hide until a large enough portion was fleshed to allow a slit to be cut 2 cm from and parallel to the edge, so that the hide could be hung from one of the pegs and fleshing could continue with the ulna flesher (after the same fashion as it was used on the moose hide). Additional slits were made in the edge as needed to raise the hide to a comfortable height for working. When all the flesh had been removed, slits were made parallel to the edge about 10 to 15 cm apart. Maryanne

Plate VIII. Some steps in the processing of raw materials.

1. Strawberry blite, Indian - paint, or in Slave "beaver berries" (*Chenopodium capitatum*) was used to mark designs on moosehide.
2. Gathering punk for smoking a moose hide.
3. and 5. Johnny Klondike demonstrating the peeling of alder bark to obtain the inner bark for making dye.
4. Maryanne Bertrandt fleshing a bear hide with an ulna fleshing tool.
6. A bear hide laced in a frame to dry before being sold.


1


2


3


4


5


6

cut away a portion about 2 cm wide at the ends of the legs to remove slits that she had made there during the fleshing, and made new slits in the corners. The hide was then bound into a frame in a similar fashion to that used for a moose hide, hind end uppermost and fur side up. Portions were cut from the lower side of the neck to give a straighter edge. The hide was left in the frame to dry. Johnny stated that hides of bears should be rubbed with burlap as they dried, to remove the grease that developed on the surface. Further treatment of the hide was not observed. The hide that is pictured on page 211 (Plate VIII, photo 6) was to be sold, therefore the skin of the head and the feet were left attached to the hide when it was skinned.

5.4 Processing described

5.4.1 Treatment of other hides

None of the informants seemed to know of a native treatment for softening beaver and muskrat hides. They can now be softened by treating with baking soda and scraping, according to Johnny. Willie McLeod said that soap or shampoo may also be used.

Bear hides had to be scraped with a knife and rubbed with gunny-sacking to remove grease as they were drying. Likely grasses, sedges or moss were used before gunny-sacking became available, but Johnny did not seem to know. Johnny remembered some kind of a black powder that was formerly put on bear hides during drying, as salt is sprinkled on them

now. At one time Johnny stated that bear hides were tanned the same as moose hides (with brain solution, scraping and smoking). Another time he said they were softened like beaver hides, using baking soda. Willie interpreted Johnny as saying that bear hides were tanned using smoke and marrow. After they had been put in water they were scraped to soften them.

Sheep hides were said to have been treated the same as bear hides.

5.4.2 Blankets of hare skins

"Rabbit" fur was cut into strips for the purpose of making blankets. The hares were case skinned[1] and the fresh skins were cut into long narrow strips by beginning at the ears and cutting spirally down and around the cylindrical shape of the fur. These strips were wound around a stick and left to dry. The dried strips were first twisted and then 'netted' into pieces large enough to serve as blankets. Johnny stated that the method for constructing the blankets was the same as that used in the making of fish nets (see page 174), however he did not give an idea of the size of the shuttle and gauge necessary (or if they were indeed used) for netting hare-skin line, nor did he mention how the strips were joined together.

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[1] The usual method is to cut the skin around the legs above the foot pads, then slit it down the inside of the hind leg and across to join the slit from the other hind leg. The anus is cut free from the rest of the skin, and the hide is peeled away from the legs, turned inside out as it is peeled from the rest of the body, the forelegs and the head.

Honigmann (1946), in speaking of the Fort Nelson Slave mentioned the "plaiting" of skins of rabbit, beaver and lynx with the "use of a bow frame, fourteen inches wide". Osgood stated that among the Hares clothing and blankets were "woven from twisted rabbit skins" (1932:45). Richardson (in Franklin, 1852:249), in speaking of the Hare Indians, stated that hare skin "being too tender to be used in the ordinary way, is torn into narrow strips, which are then twisted slightly, and plaited or worked into the required shape." The exact method of construction did not seem to be known. Whether Johnny was describing it correctly could not be verified by requesting that he or Margaret give a demonstration, because snowshoe hares were extremely scarce in the area during the period of field work.

5.4.3 Dying porcupine quills and quill embroidery

Porcupine quills were dyed by placing them in boiling water with the material used to make the dye. Dyes were made from wood with algal growth on it, a kind of "grass" ("loon-owl grass"), the inner bark of alder or young birch, small green cones from black spruce or the red fruit clusters from strawberry blite.

To prepare the quills for embroidery they were flattened by drawing them between the teeth, holding one end with the thumb and forefinger. The quill was then laid down on the moccasin vamp or the yoke of a jacket, sewn over near one end with the sinew thread, then turned back so that it covered the stitch. The quill was bent over after every stitch of the

sinew over it so that it covered the sinew. Additional quills covered the ends of the previously stitched ones. Jackets, moccasins and head bands were decorated with embroidery of porcupine quills.

CHAPTER 6. CHARACTERISTICS OF UTILIZATION OF THE FLORA

6.1 Efficiency of utilization of plant species

From information published on other tribes, and from general works on medicinal, edible and otherwise useful plants it was possible to determine what percentage of the 362 species recorded for the area were potentially useful. When this was compared with the plants used by the Slave there was a good deal of overlap, but also there were a number of potentially useful species that the Slave did not employ. The Slave also used a number of plants in ways not described for other people. This information was summarized in Table 5.

Potential usefulness of plant species occurring in the area is presented in Tables 6 and 7, along with the uses made by the Slave. Only two introduced species have been included in the tables, and those two only because they may have been used by the Slave (according to Johnny). No introduced species have been used in calculations of percent efficiency (in Table 5), and none of those species for which it was not positive that they were used by the Slave have been included (these are denoted in Tables 6 and 7 by question marks). Species which may have been used in recreation, or for charms have not been included because extreme variation exists in these areas of useage.

The first analysis of efficiency (for which the information is presented in Table 6) considers use in the broad categories of food, technology,

medicine and miscellaneous (including such things as smoking materials, cosmetics, etc.). A more detailed analysis (for which the information is presented in Table 7) is carried out for the category food, but this was not feasible for the other categories due to the extreme variation within them. (However a few comments on similar uses in technology and medicine would seem pertinent.)

Out of 93 species of potential food plants the Slave employed 44. In addition 5 other species were used (two more, said to be eaten on some occasions when the question was asked, and at other times said to be not eaten, were not included in the calculations). This yields a figure of utilization of about 50 percent of available food species (see Table 5.1).

Twenty of the species found in the area were listed as useful in technology. The Slave used six of these plus eight others. This gives an approximation of 50 percent of available species being utilized in technology (see Table 5.1).

Medicinal species used by other peoples totalled 55. Slave employed 18 of these, with 26 additionals. About 54 percent of species available for medicinal purposes were thus employed (see Table 5.1).

Miscellaneous uses were shared for five species with the Slave not using eight potential species, but using eight others. This gives a figure of 62 percent utilization of species available for miscellaneous purposes (see Table 5.1).

Table 5. Summary of the efficiency of use of plant species.

5.1

Category of Use	Number of Species Available[1]	Uses Unique to Slave	Uses Shared	Total Species Available	% used by Slave
Food	93	5	44	98	50
Technology	20	8	6	28	50
Medicine	55	26	18	81	54
Miscellaneous	13	8	5	21	62

5.2

Category of Use	Number of Species Available[1]	Uses Unique to Slave	Uses Shared	Total Species Available	% used by Slave
Greens	31	2	5	33	23
Roots	23	1	6	24	30
Fruits	43	3	25	46	61
Beverages	22		7	22	32
Confections	4	2	3	6	83*
Miscellaneous	12		2	12	17
Total	135	8	48	143	40

[1] These figures represent the number of potentially useable species as derived from the literature survey.

* This figure is high due to the small number of species involved, and to the variability encompassed in the category.

In the more detailed analysis of the uses of plants for food five categories were recognized. They were greens, roots, fruits, beverages and confections (see Table 7). The first three are the portions of the plant which were used for food. The last two take into account the manner in which the plant was used. This division was used because the parts in the first sections were directly eaten. The miscellaneous plant parts used for beverages are often boiled or otherwise processed, before the liquid is drunk, with the exception of saps. The nectars, juices, gums and flower parts, etc. which have been included under confections have been lumped together for the purpose of creating a category with a useable number of species for calculations, and because they are essentially used in the same manner. That is, they are used directly from the plant, in the manner of a 'candy'. (Although some fruits, eaten only in the field, might fall into this category, they were retained in the category fruits.)

Out of a total of 31 species which could be used as greens, the Slave share the use of five with other people, and use two not mentioned by authors writing of other cultures. This is about 23 percent of available species (see Table 5.2).

Twenty-three kinds of roots found in the area are edible. The use of only one of these appears unique to the Slave. An additional six species were used by the Slave, meaning that 30 percent of available species were utilized (see Table 5.2).

Table 6. Utilization of plant species found in the Fisherman Lake area as derived from the literature and as recorded for the Slave.

Species	Uses reported in the literature				Slave uses reported by the Klondikes			
	Food	Technology	Medicine	Other	Food	Technology	Medicine	Other
Algae						+		
Fomitopsis pinicola								+
Lycoperdon spp.			+				+	
Polyporus resinosus							+	
Cetraria islandica	+		+				+	
Cladonia rangiferina	+							
Sphagnum spp.				+				+
Dryopteris dilatata	+							
Polypodium vulgare	+		+					
Equisetum arvense	+		+				+	
Equisetum fluviatile	+						+	
Equisetum pratense	+						+	
Equisetum sylvaticum			+				+	
Equisetum spp.							+	
Lycopodium annotinum			(+)					+
Lycopodium clavatum			+					
Lycopodium complanatum			+					
Lycopodium selago	+		(+)					
Abies lasiocarpa			+				+	+
Juniperus communis	+		+		+			
Larix laricina	+	+	+				+	
Picea glauca	+	+	+			+		+
Picea mariana	+	+			+	+	+	+
Pinus contorta	+	+	+				+	
Typha latifolia	+	+			+			+
Sparganium angustifolium					+			
Sagittaria cuneata	+						+	
Agropyron spp.	+							
Beckmannia syzigachne	+							
Calamagrostis purpurascens						+		
Cinna latifolia	+							
Hordeum jubatum	+							
Hierochloe odorata		+		+				
Trisetum spicatum	+							
Carex aquatilis						+		
Carex disperma						+		
Scirpus validus	+	+						
Acorus calamus	+		+				+	
Calla palustris	+						+	
Allium schoenoprasum	+				+			
Maianthemum canadense	+				+			
Smilacina trifolia					+			

Table 6 (cont.)

Species	Uses reported in the literature				Slave uses reported by the Klondikes			
	Food	Technology	Medicine	Other	Food	Technology	Medicine	Other
Streptopus amplexifolius	+				+			
Veratrum viride			+	+			+	
Zygadenus elegans							+	
Calypso bulbosa	+							
Spiranthes romanzoffiana			+					
Populus balsamifera	+	+	+		+	+	+	
Populus tremuloides	+		+	+	+		+	+
Salix spp.	+	+	+	+	*	+	+	
Myrica gale	+		+				+	
Alnus crispa						+		
Alnus incana tenuifolia		+	+			+		+
Betula spp.	+	+		+	+	+		+
Urtica gracilis	+	+	+					
Geocaulon lividum					+			
Oxyria digyna	+				+			
Polygonum viviparum	+				+			
Rumex mexicanus	+					+		
Chenopodium capitatum	+			+		+		
Claytonia tuberosa	+				+			
Silene acaulis	+		+					
Nuphar variegatum	+		+		+			
Actaea rubra			+					
Ranunculus aquatilis	+							
Ranunculus sceleratus	+							
Drosera rotundifolia			+	+				
Ribes glandulosum	+				+			
Ribes hudsonianum	+				+		+	
Ribes lacustre	+							
Ribes oxyacanthoides	+				+			
Ribes triste	+				+			
Saxifraga punctata	+							
Amelanchier alnifolia	+	+	+		+			
Dryas octopetala	+							
Fragaria virginiana	+				+		+	
Potentilla fruticosa	+			+	+		+	
Prunus virginiana	+		+		+			
Rosa acicularis	+				+		+	
Rubus acaulis	?				+			
Rubus chamaemorus	+				+			
Rubus idaeus melanolasius	+		+		+		+	
Rubus pubescens	+				+			
Sorbus scopulina							+	
Astragalus americanus					+			
Hedysarum alpinum	+				+		+	
Lathyrus ochroleucus	+							

Table 6 (cont.)

Species	Uses reported in the literature				Slave uses reported by the Klondikes			
	Food	Technology	Medicine	Other	Food	Technology	Medicine	Other
Vicia americana	+							
Empetrum nigrum	+				+			
Elaeagnus commutata	+	+						
Shepherdia canadensis	+				+		+	
Epilobium angustifolium	+		+		+	+		
Hippuris vulgaris	+							
Aralia nudicaulis	+		+					
Angelica lucida	+		+		+			
Cicuta douglasii			+				+	
Cicuta mackenzieana							+	
Heracleum lanatum	+		+		+		+	
Sium suave	+						?	
Cornus canadensis	+				+		?	
Cornus stolonifera	+	+	+	+		+	+	+
Moneses uniflora	+		+					
Pyrola asarifolia					?			
Pyrola secunda			+					
Pyrola virens					?			
Andromeda polifolia		+					+	
Arctostaphylos alpina	+				+			
Arctostaphylos rubra	+				+			
Arctostaphylos uva-ursi	+	+	+	+	+			+
Cassiope tetragona				+				+
Chamaedaphne calyculata	+							
Kalmia polifolia			+					
Ledum groenlandicum	+				+		+	
Ledum palustre decumbens	+				+		+	
Oxycoccus microcarpus	+		+		+			
Vaccinium caespitosum	+			+	+			
Vaccinium uliginosum	+				+			
Vaccinium vitis-idaea	+				+			
Androsace septentrionalis								+
Apocynum androsaemifolium		+	+					
Mertensia paniculata								+
Dracocephalum parviflorum	+							
Mentha arvensis	+		+		+			
Stachys palustris	+		+					
Pedicularis lanata	+					+	+	
Pedicularis langsdorfii	+				+			
Boschniakia rossica							+	
Utricularia vulgaris							+	
Plantago major	+		+					
Galium boreale		+						
Galium triflorum			+					
Lonicera dioica							+	
Viburnum edule	+				+		+	

Table 6 (cont.)

Species	Uses reported in the literature				Slave uses reported by the Klondikes			
	Food	Technology	Medicine	Other	Food	Technology	Medicine	Other
Achillea millefolium	+		+				+	
Achillea sibirica			+				+	
Arnica cordifolia			+					
Artemisia arctica							+	
A. tilesii elatior							+	
Erigeron grandiflorus		+						
Erigeron philadelphicus			+					
Matricaria matricariodes	+		+		*?			
Petasites frigidus	+						+	
Petasites palmatus	+		+				+	
Solidago canadensis	+							
Taraxacum ceratophorum	?				+			
Taraxacum officinale	+		+		*?			

\+ species utilized

? uncertainty exists as to species utilization

* species or use introduced in area

Table 7. Utilization of plants of the Fisherman Lake area for food as derived from the literature and as recorded for the Slave.

Species	Uses reported in the literature						Slave uses reported by the Klondikes					
	Greens	Roots	Fruits	Bev.[1]	Conf.[2]	Misc.[3]	Greens	Roots	Fruits	Bev.	Conf.	Misc.
Dryopteris dilatata		+										
Polypodium vulgare		+										
Equisetum arvense	+											
Equisetum fluviatile	+	+										
Equisetum pratense		+										
Lycopodium selago	+											
Juniperus communis			+	+					+	*		
Larix laricina				+								
Picea glauca				+	+	+					+	
Picea mariana				+	+	+					+	
Pinus contorta						+						
Typha latifolia	+	+	+					+				
Sparganium angustifolium							+					
Sagittaria cuneata		+										
Agropyron spp.			+									
Beckmannia syzigachne			+									
Cinna latifolia			+									
Hordeum jubatum			+									
Trisetum spicatum			+									
Scirpus validus	+	+										
Acorus calamus		+										
Calla palustris		+	+									
Allium schoenoprasum	+	+					+					
Maianthemum canadense			+						+			
Smilacina trifolia									+			
Streptopus amplexifolius	+		+						+			
Calypso bulbosa		+										
Populus balsamifera						+						+
Populus tremuloides						+						+
Salix spp.				+		+				*		
Myrica gale						+						
Betula spp.				+		+				+		+
Urtica gracilis	+											
Geocaulon lividum									+			
Oxyria digyna	+						+					
Polygonum viviparum		+						+				
Rumex mexicanus	+											
Chenopodium capitatum	+		+									

Table 7 (cont.)

Species	Uses reported in the literature						Slave uses reported by the Klondikes					
	Greens	Roots	Fruits	Bev.	Conf.	Misc.	Greens	Roots	Fruits	Bev.	Conf.	Misc.
Claytonia tuberosa		+						+				
Silene acaulis	+											
Nuphar variegatum		+	+					+				
Ranunculus aquatilis	+											
Ranunculus sceleratus	+											
Ribes glandulosum			+						+			
Ribes hudsonianum			+						+	*		
Ribes lacustre			+									
Ribes oxyacanthoides			+						+			
Ribes triste			+						+			
Saxifraga punctata	+											
Amelanchier alnifolia			+	+					+			
Dryas octopetala				+								
Fragaria virginiana			+	+					+			
Potentilla fruticosa				+						+		
Prunus virginiana			+	+					+			
Rosa acicularis			+	+	+				+	+	+	
Rubus acaulis									+			
Rubus chamaemorus	+		+						+			
Rubus idaeus melanolasius	+		+	+			+		+	+		
Rubus pubescens			+						+			
Astragallus americanus								+				
Hedysarum alpinum		+						+				
Lathyrus ochroleucus			+									
Vicia americana	+											
Empetrum nigrum			+						+			
Elaeagnus commutata			+									
Shepherdia canadensis			+	+					+			
Epilobium angustifolium	+			+							+	
Hippuris vulgaris	+											
Aralia nudicaulis	+	+	+									
Angelica lucida		+					+					
Heracleum lanatum	+	+					+			*		
Sium suave	+	+										
Cornus canadensis			+						+			
Cornus stolonifera			+									
Moneses uniflora			+									
Pyrola asarifolia							?		?			
Pyrola virens							?		?			
Arctostaphylos alpina			+						+			

Table 7 (cont.)

Species	Uses reported in the literature						Slave uses reported by the Klondikes					
	Greens	Roots	Fruits	Bev.	Conf.	Misc.	Greens	Roots	Fruits	Bev.	Conf.	Misc.
Arctostaphylos rubra			+						+			
Arctostaphylos uva-ursi			+	+					+			
Chamaedaphne calyculata					+							
Ledum groenlandicum				+						+		
Ledum palustre decumbens				+						+		
Oxycoccus microcarpus			+						+			
Vaccinium caespitosum			+						+			
Vaccinium uliginosum			+						+			
Vaccinium vitis-idaea			+						+			
Dracocephalum parviflorum			+									
Mentha arvensis				+		+				+		
Stachys palustris	+	+	+									
Pedicularis lanata	+	+			+							
Pedicularis langsdorfii		+		+				+				
Plantago major	+											
Viburnum edule			+						+			
Achillea millefolium				+								
Matricaria matricariodes				+				*?				
Petasites frigidus	+											
Petasites palmatus	+					+						
Solidago canadensis			+									
Taraxacum ceratophorum	?						+					
Taraxacum officinale	+	+		+			*?					
Cetraria islandica						+						
Cladonia rangiferina						+						

1 Beverages

2 Confections

3 Miscellaneous

+ species utilized

? uncertainty exists as to species utilization

* species or use introduced in area

Fruits were one of the most highly utilized of any of the categories of edible portions of plants. Sixty-one percent (28) of the 46 edible fruits of the area were eaten. Three are not used by other people, according to their omission from the literature[1].

Thirty-two percent of available species used in the preparation of beverages were utilized (seven out of 22). Confections were available from six species found in the area. Of these two were unique Slave uses ('milk' from broken dandelion stems, and the eating of the flowers of fireweed), and three others were used by the Slave. This yields a high figure of 83 percent of available species being used (see Table 5.2). This high figure can probably be expected due to the small number of species in the category, and to the great amount of variability possible in such a category.

Under the category miscellaneous are included the use of the cambium for food and the use of plants for flavoring. Seventeen percent (2) of the 12 available plants were used (see Table 5.2).

Considered in the above manner, there are 143 different food-providing

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[1] One of these three, *Rubus acaulis* , was not mentioned in the literature, although the closely related *R. arcticus* was seen several times; Hulten (1968) considers *R. acaulis* to be a subspecies of this species. It seems quite certain that *R. acaulis* is considered edible by all people who occur within the range of the plant.

portions of the plants growing in the area. Of these the Slave used 56, with only eight of these uses being unique. The percentage utilization of all plant foods resulting from this type of analysis is 40 percent. This is ten percent lower than the figure calculated for utilization of food providing species. This is due to the fact that other people (or rather the combination of many different groups of people) use more of the species as 'multiple' foods (that is, providing more than one edible portion, e.g. roots and fruits). Twenty species have multiple uses by other groups, whereas only three species are of multiple use (as sources of food) for the Slave.

This type of analysis is limited in its usefulness in that it does not take into account abundance of the species in the area, nor the amount of utilization. There is no way of measuring the importance of a plant species in the diet of a people who no longer employ those plants as they would have done aboriginally.

For technology and medicinal purposes the Slave had numerous unique uses of plants, however the uses they shared with other human groups are also interesting. The alder bark dyes were used by many tribes from Alaska to the Appalachians. Medicinal plants which were used for the same purposes by other human groups include *Equisetum* species, *Larix laricina*, *Acorus calamus*, *Veratrum viride escholtzii*, *Salix* spp., *Achillea millefolium* and *Cetraria islandica*. *Rubus idaeus melanolasius* was also used for similar ailments to those for which the Slave used it.

A comparison of the uses of species available to the Slave by two other North American Indian tribes has been carried out in the table found in Appendix IX. The Blackfoot and the Kwakiutl were the closest tribes for which a comprehensive survey of plant uses had been carried out. Although neither one of these tribes belongs to the Athabascan language family, they do share within their ranges a number of the plant species available to the Slave. In order to include as many species as possible in the analysis of plant utilization Tables 6 and 7 combine the uses of many human groups, however a comparison with individual tribes is also of interest, and therefore Slave uses are compared with those of the Blackfoot and Kwakiutl in Appendix IX.

6.2 Abundance of vascular plant species used

It was thought desirable to have some indication of the abundance of the species of plants used by the Slave. Is use restricted to common plants, or is it evenly distributed throughout the range of common, uncommon and rare species?

Frequencies in the area covered by the vegetation map (Appendix XI) were determined for species which were found in quadrats examined to aid in the description of the vegetation (see Appendix X). Quadrat analysis was done in areas that represented uniform stands of vegetation. Lakeshores, pond edges, stream banks, disturbed areas and small areas of non-representative vegetation were not sampled.

Frequency figures were obtained by multiplying the frequency of a species within a given vegetation association by the percentage of the total area (derived from Table 4, page 43) which was occupied by that association. The overall frequency (F in Table 8) was the sum of the frequencies of a species for each of the vegetation types in which it occurred. For example: species x was found to have a frequency of 4 in association A, 10 in association B and 5 in association C. A occupied 25% of the total area, B occupied 10% and C 20%. The F value for species x was calculated to be (4 x .25) + (10 x .10) + (5 x .20) = 3.

Table 8 lists the 96 species of plants that were used by the Slave (symbols in column two note the uses to which each species was put) and the F values (as calculated above) for those species which were found in the quadrats. In addition, column four provides observations on the total occurrence throughout the area (as derived from field notes), of each species used. Abundance of plants used was analysed in Table 9 using F values and in Table 10 using ocular evaluation (as noted in column four of Table 8).

In Table 9 species with a frequency less than 3 were considered rare to uncommon. These species had to be sought out for use. Frequencies between 3 and 6, inclusive, indicated that the species were not common, yet were not difficult to locate. Species with frequencies greater than 6 were considered common to abundant and were readily available for use[1].

[1]These figures were arrived at after studying the frequencies available for the species in the area, and comparing them with notes taken in the field when plant species were being collected.

Table 8. Use, distribution characteristics and range types of plant species used by the Slave of Fisherman Lake.

Species	Uses	F	Comments on abundance	Affiliation
Equisetum arvense	m	3	also locally abundant	C
Equisetum sylvaticum	m	<1	also locally abundant	b
Lycopodium annotinum	o	<1	useage only in areas of occurrence	b
Abies lasiocarpa	mo	*	tree species	c
Larix laricina	m	*	uncommon tree species, local	b
Juniperus communis	f		scattered only at timberline and in shrubby tundra	b
Picea glauca	to	*	common tree species	b
Picea mariana	tmo	*	common tree species	b
Pinus contorta	m	*	common tree species	c
Typha latifolia	fo		local occurrence only, in ponds	C
Sparganium angustifolium	f		Fisherman Lake	b
Sagittaria cuneata	m		Fisherman Lake	b
Calamagrostis purpurascens	o		limited use, scarce in alpine areas; other species used	a-a
Carex aquatilis	t		locally abundant on shores	C
Carex disperma	t		mostly seen in disturbed areas	b
Acorus calamus	m		known only from Grass Lake	b
Calla palustris	m		local, seen in only two ponds	b
Allium schoenoprasum	f		only reported for Petitot and Kotaneelee River banks	C
Maianthemum canadense	f	+	local abundance under *Alnus-Salix* and on moutain slope	b
Smilacina trifolia	f		found locally in moist *Sphagnum*	b
Streptopus amplexifolius	f		few seen, in moist timberline area	b
Veratrum viride	m	<1	local abundance in moist alpine tundra	c
Zygadenus elegans	m	<1	only in alpine areas	A-c
Cypripedium passerinum	o		scarce and local	b
Habenaria obtusata	o	<1		b
Populus balsamifera	ftm	*	very common tree species	b
Populus tremuloides	fto	*	very common tree species	b
Salix spp.	tmo	*	differentiation of species uncertain	C
Myrica gale	m	2	locally abundant next to surface water in bog forests	b
Alnus crispa	to	*	common shrub	b
Alnus incana tenuifolia	to	*	local occurrence near lakeshores, streams	b
Betula spp.	fto	*	scattered to locally common in deciduous woods	b
Geocaulon lividum	f	2		b
Oxyria digyna	f	G		a-a
Polygonum viviparum	f	<1	on alpine tundra only	a-a
Rumex mexicanus	t		local in moist, often disturbed, sites	b
Chenopodium capitatum	t		disturbed sites	b
Claytonia tuberosa	f	G	seen only in the LaBiche ("Grass") Mountains	A-c
Nuphar variegatum	f		Fisherman Lake	b
Draba lanceolata	o		alpine site	b
Ribes glandulosum	f	9	F perhaps high, local abundance suspected in stand	b
Ribes hudsonianum	fm	<1	abundance increases along drainage systems	b
Ribes oxyacanthoides	f	<1	local occurrence	b
Ribes triste	f	3		b

Table 8 (cont.)

Species	Uses	F	Comments on abundance	Affiliation
Saxifraga hieracifolia	o	<1	alpine areas	a-a
Amelanchier alnifolia	f	FL	very scattered, more common along the Liard River	b
Fragaria virginiana	fm	2	abundant in some disturbed sites	b
Potentilla fruticosa	fm	<1	locally abundant in some alpine areas & along streams	b
Prunus virginiana	f	FL	reported for Liard River area	b
Rosa acicularis	fm	53	abundant on disturbed sites, fruits best in those sites	b
Rubus acaulis	f	<1	local occurrence	b
Rubus chamaemorus	f	10	local to common	b
Rubus idaeus melanolasius	fm	3	abundant on disturbed sites	b
Rubus pubescens	f	13	sometimes increases on disturbed sites	b
Sorbus scopulina	m		one location known, timberline site	A-c
Astragalus americanus	mo	<1	local abundance occurring	b
Hedysarum alpinum	fm	<1	locally abundant in moist alpine and stream edge sites	b
Oxytropis maydelliana	o	<<1	scattered in alpine areas	a-a
Geranium richardsonii	o		local occurrence in shrubby alpine sites	c
Empetrum nigrum	f	<1	also of local abundance	C
Shepherdia canadensis	fm	8	often in dense stands	b
Epilobium angustifolium	f	11	abundant on disturbed sites	b
Angelica lucida	f		scarce to local in shrubby tundra and at timberline	coastal?
Cicuta douglasii	m		shores, Fisherman Lake	c
Cicuta mackenzieana	m		shores, Fisherman Lake	s
Heracleum lanatum	fm	+	locally common in shrubby tundra	b
Cornus canadensis	f	46		b
Cornus stolonifera	tmo	<1	locally abundant along drainage systems	b
Andromeda polifolia	m	9	locally abundant in bog forest	s
Arctostaphylos alpina	f	<1	alpine areas only	a-a
Arctostaphylos rubra	f	5	locally common	s
Arctostaphylos uva-ursi	fo	<1	not common, but occurring in dense patches where found	b
Cassiope tetragona	o	+	used only where found, in alpine areas	a-a
Ledum groenlandicum	fm	32	common shrub	b
Ledum palustre decumbens	fm	+	rocky areas at timberline	s
Oxycoccus microcarpus	f	1	locally occurring in good numbers	s
Vaccinium caespitosum	f		alpine only, not differentiated from *V. uliginosum*	c
Vaccinium uliginosum	f	6	on suitable sites occurring in dense stands	a-a
Vaccinium vitis-idaea	f	32	common shrub	b
Androsace septentrionalis	o		seen only on disturbed stony tundra	C
Mertensia paniculata	o	7	dense stands on some disturbed sites	b
Mentha arvensis	f		lakeshores	b
Pedicularis lanata	tm	<1	alpine	a-a
Pedicularis langsdorfii	f		alpine	a-a
Boschniakia rossica	m		on roots of *Alnus* spp., more common along drainage systems	A-c
Utricularia vulgaris	m		in ponds of bog forest, rare in Fisherman Lake	b
Lonicera dioica	m		scattered along drainage systems and lakeshores	b
Viburnum edule	fm	35	dense along drainage systems, fruits best there	b
Achillea millefolium	m	<1	most common on disturbed sites	b
Achillea sibirica	m		most common on disturbed sites	b

Table 8 (cont.)

Species	Uses	F	Comments on abundance	Affiliation
Artemisia arctica	m	2	alpine	A-c
Artemisia tilesii elatior	m		most common on disturbed soil, riverbanks, alpine roads	A-c
Petasites frigidus	m	1	frequency of fruiting heads much lower	A-c
Petasites palmatus	m	2	frequency of fruiting heads much lower, dense in disturbance	b
Senecio lugens	o	<1		A-c
Taraxacum ceratophorum	f		most common on disturbed sites	s

Explantation of symbols:

F frequency, over the area of the vegetation map (Appendix XI)

* sampling did not include tree species and tall shrubs

f food

t technology

m medicine

o other

FL plants common in or found only in the Fort Liard area

G found only in, or reported for, the LaBiche Mountains

C circumpolar

b boreal

a-a arctic-alpine

s subarctic

A-c Alaskan-cordilleran

c cordilleran

Figures in Table 9 indicate that a high percentage of the plants used by the Slave were scarce in the area and were necessarily sought out for use. Only the category of plants used for food contains a high proportion of common to abundant species.

Table 10 gives the analysis of the comments that were presented in Table 8 on the abundance of plants used by the Slave. Plant species were placed in the categories scarce (plants which must be sought out), locally common (plants scarce throughout most of the area, but which occur in numbers in certain microhabitats and hence are easily gathered) and common to abundant (plants in high enough numbers that they are readily obtained when needed). A further analysis of the species of local abundance was carried out in Table 10.1 where species occurring in increased abundance in areas of disturbance and along drainage systems have been separated from those whose occurrence is increased locally by undetermined microenvironmental factors. The figures show that a large proportion of the species used were considered to be locally common. They also indicate that a number of species occurred locally in the types of habitats that were not sampled by quadrats (e.g. disturbance, drainage, non-uniform areas).

The differences between the results of the two different analyses can be attributed to two factors. First is the number of species used. Overall frequency values were obtained for only 47% (45) of the total species used. Table 9 thus represents less than half of the species used. Ocular evaluation used in Table 10 was for 96% (92) of the total species. Among the species

for which no frequency values were obtained were the trees and tall shrubs (which were not sampled with the quadrat size used). This had a noticeable effect on the abundance values obtained for species used in technology. Where Table 9 suggests that no common species were used in technology, Table 10 indicates that 50% of the species used were common.

The second factor resulting in the differences between the results presented in the two tables (9 and 10) is the sampling method. The comments on occurrence of species in Table 8 and the figures in Table 10 indicate that the method of sampling uniform stands was not suitable for determining frequencies of the species over a large area. Many areas need to be sampled in addition to uniform stands which represent the major vegetation associations present in the area. Also of importance is the 'sociability' of a species, whether it grows in small clusters, large patches or as single individuals, either scattered evenly throughout the habitat or of very uneven distribution.

It appears that the frequencies obtained are not truly representative of the actual status of a number of the species, and hence should be used with caution. The figures in Table 10 give a general idea of the abundance of the species used. Generally speaking, plants that were common in the area, or those which occurred in abundance under local conditions were more highly utilized. Uncommon to scarce species, although used to a much lesser extent, were important as medicines and charms (included in the category other uses). Scarce species were rarely sought out for food,

but were used opportunistically. The figure of seven given for the percentage of species used in technology that were scarce is accounted for by a single species.

A suggestion for future attempts at determining the overall frequency for species found in a given area would be to run transects, with varying quadrat sizes being used for tall shrubs, trees, and herbs and low shrubs. Aquatic vegetation should also be included. A much more detailed study and mapping of the vegetation would be necessary, and gradients in altitude, moisture, slope and aspect should be taken into account when setting up transect lines if they could not be random.

Table 9. Analysis of abundance of species used by the Slave of Fisherman Lake, using frequency values.

Use	# species	% species with $F<3$	% species $3 \geq F \leq 6$	% species with $F>6$
All uses	45	62	11	27
Food	26	46	15	39
Medicine	22	68	9	23
Technology	2	100		
Other	9	89		11

Table 10. Analysis of abundance of species used by the Slave of Fisherman Lake, using ocular evaluation of abundance.

Use	# species	% Scarce	% Locally common	% Common ± abundant
All uses	92*	22	64	14
Food	46	19	62	19
Medicine	41	10	73	17
Technology	14	7	43	50
Other	24	38	33	29

* Four species not included are those not found in the immediate vicinity of Fisherman Lake.

Table 10.1. Analysis of the percentage of the locally common species within the categories undetermined microhabitat, drainage systems and disturbed areas.

Use	Locally common in undetermined microhabitat	Common along drainage systems	Common in disturbed areas
All uses	43%	5%	16%
Food	44	7	11
Medicine	41	17	15
Technology	21	7	15
Other	21	4	8

6.3 Geographic affinities of vascular plant species used

Column five in Table 8 (page 231) categorizes each species with respect to the type of geographic distribution that it possesses. The categories used follow Raup's floristic elements[1] (1947:63), and are as follows: 1) Canadian coniferous forest, wide ranging (boreal, b); 2) arctic or arctic - alpine, wide ranging (a-a); 3) intermediate wide ranging sub-arctic species, with their greatest concentration near tree line (s); 4) Alaskan - cordilleran with general arctic - alpine affinities (A-c); 5) cordilleran, alpine but not arctic, mostly in the Rocky Mountains and coast ranges (c). Additional species are circumpolar or cosmopolitan in range (C). Species were placed into the categories according to range maps given in Hulten (1968) when Raup's previous classification (1947) did not include them. Only one species cannot be fitted into any of these categories, and that is *Angelica lucida* . According to Hulten's range map it would appear to be best classed as a coastal species.

Table 11 summarizes the results of this classification by giving the percentage of utilized species found within each range type, and the percentage within each range type with respect to the groups of species in the categories food, medicine, technology, and other uses by Slave. Use within each category closely parallels the general distribution of the plants of the area (as noted in column seven of the table). Greatest use was of boreal species, which make up the largest element of the local flora.

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[1] Floristic elements take into account the postulated area of origin as well as present distribution.

Table 11. Geographic affinities of vascular plant species used by the Slave of Fisherman Lake.

Distribution type	Percentage of species used (Number of species in category in parentheses)					
	Total (96)	Food (48)	Medicine (41)	Technology (14)	Other (14)	% of Total Species (346)
C	7	6	5	14	13	6
b	61	69	61	79	58	51
a-a	10	8	2	7	17	17
s	8	13	7			6
A-c	8	2	15		4	10
c	5		10		8	6
coastal	1	2				1
undetermined						3

Symbols:

C cosmopolitan

b boreal

a-a arctic - alpine

s subarctic

A-c Alaskan - cordilleran

c cordilleran

Of particular interest are the high percentages of plants of cordilleran and Alaskan-cordilleran (plus one additional of artic-alpine) affinities that were used for medicinal purposes. There is some doubt whether herbal medicines were used by the aboriginals, and in addition Jenness has suggested that the Slave have occupied territory in the mountains only during the past two centuries. Although some of the eleven species involved no doubt do extend their ranges somewhat to the east of the mountains, most are restricted to mountain habitats, even to the alpine areas. The use of these species can be explained by either of two hypotheses, diffusion of knowledge from other tribes of Indians, or invention of medicines employing these species either after the invasion of the area by Caucasians, or after the plants became available to the Slave. Although some diffusion may have occurred, the presence of unique usage tends to support the second hypothesis. The invention hypothesis is also supported by the additional presence of medicines in use, which were designated "T.B. medicines". Since tuberculosis was not a native affliction, these remedies were probably invented only after the invasion of the area by foreigners.

Of the six species used for food from the arctic-alpine and Alaskan-cordilleran elements only one extends its range any appreciable distance to the east in the boreal forest. This species (*Vaccinium uliginosum)* is not differentiated by the native people from one of the other alpine species (*Vaccinium caespitosum*). Of the other four species all were used by other tribes of Indians and hence their value as a source of food was well known in the area.

6.4 Seasonal availability

Plant foods were important when meat was difficult to obtain in early spring. Rose hips, mooseberries, cow-berries, bog cranberries and crowberries could still be gathered for eating at that time. As soon as the frost left the ground, root foods could be exploited. Initiation of sap flow in the trees provided two additional foods. The inner bark of balsam poplar was eaten, especially in times of starvation, and birch sap served to eke out meat supplies by being added to soups. New herbaceous growth such as "Indian rhubarb" (cow parsnip), and the tender green shoots of wild raspberry, provided greens. It is interesting to note that all of the plants which were described as starvation foods were available for exploitation in the spring.

Some of the plants used for food in spring were available into the summer. By late June wild fruits began to reach the stage where they could be eaten. Throughout July and August the variety of ripe fruits increased, and in late August some of those occurring in abundance could be picked for storage. Raspberry and blueberry fruits were dried, while blueberries and other kinds of fruits could be stored in buried baskets.

The first frosts had the effect of improving the flavor of some of the wild fruits. Fall was the time for storing wild fruits and the roots of "Indian carrots" (sweet vetch) gathered from the nearby mountains.

The only plant foods available in winter would be those fruits which remained on the plants, and were high enough above the ground so that they would not become covered with snow (e.g. rose hips, mooseberries).

Most of the plants used in technology, medicine, etc. were gathered only when they were needed. Some medicines and dyes, particularly roots, were taken up in August and dried for winter use, since they would be difficult to obtain from frozen ground under the snow. Fruit clusters from strawberry blite also had to be gathered in late summer and fall when they were deep red in color. Other plants were picked when needed; if necessary they were dug from under the snow. Even peat moss (*Sphagnum* spp.) was dug from beneath the snow and the frozen chunks were simply thawed and dried next to the fire for use in baby bags.

6.5 Accuracy of information supplied

Since few informants were used there is no measure of the validity of information other than the accuracy of repetition at different questioning sessions, and for different specimens of the same species.

Out of 500 responses regarding Slave terms 125 were recorded more than once for the same species and 50 terms differed from other responses to that species. Some of these were regarded as synonyms, others merely illustrate the use of description in Slave plant taxonomy (this is further discussed in Chapter 9). A few were believed to be due to misidentification, which is easily understood since the informants were not used to seeing pressed specimens.

Differences in the described use were thought to be more serious than those occurring in the naming of plants. Out of 186 recorded responses on use of species, 65 repeats were similar and 17 species elicited responses which differed on two separate sessions. Some of these responses (separated by a winter during which the informant would have been associating with others) were believed to differ due to consultation with others, resulting in the elaboration or correction of the procedure given by the informant. Others were due to mistaken identity of the specimen. For only seven species did there seem to exist absolute confusion in the informants mind, in that a second response was a direct contradiction to the first. Four of these are mentioned in Chapter 3 (*Sparganium angustifolium*, *Pyrola asarifolia*, *P. virens*, *Matricaria matricariodes*) as some uncertainty was evident as to whether they were used or not.

The other three (*Delphinium glaucum, Actaea rubra, Moneses uniflora*) were said to be not used at the second session, and in all three cases the informant was quite emphatic in his denial.

In addition to the recorded names and uses for the species found in the area, many of the names and uses were given orally on numerous other occasions when it was not possible to write them down. If a use or procedure had been recorded more than once before and another reiteration was given it was often not recorded again. These factors reduce the credibility factor that can be calculated for the information given. However it is believed that all the information presented in Chapter 3 is accurate to the best knowledge of the informants. Only questioning of other informants could prove otherwise.

CHAPTER 7. CHARACTERISTICS OF FAUNAL USE AND DISTRIBUTION

7.1 Efficiency of use

It is next to impossible to give any quantitative evaluation of the efficiency of use of animal resources. Naturally such efficiency had to be high, as animals provided the greatest part of subsistence for all of the northern Athabascans. The Slave employed nearly every species that was suited for food by its size or palatability (including some that were less than palatable according to some of the early explorers). In addition very little waste was incurred. Most of the viscera were eaten and other 'non-edible' parts were important raw materials used in technology.

In general, although most of the native peoples were not known for their conservation practises, their use of animal resources was very efficient, and the Slave were no exception.

7.2 Areal distribution

It was suggested that an attempt should be made to correlate game animals (excluding fish) of the Fisherman Lake area with the vegetation associations found in that area. Such a correlation was expected to indicate whether or not one or more vegetation types might be of greater importance to the Slave than other types, by way of providing a greater abundance of resources.

Unfortunately game species are overall too general in their selection of 'preferred habitat' (that habitat capable of supporting the greatest population densities is considered here, as well as that naturally occupied) to give a more specific correlation than to biome. Table 12 gives preferred habitats of the game species of the area as deduced from the literature.

The recognition of strict vegetation associations based on dominant tree species can be seen to be of limited value in designating habitat, except for a limited number of species such as the grouse and squirrels. In fact the best habitat will be seen to be a complex of vegetation associations.

As an example the principal game animal of the area, the moose, 'prefers' an area with a patchwork of ponds, willows and dense forest. The ponds provide summer forage, the willows winter forage, and the forest shelter, as well as easier travelling in winters of heavy snowfall. Such an area is to be found at the northwest end of Fisherman Lake, but it is not necessarily a fact that the probability of finding moose in that area is any greater than any other area around the lake. The browse area of a moose can be in the vicinity of six square miles (Lawrence, 1966:10).

A rough correlation can thus be made between game animals and biomes. From this it can be seen that the Slave were most closely associated with the species of the boreal forest and aquatic biomes, with the alpine areas mainly serving as an alternate source for subsistence.

Table 12. Preferred habitat of major game species in the Fisherman Lake area.

Boreal Forest Biome	Alpine Biome	Aquatic Biome	Ecotonal	Regeneration
Undifferentiated -closed canopy	Undifferentiated	Rivers, Streams	Timberline	moose
black bear	grizzly bear	moose	blue grouse	snowshoe hare
moose	wapiti (Su)	otter		white-tailed deer
woodland caribou	mule deer (Su)	beaver		ruffed grouse
white-tailed deer	dall sheep	ducks (SpSuF)		
lynx	mountain goat	geese (SpF)		
porcupine	hoary marmot	swans (SpSuF)		
snowshoe hare	willow ptarmigan (SpSu)	Lakes, Ponds, Marshes		
blue grouse	rock ptarmigan	moose		
owls	white-tailed ptarmigan (Su)	muskrat		
Coniferous forest		ducks (SpSuF)		
red squirrel		geese (SpF)		
spruce grouse (dense spruce)		American coot (SpSuF)		
Deciduous forest		loons (SpSuF)		
ruffed grouse		swans (SpSuF)		
Willow shrub				
willow ptarmigan (W)				
moose (SpFW)				
snowshoe hare				
Open bog forest				
sharp-tailed grouse				
greater yellowlegs				
Semi-open forest				
wapiti (W - MV)				
white-tailed deer				
mule deer (W - MV)				
woodchuck (brushy)				
white-tailed ptarmigan (W - MV)				

Symbols:
Sp ... spring
Su ... summer
F ... fall
W ... winter
MV ... mountain valleys

7.3 Temporal distribution

It would appear that the moose was the principal resource in the survival of Slave of Fisherman Lake. The moose provided food and clothing, as well as other raw materials. Fall, during rut, may have been the time when moose were most easily taken. In winter they could be tracked in the snow or snares could be set on their trails. It takes a good depth of snow to hinder the travelling of moose, but they do tend to stay in the woods where snow depth and crusting are less (Kellsall and Prescott, 1971). Some movement up the mountain slopes may occur in winter (Hosley, 1949). Spring was likely the most difficult time to hunt moose, as tracking is more difficult without snow, and the cows have sought out secluded spots to calve. In late spring and early summer the "moose licks" are visited frequently (Hosley, 1949:32). Johnny Klondike stated that the licks were a good place to ambush or snare moose. In summer moose tend to be found feeding on the aquatic vegetation of lakes, ponds or streams.

Since moose were thin and hard to hunt in the spring and not always available at other seasons, other resources had to be utilized. Black bears were thin and mean in spring and their meat was not good until late in July. Although they could be snared in berry patches in August and September, perhaps the easiest time to kill them was when a den was found in winter. An important aspect of the use of bear meat was that it was taboo for women of child-bearing age.

Snowshoe hares were snared without much effort, but the cyclic highs and

lows of their populations did not allow for great dependence upon them. McPherson (n.d.), on January 2, 1831, mentions the scarcity of hares in the area around Fort Liard, stating "these little animals having hitherto supplied them with clothing as well as food." During population highs they were an important resource, but during lows they could be extremely scarce.

Beaver were snared in spring and summer and taken from their houses in winter, but from the rapid depletion of their numbers after trading began (McPherson, n.d.) it is doubtful that they could have provided steady sustenance.

Other mammal species appear to have been taken more or less opportunistically, providing variety in the diet rather than being main constituents.

Fish could usually be resorted to in times of scarcity, and McPherson (n.d.) mentions in more than one place in his journal where starving people went to the lakes to fish. But there were times when this resource, too, failed. High and muddy water were recorded as causing the fishery to fail at Fisherman Lake in the months of June and September (McPherson, n.d.).

In spring and fall migrating waterfowl could be captured in the snares that were set in the sedges and rushes in shallow water. Species residing in the area throughout the summer were most easily taken when they were flightless due to moult in late summer. Grouse of different kinds were available year round, but were probably taken with the greatest ease when

the broods of the year had reached full growth but were still travelling about in family groups (fall). Bird eggs provided a source of food during June and July.

From this brief summary of resources it would appear that the most difficult time of the year to procure food may have been in the early spring, the time when travel was most difficult and resources were at their lowest ebb.

CHAPTER 8. FIRE AS AN ECOLOGICAL FACTOR

In addition to geography, soils, climate, vegetation and animal life, there is another important environmental factor that should be given some consideration, and that is fire. Periodic fires are a natural characteristic of the boreal forest region which the Slave inhabited, and hence their effects on the people have been briefly considered here.

The effects of fire on vegetation and wildlife are beginning to be studied more intensively as more people begin to view fire as a management tool rather than simply as a destructive force to be controlled at all costs. It is generally agreed that fires set back vegetational succession, but effects on the fauna seem to be a more controversial subject. As Rowe and Scotter (1973:457) note, "Faunal succession follows plant succession, and there are optimum habitats or stages of plant succession for every animal species." Loope and Gruell (1973:440) state "The vegetation mosaic produced by a natural fire regime results in a diverse array of wildlife habitats." To express this another way "Diminished variety in plant communities results in a reduction in the availability of ecological niches and a consequent reduction in diversity of wildlife species" (Frissell, 1973:407).

The general effect of fires was summarized by Redfield et al. (1970:80) as follows: "Fires open the habitat ..... or set back succession and this seems to be the crucial point for many species ..... Animals that do well on areas that are burned seem to be those adapted to early stages in

succession".

The effects of fire on some of the major species of game animals (as reported in the literature) in the area will be summarized below, followed by notes on the vegetation in early seral stages. This can be used to make some inferences as to the effects on the native human populations in the prehistoric era.

It is generally conceded that moose habitat is improved by fire due to "increased productivity and availability of deciduous woody plants" (Viereck, 1973:484), and that moose populations increase in response to the increased food supply. Rowe and Scotter (1973:458) caution that "The pattern and scale of burned and unburned patches is probably critical...". It would also appear that populations in different areas show different responses, as moose in the Jackson Hole area of northwestern Wyoming increased in the absence of fire. This was thought to be due to an increase in subalpine fir in the area —— said to be a staple food item (Loope and Gruell, 1973:440). Evidently food habits of the moose in that area also differ from more nothern populations.

Both white-tailed and mule deer also depend on the young growth of deciduous shrubs and trees which can be found following fire (Rowe & Scotter, 1973:458), but the area emcompassed by the burn is important. Snow depth is greater in the open and predation is a factor reducing the effectiveness of use of large burns (Heinselman, 1973:372). Browse species of moose and deer are "generally superior in quality as well as in quantity" (Rowe

& Scotter, 1973:458) on burned-over areas.

Black bear range, at least for late summer, is improved by fire. The abundance of berry-producing species is increased for from "2 to perhaps 20 yr" following fire (Heinselman, 1973:373). One of these, blueberry, was found to comprise 49% of the fall diet of the bear (Viereck, 1973:486).

Stelfax found that sheep populations in the Canadian Rockies increased following fire, due to improved range resulting from the burning back of coniferous forests (Viereck, 1973:485).

Beaver depend upon fire to rejuvenate aspen, birch and willow, species which they require for dams, lodges and winter food supplies (Heinselman, 1973:371). Erosion and deposition along stream and river banks also renew stands of these species however.

Snowshoe hares have been noted by Scotter "to frequent young forest stands in larger numbers than in mature forest" (Rowe & Scotter, 1973:459). Peak populations are attained in "young postfire stands, especially of aspen and birch ..." (Heinselman, 1973:372). Grange found that population bursts were limited to very early successional stages to be found a few years after a fire.

Generally fur-bearing species are thought to be decreased by extensive fires.

Controlled burning of marshes in Manitoba was found by Ward (1968) to

increase densities of both muskrats and waterfowl. Whether wildfires would have the same effect is not known.

Canada geese were noted by Rowe and Scotter (1973:459) to feed on "grasses and horsetail (*Equisetum sylvaticum*) on very recent burns in northern Saskatchewan."

In Alaska "removal of woody vegetation by fire increases the attractiveness of the area to most waterfowl species" (Viereck, 1973:487; from Buckley) and the earlier growth in spring was thought to initiate earlier nesting. Viereck states that such "early nesting commonly results in higher production than later nesting" (1973:487).

Sharp-tailed grouse were characterized as preferring recently burned-over areas (Rowe & Scotter, 1973:458) and ruffed grouse depend on food species rejuvenated by fire (Heinselman, 1973:373),particularly aspen, whose buds serve as winter food. Although blue grouse populations were found to decline when conifer coverage neared 75%, the effect of fires seemed to be inconsequential (Redfield, et al., 1970).

Species for which fires appear to have deleterious effects include caribou, red squirrel and spruce grouse (Heinselman, 1973; Rowe & Scotter, 1973; and Viereck, 1973).

In addition to such plants as aspen, birch, willow and alder, species important to wildlife, other species of importance as food for humans,

increase following fire. Most important are berry producing species, but others are also increased. The following is a list of species which regenerate rapidly or 'invade' areas following fire: *Amelanchier* spp., *Prunus* spp., *Rubus idaeus* (Heinselman, 1973:373), *Epilobium angustifolium*, *Rosa acicularis*, *Arctostaphylos uva-ursi*, *Ledum palustre decumbens*, *Ledum groenlandicum*, *Vaccinium uliginosum*, *Vaccinium vitis-idaea* and other *Vaccinium* species (Rowe & Scotter, 1973:449; Viereck, 1973). In addition Viereck (1973) lists genera which have fire-resistant seeds whose germination may be stimulated by fire: *Viburnum*, *Rosa*, *Cornus*, *Geocaulon* and *Shepherdia*.

Such abundance of berries would have been attractive to human inhabitants as well as black bears. And the attraction would be not to the plant resources alone, but also to the animals that were attracted to the burn for the resources that it provided. The tendency for the native people would likely have been to inhabit the edges of the burns where they could also take advantage of the shelter of more mature forests (a tendency also likely shared by many of the animal species).

Wentzel (1889:78) in 1807 observed at the "Forks of the Mackenzie River ... the banks on both sides are high and barren, which is supposed to be occasioned by the great fires made in the Spring season by the inhabitants to clear the country of underwood, in order to enjoy more ease when hunting." The tangle of fallen trunks and the dense growth of regeneration would hardly seem to present terrain more easily traversed (and likely animals avoid the area until regeneration is established), but evidence would seem

to support that within a few years following fire the area should support higher game populations. And higher game populations would result in greater ease in hunting.

Since so many of the plant and animal resources upon which they depended for a livelihood appear to have been well adapted to periodic fires, it would seem reasonable to suggest that the native people, too, were adapted to the early stages of fire succession. They, too, however required the mosaic of vegetational associations that seem to be necessary in the support of other species throughout their life cycles.

CHAPTER 9. SLAVE TAXONOMY OF THE FLORA AND FAUNA

The Slave names included in Appendices V to VIII should be considered part of an idiosyncratic taxonomy. The terms are all those applied by Johnny Klondike, Sr., and do not necessarily represent the generally used taxonomy of the Slave of the area. Johnny, himself, at one point employed two names for one particular plant. One he called the "Slave name", the other he indicated was a name he used himself. However, atypical as it may be, in the following pages it shall be referred to as Slave taxonomy.

Names for most specimens of plants and species of mammals, birds and fish were recorded in writing at least twice. Because of initial unfamiliarity with the Slave phonemic system, and difficulty in distinguishing phonemes, later recordings often resulted in a different record than the original. Also there was frequently more than one name given for the same species of plant (as recognized by Latin binomials). Names used here usually follow the later record, and where two names were used for the same plant that species may be found in two places.

9.1 Categories in Slave classification

Slave taxonomy is not all-inclusive. That is, there are many different 'objects' in their environment which they do not name. Usually these subjects are those with which there is no immediate interaction. Questioning for the names of such subjects resulted in the answer that the Slave had no name, or a very general name (life form?) was given, or alternately

the general term might be given a color modifier.

Willie McLeod added his caution that many of the 'names' that are given for certain objects (i.e. birds, plants, etc.) are simply a description of the object in question, and that different persons will give a different description.

Berlin et al. (1974) characterize a folk taxonomy as having a unique beginner, a few life forms, a number of genera and few species and varieties. Each succeeding category is usually a subdivision of one of the classes in the preceding category, although exceptions do occur. For example, a given genus may not belong to any of the recognized life forms.

Terms applied to life forms and genera are 'primary lexemes'. Such terms may be an unanalysable cluster of phonemes, or they may be unproductive or productive. Unproductive lexemes can be broken into two or more parts which have a meaning of their own, but the combined meanings do not produce a meaningful phrase as applied to the object for which the term stands. A productive lexeme has a useful meaning in the combination of the analysable parts.

Species and varieties are referred to by 'secondary lexemes' which consist of a label used for the generic name and a modifier. Secondary lexemes occur only in contrast sets (Berlin et al., 1974).

The presence of unique beginners (e.g. in English —— plant, animal) in

the Slave language was not ascertained.

9.1.1 Slave plant taxonomy

Among the plants three life forms appear to be recognized. The term dɛtšinɛ was translated to "willows" when shrubs were under discussion, and to "wood" when trees were the subject. In this regard it should be mentioned that the informant, in speaking English, used the term "willow" when discussing any shrub, as well as specifically applying it to those species which we call willows (which he identified in Slave by the term ka).

Tɬo^{h} was translated to "grass" and the term was applied to grasses, sedges and other plants having grass-like leaves, as well as a few which would appear to be unrelated.

ɛtõ was translated to mean "leaf". Earlier in the work it was thought that the term might be the equivalent to the English 'plant' (a unique beginner), because plants said not to have a name were often given the appellation ɛtõ at a different questioning session. It was decided that the translation to "leaf" was a closer representation because ɛtõ was not applied to specimens for which the terms tɬo^{h} or dɛtšinɛ had been used. The three terms are therefore interpreted to be mutually exclusive categories representing life forms. Not all named plants fall into one of these life forms. (Such are called unaffiliated generics by Berlin et al., 1974).

Table 13. Phonemes[1] used in recording Slave terms.

Phoneme	Sound as in:	Phoneme	Sound as in:
a	far	o	note
a^h	(aspirate)	o^h	(aspirate)
d	do	$\tilde{o}$	(nasalized)
e	French é	o'	note (with accent[3])
ε	men	s	sit
$ε^h$	(aspirate)	š	sh in shall
g	get	t	top
h	hi	θ	th in thin
i	hit	u	oo as in moo
ī	e in me	ŭ	up
i^h	(aspirate)	ũ	(nasalized)
ĩ	(nasalized)	w	we
j	jam	y	yet
k	kid	z	zip
l	lie	ž	zh sound
ɬ	(spiral sound[2])	^{m}b	bombard (mb)
m	man	^{n}d	send (nd)
n	no		

[1] International Phonetic Script symbols have not been followed absolutely due to the difficulty in representing some symbols with an ordinary typewriter.

[2] This sound was not easily distinguished, and hence the letter l may appear in cases where ɬ should have been used. It usually follows a t.

[3] Accent on vowels and consonants could not be determined, but it is suspected that it was used much more commonly than it was recorded.

Among the vascular plants, about 124 generic names were used. Eight of

these terms are recognized as synonyms with six of the other recognized genera. In addition there were several variations in the expression meaning "mountain grass", which were lumped together as one genus. Thus at least 116 genera of vascular plants were recognized by the Slave. Only five of these genera have specific subdivisions, with 17 species being named. Additional species may occasionally be designated by suffixing -a^{h}, atsɛllī, tšo or nɛtša (little, little one, big, big one). Those plants that were named by using life form terms with a color were not believed to be true genera, but simply a 'spur-of-the-moment' designation used only when the plant in question is present. It should be noted that this type of designation was not used to denominate any of the plants which are useful in any way to the Slave.

Twenty-eight generic names were unanalysable primary lexemes. An additional three were unproductive primary lexemes. Twenty-five generic names were not (possibly unanalysable, but many appear to have several components) translated. The remaining generic terms make use of several semantic dimensions. Properties such as smell, 'juiciness' and habitat were used. The utilization of the plant can provide its name. Especially important here are those used for medicinal purposes (designated by the term naydī). Analogy was made to animal parts. Of importance also was the utilization of a plant by a particular animal. Color has not been included among the semantic dimensions for the reason given above, although seven terms originating from five colors could be used. Table 14 gives the breakdown of the genera under semantic dimension.

Table 14. Semantic dimensions used in Slave nomenclature of plants.

Semantic dimension	# genera	Other categories
property of species	4	
size	2	numerous species
analogy	8	
animal use	20	
medicine -true	8	
-charm	8	
-other	3	
habitat	4	possible varieties
utilization	4	
Total	63	

Of the eight genera making use of analogy, two compare with other plants, five to animals or parts of animals and one to an article of clothing. Sixteen of the 19 terms which refer to 'medicinal' use contain the word naydī, translated as "medicine". Seven of these refer to the ailment treated, one describes the plant, and seven name the subject for which the plant serves as a charm (an additional one that appears to fit this category was said to be a "name only", and was not used for a charm). The other three generic names in this category do not employ the word for medicine, but two refer to the ailment to be treated and one refers to the effect of the medicine.

Size was an important dimension in species determination. The contrasting set may include big (tšo) and small (atsɛllī), or one may simply be designated as the smaller by the suffix -a^{h}.

Table 15. Unanalysable primary lexemes.

maθīlīu	ko'tsī
inkεθī	kī
nεtεnε	dakonε
εtso^h	kε
yagodī	hoε^h
gũ	ka
datɬoli	^{n}da^h
da^{h}kalli	tεta
untšu	tatõ
tεgaye	kohe^h
ỹ^{n}džea^h	tsu (—— , -a^h)*
kĩ džīa^h	^{n}duθε
^{n}datsεnε	tsutsī
εdεθõ	daθ εtõ (—— , atsεllī, nεtša, tšo)

Words or suffixes in parentheses denote additions to form species names.

Table 16. Untranslated, possibly analysable lexemes.

εtõ jõ holīa^h	yagodī panε
εtõ likε	kõka^{h}lī
tsuε allī = tsīε̃ allī	tɬo^h gaθõ (—— , -a^h)
tsεna hoε^h	tɬo^h daθεtšo
tsu duga^h	tsalε θonε^h
tsali^h ki^h	naθīta^h tɬo^h
tɬĩntε dεdžinε	εlīa
džīa^h dεhonε^h	εya(ha)dala
εtõ mε^{n}dεtlua^h	šī hεndεθε
εtõ ga^{h}līa^h	εtõ dεkoiyõ
ka (θa, θulε, da^h, kεllī)	kozõ θallī
θlõ duε^h	hluε tla^{h}lε^h
tɬo^{h}ga (—— , dītlī, dεtažya, tšo)	

Words or suffixes in parentheses denote additions to form species names.

Table 17. Slave names of plants grouped according to the semantic dimension used.

Slave term	Translation given	Literal translation or derivation
Property of the species:		
dǰia^{h} tɛθɛ	"berries water"	
ɛtõ tǰa	"big leaf"	
ɛtõ dɛtsī	"smell"	
ɛtõ hlɛkõ	"sweet"	
dǰī^{h} dɛθī	"good to eat"	
Size:		
a^{h} dakallī	"little white"	
dǰī^{h} tǰo		berries big?
Analogy:		
tɛtsīɛ^{h}	"water guts"	
tɛ tsua^{h}	"same tree water"	water spruce
tsa^{h}li(^{m}bɛ)θonɛ	breech clout	
da hoθɛ	whiskers or hair	
tsua^{h}	applied to ground pine	little spruce
^{m}bɛdzītī^{h}	"caribou horns"	
tlɪ̃ tǰɛ	"dog tail"	
tsa^{h}līkɛtõ	"frog feet plant"	tsa^{h}lī = frog, kɛ = foot, ɛtõ = plant
ɛtsõ ɛtõ	"moose guts"	
dɛ^{h}ɛnda	"geese eyes"	crane eyes
kozõ dakallī		nighthawk white
Animal uses:		
ha^{h}dõ	"geese eat"	
^{m}bɛθɪ̃zīɛlɛ	"owl berries"	
= ^{m}bɛθɪ̃dǰī		
do^{h} ɛdõ	"sheep eat"	
tsɛndī	"muskrat eat"	
tǰī dõ	"ducks eat"	
tsa^{h}lī dǰi	"frog berries"	
tsɛllī yanɛǰī	"mountain squirrel potatoes"	arctic ground squirrel "potatoes"
dɛdīɛ yanɛǰī	"mountain squirrel potatoes"	hoary marmot "potatoes"
= dɛdīɛ dǰī		
glõ dõ = glõ dǰī	"squirrel eat"	
= glõ yoǰɛtī		
dī θīli	"chickens eat"	
= dī yoǰɛtī		
noθɛdǰi	"marten berries"	

Table 17 (cont.)

Slave term	Translation given	Literal translation or derivation
tsa dǯī	"beaver berries"; "beaver ear"	
sa^{h} dǯĪ (ɛtõ)	"bears eat"	
= sa^{h} yɛnošɛtī		
= sa^{h} yošɛtī		
= sa^{h} tīlɛ^{h}		
kolõ dǯī	"moose berries"	(Johnny alone uses this name.)
tasa^{h} dǯi	"worm gonna eat 'em"	
õka dǯi	"whiskey-jack berries"	gray jay "berries"
yatonɛtõ	"jump deer" eat	yatonɛ = white-tailed deer; ɛtõ = leaf
noga ɛtso^{h}	"wolverine rhubarb"	
tlĩ dǯīa^{h}	"dog berries"	
dǯīa^{h} dɛ^{h}		"berries" crane
<u>Medicine</u>:		
kodzelī(a^{h}) naydī	sore heart medicine	
koθɛntelī naydī		elī = pain
dɛko naydī	"cough medicine"	
dɛtšinka naydī	?	
= kotzɛdɛtlelī	?	
kotzɛθī naydī	back medicine	
ya^{h} naydī		ya^{h} = lice
kotsŭ^{n}dago		nɛndatsŭ^{n}dago(θɛ) = "eyebrow"
(—, a^{h}, atsɛllī, dakallī)		
kolí^{h} naydī	?	? mouth medicine
naydī dakallī tɬo^{h}		white medicine grass
tsɛllī naydī	"girl medicine" (charm)	
tsa naydī	"beaver medicine"	
noθɛ naydī	"marten medicine"	
nogɛθɛ naydī	"fox medicine"	
dɛdīɛ naydī	"mountain squirrel medicine"	hoary marmot "medicine"
noθɛtšo naydī	"fisher medicine"	
dɛnɛlī naydī	"man medicine"	no man med :ine
nota naydī	"lynx medicine — name only"	
^{n}da^{h} dzɛku	"throw-up root"	
<u>Habitat</u>:		
ɛndago tɬo^{h}	"moose lick grass"	
^{n}dɛ(k)ɛtõ	"mud plant"	
= ^{n}dɛtlotõ		

Table 17 (cont.)

Slave term	Translation given	Literal translation or derivation
tsuīkali	"muskeg berries"	
tɛ^{h} dǯīa^{h} = tuɛ dǯī	"water berries"	
šīkɛkõ ɛtõa^{h}	"mountain top" leaf	
šīta^{h}ko tɬo^{h}	"mountain top" grass	
šikɛko tɬo^{h}ka^{h}	"mountain boss"	
šīkɛ = šīkɛkõ		
<u>Utilization</u>:		
θluɛ gõɛ θɛtɛ	fish-meat bannock	
nežī tɬo^{h}	"moose brain grass"	
tɬo^{h} dzīõ		grass berries?
ɛtõ dǯī		leaf berries?
<u>Color</u>:		
ɛ tõ dītlī(a^{h})		leaf blue
= ɛtõ dɛnītlī		
ɛtõ dakallī(a^{h})		leaf white
(also: a^{h} dakallī)		
ɛtõ dɛθoī		leaf yellow
ɛtõ di^{m}beθa		leaf brown
nɛtɬɛtõ	"red berries"	red leaf
= dɛtsilɛ		
ɛdɛtlɛ tšinɛllī	"color"; "pen"	

Words or suffixes in parentheses denote additions to form species names.

9.1.2 Slave animal taxonomy

Life forms in what we recognize as the animal kingdom appear to be innately recognized but not by terminology (called covert categories by Berlin et al., 1974).

Within the group of feathered animals a number of subcategories appear to be recognized, but a term including all does not seem to exist. Although tšua is translated to our "bird" (a life form in English), it appears to be applied in most cases to the Passerines, or to species which are not of any 'economic' importance (the "dicky-birds" in bird watchers' lingo) to the Slave. Similar categories include ha^{h} (goose), tšī (duck), εzε (hawk?), dī (chicken or grouse), dunzε tšo (sandpiper??), and ^{m}bεθī (owl). These terms appear to represent a higher category than genus, and might be termed classes of birds.

The lack of translations of bird names which appear to be productive lexemes increases the difficulty of analysis. In many cases it was not possible to determine if the informant was giving an actual name for a bird, or if he was simply describing it or its habitat or actions. As a result of this confusion it seems to be imprudent at this point to make a statement on the genera and species recognized.

No term was given for the life form represented by the English 'mammal', although it appeared to be recognized as a covert category. The Slave recognize 30 genera, and within six of those genera a possible 15 species may be recognized. One genus has four 'species', one has three 'species', and the remaining four genera have two 'species' each.

Differentiation at the species level occurs within the two semantic dimensions color and size. Of the four species of bear (sa^{h}) recognized, three are distinguished by color (color phases of the black bear) and one by size. (The recognition of the color phases may be post-trading terms.)The three 'species' of fox correspond to the three color phases,

but since no translation could be made other than the English terms red, black and cross-fox, it is uncertain whether the Slave names actually designate the color. A coyote was designated as a "small wolf", and a fisher as a "big marten". The color phases of the snowshoe hare were given as black and white. These may not be recognized as species, although the designation was used, since they apply only to the color of the fur in different seasons. Black and white color phases were also recognized in Dall's sheep.

The Slave recognized 12 genera of fish, with no species. The general designation for fish, tɬu, was the same as that applied to the most commonly netted fish in Fisherman Lake.

9.2 Implications from Slave taxonomy

About 55% (35) of the generic names used for plants employ the name of an animal as a component. This figure points to the importance of animals in the life of the Slave. A high percentage of the environment that was classified, was so classified with respect to the animal life. Fifty-seven percent (20) of the generic terms employing animal names described or inferred the use of that plant by the animal mentioned. Such a high percentage would suggest that the Slave saw their environment 'through the eyes of the game animals', so to speak. Such a mode of cognizance could be very important in a society with an animal-based subsistence. A hunter will be more successful in taking game if he understands how his quarry sees and responds to its environment.

About 33% (21) of the generic names of plants imply or describe the use of the plant by the Slave. Hence utilization was also an important factor in the evolution of generic names. In addition 82% (23) of the unanalysable primary lexemes were for plants which were used by the Slave. Thus it would appear that in the naming of the plants around them those species of direct or indirect importance to the Slave were the only ones which they found it necessary to name. With some exceptions, other plants were simply

described when it became necessary to communicate ideas about them.

All fish types were recognized by primary lexemes, and a high percentage of the mammals. In the classification of the birds, a much smaller percentage of primary lexemes was used, but the lowest use was to be found in the naming of plants. This fact would also seem to emphasize the importance of animals in Slave cognizance of their environment.

CHAPTER 10. COMMENTARY

The Fisherman Lake Slave provided information on about 98 species (see Table 18, this page) of plants used by the Slave. Table 18 gives a general breakdown of uses and the number of families, genera and species useful in each category. Several uses for plants have been introduced to the Slave in the historic era.

Table 18. Numbers of families, genera and species represented by all vascular plants used by the Slave of Fisherman Lake.

Category	# Families	# Genera	# Species
Total	38	74	98+
Food	23	39	51+
Medicine	18	33	41+
Charms	5	7	7+
Technology	10	12	16+
Other	9	12	13+
Introduced spp.	2	2	2

Table 19 (page 269) presents information on numbers of taxa for which uses were known to be introduced. Some species represented here also had been used formerly, but for different purposes. Introduced foods include those species which were used for the preparation of "brew" (fermented drinks). It is uncertain whether Mackenzie's statement (see page 58) on the non-use of the roots of sweet vetch should be taken as an indication that use of this plant as a food was introduced. (It was not included in Table 19.) All medicines described as "T.B. medicine" were likely introduced, as tuberculosis was not a native disease. However some of

these medicines may have previously been used for such ailments as colds, coughs or congestion. The technological use that was questioned was the making of buttons. Aboriginals may have made decorations of balsam poplar bark, but buttons do not appear to have been made by any of the northern Indians. Other introduced uses include the making of pipes and the preparation of tobacco substitutes. The introduction of smoking and alcoholic beverages account for over 75% of the introduced uses of plants.

Table 19. Numbers of families, genera and species of vascular plants whose use was known to be introduced to the Slave of Fisherman Lake.

Category	# Families	# Genera	# Species
Total	11	14	14
Food	5	6	6
Medicine	2	2	2
Charms	1	1	1
Technology	1	1	1
Other	4	4	4

More than 84 out of 96 (88%) species discussed (counting groups of undistinguished species such as *Betula* spp., *Salix* spp., etc., as one) appear to have been in use by the Slave in the Fisherman Lake area at the time of contact. Sixteen of these (19%) were available only from alpine areas, as noted in Table 20 (page 270), the remainder were available from the boreal forest and aquatic sites such as streams, rivers, ponds and lakes.

Dismal reports of early explorers stated that Slave and other northern Athabascans had no knowledge of herbal remedies. They failed to mention

Table 20. Numbers of families, genera and species of vascular plants available to the Fisherman Lake Slave only from alpine areas.

Category	# Families	# Genera	# Species
Total	10	15	16
Food	5	8	8
Medicine	4	5	5
Charms	2	2	2
Technology	1	1	1
Other	2	2	2

any roots, greens, beverage plants or confections, etc. used by these natives. From information available no conclusions can be drawn as to whether the multiplicity of plant uses recorded here were developed in post-contact times, or earlier. Regardless of when knowledge of such uses became available it seems that a large percentage of them have been lost in the last generation. Although the older people still retain the knowledge of them the figures in Table 21 suggest that only about half of the species previously found useful are now used.

Table 21. Numbers*of families, genera and species of vascular plants that were observed being used, or that were noted to have been used by the older generation of Fisherman Lake Slave.

Category	# Families	# Genera	# Species
Total	18	29	43
Food	11	18	29
Medicine	3	5	5+
Technology	6	7	10+
Other	2	2	3+

* These figures may be low due to lack of specific questioning on this matter. It is not known whether or not charms were still used.

Information was obtained on the use of about 81 species of animals as shown in Table 22. Only the use of clam shells for making buttons was thought to be introduced.

Table 22. Families genera and species of animals for which use by the Slave of Fisherman Lake was recorded.

Category	Past Use			Present Use
	# Families	# Genera	# Species	# Families
Total	28	63±	81±	?
Food	23	49±	65±	18
Medicine	2	2	2	-
Technology	16	42±	58±	4
Other	7	10±	10±	1

± designates approximate figures. The exact number of genera or species was not known, because the occurrence of some species in the area is not certain (refer to Appendices II, III, and IV).

With regard to animal use it would appear that efficiency of use has dropped. The same species are still being used as sources of food (except for some types of birds), but viscera and other parts formerly eaten are no longer used. This is in some part due to the influence of European tastes. Use of animal parts in technology, medicine, etc., has been reduced drastically, largely due to substitution of imported goods. Major use was observed only for hides and ulna fleshers. Use of fur-bearing species increased with their increased economic value.

The steps in constructing articles now seldom made have been recorded in detail. Some items were merely described because lack of time and

materials precluded their construction. Technological knowledge has generally decreased or been replaced with new methods. Many artifacts are no longer made, their use being obsolete or displaced by goods manufactured outside the area. Knowledge of processing is decreased in the younger generation. Most significant changes have been brought about by the adoption of metal tools and utensils and store-bought clothing, which remove the necessity for the people to make these items themsleves from the materials at hand.

Recorded here is a large portion of the knowledge that it was the purpose of this project to salvage, however it is far from complete. Other informants, both from Fort Liard and elsewhere, could supply additional information, as could observations at other seasons of the year in addition to summer.

The picture drawn of the Slave in the past through their uses of environmental components was one of complete interaction with the local environment. Use of available resources was, of necessity, highly efficient and each group of men and women, between whom knowledge of processes and types of labor were divided, was a self-sufficient unit.

The gradual absorption into an outside economy resulted in the loss of efficiency of use of local resources and that loss in efficiency tied the people into dependance upon the outside economy. This further decreased efficiency of use and knowledge of how to use the local resources.

Now that young children are sent to schools their chances of gaining 'bush-knowledge' are further reduced. The learning of another language and the contact with other cultures results in changes in the cognition of their environment. So acculturation proceeds, and the capabilities of these people for living 'off the land' decreases. Only time will tell where it will lead.

GLOSSARY OF TERMS[1]

aboriginal *adj.* primitive, earliest; *n.* a first inhabitant

aboriginally *adv.* from the beginning

accent stress or emphasis placed on a phoneme or syllable

acetabulum the socket of the hip bone

achene a small, dry, hard, one-locular, one-seeded indehiscent fruit

affine person related by marriage

ament a catkin, or dry scaly spike, usually unisexual

A.M.O.C.O. A.M.O.C.O. Canada; Canadian branch of American Oil Co.

anal fin fin on the ventral side, posterior to the anus

artifact something shaped by the art of man and not by nature

aspirate to pronounce with a full breathing sound, to prefix the sound h to a word or letter

babiche *n.* term of French origin referring to cord made from rawhide

bannock a quick bread similar to baking-powder biscuits, baked in a frying pan over the open fire

barking tool tool used to remove sections of bark from trees or shrubs

baste to sew with long, loose stitches to hold in place temporarily

beaver castor glands lateral to the anus which produce the musky smelling castoreum

berry a pulpy fruit with immersed seeds

bryophytes mosses and liverworts

cambium a layer of persistent meristematic tissue giving rise to secondary vascular tissue in vascular plants

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1 References consulted were Fernald (1970), Irvine (1963) and Moss, H. (1965).

cane stem of blackberry or raspberry, usually refers to stems over one year old which are semi-woody

capsule a dry, dehiscent fruit composed of more than one carpel

Carboniferous a period of the Paleozoic era, 280 to 345 million years b.p.

carpel a simple pistil or one member of a compound pistil

cartilage a strong, elastic, transparent tissue in the body; gristle

cathartic purgative; medicine promoting evacuation of the bowels

cone fruit-bearing structure of plants in the pine family

corymb a flat-topped or convex open flower cluster, flowering at the margins first

cm centimeter, one hundredth of a meter

Cretaceous last period of the Mesozoic era,63 to 135 million before present

decoction an extract procured by boiling

dehiscent opening regularly by valves, slits, etc.

diuretic a medicine which tends to increase the flow of urine

dm decimeter, one tenth of a meter

drupe a fleshy or pulpy fruit with an interior hard stone or pit

ease to slacken, usually refers to the slackening or bunching up of one of the sides of a seam, so that it will fit the other which is shorter

eutrophic highly productive in terms of organic matter produced

febrifuge a drug taken to allay fever

fibula the slender outer bone of the lower hind leg

F.L.A.P. Fisherman Lake Archaeology Project

Gray Wooded great group subdivision of the Podzolic Order of soils, associated with forest vegetation

gunwale the upper edge of the side of a boat or ship

herb a plant of which parts are used for medicine, food or scent

hip the fruit of a rose, fleshy floral cup surrounding bony achenes

Humic Gleysol great group subdivision of the Gleysolic Order, which is characteristically poorly drained and marked by blue, rusty, yellow or white streaking.

indehiscent remaining persistently closed (refers to fruits)

innominate bones hip bones

I.N.S. Institute for Northern Studies, University of Saskatchewan

legume fruit characteristic of the pea family, having two to many seeds

lexeme an element of a vocabulary

lichen 'plants' consisting of symbiotic algae and fungi

locule the cavity of an ovary

m meter

mericarp a portion of a fruit which splits away as a seemingly separate fruit, characteristic of plants in the Umbelliferae

meristem tissue made up of cells capable of dividing indefinitely

mustem mixtures of various materials put upon or near traps to attract the animal for which the trap was set

nasalized sound modified by the nose, such as the letters m and n

n.d. no date

Organic great group great group (called Peat great group by Moss, 1965) of the Organic Order of soils, poorly drained of organic material over mineral

Orthic subgroup subdivision of great groups of soils

overcast in sewing, to stitch over and around the edges of the material,

usually done to prevent unravelling of the fabric

over-cut cut made in a tree on the opposite side, and slightly higher than an under-cut, to make the tree fall away from that side

pelvic bone bone of the hip

peritoneum the membrane which lines the abdominal cavity and surrounds the intestine

Permian last period of the Paleozoic, 240 to 280 million years ago

petiole the support or stalk of a leaf

pome fruit formed from an inferior ovary, surrounded by fleshy receptacle

phoneme a sound of speech

prow the forepart or bow of a ship

radius smaller bone of the lower foreleg

Rego subgroup subdivision of great groups of soils

rhizome an underground stem, usually horizontal, rooting at nodes, curving up at the apex

rosette a cluster of leaves or other organs in a circular form

rut mating season of members of the deer family

tail fin the caudal fin, occurring at the end of the spinal column

tangent a line which touches a curve, but when extended does not cut it

tuber (also tuberous) a thickened, short, underground branch with buds or 'eyes' (tuber-like)

ulna larger bone of the lower foreleg

under-cut cut made in a tree, low down, on the side towards which it is desired that the tree should fall

vamp the upper leather of a shoe or boot

withe tough flexible twigs used in basket-making, thatching, etc. (willow)

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APPENDIX I

ANNOTATED PLANT LIST

The following is a list of the plant species found in the Fisherman Lake area (60° 20' N, 123° 45' W) and on nearby Pointed Mountain (60° 22' N, 123° 55' W). A few specimens were also collected on the LaBiche Mountains just south of Dendale Lake (60° 44' N, 123° 30' W). One specimen is from "Grass Lake" (60° 50' N, 123° 30' W) and a few are from Fort Liard (60° 14' N, 123° 29' W). Specimens from the LaBiche Range have collection numbers prefixed by GM, while those from the other areas are prefixed with FL. Latin names of the species are followed by the common names where these are known. Comments have been made on the status (as defined below) of species and notes on where each was found in the area. Flowering and fruiting dates are given where they are known.

Appended to the list are a few species which Johnny Klondike reported to have seen in the area, but which were not found during summer field work.

The sequence of families generally follows the Engler and Prantle order as modified by Moss (1959) with generic and specific names in alphabetic order. Latin nomenclature follows either Hulten (1968) or Moss (1959) with some synonyms given where they were thought useful.

Definition of terms:

Rare ..... plants observed in one location

Very uncommon . plants observed in two to five locations

Uncommon ..... plants observed in more than five locations

Scattered ..... plants thinly dispersed throughout the area (many locations with only one or two plants at each location)

Common ..... generally distributed throughout the area, occasionally occurring in pure stands

Abundant ..... generally distributed throughout the area, frequently occurring in pure stands

Local ..... in a given locality the numbers of individuals may differ from the general distribution, resulting in what may be termed locally abundant, locally common, etc.

Part I

Vascular plant species

POLYPODIACEAE

Cystopteris fragilis (L.) Bernh. Fragile Fern
Very uncommon. In rock crevices in alpine tundra on Pointed Mountain. FL103, FL382, FL589.

Cystopteris montana (Lam.) Bernh. Mountain Bladder-fern
Very uncommon. In damp soil near rivulets on Pointed Mountain. FL301, FL652.

Dryopteris dilatata (Hoffm.) A. Gray ssp. *americana* (Fisch.) Hult. = *D. austriaca* (Jacq.) Woynar
Spiny Wood-fern
Very uncommon. In rock crevices at 1230 m on the center peak of Pointed Mountain. FL94, FL632, FL633.

Dryopteris fragrans (L.) Schott. Fragrant Cliff-fern

Very uncommon. In open rocky areas at 1230 m on the center peak of Pointed Mountain. FL95, FL96, FL634.

Gymnocarpium dryopteris (L.) Newm. = *Dryopteris disjuncta* (Ledeb) Morton
Oak-fern

Rare. In rock crevices at about 1230 m on the center peak of Pointed Mountain. Cody's collection 18 miles (28.8 km) southwest of Fort Liard (Cody, 1963) and Raup's from Brintnell Lake (Raup, 1947) are the only records for Mackenzie District other than Hooker who stated that it occurred "to Bear Lake" (1825:40 in Cody 1963:109). FL63.

Matteuccia struthiopteris (L.) Todaro Ostrich-fern

Rare, but locally common in the area found. In a ravine under aspen, willow and saskatoon, at Fort Liard. FL620, FL718.

Polypodium vulgare L. ssp. *columbianum* (Gilb.) Hult.
Common Polypody
Licorice Fern

Rare. In rocky areas at about 1230 m on the center peak of Pointed Mountain. FL635.

EQUISETACEAE

Equisetum arvense L. Common Horsetail

Common to abundant. In mineral soil in disturbed areas, scattered on lakeshores and in other areas of wet soil around Fisherman Lake. Also on alpine tundra on the LaBiche Mountains in the vicinity of Dendale Lake. FL28, FL51, FL270, FL413, FL444, GM43.

Equisetum fluviatile L. Water Horsetail

Locally common in the shallow waters of Fisherman Lake. FL443.

Equisetum palustre L. Marsh Horsetail
Meadow Horsetail

Rare? In a wet area behind the ice-push ridge on the northeast shore of Fisherman Lake, west of Brother's cabin. FL564.

Equisetum pratense Ehrh. Meadow Horsetail

Uncommon. In wet soil along lakeshores and temporary drainage systems. FL13, FL59.

Equisetum scirpoides Michx. Dwarf Scouring-rush
Scattered. Mossy spruce woods and bog forests in the Fisherman Lake valley. Also under pine woods and timberline forest and on alpine tundra on Pointed Mountain. FL14, FL426.

Equisetum sylvaticum L. Woodland Horsetail
Locally common. On roadsides in the Fisherman Lake valley. Uncommon in timberline forest, Pointed Mountain. FL71, FL82, FL427.

Equisetum variegatum Schleich Variegated Horsetail
Northern Scouring-rush
Rare. In pool in ditch. FL420 (+ additional collection made at the same location).

LYCOPODIACEAE

Lycopodium alpinum L. Alpine Club-moss
Ground-fir
Rare. On alpine tundra of the LaBiche Mountains near Dendale Lake. GM28.

Lycopodium annotinum L. Stiff Club-moss
Bristly Club-moss
Uncommon. Under deciduous woods. FL15, FL116, FL418.

Lycopodium clavatum L. var. *monostachyon* (Grev. & Hook.) Sel.
Running Club-moss
Rare. On alpine tundra on the center peak of Pointed Mountain. FL410.

Lycopodium complanatum L. Ground-pine
Ground Cedar
Very uncommon. Under aspen woods in the Fisherman Lake valley and on shrubby alpine tundra on Pointed Mountain. FL19, FL176.

Lycopodium selago L. Mountain Club-moss
Fir Club-moss
Very uncommon. On alpine tundra of Pointed Mountain and the LaBiche Mountains near Dendale Lake. FL210, FL388, GM9.

PINACEAE

Abies lasiocarpa (Hook.) Nutt. Alpine Fir
Very uncommon in forests of the Fisherman Lake valley. Co-dominant with white spruce in forests of the upper

slopes of Pointed Mountain. Scattered in timberline forests and alpine tundra. FL347, FL532.

Juniperus communis L. ssp. *nana* (Willd.) Syme
Ground Juniper
Very uncommon in alpine tundra of Pointed Mountain. FL209, FL531.

Larix laricina (DuRoi) K. Koch. American Larch
Tamarack
Scattered in wet areas of bog forest. Rare on higher lake terraces of the Fisherman Lake valley. Uncommon on alpine tundra of Pointed Mountain. FL267, FL679.

Picea glauca (Moench.) Voss White Spruce
Common to locally abundant. Co-dominant in mixed woods and mixed coniferous. Pure stands are limited in area. FL569.

Picea mariana (Mill.) B.S.P. Black Spruce
Bog Spruce
Common to abundant. Dominant to co-dominant tree in coniferous forests of the Fisherman Lake valley. FL470.

Pinus contorta Dougl. Lodgepole Pine
Very uncommon throughout the Fisherman Lake valley. Scattered in timberline forest, uncommon on alpine tundra and a common tree in secondary forest (following fire) on the west slopes of Pointed Mountain. FL170, FL533.

TYPHACEAE

Typha latifolia L. Common Cattail
Uncommon. Locally abundant at pool edges. FL560.

SPARGANIACEAE

Sparganium angustifolium Michx. Narrow-leaved Bur-reed
Locally common in shallow water of Fisherman Lake. FL684.1 .

Sparganium multipedunculatum (Morong) Rydb.
Many-stalked Bur-reed
Status is not known for this species because it was not recognized in the field but it is believed to be less common than *S. angustifolium* in the shallow waters of Fisherman Lake. Fruiting heads were nearly mature in mid-August. FL684.2.

POTAMOGETONACEAE

Potamogeton perfoliatus L. var. *richardsonii* Benn.
Red-headed Pondweed
Common in water to 2 m deep in Fisherman Lake. FL226, FL479.

Potamogeton praelongus Wulf. White-stemmed Pondweed
Very uncommon? Seen only at the southeast end of Fisherman Lake. FL537.

Potamogeton vaginatus Turcz. Large-sheathed Pondweed
Scattered in shallow water of Fisherman Lake. FL230, FL483.

ALISMACEAE

Sagittaria cuneata Sheldon Wapato
Arum-leaved Arrowhead
Very uncommon in shallow water in Fisherman Lake. FL405, FL680.

GRAMINEAE

Agropyron cristatum (L.) Gaertn. Crested Wheatgrass
Introduced. Common on Pointed Mountain airstrip.

Agropyron trachycaulum (Link) Malte. Slender Wheatgrass
Rare on roadside. FL691, collected on the shore of Fisherman Lake may be this species, although it is not typical. FL356, FL691?

Agropyron trachycaulum (Link) Malte. var. *novae-angliae* (Scribn.) Fern.
Western Wheatgrass
Rare. At edge of road near Pointed Mountain airstrip. FL663.

Agrostis scabra Willd. Hairgrass
Ticklegrass
Very uncommon. Disturbed areas around the shores of Fisherman Lake. FL650, collected on the south ridge of Pointed Mountain where it was abundant on a ridge of mineral soil, may be a local race or possibly var. *geminata* (Trin.) Hult. (A. Skoglund, personal communication). FL685, FL650?

Alopecurus aequalis Sobol. Green Foxtail
Rare. In disturbed areas on the shores of Fisherman Lake. FL665.

Arctagrostis latifolia (R.Br.) Griseb. var. *arundinacea* (Trin.) Griseb.
Uncommon on damp soil of stream banks and lakeshores around Fisherman Lake and on Pointed Mountain. FL234, FL319, FL324, FL349.

Arctagrostis latifolia (R.Br.) Griseb. var. *latifolia* Polar Grass
Rare on the shore of Fisherman Lake and on alpine tundra of the LaBiche Mountains near Dendale Lake. FL689, GM14.

Beckmannia syzigachne (Steud.) Fern Sloughgrass
Rare on shore of Fisherman Lake and at the edge of a rivulet on Pointed Mountain's center peak at 1230 m. FL399, FL643.

Bromus inermis Leyss. Awnless Brome
Rare. Introduced. At 1265 m on center peak of Pointed Mountain and on the airstrip. FL166, FL344.

Calamagrostis canadensis (Michx.) Beauv. Blue-joint
Uncommon. In moist soil throughout the Fisherman Lake valley, and on Pointed Mountain. In areas of disturbance by man it becomes common to abundant (e.g. old camp sites). FL720 from "Witchs' Plain" shows introgression with *C. inexpansa*. FL117, FL199, FL232, FL273, FL316, FL624, FL720.

Calamagrostis inexpansa Gray Northern Reedgrass
Very uncommon in moist soil on shores of Fisherman Lake. FL353, FL690.

Calamagrostis neglecta (Ehrh.) Gaertn. Narrow Reedgrass
Rare. Collected along the road near the Kotaneelee River. FL699.

Calamagrostis purpurascens R. Br. ssp. *purpurascens* Purplish Bentgrass
Rare. Found on rocky north-facing slope of the center peak of Pointed Mountain at 1230 m. FL636.

Cinna latifolia(Trev.) Griseb. Drooping Wood Reed
Rare. In moist soil on shore of Fisherman Lake. FL686.

Elymus sibiricus L. Siberian Wild Rye
Rare. At edge of road near the Kotaneelee River. Collected in this area by Jeffrey (1961) and along the Liard River by Cody (1963). This is the only known area of occurrence in the Mackenzie District. FL702.

Festuca altaica Trin.

Very uncommon. Tufted in dry soil on alpine tundra of the north ridge of Pointed Mountain. Also on the LaBiche Mountains near Dendale Lake. FL509, GM15.

Festuca baffinensis Polunin.

Very uncommon on alpine tundra at 1330 m on the north ridge of Pointed Mountain. FL610.

Festuca brachyphylla Schultes — Short-leaved Fescue

Very uncommon on alpine tundra on Pointed Mountain. FL99.

Festuca rubra L. — Red Fescue

Rare. At road edge at 1230 m on Pointed Mountain. FL644.1.

Hierochloe alpina (Sw.) R.& S. — Alpine Sweet Grass

Uncommon on alpine tundra of Pointed Mountain and the LaBiche Mountains near Dendale Lake. FL100, FL376, FL510, GM16.

Hierochloe odorata (L.) Wahl. — Sweet Grass

Very uncommon in moist soil on the shore of Fisherman Lake and the bank of the Liard River about 14.5 km southwest of Fort Liard. FL54, FL434.

Hordeum jubatum L. — Foxtail Barley, Squirrel-tail Grass

Very uncommon. In areas disturbed by heavy machinery. FL341, FL687.

Hordeum vulgare L. — Barley

Rare. Introduced. One plant found growing on the roadside around 1230 m on the center peak of Pointed Mountain. FL317.

Lolium perenne L. — Common Darnel

Rare. Introduced. Found growing on Pointed Mountain airstrip. Not reported for the N.W.T. by Porsild and Cody (1968). FL339.

Phalaris arundinacea L. — Reed Canary Grass

Very uncommon on sandy shores of Fisherman Lake. FL623.

Phleum alpinum L. — Mountain Timothy

Rare. On alpine tundra on north ridge of Pointed Mountain. FL386.

Phleum pratense L. Common Timothy

Very uncommon. Introduced. In areas disturbed by humans. FL667.

Poa alpina L. Alpine Bluegrass

Rare? Tufted in moist alpine tundra at 1330 m on the north ridge of Pointed Mountain. FL587.

Poa glauca M. Vahl. Meadow-grass
Glaucous Bluegrass

Rare in alpine tundra at 1330 m on the north ridge of Pointed Mountain. FL611.

Poa pratensis L. Junegrass
Kentucky Bluegrass

Very uncommon. All specimens from moist soil in areas of disturbance (lakeshore, and along an Indian trail through bog forest). FL198, FL240, FL666. (FL666 is atypical.)

Trisetum spicatum (L.) Richter ssp. *majus* (Vasey) Hult.

Rare. At edge of road at 1230 m on the center peak of Pointed Mountain. Not recorded for the N.W.T. by Porsild and Cody (1968). FL311.2.

Trisetum spicatum (L.) Richter ssp. *spicatum*
Spike Trisetum

Uncommon in mineral soil and on alpine tundra above 1230 m on Pointed Mountain. FL311.1, FL374, FL609, FL734.

CYPERACEAE

Carex aenea Fern. Hay Sedge

Scattered in mineral soil in disturbed areas in the Fisherman Lake valley. FL143, FL335, FL688, FL693.

Carex albo-nigra Mack.

Very uncommon in alpine tundra on Pointed Mountain. FL365, FL608.

Carex aquatilis Wahl. Water Sedge

Common in wet areas of the Fisherman Lake valley and around pools on the top of the south ridge of Pointed Mountain. FL90, FL237, FL254, FL274, FL325, FL328, FL647, FL705.

Carex atherodes Spreng. Awned Sedge

Rare?? Collected with *C. rostrata* on the shore of Fisherman Lake at Village Point. May be more common

than noted as it was not distinguished in the field. FL706.

Carex atrata L. Black Sedge
Rare? In stony alpine tundra on the center peak of Pointed Mountain. FL158 may be an immature specimen of this species. FL158?, FL163.2.

Carex atrata L. ssp. *atrosquama* (Mack.) Hult.
Rare? In moist ditch. FL466.

Carex aurea Nutt. Golden Sedge
Uncommon. In wet soil on seismic lines and in ditches in the Fisherman Lake valley. FL214, FL251, FL358.

Carex brunnescens (Pers.) Poir. Brownish Sedge
Rare? On wet cut-line through edge of bog forest on the northeast shore of Fisherman Lake. FL217.

Carex canescens L. Hoary Sedge
Very uncommon. Bog forest and wet soil of disturbed areas in the Fisherman Lake valley. FL145, FL277, FL329, FL692.

Carex capillaris L. Hair-like Sedge
Rare. In alpine tundra on the north ridge of Pointed Mountain. FL520.

Carex concinna R. Br. Beautiful Sedge
Rare. In disturbed area of bog forest on the northeast shore of Fisherman Lake. FL454.1, FL454.2.

Carex deweyana Schw.
Very uncommon. In bog forest and wet ditch in the Fisherman Lake valley. FL201, FL559.2.

Carex diandra Schk. Two-stamened Sedge
Rare? In bog forest at southeast end of Fisherman Lake. FL233.

Carex dioica L. ssp. *gynocrates* (Wormsk.) Hult.
Northern Bog Sedge
Rare. Found in an old burn with regrowth of black spruce on the southwest side of Fisherman Lake. FL92.

Carex disperma Dewey Soft-leaved Sedge
Uncommon in wet areas (often disturbed) and in bog forest in the Fisherman Lake valley. FL25, FL200, FL216, FL453.

Carex garberi Fern.
Rare. Wet area in ditch between Fisherman Lake and the Liard River. FL559.1.

Carex lachenalii Schkuhr. Two-parted Sedge
Uncommon. In alpine tundra of the LaBiche Mountains near Dendale Lake. GM24.

Carex lacustris Willd. Lakebank Sedge
Rare? On seismic line north of Brother's cabin. FL249.

Carex magellanica Lam. ssp. *irrigua* (Wahl.) Hult.
Bog Sedge
Rare? In bog forest at the southeast end of Fisherman Lake. FL276.

Carex media R. Br. Intermediate Sedge
Very uncommon. On cut-lines on the northeast side of Fisherman Lake. FL215, FL561.

Carex membranacea Hook.
Uncommon in alpine tundra of the LaBiche Mountains near Dendale Lake. GM46.

Carex microchaeta Holm.
Uncommon in alpine tundra of the LaBiche Mountains near Dendale Lake. Rare in stony tundra on Pointed Mountain's center peak. GM11, FL163.1.

Carex misandra R. Br.
Uncommon in alpine tundra of the LaBiche Mountains near Dendale Lake. GM12.

Carex praticola Rydb. Northern Meadow Sedge
Rare? Collected in a wet area on a cutline through the edge of a bog forest near the shore of Fisherman Lake. FL213.

Carex pyrenaica Wahl.
Uncommon in alpine tundra of the LaBiche Mountains near Dendale Lake. GM41.

Carex rostrata Stokes Beaked Sedge
Scattered throughout in wet areas. Common along shores of Fisherman Lake. FL249, FL253, FL257, FL396, FL698, FL704.

Carex rupestris All. Rock Sedge
Rare. In stony alpine tundra on the center peak of Pointed Mountain.

Carex saxatilis L. var. *major* Olney = *C. physocarpa* Presl.
Rare. Found only at the edge of a pond on the top of the south ridge of Pointed Mountain. FL648.

Carex vaginata Tausch. Sheathed Sedge
Very uncommon. Under black spruce and in moist ditch near black spruce woods in the Fisherman Lake valley. FL321, FL465.

Eleocharis palustris (L.) R. & S. Spike-rush
Scattered on sandy shores and in very shallow water of Fisherman Lake. FL225, FL397, FL504.

Eriophorum angustifolium Roth. Narrow-leaved Cotton-grass
Uncommon. Around pool edges in open bog forest, at the southeast end of Fisherman Lake. Also in an area of water seepage on the north ridge of Pointed Mountain. FL269, FL354, FL586.

Eriophorum brachyantherum Trautv. & Mey
Very uncommon. In wet ditch and at the edge of pools in open bog forest at the southeast end of Fisherman Lake. FL73, FL469.

Eriophorum russeolum Fr. var. *albidum* Nyl.
Very uncommon. Known from pool edges in open bog forest at the southeast end of Fisherman Lake. FL278, FL476.

Eriophorum vaginatum L. ssp. *vaginatum*
Uncommon in wet moss in open bog forest of the Fisherman Lake valley. Also scattered in 'grassy' tundra on the top of the ridge of the LaBiche Mountains south of Dendale Lake. FL202, FL475, GM1.

Scirpus acutus Muhl. Hard-stemmed Bulrush
Viscid Great Bulrush
Rare? One specimen, tentatively identified as this species by J.H. Hudson was collected from the south-east end of Fisherman Lake. FL539.

Scirpus microcarpus Presl. Small-fruited Bulrush
Rare. Known only from wet ground near a small pool north of Brother's cabin. FL258.

Scirpus validus Vahl. Great Bulrush
Soft-stemmed Bulrush
Abundant in shallow water of Fisherman Lake. FL229, FL395, FL703.

ARACEAE

Acorus calamus L. Sweetflag

Rare. Known only from "Grass Lake" which is near the Liard River, downstream from Flett Creek (approximately 60° 44' N, 123° 30' W). Apparently has not previously been collected from southwestern Mackenzie District. FL719.

Calla palustris L. Wild Calla

Rare. Locally abundant in small pond north from Brother's cabin. Also abundant at "Grass Lake". FL256, FL573.

LEMNACEAE

Lemna minor L. Duckweed

Very uncommon. On surface of small pond north from Brother's cabin and in some muskeg pools. FL255, FL572.

JUNCACEAE

Juncus alpinus Vill. Alpine Rush

Scattered on sandy shores of Fisherman Lake. FL360, FL398, FL668.

Juncus bufonius L. Toad Rush

Rare? Seen only in disturbed area of construction site at the base of Pointed Mountain. FL364.

Juncus castaneus Sm. Chestnut-colored Rush

Scattered along stream banks and wet ditches in the Fisherman Lake valley. FL144, FL366, FL390, FL701.

Juncus drummondii E. Meyer

Rare? In moist areas in alpine tundra of the LaBiche Mountains near Dendale Lake. Recorded as new to the Yukon by Porsild (1951) along the Canol Road. GM40.

Luzula confusa Lindeb.

Rare? Local abundance in slight depression on the top of the south ridge of Pointed Mountain. FL649.

Luzula multiflora (Retz.) Lej. ssp. *multiflora* Many-flowered Woodrush

Very uncommon. In dry mineral soil on the north ridge of Pointed Mountain. FL375, FL513.

Luzula parviflora (Ehrh.) Desv. ssp. *parviflora*
Small-flowered Woodrush
Uncommon in moist areas of alpine tundra on Pointed Mountain. FL164, FL293, FL583.

LILIACEAE

Maianthemum canadense Desf. Wild Lily-of-the-valley
Very uncommon. Locally scattered. Under the *Alnus* in the Fisherman Lake valley and on a cutline on the slope of the south ridge of Pointed Mountain. FL535, FL655, FL721.

Smilacina trifolia (L.) Desf. Three-leaved Solomon's-seal
Very uncommon in wet *Sphagnum* in bog forests. Flowering in early June. Fruits not yet ripe on July 22. FL64, FL326.

Streptopus amplexifolius (L.) DC. Twisted-stalk
White Mandarin
Rare. Found in only one location under *Salix* at the edge of a spring-fed stream on the center peak of Pointed Mountain at about 1230 m. Fruits not yet ripe on August 22. This appears to be the fourth record for the N.W.T. (see Scotter and Cody, 1974: 878). FL403, FL642.

Tofieldia coccinea Richards. Northern False Asphodel
Rare? In stony alpine tundra on the north ridge of Pointed Mountain. Flowers present on July 29. FL726.

Tofieldia pusilla (Michx.) Pers. Common False Asphodel
Very uncommon in stony alpine tundra on Pointed Mountain. Flowering in early July. FL162, FL211, FL729.

Veratrum viride Ait. ssp. *escholtzii* (Gray) Love & Love
False Hellebore
Uncommon yet locally abundant in moist areas in alpine tundra on Pointed Mountain, the Kotaneelee Mountains, and the LaBiche Mountains near Dendale Lake. FL307, FL394, FL598.

Zygadenus elegans Pursh White Camas
Scattered in mesic alpine tundra on Pointed Mountain. Also seen in lodgepole pine forest on the north ridge of Pointed Mountain. Flowering begins in mid-July. FL294, FL370, FL578.

ORCHIDACEAE

Calypso bulbosa (L.) Oakes — Venus' Slipper
Very uncommon. In litter under deciduous woods in the Fisherman Lake valley. Flowers in early June. FL18, FL423.

Corallorrhiza trifida Chat. — Early Coral-root, Pale Coral-root
Very uncommon. Under deciduous and white spruce woods in the Fisherman Lake valley. Rare in alpine tundra on the center peak of Pointed Mountain. Flowering in June and July. FL34, FL183.2, FL247.

Cypripedium passerinum Richards. — Northern Lady's-slipper, Sparrow's-egg Lady's-slipper
Rare. Found in one area under *Salix* in opening in white spruce woods. Flowering in late June. FL150, FL494.

Goodyera repens (L.) R. Br. — Dwarf Rattlesnake-plantain
Uncommon to scattered in moss under black and/or white spruce in the Fisherman Lake valley. Flowering in July and August. FL246, FL676, FL682.

Habenaria hyperborea (L.) R. Br. — Northern Green Orchid
Rare. Found only in open bog forest west of Fisherman Lake. FL363.

Habenaria obtusata (Pursh) Richards. — Blunt-leaf Orchid
Very uncommon. In litter under deciduous woods, and in moss under white spruce. Flowering in June. FL17, FL458.

Listera borealis Morong — Northern Twayblade
Rare. In moss under spruce woods. Flowers present June 8. FL37.

Orchis rotundifolia Pursh — Small Round-leaved Orchid
Very uncommon, yet locally common. In moist soil under *Salix*, or in moss under spruce in the Fisherman Lake valley. Flowering in June. FL36, FL486.

Spiranthes romanzoffiana Cham. & Schlecht. — Hooded Ladies'-tresses
Uncommon in moss of bog forests of the Fisherman Lake valley. Flowering in July and August. FL281, FL327, FL331, FL630.

SALICACEAE

Populus balsamifera L. Balsam Poplar
Abundant. Co-dominant with *P. tremuloides* in deciduous woods. Scattered to common along creeks and the lake shores. FL478.

Populus tremuloides Michx. Trembling Aspen
Abundant. Co-dominant with *P. balsamifera* or dominant in deciduous woods; in mixedwoods, co-dominant with white spruce.

Salix alaxensis (Anderss.) Cov. var. *alaxensis*
Rare? On north-facing slope of a westward extending ridge of Pointed Mountain at about 1265 m. FL167.

Salix arbusculoides Anderss.
Very uncommon? On creekbanks and lakeshores. FL47, FL480.

Salix arctica Pall. Arctic Willow
Scattered to common on alpine tundra of the LaBiche Mountains near Dendale Lake. GM6, GM25.

Salix athabascensis Raup.
Very uncommon. In bog forest at the southeast end of Fisherman Lake. FL262, FL471, FL472.

Salix barclayi Anderss.
Rare? Collected in shrubby alpine tundra on Pointed Mountain. An eastward extension of the known range of this species (G.W. Argus, personal communication). FL179.

Salix bebbiana Sarg. Beaked Willow
Common on the lakeshore, scattered in spruce woods, in shrub associations and along streams in the Fisherman Lake valley. FL22, FL40, FL120, FL121, FL122, FL123, FL430, FL464, FL654.3.

Salix drummondiana Barr. = *S. subcoerulea* Piper
Locally abundant in *Salix-Alnus* association on the lakeshore at Village Point. FL406-FL462, FL407-FL461, FL408-FL463. (These numbers represent companion collections from the same willow clumps.)

Salix glauca L. var. *villosa* (Hook.) Anderss.
Common along the lakeshores and stream banks in the Fisherman Lake valley and in shrubby alpine tundra on Pointed Mountain. FL68, FL146, FL177, FL178, FL187, FL235, FL350, FL380, FL519, FL592.1, FL592.2, FL696, FL730.

Salix lanata L. ssp. *richardsonii* (Hook.) A. Skvortz.
Rare. Two shrubs seen on the north-facing slope of a westward extending ridge of Pointed Mountain at about 1265m. FL169.

Salix myrtillifolia Anderss. Myrtle-leaved Willow
Scattered to common in moss under spruce woods and in bog forests of the Fisherman Lake valley. FL39, FL63, FL66, FL80, FL138, FL452.

Salix myrtillifolia Anderss. var. *cordata* Dorn
Scattered in moss under spruce woods of the Fisherman Lake valley. Common in shrubby alpine tundra of Pointed Mountain. FL179, FL180, FL425, FL490.

Salix planifolia Pursh. ssp. *planifolia* Flat-leaved Willow
Scattered to common on lakeshores of Fisherman Lake. FL27, FL424, FL442, FL460, FL481.

Salix pseudomonticola Ball.
Rare? Lakeshore on the northeast side of Fisherman Lake. FL29.

Salix reticulata L. Netted-leaved Willow
Common in moss of shrubby tundra on the center peak of Pointed Mountain. FL184, FL527.

Salix rigida Muhl. Stiff Willow
Locally abundant on the banks of the Liard River about 14 miles southwest of Fort Liard. FL433.

Salix raupii Argus
Rare. A range extension of a species found in the MacDonald Creek area along the Alaska Highway (Argus, 1974). Argus mentioned two other localities known, but did not give these locations. FL149.

MYRICACEAE

Myrica gale L. Sweet Gale
Locally common, especially around pools in bog forest and along creek edges. FL259, FL265, FL441.

BETULACEAE

Alnus crispa (Ait.) Pursh Green Alder
Mountain Alder
Common understory shrub in deciduous woods, in timberline forest and shrubby tundra. FL6, FL119, FL181, FL487.

Alnus incana (L.) Moench. ssp. *tenuifolia* (Nutt)
Speckled Alder
Thinleaf Alder
Locally common in moist or frequently inundated areas along lakeshores and temporary drainage systems. FL24, FL49,FL488.

Betula X *eastwoodae* Sarg. = *B. glandulosa* Michx. X *B. fontinalis* Sarg.
Yukon Birch
Very uncommon in bogs. Height data was lost for FL263; it may be *B. glandulifera* (Regel) Butler. FL72, FL263?

Betula glandulosa Michx.
Dwarf Birch
Resin Birch
Common in open bog forests of the Fisherman Lake valley and in shrubby alpine tundra and timberline forest on Pointed Mountain. FL69, FL502.

Betula nana L.
Dwarf Arctic Birch
Scattered in alpine tundra on Pointed Mountain. FL160.2, FL594.

Betula neoalaskana Sarg. var. *neoalaskana*
Scattered throughout woods. FL50 shows introgression with *B. papyrifera*. FL33, FL50, FL124, FL271.

Betula papyrifera Marsh.
Paper Birch
White Birch
Very uncommon in woods. The specimen shows introgression with *B. neoalaskana*. FL16.

Betula papyrifera Marsh. var. *cordifolia* (Regel) Fern.
Heart-leaved Paper Birch
Very uncommon? Young specimens collected from a cutline on the east slope of the south ridge of Pointed Mountain were placed in this variety because of their dense pubescence. FL653.

Betula X *sargentii* Dugle = *B. glandulifera* (Regel) Butler X *B. glandulosa* Michx.
Rare in muskeg. FL264.

Betula X *winteri* Dugle = *B. papyrifera* Marsh. X *B. neoalaskana* Sarg.
Scattered throughout to common in favorable areas. FL125, FL126, FL127, FL128.

URTICACEAE

Urtica gracilis Ait. Stinging Nettle
Rare, yet locally abundant. Seen only in a cutline near the F.L.A.P. camp. FL84, FL657.

SANTALACEAE

Geocaulon lividum (Richards.) Rern. Northern Comandra
Scattered in moss under spruce woods, in deciduous woods and bog forests. Flowering in mid-June; fruits ripening in late July or early August. FL31, FL61, FL455, FL570.

POLYGONACEAE

Polygonum achoreum Blake Striate Knotweed
Introduced. Locally common along roads in Fort Liard. FL621.

Polygonum amphibium L. Water Smartweed
Water Persicaria
Uncommon. In shallow water of "Fish Creek". No flowering plants were seen. FL224.

Polygonum aviculare L. Yard Knotweed
Introduced. Rare. At roadside on Pointed Mountain. FL314.

Polygonum viviparum L. Alpine Bistort
Scattered in moist areas of alpine tundra on Pointed Mountain. Also on the LaBiche Mountains near Dendale Lake. Begins flowering in July. FL296, FL579.

Rumex mexicanus Meisn. Narrow-leaved Dock
Scattered on lakeshores and in moist soil in disturbed locations. FL285, FL337, FL553.

CHENOPODIACEAE

Chenopodium album L. Pigweed
Lamb's-quarters
Likely introduced. Locally abundant in a few areas on roadsides. FL110, FL660.

Chenopodium capitatum (L.) Asch. Strawberry Blite
Indian-paint
Scattered in mineral soil of disturbed areas in the Fisherman Lake valley and on the slopes of Pointed Mountain. FL111, FL554.

PORTULACACEAE

Claytonia tuberosa Pall. ex. Willd. Spring-beauty
Uncommon to scattered in moist areas of alpine tundra of the LaBiche Mountains near Dendale Lake. Flowers present on July 22. This may be a range extension southward. Previously collected from the Mayo District, Yukon (Porsild, 1951) and Nahanni National Park, N.W.T. (Scotter & Cody, 1974). GM23.

CARYOPHYLLACEAE

Cerastium beeringianum Cham. & Schl. Mouse-ear Chickweed
Very uncommon in stony alpine tundra on the north ridge of Pointed Mountain. Flowering in late June and July. FL515, FL725.

Melandrium affine J. Vahl.
Uncommon. In alpine tundra above 1300 m on Pointed Mountain. Flowering in late June and July. FL156, FL546, FL735.

Minuartia rubella (Wahl.) Graebn.
Scattered on stony alpine tundra of Pointed Mountain. Flowering from late June through July. FL191.1, FL401, FL514, FL603, FL723.

Moehringia lateriflora (L.) Fenzl. Grove Sandwort
Scattered in moist soil in woods and on cutlines in the Fisherman Lake valley. Flowering through June and July. FL10, FL45, FL244, FL351, FL437.

Silene acaulis L. Moss Campion
Scattered hummocks in alpine tundra of the LaBiche Mountains near Dendale Lake. Flowers withered on July 22. GM48.

Stellaria calycantha (Ledeb.) Bong. Calyx-flowered Chickweed
Rare? Collected in alpine tundra on the center peak of Pointed Mountain. Flowers present July 18. FL303.

Stellaria laeta Richards.
Rare? Collected in moist ground on seismic line through *Salix* , on a low lake terrace. Flowers present on June 11. FL446.

Stellaria longifolia Muhl. Long-leaved Chickweed
Rare? Collected in a wet area of bog forest at the south end of Fisherman Lake. Flowers present on June 11. FL279.

Stellaria longipes Goldie Long-stalked Chickweed
Rare? Under *Salix* along the lakeshore. Flowers present on June 9. FL62.

Stellaria monantha Hult. One-flowered Chickweed
Very uncommon in alpine tundra of Pointed Mountain; found once on a cutline near Fisherman Lake. Flowering in June. FL86, FL192, FL512.

NYMPHACEAE

Nuphar variegatum Engelm. Yellow Pond-lily
Bullhead Lily
Scattered to locally abundant in water up to 2 m deep in Fisherman Lake. Flowering begins in early July; fruits mature in late August or September. FL222, FL557.

RANUNCULACEAE

Aconitum delphinifolium DC. Monkshood
Scattered in alpine tundra of Pointed Mountain. Scattered to locally common in alpine tundra of the LaBiche Mountains near Dendale Lake. Flowering in July. FL304, FL595.1, FL595.2, GM21.

Actaea rubra (Ait.) Willd. Red and White Baneberry
Scattered in moist shrub associations in the Fisherman Lake valley, in shrubby alpine tundra of Pointed Mountain and on the bank of the Liard River at Fort Liard. Flowering begins in early June; fruits ripen in late July. FL67, FL352, FL459, FL597.

Anemone drummondii S. Wats. Drummond's Anemone
Uncommon in alpine tundra of Pointed Mountain. Flowering in June. FL102, FL173.

Anemone narcissiflora L. ssp. *interior* Hult.
Scattered and locally common on alpine tundra of the

LaBiche Mountains near Dendale Lake. Flowering in July. GM18 may be a polyploid. GM10, GM18.

Anemone parviflora Michx. Small-flowered Anemone
Scattered in moist alpine tundra of Pointed Mountain. Flowering in the latter part of June. FL174, FL288, FL526.

Anemone richardsonii Hook.
Uncommon in moist soil of low lake terraces in the Fisherman Lake valley; uncommon to scattered in moist spots in alpine tundra of Pointed Mountain. Flowering in June. FL89, FL151, FL175, FL530.

Aquilegia brevistyla Hook. Blue Columbine
Very uncommon. Seen on low lake terrace of Fisherman Lake. Collected from the bank of a stream running from Pointed Mountain. Flowering in June. FL133.

Delphinium glaucum Wats. Tall Larkspur
Scattered in shrubby alpine tundra of Pointed Mountain and along the stream banks in the Fisherman Lake valley. Flowering in July. FL305.1, FL305.2, FL619.

Ranunculus aquatilis L. var. *eradicatus* Laest.
White Water Crowfoot
Rare. In pool on seismic line east from the south end of the Pointed Mountain airstrip. Flowers present on July 22. FL330.

Ranunculus gmelini DC. ssp. *purshii* (Richards.) Hult.
Small Yellow Water Crowfoot
Rare. Collected in water about 40 cm deep in *Salix-Carex* area. Flowers present June 21. FL482.

Ranunculus lapponicus L. Lapland Buttercup
Very uncommon. In mud under *Salix* near the shore of Fisherman Lake. Flowering in June. FL38, FL491.

Ranunculus macounii Britt. Macoun's Buttercup
Rare? Collected on seismic line north of Fisherman Lake. Flowers present on July 5. FL252.

Ranunculus nivalis L.
Scattered in moist spots in alpine tundra of the LaBiche Mountains near Dendale Lake. Most petals fallen by July 22. GM17.

Ranunculus pennsylvanicus L. Bristly Crowfoot
Rare. Collected on lakeshore of Fisherman Lake.

Flowers present July 13. Collected in the N.W.T. only at Fort Simpson (Cody, 1961; this was a range extension from Wood Buffalo Park, Alberta). FL283.

Ranunculus sceleratus L. ssp. *multifidus* (Nutt.) Hult.
Cursed Crowfoot
Rare. Collected on the shore of Fisherman Lake. Flowers present on June 22. FL485.

Thalictrum sparsiflorum Turcz. var. *richardsonii* (Gray) Boivin
Flat-fruited Meadow Rue
Very uncommon. Under *Salix* on low lake terraces of Fisherman Lake. Flowers present on June 19. FL129.

Thalictrum venulosum Trel. Veiny Meadow Rue
Scattered to locally common along the shores of Fisherman Lake. Flowering in June; fruits mature in late July. FL53, FL220, FL242, FL500, FL566.

FUMARIACEAE

Corydalis aurea Willd. Golden Corydalis
Scattered. Only seen in disturbed areas. Flowers present from mid-May throughout the summer. FL83, FL493.

Corydalis sempervirens (L.) Pers. Pale Corydalis
Very uncommon. Only found in disturbed areas above 1230 m on Pointed Mountain. Flowers present in early August. FL385, FL639.

CRUCIFERAE

Arabis drummondii Gray Drummond's Rock Cress
Rare. Collected on alpine tundra on the center peak of Pointed Mountain. FL154.

Arabis hirsuta (L.) Scop. var. *pycnocarpa* (Hopkins) Rollins
Hirsute Rock Cress
Rare. Collected on a cutline. FL85.

Capsella bursa-pastoris (L.) Medic. Shepherd's-purse
Introduced. Scattered in disturbed areas and along roadsides. FL312, FL671.

Draba fladnizensis Wulf. Whitlowwort
Rare in alpine tundra on the center peak of Pointed Mountain. FL191.2.

Draba lanceolata Royle
Uncommon in stony alpine tundra on the north ridge of Pointed Mountain. FL516.

Erucastrum gallicum (Willd.) Schulz. Dog Mustard
Introduced. Scattered on roadsides and in disturbed areas. FL239, FL393, FL662.

Erysimum cheiranthoides L. Wormseed Mustard
Very uncommon. Seen only in disturbed areas. FL52, FL645.

Rorippa islandica (Oed.) Borbas Yellow Cress
Uncommon. Seen only in disturbed areas. FL284, FL661.

DROSERACEAE

Drosera rotundifolia L. Round-leaved Sundew
Uncommon to locally common on *Sphagnum* in bog forests. Flowering in July. FL203, FL362.

SAXIFRAGACEAE

Chrysosplenium tetrandrum (Lund) Th. Fries Golden Saxifrage
Rare. Found only in a wet area on a seismic line north of Fisherman Lake. FL248.

Mitella nuda L. Miterwort
Bishop's-cap
Scattered to locally common in woods. Flowering in mid-June. FL5, FL44, FL489.

Parnassia kotzebuei Cham. & Schl. Grass-of-Parnassus
Locally common in damp areas of alpine tundra near timberline on Pointed Mountain. FL193, FL295, FL582.

Parnassia palustris L. ssp. *neogaea* Hult. Northern Grass-of-Parnassus
Scattered on lakeshores of Fisherman Lake, locally common in some disturbed, wet areas of bog forest. FL323, FL629.

Ribes glandulosum Grauer. Skunk Currant
Very uncommon in woods, locally common under *Alnus* thickets. Flowering in early June; fruits ripe by mid-July. FL8, FL65, FL428.

Ribes hudsonianum Richards. Wild Black Currant
Very uncommon in woods to locally common along temporary drainage systems. Also common in one old campsite, Fisherman Lake. Flowering early June, ripening in late July.

Ribes lacustre (Pers.) Poir. Bristly Black Currant
Very uncommon? In deciduous woods and under white spruce. Flowering early in June; fruits ripening in late July. FL11, FL571.

Ribes oxyacanthoides L. Wild Gooseberry
Scattered in moist ground under *Salix*, deciduous woods. Flowering in late May or early June; green fruits reaching maximum size by late June. FL48, FL50, FL421, FL498.

Ribes triste Pall. Wild Red Currant
Uncommon to scattered under shrub associations, white spruce and on low lake terraces of the Fisherman Lake valley. Flowering in early June; fruits ripe by mid-July. FL118, FL422.

Saxifraga flagellaris Willd. ssp. *setigera* (Pursh) Tolm.
Spiderplant
Scattered in stony alpine tundra on the center peak of Pointed Mountain. Flowering in early July. (Numbers present in July 1975 make it appear strange that it was not collected in 1973 or 1974. FL733.

Saxifraga hieracifolia Waldst. & Kit. Stiff-stemmed Saxifrage
Scattered in moist areas of alpine tundra of Pointed Mountain and the LaBiche Mountains near Dendale Lake. FL188, FL523, GM44, GM45.

Saxifraga hirculus L. Bog Saxifrage
Scattered in alpine tundra of the LaBiche Mountains near Dendale Lake. Flowers present on July 22. Previous Yukon collections are from Kluane Lake, Old Crow River and the Canol Road (Porsild, 1951). GM4.

Saxifraga punctata L. Cordate-leaved Saxifrage
Locally common in moist areas of alpine tundra in the LaBiche Mountains near Dendale Lake. Flowers present July 22. GM31.

Saxifraga rivularis L. Alpine Brook Saxifrage
Locally common in wet spots in alpine tundra of the LaBiche Mountains near Dendale Lake. Flowers present July 22. GM30.

Saxifraga tricuspidata Rottb. Three-toothed Saxifrage
Prickly Saxifrage
Locally common in rocky areas around timberline on the center peak of Pointed Mountain. Also in rocky areas of alpine tundra in the LaBiche Mountains near

Dendale Lake. Flowering from late June throughout July. FL101, FL525.

ROSACEAE

Amelanchier alnifolia Nutt. Serviceberry
Juneberry
Saskatoon
Very uncommon in woods of low lake terraces around Fisherman Lake. Locally common in woods along the banks of the Liard River at Fort Liard. Flowering in mid-June; fruits not yet ripe in late July. FL243, FL477.

Dryas integrifolia Vahl. ssp. *integrifolia* White Mountain Avens
Scattered to locally common in alpine tundra of Pointed Mountain. Flowering in late June. FL183, FL289, FL517.

Dryas octopetala L. ssp. *octopetala*
Scattered in alpine tundra of the LaBiche Mountains near Dendale Lake. In the Yukon it was previously collected at Kluane Lake, along the Canol Road and at the Arctic Coast (Porsild, 1951). Also found at Nahanni National Park (Scotter and Cody, 1974). GM3.

Fragaria virginiana Duch. ssp. *glauca* (S. Wats.) Staudt.
Wild Strawberry
Scattered under *Salix-Alnus* and mixedwood of the Fisherman Lake valley and in montane forests of Pointed Mountain. Locally common in disturbed areas. Flowering in early June; fruits ripe in July. FL9, FL43, FL429, FL724.

Geum perincisum Rydb. = *G. macrophyllum* Willd. ssp. *perincisum* (Rydb.) Hult.
Yellow Avens
Uncommon. Found only in disturbed areas near the shore of Fisherman Lake. Flowering in late June. FL221, FL501.

Potentilla diversifolia Lehm.
Uncommon in alpine tundra of the LaBiche Mountains near Dendale Lake. GM22.

Potentilla fruticosa L. Shrubby Cinquefoil
Uncommon in shrubby alpine tundra and on the banks of streams. Flowering begins in the latter part of June. FL131, FL528.

Potentilla hyparctica Malte

Rare? Collected from stony alpine tundra on the north ridge of Pointed Mountain. Flowers present June 27. FL508.

Potentilla norvegica L. ssp. *monspeliensis* (L.) Asch. & Graeb. Rough Cinquefoil

Introduced. Found only in areas disturbed by heavy machinery. Scattered. Flowering in early July. FL140, FL556.

Potentilla palustris (L.) Scop. Marsh Cinquefoil

Scattered among *Carex* in muskeg ponds and along the marshy edges of streams in the Fisherman Lake valley. FL236, FL268, FL355, FL677.

Potentilla pennsylvanica L. Pennsylvanian Cinquefoil

Locally common on the banks of the Liard River at Fort Liard. FL713.

Potentilla uniflora Ledeb.

Scattered on stony alpine tundra of the center peak of Pointed Mountain. Flowering in late June. FL157.

Rosa acicularis Lindl. Prickly Rose

Scattered to common throughout woods. Locally abundant in areas of disturbance. Flowering in June; hips ripen in late July and early August. FL57, FL78, FL492.

Rubus acaulis Michx. Dwarf Raspberry

Scattered to locally common in moist *Salix-Alnus* and black spruce woods, most numerous in openings (often those caused by disturbance). Flowers in early June; fruits ripen in July. FL32, FL42, FL447.

Rubus chamaemorus L. Cloudberry
Baked-apple Berry

Scattered to locally abundant in *Sphagnum* of bog forest in the Fisherman Lake valley. Also seen on alpine tundra of the LaBiche Mountains near Dendale Lake. Flowers in early June. Fruits ripen in mid to late July. FL75, FL266, FL448.

Rubus idaeus L. ssp. *melanolasius* (Dieck) Focke
Wild Red Raspberry

Uncommon under shrub associations. Locally abundant in man-disturbed areas. Flowering in June; fruits ripe by mid-July. FL77, FL664.

Rubus pubescens Raf. Dewberry
Running Raspberry
Scattered throughout deciduous and mixedwood forests and under shrub associations in the Fisherman Lake valley. Flowering early in June; fruits ripe by early July. FL12 may be var. *paracaulis* (Bailey) Boiv. FL3, FL12, FL55, FL439.

Sibbaldia procumbens L.
Locally common in wet areas of alpine tundra in the LaBiche Mountains near Dendale Lake. GM27.

Sorbus scopulina Greene Western Mountain Ash
Rare. Seen only in shrubby alpine tundra on the north ridge of Pointed Mountain. Flowers present in late July. FL378, FL612.

Spiraea beauverdiana Schneid. Meadowsweet
Uncommon to locally common in shrubby alpine tundra and timberline forest on Pointed Mountain. FL590.

LEGUMINOSAE

Astragalus alpinus L. ssp. Alpine Milk Vetch
Locally common on banks of the Liard River at Fort Liard. FL716.

Astragalus americanus (Hook.) M.E. Jones American Milk Vetch
Locally abundant to scattered along stream banks and the shores of Fisherman Lake, in disturbed areas. Flowering in late June; pods full size by mid-July. FL137, FL287, FL564.

Hedysarum alpinum L. ssp. *americanum* (Michx.) Fedtsh.
Sweet Vetch
Liquorice-root
American Hedysarum
Common in moist areas of alpine tundra on Pointed Mountain. Scattered on the banks of mountain streams. Flowering in late June and early July. FL98, FL172, FL368, FL549.

Lathyrus ochroleucus Hook. Cream-colored Vetchling
Scattered in deciduous woods and under *Salix -Alnus* association in the Fisherman Lake valley. Also in disturbed areas. Flowering in early to mid-June. FL81, FL338, FL468.

Lupinus arcticus Wats. Arctic Lupine
Scattered to locally common on alpine tundra on the

north ridge of Pointed Mountain. Flowering from late June on through the summer; ripe fruits present in August. FL206, FL369, FL511.

Medicago sativa L. Alfalfa
Introduced. Very uncommon in disturbed areas along roads. FL340, FL694.1.

Melilotus albus Desr. White Sweet Clover
Introduced along roads. FL694.2.

Melilotus officinalis (L.) Lam. Yellow Sweet Clover
Introduced along roads. FL694.3.

Oxytropis campestris (L.) DC. ssp. *gracilis* (Nels.)Hult.
Late Yellow Loco-weed
Very uncommon? Collected in a rocky area at timberline on the center peak of Pointed Mountain. Flowers present June 12. FL97.

Oxytropis deflexa (Pall.) DC. var. *sericea* T.& G.
Reflexed Loco-weed
Uncommon in moist soil of stream banks and on a seismic line on a low lake terrace in the Fisherman Lake valley. Flowering in late June; pods well developed by mid-July. FL142, FL250, FL563.

Oxytropis maydelliana Trautv.
In moist alpine tundra of Pointed Mountain. Flowering in late June. FL171, FL522.

Oxytropis nigrescens (Pall.) Fisch. ssp. *bryophila* (Greene) Hult.
Locally common in stony alpine tundra of the north ridge of Pointed Mountain. Flowering in late June and in July. FL507, FL722.

Oxytropis sericea Nutt. var. *spicata* (Hook.) Barneby
Early Yellow Loco-weed
Uncommon in stony alpine tundra on the north ridge of Pointed Mountain. Fragments collected between Nahanni Butte and Fort Simpson were classified as this species by Raup (1947). FL372.

Trifolium hybridum L. Alsike Clover
Introduced. Scattered along roadsides; abundant along pipelines where seeded. FL391, FL558.

Vicia americana Muhl. American Wild Vetch
Scattered in open woods, areas of disturbance, under *Salix-Alnus* association of the Fisherman Lake valley. Flowering in late June. FL136, FL497.

GERANIACEAE

Geranium bicknellii Britt. Cranesbill
Bicknell's Geranium

Very uncommon. Seen only on one cutline in the Fisherman Lake valley. Flowering in early June. FL88.

Geranium richardsonii Fisch. & Trautv. Wild White Geranium

Scattered in shrubby alpine tundra of the north ridge of Pointed Mountain. Flowering on July 22. Previous collections in the area are from Hole-in-the-Wall Lake (Porsild, 1961) and Nahanni National Park (Scotter & Cody, 1974). FL607.

EMPETRACEAE

Empetrum nigrum L. Black Crow-berry

Locally abundant in moss under spruce woods in the Fisherman Lake valley and in moist areas of alpine tundra on Pointed Mountain. Fruits ripen in late July to early August. FL35, FL548.

VIOLACEAE

Viola renifolia Gray Kidney-leaved Violet

Uncommon to scattered in woods. Flowering in late May. FL190, FL419.

ELAEAGNACEAE

Elaeagnus commutata Bernh. Silverberry
Wolf Willow

Rare in the area. Seen only on the banks of the Liard River at Fort Liard, where it was locally common. No fruiting plants were seen. FL712.

Shepherdia canadensis (L.) Nutt. Soapberry
Canada Buffalo-berry

Scattered to uncommon in woods throughout. Abundant in mixedwoods and in some areas of deciduous woods. Flowering in mid-May; fruits ripe early in July. FL4, FL282, FL415.

ONAGRACEAE

Epilobium anagallidifolium Lam. Pimpernel-leaved Willow-herb
Very uncommon. In moist alpine tundra of the LaBiche Mountains near Dendale Lake. Flowers present July 22. GM33.

Epilobium angustifolium L. Fireweed
Great Willow-herb
Locally abundant in areas disturbed by man in the Fisherman Lake valley and on Pointed Mountain. Flowering begins in late June. FL384, FL551.

Epilobium glandulosum Lehm. var. *adenocaulon* (Haussk.) Fern.
Northern Willow-herb
Glandular Willow-herb
Locally scattered to locally common in moist soil in areas disturbed by humans in the Fisherman Lake valley and on Pointed Mountain. FL313, FL670.

Epilobium palustre L. Marsh Willow-herb
Rare. Collected in an area of disturbed moist soil. FL695.

HALORRHAGIDACEAE

Myriophyllum spicatum L. var. *exalbescens* Spiked Water Milfoil
Scattered in shallow water of Fisherman Lake. FL227.

HIPPURIDACEAE

Hippuris vulgaris L. Common Mare's-tail
Scattered to locally common in shallow water of Fisherman Lake. FL228, FL275, FL539.

ARALIACEAE

Aralia nudicaulis L. Wild Sarsaparilla
Scattered to locally common on banks of mountain streams in lower altitudes on Pointed Mountain. No flowering or fruiting plants were seen. FL348, FL618.

UMBELLIFERAE

Angelica lucida Math. & Const. Angelica
Uncommon to locally common in shrubby alpine tundra of Pointed Mountain. Flowers in mid-July. Not

previously collected form Mackenzie District; an eastward range extension at that latitude. FL308.

Cicuta douglasii (DC.) Coult. & Rose = *C. maculata* L. var. *angustifolia* Hook.
Western Water Hemlock
Scattered on sandy and rocky shores of Fisherman Lake. Flowering in mid-July. FL286, FL601, FL675.

Cicuta mackenzieana Raup. Water Hemlock
Scattered about edges of pools in bog forests in the Fisherman Lake valley. FL272.

Heracleum lanatum Michx. Cow Parsnip
Scattered to locally common in shrubby alpine tundra and timberline forest on Pointed Mountain. Flowering in mid-July; fruits ripe by mid-August. FL306, FL377, FL599.

Osmorhiza obtusa (Coult. & Rose) Fern. = *O. depauperata* Philippi
Sweet Cicely
Rare under *Salix* of shrubby alpine tundra on the north ridge of Pointed Mountain. Flowering on July 19. FL591.

Sium suave Walt. Fragrant Water-parsnip
Scattered on rocky and sandy areas of shores of Fisherman Lake. Flowering in late July. FL602.

CORNACEAE

Cornus canadensis L. Bunchberry
Dwarf Cornel
Common in woods (except black spruce and bog forests) to timberline in the Fisherman Lake valley. Flowers from mid-June on; fruits ripe in late July or early August. FL56, FL79, FL467.

Cornus stolonifera Michx. Red Osier Dogwood
Locally abundant along temporary drainage systems and under *Salix-Alnus* associations in the Fisherman Lake valley. Flowers in June; fruits ripen in late August. FL107, FL496.

PYROLACEAE

Moneses uniflora (L.) Gray Single Delight
One-flowered Wintergreen
Locally common in moss under spruce woods; also in moist area on cutline in the Fisherman Lake valley.

Flowers in mid-July. FL132, FL562.

Pyrola asarifolia Michx. Common Pink Wintergreen
Common in deciduous and mixedwoods and shrub associations of the Fisherman Lake valley. Flowering from mid-June throughout July. FL147, FL568.1, FL568.2.

Pyrola grandiflora Radius Arctic Wintergreen
Rare in shrub association on low terrace of Fisherman Lake; uncommon to scattered on rocky alpine tundra of Pointed Mountain. Flowering in late June. FL189, FL495.

Pyrola secunda L. One-sided Wintergreen
Scattered throughout deciduous, mixed and coniferous woods of the Fisherman Lake valley and montane forests and alpine areas of Pointed Mountain. Flowers in the latter half of June and in July. FL332, FL361, FL674.

Pyrola virens Schweigg. Greenish-flowered Wintergreen
Uncommon to scattered in deciduous, mixed and coniferous woods of the Fisherman Lake valley. Flowers in late June and July. FL130, FL683.

ERICACEAE

Andromeda polifolia L. Bog Rosemary
Common to locally abundant in bog forest of the Fisherman Lake valley. Flowering in June. FL205, FL231, FL451.

Arctostaphylos alpina (L.) Spreng. Alpine Bearberry
Common to scattered in alpine tundra of Pointed Mountain. Flowering in June; fruits ripe at the beginning of August. FL383, FL638.

Arctostaphylos rubra (Rehder & Wilson) Fern.
Alpine Bearberry
Scattered to locally abundant in moss under coniferous woods of the Fisherman Lake valley. Mixed stands with *A. alpina* occur in shrubby alpine tundra on Pointed Mountain. Flowers in late May; fruits may be ripe by mid-July. FL185, FL322, FL416, FL672.

Arctostaphylos uva-ursi (L.) Spreng. Common Bearberry
Mealberry
Kinnikinnick
Very uncommon, but locally common on sandy bank of

a mountain stream and on a north-facing slope of Pointed Mountain above timberline. Fruits ripening in August. FL139, FL168, FL616.

Cassiope tetragona (L.) D. Don. White Mountain Heather
Locally common in moist areas of alpine tundra on Pointed Mountain and the LaBiche Mountains near Dendale Lake. Flowers mid-June to mid or late July. FL292, FL529, GM42.

Chamaedaphne calyculata (L.) Moench Leather-leaf
Locally abundant to scattered in bog forests in the Fisherman Lake valley. Flowers in mid-June. FL204, FL450.

Kalmia polifolia Wang. Bog Laurel
Mountain Laurel
Rare. In moist area of mesic alpine tundra of the LaBiche Mountains near Dendale Lake. Flowers present on July 22. GM39.

Ledum groenlandicum Oeder Common Labrador Tea
Common to abundant in mixedwood and bog forests. Scattered nearly throughout the Fisherman Lake valley. Flowering in mid-June. FL20, FL58, FL473.

Ledum palustre L. var. *decumbens* Ait. = *L. decumbens* (Ait.) Lodd.
Northern Labrador Tea
Very uncommon in rocky areas of alpine tundra and timberline forest on Pointed Mountain. FL105, FL637.

Oxycoccus microcarpus Turcz. Small Cranberry
Small Bog Cranberry
Scattered to common on *Sphagnum* hummocks in bog forests of the Fisherman Lake valley. Flowering in early June; fruits ripe in mid-August. FL76, FL628.

Phyllodoce empetriformis (Smith) D. Don. Red or Purple Heather
Very uncommon. In mesic alpine tundra of the LaBiche Mountains near Dendale Lake. Flowers present on July 22. GM29.

Rhododendron lapponicum (L.) Wahl. Lapland Rosebay
Scattered in stony alpine tundra on Pointed Mountain. Begins flowering in late June. FL159, FL290, FL518.

Vaccinium caespitosum Michx. Dwarf Blueberry
Common in mesic alpine tundra of Pointed Mountain. Flowers appear in early July; fruits may be ripe by the latter part of July. FL379.1, FL574.1.

Vaccinium uliginosum L. ssp. *alpinum* (Bigel.) Hult.
Alpine Blueberry
Alpine Bilberry

Common to abundant in bog forests of the Fisherman Lake valley; common on mesic alpine tundra of Pointed Mountain. Flowers appear in early to mid-June; fruits may be ripe by mid-July. FL70, FL212, FL219, FL379.2, FL449, FL574.2, FL627.

Vaccinium vitis-idaea L. var. *minus* Lodd. Mountain Cranberry
Cowberry

Common throughout and locally abundant in the deciduous and mixedwoods of the Fisherman Lake valley, and montane and alpine areas of Pointed Mountain. Flowers in mid-June; ripe fruit in late August.

PRIMULACEAE

Androsace septentrionalis L. Fairy Candelabra
Northern Androsace

Locally common. Only observed in areas of stony alpine tundra on the north ridge of Pointed Mountain where the area had been disturbed by heavy machinery. Begins flowering in late June. FL371, FL505.

GENTIANACEAE

Gentiana amarella L. Felwort
Northern Gentian

Locally common in disturbed areas and in moist soil in the Fisherman Lake valley and on Pointed Mountain at timberline. Flowering in late July and in August. FL333, FL345, FL658.

Gentiana glauca Pall.

Locally common in moist alpine tundra of Pointed Mountain and on the LaBiche Mountains near Dendale Lake. Flowering throughout July. FL153, FL547.

Gentiana propinqua Richards.

Very uncommon. In moist areas of alpine tundra above 1250 m on Pointed Mountain. Flowering from mid-July into August. FL291, FL646.

Gentiana prostrata Haenke

Rare. Collected from alpine tundra on the north ridge of Pointed Mountain at 1260 m. Flowers present on July 22. Previously collected from Nahanni Butte (Jeffrey, 1961)and Nahanni National Park (Scotter

& Cody, 1974). FL606.

APOCYNACEAE

Apocynum androsaemifolium L. Dogbane
According to John Hudson these specimens appear to be a hybrid with either *A. cannabinum* L. or *A. sibiricum* as they are not typical of the species. Found only on the upper banks of the Petitot River within the edges of and east of Fort Liard. Flowers present on July 27. FL717.

POLEMONIACEAE

Polemonium acutiflorum Willd. Jacob's-ladder
Very uncommon. Found mainly in disturbed areas: bog forest by the shore of Fisherman Lake, along the road at timberline (1250 m) on Pointed Mountain. Also in alpine tundra of the LaBiche Mountains near Dendale Lake. Flowering in late June and throughout July. FL280, FL550, GM8.

Polemonium boreale Adams. ssp. *boreale*
Scattered in alpine tundra above 1265 m on Pointed Mountain. Flowering throughout June. FL105, FL165, FL506.

BORAGINACEAE

Mertensia paniculata (Ait.) Don. Tall Lungwort
Scattered throughout, locally abundant in areas of disturbance in the Fisherman Lake valley. Also on the LaBiche Mountains alpine tundra near Dendale Lake. Flowering from early June throughout the summer. FL2, FL64, FL440, GM35.

Myosotis alpestris Schmidt. Alpine Forget-me-not
Locally common on moist, east-facing slope of alpine tundra on the LaBiche Mountains near Dendale Lake. Flowering on July 22. GM47.

LABIATAE

Dracocephalum parviflorum Nutt. = *Moldavica parviflora* (Nutt.) Britt.
Small-flowered Dragonhead
Locally common in disturbed areas along roads in the Fisherman Lake valley and the Gap. Flowering from

late June until mid-August. FL141, FL700.

Mentha arvensis L. Wild Mint
Scattered along sandy and rocky lakeshore of Fisherman Lake. Flowering in late July and early August. FL359, FL626.

Stachys palustris L. ssp. *pilosa* (Nutt.) Epling
Woundwort
Marsh Hedge-nettle
Locally common on the Liard River bank at Fort Liard. Flowers present in late July. FL715.

SCROPHULARIACEAE

Castilleja raupii Pennell Painted-cup
Indian Paint-brush
Uncommon throughout, locally common in disturbed areas of the lower terraces around Fisherman Lake and above timberline on Pointed Mountain. Flowering throughout June and July. FL41, FL544, GM32.

Pedicularis capitata Adams
Scattered in stony alpine tundra above 1265 m on Pointed Mountain. Flowering late June and early July. FL182, FL545.

Pedicularis labradorica Wirsing Labrador Lousewort
Very uncommon in moss under white spruce or in bog forest of the Fisherman Lake valley. Flowering in late June and early July. FL148, FL540.

Pedicularis lanata Cham. & Schlecht. = *P. kanei* sensu Hulten not Durand
Woolly Lousewort
Uncommon to scattered in moist alpine tundra on Pointed Mountain. FL152, FL521.

Pedicularis langsdorffii Fisch. ssp. *arctica* (R. Br.) Pennell
Very uncommon? In moist alpine tundra on the north ridge of Pointed Mountain and on the LaBiche Mountains near Dendale Lake. FL588, GM7.

Veronica wormskjoldii R.& S. Speedwell
Rare in moist alpine tundra on the north ridge of Pointed Mountain and on the LaBiche Mountains near Dendale Lake. FL593, GM26.

OROBANCHACEAE

Boschniakia rossica (Cham. & Schlecht.) Fedtsch.
Broom-rape
Very uncommon on stream banks of the Fisherman Lake valley. Parasitic on the roots of alder. FL346, FL613.

LENTIBULARIACEAE

Utricularia intermedia Hayne — Flat-leaved Bladderwort
Rare? In shallow water of Fisherman Lake. FL223.

Utricularia vulgaris L. — Greater Bladderwort
Common Bladderwort
Very uncommon to locally abundant in ponds of the bog forests in the Fisherman Lake valley. FL678.

PLANTAGINACEAE

Plantago major L. var. *major* — Common Plantain
Whiteman's Foot
Uncommon on sandy lakeshores and in disturbed areas of moist soil in the Fisherman Lake valley. FL400, FL625.

RUBIACEAE

Galium boreale L. — Northern Bedstraw
Scattered in disturbed areas, very uncommon in woods of the Fisherman Lake valley and on Pointed Mountain. FL115, FL381, FL555.

Galium triflorum Michx. — Sweet-scented Bedstraw
Uncommon in shrub associations, very uncommon in the woods of the Fisherman Lake valley. FL614.

CAPRIFOLIACEAE

Linnaea borealis L. ssp. *americana* (Forbes) Hult.
Twinflower
Common throughout the woods. FL108, FL534.

Lonicera dioica L. var. *glaucescens* (Rydb.) Butters
Twining Honeysuckle
Uncommon to scattered around lakeshores and in regions of temporary drainage systems in the Fisherman Lake valley. FL109, FL503.

Viburnum edule (Michx.) Raf. Mooseberry
Squashberry
Low-bush Cranberry
Scattered throughout the woods. Abundant in regions of temporary drainage systems through deciduous woods. Flowering in early June; fruits ripen in August. FL1, FL436.

ADOXACEAE

Adoxa moschatellina L. Moschatel
Uncommon in moist soil under *Salix* or *Alnus*. May be locally common. FL23, FL484.

CAMPANULACEAE

Campanula lasiocarpa Cham. Alpine Harebell
Uncommon to scattered in stony alpine tundra of Pointed Mountain. FL367, FL604.

Campanula uniflora L. Alpine Harebell
One-flowered Bluebell
Rare in stony alpine tundra of Pointed Mountain. FL605, FL732.

COMPOSITAE

Achillea millefolium L. Common Yarrow
Milfoil
Scattered to common in disturbed areas of the Fisherman Lake valley. FL135, FL565.

Achillea sibirica Ledeb. Siberian Milfoil
Scattered to common in disturbed areas of the Fisherman Lake valley and Pointed Mountain. FL318, FL600.

Antennaria alborosea A.E. Pors. & M.P. Pors.
Very uncommon in alpine tundra of Pointed Mountain. FL155, FL575.

Antennaria compacta Malte.
Rare in alpine tundra of the center peak of Pointed Mountain. FL160.1.

Antennaria ekmaniana Porsild
Rare in alpine tundra on the north ridge of Pointed Mountain. FL576.

Antennaria isolepis Greene
Rare. In alpine tundra of the south ridge of Pointed Mountain. FL656.

Antennaria monocephala DC. ssp. *monocephala*
Rare in alpine tundra on the LaBiche Mountains near Dendale Lake. GM49.

Antennaria rosea Greene var. *nitida* (Greene) Breitung
Rosy Everlasting
Rare. In alpine tundra of the north ridge of Pointed Mountain. FL577.

Arnica alpina (L.) Olin. ssp. *angustifolia* (Vahl.) Maguire
Alpine Arnica
Rare. In alpine tundra on the north ridge of Pointed Mountain. FL207.

Arnica alpina (L.) Olin. ssp. *attenuata* (Greene) Maguire = *A. lonchophylla* Greene ssp. *genuina* Maguire
Uncommon in alpine tundra on Pointed Mountain and on the banks of a mountain stream. FL134, FL543.

Arnica alpina (L.) Olin. ssp. *tomentosa* (J.M. Macoun) Maguire
Rare. In moist area in alpine tundra on the center peak of Pointed Mountain. FL195.

Arnica cordifolia Hook. Heart-leaved Arnica
Uncommon in moist areas under *Salix* of shrubby alpine tundra on Pointed Mountain. FL299, FL596.1, FL596.2, FL404.

Arnica lessingii Greene
Scattered to common on alpine tundra of the LaBiche Mountains near Dendale Lake. GM20.

Artemisia arctica Less. ssp. *arctica* Arctic Wormwood
Uncommon to scattered in alpine tundra, timberline forest and pine forests on Pointed Mountain. FL104, FL297, FL541.

Artemisia biennis Willd. Biennial Wormwood
Biennial Sagewort
Introduced? Locally common along roads at Fort Liard and along the Kotaneelee road. FL714.

Artemisia tilesii Ledeb. ssp. *elatior* (T.& G.) Hult.
Very uncommon in alpine tundra on Pointed Mountain. Locally common in some areas along the banks of the Liard River. FL309, FL402, FL640.

Aster ciliolatus Lindl. Lindley's Aster
Rare? Collected from the roadside. FL357.

Aster commutatus (Torr. & Gray) Gray
Uncommon on the banks of the Liard River at Fort Liard. FL709.

Aster hesperius A. Gray Western Willow Aster
Uncommon on banks of the Liard River at Fort Liard. FL710.

Aster sibiricus L. Siberian Aster
Scattered in riparian situations in the Fisherman Lake valley, and on alpine tundra on Pointed Mountain. FL196, FL241, FL310, FL581, FL708.

Crepis tectorum L. Narrow-leaved Hawk's-beard
Annual Hawksbeard
Very uncommon. Introduced and found only in disturbed areas. FL320, FL343.

Erigeron acris L. ssp. *politus* (E. Fries) Schinz & Keller
Very uncommon. On lakeshore near the F.L.A.P. camp, and on roadside in alpine area on Pointed Mountain. FL315, FL669.

Erigeron grandiflorus Hook.
Rare. In stony alpine tundra on the north ridge of Pointed Mountain. FL373, FL581.2.

Erigeron philadelphicus L. Philadelphia Fleabane
Rare. In ditch above the Liard River about 14.5 km southwest of Fort Liard. FL536.

Erigeron unalaschkensis (DC.) Vierh. = *E. hyperboreus* Greene
Rare in alpine tundra on the north ridge of Pointed Mountain and on the LaBiche Mountains near Dendale Lake. FL580, GM34.

Hieracium gracile Hook. var. *alaskanum* Zahn.
Rare. In damp area within shrubby alpine tundra on the north ridge of Pointed Mountain. FL584.

Hieracium triste Willd.
Very uncommon in alpine tundra of the LaBiche Mountains near Dendale Lake. Collected previously along the Canol Road by Porsild (1951) and in Nahanni National Park by Scotter and Cody (1974). GM36.

Hieracium umbellatum L. = *H. canadense* Michx.
Canada Hawkweed
Rare. Found on roadside. FL681.

Lactuca tatarica (L.) C.A. Mey. Blue Lettuce
Uncommon. On the banks of the Liard River in Fort Liard. FL711.

Matricaria matricariodes (Less.) Porter Pineapple-weed
Introduced. Locally common along roads in Fort Liard. FL622.

Petasites frigidus (L.) Fries var. *frigidus*
Arctic Coltsfoot
Scattered in wet area of *Sphagnum*, *Carex* and *Eriophorum* along a ridge-top of the LaBiche Mountains near Dendale Lake. GM2.1.

Petasites frigidus (L.) Fries var. *nivalis* (Greene) Cronq. = *P. hyperboreus* Rydb.
Vine-leaved Coltsfoot
Common in moist soil near lakeshores and in *Pinus contorta* forests on the slopes of Pointed Mountain. Uncommon in open bog forest of higher lake terraces. FL445.

Petasites firgidus (L.) Fries var. *nivalis* (Greene) Cronq. X *P. palmatus* (Ait.) Gray
Hybrid *Petasites* are common in damp mineral soil of ditches and shores. Also scattered in the *Salix* association, timberline forest and in shrubby alpine tundra. Flowering in late May. FL414, FL456.

Petasites palmatus (Ait.) Gray Palmate-leaved Coltsfoot
Common in damp soil, scattered throughout mixedwoods, open bog forests of the higher lake terraces, timberline forests and shrubby alpine tundra. Flowering in late May. FL87, FL412, FL457.

Petasites sagittatus (Banks) Gray Arrow-leaved Coltsfoot
Common in moist soil near lakeshores and streams. Flowering in late May. FL218, FL245, FL334, FL417, FL552.

Senecio lugens Richards. Groundsel
Ragwort
Uncommon to scattered in alpine tundra of Pointed Mountain. Rare under white spruce in the Fisherman Lake valley. FL93, FL194, FL208, FL302, FL524, FL542.1 FL542.2.

Senecio pseudaureus Rydb.
Very uncommon. On the shore of Fisherman Lake at Village Point. In moist area of alpine tundra on the center peak of Pointed Mountain. FL298, FL707.

Senecio triangularis Hook. Brook Ragwort
Uncommon under *Salix* in moist areas of shrubby alpine tundra on Pointed Mountain. FL300, FL641.

Senecio yukonensis Pors.
Scattered in alpine tundra of the LaBiche Mountains near Dendale Lake. GM2.2, GM19, GM37.

Solidago canadensis L. var. *salebrosa* (Piper) M.E. Jones
Graceful Goldenrod
Rare? Found on roadside. FL392.

Solidage decumbens Greene Mountain Goldenrod
Very uncommon. Creek bank on the slope of Pointed Mountain and at the edge of the road in the Kotaneelee River valley. FL615, FL697.

Solidago multiradiata Ait. var. *multiradiata*
Rare. In shrubby alpine tundra on the north ridge of Pointed Mountain. FL585.

Taraxacum alaskanum Rydb.
Uncommon in alpine tundra of the LaBiche Mountains near Dendale Lake. GM38.

Taraxacum ceratophorum (Ledeb.) DC.
Rare? Collected from a sandy shore of Fisherman Lake. Previously collected in the area by Raup at Brintnell Lake (1947). FL197.

Taraxacum officinale Weber. Common Dandelion
Introduced. Uncommon in disturbed areas in the Fisherman Lake valley. FL435, FL499.

Part II
ADDITIONAL species reported for the area by Johnny Klondike:

Allium schoenoprasum L. var. *sibiricum* (L.) Hartm.
Wild Chives
Reported by Johnny for the Petitot (Black) and Kotaneelee Rivers. Found by Cody (1963) on the Liard River bank near Fort Liard.

Oxyria digyna (L.) Hill Mountain Sorrel
Reported by Johnny to grow in the LaBiche Mountains. Not seen in the vicinity of Dendale Lake, but within the range given by Hulten (1968).

Saxifraga reflexa Hook.
Reported by Johnny to grow in the LaBiche Mountains.

Not found in the vicinity of Dendale Lake. This area is south of the range as given by Hulten (1968). It is likely that the drawing from which the plant was identified was mistaken for another species.

Prunus virginiana L. Choke Cherry

Reported by Johnny to be found along the Liard River. It was collected at Nahanni Butte by Scotter and Cody (1974).

Part III

Partial list of species of bryophytes, lichens and fungi.

The following lists do not include all of the specimens collected, and, with the exception of a few of the fungi, none have been verified by an authority. References consulted for specific names were as follows:

Crum, H. 1973 Mosses of the Great Lakes forest. Contributions from the University University of Michigan Herbarium Volume 10. (404 pp).

Hale, M.E. 1969 How to know the lichens. Dubuque: Wm. C. Brown Company Publishers. (226 pp).

Groves, J.W. 1962 Edible and poisonous mushrooms of Canada. Ottawa: Information Canada. (298 pp).

BRYOPHYTES

Ceratodon purpureus (Hedw.) Brid.	
Climacium dendroides (Hedw.) Web. & Mohr	Tree Moss
Dicranum polysetum Sw.	
Dicranum undulatum Brid.	
Drepanocladus uncinatus (Hedw.) Warnst.	
Hylocomium splendens (Hedw.) BSG	Stair-step Moss Mountain Fern Moss

Mnium spinulosum BSG	Red-mouthed Mnium
Pleurozium schreberi (Brid.) Mitt.	
Pohlia nutans (Hedw.) Lindb.	
Polytrichum commune Hedw.	Common Hair Cap Moss
Polytrichum juniperinum Hedw.	Juniper Moss
Polytrichum piliferum Hedw.	
Ptilium crista-castrensis (Hedw.) De Not.	Knight's Plume
Sphagnum spp.	Peat Mosses
Sphagnum wulfianum Girg.	

LICHENS

Cetraria islandica (L.) Ach.	Iceland Moss
Cladonia alpestris (L.) Rabenh.	
Cladonia arbuscula (Wallr.) Rabenh.	
Cladonia mitis Sandst.	
Cladonia rangiferina (L.) Wigg.	
Peltigera aphthosa (L.) Willd.	
Peltigera canina (L.) Willd.	Dog Lichen
Peltigera horizontalis (Huds.) Baumg.	
Peltigera malacea (Ach.) Funck	
Stereocaulon saxatile Magn.	
Umbilicaria hyperborea (Ach.) Ach.	
Umbilicaria proboscidea (L.) Schrad	

FUNGI

Boletus edulis Bull. ex Fr.
Fomitopsis pinicola (Sw. ex Fr.) Karst.
Gyromitra esculenta Fr.
Lycoperdon perlatum Pers.
Lycoperdon pyriforme Pers.
Morchella angusticeps Peck.
Polyporus resinosus Schrad. ex Fr.

APPENDIX II

FISH OF THE FISHERMAN LAKE AREA (CLASS PICES)

Fish were identified from the drawings in McPhail and Lindsey (1970) by Johnny and Margaret Klondike and by their son Jimmy. The distribution of the species in the area is given as it was known to them. The fish appeared to be readily recognized and all except two were given the same Slave designation by Johnny and Margaret, and by Jimmy, at two different questioning sessions. The ordering of the species and the spawning dates are taken from McPhail and Lindsey (1970).

Stenodus leucichthys nelma (Pallas) — Inconnu

These fish were reported by Jimmy to be found in the Liard River. They are late summer or early fall spawners.

Coregonus clupeaformis complex — Humpback Whitefish

This is the commonest species netted in Fisherman Lake. Spawning begins in late summer and sometimes lasts until December.

Prosopium williamsoni (Girard) — Mountain Whitefish

This species was recognized as one that is also netted in Fisherman Lake. Spawning occurs on gravelly stream beds or shores from November until January.

Thymallus arcticus (Pallas) — Arctic Greyling "Bluefish"

These fish are found in the Kotaneelee River and in the stream that was referred to as Gap Creek. Greyling spawn in streams with gravel or rocky bottoms from May to mid-June, after which they return to lakes or rivers.

Salvelinus alpinus (Linnaeus) — Arctic Char

This species was reported to be found in the Black (Petitot) and Beaver Rivers. Since McPhail and Lindsey map it only in the very lowest portion of the Mackenzie River drainage, it is possible that it was mistaken for another kind of "trout" (perhaps lake trout?).

Salvelinus malma (Walbaum) — Dolly Varden, Bull Trout

This species was reported for the Kotaneelee River. Dolly Varden spawn in the gravel of streams or inlet rivers from late August until November.

Essox lucius Linnaeus — Northern Pike, Jackfish

This fish is found in good numbers in Fisherman Lake. It was caught in nets and with hooks during the period of summer field work. Pike spawn in weedy flooded areas of floodplains or bays after the break-up of ice in the spring.

Couesius plumbeus (Agassiz) — Lake Chub

This small fish is found in Fisherman Lake where it is eaten by larger fish. They spawn from late May through June, sometimes as late as August.

Catostomus catostomus (Forster) — Longnose Sucker, Mullet

These fish are found in Fisherman Lake and the Liard River. They spawn after break-up in inlet or outlet streams or in shallows.

Lota lota (Linnaeus) — Loche, Burbot, Ling

This species could be caught in Fisherman Lake using bone fish hooks according to Johnny. They spawn in late winter in the shallows under the ice. Post spawning movements into the streams occur in late winter and early spring, ceasing by July. Summer nights are spent in shallower water.

Cottus cognatus Richardson — Slimy Sculpin

This tiny fish was recognized by Johnny and Margaret as one which occurred in "Grass Lake. They supposedly spawn in stony shallows or running water.

Stizostedion vitreum vitreum (Mitchill) — Yellow Walleye, Pickerel, Dore

This species was caught in Fisherman Lake. Jimmy said that they are also found in the Liard River. They spawn in spring around the time of ice break-up, in sandy or rocky shoals, or in the gravel shallows of streams. They are a schooling fish which exhibits "migratory habits" (McPhail and Lindsey, 1970:349).

APPENDIX III

BIRDS OF THE FISHERMAN LAKE AREA (CLASS AVES)

The following is a list of the bird species which were observed in the Fisherman Lake area during the time periods June to August, 1973, May to August, 1974 and July 1975. Terminology on status and abundance follows the standards set by the Federation of New York State Bird Clubs in 1954, which was reprinted in the Blue Jay [15(2):56]. Scientific and common names and the ordering of the species are taken from the American Ornithologists' Union Check-list (1957) and its thirty-second supplement (1973). Where possible additional details have been included for species near the edges of their known range.

Following the list of species that were observed in the area are a few comments on additional species which Johnny Klondike gave Slave names when he looked at their pictures in Peterson's *A Field Guide to Western Birds* (1969). It was taken to mean that these species had been seen by him in the area.

Part I Species observed in the area

Gavia immer (Brunnich) Common Loon
Uncommon summer resident, probably breeding.

Podiceps grisegena (Boddaert) Red-necked Grebe
Uncommon summer resident, probably breeding.

Podilymbus podiceps (Linnaeus) Pied-billed Grebe
Very rare. The distinctive cow-cow-cow.... call was heard only once, on June 1, 1973.

Ardea herodias Linnaeus Great Blue Heron
A single bird, thought to be this species was glimpsed briefly flying along the lakeshore, July 23, 1975.

Olor columbianus (Ord) Whistling Swan
Transient, seen resting on the lake in early May, 1974.

Olor buccinator (Richardson) Trumpeter Swan
Rare summer resident. Believed to breed in the area. A single bird was seen June 4, 1973. In July, 1973, two swans and a cygnet were observed by two members of the F.L.A.P. crew on Fish Creek. In 1974 four birds arrived at the lake on May 19 and two remained about the lake until 23 May. Between 15 June and 24 June additional observations were of two to three birds. Although it was not possible to approach closely enough to determine lore color, the calls of the birds were distinctly lower than those of a whistling swan, and were similar to the recording given by Peterson's *A Field Guide to Western Bird Songs* for the trumpeter swan.

Branta canadensis (Linnaeus) Canada Goose
Transients. Uncommon during May and June, 1974.

Anser albifrons (Scopoli) White-fronted Goose
Common transient in early May, 1974.

Chen caerulescens (Linnaeus) Snow Goose
Fairly common transient in early May, 1974.

Chen rossii (Cassin) Ross' Goose
Transient. Flock of about 100 birds seen 6 May 1974. They were distinguished from the snows which they accompanied by smaller size and the low, grunting call of the Ross'.

Anas platyrhychos Linnaeus Mallard
Fairly common summer resident, probably breeding.

Anas acuta Linnaeus Pintail
Rare. Two seen 11 May 1974.

Anas crecca Gmelin Green-winged Teal
Uncommon summer resident. Probably breeding.

Anas americana (Gmelin) American Wigeon
Uncommon summer resident, not seen later than 21 June 1974.

Anas clypeata (Linnaeus) Northern Shoveler
Uncommon summer resident, not seen later than 19 June 1974.

Aythya affinis (Eyton) Lesser Scaup
Uncommon summer resident? Not seen later than 4 June, 1973.

Bucephala clangula (Linnaeus) Common Goldeneye
Fairly common summer resident, breeding. Numerous broods and a nest with seven eggs seen.

Bucephala albeola (Linnaeus) Bufflehead
Uncommon summer resident, likely breeding.

Clangula hyemalis (Linnaeus) Oldsquaw
Summer visitants in late May and early June 1974.

Melanitta deglandi (Bonaparte) White-winged Scoter
Summer visitant. In mixed flocks with surf scoters on the lake from late May into mid-July.

Melanitta perspicillata (Linnaeus) Surf Scoter
Summer visitant. In mixed flocks with white-wingeds from late May to mid-July.

Oxyura jamaicensis (Gmelin) Ruddy Duck
Rare. Seen and heard only in June 1973.

Mergus serrator Linnaeus Red-breasted Merganser
Uncommon summer resident, possibly breeding.

Accipiter gentilis (Linnaeus) Goshawk
Resident? Possible goshawk seen 10 July, 1975.

Accipiter striatus Vieillot Sharp-shinned Hawk
Uncommon summer resident.

Buteo jamaicensis (Gmelin) Red-tailed Hawk
Uncommon summer resident, probably breeding.

Haliaeetus leucocephalus (Linnaeus) Bald Eagle
Uncommon summer resident. Reported breeding.

Circus cyaneus (Linnaeus) Marsh Hawk
Rare summer resident.

Pandion haliaetus (Linnaeus) Osprey
Very rare. One seen 14 May, 1974.

Falco columbarius Linnaeus Merlin
Very rare summer resident.

Falco sparverius Linnaeus American Kestrel
Uncommon summer resident, possibly breeding.

Dendragapus obscurus (Say) Blue Grouse
Very rare resident. One seen 19 June, 1973.

Canachites canadensis (Linnaeus) Spruce Grouse
Rare resident.

Bonasa umbellus (Linnaeus) Ruffed Grouse
Fairly common resident. Breeding. Several broods seen.

Lagopus mutus (Montin) Rock Ptarmigan
Rare resident.

Grus americana (Linnaeus) Whooping Crane
Rare transient. Three birds believed to be of this species were seen across the lake on May 7, 1974. In company with a flock of sandhill cranes, the birds appeared to be about the same size. The flight pattern was similar and the long neck was extended during flight, with the feet trailing behind. The birds were observed across the lake from the F.L.A.P. camp, a distance approaching 1.5 km, with 7 x 35 binoculars in dull lighting. No note was made at the time of the sighting whether wing tips were black or not.

Grus canadensis (Linnaeus) Sandhill Crane
Common transient during May.

Porzana carolina (Linnaeus) Sora
Rare summer resident. Two heard calling 4 June 1973, and one heard 27 June 1974.

Fulica americana Gmelin American Coot
Rare summer resident? Only sighting was six seen 4 June 1973.

Capella gallinago (Linnaeus) Common Snipe
Uncommon summer resident. Heard winnowing from early May to early July. Probably breeding.

Actitis macularia (Linnaeus) Spotted Sandpiper
Fairly common summer resident. Breeding. Three nests seen.

Tringa solitaria Wilson Solitary Sandpiper
Rare summer resident. Breeding. Downy young seen.

Tringa melanoleuca (Gmelin) Greater Yellowlegs
Uncommon summer resident. Probably breeding, adults scolding.

Calidris minutilla (Vieillot) Least Sandpiper
Rare transient. Two seen 23 July 1973.

Larus argentatus Pontoppidan — Herring Gull
Large gulls seen occasionally throughout the summers were thought to be of this species, but details of sightings were not recorded.

Larus canus Linnaeus — Mew Gull
Irregular summer visitant. One found dead on the lakeshore on 12 July 1975 was photographed.

Larus philadelphia (Ord) — Bonaparte's Gull
Irregular summer visitant.

Bubo virginianus (Gmelin) — Great Horned Owl
Uncommon resident. Probably breeding.

Chordeiles minor (Forster) — Common Nighthawk
Fairly common summer resident, probably breeding.

Megaceryle alcyon (Linnaeus) — Belted Kingfisher
Rare summer resident. Likely breeding.

Colaptes auratus (Linnaeus) — Common Flicker
Uncommon summer resident. Probably breeding.

Dryocopus pileatus (Linnaeus) — Pileated Woodpecker
Rare resident. Probably breeding.

Sphyrapicus varius (Linnaeus) — Yellow-bellied Sapsucker
Common summer resident. Breeding, several nests seen.

Dendrocopos villosus (Linnaeus) — Hairy Woodpecker
Rare resident.

Dendrocopos pubescens (Linnaeus) — Downy Woodpecker
Rare resident.

Picoides arcticus (Swainson) — Black-backed Three-toed Woodpecker
Very rare resident.

Picoides tridactylus (Linnaeus) — Northern Three-toed Woodpecker
Very rare resident.

Tyrannus tyrannus (Linnaeus) — Eastern Kingbird
Uncommon summer resident. Likely breeding.

Sayornis saya (Bonaparte) — Say's Phoebe
Uncommon summer resident. Possibly breeding at timberline.

Empidonax alnorum Brewster — Alder Flycatcher
Uncommon summer resident.

Empidonax minimus (Baird & Baird) Least Flycatcher
Common summer resident in deciduous woods. Believed to be breeding.

Contopus sordidulus Sclater Western Wood Pewee
Uncommon summer resident. Breeding. One nest seen.

Nuttallornis borealis (Swainson) Olive-sided Flycatcher
Rare summer resident.

Iridoprocne bicolor (Vieillot) Tree Swallow
Fairly common summer resident. Breeding.

Riparia riparia (Linnaeus) Bank Swallow
Locally common summer resident. A colony was seen near Fort Liard.

Hirundo rustica Linnaeus Barn Swallow
Rare summer resident.

Perisoreus canadensis (Linnaeus) Gray Jay
Uncommon resident. Young seen.

Corvus corax Linnaeus Common Raven
Fairly common resident. Breeding. Adults reported to have been seen feeding young.

Parus atricapillus Linnaeus Black-capped Chickadee
Fairly common resident. Breeding. One nest found.

Parus hudsonicus Forster Boreal Chickadee
Fairly common resident. Breeding. One nest found.

Sitta canadensis Linnaeus Red-breasted Nuthatch
Rare summer resident.

Troglodytes aedon Vieillot House Wren
Very rare summer resident? Heard on two occasions in 1973 and once in 1974.

Turdus migratorius Linnaeus Robin
Fairly common summer resident. Breeding. Three nests seen.

Ixoreus naevius (Gmelin) Varied Thrush
Uncommon summer resident. Breeding. Juveniles seen.

Catharus guttata (Pallas) Hermit Thrush
Uncommon summer resident.

Catharus ustulata (Nuttall) Swainson's Thrush
Fairly common summer resident. Breeding. Adults seen carrying food and scolding.

Catharus minima (Lafresnaye) Gray-cheeked Thrush
Summer resident? Possibly heard singing on several occasions, although not seen.

Myadestes townsendi (Audubon) Townsend's Solitaire
Rare summer resident.

Regulus calendula (Linnaeus) Ruby-crowned Kinglet
Fairly common summer resident in spruce woods.

Anthus spinoletta (Linnaeus) Water Pipit
Common summer resident above timberline.

Bombycilla garrulus (Linnaeus) Bohemian Waxwing
Uncommon summer resident.

Bombycilla cedrorum Vieillot Cedar Waxwing
Uncommon summer resident. Heard in area, seen at Fort Liard.

Lanius excubitor Linnaeus Northern Shrike
Not seen in the immediate area of Fisherman Lake, but one was observed in the LaBiche Mountains near Dendale Lake.

Vireo solitarius (Wilson) Solitary Vireo
Uncommon summer resident. One was observed at 10 m with 7 x 35 binoculars on 17 May 1974, showing the distinctive wing bars and white eye-ring. Heard periodically throughout June 1974.

Vireo olivaceus (Linnaeus) Red-eyed Vireo
Uncommon summer resident. Probably breeding.

Vireo philadelphicus (Cassin) Philadelphia Vireo
Very rare. One seen 10 July 1974. The underparts were distinctly yellowish and wing-bars were lacking. The bird was observed at 4 m with 7 x 35 binoculars for about five minutes in excellent light.

Vireo gilvus (Vieillot) Warbling Vireo
Uncommon summer resident.

Mniotilta varia (Linnaeus) Black-and-white Warbler
Uncommon summer resident. Observed on two occasions on the 25 and 27 May 1974, at about 7 m feeding on the trunks of balsam poplar, with black and white crown stripes obvious. The characteristic weesee

weesee ... call was heard periodically from 21 May to 19 June and again on 3 August 1974.

Vermivora peregrina (Wilson) Tennessee Warbler
Fairly common summer resident. Breeding. Adults seen carrying food.

Vermivora celata (Say) Orange-crowned Warbler
Uncommon summer resident.

Dendroica petechia (Linnaeus) Yellow Warbler
Fairly common summer resident. Breeding. Two nests seen.

Dendroica coronata coronata (Linnaeus) Yellow-rumped (Myrtle) Warbler
Fairly common summer resident. Breeding. Adults seen carrying food.

Dendroica striata (Forster) Blackpoll Warbler
Rare. Seen in May, 1974.

Dendroica palmarum (Gmelin) Palm Warbler
Rare. Two birds thought to be this species were seen 26 May 1974.

Seiurus aurocapillus (Linnaeus) Ovenbird
Common summer resident in deciduous woods. Breeding. One nest found.

Seiurus noveboracensis (Gmelin) Northern Waterthrush
Fairly common summer resident. Breeding. Adults carrying food and performing distraction displays.

Oporornis philadelphia (Wilson) Mourning Warbler
Uncommon summer resident. Observed closely on numerous occasions when gray hood, black chest and yellow belly were clearly visible. Familiar chirry chirry chorry chorry call was heard throughout June and July 1974. Breeding? Adult birds scolding on 28 July 1975.

Geothlypis trichas (Linnaeus) Common Yellowthroat
Very common summer resident in *Salix* around the lake. Probably breeding.

Wilsonia pusilla (Wilson) Wilson's Warbler
Rare. Seen only in late May and early June.

Wilsonia canadensis (Linnaeus) Canada Warbler
Rare? One seen and heard 7 and 8 July 1975. The yellow belly, necklace of black streaks and gray back were

observed from about 5 m. The song fitted the description given by Gunn (Peterson, 1969:261).

Setophaga ruticilla (Linnaeus) American Redstart
Uncommon summer resident. Likely breeding.

Agelaius phoeniceus (Linnaeus) Red-winged Blackbird
Common summer resident in *Salix* margin around the lake.

Euphagus carolinus (Muller) Rusty Blackbird
Uncommon summer resident. Seen mostly during May.

Quiscalus quiscula (Linnaeus) Common Grackle
Very rare. One seen May 10, 1974. Observed at 10 m the long 'keeled' tail was conspicuous.

Molothrus ater (Boddaert) Brown-headed Cowbird
Uncommon summer resident. Periodically observed and heard from 11 May to 17 July 1974. Distinguished by short bill, brown head and the bubbly call of the males.

Piranga ludoviciana (Wilson) Western Tanager
Rare to uncommon summer resident.

Pheucticus ludovicianus (Linnaeus) Rose-breasted Grosbeak
Uncommon summer resident. Likely breeding.

Hesperiphona vespertina (Cooper) Evening Grosbeak
Uncommon summer resident. The distinctive large, pale bills, black and white wings and the bright yellow plumage of the males were observed on 6 and 27 May 1974 and 17 July 1975. On numerous other occasions in June and July 1974 the peeer call of these birds was heard.

Carpodacus purpureus (Gmelin) Purple Finch
Uncommon summer resident. Male observed displaying.

Pinicola enucleator (Linnaeus) Pine Grosbeak
Rare. Seen only 6 May 1974.

Acanthis flammea (Linnaeus) Common Redpoll
Common to very common transient in May.

Spinus pinus (Wilson) Pine Siskin
Uncommon summer resident. Breeding? Adults seen gathering nesting materials 14 June 1974.

Passerculus sandwichensis (Gmelin) Savannah Sparrow
Rare summer resident? Also observed in the LaBiche Mounains near Dendale Lake.

Ammospiza leconteii (Latham) LeConte's Sparrow
Rare summer resident. Observed on 20 May and 18 June 1974 at about 5 m. Buffy breast, streaked sides and white crown stripe were seen. The bird seen on 18 June was scolding.

Junco hyemalis (Linnaeus) Dark-eyed (Slate-colored) Junco
Very common transient in mid-May. Fairly common summer resident.

Spizella arborea (Wilson) Tree Sparrow
Very common transient in early May.

Spizella passerina (Bechstein) Chipping Sparrow
Common summer resident. Breeding. Two nests seen.

Spizella pallida (Swainson) Clay-colored Sparrow
Rare. Two were heard singing on 21 June 1974.

Zonotrichia querula (Nuttall) Harris Sparrow
Very rare. A single bird was seen 31 May 1974.

Zonotrichia leucophrys (Forster) White-crowned Sparrow
A common transient in early May. Common summer resident above timberline.

Zonotrichia atricapilla (Gmelin) Golden-crowned Sparrow
Common summer resident above timberline on Pointed Mountain. Believed breeding. Adults seen scolding and carrying food. On several occasions birds were observed at 5 m. Black-bordered yellow crowns were distinctive. The call was heard on other occasions but was not identified until later.

Zonotrichia albicollis (Gmelin) White-throated Sparrow
Very common summer resident in deciduous woods. Breeding. One nest observed.

Passerella iliaca (Merrem) Fox Sparrow
Summer resident in open muskeg with willows and above timberline. Fairly common.

Melospiza lincolnii (Audubon) Lincoln's Sparrow
Fairly common summer resident in open muskeg.

Milospiza melodia (Wilson) Song Sparrow
Very rare? One heard singing 10 June 1974 and another 8 July 1975. Another bird was heard and seen at Fort Liard 26 July 1975.

Part II

Additional bird species which may occur in the area that were given Slave names (or descriptions?) by Johnny Klondike were as follows:

Gavia arctica (Linnaeus) — Arctic Loon

Podiceps auritus (Linnaeus) — Horned Grebe

Aechmophorus occidentalis (Lawrence) — Western Grebe

Botaurus lentiginosus (Rackett) — American Bittern
The voice of this species was described by the utterance "uu - a^{h} - uu", which fits very closely the call of the bird.

Anas strepera Linnaeus — Gadwall

Anas discors Linnaeus — Blue-winged Teal

Aythya valisineria (Wilson) — Canvasback

Histrionicus histrionicus (Linnaeus) — Harlequin
Johnny stated that these ducks occurred on the "mountain top" in the "little creeks".

Polysticta stelleri (Pallas) — Steller's Eider
Somateria mollissima (Linnaeus) — Common Eider
Somateris spectabilis (Linnaeus) — King Eider
Of these three species of oceanic birds only the latter two appear to be accidental to casual inland. The king eider was reported for Fort Simpson by Bent (1962). It is questionable whether the species would be seen often enough in the area for the people to have coined a name for them. Both names applied to the common eider were also applied to other waterfowl species.

Melanitta nigra (Linnaeus) — Black (Common) Scoter
Likely these were not distinguished from other scoters.

Lophodytes cucullatus (Linnaeus) — Hooded Merganser
May not have been distinguished from bufflehead.

Mergus merganser Linnaeus — Common Merganser
May not have been distinguished from the red-breasted merganser.

Buteo lagopus (Pontoppidan) — Rough-legged Hawk
Perhaps no distinction was made between this species and red-tailed hawk.

Lagopus lagopus (Linnaeus) Willow Ptarmigan
The birds' voice was described as " a^{h} - hahaha".

Lagopus leucurus (Richardson) White-tailed Ptarmigan
The call of this bird was given as "datsinki".

Pedioecetes phasianellus (Linnaeus) Sharp-tailed Grouse

Nyctea scandiaca (Linnaeus) Snowy Owl

Glaucidium gnoma (Wagler) Pygmy Owl

Strix nebulosa Forster Great Gray Owl

Aegolius funereus (Linnaeus) Boreal Owl

Tachycineta thalassina (Swainson) Violet-green Swallow
This species could be easily confused with tree swallow.

Cyanocitta cristata (Linnaeus) Blue Jay

Nucifraga columbiana (Wilson) Clark's Nutcracker
This species may not have been differentiated from northern shrike.

Certhia familiaris Linnaeus Brown Creeper

Cinclus mexicanus Swainson American Dipper
About this bird Johnny said that when the weather became cold in fall they would be found at the hotsprings.

Troglodytes troglodytes (Linnaeus) Winter Wren
This birds' voice was given as "koĩ koĩ koĩ", which would make it appear as though it had been confused with some other species.

Sialia mexicana Swainson Western Bluebird
These birds were said to be seen when the snow was on the ground.

Sialia currucoides (Bechstein) Mountain Bluebird
Johnny stated that there were "lots in April".

Regulus satrapa Lichtenstein Golden-crowned Kinglet

Xanthocephalus xanthocephalus (Bonaparte) Yellow-headed Blackbird
The voice was described as "aã - aã", which fits the call.

Loxia curvirostra (Linnaeus) Red Crossbill

Melospiza georgiana (Latham) Swamp Sparrow

APPENDIX IV

MAMMALS OF THE FISHERMAN LAKE AREA (CLASS MAMMALIA)

The following list of mammals includes species seen in the area as well as those said to be in the area by Johnny Klondike. Some of the small mammals have not been identified to species but this was deemed unimportant because the Slave do not distinguish more than one type. Those species which should occur in the area have been included in brackets (taken from Banfield, 1974; Caras, 1967; Rand, 1945). Nomenclature and ordering of the species follows Banfield (1974).

[*Sorex cinereus* Kerr] — Masked Shrew
[*Sorex palustris* Richardson] — American Water Shrew
[*Sorex obscurus* Merriam] — Dusky Shrew
[*Microsorex hoyi* (Baird)] — Pigmy Shrew

Several were observed in the cabin clearing which is in mixed broad-leaved forest.

[*Myotis lucifugus* (LeConte)] — Little Brown Bat
[*Lasiurus cinereus* (Palisot de Beauvois)] — Hoary Bat
[*Eptesicus fuscus* (Palisot de Beauvois)] — Big Brown Bat

Bats were observed at dusk flying in the cabin clearing.

Lepus americanus Erxleben — Snowshoe Hare

Although only two were observed during the field work, in previous years they were reported to have been abundant.

Eutamias minimus (Bachman) — Least Chipmunk

They were common in the mixed broad-leaved forest around the camp and occasional throughout the woods.

Marmota monax (Linnaeus) — Woodchuck

Three or more were known of in the area near the F.L.A.P. camp during field work.

Marmota caligata (Eschscholtz) — Hoary Marmot

None were seen on the south end of the Liard Range. Johnny reports that they were there in the past, but that they are more plentiful on the LaBiche Range in the Yukon.

Spermophilus parryii Richardson — Arctic Ground Squirrel

They were reported for the area by Johnny, on the mountains and once one was seen on the trail from the lake to Fort Liard. One was seen on the LaBiche Mountains near Dendale Lake.

Tamiasciurus hudsonicus (Erxleben) — American Red Squirrel

Squirrels were most common in spruce woods, although they were occasional in deciduous woods as well.

Castor canadensis Kuhl — Beaver

None were seen in Fisherman Lake, but sign was plentiful along the creeks. They are trapped in the area.

Peromyscus leucopus (Rafinesque) — White-footed Mouse

These mice were common at the F.L.A.P. camp.

Neotoma cinerea (Ord) — Bushy-tailed Wood Rat

One was seen at the F.L.A.P. camp in the summer of 1973.

[*Synaptomys borealis* (Richardson)] — Northern Bog Lemming

Lemmings were seen on occasion in the area.

[*Clethrionomys rutilus* Pallas] — Northern Red-backed Vole
[*Phenacomys intermedius* Merriam] — Heather Vole
[*Microtus pennsylvanicus* (Ord)] — Meadow Vole
[*Microtus chrotorrhinus* (Miller)] — Rock Vole

Voles were seen in the area around the F.L.A.P. camp.

Ondatra zibethicus (Linnaeus) — Muskrat

Johnny reported that they were abundant in marshy areas around the lake. One was caught in one of his fish nets set at the mouth of a creek.

Erethizon dorsatum (Linnaeus) — American Porcupine

About four were seen throughout the course of three summers, both in the valley and on the northern ridge of Pointed Mountain.

Canis latrans Say — Coyote

Although they were neither heard nor seen during summer field work, they were reported to be present by the Klondikes.

Canis lupus Linnaeus — Wolf

Wolves were occasionally reported seen by AMOCO personnel and tracks were seen along roads of the Fisherman Lake valley.

Vulpes vulpes (Linnaeus) — Red Fox

Although there had previously been more, only one had

been seen on Pointed Mountain in the last several years.

Canis familiaris Dog

Dogs used by the Slave were usually kept tied, however dog tracks were occasionally seen on the roads without accompanying human tracks.

Ursus americanus Pallas American Black Bear

Black bears were common in the area, in both the black and brown color phases.

Ursus arctos Linnaeus Grizzly Bear

Several reports of grizzly bears were made by the Klondikes during the years which the F.L.A.P. was in operation in the Fisherman Lake area. Johnny also reported that they were common in the LaBiche Mountains of the Yukon.

Martes americana (Turton) Marten

Marten were reported to be trapped locally.

Martes pennanti (Erxleben) Fisher

Fisher were occasionally trapped in the general area.

[*Mustela erminea* Linnaeus] Ermine, Stoat or Short-tailed Weasel
[*Mustela nivalis* Linnaeus] Least Weasel

Johnny reported that a weasel was about his camp during the summer but it is not known which species it was. Weasel are trapped locally.

Mustela vison Schreber American Mink

One was seen in the summer of 1974. Mink are trapped locally.

Gulo gulo Linnaeus Wolverine

One wolverine was seen by AMOCO personnel on Pointed Mountain during the summer of 1974.

Lontra canadensis (Schreber) River Otter

Otter were reported by the Klondikes to be on the Liard and Kotaneelee Rivers, and occasionally at Fisherman Lake.

Felis concolor Linnaeus Mountain Lion

Johnny reports two sightings for the area.

Lynx lynx (Linnaeus) Lynx

Lynx were seen occasionally in the Fisherman Lake valley. They are trapped in the area.

Rangifer tarandus (Linnaeus) Woodland Caribou
They are rarely reported in the Fisherman Lake area, but Johnny stated that they are in good numbers in the Yukon.

Odocoileus hemionus (Rafinesque) Mule Deer
Reported from the Yukon by Johnny, especially in the "Grass Mountains".

Odocoileus virginianus (Zimmerman) White-tailed Deer
One was seen 13 July 1973. Johnny reported that they are seen infrequently.

Alces alces (Linnaeus) *andersoni* Peterson Moose
Tracks were seen both in the Fisherman Lake valley and on the ridge tops of Pointed Mountain. They are an important source of food for the local residents.

Cervus elaphus Linnaeus *nelsoni* V.Bailey American Elk, Wapiti
Reported by Johnny Klondike to be in the Yukon ("other side Kotaneelee") in good numbers. Found archaeologically in the Fisherman Lake valley (G.J. Fedirchuk, personal communication).

Bison bison (Linnaeus) *athabascae* Rhoads Wood Bison
The last bison reported for the area was shot by Michele Bertrandt's father.

Oreamnos americanus (de Blainville) Mountain Goat
Mountain goats are rarely near Fisherman Lake, but according to Johnny they are present in the mountains in the Yukon.

Ovis dalli Nelson Dall's Sheep
Johnny reported that sheep occasionally come over onto the Liard Range north of Fisherman Lake, but that they are resident in the Yukon.

APPENDIX V

SLAVE NAMES FOR PLANTS OF FISHERMAN LAKE

Slave Name	Translation Given	Derivation if Known	Species Included
ǰī kɛkõ ɛtõa^{h}		ǰī = mountain a^{h} = little	
ǰī kɛ			*Oxytropis sericea*
ǰī kɛkõ			*Lycopodium selago*
ǰī kɛkõ tłoʰ ka^{h}	mountain boss		*Agrostis scabra, Luzula confusa*
ǰī hɛndɛ θɛ			*Agrostis scabra*
ǰī tɛ^{h}ko tło^{h}	mountain-top grass		*Saxifraga tricuspidata*
ɛya(ha)dala		ɛyaθɛ = cross mɛdala = ??	*Dryopteris dilatata* *Matteuccia struthiopteris*
ha^{h}dõ	geese eat	ha^{h} = geese dõ = eat?	*Equisetum* spp.
^{m}bɛdzīti^{h}	caribou horns		*Lycopodium annotinum* *L. clavatum, L. selago* *Cassiope tetragona*
ɛlīa			*Cassiope tetragona* *Lycopodium selago*
^{m}bɛθỹzīɛlɛ = ^{m}bɛθỹ dǰī = ^{m}bedǰī	owl berries	^{m}bɛθī = owl	*Juniperus communis*
^{n}duθe			*Larix laricina*
tsu	spruce		*Picea glauca*
tsua^{h}	muskeg spruce	-a^{h} = little	*Picea mariana* *Lycopodium complanatum*
tsutsi			*Abies lasiocarpa*
kohe^{h}	jack pine		*Pinus contorta*
naθītaʰ tłoʰ		tłoʰ = grass-like plant	*Typha latifolia*
tłoʰ dǰī		dǰī = berries?	*Sparganium angustifolium*
tłoʰ			all species of grasses, Carexes, other plants having long narrow leaves; some plants without this character: *Epilobium adenocaulon* *Taraxacum officinale*
ɛ tõ tłoʰ			*Melandrium affine*
tłoʰla	barley		*Hordeum vulgare*
tłoʰga tǰo			*Arctagrostis arundinacea* *Phalaris arundinacea*
tłoʰga			*Calamagrostis inexpansa* *Calamagrostis purpurascens*
tłoʰga dītlī		dītlī = blue	*Calamagrostis canadensis*
tłoʰ ga dɛtaǰya			*Beckmannia syzigachne*
ɛ^{n}dago tłoʰ	moose lick grass		*Festuca altaica* *Phleum pratense* *Poa pratensis* *Carex saxatilis* *Eriophorum brachyantherum*

Slave Name	Translation Given	Derivation if Known	Species Included
tɬo^{h} daθɛ tšo			*Carex aquatilis*
nežī tɬo^{h}	moose brain grass	kolõ nežī = moose brain	*Carex disperma* *Carex rostrata*
tɬo^{h} gaθua^{h}			*Eleocharis palustris*
tɬo^{h} gaθõ			*Scirpus validus*
tatõ	everybody name	= ɛ tõ ??	*Potamogeton* species *Ranunculus gmelini*
tɛta	leaf		*Nuphar variegatum*
tɛtsīɛ^{h}	water guts		*Potamogeton perfoliatus* *P. praelongus* *P. vaginatus*
kodzelī(a^{h}) naydī		kodzelī = sore heart naydī = medicine	*Sagittaria cuneata*
tsalɛ θonɛ^{h}			*Sagittaria cuneata*
hlɛkõ	sweet		*Hierochloe odorata*
tlī tsɛ	dog tail		*Hordeum jubatum*
tluɛ gõɛθɛtɛ	fish meat bannock		*Carex aquatilis*
do^{h}ɛdõ	sheep eat	do^{h} = Dall's sheep	*Carex dioica*
tsɛndī	muskrat eat	tsɛn = muskrat	*Calla palustris*
kolɪ^{h} naydī			*Calla palustris*
tšī dõ	ducks eat	tšī = duck	*Lemna minor*
kõka^{h} lī			*Lemna minor* *Capsella bursa-pastoris*
tɬo^{h} dzīõ		dzī = berries?	*Allium schoenoprasum*
tsa^{h}li dzī	frog berry		*Maianthemum canadense* *Smilacina trifolia* *Streptopus amplexifolius* ? *Senecio lugens*
^{n}da^{h}	medicine root		*Veratrum viride*
^{n}da^{h} dzɛku	throw-up root		*Veratrum viride*
naydī dakallī tɬo^{h}		naydī = medicine dakallī = white	*Zygadenus elegans*
dɛkamarīkɛ	Mary, Mother of Jesus?	kɛ = foot or track	*Calypso bulbosa* *Orchis rotundifolia* *Parnassia kotzebuei*
tsɛllī yanɛšī	mountain squirrel potatoes	tsɛllī = arctic ground squirrel	*Corallorhiza trifida* *Habenaria obtusata* *Polygonum viviparum* *Claytonia tuberosa* *Anemone richardsonii* *Parnassia kotzebuei* *Pyrola asarifolia*
dɛdīɛ yanɛšī	mountain squirrel potatoes	dɛdīɛ = hoary marmot	*Orchis rotundifolia* *Polygonum viviparum* *Claytonia tuberosa* *Saxifraga tricuspidata* *Pyrola asarifolia* *Pyrola virens*
dɛdīɛ dzī			*Pyrola asarifolia* *Pyrola virens*
tsɛllī naydī	girl medicine	tsɛllī = girl or little one	*Cypripedium passerinum*
tsa naydī	beaver medicine	tsa = beaver	*Habenaria obtusata* "two leaf" - possibly *Listera borealis*
yagodī			*Cicuta douglasii*
yagodī panɛ	same poison as yagodī		*Spiranthes romanzoffiana*

Slave Name	Translation Given	Derivation if Known	Species Included
glõ dõ	squirrels eat		*Spiranthes romanzoffiana*
glõ tło^{h}			*Pyrola secunda*
glõ yošɛtĩ	squirrels eat		*Spiranthes romanzoffiana*
glõ džĩ	squirrels eat		*Cornus canadensis*
θlõ du ɛ^{h}			*Populus balsamifera*
dĩa^{h} = dĩ			*Populus tremuloides*
ka	willow		*Salix* species
ka kɛllĩ			*Salix planifolia* *Salix arbusculoides* *Salix rigida* *Salix drummondiana*
ka da^{h}			*Salix bebbiana* *Salix glauca villosa* *Salix athabascensis* *Salix alaxensis* *Salix myrtillifolia* *S. myrtillifolia cordata* *Salix scouleriana*
ka θulɛ			*Salix scouleriana* *Salix drummondiana* *Salix athabascensis*
ka θa	willows river		?
õka džĩ ɛtõ			*Salix reticulata*
õka džĩ			*Arctostaphylos rubra* *Arctostaphylos alpina*
džĩa^{h} dɛ^{h}			*Arctostaphylos alpina*
hoɛ^{h}			*Alnus crispa*
hoɛtõ			*Salix reticulata*
kɛ			*Alnus incana*
dakonɛ			*Myrica gale* *Chamaedaphne calyculata*
dĩ θĩlĩ = dĩ yošɛtĩ		dĩ = blue grouse or spruce grouse yošɛtĩ = eat (mošɛzɛtĩ)	*Betula glandulosa* *Betula nana*
kĩ(a^{h})			*Betula neoalaskana* *Betula papyrifera* *Betula X winteri*, etc.
kotsĩ			*Urtica gracilis*
noθɛ džĩ ? tsĩalĩ	marten berries	noθɛ = marten	*Geocaulon lividum*
tsa džĩ	beaver ear		*Oxyria digyna* *Pyrola asarifolia* *Pyrola grandiflora*
tsa džĩ	beaver berries		*Chenopodium capitatum*
ɛdɛθõ			*Rumex mexicanus* *Pedicularis lanata*
sa^{h} džĩ (ɛtõ)	bears eat	sa^{h} = bear dzi = berries	*Actaea rubra*
sa^{h} tĩlɛ^{h}	bears eat roots		*Boschniakia rossica* *Osmorhiza obtusa* *Pedicularis lanata* *Pedicularis langsdorfii*
sa^{h} yošɛtĩ	bears eat roots	yošɛti = eat (mošɛzɛtĩ)	*Pedicularis langsdorfii* *Vicia americana* *Lathyrus ochroleucus*
sa^{h} yɛnošɛtĩ			*Petasites hyperboreus* *Petasites sagittatus*

Slave Name	Translation Given	Derivation if Known	Species Included
tsa^{h}li kɛtõ	frog feet plant	tsa^{h}li = frog kɛ = foot ɛtõ = leaf or plant	*Delphinium glaucum*
tsalĩ^{h} kĩ^{h}			*Rubus acaulis* *Rubus pubescens*
tsa^{h}lɛ(^{m}bɛ)θonɛ	(breech clout??)		*Petasites sagittatus*
^{n}dɛ (k) ɛtõ	mud plant	^{n}dɛ = ground, mud, "mat"	*Ranunculus lapponicus* *Mitella nuda* *Potentilla norvegica* *Viola renifolia* *Castilleja raupii* *Arnica alpina*
ɛtõ ga^{h}lĩa^{h}			*Thalictrum venulosum*
noθɛ naydĩ	marten medicine	noθɛ = marten	*Draba lanceolata* *Saxifraga hieracifolia*
ɛtõ mɛ^{n}dɛtlua^{h}			*Rorippa islandica*
dž̌ĩa^{h} dɛhonɛ^{h}			*Ribes glandulosum*
^{n}datsɛnɛ			*Ribes hudsonianum*
tlỹ dž̌ĩa^{h}	dog berries	tlỹ = dog	*Ribes lacustre*
da hozɛ (da hoθɛ)			*Ribes oxyacanthoides*
dž̌ĩa^{h} dɛθĩ	good to eat		*Ribes triste*
nogɛθɛ naydĩ	fox medicine	nogɛθɛ = red fox	*Senecio lugens* *(Saxifraga reflexa)*
kỹ dž̌ĩ(a^{h})			*Amelanchier alnifolia*
ỹ^{n}dzea^{h} = ỹ^{n}dzɛtõ			*Fragaria virginiana*
tlỹtɛ dɛdž̌inɛ			*Potentilla fruticosa* *Andromeda polifolia*
koθɛntelĩ naydĩ		elĩ = pain	*Potentilla fruticosa* *Andromeda polifolia* *? Utricularia vulgaris*
tɛgaye			*Potentilla palustris*
untš̌u			*Rosa acicularis*
tsuĩkali	muskeg berries		*Rubus chamaemorus*
da^{h}kalli			*Rubus idaeus melanolasius*
tsu duga^{h}	(Slave name)		*Sorbus scopulina*
kolõ dž̌ĩ	moose berries (Johnny's name)	kolõ = moose	*Sorbus scopulina*
dž̌ĩa^{h} tš̌o			*Spiraea beauverdiana*
kozõ dakallĩ		kozõ = nighthawk dakallĩ = white	*Astragalus americanus* *Oxytropis deflexa sericea*
dɛnɛ θaɛ^{h}	Indian carrot	dɛnɛ = Slave Indian	*Hedysarum alpinum*
datɬoli			*Vicia americana* *Lathyrus ochroleucus*
dɛnɛlĩ naydĩ	man medicine	dɛnɛ = Slave, -lĩ = no or none naydĩ = medicine	*Melilotus alba* *Melilotus officinalis*
dɛdĩɛ naydĩ = dɛdĩɛ tɬo^{h}			*Oxytropis maydelliana*
noθɛ tš̌o naydĩ	fisher medicine	noθɛ tš̌o = fisher	*Geranium richardsonii*
dž̌ĩa^{h} tɛθɛ	berries water		*Empetrum nigrum* *Oxycoccus microcarpus*
tsɛna hoɛ^{h}			*Shepherdia canadensis*
gũ			*Epilobium angustifolium*
tɛ^{h} tsua^{h}	same tree water	tɛ^{h} = water tsu = spruce	*Hippurus vulgaris*

Slave Name	Translation Given	Derivation if Known	Species Included
noga ɛtsoʰ(θɛ)	wolverine rhubarb	noga = wolverine ɛtsoʰ = *Heracleum lanatum*	*Angelica lucida*
ɛtsoʰ	Indian rhubarb		*Heracleum lanatum*
dɛko naydĪ	cough medicine	dɛko = cough	*Heracleum lanatum*
hluɛ tlaʰlɛʰ			*Sium suave* (possibly *Cicuta mackenzieana*)
tsuɛ allĪ = tsĪɛ allĪ			*Cornus canadensis*
(d)aʰ dakallĪ	little white	aʰ = little dakallĪ = white	*Cornus stolonifera*
ɛtõ džĪ			*Pyrola grandiflora*
kotsŭⁿdago		nɛndatsŭⁿdago (θɛ) = eyebrow	*Ledum groenlandicum*
kotsŭⁿdagoaʰ = kotsŭⁿdago atsɛllĪ			*Ledum palustre decumbens*
kotsŭⁿdago dakallĪ	no tea	dakallĪ = white	*Andromeda polifolia* *Rhododendron lapponicum*
nɛtɛnɛ			*Arctostaphylos uva-ursi*
dɛʰenda	geese eyes	dɛʰ = sandhill crane nɛnda = eyes	*Oxycoccus microcarpus*
ɛdɛtlɛ tšinɛlĪ	color		*Rhododendron lapponicum*
inkɛθi			*Vaccinium uliginosum* *Vaccinium caespitosum*
yaʰnaydĪ		yaʰ = lice naydĪ = medicine	*Androsace septentrionalis*
ɛtõ hlɛkõ	smell good	hlɛkõ = sweet	*Polemonium boreale* *Pedicularis labradorica* *Taraxacum officinale*
ɛtõ tša	big leaf		*Mertensia paniculata*
ɛtõ dɛtsĪ	smell		*Mentha arvensis*
nota naydĪ	lynx medicine	nota = lynx	*Pedicularis capitata*
ɛtõlikɛ			*Pedicularis capitata*
kozõθallĪ		kozõ = nighthawk	*Pedicularis labradorica* *Matricaria matricariodes*
tɛʰ džĪaʰ = tuɛ džĪ	water berries	tɛʰ = tuɛ = water	*Utricularia vulgaris*
yatonɛtõ	jump-deer goin' to eat 'em	yatonɛ = white-tailed deer; ɛtõ = leaf	*Plantago major*
kotzɛdɛtlelĪ		eli = pain	*Lonicera dioica*
dɛtsinka naydĪ		naydĪ = medicine	*Lonicera dioica*
maθĪlĪu			*Viburnum edule*
daθ ɛ tõ atsɛllĪ		atsɛllĪ = little one	*Achillea millefolium*
daθ ɛ tõ nɛtša		nɛtša = big one	*Achillea sibirica*
daθ ɛ tõ tšo		tšo = big	*Petasites palmatus* *Petasites sagittatus* *Artemisia tilesii elatior*
daθ ɛ tõ			*Petasites palmatus*
ɛtsoʰɛtõ	moose guts		*Arnica cordifolia*
kotzɛzĪ naydĪ			*Artemisia arctica*
ɛtõ jõ holĪaʰ			*Erigeron unalaschkensis*
ɛtõ			*Goodyera repens* *Polygonum achoreum* *Moehringia lateriflora* *Anemone parviflora* *Aquilegia brevistyla*

Slave Name	Translation Given	Derivation if Known	Species Included
ɛtõ			*Dryas integrifolia* *Moneses uniflora* *Gentiana amarella* *Adoxa moschatellina*
ɛtõ dītlī		dītlī = blue	*Chenopodium album* *Minuartia rubella*
ɛtõ dɛnītlī		dɛnītlī = blue	*Aconitum delphinifolium* *Anemone drummondii* *Aquilegia brevistyla* *Lupinus arcticus* *Gentiana glauca* *Polemonium acutiflorum* *Polemonium boreale* *Mertensia paniculata* *Aster sibericus* *Erigeron philadelphicus*
ɛtõ dakallī		dakalli = white	*Cerastium beeringianum* *Melandrium affine* *Erucastrum gallicum* *Parnassia palustris* *Dryas integrifolia* *Geranium richardsonii* *Galium boreale* *Antennaria alborosea* *Antennaria ekmaniana* *Erigeron acris politus*
ɛtõ dɛθoī		dɛθoī = yellow	*Anemone richardsonii* *Ranunculus lapponicus* *Corydalis aurea* *Erysimum chieranthoides* *Geum perincisum* *Potentilla uniflora* *Castilleja raupii* *Arnica alpina* (3 subspecies) *Arnica cordifolia* *Senecio lugens* *Senecio triangularis*
ɛtõ dim̃bɛ(θa)		dim̃bɛ = brown	*Corydalis sempervirens*
nɛtlɛtõ	red berries	nɛtlɛ = red	*Moneses uniflora* *Linnaea borealis*
ɛtõ dɛkoīõ	?		*Taraxacum ceratophorum*

APPENDIX VI

SLAVE NAMES OF FISH SPECIES OF THE FISHERMAN LAKE AREA

Slave names for fish were given by Johnny Klondike with the counsel of Margaret Klondike. Additional names in parentheses are those given by Jimmy Klondike that differed from those given by his parents.

Slave Name	Fish Species
nuītõ	inconnu
tłu	humpback whitefish
θedihī (ŭnbulī)	mountain whitefish
tsɛ dīa^{h} (ŭnbulī, tsutiẽ)	arctic greyling
sa^{m}ba^{h}, sama^{h}	arctic char
dezena^{h}, dezenīa^{h} (sama^{h})	Dolly Varden
uda^{h}	northern pike
tłuɛ tšīθɛ	lake chub
dɛdilī	longnose sucker
noθī (ŭnkī)	burbot
ɛtsõ lua	slimy sculpin
ũ tšuɛ	yellow walleye

APPENDIX VII

SLAVE NAMES FOR BIRDS AS IDENTIFIED BY JOHNNY KLONDIKE

Slave term	Translation or comments	Species included
tutsī		common loon
θi^{m}bɛ		arctic loon
nota		red-necked grebe
nota atsɛlla	atsɛlla = small	horned grebe
nota tšo	tšo = big	western grebe
yikonī	says uu - a^{h} - uu	American bittern
dɛdõ tšo = dɛdõ dakallī		whistling swan
goga =? ^{n}daglīš		trumpeter swan
dadɛ^{h}		snow goose, blue goose, white-fronted goose
ha^{h}		Canada goose
tšī	duck	
tšī tšo		mallard
tšī tsɛlla		gadwall, green-winged teal
tšī ^{n}dɛllī		pintail
tšī minodagodɛ^{hm}ba		blue-winged teal
tšī ^{n}dɛθɛ	says ɛ̃-ɛ̃-la	oldsquaw
dɛta tšī	mountain top - little creek	harlequin duck
tšī gɛθɛ		white-winged scoter, surf scoter, black scoter
(tšī) ɛkotšīna		ruddy duck
sa^{h}sī		American wigeon, common eider
θolī		northern shoveler
^{n}daθīta		canvasback, lesser scaup
dɛ̃kã		lesser scaup, king eider
dɛθelī		common goldeneye
kela^{hm}ba		bufflehead, hooded merganser,common eider
ɛyɛha tšo		surf scoter, black scoter
θoa		common merganser, red-breasted merganser
ɛ̃hɛla'		Steller's eider, king eider
ɛzɛ	? hawk	marsh hawk
ɛzɛ^{hm}ba^{h}		goshawk, marsh hawk
ɛzɛ kɛllī		merlin
ɛzɛ tsɛlla		kestrel
tadzea		sharp-shinned hawk
ɛθa		red-tailed hawk, rough-legged hawk
ɛhɛ^{n}da = ɛ̃da^{h}lī	eagle dog	bald eagle
θadɛ tšuɛ		merlin
dī	chicken	
dī tšo	says mmmb	blue grouse
dī kɛllī		spruce grouse
ɛdzedzunɛ		ruffed grouse

Slave term	Translation or comments	Species included
ku^{m}ba	says au-oa-u	rock ptarmigan
ku^{m}ba tšo	says ah'-ha-ha-ha	willow ptarmigan
datsinkī	says datsinkī	white-tailed ptarmigan
ɛtahī		sharp-tailed grouse
dɛ^{h}		sandhill crane
kotsɛntonī		Virginia rail
ðĩ ðĩ	says ðĩ-ðĩ-ðĩ	sora
tatzohɛ		yellow rail
tsɛko = tsīɛkollī		American coot
= õka tšiθɛ		
kotsõθõɛ		common snipe
tsuduhẽ	muskeg bird	solitary sandpiper
dunzɛ	muskeg - says dũ-dũ-dũ-dũ	greater yellowlegs
	says tuɛ-tuɛ-tuɛ	
mɛka		all gulls
mɛka θīja		terns
^{m}bɛθī	owl	
^{m}bɛθī go^{n}dɛ		great horned owl
= ^{m}bɛθī ^{m}bɛdzī gułī		
^{m}bɛθī dakallī		snowy owl
^{m}bɛθī θa ?	^{m}bɛdzī huli (lit. no horns)	great gray owl
ɛθɛllī		boreal owl
ɛθlozihīẽ		pygmy owl
kozõ		common nighthawk
ɛ^{n}dawõ	"fish goin' to eat"	belted kingfisher
^{n}dɛtzɛnī		yellow-shafted flicker
θaha diθaha		yellow-bellied sapsucker
θlõ jẽ		hairy woodpecker, downy woodpecker, black-backed three-toed woodpecker, northern three-toed woodpecker
mɛtsīlako dakollī		eastern kingbird
= tšua^{h} yõdītlī		
ɛdatsŭnte		flycatchers
θɛdõka		swallows
mɛtlõta		violet-green swallow
õka		gray jay
θɛ datsuī		blue jay
õka wõ		Clark's nutcracker, northern shrike
ɛtsotlīã		boreal chickadee
= ^{m}bɛkõkõ dɛtsīla		
ɛtsotlīã tšo		black-capped chickadee
?	says õy-õy	red-breasted nuthatch
di tšua^{h} džīθa		brown creeper

Slave term	Translation or comments	Species included
tɛtsoθɛ^{h}	"cold, hotspring alright"	American dipper
? θītšīõka	says koĩ - koĩ - koĩ	winter wren ?
tsĩkõ		robin
tšua^{h} tšo	says kuīīī	varied thrush
	says tsī-tsī-tsī-tsī	mourning warbler
ko^{h}diɛ^{h}		hermit thrush, Swainson's thrush, gray-cheeked thrush
tšua^{h} dītlī		western bluebird
tšua^{h} dītlīa^{h}	lots in April	mountain bluebird
tšua^{h} go^{n}de		golden-crowned kinglet, white-throated sparrow
^{m}bɛdzɛ godɛtzīa		ruby-crowned kinglet
θī datsuī		Bohemian waxwing
tšua^{h} dɛhulīa		red-eyed vireo
	yellow bird	western tanager
di tšua^{h} dɛhulīa		yellow warbler
dɛnaθea^{h}		black-and-white warbler
tšua^{h} tšiθa		blackpoll warbler, black-and-white warbler, savannah sparrow
šīkɛkõ tšua^{h}	(mountain top bird)	yellow warbler, northern waterthrush
sakɛdzīθa		yellow-rumped warbler
kotzõθõi		ovenbird, northern waterthrush
kotša tšo	says ã - ã	yellow-headed blackbird
	says tša kõ krīī	red-winged blackbird
ɛdi^{n}do		pine grosbeak
yīha kokaha		red crossbill
	says kaīn kaīn	(slate-colored) dark-eyed junco
mɛzɛti kodɛtšila		tree sparrow
tšua^{h} di^{m}bɛ		clay-colored sparrow
tšua^{h} θõ dewõ		Harris sparrow
ɛtlīɛta		golden-crowned sparrow
= mɛzɛtī kodɛθoia^{h}		
kõdī tšo		fox sparrow
mɛtzi godɛtzīa		swamp sparrow
kõdī		song sparrow

APPENDIX VIII

SLAVE NAMES OF MAMMALS AS IDENTIFIED BY JOHNNY KLONDIKE

Slave term	Comments	Species included
ɛtozi hoha		shrews
kotzononda		bats
sa^{h}	bear	
sa^{h} dɛnītlɛ	black phase	black bear
sa^{h} dɛsīl	cinnamon phase	black bear
sa^{h} di^{m}bɛ	blue phase	black bear
sa^{h} nɛtšǎ	nɛtšǎ = big one	grizzly bear
nogɛθɛ	fox	
nogɛθɛθoi	red	red fox
som(a)nogɛθɛ	black or silver phase	red fox
ɡkɛtonei nogɛθɛ	cross fox	red fox
=nogɛθɛ kɛtinya	?	
dɛka		wolf
dɛka(h)a^{h}	small wolf	coyote
tɨĩ		dog
noθɛ	marten	
noθɛ tšǒ	tšǒ = big	fisher
nɛ^{m}ba		weasel
tɛna^{h}dlɛ		mink
noga		wolverine
na^{m}bɛ		river otter
noda^{h}		lynx
ga^{h}	"rabbit"	
ga^{h} dakallī	white phase	snowshoe hare
ga^{h} dɛnītlɛ	brown phase (lit. black)	snowshoe hare
koẽ		woodchuck
dɛdīɛ	two teeth, white head, brown and yellow rump; says kwīīī	hoary marmot
ɛθolī = ɛθoa^{h}		least chipmunk
glõ		red squirrel
tsɛllī	says tš-tš	arctic ground squirrel
tsa		beaver
atsɛllīah		white-footed mouse
kluɛ		mice
ɛdzɛ^{m}balī		bushy-tailed wood rat
tlɛ^{n}dɛθoɛ		lemmings and voles
tɛka = tsɛtɛka = tsẽ		muskrat
kohai		porcupine
mɛdzī (^{m}bɛdzī)	male ("daddy")	woodland caribou, mule deer
^{m}beya^{h}	female ("mother")	woodland caribou
mɛdzī tšǒ	male, mītso = "long horns"	elk
mɛta^{h} (^{m}bɛta^{h})	female	elk
yatonɛ	"jump deer"	white-tailed deer
kolõ		moose
(d)ɛjidɛ		wood bison
do^{h}		Dall's sheep
do^{h} dɛnītlɛ	black phase	Dall's sheep
ɛ^{hm}ba^{h}		mountain goat

APPENDIX IX

PLANT USE OF THREE AMERICAN INDIAN TRIBES

The following table compares the use of species found within the Fisherman Lake area by three North American tribes of native peoples.

Species	Food			Technology			Medicine			Other		
	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave
Algae				+		+						
Fomitopsis pinicola												+
Lycoperdon spp.							+		+	+		
Polyporus resinosus									+			
Polyporus spp.				+			+			+	+	
Cetraria islandica									+			
Evernia vulpina				+			+					
Peltigera canina											+	
Sphagnum spp.								+			+	+
Bryophytes					+					+		
Dryopteris dilatata		+			+							
Equisetum arvense				+	+		+	+	+	+		
Equisetum spp.									+			
Lycopodium annotinum												+
Lycopodium complanatum							+					
Abies lasiocarpa	+						+		+	+		+
Juniperus communis			+				+	+				
Larix laricina									+			
Picea glauca						+						+
Picea mariana			+			+			+			+
Pinus contorta				+	+			+	+			

Species	Food			Technology			Medicine			Other		
	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave
Typha latifolia	+		+		+		+			+		+
Sparganium angustifolium			+									
Sagittaria cuneata	+								+			
Calamagrostis purpurascens						+						
Hierochloe odorata							+			+		
Carex aquatilis						+						
Carex disperma						+						
Scirpus acutus	+											
Acorus calamus							+		+			
Allium schoenoprasum	+		+	+			+					
Maianthemum canadense			+									
Smilacina trifolia			+									
Streptopus amplexifolius			+									
Veratrum viride	+						+	+	+		+	
Zygadenus elegans									+			
Populus balsamifera			+			+			+			
Populus tremuloides	+		+			+	+			+		+
Salix spp.	+			+		+	+		+	+		
Myrica gale									+			
Alnus crispa						+						
Alnus rubra					+			+				
Alnus tenuifolia				+		+	+					+
Betula spp.			+	+		+						+
Geocaulon lividum			+									
Oxyria digyna			+									
Polygonum viviparum			+									
Rumex mexicanus						+	+					
Chenopodium album	+			+								

Species	Food			Technology			Medicine			Other		
	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave
Chenopodium capitatum						+						
Claytonia tuberosa			+									
Nuphar variegatum	+		+									
Actaea rubra							+					
Thalictrum sparsiflorum										+		
Drosera rotundifolia											+	
Ribes glandulosum			+									
Ribes hudsonianum			+						+			
Ribes lacustre		+										
Ribes oxyacanthoides	+		+							+		
Ribes triste			+									
Amelanchier alnifolia	+	+	+	+			+			+		
Fragaria virginiana	+	+	+				+		+			
Potentilla fruticosa	+		+						+	+		
Prunus virginiana	+		+	+			+			+		
Rosa acicularis	+		+				+		+	+		
Rubus acaulis			+									
Rubus chamaemorus			+									
Rubus idaeus	+		+				+		+			
Rubus pubescens			+									
Sorbus scopulina									+			
Astragalus americanus			+									
Hedysarum alpinum			+						+			
Lupinus spp.							+			+		
Oxytropis sericea spicata												
Empetrum nigrum			+				+			+		
Elaeagnus commutata	+						+			+		
Shepherdia canadensis	+	+	+						+			

Species	Food			Technology			Medicine			Other		
	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave
Epilobium angustifolium	+		+	+		+	+	+				
Aralia nudicaulis							+					
Angelica lucida			+								+	
Cicuta douglasii								+	+			
Cicuta mackenzieana									+			
Heracleum lanatum	+	+	+	+			+	+	+	+	+	
Cornus canadensis		+	+									
Cornus stolonifera	+			+		+	+		+	+		+
Moneses uniflora								+				
Pyrola spp.							+					
Andromeda polifolia									+			
Arctostaphylos alpina			+									
Arctostaphylos rubra			+									
Arctostaphylos uva-ursi	+		+	+			+			+		+
Cassiope tetragona												+
Kalmia polifolia								+				
Ledum groenlandicum		+	+						+			
Ledum palustre decumbens			+						+			
Oxycoccus microcarpus		+	+									
Vaccinium caespitosum			+									
Vaccinium uliginosum		+	+									
Vaccinium vitis-idaea			+									
Androsace septentrionalis												+
Mertensia paniculata												+
Mentha arvensis	+		+									
Pedicularis lanata						+			+			
Pedicularis langsdorfii			+									
Boschniakia rossica									+			

Species	Food			Technology			Medicine			Other		
	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave	Blackfoot	Kwakiutl	Slave
Utricularia vulgaris									+			
Plantago major								+				
Galium boreale				+								
Galium triflorum							+			+		
Lonicera dioica									+			
Viburnum edule		+	+						+			
Achillea millefolium	+						+	+	+			
Achillea sibirica									+			
Antennaria rosea										+		
Artemisia arctica									+			
A. tilesii elatior									+			
Aster spp.				+			+			+		
Petasites frigidus									+			
Petasites palmatus									+			
Solidago spp.							+					
Taraxacum ceratophorum			+									

APPENDIX X

FREQUENCIES OF SPECIES FOUND IN QUADRATS (f) FOR ASSOCIATIONS SAMPLED, AND CALCULATED FREQUENCY (F) OVER THE AREA MAPPED.

Species	Frequency of occurrence (f) within each association[1]													Overall
	1	2	3	4	5	6	7	8	9	10	11	12	13	F[2]
Equisetum arvense						6		96		4				3
Equisetum scirpoides		96		20			4			12		68	20	8
Equisetum sylvaticum											28			<1
Lycopodium annotinum													10	<1
*Abies lasiocarpa**									28		32		10	<1
Picea glauca *		4	4	8			4	+		4		28	20	2
*Picea mariana**			8		100	30								10
*Pinus contorta**												8		<1
Agropyron spp.								4						<1
Calamagrostis canadensis						2								<1
Calamagrostis spp.							24							5
graminoid indetermined				8					20	20	53	13	30	2
Carex spp.		4				32				4		33	50	8
Luzula spp.												7		4
Maianthemum canadense							+				+			+
Tofieldia pusilla												12		<1
Veratrum viride											8			<1
Zygadenus elegans										8			30	<1
Goodyera repens			12	12										<1
Habenaria obtusata			+	4						+				<1
Orchis rotundifolia			4											<1
Spiranthes romanzoffiana						4								<1
*Populus balsamifera**	4													1
*Populus tremuloides**	4	8	+									7		2
Salix spp.						6	+	16	4	12	36	60	32	3
Salix myrtillifolia				20		38								10
Salix reticulata												67	30	<1
Myrica gale						8								2
Alnus crispa	16						32		7		+	13		10
Alnus incana tenuifolia								+						+
Betula glandulosa						10			7		40	27	20	3
Geocaulon lividum			+			8								2
Polygonum viviparum												27	40	<1
Caryophyllaceae indetermined								4				7	20	<1
Aconitum delphinifolium											13	+		<1
Actaea rubra							8	8						2
Anemone drummondii											40		10	<1
Anemone parviflora													60	<1
Anemone richardsonii											7			<1
Delphinium glaucum										4	7			<1
Drosera rotundifolia						2								<1
Mitella nuda	12		16	80		8	36	72	20	4	7	+		18

Species	Frequency of occurrence (f) within each association[1]													Overall
	1	2	3	4	5	6	7	8	9	10	11	12	13	F[2]
Parnassia kotzebuei				24							7	7	10	1
Ribes glandulosum							48							9
Ribes hudsonianum								4						<1
Ribes oxyacanthoides				8										<1
Ribes triste				16			12	4						3
Saxifraga hieracifolia												27	60	<1
Saxifraga tricuspidata													60	<1
Dryas integrifolia												7	13	<1
Fragaria virginiana		4	8	8				20	20	12				2
Potentilla fruticosa						2								<1
Rosa acicularis	76	88	68	60		24	72	68	13	56	7			53
Rubus acaulis								8			27			<1
Rubus chamaemorus						42								10
Rubus pubescens	8	36	4				40	32						13
Rubus idaeus							4							3
Spiraea beauverdiana											13			<1
Astragalus americanus								+	7					<1
Hedysarum americanum									+			53		<1
Lathyrus ochroleucus								4						<1
Oxytropis maydelliana												13		<1
Vicia americana								4						<1
Empetrum nigrum						+			+	8				<1
Viola renifolia		4	4	16			4	16			7			2
Shepherdia canadensis		84	12	16		2		+	27	4				8
Epilobium adenocaulon												13		<1
Epilobium angustifolium		12		8			40	32	20	32	67		30	11
Heracleum lanatum											+			+
Cornus canadensis	72	84	84	48			56	72	60	100	80			46
Cornus stolonifera								28						<1
Moneses uniflora			12						13	32				2
Pyrola asarifolia	28	12					52	20	13	4				19
Pyrola grandiflora										16			30	<1
Pyrola secunda	24	20	8			8			47	8	13	73	20	11
Pyrola virens		2					8		7		7			2
Andromeda polifolia						38								9
Arctostaphylos alpina												47	10	<1
Arctostaphylos rubra						20								5
Arctostaphylos uva-ursi							4						10	<1
Cassiope tetragona												+		+
Chamaedaphne calyculata						14								7
Ledum palustre decumbens												+		+
Ledum groenlandicum	4	84	8	60		86	12			16	13	33	20	32
Oxycoccus microcarpus						6								1
Rhododendron lapponicum													20	<1
Vaccinium uliginosum						24				12		27	30	6
Vaccinium vitis-idaea		80		56		94			40	44	7	33	10	32

Species	Frequency of occurrence (f) within each association[1]													Overall
	1	2	3	4	5	6	7	8	9	10	11	12	13	F[2]
Gentiana amarella													30	<1
Gentiana glauca													80	<1
Polemonium acutiflorum										4	7	+		<1
Polemonium boreale													40	<1
Mertensia paniculata	12			16			12	12	13	4	7	47		7
Castilleja raupii												+	30	<1
Pedicularis capitatum												40	50	<1
Pedicularis labradorica						+				4				<1
Pedicularis lanata													10	<1
Veronica wormskjoldii											27			<1
Galium boreale			4											<1
Galium triflorum		8	4				12	40						4
Linnaea borealis	88	36	48	80		2	88	52	87	100	67	20		54
Viburnum edule	76	60	48	40			40	12						35
Adoxa moschatellina	4						56							12
Achillea millefolium								12			13			<1
Arnica alpina										8			30	<1
Arnica cordifolia										16	20			<1
Artemisia arctica									13	56	33		30	2
Aster alpinus													10	<1
Aster sibiricus								8	7		20			<1
Petasites frigidus						+				32				1
Petasites frigidus X *palmatus*				12				12			20	33		<1
Petasites palmatus		+				8					53	7		2
Senecio lugens												13	20	<1
unknown vascular spp.											13		70	<1
Dicranum spp.						30								7
Hylocomium splendens		80	100		100	12	8		100	80	7	7		21
Pleurozium schreberi			4		100	28	24			12	13			15
Polytrichum spp.						16				44	53		70	6
Sphagnum spp.						8								2
unidentified bryophyte		4	4	100		6	8				13	83	50	8
Cladonia spp.						66			7	36	7	7		17
Peltigera spp.			12	12		12	4		13	12		27		5
unidentified lichen									7			7	60	<1

[1] Numbered associations are as follows:

1 mixed deciduous woods
2 mixedwood forest
3 mixed coniferous (*Picea* spp.)
4 *Picea glauca* forest
5 *Picea mariana* forest
6 bog forest or muskeg
7 shrub association
8 *Salix* association
9 mixed coniferous (*Picea-Abies*)
10 *Pinus contorta* forest
11 timberline forest
12 shrubby alpine tundra
13 stony alpine tundra

[2] Overall frequency (F) was calculated for the area of the vegetation map by Σfa, where f is the frequency of a species in each association and a is the area occupied by that association.

* Tree species for which the quadrat size was inadequate for frequency measurement.

\+ Denotes species found within the plots, but not within the quadrats.