KITWANGA FORT NATIONAL HISTORIC SITE
SKEENA RIVER, BRITISH COLUMBIA
HISTORICAL RESEARCH AND ANALYSIS OF STRUCTURAL REMAINS
by George F. MacDonald
1979
KITWANGA FORT NATIONAL HISTORIC SITE
SKEENA RIVER, BRITISH COLUMBIA

Historical Research and Analysis of Structural Remains

George F. MacDonald
Senior Archaeologist
National Museum of Man
Ottawa
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Frontispiece design represents the warrior Nekt with the head of his father in the canoe in which Nekt and his mother returned to the Skeena River. From a carving on the pole of Lalt (Laksial) at Kitwanga.
The kitwanga Fort Site, which sits on a prominent physiographic feature and is rich in oral traditions, is a declared National Historic Site in Canada. Limited test excavations were conducted at the site by a joint National Museum of Man, Parks Canada archaeological team for five weeks in the summer of 1979.

Evidence was found in the excavations of five house structures on top of the hill and of a variety of economic and ritual structures adjacent to it. Analysis of dateable materials and artifacts from the site suggest that it was occupied intermitantly from about the seventeenth century until the early part of the nineteenth century. Dendrochronology was used for the first time in the region to help to date the occupation episodes. Analysis of obsidian samples confirm that long range trading trails stretching as far away as the Stikine River helps to account for the location of the fort. Heightened trading activity and the formation of trading monopolies early in the Maritime fur trade period are reflected at this fort.

Attention was devoted to testing archaeologically details of legendary accounts of a particular warrior chief by the name of Nekt who controlled the fort in its latest phase.
This is the first of several projected volumes on the history, ethnography and archaeology of the Kitwanga Fort National Historic Site. Attention is focused in the first part of this report on historical research I conducted over the past two years on trade and warfare patterns among the Tsimshian Indians. This provides the background necessary to understand and evaluate the importance of the fortified site under investigation.

The second part of this report describes and analyses archaeological data on all of the structural remains from the site and comments on their relationships to available ethnohistorical information. Preliminary reports on the laboratory analysis of various types of samples from the site are included in the Appendices.

The next volume will deal with the artifacts from the 1979 excavations at the site and their relationship to prehistoric assemblages from northern British Columbia and the position of the historic goods within the context of the Russian and maritime fur trades of the late eighteenth and early nineteenth century. The ethnography and material culture related to families associated with the fort will form the second part of that volume.
Acknowledgements

Historical events associated with the native peoples of Canada are largely unknown to the general public. As an archaeologist I am increasingly aware that the native history of our country is both rich and varied, and that it is important to make this rich heritage known to the Canadian public and to see that it is commemorated adequately. The story of the warrior Nekt is one such fascinating episode of Indian history involving hill top forts, warriors in elaborate suits of armour, and all of the ceremonialism and ritual that has made Northwest Coast Indian culture so fascinating to us today. Like many such stories, we began with semi-legendary accounts and attempted to fit them into a historic context by investigating both the locale in which the events took place and the memories of the people whose ancestors had been associated with those events.

The investigation reported here would not have been possible without the support and assistance of the people of Kitwanga. In particular I would like to thank the former Chief Councilor, Larry Moore and The former Band Secretary, Glen Williams, for the arrangements they made for students from the reserve to work on the project. I also wish to thank Neil Sterritt, Director of the Gitksan-Carrier Tribal Council in Hazelton for advice and encouragement and to Polly Sargent and the 'Ksan Dancing Society for allowing me to photograph the suits of armour they have recreated, particularly that of the warrior Nekt. The picture of Nekt's armour worn by Victor Mowat of Hazelton (fig. 2) is reproduced here with kind permission of the 'Ksan Dancing Society.
I would like to express my appreciation to the two agencies which sponsored this research, first to the National Museum of Man, National Museums of Canada and particularly the Director, Dr. W.E. Taylor, Jr., for making my time available to the project and to Mr. Wally Kozar, Assistant Director for providing valuable administration support, and second to the National Historic Parks and Sites Service, Parks Canada, particularly the Research Section, including Mr. John Rick, Head of the Research Division in Ottawa who first invited me to undertake this project, and Mr. Gerard Finn, Head of the Western Canada Research Section in Calgary, who was responsible for the planning and administration of the project. I would also like to thank DiAnn Herst Chief of the Archaeological Research Section, Ottawa, for providing space for analysis of the collections and the production of this report, and Al Wilson for arranging drafting services. Similarly, I would like to thank Dr. Roger Marois, Chief, Archaeological Survey of Canada, National Museum of Man, for services he made available from that agency.

For his extensive assistance both in the field project at Kitwanga and in the laboratory in Ottawa I wish to thank my colleague Dr. James B. Shaeffer. From the initial planning of the project to the preparation of the report, Dr. Shaeffer was involved throughout and gave his time and effort far beyond the requirements of his research contract with Parks Canada. I would like to also thank Rosalind Whalley who has been very helpful in researching questions of much importance to the archaeological interpretation of the site and its former occupants, both through ethnographic research in archives in Ottawa and Victoria, and directly with the descendants of the people of the Ta'awdzep now living in and around Kitwanga, British Columbia.

I further want to thank my wife Joanne MacDonald for her continued support throughout this project and for her research on material culture associated with the families at the fort which is included in the second volume of the report.

Thanks also go to Joanne Monahan, the regional advisor for Kitimat district to the Archaeological Sites Advisory Board of British Columbia.
She served most ably as finds recorder, photographer and field laboratory supervisor.

To the crew who excavated the site for six weeks in the summer of 1979, I extend thanks for their interest and help. The student assistants include: Jane Sproule Thompson, Wayne Nelles, Helen Lemmon, and Richard Mackie. Two volunteers include Dianna Farrow and Joanne MacDonald. Local assistance from Kitwanga included: Charlie Morgan, Clyde Williams, Valerie Williams, Leona Bright, Leona Williams, Phyllis Morgan and Patsy Bright.

While excavating the fort hill most of the crew lived in the teacherages in Kitwankul village arranged by E. Bergman of the Department of Indian Affairs in Hazelton. Chief Peter Williams and Chief Solomon Marsden made us welcome in the traditional way with a special performance of their Lak-an-zok dance group. May Derek, a local historian and resident anthropologists Vickey Jensen and Jay Powell helped with many arrangements.

Expression of my appreciation is due to the team of scientists from the Forestry Research Station of the Government of British Columbia in Smithers who contributed their special expertise for the region to settling some major questions about the natural history of the site. They include Dr. David Wilfred who provided a thorough interpretation of the geology of the site area; Dr. Richard Throwbridge who interpreted the soils; and Dr. James Pozar who provided a definitive list of the plant & tree species observed in the Parks Canada property.

The preparation of this report was done in Ottawa and involved many people in addition to those already mentioned. For the appendix on faunal remains from the site I am indebted to Anne Meachem Rick, Director, Zooarchaeological Identification Centre, National Museum of Natural Sciences. Thanks also go to Gerard Van Velthuizen, Contract Geologist and L. Moyd, Associated Curator, Mineralogy Department, National Museum of Natural Sciences for the identification and interpretation of the mineral specimens; and from the staff of Historic Parks and Sites Branch, Material Culture Research, Karlis Karklins who examined and commented on the bead collection from the site; Douglas
Bryce, of the Underwater Archaeology Section and Bruce Morton, arms specialist who examined and commented on weapon parts and Catherine Sullivan, glass specialist, who examined and commented on the glass fragments from the Conservation Division, H. Unglik; and John Dawson for chemical analysis and identification of metal objects;

For drafting I wish to thank Rick Lalonde of the Calgary office of National Historic Sites and Parks branch, Steve Epps of the Ottawa office of N.H.S.P.S. and David Laverie of Archaeological Survey of Canada, National Museum of Man. For the typing many thanks goes to my secretary June Marsham, and to Lucie Clayton of the National Historic Parks and Sites Service, Ottawa.

Finally, I would like to thank the Ottawa artist, Art Price for his patience and skill in interpreting my vision of what the Ta'awdzep looked like in Nekt's time into a fine display model.

George F. MacDonald
Ottawa
January 15, 1980
Fig. 1. Model of the fort at the Ta'awdzep near Kitwanga during the occupation of the warrior Nekt.
INTRODUCTION

In 1965 I visited Dr. Marius Barbeau at his home in Ottawa to talk of my plans for archaeological field work in northern British Columbia. Dr. Barbeau was almost eighty years old at that time and had been retired from the National Museum for many years. After a brief conversation about my interest in the Skeena River peoples, Dr. Barbeau began a long story about a warrior named Nekt and about the hill near Kitwanga where this warrior had his fort. Before I left that afternoon Dr. Barbeau stressed how important he thought this site was to the history of the coast and that he thought I should undertake an investigation of Nekt's fort.

It was not until 1968 that I heard of the site once again, and on this occasion it was from Mrs. Polly Sargeant of Hazelton, who with the Skeena River Totem Pole Restoration Society, had decided to erect a historical marker at the site (fig. 3). Mrs. Sargeant recounted to me the stories of how the hill was 'man made' as its name apparently indicated and she suggested once again that I investigate the hill. I did make a visit to the site that summer and observed that there were ridges and numerous depressions on top of the hill that indicated the remains of old structures. Shortly, thereafter, I talked to Mr. Philip Ward, Conservator at the British Columbia Provincial Museum, who was helping the local society to conserve poles at Kitwanga and Kitwankul. He said he had excavated a small test pit on top of the hill but that nothing of significance had been found, and that there did not appear to be any sizeable cultural deposit on top of the hill.
Fig. 2. A reconstruction by the Ksan Dancing Society of the armour and weapons of the warrior Nekt. Reproduced with their permission.
In 1975 the Kitwanga Battle Hill came to my attention once again when it was brought before the National Historic Sites and Monuments Board of Canada. I represented the National Museums of Canada on that Board and was pleased to support the Board's declaration that the site was of National Historical importance. I did point out to the board, at that time, that there was another much larger fort at the Kitselas Canyon, which appeared to have much more extensive archaeological remains, and had been occupied for a much longer period than the one near Kitwanga. I had cleared the Kitselas site of vegetation and carefully mapped the site in 1968 and published reports on it in 1969 (MacDonald & Allaire 1969) and later in 1979 (Allaire, MacDonald and Inglis 1979). The relationship between these two forts was not well understood but there seemed to be as many differences between these sites as there were similarities.

The National Historic Sites and Parks Service of Parks Canada felt more information about the Kitwanga fort site was required for their planning purposes and invited me to pay a brief visit to the site in November of 1978 and provide them with recommendations for further work. My visit coincided with a disastrous storm and flood on the Skeena River in which the road and railroads were washed out in literally hundreds of places and the link between Hazelton and Prince Rupert was severed for weeks. This somewhat inhibited my investigation, but with the aid of Mr. Ron Sebastian of Hazelton and his four wheel drive vehicle, I was able to make several trips to the site and make detailed on-site observations that resulted in a report and a number of recommendations. The main recommendation was that the site should be subjected to a limited test with specific objectives as follows: (MacDonald 1978)

1) to determine the number and extend of structures on the hill
2) to determine the nature of any features that might survive below the hill, such as trails, storage pits, etc.
3) to recover dateable materials to determine when and for how long the site was occupied.

In the early spring of 1979 I was asked by Mr. John Rick of the National Historic Sites and Parks Branch if I would undertake a limited
test of the kind recommended in a joint project between his agency and the National Museum of Man with whom I am employed. The museum approved of this arrangement and plans were co-ordinated through Gerrard Finn, Head of Historical Research in the Calgary Office of Parks Canada for an excavation to begin in early July, and to last for a period of six weeks with a crew of eight to ten members.

Archival research was begun by Parks Canada who assigned Rosalind Whalley to research the records of Marius Barbeau in The Canadian Centre for Folk Culture Studies of the National Museum of Man, where hundreds of manuscript pages were located that relate to the Kitwanga fort hill and the activities of the warrior Nekt.

A series of 14 tapes had been purchased by Parks Canada which recorded Jack Morgan, now deceased, recounting the wars of the Kitwanga people with the Haida, Kitimat and Nass River peoples. Consequently, there was a substantial corpus of historical traditions relating to the site that were available to the project before excavation actually began at the site.

The Kitwanga Fort Project as it became known, presented a unique research opportunity in that it was possible to co-ordinate the archaeology of a specific historical site with a rich oral tradition of the wars and skirmishes that took place there over a number of centuries. Canada has few sites where full accounts of intergroup relationships can be extended back for centuries beyond the period of first contact between Indians and Whites.

As part of the Kitwanga Fort Project, Rosalind Whalley, was reassigned in May 1979 to the Kitwanga area to record oral traditions associated with the site. There she arranged for native research assistants to accompany her to the site and offer their knowledge for the interpretation of a particular site problems. The information received was of great use in planning the excavation strategy, and in determining the function of artifacts and features encountered in the dig.
Fig. 3 Historic plaque in the form of a ceremonial copper erected by the Skeena River Totem Pole Restoration Committee circa 1967 to commemorate the Kitwanga Ta'awdzep.
ETHNOHISTORY
The oral history of Skeena River tribes has engaged the interest of a number of anthropologists beginning with Franz Boas who collected many legends from the Gitksan and Tsimshian at Port Essington on the lower Skeena late in the last century (Boas 1970). Lieutenant George Thornton Emmons who first served as an American Naval Officer on the coast of Alaska, retired to a long commitment to the study of Indian cultures of the northern coast. He made numerous trips to the Skeena River between 1908 and 1914 and took a particular interest in Kitwanga and the stories of Nekt. Marius Barbeau, and his field researcher, William Beynon, collected a large quantity of text materials from Gitksan sources from 1915 until the mid 1950's.

The richness of the Boas, and Barbeau/Benyon narratives attracted the attention of Claude Levi-Strauss who chose the myth of Azdiwal from the Skeena-Nass River as the vehicle for several essays on structural analysis, with many rejoinder articles by colleagues which continue to appear in the anthropological journals.

Although this rich resource of textual materials runs to the thousands of pages, there is a much smaller, but not insignificant amount that relates to the Kitwanga fort hill. The most extensive notes are those of Barbeau/Benyon in the files of the Canadian Center for Folk Culture Studies of the National Museum of Man in Ottawa.
A collection of materials of special interest to the project are the tapes recorded by Willis Morgan of his elderly uncle Jack Morgan, who died almost a decade ago. These recordings are being transcribed by Rosalind Whalley and together with the archival materials will form the basis of a later study on the oral traditions surrounding the ta'awdzep of Nekt.

Although there are many variants of the Nekt (Naeqt) story (see Appendix I). Barbeau has conveniently synthesized a standard account which is reproduced here to set the stage for the reconstruction which follow (Barbeau 1929: 52, 53).

"A party of Haidas, from Queen Charlotte islands, raided a fishing camp at the mouth of the Nass, massacred many of the occupants, and captured a beautiful young woman of high rank, whose name was Lutraisuh. She became the wife of Qawaek, a Haida chief, and gave birth to two sons, whom the father smothered to death after their birth, for fear that some day they might avenge the death of their uncles. Lutraisuh deceived her husband as to the sex of her third child, making him believe in the birth of a daughter, whose life he spared for that reason. With the help of some relatives of the Raven crest, Lutraisuh murdered her Haida husband, cut off his head, and escaped by night in a dug-out. The tale of her flight across the sea to the mainland is illustrated in a few poles of this clan, which may be called the Naeqt (Tongue-licked) clan. Her child in the bow of the canoe is supposed to have sucked the protruding tongue of his father's head. Lutraisuh was rescued at the mouth of the Nass and was adopted there by a family of relatives. Her son, named Naeqt (Tongue-licked) from the episode of his mother's flight in a canoe, grew into a strong, reckless boy, inheriting many of his father's characteristics. The uncles finally dismissed both mother and son, who then began a life of wanderings and solitude in the forest. Naeqt grew up with but one ambition, that of punishing the wrongs which he and his mother had to suffer. He became a bold and powerful warrior and made friends with some families on the Skeena which later were to become the Kitwanga tribe. He fashioned for his use an armour out of a grizzly-bear skin reinforced inside with a coat of pitch
and flakes of slate, and began his career as a mysterious raider of coast and Nass River settlements. He was mistaken for a mythic Grizzly-bear, whose attacks could not be resisted, on account of a magical war club in his front paw, the Strike-but-once-club. But his identity was ultimately discovered, after he had killed many people. Several tribes, from Kitamat and the Nass, organized together to defeat him and his confederates and curb his ascent to power. He then established his tribal quarters on Ta'awdzep (Fortress), a pyramid-like hill 2 miles north of the present village of Kitwanga, on Gitwinlkul river. To protect his stronghold against a surprise attack, which was anticipated, he made a fence of logs around the five houses of his tribe, and a trap door covered with deer hoofs, which would rattle at the least contact. When the enemies one night tried to climb the steep slope of Ta'awdzep, they were crushed to death by the logs that rattled down as soon as they were released by the besieged warriors above. Naeqt was later wounded, some say by a gunshot (from the first gun used in the country), while he donned his Grizzly-bear armour on an expedition, and then clubbed to death.

Formal analysis of the many variants of the Nekt story would undoubtedly produce many conclusions of historical and anthropological significance. A structural analysis should reveal a set of relationships between Gitksan families and villages as well as wider set of relationships to other groups as far separated as the Haida, the Haisla, the Niska, Coast Tsimshian and Tsetsaut. In many respects the Nekt story is constructed of architypal elements that occur in many other warrior stories from the North Coast. Undoubtedly there was a historical person called Nekt who did have a fort on the Kitwanga hill, but his existence was sufficiently far back in the past for the exact localities of his adventures to have been readapted to regional needs. In some accounts his mother comes from Kispiox. In others she is from Kisgigas or from a Nass River village. Stories also vary as to where Nekt resettles after he leaves the Ta'awdzep at Kitwanga and even to the place where, and the method whereby, he is finally killed.
Similar to the difficulties of reconstructing the biography of the warrior Nekt, are those of trying to sort out the various episodes of warfare that took place at the Ta'awdzep and of matching them with the archaeological remains at the site. In preparation for task it is necessary to review some of the background of warfare and weaponry among the northern tribes of the northwest coast.

Fig. 4. The Tsimshian Artist Fred Alexceé produced many paintings based on memories of Port Simpson. This Tsimshian warrior is one of a number showing the use of armour, bows and arrows in somewhat crude but very dramatic illustrations. (Countesy Vancouver Centennial Museum).
Among the Tsimshian speaking peoples of British Columbia warfare is recorded in epic oral histories that, by conservative estimates, span three or four centuries prior to European contact (Robinson and Wright 1962). The wars of the coast Tsimshian were on a much larger scale than were those of their relatives on the upper Skeena River. The coast Tsimshian went to war in large, sea going canoes that could carry fifty warriors and that were deployed on raids hundreds of miles north and south of their home territory. In a recent study of northwest coast warfare, Ferguson (1979B:4) states:

"The river mouths also were centers of trade both before and after contact. Furs and other items from the interior were traded down the valleys and western buyers clustered around the estuaries. Control of this trade was a continual source of conflict."

In particular reference to the Skeena Estuary, he states (Ferguson 1979B:6):

"Boas' (1970:335-378) informants recalled a long series of exterminative raids fought between the Tlingit and Tsimshian over control of the Nass and Skeena Estuaries. These occupied most of the eighteenth century, with the Tlingit finally being defeated and pushed north".

The Haida were pushing out from their Queen Charlotte Island home in several directions. To the north they displaced Tlingit people from
much of the Prince of Wales Archipelago, and made frequent attacks on Coast Tsimshian villages. According to legend they were leading war parties up the Skeena River even before the Maritime fur trade had been established.

Archaeology in the Prince Rupert Harbour area near the Skeena estuary (MacDonald 1968) demonstrates clearly that warfare has been an organized and relatively extensive activity since approximately 1000 B.C. A study of fractures in human skulls and limbs from skeletons recovered from shell midden sites near Prince Rupert, shows major conflicts with heavy weapons such as stone clubs throughout the first millenium B.C. (Cybulski:1978). Finds of massive monolithic clubs as well as stone club heads, slate dagger blades and whalebone clubs verify this conclusion.

Repercussions of such widespread hostilities near the Skeena estuary undoubtedly were felt at least as far as the Kitselas Canyon (Allaire: 1978). Even from this early period the coincidence can be seen in the increase in evidence for interregional trade, and in intergroup conflict. Warfare and trade go hand in hand over the past three thousand years in the Skeena estuary and adjacent coast.

The pattern of warfare was consistent along the entire Northwest coast as far as the Bering Sea (Burch: 1974). Night or dawn attacks were favoured and the aim was generally to trap as many people in the house as possible, and to take the women and children alive to be slaves. Most such activities could best be characterized as raids rather than wars. Motivation for war was for revenge or to take slaves, food stores or crest priveleges. Territorial expansion was rarely the motivation or result of such hostilities.

Large specially built war canoes gave amazingly effective strike and retreat capability. Campaign supplies could be stored easily in the big watercraft so that the warrior crew was not slowed down by the necessity of foraging for food. There are several accounts that describe Tsimshian war canoes armed with large rocks that were used at close range to sink enemy craft. Small cannon were mounted on war canoes early in the maritime fur trade period. The mobility provided to
the coast Indians by the war canoe can be favorably compared to that of
the horse nomads of Eurasia. Traditional narratives talk of Haida war
parties on the Skeena River with as many as 600 men in 12 canoes.

The only organization of war parties was into lineage or household
groups each of which recognized the authority of their own chief. A
chief wishing to lead a war party was required to solicit the assistance
of other house chiefs within his village. War parties drawn from a
number of villages were rare. The close relationships between a
household group and a canoe party is noteworthy. A house chief became a
canoe chief and every member of the party had an assigned seat in the
canoe that corresponded to his seating rank within the house. Canoes,
like houses, were named beings thought to have an existence and history
of their own.

It has often been noted for the Northwest coast that warfare is
conducted like a ceremony, and ceremonies, particularly the potlatch, is
conducted like warfare. There is good evidence to support the view that
potlatching and warfare were part of a continuum whereby disputes
between groups who were physically or culturally close would be dealt
with through the potlatch, whereas disputes between those who were more
distant were dealt with through warfare.

The use of armour appears to have been almost as much for
ceremonial display as it was for protection. Ritual combats between
elaborately armoured warriors were often used to decide the outcome of a
particular battle. Elaborately carved helmets, or painted leather
jerkins over the armour were important forms of display.

Preparation for war involved fasting and abstinence from sexual
intercourse by the man prior to the campaign, and rigidly observed
abstinence by wives back in the villages. Ritual purification of a
warrior was achieved by taking emetics or sweat baths.

Shaman were taken on war parties as they could often forecast the
future or see through the mist or fog on canoe journeys. Some shaman
had mirrors of stone in which they could foresee the outcome of proposed
battles or campaigns. Shaman often wore armour for their combat with
other shamans over the souls of patients. Naekt's armour of a grizzly
Fig. 6. The most complete suit of Northwest Coast Indian armour is the one preserved in the Museum of Anthropology and Ethnology in Leningrad. It was collected from Russian America early in the last century. Suits of armour such as this added at least a foot to the height of the warrior, rendering him a most imposing figure on the battle field, according to Russian accounts.

a. In this view the long leather war coat is worn under the fitted slat armour which protects the chest and abdomen. The helmet is carved of heavy wood with inlays of opercula shells for the teeth; abalone shells for the eyes; human hair for the beard and sea lion whiskers dyed black for the crown of hair.

b. Detail of the slat armour protector for the upper left arm which is strung together with twisted nettle fibre. In this example an extra heavy leather collar of sea lion hide has been inserted between the visor and the war coat. The warrior could only glimpse the action through the slit between the helmet and the visor.
bear hide is virtually identical to the bear skin cape used by Shaman among the Gitksan. It is this bear skin armour of Nekt that Awkawt wears as a shaman on The Raven-Sailing-through-the-air pole at Kitwanga.

ARMOUR:
Several types of armour were used by the Tsimshian speaking tribes. The most elaborate was wooden slats or rods woven into an articulated cuirass. Decorative panels on front and back often bore painted clan crest designs. The breast plate was in four parts, two parts cover the thorax front and back and the other two which are smaller cover the front and back of the lower neck (fig. 6b). Assistance is needed to get into this type of armour. It is often worn over a leather shirt, possibly to keep the wood from chaffing the skin, but sometimes the wooden armour is concealed under a leather shirt or jerkin. Wooden armour was particularly common among the Sitka Tlingit, but early accounts speak of wooden armour among the Niska and Coast Tsimshian.

The second type of armour was made from heavy leather. This was often the skin of a large animal such as a sea lion, elk or moose folded double and then wrapped around the body and fastened at the left side by toggles or leather thongs. This kind of armour could be reinforced in several ways. Wooden or metal slats could be sewn inside, and gravel or small stones could be glued on the outside with strong fish glues. This treatment was often applied three or four times until the leather coat was like cement.

Nekt's armour was a variant from both of these types since some accounts claim that he had plaques of shale sewn on the inside of his armour which was made from a grizzly bear hide with the hair outside. The weight of this armour must have been considerable. Chief Hlengwah of Kitwanga (Jim Laknitz) described Nekt's armour to Barbeau in detail in 1920 (Barbeau ms: 277).

"Maskibu (the name Nekt had as a youth) made up his mind to skin it (a grizzly bear he & a companion had just
Fig. 7. Heavy leather armour was folded double and fastened with toggles up one side. Crest figures often embellished the front and back.

(Smithsonian Institution)
killed, but he did not want to cut the skin open, just a little cut across the belly. They skinned it. After that, they decided to kill mountain goats. They got some and took out the sinew and some hoofs. They lit a fire and heated some stones in (it) and put the sinew on the stones, and they tanned the grizzly's skin there. When the skin was dry, one of Maskibu's nephews tried to put the skin on himself. Putting on the skin, they made a noise 'haw, haw, haw'. The man inside it tried to gallop like a bear. When the skin was quite dry, they opened the hole in the ground where the hot stones were with the sinew. The sinew was cooked and ready. Maskibu and some of his nephews went to get some slate and told the woman to sew the skin of the grizzly together with groundhog skins. They put the cooked sinew (it was cooked soft like cornstarch) on the skin, inside and into the fur, spreading it all over. It was like glue. Then they laid on some broken slate and made it adhere. It was difficult to lay it just right in the joints of the arms and at the knees. After they had finished doing this, they took more sinew (like glue) and spread it all over with more slate. When this was done, they put groundhog skins over it all and made a lining. The name of this [armour] was Gwisendzedzalt, 'Glue-all-over'. Maskibu then tried to put it on himself, and told to some of his nephews, 'When I run, try to shoot me with your arrows. Try to spear me too.' He was testing the grizzly's skin. So they began to chase him with arrows. But the arrows did not penetrate the skin. That is why they had worked on it. It was now complete. (The informant has a skin like it in his house showing the ends of the arrows sticking into it.)"
Fig. 8. A variety of daggers and sheaths
(Smithsonian Institution)
Limb Armour:
Wooden slats were also used in greaves to protect the lower leg and on the lower arms as in (fig. 6b).

Visors: Wooden collars could be used with either type of armour (as in fig. 5). They were made by kerfing a piece of wood and bending it into a complete circle, fixed by leather lashing at the back. Visors were widest in front to cover the throat and had a mouth piece to be held in the teeth for security. Visors had both breathing holes as part of the mouth piece and eye holes for visibility. They were usually decorated with shallow relief carvings and painted.

Helmets:
Massive wooden helmets fitted flush over the visors and added considerably to the height of the warrior. Europeans found that although they had no trouble shooting through the wooden breast plates of the natives they could not shoot through their wooden helmets which were often at least four inches thick.

The decoration of helmets usually consisted of human faces, often grotesquely contorted, or animal crests such as bear or beaver. A chief at the Kitselas fort surprised and defeated his enemy by wearing a helmet carved like a vagina.

Weapons:
Daggers. The most common weapon for close hand to hand fighting was the dagger. In prehistoric times daggers were made of chipped and ground slate (MacDonald & Inglis 1975). Slate daggers have been used by Tsimshian in the area of Metlakatla for the past three thousand years. Old ethnographic examples of such weapons have been collected which are made of native copper or of whalebone and have the distinctive fluted blade. Some of these examples of native materials may be prehistoric, inspired in their form by the Siberian type of fluted dagger, known since the Bronze Age of that region. In specific reference to the Gitksan, Emmons notes (1910ms):
"The primitive knife was of stone and bone, but of these none remain. The oldest type of metal knife was like that of the coast tribes and unquestionably procured from them in trade - a double bladed weapon fashioned from an old file or piece of steel and later steel knife having a broad single blade was procured from white traders."

**War Spear.**

De Laguna (1972:589) describes the war spear of the north coast as "a knife tied on the end of a stick, and seems to have been the same as that used in hunting bears". The Tsimshian claim to have used spears from the palisades of their forts that were eighteen feet long. Presumably these would be knives or spear points lashed to long poles to ward off attackers. Most spears that were used in hand to hand combat were no more than six or seven feet long and were used for thrusting and never thrown.

**War Clubs.**

**Stone**

There was a recognizable "club complex" on the Skeena River (Duff 1963) which dates back several millenia. The most dramatic examples are made entirely of stone (Duff 1975 pps. 101-111) and represent a wide variety of animals, birds, fish, humans and mythological, composite creatures. Thirty-five clubs of this style were found in a cache pit in the Hagwilget Canyon by Johnny Muldoe in 1898. Others now in the National Museum of Man, Ottawa, were collected at Metlakatla on the coast demonstrating that this style was known throughout Tsimshian speaking territory. Fragments of similar clubs have been found in the Prince Rupert Harbour and in the Kitselas Canyon in association with materials radio carbon dated at more than 2,000 years old (MacDonald 1977 ms).
Fig. 9. Variety of war clubs from the Skeena River.
- from left
- a prehistoric stone club in the Skeena River style.
- an ethnographic period stone club.
- a war pick with a nephrite blade.
- an antler war club which was broken and repaired with a wooden handle splice.
Antler
Another type of war club much used by the Tsimshian speaking peoples was made from the beam of a caribou antler on which one tyne has been left projecting to form a sharp point of the weapon. Miniature examples of this type, carved in bone and antler have been found in the Prince Rupert sites as early as two millenia ago. G.T. Emmons describe them for us. (1910ms.)

"The caribou horn club A halah was common to all of the interior people who had the caribou and reached the coast tribes in trade. I have found the type among the Tlingits which had been brought from the valley of the Yukon, and on a totem pole at Kitwangar is represented one in the hand of a human figure. The club is generally ornamental in lines and cuts and a record of those killed was kept in cuts on the under part of the handle. Many small ones were carried concealed under the arm pit or blanket and in the projecting arm was often inserted a sharp point of stone or bone and later steel, such were used to strike a vital blow back of the ear or the temple.

War Picks
These consisted of a slate or nephrite blade attached with lashing to a wooden or bone handle. They were very effective in poking a hole in an enemies skull, a feature noted in some of the skulls from the Prince Rupert Harbour excavations.

The strike-only-once club of the warrior Nekt was probably this kind of club, as the model which appears on the Ta'awdzep pole of Hlengwah is a variety of this type. Emmons comments on several types of picks which he noted in the area (1910 ms.)

"Stone clubs dug up on living sites along the river from Kispiox to Kitwangar are of the club and pick type. The form Ahalah or Hanne yat sar "to raise up and hit on the
Fig. 10. Gitksan armour included the visor and helmet but often hid the armour plating under the decorative war coat.
Jack Hudson photo, Courtesy of the Ksan Dancing Society.
head was pointed at both ends with a deep groove in the middle and is said to have been attached to the end of a short straight handle by means of a lashing of raw hide passing around the handle and over the groove. This character of club is similar to that used by many of the Plains tribes except that the stone head was flattened on the sides instead of being rounded. The other Dar Coess was a stone pick slightly curved at the smaller pointed end, from eight to twelve inches long and mounted through the end of a short stout wooden handle. This type is found among the Tlingit and was somewhat of a ceremonial weapon used to kill slaves at feasts and was the property of a chief. I am inclined to believe that this was of the coast and was borrowed by the Kitckshean (Gitksan).

Braining Stone.
Pecked and ground from a cobble and often bipointed, such hand held clubs were like a concealed weapon. Gitksan stories recount how warriors often carried these stones along with them should they be suddenly attacked. Some examples observed in private collections in the area are grooved for the fingers, while others had knobs or points on either end.

Bows and Arrows.
The bow and arrow was widely used in warfare. Some were compound bows reinforced with sinew and pitch while others were simple wooden bows. Some had fluting on the inside of the bow in imitation of the fluting on dagger blades. Many had painted decorations and may have been used only on ceremonial occasions. Fig. 4. illustrates a Tsimshian warrior in armour meeting a barrage of arrows as depicted by a native artist from Port Simpson in the last century.
Fig. 12. Combat between armed warriors was a ceremonial as well as a militaristic exercise. A warrior would be chosen to represent each side. The visual effect of the elaborate crest decorations on helmets, clubs and war shirts was considered very important and wars were occasionally terminated when a particularly spectacular piece of weaponry was brought into the duel. Just such a piece was the "Strike-only-once" club belonging to the warrior Nekt from the Kitwanga Ta'awdzep. Fighting usually began with long spears and progressed to clubs and daggers until one warrior was defeated. If the duel was decisive the whole campaign was considered to be determined.
Fig. 12.
Fig. 11. Fort locations around Kitwanga.
War arrows were made from the wood of the Saskatoon berry bush that grew almost everywhere in the Skeena Valley but which was rare on the coast. Consequently, there was a brisk trade in arrow shafts from the Gitksan to the coast tribes. The Gitksan maintain that the cedar arrows used by coast tribes could be easily broken off by the wounded man, but that Saskatoon arrows were too hard and consequently caused more bleeding before they were removed.

Firearms.
One version of the Nekt story maintains that he was shot with the first rifle that came into the area. It was purchased by a consortium of chiefs from the Nass River, possibly from Tlingits who had guns by 1794 (de Laguna 1972:589). Guns were probably common on the Skeena River after the beginning of the nineteenth century, although it was probably not until about 1835 that good rifles became readily available through the Hudsons Bay Company at Port Simpson, or slightly earlier from Fort St. James.

A pistol barrel was found at Ta'awdzep along with many pieces of lead shot (Volume 2). Although the demise of Nekt by a rifle may be apocryphal, there can be little doubt that the last days of the Ta'azdzep resulted from the introduction of accurate rifles. Once attackers could shoot with any accuracy from the high ridge that surrounds the fort hill on three sides, picking off the inhabitants would be like shooting fish in a barrel.

Forts on the Northern Northwest Coast
Of the North Coast language groups, Tsimshian, Haida and Tlingit, all had elaborate forts at the period of contact with Europeans. Captain Cook recorded the first example when he described a hilltop fortified retreat on a small island off the West Coast of Graham Island, Queen Charlotte Islands, in 1778. He called it Hippah Island, after the Maori term for similar forts he had recently encountered in New Zealand.
Fig. 13. The partially fortified Tlingit village of Hoonah in Southeast Alaska. Only five of fourteen houses have been included within the palisade. The props are only found on the front of the fort and may have been to roll logs down on invaders like at the Kitwanga Ta'awdzep. The house in the foreground is built out beyond the winter high tide line on props like two of the Ta'awdzep houses. On the extreme right behind the village is a brush structure that is probably a sweat lodge. Northwest Trading Company Photo circa 1805. Courtesy Berlin Museum für Völkerkunde. (NMC neg. 78-6040).
Fig. 14. Detail of the Hoonah Fort. Note the large raven head crest on the top of the palisades. The two gateways have two different kinds of stairs. Those in the foreground are of European type while the notched log ladders at the further door are aboriginal and could be quickly drawn back into the fort like a drawbridge (NMC neg. 78-6041).
Newcombe recorded two dozen fort locations on the Queen Charlotte Islands and the myths of the Haida speak of many others. In fact each village appears to have had its retreat or defensive place. Depending on local topography these varied from simple palisades on rocky outcrops to sizeable forts with elaborate defensive systems. One of the largest forts was supposed to have been the one built by the people of Hiellan village at Tow Hill, a prominent landmark on the North Coast of Graham Island, Q.C.I. This fort had rolling log defenses like those of the Kitwanga fort and is the particular fort involved in the Kitwanga-Haida wars.

The Haida term for fort as recorded by Dr. C.F. Newcombe is Taodji. The term is not Haida in origin, but is likely derived from the Tsimshian term Ta'awdzep, which can be analysed to mean "built up above", a basic description of a hill top fort. This raises an interesting question whether the concept of a hill fort, as well as the term, was borrowed by the Haida from the Tsimshian.

Tlingit Forts
The Russian explorers and early traders recorded many Indian forts which they called redoubts (the Russian term for fortified retreat).

After the Tlingit tribe attacked and took the Russian fort at Sitka in 1803 they immediately set to work to build a fort for the retributive strike from the Russians, which they knew would come. It came a year later, and various episodes of the conflict are the best documented illustrations of northern Northwest Coast use of forts that we have.

The Tlingit decided to move the fort from the island in Sitka Harbour where it had traditionally been because they knew the Russian gunboats could shell the fort without obstruction. Therefore they moved their fort to the mouth of the Indian River where the shallow tidal flats prevented the ships from drawing within effective cannon range, but which did not inhibit their own canoe navigation.
Fig. 15. TLINGIT FORT AT SITKA. destroyed by the Russians in 1804
The site has been excavated and is now part of the SITKA National Historic Park.
On a foray to attack the fort in longboats, the Russians were taken totally by surprise by a lone Tlingit warrior who had floated down the Indian River to a place below where they landed on the beach. Dressed in a suit of leather and wooden armour, and flailing a Russian made sledge hammer, he attacked the Russian party from behind and drove them off single handed.

Before the Russians could plan a second attack the Tlingit mysteriously abandoned the fort. It took 300 Russian seamen several days to demolish and burn it. Before its destruction Lisianski recorded a plan and elevation. The details of the palisades, entry ways, etc. for this fort are consistent with the oral descriptions of the Kitwanga Ta'awdzep.

The Indian River fort has become a U.S. National Historic Monument and has a large interpretive centre, totem pole park and ground interpretation of the fort itself. The whole operation is very instructive as to what can be done with this type of site.

Only one Tlingit fort, the one at Hoonah, was ever photographed. In Fig. 3. the vertical log palisade protects only five houses in a village of a dozen or more community houses. However, the large birds head (probably Raven) is evidently a clan-marker and is consistent with the practice of wars being waged primarily by one particular clan against another. The startling feature of these photographs, confirmed by period drawings, is that the palisades always have external supports for the vertical posts. It appears that it would be relatively easy to pull away these supports with ropes and hooks, even under fire, reducing the strength of the palisade wall very considerably.
Fig. 16. A fortified house in southeast Alaska. The steeply pitched palsače is also described as occurring among the Haida of the Queen Charlotte Islands. The doorways swing up and may have been the origin of the idea of a trapdoor.
(reproduced from Ridley, 1903)
TRAILS AND TRADE:

The Kitwankul Trail
Of the dozens of trails that linked native villages in northern British Columbia the most famous of all was the Kitwankul Trail between the Skeena and Nass Rivers. It was one of the widest trails in the region and reported to be as much as one meter deep where it cut over hills and ridges. It was about 60 kms long. The trail was used by many explorers of the late nineteenth century including George Mercer Dawson and Charles Horetzsky who have left detailed descriptions of the trail and the traffic they encountered on it.

The Kitwankul trail is mainly a cross country trail from Aiyansh on the Nass River to Kitwankul Lake. From there it follows the edge of the lake and the Kitwanga River all the way to its confluence with the Skeena. There are some minor deviations from the river to cut overland as it does a few kilometers before it reaches the Skeena. This eliminates a large meander of the Kitwanga river and also reaches the Skeena farther upstream from the Village of Kitwanga. Trails rarely have their junctions with other trails or rivers right at villages (Donahue 1974). At the Skeena River the Kitwankul Trail joined with the Skeena River trail a major segment of which ran from Usk to Hazelton via Kitwanga. It was the later trail that was used by the authorities to suppress the Skeena River Rebellion and hunt down Kitwankul Jim (Barbeau 1928).
a. Transport on the old grease trails consisted of carrying heavy loads on the backs of men, women, children and dogs.

b. Transport on the rivers relied on small dug out canoes made from local cottonwood trees or larger red cedar canoes traded from coastal Indians, as in this illustration. (NMC 47035).
Fig. 18.

a. Indian boy on a Skeena River trail with a woven cedar back pack and woven wool tumpline.
Harlan I. Smith photo. 1925 NMC 49308

b. Gitksan Indian dog with carrying pack on Skeena River trail.
Harlan I. Smith. 1925 NMC 65510
Commodities carried over the grease trail spanned a wide variety of both native and European trade goods. Olachan grease, from which the trail took its name, was undoubtedly the single most important commodity since this trail was the main line from the Nass fisheries into the interior. According to Horetzky men on the trail carried an average of three hundred pounds of goods in tied wooden boxes, with a trump line to their forehead. Women carried half that amount, but even children and dogs were pressed into service to carry as much as possible.

The Kitwankul trail was begun in prehistoric times but it is impossible to say when. As a hunting trail it is undoubtedly many thousands of years old, but as a major trade route, it probably came into importance between two and three thousand years ago. The technology of fishing Eulachon and of preserving the oil by fermentation and separation may not be older than that. There is clear evidence of prehistoric trade in the finds of fourteen pieces of obsidian at the site which came from Mt. Edziza on the Stikine River. The Nass to Skeena grease trail and the Nass to Stikine trail form a direct route from Kitwanga to the Edziza Source. (Appendix VI).

The Kitiwanga fort hill is located only a few hundred meters from the grease trail. The major question is, however, if the function of the fort was to secure the grease trail. Informants say there was no attempt to block anyone going to the Nass fisheries from the trail, nor to charge them a users fee. It would appear that this situation is parallel to ones described by Amsden for Alaska, where local groups who controlled resources so rich they could not hope to deplete them, would exploit the resources further by inviting the neighbours in to fish, and thereby putting the visitors in their debt. This applied to the provision of camp sites and fishing stations to visitors by the Nishka, and the trails were simply another necessity to which sharing was extended. It is unlikely a fort was required on the grease trail as long as the main use was in connection with the Nass fishery. When European trade had commenced in the region, however, the situation probably changed rapidly.
European trade items were an extremely desirable and very rare resource in the eighteenth century. Metal weapons including war daggars, metal arrow points etc. gave a military advantage as well as economic ones. In return for European trade objects the Indians were required to barter skins, which were also in limited supply. It is clear in the eighteenth and nineteenth centuries that chiefs vied with each other to control trade routes. This has been documented on the coast for Maquina among the Nootka, Cunneha among the Haida and Legaic among the Coast Tsimishian (Robinson, M; 1978). Legaic formed solid alliances with the Hudson Bay Company when they established Fort Simpson in 1834 by providing the land on which to build the post and by marrying his daughter to the chief factor. Within a short period his new wealth and weaponry gave him undisputed authority over all trade on both the Nass and Skeena Rivers, and presumably the grease trail which linked the two rivers. Since the Kitwanga Ta'awdzep was abandoned at just the time Legaic rose to power it is conceivable that he may have had a hand in the burning of the fort buildings. Mrs. Sutton (the present Chief Akhawt) said a "crazy man" burned the fort, but a more rational explanation may have underlain the event.

The Kitwankul Trail is part of a network of trails that distributed goods between the coast and interior. Of all of the northern coast rivers from Telegraph Creek in the north to Kemano in the south, only a handful, such as the Nass (part way) and the Skeena are navigable because of the steep gradient of their channels. Even the Skeena and Nass present problems of spring flooding, other seasonal flash flooding and winter freeze up that put limits on their usefulness for canoe travel. Overland trails, or trails along the river banks, provided a much more reliable system for the transport of trade items.

A brief discussion of the trails that connected the Kitwankul Trail to the major villages throughout the North Coast and adjacent interior is provided here. The numbers correspond to those on the trail map in Fig. 19. The Kitwankul trail in unnumbered on the map.

1) The Skeena Trail runs along the north bank of that river from possibly as far downstream as the Khyex River to the Kitsumkalum
Fig. 19 Trading trails in the northern interior of British Columbia. A good number of them have now been developed as roadways.
a. The Kispiox fort was the scene of pitched battles with the Coast Tsimshian. Its fortified houses once covered the small island in the middle of the photo.

b. The fort of Gitlaxdzok at the Kitselas Canyon stood on the tree covered bluff at the right. It also had rolling log defences and was the largest fort on the Skeena River.
Fig. 21. The Nass River at Gitlaxdamsk. Looming in the background is another Ta'awdzep at the opposite end of the Kitwankul grease trail from the one at Kitwanga. NMC 69678.
River near Terrace, where it linked with a trail past Lake Kitsumkalum to the Nass River. From Kitsumkalum the Skeena Trail continued through the Kitselas Canyon, past Usk to Kitwanga where it met the Kitwankul trail. From Kitwanga the Skeena trail went to Gitemmax (Hazelton) where it joined with five other trails (Donahue 1973:4). One branch continued up the Skeena River cutting across the big bend of the river above Kispix to rejoin it at the now abandoned village of Kuldo. From there it continued to Dease Lake and links with other trails. It appears that this one trail alone, which was made up of a number of segments, followed the Skeena River for about one thousand kilometers.

2) The Cranberry Trail begins at Kispiox village on the upper Skeena River and follows the course of the Kispiox River to a point near its source where it jumps over to the headwaters of the Cranberry River, a tributary of the Nass River. At Cranberry Junction the Kispiox, Kitwankul and Stikine trails meet together and then descend the Nass River to Gitlaxdamsk. There it passes the Kitsumkalum Trail and links up with the eulachon fishery grounds at Mill Bay, Red Bank and Nass Harbour.

3) The Stikine Trail begins at Cranberry Junction where it meets the Kispiox trail from the Upper Skeena and runs north to Telegraph Creek on the Stikine River at which point a number of trails intersect. Obsidian from the Stikine source found in sites along the Skeena River indicates that this trail has been in use for several thousand years. Although more research is required it appears that this was a major trail bringing Russian trade goods into the Upper Skeena and Nass River areas.

4) The Kitsumkalum Trail is a close parallel to the Kitwankul Trail. It begins on the Skeena River at Kitsumkalum, below Terrace, and passes the old village site of Kitsumkalum (now deserted), and follows the eastern shore of Kitsumkalum Lake to emerge on the Nass River a short distance from the village of Gitlakdamsk. The recently constructed highway from Terrace to Ayansh follows this trail.
5) The Copper River Trail leaves the south bank of the Skeena River at the bottom of the Kitselas Canyon and follows the course of the Copper River, which is unnavigable, to the Bulkley River near Taye Lake, above Moricetown. It is clearly indicated on Father Morice's map of 1907. It was followed by J. Fountain and H.C. Hawkins in 1904 (Morice 1907). About mid way on this trail a branch north led through a pass to join the Gitseguecla-Moricetown trail.

6) The Gitseguecla-Moricetown Trail follows a mountain pass between the Skeena and Bulkley River valleys. It leaves the Skeena at a point near where the Kitwankul Trail reached the Skeena from the north just above Kitwanga, and just below Gitseguecla on the opposite side. It was in a real sense a southern continuation of the Kitwankul Trail past the Skeena River.

7) The Kisgigas Trail began at Gitenmax (Hazelton) and followed the east bank of the Skeena River north to Kisgegas village (now abandoned). Today it has been turned into an emergency road for the Fisheries Service of British Columbia. From Kisgegas village on the Babine river, the trail heads northeast to Bear Lake, where old Ft. Connelly once stood and from there east to Fort Graham on the Finlay River. The use of this trail to bring iron goods to the Finlay River Indians was commented upon by Simon Fraser (Morice 1971).

8) The Babine Lake Trail began at Gitenmax (Hazelton) and followed the Bulkley trail to just past Hagwilget where it headed east following the Bear River valley to a pass south of Mt. French down to Fort Babine. The fort was on the site of an ancient village of the Babine Indians at a narrows in the lake; Archaeological work there in 1966 shows evidence for a long occupation of this site (Turnbull 1966 ms). Across the narrows the trail continued as far as the Peace River.

9) The Moricetown-Babine Lake trail paralleled the Hazelton-Fort Babine trail but ran from further south on the Bulkley to a more southerly point on Babine Lake.
10) The Bulkley River trail started at Gitenmax (Hazelton) and followed the course of the Bulkley River past Moricetown, and past the Morice River near where Houston stands today, to trails which connect it with Oosta Lake and others in the Tweedsmuir Parks region.

11) The Kemano-Telkwa trail began on Gardner Inlet and ran up the Kemano river then took a southern branch through a high pass to Emerald Lake, and a chain of neighbouring lakes to Lamprey Creek a tributary of the upper Bulkley River. From there to Telkwa the trail was along the banks of the Bulkley River. This was not a major trail and was undoubtedly closed during mid winter.

12) The Kitimat trail was one of major importance that linked the Skeena River with the head of Douglas channel. The trail left the Skeena just below the Kitselas Canyon cutting overland to the eastern slope of Lakelse Lake. From there the trail ran parallel to the Kitimat River, though some miles to the east of it, until it reached salt water where present day Kitimat stands today.

This trail is important in the traditions surrounding the Kitwanga Fort as it was the trail taken by Nekt during his raid on the Kitimat where he acquired the rights to secret ceremonies. It was also the trail that brought the Kitimat warriors to Kitwanga in another episode.

13) The Port Essington - The Hartley Bay trail left the Skeena at what is now Port Essington and followed the Ecstall River to a low divide back of Hartley Bay. The Hudson's Bay Co., established a post at Port Essington, only a few years after Port Simpson was established. The people from Kitimat, Kemano and Hartley Bay found this a convenient route to trade for European goods throughout most of the nineteenth century.

14) The Kitimat-Kemano trail linked these two communities through the interior although good water links also existed between them.

15) The trail to Work Channel linked the lower Skeena from the mouth of the Khyex River to a small Indian village at the head of Work Channel. It provided a well protected route from the Skeena to Portland Inlet and the mouth of the Nass River.
16) The Stikine trail ran up the Stikine River from its mouth to Telegraph Creek where it met the trail south to the Nass River (trail no. 3). It continued up Telegraph Creek to Dease Lake and eventually to Lower Post on the Yukon border. The Stikine River is not navigable very far up by canoe. The importance of this trail lies in the fact that this route linked with the Russian Fort Dionysius. Before 1825 this was a major avenue for Russian trade materials but after this date the area was leased to the Hudson's Bay Company and the post near the mouth was renamed Fort Dionysius.

17) The trail from Babine Lake to Bear Lake is undoubtedly an aboriginal one, but became very significant in the early nineteenth century as a link between two fur trading posts - Fort Babine at the north end of Babine Lake and Old Fort Connelly at the north end of Bear Lake. From the latter post a series of trails led eastwards to the Peace River.

18) This is another trail which links Bear Lake to Takla Lake and a chain of other lakes and rivers to the major trading post at Fort St. James in the upper Fraser River drainage.

19) Leading north from Old Fort Connelly is an important trail to the Finlay River with connections to the Peace River and the high plains.

20) At the big bend of the Skeena River north of Kuldo the trail branches with the northern trail heading between the headwaters of the Nass and Skeena rivers to link with the Spatsizi River to Dease Lake near the headwaters of the Stikine River.

21) At the same branch where trail No.19 heads north, the second branch follows the Skeena River to a tributary that leads to Bear Lake and Old Fort Connelly where several other trails in Carrier territory converge.

22) From Gitlakdamsk on the Nass River a short but important trail leads across to the head of Observatory Inlet where the town of Alice Arm stands today.
23) A branch of the trail from the Nass River to Telegraph Creek heads due west around the north shore of Bowser Lake to the lower Iskut River which it follows to the mouth of the Stikine River near where Fort Dionysius (later Wrangell) was situated. This was indeed the shortest route from the Skeena River to a Russian fur trading post, and most important as trade for European goods opened up in the eighteenth century.

The twenty three trails discussed above are all major ones that were in use in prehistoric times. There were, of course, scores of secondary trails that linked every village and every major economic or resource area together. For most trails there were alternate routes that were used in summer and winter. In winter many of the higher passes were blocked with snow in which case longer alternate trails along river banks were used. In spring, however, these routes often disappeared under flood waters. Once the rivers froze over they became natural highways. There were considerable periods each year on the Skeena when ice was unstable or the river was in flood that trails along the bank were required. By late spring these usually became congested with the prolific new growth which characterized the area to divert traffic where possible.

The Tsimshian speaking peoples of the Skeena and Nass Rivers were unique on the West Coast of Canada for using snowshoes extensively in their trading ventures. They employ their own style with pointed, lashed toe struts that suggest a long period of development and use.

Within historic times dog teams have been widely used on the Skeena River in winter. The sleighs are of local manufacture but were not aboriginally known in this area. Nevertheless, dogs were used to pack supplies in prehistoric times. Dog sleds probably came into use in the early 1800's after trading posts at Bear Lake, Fort St. James, and Fort Babine introduced the concept.

Charles Horetsky was the first person to leave an eyewitness account of the Kitwankul grease trail from Kitwanga to the Nass when he was surveying the route for the Canadian Pacific Railway in 1872. He
decided that the Skeena route was not too promising and that he would cut over to the Nass valley to see what it offered. Unfortunately, he took a short cut overland from the Skeena and met the Kitwanga River valley just above the fort hill which he never saw. He describes his route as follows (1874:117):

For three miles and a half we still kept the ice of the Skeena, when reaching the head of a rapid, we stuck to the right, and ascended a steep hill, keeping a nor'west course for the Kitwanga River, which we came to at one p.m., having cut off a good sized triangular piece of the rough country between it and the Skeena.

Horetzky's description of the trail and the traffic that passed along it is particularly useful. (1874:117).

Since we left the river we met many of the Kitsgïgïughlé (Kitseguecla) Indians returning from the great feast at Kitwancole; more than one hundred must have passed us, and they were, without a single exception, not only the men, but also the women and children, laden with large cedar boxes, of the size and shape of tea-chests, which were filled with the rendered grease of the candle fish caught in the Naas waters.

He goes on to state, (1874:118):

They passed us in twos and threes; sometimes a whole family, father, mother and olive branches, all loaded to their utmost capacity; little children even, of tender years, carried burdens of thirty or forty pounds weight, and tottered along in silence. One savage had, in addition to the usual load of grease, perched on its summit, an old and decrepit woman, perhaps his mother. This man could not have had less than two hundred and fifty pounds weight on his back; but they are a tough, hardy set and great carriers.
As to the condition of the trail, he states (ibid: 118):
...on the morning of the 7th, when we were again on the road, still benefiting by a fine trail, where we could dispense with our snow shoes, we were now following the eastern slope of the Kitwanga valley, which was very rough and intersected by numerous gullies. The trail kept from a mile to a mile and a half from the river, and soon entered a dense forest of heavy spruce and pine, through which we plodded until ten, when the trail turned suddenly riverwards, and we descended to a beautiful level, in the middle of which the Kitwanga flowed southwards to the Skeena, then distant probably twelve miles. Just before leaving the high ground above, we passed through the centre of an immense encampment of Indians, numbering at least, two hundred.

On arriving at Kitwankul, mid-way on the trail, he observes (ibid: 120):

For the last ten days this village has been the place of barter between the Naas Indians and those of the interior. The former had carried up grease to the extent of many hundred boxes, which they had exchanged with the Skeena Indians for blankets and other articles.

He passed Kitwankul lake and to the north encountered low swampy ground in which cedars predominated. He continues (ibid: 122):
Resuming our march after dinner, the trail being yet well beaten...we passed, three miles and a half further on, the Indian village of Welpamtoots....

Approaching the Nass River he observes (ibid: 123):
We pushed on, however, the trail becoming very much worse....after making poor progress we camped near a large assemblage of Naas Indians, who were returning homewards. Here the trail, or what was left of it, disappeared entirely, and we had now to beat the road through three feet of snow, very soft, and extremely difficult to plow through.
Heading down the valley toward Gitlaxdamsk he notes, (1874:126): On the 13th, at six a.m., we moved on; a mile and a half over the hills taking us to the edge of the valley again, down the side of which we slid for about two hundred and fifty feet, and as the dawn was breaking, reached the bed of the Chean-Nowan, close to an Indian suspension bridge.

Following a trail that sometimes rose to three hundred and fifty feet above the river and at others took them along narrow ledges of river ice, they arrived at Gitlaxdamsk at five thirty on the 14th. It thus took them from 6am on the 6th until 5:30pm on the 14th, or eight and a half days to cover the Kitwankul Trail from Kitwanga to Gitlaxdamsk under winter conditions.

George Mercer Dawson who conducted a geological survey of the Skeena Valley in 1879 for the federal government, states that it could be covered much faster in the summer months: "A trail leads from this place (Kitwanga) across to the Nasse River, the journey occupying, according to the natives, three long days." (Dawson 1881: 15B)
The Historical Period:

Early Historical Contacts:

The dates of the first occurrences of trade objects of European manufacture among the native people of Northwest British Columbia is an open question.

Maritime exploration begins with the Spanish under Juan Perez who probably reached the Queen Charlotte Islands by 1775. Cook made landfalls on the outer coast in 1778 followed by Captain Dixon in 1787, La Perouse, and by the 1790's Vancouver and a host of other explorers and traders. Invariably the early maritime explorers expressed considerable surprise in finding quantities of trade goods, particularly iron axes and knives, in the hands of the native people they contacted.

Dixon remarks "...a fondness for carving & sculpture was found among the people by Captain Cook; iron implements were in common use," and he adds: "it must doubtless be a considerable time ago that iron was introduced from that coast" (1968: 243-44).

At roughly the same time, in the late eighteenth century explorers and traders came to Northern British Columbia over the Rockies, beginning with Alexander MacKenzie in 1792. Father Morice describes what he believes to be the first iron axe owned by the Déné as coming from a village called "Tsechak", near Hazelton on the Skeena River, about 1730. Morice further notes that Simon Fraser found iron wares near the 49th parallel "...some of them which seemed of Russian
manufactures". (1962: 9) Morice justifies this by pointing out "When in 1741, Behring first reached the mainland of America, he found among the inhabitants of the Fox or Eastern Aleutian islands 'long iron knives, apparently their own manufacture'. (quoted in Morice 1962: 346)

Such items were undoubtedly traded across Bering Strait from the Gulf of Anadyr opposite the mouth of the Yukon River. Behring notes (9-10) that as early as 1648 trading expeditions had brought quantities of trade objects to this area some of which would have been traded into the New World. Stellar comments of the Siberian eskimos: (Jochelson 1933: 22):

"The Chuckchee carry on trade with America through the medium of the islanders (Diomede), they sell to the Americans iron knives, axes, lances, iron points, in exchange for sea-otters, martens and foxes. The Chuckchees obtain iron wares at Anadyr at excessive prices from the Russians and sometimes sell to the Americans for furs".

Gregor Shelikov established the first permanent trading settlement at Three Saints on Kodiak Island in 1784 (Clark nd). In the 1790s as the Russians depleted the sea otter, first on the Alutians and later around Kodiak island, they began to extend down the coast of southeast Alaska. In 1799 Baranov founded Redoubt St. Gabriel at Sitka in south East Alaska only to be driven out by the Tlingit in 1802. In reference to the founding of Sitka by Baranov, Bennett and Schermacher State (1967:3) "A settlement here, he saw, would bring the Northwest coast under Russian rule and thus make it more difficult for other nations to continue their trade rivalry." After driving the Tlingit rebels from their fort at Sitka in 1804 the Russians expanded their settlements and activities and rapidly down the coast until they were held by a southern boundary at 54°40' by a treaty with the United States in 1824.

When Zagoskin visited the Russian posts at Fort St. Michael on Norton Sound and Ft. Alexander on Bristol Bay on the Bering Sea coast of Alaska in the 1840's:

"both carried a stock of native goods: In addition to 'Yakut' knives, 'Kolosh' capes and 'Yenesei' axes these
forts were stocking warus and whale fat, warus and deer hides, decorated Chuckchi parkas..." Stoddard (1972:55).

The Yenesei and Chuckchee items were direct imports from Siberian tribes. Recently I found a suit of Tlingit armour in a small museum in Finland which had a broad border of Chuckchee fur mosaic attached to the hem that bears witness to the trade in native goods between Siberia and the northwest coast.

Archaeologically, trade goods have been found in the central interior of B.C. which corroborates these dates. Borden (1959) found a chinese coin at the Carrier village of Chilac which Morice claims was destroyed during a Chilcotin raid of 1745. Excavating in the Chilcotin area south of Carrier territory Wilmeth (1979:150), has trade copper objects appearing at A.D. 1705 ± 75. It is now apparent that trade objects of European origin began to appear in the Skeena River district in the early decades of the eighteenth century although the first European did not travel this river before another century had passed.

Indian consultants confirm that Russian trade goods were the first European-made items they saw. When an iron pot was discovered in house 3 at the Kitwanga fort this summer, Leonard Bright from Kitwanga said it was a Russian pot and gave a Gitksan term that incorporated a form of the name 'Russian'. The term is used for all such iron vessels even today although most were traded later from the Hudsons Bay Company.

The pistol barrel found at the site could have come from any source as could the adze blades and other metal objects with the exception of the dagger. The fluted blade of the dagger is based on the Siberian style of knife and unlike any Euroamerican knives which are usually asymmetrical in outline but symmetrical in cross section, directly the opposite of Siberian knives. Siberian forms can be traced back to Bronze Age prototypes some 4,000 years old. This type of dagger became very popular as war daggers in the late eighteenth and early nineteenth century. However, there are examples with either copper or bone blades which could be much older.

Excavations indicate iron was worked at the Archangel Gabriel Redoubt at Old Sitka which only existed from 1799 to 1802 (Barnett and
Schumacher 1967: 29) and at the Archangel Michael Redoubt which replaced the former in 1804 at the present site of Sitka.
EXPLORATION OF THE SKEENA RIVER

The first European to enter the Skeena River was Mr. Whidby, Captain Vancouver's first officer, on July 9th and 10th in 1793. Whidby surveyed "a very rapid stream against which the boats could scarcely make any way" (Vancouver) and progressed up as far as the Ecstall River which was named Port Essington. None of the rivers entering the delta of the Skeena at this point were recognized as being of particular size or note.

At the upper reaches of the Skeena in the interior, Sir Alexander McKenzie heard only rumours of the river in his journey of 1793. It was not until 1805 that Simon Fraser coming via the Parsnip River established Fort McLeod, and the next year built Fort St. James on Stuart Lake. In January 1812 D.W. Harmon, the factor at Fort St. James and McDougal from Fort McLeod paid a new year's visit to the Indians on Babine Lake. They were the first Europeans to enter the headwaters of the Skeena River. A fort was built on Babine Lake in 1833, the year after the Northwest Fur Company and the Hudson's Bay Company were amalgamated. One of the major reasons for the post was to develop a good source of fish to supply posts further into the interior where fish and game were scarce.

As part of Peter Skene Ogden's reconnaissance of the north coast for the Hudson's Bay Company beginning in 1830 to find a suitable post location, Donald Manson was sent up the Skeena in October 1832 and ascended the river for about fifty miles by canoe. (Large, 1957:174).
Fig. 23. Early view from the foot of Ta'awdzep before bulldozing the farm road looking south to the Seven Sisters Mountains
John Wark probably covered much the same territory of the lower Skeena in 1835. Large (1957: 23) comments

"It is doubtful, however, if the Indians would have permitted him to ascend past the canyon as they were exceedingly jealous of their trading privileges on the river and would look on John Wark as their opposition".

The first record of a European on the Skeena River in Gitksan territory, that is above the Kitselas Canyon, is the journey of Major Downie who did pass through the Kitselas Canyon and ascended the Skeena in 1859 as far as Gitenmax (Hazelton). He then took the inland trail to Kisqegas on the upper Skeena, from where he went to Babine Lake and Fort St. James and down the Fraser to Vancouver.

The first steamer was tried on the Skeena in 1864 by Captain Tom Coffin to supply the proposed Collins overland telegraph line from New York to Europe via the interior of British Columbia and Siberia. He was able to ascend the Skeena for only ninety miles in the steamer "Union" to a point below the present City of Terrace. The scheme to build the overland telegraph trail was abandoned before work crews had progressed very far beyond Fifth Cabin north of Kispiox. Outside settlement of the area was slow until the railway down the Skeena was built between 1907 and 1914. It was the railways which drew the attention of the National Museum of Canada to the fact that the Indian cultures would now face rapid change. Harlan I. Smith and Marius Barbeau were dispatched in 1915, Smith to Kitwanga, Hazelton and Kispiox, and Barbeau to Port Simpson on the coast. They both returned periodically to the Skeena villages until the Great Depression in 1929 when field work halted for some years. Many specimens from Kitwanga were collected during this trip, particularly by Barbeau (Volume II).

It was the railroad, with its interest in tourism that provided Smith with most of the funds to restore the totem poles at Kitwanga and Kitselas canyon. The relocation and conservation treatment the Kitwanga poles received between 1924 and 1926 is largely responsible for their existence today. Many of these poles relate graphically the histories of the Ta'awdzep families (Volume II).
Fig. 24. The north face of Ta'awdzeb taken in 1945 before the trees had grown extensively over it. The bank in the foreground appears to have eroded little in the past thirty-five years.
GEOLGY

Dr. David Wilfred of the Research Branch of the B.C. Forest Service in Smithers visited the site in mid-July. An inspection was made of the fort hill as well as a broader survey of the whole of the Parks Canada site to the east of the Kitwanga River, and additional areas near the highway where there were convenient road cuts and a gravel pit. A type section was chosen on the northeast side of the road which cuts through the lip of the upper terrace between the Kitwanga road and the Faulkner farm.

The bedrock throughout the area is calcareous limestone. In certain areas there is an overlying bedrock unit of shale that is very friable and weathered when exposed. This unit has been eroded by the river upstream from the site and accounts for the numerous water worn shale pebbles encountered in the excavation.

Capping the bedrock units in most areas is a medium-to-coarse unsorted gravel which represents outwash from the last glaciation and is found on the highest terraces well above the present river level.

The uppermost unit in the section examined on the high terrace was identified as a loess unit that is part of a system due to aeolian deposition of sediment at the end of the Wisconsin glacial period, from about Hazelton down the Skeena Valley as far as Terrace.
On the lower terrace to the north of the fort hill, the sediments are all fluvial as exposed in the eroding bank of the Kitwanga river. The variation of sediment size sorted into various layers indicated strong seasonal fluctuation of the volume of water in the river and constantly shifting channels. The controlling factor on stream downcutting at this point is the level of the bedrock slightly downstream at the hill.

GEOLOGY OF THE FORT HILL:
The core of the fort hill is the highly fractured calcareous limestone unit. The slope of the hill on the north side is 34° steepening to 40° in some areas. A test pit was dug only 40cms. to bedrock to confirm Dr. Wilfred's observation that the steep slope on that side indicated that bedrock was just under the surface of the ground, although no bedrock is exposed anywhere on the hill itself. In order to test the depth of the mantle of sediments on top of the hill, one of the excavation units (1A) was taken down a depth of 1.75 meters before encountering the top of the rock.

The opposite side of the hill, facing south has a much gentler slope, protected as it was on the downstream side in early Holocene times. Although no shale bedrock was found in the test pits, heavy gravels were encountered just below the crest of the hill and only 10 cms. below the surface. Some of the storage pit features in house 3 had been excavated into these heavy gravels.

The unit capping the fort hill was the yellowish fine loess. The only structure that could be detected in undisturbed sections of this material appeared to be mineralization bands due perhaps to spring drainage conditions. Dr. Wilfred thought it highly unlikely that there were ever springs on the hill except at the period of maximum spring runoff. However, springs were found along the bank beneath the uppermost terrace near the Kitwanga road.

Dr. Richard Throwbridge, a pedologist with the B.C. Forest Service observed that the carbonate and shale bedrock would have encouraged the
Fig. 25. A test excavation on the north side of the Ta'awdzep reveals the bedrock core of the hill close to the surface.
natural growth of juniper on the south slope of the hill. However, it is clear from accounts of other sites that the slopes of fortified hills were kept clear of vegetation as much as possible.

Climate:
The Skeena River system has an interior continental climate above the Kitselas Canyon and a coast climate below that point. The interior system is characterized by abrupt seasonal temperature change (summer 10°C to 16°C, winter -10°C to -7°C). At Terrace the mean precipitation is 117 cm per annum with average temperatures of 17°C in July and -4.5°C in January. At New Hazelton, the precipitation is 46cm per annum and the average temperature fluctuates from 15°C in July to -9°C in January. Kitwanga is located mid-way between Terrace and New Hazelton but in climate is closer to the latter.

Fig. 26. Photo by Marius Barbeau taken in 1923 entitled "The Mythic Tahawdzep fortress 2 miles behind Kitwanga."
BOTANICAL SURVEY OF THE SITE:

A thorough survey of plants to be found on the Parks Canada property was prepared by Dr. James Pozar, a botanist with the Research Branch of the B.C. Forest Service. The complete list of trees, shrubs, herbs and weeds is included in Appendix V.

It is interesting to note that the archaeological finds of wood and bark closely parallels the list of trees on the site at present. Hemlock does not occur in the archaeological remains on the site today, but is found in the Kitwanga River valley. Western red cedar, occurred in the site remains, but is no longer found on the property. It would have been imported for the construction of houses, boxes, etc. Lodgepole pine was the most common wood specie found in the site where it still grows, and was probably the main source of firewood to the site inhabitants. Paper birch is relatively rare on the property today but was extensively used in the past to line storage pits, and probably for containers as well. Cottonwood was likely the commonest material for dugout canoes in this area.

An attempt was made to investigate the ethnobotany of the site. Almost all of the shrubs that bear edible fruits or nuts were used by the native people, including saskatoon berries, hazelnuts, chokecherries, rosehips, gooseberries, squashberry, raspberries, thimbleberries and soopalalie (or soapberry). Willow bark was used as a lashing material and red willow branches were used for the forms of sweat lodges and puberty huts.
Fig. 27. Kitwanga Ta'awdzep from the south. This was the lowest & gentlest slope and probably the most heavily fortified.
The Excavations:

Excavation Control
Since the site on the top of the hill was relatively small and the deposit quite shallow, meter squares provided convenient excavation units. A meter grid was extended over the site in a quadrant system having its centre in House Three. The east-west baseline ran through the centres of Houses One to Three. The grid number of the southeast stake was chosen to represent the square. Squares were referenced in the records by the operation number followed by a sub-operation letter (e.g. 9a, b, c, etc.).

Excavation was conducted in lots, or 5 cm. levels starting from the surface at the southeast stake. Isolated squares were trowelled, while the trenches were both trowelled and shovelled, with all dirt screened through a 1/4" or finer mesh screen. Levels for recording purposes were taken from a point at the surface at the southeast stake which both designated the square and established the datum point for the square. All datum points were calculated from the permanent bench mark datum set on the hilltop in 1976 by Parks Canada surveyors.

Strategy:
The excavations were designed to accomplish limited testing objectives and were not intended to be a full scale investigation of the site. Of the six weeks scheduled for the digging period of the crew, approval
delays reduced the operation by one full week. Six full-time student excavators were employed for the entire period, augmented by local labour from the Kitwanga reserve which totalled an additional two man months. Thus it was possible to do only the minimum amount of excavation required to answer key questions about the site.

The operations divided neatly into two sections:
1) The top of the hill with its houses and palisade.
2) The area below the hill with its trails, puberty and storage pits, possible fish smoking houses and sundry other structures.

The investigation and numbering of operations began with the clearest features and were extended virtually to the property limits, and in a few cases, beyond them. The questions posed and the approach taken to testing each of them is outlined below:

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**Fig. 31. LIST OF OPERATIONS AND SUB-OPERATIONS**

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>SUB-OPERATIONS</th>
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<tbody>
<tr>
<td>1</td>
<td>1A, 1B, 1C, 1D, 1E</td>
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<tr>
<td></td>
<td>9A, 9B, 9C, 9D</td>
</tr>
<tr>
<td>2</td>
<td>2A, 2B, 2C, 2D</td>
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<tr>
<td>3</td>
<td>3A, 3B, 3C, 9K</td>
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<tr>
<td>4</td>
<td>4A, 4B, 9G, 9E</td>
</tr>
<tr>
<td>5</td>
<td>5A, 5B, 5C, 5D</td>
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<tr>
<td>6</td>
<td>trench A</td>
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<tr>
<td>7</td>
<td>7A, 7B, 7C, 7D, 7E 65 food storage pits</td>
</tr>
<tr>
<td>8</td>
<td>19 food storage pits</td>
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<tr>
<td>9</td>
<td>9E, 9F, 9G</td>
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<tr>
<td>9T</td>
<td>Test Pits, 1, 2, 3, 4, 5, 6, 7, 9H</td>
</tr>
<tr>
<td>10</td>
<td>nil</td>
</tr>
<tr>
<td>11</td>
<td>test pit at spring</td>
</tr>
<tr>
<td>1-4, 9T</td>
<td>trench 1</td>
</tr>
<tr>
<td>1-3, 9T</td>
<td>trench 2</td>
</tr>
</tbody>
</table>
Operation 001

This was meant to coincide as nearly as possible, with surface indications of a house feature on the top of the hill at the eastern end. In most areas the walls of the house were clearly outlined by a ridge of earth around the periphery and a rectangular central depression inside the wall ridges. Among the Indians of the coast, houses with central depressions invariably indicate those of the higher ranking families in the village. It is assumed the same principles apply in this area as well. My initial assumption that this was Nekt's house was later confirmed by the majority of the native commentators.

The first test was in what was presumed to be the side wall of house 1. Designated 1A, this one meter square test encountered the sill of the house as well as some additional features of interest. The second unit 1B, to be opened was in the presumed area of the central hearth of house 1. It immediately produced grey wood ash of unusual compactness, that extended out beyond the one meter square in all directions. To delimit the hearth, additional units were placed on either side of the original one along the E-W grid line. They were labelled units 1C & D. The hearth was shown to be roughly circular, and about two meters in diameter. Its shape suggests it was built on a dirt floor rather than within a square hearth opening in a wooden floor.

The hearth was clearly distinguished as a highly cemented layer up to 20 cms in depth that was very consolidated when first uncovered, to the extent that it was assumed to be decomposed limestone. However, it dried out and fractured on exposure to air. Examination of fragments disclosed immediately that the material consisted of highly compacted wood ash with a high admixture of calcined bone and small quantities of earth. The effect of hearth temperatures on this material was to fuse it almost into low grade bone china. This peculiar hearth lining appeared in all other hearth areas of the site and became a major indicator in test pits of the central hearths of houses. The soil immediately beyond this compact ash crust was invariably reddened by the intense heat of the central hearth.
SUB-OPERATION 1A

Legend

- Turf
- Light brown organic loess
- Dark brown organic loess
- Mottled organic stained loess
- Red burned loess
- Yellow loess
- Grey loess
- Unaltered orange loess
- Rocks
- Bedrock

Fig. 32
Fig. 33. Wooden fragments of a structural support post in house 1 discovered in trench 2.
A half meter trench cut through the front and back wall areas of house 1 revealed features of house support posts, numerous smaller posts some still contained preserved wood as in (Fig.32) and food storage pits. At the back of the house was a large pit feature that from the outset was presumed to be a trap door in the palisade. As more was discovered concerning house 1, it was concluded that this feature was on the back wall of the house, and that the palisade was built against the house wall in such a way that the trap door led under both the back wall and the palisade at the same time. Inside the confines of this large feature was a large storage pit that still retained much of its birch bark lining. The numbering applied first to this feature was part of operation 9, that assigned to the palisade area, and it was not changed once it was decided that the feature was also part of operation 001 (house 1) since that would have added confusion to the notes and photo records. Consequently, the four units in the trap door feature, were designated 9a, b, c, & d. and are described and illustrated in Operation 009.

Features in Operation 001

Sub-Operation 1A (Fig.33). This was a single meter square located on the ridge that marked the west wall of house 1. It was the first unit excavated since it was on the highest area of the site which was clearly a cultural feature. It promised to yield the deepest stratigraphic section, as well as details of wall construction of the house. The unit fulfilled all of these expectations and it was decided to continue its excavation as a geological pit to test the depth of soft sediment on the top of the hill. Excavation ceased upon encountering a pavement of rocks at 175cm. below the surface. Probing with the steel rod confirmed that bedrock was continuous across the unit. The upper rocks were exfoliated blocks from the surface of the bedrock.

Four significant cultural features were found in this unit.
Fig. 34. House 1 (op. 001) Organic stain of west house wall across center of unit parallel to arrow. Pins mark post moulds. Whitish pit on back wall is filled with burned animal bones and ash.

Fig. 35. The central hearth, units 1B, C & D in House 1.
Feature 1 (Fig. 34) was an ash pit 50cms in diameter, filled with partly consolidated wood ash and a high proportion of calcined bone fragments. At the bottom of the pit was a dark lens of organic material in which were preserved several large pieces of birch bark. This appeared to be the original lining of the pit. The animal bone has been identified (Appendix II) and consists mostly of small animals like hare, marmot and beaver. The clear demonstration of the pit edges and the remains of birch bark lining suggest the ashes were buried in the pit rather than the feature representing a hearth of any kind. The mixture of ash and burned bone is the same as that in the central hearths. It possibly represents a symbolic transfer of ashes to the walls of the house. This practice is known to have taken place at the rebuilding of houses by a chief's successor when a small quantity of the old hearth ash is transferred to the walls of the new house.

Feature 2 is a large pit which is illustrated in the north and west walls profiles. It is a layered pit with burned soil at the bottom in the deepest area with a thin layer of dark organic soil separating it from the mottled, organic stained loess.

Feature 3 (Fig. 34) is a trench which through the middle of the unit can be clearly seen in the centre of the north and south wall profiles. It appears to be the sill of the west wall of house 1.

Feature 4 consists of 10 scattered post molds which do not form any particular pattern but may represent stakes set in the ridge to create wall partitions, drying racks, etc.

Sub-Operation IB, C & D. These three units were excavated to reveal a single large hearth feature in the centre of house 1. It was the most fully excavated of all of the five central hearths that were tested, and it was also the largest. It is slightly more than two meters in diameter and roughly circular in outline. The hearth was in the exact
SUB-OPERATION 9C

Legend

- Turf
- Light brown organic loess
- Dark brown organic loess
- Mottled organic stained loess
- Red burned loess
- Yellow loess
- Grey loess
- Unaltered orange loess
- Rocks

Fig. 36.
Fig. 37. Excavation of feature 9a, b, c, d, the hiding place and escape hatch at the rear of house 1.
Fig. 38. The birch bark lining in the bottom of a storage pit within the hiding place at the rear of house 1.
centre of the house depression, although not the center of the house itself, since there was a wide back platform to this house.

The hearth is characterized by three layers. The largest portion is the highly consolidated gray wood ash and calcined bone. There are some fire cracked rocks mixed in the ash and a few artifacts, mostly glass beads.

Underlying the ash is a thin layer of charcoal and incompletely combusted wood. Under the hearth feature the loess appears to be undisturbed but has been burned red by the heat of the hearth.

Sub-Operation 1E. The purpose of this unit was to determine the nature of a burnt semi-circular lens that appeared in the south profile of trench 2, at 19.5 - 20.0E. When encountered in the trench profile it appeared this feature might be the remains of a burnt sill of the house but upon excavation it appeared to be a localized pit feature.

Sub-Operation 9A, B, C, D. These four one meter units quartered a large depression on the north edge of the hill behind house 1. I had known of this large depression since my first visit to the site and had always considered it to be the best candidate for the trap door entrance to the Ta'awdzeep as described in oral traditions. For this reason it was included within the operation 009 intended to encompass the palisade.

As clearing of the site continued and as excavation of the houses advanced, it became more obvious that the entire feature lay within the platform of House 1. Excavation of the large pit itself indicated that there was a large depression filling most of the 4 units. In the fill of this pit several complete artifacts were found including a delicate antler barbed harpoon and a chipped stone projectile point. Since neither artifact was damaged in the slightest it appeared that these objects had been cached in the pit, probably with their hafts attached. The space in the pit was large enough for several people to hide themselves if the house was under attack.
In the northwest unit, 9C there was a large second pit (Fig. 36, feature 1) which extended an additional 40 cms. further down. It was lined with sheets of birch bark, which were still relatively intact, preserved by the depth at which they had lain. After records had been made hot wax was put on the sheets of bark to preserve them for possible later conservation. Both feature 1 and the larger pit were filled with soil containing numerous fragments of decayed wood and charcoal.

Subsequent interpretation of the palisade at the north side of the hill suggests that it stood directly beside the rear walls of houses 1, 2, 3 and probably 5. The hiding place in 9A, B, C & D was probably built so that one could enter from the back of the house and exit under the palisades by pushing aside some planks disguised on the outside with dirt.

An episode of the Skawah legend of the Gitksan seems to describe this feature dramatically (Barbeau 1928: 174-176).

"Abalone-pearl-labret spread her skin robe over her fair daughter Skawah and led her to the inner partition of the house, wherien are secreted a families sacred possessions. With her hands she scooped up the earth from the floor and raised a copper shield, which hid a passage extending to the forest tangle in the rear. Both mother and daughter crawled down the narrow opening, resetting the shield behind them. Thus they passed off from the light of day into the gloom of a refuge underground, while the Kunradal warriors in fearful numbers swarmed over the ice on the river.

As the fugitives crouched in hiding, they heard the war-whoops of the invaders, the howling of dogs, the uproar of challenge and defiance in turn; faintly at first, from afar; then distinctly as the battle spread wide over their heads. They shuddered at the thump of stone mauls on the split-cedar planks of their houses, the peals of invectives, and on every side the din of blows, incessant and deadly.
There travelled through the air at sunset a clamour of victory, the war-chant of Kumradal exultant. Succeeded with fatal progress the crackling of fire overhead, the acrid smell of burning cedar, the rumbling of corner posts and roof-beams sinking to the floor, then stillness, that of death and extinction. Only ruins remained on the defaced terraces of Keemelay, and terror below, in the bosoms of mother and daughter abandoned to their fate in a wasted homeland.

Operation 002
This operation number was applied to a level rectangular area immediately west of the boundaries of operation 001. It appeared to be a prepared house floor, and although there were numerous surface depressions along the edges of the unit, these were not elevated ridges. On the north side of the operation was a lower terrace, about one meter wide that appeared to be a pathway in front of the house. It connects with a similar path in front of the houses on either side of house 2.

The central area of operation 002, a zone about two meters by five meters was covered in Saskatoon bushes almost ten feet in height. They appeared to be growing over the old central hearth. Ash often encourages prolific plant growth of this kind. A meter square (2d) was excavated to confirm the hearth position. The hearth appeared to be of similar dimensions to the central hearth of operation 001, but it was not economical to excavate the feature further. Several fragments of iron rich rock, possibly from the same parent block, gave extremely high response from the metal detector that was passed over the hearth before excavation but no other metal objects were found in the unit.

Informants had indicated that during times of seige, people hid in pits under the floors of the houses. The shape and location of the two pits at the front of house 2 warranted further investigation. Consequently, a meter square (2b) was excavated into a linear depression about 1.5 meters long, one of a pair of depressions which flanked the
Fig. 39. Cast iron trade kettle lying in a storage pit inside of house 2. Carbonized food remains and cedar bark matting were found adhering to the underside of the kettle.
front entrance to the house. Large fragments of burned wood were encountered just under the turf and appear to have resulted from the collapse of a burning structure. When a 50cm. trench was laid out across the site it took in part of this square, so that half was finished as part of the trench, while the other half was abandoned at the 20 cm. level.

The metal detector yielded its highest reading on the hilltop at a spot in the northeast portion of house 2 (N3-4, E10-11). To determine the reason for this reading a meter square (2c) was excavated and found to contain a large side portion of a cast iron cooking pot (Fig. 39') in a pit that had not been detected on the surface.

Trench 2 cut along the back wall of house 2 and through the depression that seems to be the trap door escape hatch of that house. Numerous pit features and fragments of posts were encountered in this trench. They are shown in Fig. 33 and described in features 1-5 of trench 2.

Operation 003
The levelled surface of house 3 consisted of a large rectangular area lying at a slightly lower elevation immediately to the west of house 2. Three meter squares and two half meter trenches were excavated in this house. Square 3A and 3B were excavated in a double depression that appeared to represent two overlapping pits or large post moulds. It was hoped that there might be temporal separations between the two pits so they were both excavated. Square 3C was established to test another large depression, thought to represent a large food storage pit along the western side wall of house 3.

Two more units 9A and 9B were excavated into surface depressions in part of zone 9 that were thought to be in the palisade area in front of house 3. It now appears that they are still within the front wall of house 3 and this house projected considerably further south of houses 1 and 2, as did its neighbour, house 4, to the west. Although not renumbered as operation 003 these depressions proved to be large storage
pits with birch bark linings rather than palisade post depressions, as first thought.

Trench 2 at the back of this house intersected a very large feature, possibly the trap door/hiding place for house 3.

Features in Operation 003

Sub-Operation 3A. This unit was thought to be in the approximate location of the southwest corner post of house 3. A surface depression was noted in about the center of the unit before excavation began. It was later evident that this unit was well within the house.

Feature 1. This was a large post mould containing decayed wood fragments of red cedar. It must have been a structural member of the house but to judge from its size it may have been from an interior partition rather than the main outside wall.

Feature 2. This is a continuation of feature 1 into the northeast corner of the unit. The whole feature shows soil disturbance from an old excavation at the time of occupation of the site. It is possible that this wall feature is from a phase of occupation when there were perhaps two house structures on the platform in operation 003.

Sub-Operation 3B. In order to determine if the large feature (1 and 2) of sub-operation 3A was continuous as would be expected for a house wall trench, the unit immediately west was opened up. There was no evidence of any such extension in the east wall of 3B as would have been expected if the feature from 3A had continued.

Feature 1. This is a large storage pit in the west wall of 3B. The bottom of the pit was lined with sheets of birch bark and rolls of birch bark were found within the pit fill along with numerous pieces of
Fig. 41. Hearth of House 3 encountered in trench 1.
charcoal and fire cracked rock. This probably simply indicates that the pit was filled after use with debris from the hearth.

**Feature 2.** This is a clearly marked post mould that may have been associated with the west wall of the house.

Sub-Operation 3C. In hopes of locating clear evidence for the west wall of house 3 a unit was excavated at the western edge of platform. The dark brown organic soil which can be noted underlying feature 1 in the south wall and in the north wall was continuous on the west wall. It probably represents the decayed remains of the sill for the west wall. There were two post moulds, both ten centimeters in diameter in the floor of the unit which do not appear in the profiles, but were probably used as wall or partition supports.

**Feature 1.** This was a very large pit in the southwest wall of the unit which contained typical pit fill of small pieces of charcoal and fire cracked rock. It may have been a hiding place for goods or people under the sleeping platforms near the wall of the house.

**Operation 004**
This small triangular terrace at the western tip of the site appeared too small to have supported any house structure. Informants claim that there was at least one house built on stilts overhanging the edge of the hill. Unfortunately, opinion differed as to which end of the site the "hanging house" was on. Mrs. Sutton (Chief Akawt) maintained that it was just east of Nekt's house on an even smaller triangle of land, while all the other informants maintained that it was in the operation 004 area.

It was assumed that the central hearth of house 4 could not easily have been built out over the edge without danger of fire spreading into the timber supports, but probably lay along the edge of the hill. From the likely position of the east wall it was calculated approximately
Fig. 42. Birdseye view of the Ta'awdzep from the west end showing the estimated outlines of the house platforms in relation to the trenches. The horizontal dimension of the platforms are shown in black. The area covered by the houses as adjusted to the slopes of the hill are in dashed lines.
where the west wall would be, and more particularly where the corner post on the extreme overhang would be. A meter test square placed downslope at the estimated position failed to locate the post, but subsequently became a convenient starting point for a trench (No.1) along the south 3 line. It soon became obvious from the downslope profile of this trench that dirt had been loaded over the side of the hill and had buried an old humus line (Fig. 62). The loaded material came from quarrying the triangular level terrace on which half of house 4 stood. In depth, the material loaded over the side of the hill reached a maximum of 10 cms and covered an area of the downhill slope slightly larger than the level triangle itself. It is quite likely that the cutting and dumping encountered on this lot constituted a major part of the basket and box transport of soil mentioned in the legends about the construction of the hill. Considerable earthmoving was reflected in this feature and the story was possibly enhanced through time to give rise eventually to the story that the hill itself was man made.

The central hearth for house 4 (Fig. 28) was located on the last day of the project in a test excavation on a small bulge along the edge of the hill. The hearth covered the entire surface of the bulge and although the test unit was not taken down to the sterile zone for lack of time, it appears probable that the bulge was an earth pile built out from the edge to support the central hearth. All of the features of this house indicate that every effort was made to establish space for a house where there had originally been but a small sloping triangle offset to the south of the hill. This offset, part of the downstream hook of the hill crescent, required house 4 to shift south of the other houses to encompass enough land on which to build it.

Operation 009T
The fifth and last house was discovered on an even smaller triangle of land than house 4, on the eastern end of the hill. In fact the level space was so small that I thought initially it may have been an entrance through the palisade; that is, some kind of fortified gateway. There was ample evidence of small pits and trenches on the surface that could have been part of a stockade and gateway. Consequently, the operation
Fig. 43. The hearth of house 5 (operation 009) on the edge of the platform at the east end of Ta'awdzep. Half of the house was built on pilings.
was initially considered to be that of the palisades, operation 009, and suboperation 9H was labelled accordingly.

The first conclusive evidence that this was a house platform was found in one of six test pits dug into various depressions in this operation area. Compact grey ash with calcined bone fragments underlain by heat reddened soil, established the location of the central hearth features confirming evidence in the form of large pieces of burned wood found on the downhill slope under what would have been the house overhang. The length and orientation of the carbonized wood indicated it resulted from burned planks that had fallen down the slope (Fig. 44.). The location of the charcoal just beneath the sod suggests that the burning episode was the terminal event for use of the fort, since no occupation refuse was found to overlie it. If this slope should be carefully excavated at some future date, it is likely that structural details of the house could be determined from the burned plank remains.

**Operation 005**

A small terrace located between the hill and the river was noted by the surveying crew in 1966 to contain three large depressions roughly equidistant from each other. The terrace is much lower than the hill but still well above the flood reach of the river. It is a bedrock controlled feature with only a thin mantle of soil.

When the area was cleared of dense brush, mostly red willow, another smaller depression near the southern edge of the terrace was also found. It was initially assumed that the depressions were all food storage pits, although they were considerably larger than usual.

Units 1 meter square were excavated into the two largest pits (5A and 5B) to provide cross sections and soil samples to be collected for content analysis. During a periodic visit by Mrs. Sutton, she was taken to this area and asked her opinion. At first she agreed they were food storage pits, but then looked puzzled for a few moments. She kept looking at the pits and then up the hill and down to the river. Finally, her expression changed to a smile of recognition and she
Fig. 44. Burned soil and charcoal just beneath the turf represent the collapsed remains of the burnt house. The slope is steep at this point as shown by the stake which is being held level.
SUB-OPERATION 5B

Legend

- Turf
- Light brown organic loess
- Dark brown organic loess
- Mottled organic stained loess
- Red burned loess
- Yellow loess
- Grey loess
- Orange streaked clay
- Pebbley clay
- Unaltered orange loess
- Rocks

Fig. 45
Fig. 46. Operation 005 showing the excavation of units 5A and 5B from the top of Ta'awdzep. The girls puberty lodges were usually located at the greater distance from the village, but during times of warfare, the lodges were kept closer to the fort. Cedar bark strings were said to provide a communication link between the lodges and the houses of the girls parents. The girls were not allowed to speak during their month long seclusion.
exclaimed "This is the girls' school!" She then explained to an incredulous audience of students, Rosalind Whalley and myself, that these were the pits over which small conical huts were built for the seclusion of girls when they reached puberty. At first menstruation the girls were brought to these huts by an aunt and taught how to behave as a woman. I checked as many details as possible about the size of the huts, how they were heated, how oriented and if they reused. My conclusion was that all of the observed features of the pits fitted with Mrs. Sutton's interpretation. The remainder of the units 5A and B were excavated with a view to testing this suggestion. Unit 5B (Fig.48) produced a central hearth feature with abundant charcoal lenses suggestive of reuse at intervals. Samples of the pit's soil content was collected for later analysis. Since food storage pits do not require hearths it is most likely that 5B is the pit for a puberty hut with a small fireplace to provide warmth in cold weather. William Beynon describes the use of the puberty hut among the Tsamshian as follows (1948-49 ms).

"The next stage for the girl was when she had her first menstrual period. When this came on she would be again in charge of the oldest paternal aunt or paternal grandmother and she would be taken to the hut specially built for this purpose and there she should be kept in seclusion attended only by her paternal aunt. She would be made to drink water with a tube, usually a small hollow leg bone of some bird. When she was thoroughly cleaned of her menses, then four children were brought in. These were about six years old, two male and two female and these would chew food for the adolescent. The reason for this was that she would have children of both sexes.

There was a small swale between operation 005 and the side of the fortress hill that was very wet when first cleared of the red willow cover. A small shovel test was dug in the clearing to determine if there was a spring at this location. No evidence for a spring was found and in a few days the exposed soil dried out.
Fig. 47. Excavating a girls puberty pit in Operation 005.

Fig. 48. The hearthstones and charcoal lenses in the bottom of a girls puberty pit 5B.
Fig. 49. Operation 006 consisted of a trench across what was suspected to be the site of houses or smoke houses. No cultural features were voted in the trench floor.

Fig. 50. The trench in Operation 006 was excavated by shovel and mechanized shaker screen.
Operation 006

The large terrace several acres in extent to the north of the fort hill appeared to have all the requirements for a village location. It was close to the hill and protected by it since most invasion threats by trail or river would come from the south. It was well above the flood plain. Of the two terraces south of the hill, one was below the flood plain and the other quite a climb from the river, rendering both of them undesirable for houses.

The area of operation 006, had itself been a flood plain in early post glacial ties and consisted of fluvial sediments of different grain size. A shallow channel characteristic of the quarrying action of streams along the outer edge of an erosion loop traced along the inner edge of the terrace against the steep face of the next higher terrace.

In one area near the hill was a depression with relatively heavy vegetation covering what appeared to be a house site, although not one of long duration. The stream bank was carefully checked and showed no trace of eroding house deposits. Consequently, a long trench was excavated some 10 meters from the bank which seemed to be the optional area to encounter house remains if any had stood there. The trench was 60 meters long ending in a swale that cut diagonally across the terrace and which marked an old channel of the river. The field on this terrace had been plowed numerous times in the past although for the last few decades it had served only as pasture. Cultivation would have filled in any food storage pits. However, the marked contrast between the light yellow subsoil and the dark humus layer would have made any storage pits or post holes stand out very clearly in an excavation. Because of the uncertain return involved, the entire trench was excavated by shovel with the soil passed through a motor driven shaker screen of 1/4" mesh. The extremely efficient shovel work of two crew members completed the trench in three days. It is somewhat surprising to note that not a single sub-surface feature or artifact was found in the entire length of the trench, although pieces of modern glass were recovered from the sod zone.
Fig. 51. Probing one of 50 food storage pits at the base of Ta'awdzep.
The reaction of a visiting geologist to this situation was to indicate that very active erosion was occurring along the river edge in this area and that erosion of up to one hundred meters could have occurred within the past two centuries.

Operations 007 and 008

Due to the influence of the bedrock core of the fort hill a series of depositional and erosional cycles formed a boundary between all of the terraces on the property, and at the same time linked them together. Taking advantage of this topography the Indians established a trail down the slope from the high terrace where the Kitwankul Trail passed (and where the Hand of History sign of the highway is today) to the eastern horn of the hill. From there the trail ran along the southern flank of the hill to the western horn where another path zigzagged down the steep northern slope of the hill toward the area of operation 005 and the river. The main trail up the hill was in front of Nekts house (No. 1) and is still clearly marked to this day.

From a point midway down the first slope to the western horn of the fort hill, the trail was spotted on either side with large food storage pits (Fig. 29). I had noted half a dozen of these pits on my visit to the site in November, but the brush was too dense to see many of them. It took two men a full two weeks to clear all of the brush from these trails so they could be accurately mapped and tested. Each pit was marked with an orange tag stake and assigned a number.

Where the modern service road cut over the terrace edge the trails and pits were obliterated in a swath nearly 10 meters wide (Fig. 29). The area to the east of the road was designated operation 008. That to the west of the road flanking the hill was operation 007. Once the areas were cleared it became obvious that they should have been a single operation, and should henceforth be considered together as parts of a trail network between the trail and the river with the fort hill standing in the middle.
Fig. 52. Excavated sweat bath rock pile in feature 7A which contained scattered charcoal but was only a surficial feature.

Fig. 53. Excavated sweat bath feature 7E that had been partly destroyed by agricultural levelling.
In total 84 food storage pits were mapped in these two operations. All of the pits were tested with a long steel probe (Fig. 49) to determine their depth and if they contained any cultural remains, such as stone or metal tools or weapons. They were also tested with the metal detector but no artifacts were found in these tests.

Several types of other features were encountered that required explanation. The first type consisted of piles of cobbles, some of which were buried beneath the sod indicating considerable time depth. Three large cobbles concentrations were tested, but there were many smaller concentrations that were simply mapped as a cluster.

The largest of the three tested (designated 7A - Fig. 54) contained over a hundred cobbles, some of which had been worked into chopping tools. A trench was cut across the concentration after each cobble had been mapped and marked for restoration purposes. After excavation the trench was lined with a sheet of plastic to mark the limit of excavation, the trench filled and the cobbles restored to their original position. A number of worked cobbles were collected as artifacts from the feature.

A related feature (designated 7C) was encountered just below the hill adjacent to the trail. It consisted of a small mound with considerably fewer cobbles than in 7A, and when cross sectioned with half meter wide trench, the cobbles were found to be mostly resting on the surface. The small mound consisted of loose topsoil with no indications of burning nor evidence for an underlying pit.

The final feature of this type (7D - Fig. 54) was beyond the undisturbed zone of area 7, just in front of the office trailer, and appeared to be a stone pile that had been mostly destroyed by the bulldozer that cleared a road through the site several decades ago. About twenty larger cobbles and numerous worked cobble spalls were uncovered in the excavation of the feature, but there was no pit associated with the feature.

The interpretation of these stone piles presented a problem that was taken to the native consultants. It was clear that at least one pile was prehistoric, and not the product of field clearance since most
Fig. 55. A sweat bath structure among the Tlingit of southeast Alaska ca. 1895. NMC photo.

Fig. 56. Reconstruction built under native supervision at the Ta'awdzep 1979.
Fig. 55. Feature 9E in House 3 was a large food storage pit with fragments of a bark lining. The large rocks in the bottom may have been added to support later posts. The post mould on the right still contains brittle fragments of red cedar.
cobbles were partially or completely buried; furthermore, there were artifacts in all three features, and charcoal in one (7A).

Mary Johnson of Kispiox was asked her opinion first. She studied the feature and the immediate surroundings and then pronounced unequivocally that it had been a steam bath, or 'medicine' bath. Other consultants including Olive Mulwain of Gitseguecla agreed with the first interpretation. Since no steam bath had been described in detail for the Skeena River I asked Olive Mulwain to advise on the details of reconstructing one (Fig. 56). Although the results of this experimental reconstruction are not conclusive they suggest that the 'steam bath' (or sweat lodge) is the best explanation for the use of these rock piles.

It was damned that there was no cooking activity associated with preservation of food for the storage pits nearby that could provide an alternative explanation for these rock features.

Much smaller accumulations of rock, such as 7B, could also have been sweat lodges on a smaller, probably individual scale. They also included both fire cracked and whole cobbles, and varied from a few to a dozen cobbles. No doubt other examples could have been designated but in small features of this sort the effect of 'borrowing' stones from one feature to another blunts the usefulness of trying to record all examples of this phenomenon.

Native consultants claimed that both medicine baths - designed to improve the health of a patient, and purification baths - meant to divest a hunter or fisherman of his human smell which is repulsive to animals and fish - were usually taken individually. The three larger concentrations may refer to group steam baths that were practiced on occasion, or even communal rock piles at favoured localities for the use of individuals.

Operation 009

The original intention of this operation was to include the zone around the house lots that was thought to include the palisade of the fort. As the evidence accumulated for the house structures it became obvious that
Fig. 58. Feature 9E in House 3 was a large food storage pit with fragments of a bark lining. The large rocks in the bottom may have been added to support later posts. The post mould on the right still contains brittle fragments of red cedar.
some houses were larger than initially assumed. In fact the back of house 1 and the fronts of houses 3 and 4 extended into Operation 009. The fifth house at the east end of the hilltop was entirely within Operation 009 and was designated 009T. Since, in fact, no evidence was found of a palisade, the raison d'être for the operation designation disappeared, but for the sake of continuity in recording the original numering was maintained. The operation 009 features were presented earlier with the house operations to which they belonged, but a resumé of all of the sub-operations will be presented below:

9a, b, c & d were each quadrants of the trap door feature at the back of House 1 (Operation 001).

9e, f, g were storage pits in the south end of House 3 (Operation 003). They were marked by surface depressions that were thought to represent posts (possibly of the palisade) but which on excavation proved to be storage pits with birch bark linings.

9k was a small hearth under a huge flat slab at the southern end of House 3.

Operation 010
Oral history for the site abounds with references to a spring along the hillside where girls were sent daily to draw water for the fort. In one important episode the girls see the reflection of any enemy warrior in the pool at the spring. They quickly return to notify Nekt of an impending attack. The most likely location of the spring seemed at first to be in the zone at the base of the hill but thorough search of that area revealed no sign of a permanent spring. A note on the local maps showed a spring along the steep slope from the uppermost terrace where the grease trail passes the fort. This slope was cleared from the point at which the road cuts down between the two main fields to the northeast corner of the property, in an attempt to locate the spring. Since no likely features were found, nothing was designated in Operation 010.
Operation 011
The large field to the south of the fort hill on the far side of the road would have been kept clear of trees for defensive purposes while the fort was in use. It would have thus provided a large activity area for drying fish and processing other food. A thorough search of the area yielded several dozen massive stone tools, mainly cobble choppers and hammerstones.

One intriguing tool type which turned up in surprising numbers was a cobble with deeply pitted depressions on one or both faces. Similar artifacts, considered to be anvils for stone chipping, had been found before on Indian sites in Canada but not previously in this region. Some careful observations and deductions by Mr. Jack Hepplewhite of Terrace demonstrated that they were indeed hammerstones, but ones used by local farmers to pound metal horse tethering stakes into the ground. A single example was retained for future reference.

The possibility of the existence of food storage pits in Operation 011 cannot be ignored. Bulldozing and cultivation in this area would have obliterated all trace of such pits on the surface, but sub-soil indications should be preserved. Unfortunately, it would require a lot of earth moving to test this hypothesis and does not appear to be justified since a sizeable sample of such features is preserved on the northern side of the road in Operation 007.

Operation 012
After a thorough, but unsuccessful search of Operation 005 and 010 for the spring used by the inhabitants of the fort, the quest was extended to the steep bank to the east of Operation 011, just below the location of the present highway and the old grease trail. Mr. Faulkner, the custodian of the property had indicated that this is where they tapped the water for their horses and for the family use as well. This spring is just over the boundary of Parks Canada land. With assurance to the owner that we would be careful not to dig up his water supply line, a
small test pit was put into a very wet spot just below the spring. In this test preserved wood was recovered, some fragments of which appear to have been worked. Soil conditions for preservation in this area are optimal but there is evidence of recent disturbance mixing old and new wood throughout the area.
Prior to excavation the sod from each trench was removed in 25 x 50 cm. blocks to the top of the cultural deposit. The underlying deposit was then removed with shovels in 5 cm. layers, in sections of the trend a meter at a time. If soil colours changed, rock concentrations, artifacts or other clues appeared, the area thought to encompass the find was marked off and the shoveller proceeded down the trench. All soil removed from the trench was screened through 1/4" mesh shaker screens that were lined with a finer mesh screen when smaller items, like beads, were suspected.

Follow-up crews excavated the special find areas with trowels and took soil and other samples from the features. The density of features in both trenches was higher than anticipated. A drafting and a photographic team recorded the profiles and features encountered in the trench, using dry and wet spray techniques to enhance the subtle soil and stratigraphic changes.

Trench 1 (Fig. 59)
The first test trench was a half meter wide and ran east and west along the south three meter line, from West 13 to East 30. It was situated so as to cut across the front walls of as many houses as possible, with particular attention to Houses 1 and 2. General observations on the discoveries in the trench for each particular house have already been
provided in the operation summaries above. The average depth of Trench 1 was one meter, which was sufficient to catch the bottoms of the deepest pits or post features encountered.

The most notable finds in Trench 1 were:
1. the buried soil horizon (W6 to W11 profile) indicative of site terracing prior to the last period of construction
2. the large central hearth of House Three
3. house post features for Houses One and Two.
The features in this trench were numbered from one to 80 and indicated on the floor plan and profile in fig.

Description of Features in the North Wall of Trench Number 1

Feature 1 (5.3W-13W) consists of a long lens of fill that has been dumped down the western slope of the hill during the preparation of the lot for house 4. The feature begins at 6.3 meters west and continues to the end of the trench at 13 meters west. The outline of the feature could be detected from the top of the hill when vegetation had been cut down and the sun was at a low angle in late afternoon. The feature covered about fifty square meters. The average depth of the fill which comprised the feature was thirty centimeters. The total volume of fill was about seventeen cubic meters.

The feature overlays the old sod line and could be clearly traced along the wall of trench number 1. The eastern end appears to end in a dark organic stained vertical line that may represent the remains of a retaining wall at the west end of house 3 platform.

Feature 2 (2.2W) is a post mould filled with dark brown organic material. It was approx. 50 cms. long and was slightly angled to the west.
Fig. 60  Trench 1 (right) and 2 (left) from the west across the top of the ta'awdzep

The blocks along the side of the trenches are piles of sod that were carefully replaced after excavations to prevent later erosion of the hill.
Feature 3 (0.5-1W) is a relatively straight sided pit about 50 cms. in diameter which extends thirty centimeters below the humus zone. The west end of the pit is stained from decomposed organic remains while charcoal stains are found at the east end and near the top of the pit. It is presumed to be a food storage pit near hearth 3.

Feature 4 (0.1E) is a basin shaped pit on the very edge of hearth 3. It is filled with charcoal stained earth. Its shallowness, position and contents suggest it may have been an earth oven for baking at the side of the main fireplace of house 3.

Feature 5 (0.2-1.1E) is a trilobate depression filled with a highly consolidated mixture of wood and bone ash and soil. Beneath the bottom of the feature the earth is burned red indicating this was a major hearth feature. Its size and location at the center of the platform for house 3 indicates it is the central hearth for this house.

Feature 6 (1.6E) is a post mould about 8 cms. in diameter & 20 cms. in depth below the dark organic and charcoal zone in which it originates. Its total depth from the surface is 35 cms.

Feature 7 (1.7E) is another post mould similar to feature six in size and contents.

Feature 8 (1.9E) is a concentration of 24 rocks. They range up to 14 cms. long and all show evidence of fire cracking. It probably represents the remains of a baking oven although no trace of a pit could be distinguished.
Feature 9 (2.2E) is a small, post mould about 5 cms in diameter which extends 25 cms from the surface. It is faint in colour and probably represents the position where a stake, perhaps as a fish roasting fork, was pushed into the ground and later removed.

Feature 10 (2.4E) is virtually identical to feature nine.

Feature 11 (4.5E) is a depression filled with organic matter which could be traced in a line across the trench. It appears to be part of a sill of a wall of house 2. On the south wall of trench one, this feature was recorded as number 43.

Feature 12 (5E) is a small depression, perhaps a sill about 5 cms. wide & extending 30 cms. from the surface. It may connect with feature 44 in the south wall of the trench.

Feature 13 (5.1E) is another post mould of similar dimensions to feature 12.

Feature 14 (5.6-6.1E) is a large pit 40 cms. in diameter & 35 cms. deep, that is marked on the surface by a depression about 15 cms. in depth. The pit fill consists of a thin charcoal lining, followed by organic rich, unburned soil, and a core 50 cms. in diameter of burned wood fragments. It may be a door post depression for house 2.

Feature 15 (7.7E) was a small post mould 8 cm. in diameter in the baulk (no 3) which does not show on the profile of the trench. It extended 55
cms. below the surface. It lies directly in front of the large post in feature 16.

**Feature 16 (7.8E)** is a large pit filled with mottled soil. It is 40 cms. deep from the surface and about 50 cms. in diameter. It may be another support door post of house 2.

**Feature 17 (8.7E)** is a small, irregular shaped organic stained area that might be either a post mould of unusual shape or a large root channel. It is about 7 cms. in diameter and extends 30 cms. from the surface.

**Feature 18 (8.8E)** is a relatively large and clearly marked post feature. It is 15 cms. in diameter and extends 75 cms. from the surface. It may represent a structural member of the wall of house 2.

**Feature 19 (9.0E)** is a small post mould 8 cms. in diameter, extending 38 cms. below the surface.

**Feature 20 (9.4E)** is a small post mould 5 cms. in diameter and extends about 35 cms. from the surface.

**Feature 21 (12-12.6E)** at 12 east is a large pit about 50 cms. in diameter and about 50 cms. deep. It is lined with a dark organic layer on the bottom but mostly filled with only slightly darkened yellow loess material. The uppermost one third of the pit contains numerous lenses of charcoal, organic stained soil and yellow loess.
Feature 22 (12.8E) is a ridge across the trench, filled with organic material that may represent a sill of house 1.

Feature 23 (13.7E) is a small post mould with a tapered base which extends only 30 cms. below the surface.

Feature 24 (14.1E) is a small post mould, 5 cms. in diameter and 25 cms. deep which contains decomposed wood in the lower 12 cms. of the feature.

Feature 25 (14.4E) is similar to twenty four but is only 16 cms. from the surface to the base.

Feature 26 (14.5-15.1E) is a large pit 58 cms. in diameter by 53 cms. in depth. It is filled with layers of charcoal, burned and unburned sand. It may have been used for cooking.

Feature 27 (15.2-16.1E) is a meter long lens of black stained soil. There is no charcoal in the lens, only a greasy uniform stain in the loess subsoil. It is possible that this feature and the previous one relate to the preparation of bone or fish grease.

Feature 28 (16.8E) is a small post mould in baulk 7 that does not appear on the north profile.

Feature 29 (17.6-18.4E) is a piece of very rotten wood about 6 cms. in thickness and about one meter long that is lying 10 cms. below the surface. The east end of the wood is vertical at 18.6 m. east.
Feature 30 (18.6E) is another vertical piece of decomposed wood 10 cms in thickness & extending 20 cms. below the surface.

Feature 31 (19.1-19.4E) is another fragment of rotten wood. It is probably that all three pieces of wood in features 29 to 31 were once past of the same structure.

Feature 32 (20.4-21E) is an ash lens between 20.5E and 21E adjacent to reddish burned soil at 20E. Its position under the eastern sill of house 1 is reminiscent of the ash pit in the west wall of this house in unit 1A, although feature 32 is not as concentrated or as well demarcated as the one in 1A.

Feature 33 (21.3-21.8) is a channel running along the base of the east ridge of house 1. It appears to be either the remains of a log retaining wall of house 1 or of a log sill of the house in operation 9T (House 5). Since the lot for house 5 is so narrow, the latter seems most likely.

Feature 34 (23.1E) is a small post mould 8 cms. in diameter and extending to only 20 cms. below the surface.

Feature 35 (24.2-24.7E) appears to be the remains of a burned log which may have been part of the structure of house 5.
Fig. 61. Trench 2 at N4E0 showing burned lenses outlining the terraced platforms of houses 3 and 4.

Fig. 62. North wall of trench 1 midway down slope between W9 and W10 showing the old soil horizon that was buried by loess removed in the original construction of house 4.
Feature 36 (28.4-29E) is a shallow depression lined with charcoal fragments. It may relate to either the structure of house 5 or to part of the palisade around the fort.

Features in South Wall profile of Trench number one

Feature 37 (2.6-3.4W) is in alignment with the eastern end of feature 1 on the north wall of the trench and marks even more clearly the collapse of a retaining wall along the edge of the platform for house 3. The horizontal lines of rotten wood in the profile probably represent one of the retaining planks with mixed zones of yellow loess and organic and charcoal stained soil over it representing the collapsed fill that was once retained behind the wall.

Feature 38 (0.4W) is a small basin shaped depression about 30 cms. in diameter and 10 cms deep, filled with charcoal stained soil. Its function is not clear.

Feature 39 (0.0-1.5E) is a part of the same central hearth of house 3 as noted in feature 5 in the north wall. The compact ash is continuous across the trench, as is the underlying burned soil.

Feature 40 (0.6-1.2E) is a food storage pit with traces of a birch bark lining in the bottom. Its position under the central hearth of house 3 suggests it was used prior to the positioning of the hearth.

Feature 41 (1.6-2.1E) is a shallow pit on the edge of hearth of house 3, which has been filled with fire cracked rocks. It appears to be part
Feature 42 (2.9-3.2E) is a medium sized pit 30 cms. in diameter and 62 cms in depth. The pit fill was only slightly darker than the surrounding soil suggesting that the pit was deliberately filled in after use with more or less the soil that was excavated from it.

Feature 43 (4.2-4.5E) is a house sill on the 4.4E line. It corresponds with feature 11 in the opposite wall and represents a sill of a house.

Feature 44 (4.7E) may be a continuation of the disturbance associated with the wall of house 2, perhaps another sill which appears in the north wall as feature 12.

Feature 45 (4.9-5.5E) is a large circular pit with remarkably straight sides and flat bottom. It is 60 cms. in diameter and extends 45 cms from the surface. The bottom is covered with 5 cms. of dark organic material overlain by yellowish brown loess and topped by another dark organic layer. It is possible that this is a hole for a roof support post.

Feature 46 (6.8E) is a long thin post mould 6 cms. in diameter, extending 50 cms. below the surface.

Feature 47 (6.9-7.6E) is a large storage pit 60 cms. in diameter and 60 cms. deep. There was no evidence of a liner in this pit.
Feature 48 (8.7E) is a slight depression about 10 cms. in diameter and about the same depth below the humus (25 cms. from the surface).

Feature 49 (9.3-10E) appears to be a double pit, marked by a surface depression. The upper half of the pit is 75 cms. in diameter and 45 cms. from the surface to a heavy organic layer in the bottom. Beneath that a narrower pit, 60 cms. in diameter extends down a further 35 cms.

Feature 50 (10.1-10.6E) consists of a large slab of rock 50 cms. long and 15 cms. thick. It is sitting between lenses of charcoal and dark humus material and probably represents a roof weight slab used to hold down sheets of cedar bark roofing.

Feature 51 (10.7E) is a small post mould 6 cms. in diameter and about the same depth below the humus layer.

Feature 52 (11.4-11.7E) is a small semicircular pit 30 cms. in diameter and extending to 40 cms. from the surface. It was filled with lenses of dark organic material and of loess.

Feature 53 (12.2E) is a large post mold 15 cms. in diameter and 45 cms. below the surface.

Feature 54 (12.6E) is a small post mold 4 cms. in diameter and 30 cms. below the surface.

Feature 55 (12.7-13E) is a shallow depression filled with dark organic material that may be part of a sill.
Fig. 63. Kitwanga Ta'awdzep from the north taken at the end of the excavation. Trench 1 is in the background and Trench 2 is in the foreground.
Feature 56 (13.1-14.6E) is a large depression 150 cms. long marked by a
surface depression about 50 cms. wide by 150 cms. long. The fill
consists of some fire cracked rock and dark organic material. It is
located just inside the sill of house 1 and may be a hiding place for
women or children under the floor of the house.

Feature 57 (14.7E) is a small post mold 10 cms. in diameter and
extending 25 cms. below the surface.

Feature 58 (14.9E) is a large post mold 10 cms. in diameter extending 55
cms. below the surface.

Feature 59 (15.1-15.8E) at 15.4 meters E is a large post hole 65 cms. in
diameter and 80 cms. deep which still retains traces of the wooden post
on the sides and at the bottom of the pit. The post would appear to be
40 cms. in diameter which is thought to be a reasonable size for houses
on the hill at this time.

Feature 60 (15.8-17.5E) is a thick dark lens from the humus zone to
40-50 cms. below the surface. It is 170 cms. in length. The function
of this feature is not obvious, but it possibly is connected with
another hiding place just behind the front wall of the house, but one
that was filled in before the house was abandoned.

Feature 61 (16.7E) is a small post mold in the floor of the trench.
Feature 62 (17.1E) is a medium post mold with dark organic fill that cuts through feature 60.

Feature 63-70B (17.3-19.2E) are all small post molds 6-8 cms. in diameter with the following depths.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Depth below surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>40 cms.</td>
</tr>
<tr>
<td>64</td>
<td>55 cms.</td>
</tr>
<tr>
<td>65</td>
<td>33 cms.</td>
</tr>
<tr>
<td>66 A, B</td>
<td>59 cms. (slanted)</td>
</tr>
<tr>
<td>67</td>
<td>not assigned</td>
</tr>
<tr>
<td>68</td>
<td>26 cms.</td>
</tr>
<tr>
<td>69A</td>
<td>26 cms.</td>
</tr>
<tr>
<td>69B</td>
<td>26 cms.</td>
</tr>
<tr>
<td>70A</td>
<td>44 cms.</td>
</tr>
<tr>
<td>70B</td>
<td>70 cms.</td>
</tr>
<tr>
<td>71 (A,B,C)</td>
<td>depth not recorded</td>
</tr>
</tbody>
</table>

This concentration of 14 small post molds is the most extensive noted at the site. It occurs adjacent to a large concentration of fire cracked rock and may represent a sweat bath within the house. Such features are noted in the oral traditions.

Feature 72 (18.6-19E) is an area about 50 cms. in diameter that is filled with fire cracked rock and charcoal. It lacks a layer of solid ash characteristic of a major hearth and possibly served only to heat or store rocks for a steam bath.

Feature 73 (20.3-20.6E) is a large post mold 20 cms. in diameter and 55 cms. from the surface to the base. It is on the slope of the ridge between house 1 and house 5 (operation 9T). It could belong to either house.
Feature 74 (22.0E) is a small linear depression filled with dark organic material. It may be part of a sill of house 5.

Feature 75 (22.4E) is a small post mold in the floor of the trench.

Feature 76 (22.3-22.5E) is a small depression 20 cms. wide and of undetermined length.

Feature 77 (22.9-23.5E) is a large shallow depression 55 cms. in diameter.

Feature 78 (24.6-25.1E) is a large pit 50 cms. wide on the brink of the hill with dark organic staining. It may be part of the sill of house 5.

Feature 79 (25.4E) is a large post mold 10 cms. in diameter and 50 cms. in depth. It may be one of the palisade pickets.

Feature 80 (25.8-27.0E) is a shallow basin like depression 1 m. wide with dark lenses. It may also relate to defensive works near the crest of the hill.
Trench Number 2 (Fig. 64).

Trench number 2, also 50 cms wide, was located on the North 4 line from E0 to E30 to cut across the back ridges of houses 1, 2, and 3 and the area at the east end of the site that later proved to be the location of another house, number 5 (operation 9T). In Houses 2 and 3 the trench revealed the structure of the trap door hiding places. At the west end of the trench in House 3 a buried soil indicated that burning had occurred before the last construction phase. The trap door for House 3 also turned out to be a very large feature and in the trench through House 1 the stumps of wooden posts were found in place preserved in the sub-soil.

The trench was opened for its full length by removing the extremely densely rooted sod in rectangles 30 cms. by 50 cms. and stacking them along the south side of the trench. This was done for two reasons, first because it was almost impossible to trowell through the woody roots in the sod and second because a long trench across the top of the hill would have started seasonal erosion if there were no sod to hold the light loess soil in place, particularly in the spring.

The trench was excavated in 10 cms. levels progressing along the entire length of the trench then returning to the starting point at the west end to begin the next 10 cm. level. All of the soil was sifted through a 1/4" mesh screen. Where finds were dense or the stratigraphy showed complications, an area thought to encompass the find was sectioned off and trowell excavation commenced. Artifacts and features
Fig. 64
Trench 2
Fig. 65. Houses 1 (left) and 2 (right) outlined with surveyor's tape. The hiding place and escape hatch for house 1 is under excavation in the left foreground. Trench 1 is in the foreground.
were recorded in reference to one meter grid stakes positioned along the south wall of the trench. Levels were taken from the southeast stake for each grid unit.

Photographs in both colour and black and white were taken to record the floor and profiles of the trench at each level. Record photographs were done with the floor and walls in a dry condition, then they were sprayed with water from a back-pack sprayer and allowed to dry partially to bring out the difference in the organic context of the soil, then they were photographed again.

**Feature 1** (6.0-8.3E) is a very large, bark lined pit 56 cms. deep at its deepest point (E7). It is probably part of a much larger feature, joining with feature 11 (E4.5-E5.6) which would make this one super feature almost 4 meters in length and 80 cms. in depth. There is complex lensing in the upper parts of the feature which may represent different periods of use and abandonment with wall collapse. It appears most likely from the size and position of this feature that it is part of a trap door hiding place for House 3.

**Feature 2** (9.2E) is a post mold 10 cms. in diameter and 50 cms. in depth from the surface. It is large enough to have been a structural member of the house, perhaps to support an interior partition at the back of the house.

**Feature 3** (10.5-11E) is a moderate sized pit filled with ash. The sand under the ash is burned orange. It may have been a small cooking hearth.

**Feature 4** (10.65-10.70E) is a post mold 52 cms. in depth below the surface.
Feature 5 (11.76-11.81E) is a shallow post mold in the north wall of the trench, which extended 35 cms below the surface.

Feature 6 (12.5E) is a tapered post mold 5 cms. in diameter, extending 38 cms. from the surface on the south wall of the trench.

Feature 7 (12-12.6E) is a storage pit 39 cms. in depth.

Feature 8 (13E) is a post mold 9 cms. in diameter & 35 cms. deep with an unusually flat bottom.

Feature 9 (13.4-13.8E) is a pit 50 cms. in diameter and 65 cms. deep. It is narrower at the top than in the middle which is an unusual feature in pits at this site. There was no evidence of a bark lining in this pit.

Feature 10 (13.7-14E) is a moderate sized wooden post in the floor of the trench. The wood had deteriorated in the outer layers but could be removed intact for later study. It proved to be western red cedar. The post itself was approximately 18 cms. in diameter while the pit it rested in was 30 cms. in diameter. The post was preserved between 26 cms. and 63 cms. below the surface.

Feature 11 (4.5-5.7E) was numbered out of sequence, and was located adjacent to feature 1. It consisted of a bark-lined pit, and as noted in the comments on feature 1 that was also a bark lined pit, the two may be opposite ends of a very large trap door structure or sub floor hiding
place at the back of house 3. If that is the case then the structure was not completely excavated.

**Feature 12** (12.5E) is a post mold in the north wall of the trench. It is 10 cms. in diameter and extends 35 cms. from the surface.

**Feature 13** (12.8E) is a post mould that enters the north wall of the trench at an angle so that only the lower part is exposed. It is tapered and only 5 cms. in diameter at its widest part, and could be a root cast.

**Feature 14** (13.9-15.5E) is a very large pit one and a half meters long which penetrates to 1 meter below the surface. It is much larger in the southern profile than in the northern one, but both indicate that it is part of a large storage pit with complex internal stratigraphy and evidence of two intrusive pits within it.

**Feature 15** (15.5E) is a small post mold 5 cms. in diameter extending 30 cms. from the surface. It occurred in the floor of the trench on the edge of feature 18.

**Feature 16** (15.6E) is a small post mold, 6 cms. in diameter extending to 24 cms. below the surface in the floor of the trench.

**Feature 17** (15.7-16.1E) is a rotten log lying on the floor of the trench between 20 and 25 cms. below the surface. It is probably part of a post that had fallen over and been buried by later fill.
Feature 18 (15.30-16E) is a basin shaped pit extending to 45 cms. below the surface. There is a lense of rotten organic material on the bottom of the pit.

Feature 19 (16-16.3E) is a large post mould 30 cms. in diameter extending 90 cms. from the surface in the north wall of the trench. The feature is large enough to have supported a structural member of the house. A worked shell adze fragment and a flake were found in association.

Feature 20 (16.4-17.63E) is a large pit over 1 meter in diameter and 90 cms. deep in the south wall of the trench. There are alternate lenses of dark organic and yellow loess filling. This was probably a food storage pit from its size.

Feature 21 (16.88-17.1E) is a small pit extending to 30 cms. below the surface on the north wall of the trench.

Feature 22 (17.88-18.17E) is a small pit 30 cms. in diameter and extending only 30 cms. below the surface on the north wall of the trench.

Feature 23 (18.46-18.7E) is a small pit 40 cms. at the top and extending down 29 cms. from the surface in the south wall of the trench.

Feature 24 (19.47-20.05E) is a small hearth filled with grey ash that extends down 30 cms. in the south wall of the tread.
Feature 25 (19.37-19.85E) is a pit 50 cms. in diameter and 40 cms. deep from the surface, in the north wall of the square, which may have held a wall post of house 1.

Feature 26 (20.24-20.35) is a post mold 20 cms. in diameter and 65 cms. deep below the surface in the south wall of the trench.

Feature 27 (21-21.40) is a depression which could also be traced on the surface at right angles to the trench and parallel to the ridge of house 1. It was 50 cms. wide and 25-40 cms. It appears to be the sill of house 5.

Feature 28 (23.08-23.18) is a post mould in the south wall of the trench extending to 22 cms. below surface.

Feature 29 (27.29-28.24E) is a concentration of ash and charcoal which cuts across the trench and attains a maximum width of 2 meters. The whole concentration is only 15 cms. below the surface, and probably represents the remains of the last burned house on this lot.

Feature 30 (3.9E) is a large post mold 6 cms. in diameter and 95 cms. deep below the surface.
Cultural Stratigraphy

The excavations on the hilltop area at the Kitwanga fort presents some unique features in terms of the stratigraphic interpretation. Since the area available for the houses was slightly crested in its original form, and was too small to accommodate the number of structures placed on it, considerable cutting and filling had to be done to terrace the hilltop into house platforms.

For the last occupation of the fort there is considerable evidence for levelling of the platforms for Houses 1, 2 and 3. Platform 4 presented special problems to accommodate a house structure. The west end of Trench 1 clearly illustrates the dumping of fill to build up the hillside in this area with fill taken from the eastern side of the platform. The result was that the elevation of House 4 platform was considerably lower overall than that of Houses 1 to 3 (but only slightly lower than House 5 which had a similar problem.).

The changes made to House 1 were equally drastic in character. The central portion had been excavated as had the trap door feature and the fill used to bank up the walls of the houses and form the rear bench. It appears that some earth was also brought up the bank from House 5 since there is no evidence for a buried soil in the profile of Trench 2 on the eastern slope of the hill beneath House 5. In other words where House 4 added to its own lot by dumping quarried material over the hill, House 5 added to the foundations of House 1.
The effect of all of this cutting, filling and levelling was to remove most of the earlier deposit. The most extreme case was again in House 1 housepit where there was no evidence of cultural deposits under either the floor or the hearth. On the other hand, most levelling activities were of the order of 25 cms. or less so that the bottom of post holes and pits would not be disturbed. Similarly, some old surfaces would be protected by fill dumped over them. Evidence for all these possibilities were found in the excavations.

There is no evidence, however, that occupations of Kitwanga fort were very intensive. There is some side hill midden on the north side of the hill. At no place was it more than 15cm. thick. Since the gradient is so steep, over 40°, it is likely that most garbage tumbled down the hill rather than building up in any one spot. This would tend to diminish the accumulation of usual occupation indicators.

The number of pits and post holes dug into the top of the hill is most impressive. Using the pits and posts encountered in the excavation units and trenches it can be estimated that there were nearly 1,000 pits and post moulds of various sizes and functions dug into the top of the hill. Stratigraphy has been obliterated in certain areas of the hill by this activity. In view of the small population and short occupation of this site relative to coastal sites, it is staggering to contemplate the effect of the digging of pits and post holes on the stratigraphic picture of coast sites.

Stratigraphic markers in the light brown loess occur in the form of organic staining and of charcoal lenses. The first is due to the decomposition of organic material, but since there is not a great amount of human activity (in terms of population or time) at the fort, the organic staining of deposits can be described as slight.

Burning, however, has been a much more significant marker in the stratigraphy. Oral traditions indicating that the fort was purposefully burned down is confirmed by large pieces of charcoal indicating collapsed structures in House 2 and House 5. This would mark the termination of the fort occupation. Another buried charcoal lens is less extensive but shows up in the profile of N4/E0-4, and possibly in Trench 1 in Operation 001. It consists of a stain rather than lumps of
charcoal as in the previous example. Burning of forts may in fact have been a frequent occurrence. From the legends it appears that if a fort was captured it was always burned down before the enemy retreated.

It is tempting to assume that the zone between the upper and lower charcoal line coincides with the historic occupation of the fort by Nekt whereas what lies below the charcoal line represents prehistoric occupation. The distribution of artifacts that are considered prehistoric (including chipped stone, ground shell, adze blades, etc.) coincides with this scheme. This will be elaborated further in (Vol.2) of this report. It should be stressed, however, that stratigraphic boundaries are highly discontinuous across the house platforms, and that the picture is further complicated by the large number of intrusions through the stratigraphic horizons.
The Reconstruction of the Model of Kitwanga Fort

In mid November, 1979 after working with the notes and profiles and looking at the ethnohistoric data for several months I decided that a model of the site with reconstructed buildings would be the best method of bringing various bits of data together from a variety of sources into a coherent whole. Art Price a freelance artist and an experienced model maker in Ottawa, undertook to construct the model after my plans and sketches. It was completed before the end of December.

The most appropriate size for the model in order to show the house structures and palisades in reasonable detail was on a scale of 1 to 50. Setting the boundaries of the model at the minimum needed to show the special structures investigated in the periphery of the hill, required that the model be two meters square (almost 50 square feet). Since the model was destined to go back to Calgary and eventually to Kitwanga it was necessary to build it of light but strong materials. The topography was constructed of fibreglass on a strong plywood frame so that the finished model weighed only 60 lbs.

Details for the structures came primarily from the floor plans of the excavation. The large central hearths indicated the number of houses and their relative widths. Their length was determined by the house platforms themselves and information from the two trenches. Evidence for the superstructural details came from the photographs taken along the Skeena River early in the century by Marius Barbeau and Harlan I. Smith of the National Museum of Man. Cedar bark roofing held down
Fig. 66. Model reconstruction of the Kitwanga Ta'awdzep. The four spiked log rollers are based on oral tradition which specify this number.
with light poles is confirmed in many photographs of Gitksan traditional houses, as in the low pitch of the gable roof. Although there was no direct evidence of oval doorways in any of the photographs they were originally included in the model houses. This was thought to be appropriate since there are several very old entry poles still standing in Kitwanga which have oval doors through them which show signs of wear from actual use as doorways. I was soon informed by knowledgeable people on the Skeena who saw photos of the model that the Ta'awdzep houses had no doors. Entry to the houses was gained by moving certain loose wall boards known only to house members and friends.

There were no totem poles on the hill according to most informants but one house had a decorated gable according to one of Barbeaus informants (C.C.F.C.S. archives). It consisted of paintings of three women holding children with an added device of five poles lashed diagonally on either side of the doorway (Fig. 17). (Barbeau, C.C.F.C.S. A-vii, 48a i).

Fig. 17. Ta'awdzep house front decoration.
The decorated house was said to be "Hanging House" which is thought to be either house 4 or 5. This feature was not included in the model because of the uncertainty as to the exact house.

Trap doors were included in the back of houses 1, 2 and 3 as indicated from the excavations. It became obvious when constructing the model that the palisade must have virtually touched the back walls of the houses in order for the trap door hiding places to have allowed passage from the house under the palisade within the dimensions of the features found on site.

There was no direct evidence at the site for the palisade other than scattered post features which do not form a recognizable pattern. There are several good sources in existing drawings and photographs of nineteenth century forts in Southeast Alaska. The earliest document is the Lisianski drawing of the floorplan and elevation of a Tlingit fort at Sitka. This fort, (Fig.15.) pictured in 1804, was a contemporary of the late occupation of the Kitwanga fort. Details from this drawing were followed closely in the model.

For the length and thickness of the pickets, they appear in the photograph in (Fig.14.) to be 25 to 30 cms. in diameter and 3 to 4 meters in length. The pickets are supported in the Sitka fort by rows of sleeper logs stacked three high on both the inside and outside of the palisade. This would allow the pickets to be supported without being set in deep holes. This would have been impossible on the side of Kitwanga Ta'awdzep since tests proved the bedrock was only 40 cms. or so beneath the surface.

There are three doorways in the model of the Kitwanga fort. Informants varied between a single door and four doors. Most forts had multiple doors to allow escape if the fort fell to attackers. The doorways are modelled on those at Sitka which are short and raised a meter or so off the ground so that one must stoop over and climb through them sideways creating a marked disadvantage for the person going through the doorway.

All three documented forts (Figs.13-16) show the walls supported by external prop poles fastened at wide intervals to stringers fastened
Fig. 68. The houses as originally constructed in the model of the Ta'awdzep. Native consultants claim that the houses had hidden doorways and did not have rocks on the roofs of the houses. The log rollers have branches trimmed to the dimensions discussed in the traditions for this fort.
near the top of the palisade. This arrangement appears impractical since it would help enemies to scale the palisade, or would allow them to pull away the props with ropes and possibly the palisade as well (as in the Haida fort with pickets at a 70° angle. The uniformity of this feature in all the documents show they were a regular feature of the palisade.

Jack Morgan said there were poles sloping out from the palisade at the Kitwanga fort to start the spicked logs rolling. A spike log dropped vertically from the palisade would merely stick in the ground. They are shown this way in the model, as skids for the rolling logs as well as props for the palisade. In reference to the log rollins Luke Fowler, (Laxsail of the house of Haku) told Barbeau (Ms.P:252): "In all there were four of the large logs covered with sharp spikes."

There were several features surrounding the fort hill that were investigated archaeologically and have been included in the model. Of major significance were the four puberty pits on the small rock outcrop between the fort and the river (operation 005). The sweat bath in operation 011 was based on an excavated rock feature, thought to be a sweat bath, and the description of two informants from Gitsequecla on the construction of the framework for the bath.

All features on the model were constructed in such a fashion that they could be altered easily as new information came in from further excavations or from ethnographic sources. Since this process has already begun with the doorway modifications, the use of interpretive models in ethnohistory and archaeology becomes apparent. It is surprising that so few models are used on an experimental basis in Canadian archaeology.
Summary and Conclusions

The main structural complex investigated by the National Museum of Man and Parks Canada project team was the fortified dwellings on top of the hill. However, evidence was also sought on Parks Canada land around the hill for additional structures which native consultants claimed had stood below the hill. In some cases such as the food storage pits and trails, matching evidence was found in the site. In other cases where native consultants provided clear descriptions of dwellings and fish smoking houses below the hill, no evidence was found in testing. Some features, on the other hand, had not been predicted but when they were encountered native consultants were brought in and, in certain cases were able to offer probable explanations that could be further tested archaeologically. One such example was the girls puberty pits. Their explanation for these pits would never have occurred to me as I assumed that such features would be well secluded from the village. The native explanation that they were kept close to the fort because of the condition of hostilities that prevailed when the fort was occupied, made good sense. On this basis I was able to postulate differences between food storage pits and puberty pit structures and modify the excavation strategy to look for superstructure details like post moulds for the puberty huts that would not be found in food cache pits which were not supposed to be detectable from the surface of the ground.

There were some structures that were claimed to have existed on the site, but which had been destroyed subsequently. One example would be the evidence for fish weirs in the river, all traces of which have been washed away by subsequent floods. Nevertheless, clear oral statements were collected that weirs existed within the Parks Canada property and at another locality one kilometer up the river.
Fig. 69. A fish weir on the Kitwankul River, fifteen miles upstream from the Kitwanga fort. October 1, 1918. Louis Shotridge. Photo NMC 71-8442.

Fig. 70. Gitksan youth with salmon trap for use with fish weir above. October 1, 1918. Louis Shotridge. Photo NMC 71-8566.
The structures of these weirs would have been very similar to the one that Louis Shotridge photographed fifteen miles further up the Kitwankul river from the Ta'awdsep while on an expedition for the University of Pennsylvania Museum in 1918 (Fig.69). He also recorded the basketry traps that went with this weir. Another basketry trap possibly from a weir near the Ta'awdzep itself was collected from one of the families related to the fort. This trap is said to be for deep water and it is hard to know whether this might be for a deep pool along the Kitwankul river or on the Skeena near Kitwanga (see Volume 2).

In understanding some of the native interpretations of archaeological structures it was necessary to attempt actual reconstructions, and to put the structures to use. This was particularly valuable for the sweat baths. In this case a list of all of the materials used could be made and each sub-activity area recorded such as the fireplace to heat the rocks which was discrete from the sweat lodge itself.

It was my intention to reconstruct a food storage pit but in a projection on paper of the cost in both time and money, it was decided to postpone that for another time. Digging the pit would have been the easiest part; collecting the bark from four or five birch trees would have been somewhat more difficult, requiring permission of whoever's land the trees were growing on to strip and therefore kill that number of trees. The most difficult part would have been accumulating enough dried food stuffs to simulate a woman's food store for a year, and leaving them in the pit long enough to test the results. Native consultants were able to describe the delicious aromas that emanated from a freshly opened salmon cache pit.

A detailed description of the construction of the food storage pits was collected on tape. Even though these accounts are quite specific as to the actual construction of the pit, the idea of remaking one should not be abandoned as there are many details of the way the packages for the various types of food were wrapped and tied, and how the pit was disguised once finished. Such details would only
come out in a full-fledged reconstruction. Since food storage pits constitute the single most common structural feature at the Ta'awdzep and at other prehistoric village sites in the region, and since they figure prominently among the causes of raiding and warfare, they should be understood and interpreted as fully as possible.

There are of course, other kinds of storage pits which could be anticipated at a site of this nature. One example is the kind of pit which is used for preparing "stink eggs". These are generally much smaller pits than those used for food storage. They are also carefully lined with birchbark and filled with fresh salmon roe. The pit is then resealed and left to ferment for several months. The technique is part of an approach to fish preservation by means of fermentation that is widespread in Asia, particularly Siberia as well as on the Northwest Coast. It is related to the fermentation of Eulachon oil to make fish "grease" that was so critical in the development of the grease trails. This theme of food preservation involving the fermentation of fish oil and eggs as well as the preservation of fish by drying and smoking, deserves major emphasis in the interpretation of this site.

Although they are not structures in the usual sense, trails across the Park property were another type of feature on which a surprising amount of information was recovered. That section of the trail from the observation point on the highway to the western end of the hill, traversing Operation 008 and 009, has been remarkably well preserved and should be safeguarded from future degradation. Once cleared of dense brush it became all the more obvious how close the trail came to obliteration due to agricultural activities in the adjacent fields. The identity of the trail as the original one used by Ta'awdzep inhabitants would not have been nearly as conclusive had it not been for the more than eighty food storage pits which flanked the trail on either side for virtually it's full length. The trail has been seriously damaged at only one point where the service road cuts through it but, this section could easily be restored.

The linking trail to the top of the hill and the fort itself was
so obvious it almost escaped my attention. It runs directly between the main trail and the door of Nekt's house. I had initially concluded that trails to the top of the hill went up the gentle slopes on either end of the hill. Consequently, test excavations were laid out on the east end of the hill at the position where a gate or entry-way might be expected. No such evidence was found and it became evident from the information in these tests (Operation 009T) that the area had been a house structure (House 5). It is quite possible that this house had a trap door escape hatch, as did the houses which were built on platforms 1 to 3 on the hill.

Since House 5 was built mostly on stilts over the end of the hill, it is possible that it could also have had a trap door that functioned as a concealed entrance to the house; as described in the oral traditions of a trap door with dried deer hooves suspended from it on cords.

The evidence for the palisade was the most elusive. The picture is fairly clear on the north slope of the hill where the palisade had to be adjacent to the back wall of the house to allow the trap door for houses 1 to 3 to function at all. On the south side of the hill excavations were concentrated on top the hill. It initially appeared, from the ridges of house platforms that emerged once the site was cleared of vegetation, that the houses were smaller and fewer in number than was evident later. It was not, in fact, until the model was constructed from the house floor plans that the size and density of structures on the hilltop became obvious. The palisade on the south side of the hill is almost certainly farther down the slope than was tested in the excavations reported here.

The arguments entertained while planning the reconstruction of the fort in model form is reported in the next section.

The main structures on the Ta'awdzep were, of course, the plank houses and it was these structures which received the most attention. Informants claimed variously, that there were three, four, five or six houses on the hilltop in Nekt's time. The people most familiar with the histories of the hill, particularly Chief Hlengwah, claimed there were
Fig. 71. Drawings of the houses on Ta'awdzep by Chief Hlengwah 1925.

a. The orientation of this sketch is clearly marked. The irregular house lot on the eastern end is shown but no trace is given of the similar house on the opposite end.

b. This drawing with Barbeau's handwriting shows five marked areas, the number of houses he ascribed to the fort in Nekt's day.

c. Barbeau has indicated four chief's houses on this sketch map, that of Nekt and another Laxsel chief, Tenemget (Laxhibu) and Gilawo (Laxski·k).
five houses. Barbeau himself adopts this number as the most likely when referring to the houses in the fort. I also favour this number since there were five large, intact hearths, relatively equidistant along the medial axis of the hill. These houses were entirely contained on their individual platforms that had been terraced on the hilltop, while the ones at either end of the hill were built out over the edge supported by posts.

The hearths of both of the "hanging houses" were nestled on the brink of the small triangular platforms which anchored the two houses to the hilltop. It is probable that the hearths had been cribbed for support, particularly on the downhill slope. The floors of these houses would necessarily have been decked with cedar planks to provide a level platform.

It is probable that houses 1 to 3 also had planks covering their floors, except for the hearth area, since there were large storage pits and hiding places that would only have been effective if the floors were covered by wide planks.

The floor of house 1 was probably the most elaborate in its construction since the earth ramps and the corresponding sunken area around the hearth indicate that there were benches around the central pit. A wide platform at the rear of the house was likely partitioned off from the rest of the dwelling as the compartment of the chief.

Informants identified house 1 as Nekt's house but this poses something of a problem. On the one hand it appears that Nekt should occupy the most elaborate structure in the fort since he was the head warrior. However, he was outranked in terms of status by Chief Hlengwah, at least once the latter had moved to the fort. Nekt was also out-ranked by several other chiefs on the fort as well. Nevertheless, there appears to be a recognized principle in operation that the war chief takes over exceptional privileges during times of conflict, and this was probably particularly true in the case of Nekt, whose reputation as a warrior has survived above any other.

There are fragmentary references to the identity of various houses
on the hill, the order in which they were built, and who inherited them. The social aspects of the households is discussed in Appendix I.

Marius Barbeau questioned Jim Laknitz (Chief Hlengwah) on this topic in the mid twenties and has left in his archives a number of sketches of the houses on Ta'awdzep that are germane to this discussion and are therefore reproduced in (Fig.71).

The structural members of the houses from direct site evidence, were of red cedar. None of the support posts appeared to be very large compared to later historic houses, but were in proportion to the relatively small size of the houses on the hill and the light cedar bark roofs which covered them.

According to the taped information of Jack and Willis Morgan, the first episode of building activity on the hill was a single structure. This was built as a defensive retreat during the Haida wars, but in fact the war never came to the fort and it was eventually abandoned without ever being used. This structure was described as having two stories and that the first story consisted of a cribwork of horizontal logs. Soil was piled up around this barricade to disguise the first story of the building. The informant who provided these details was Jack Morgan who unfortunately is now deceased. No other native consultant has comparable information to that he received directly from his grandfather, about the year 1900. The latter was probably born within the first quarter of the nineteenth century and may have actually lived in the fort, since he passed to Jack Morgan a lot of detailed information about the episodes and structures of the Ta'awdzep at Kitwanga.

There are references in accounts from other groups on the North Coast to double storied houses used in warfare but they are usually regular plank houses that have had a floor added to form an attic where warriors can hide and surprise the enemy. In one such account the invaders got their daggers stuck in the wooden dummies they take for sleeping people and are slaughtered by the defenders.
There is some resemblance between the description of the house with the basement where the women and children could hide and the remains of house 1 that cannot be dismissed without further excavation. If the first storey of the Haida war house was in fact only a hiding place with room enough to crawl around (perhaps 50 cms) then the central pit of house 1 could have been floored over and conform to both the traditions and the physical evidence. The immediate objection that is raised against this is that the central hearth on the floor of the pit was in situ and had not collapsed from a floor, even a short distance above. This objection can be countered by postulating that the foundation is original but that the final owner of house 1, possibly Nekt himself, removed the intermediate floor and converted it to a house pit as becoming to a warrior-chief. The hearth excavated by the archaeological project, could then be in its last position on the ground in the pit.

It was hoped that trench 2 would clarify this problem by revealing stratigraphic evidence for several building phases on the back platform of the house. No such evidence materialized, although the post fragments found near the bottom of the trench could be interpreted as belonging to an early construction phase of the house.

Two recommendations for further archaeological testing can be made at this point:

1) that the position of the palisade on the south side of the hill be determined by further testing (up to 10 meters) downslope from the 1979 excavation.

2) that the wall ridges and interior pit of house 1 be carefully excavated for stratigraphic evidence that could determine the question of whether or not this was once the site of the single fortified house built for the first Haida war as mentioned in the myth.

There was simply not the time available last summer within the limited testing operation that had been planned to solve these two
significant problems. Finally, it should be noted here that there is no natural agency threatening this site that would suggest an urgency to the above recommendations, beyond that set by requirements for this information by Parks Canada.

Fig. 72. Two Kitwanga people standing in the central pit of Nekt's house which is the most likely place for the double floored structure mentioned in the legends. It was the first building on top of Ta'awdzep and was designed to protect the Kitwanga people from Haida invaders. Photo by Marius Barbeau 1924. NMC 59723.
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APPENDICES
APPENDIX I

PRELIMINARY STATEMENT ON THE GITKsan VILLAGES AND CHIEFS ASSOCIATED WITH THE KITWANGA FORT NATIONAL HISTORIC SITE

BY Rosalind Whalley
Research Assistant
Western Region
National Historic Parks and Sites
Parks Canada
Dept. of Environment
APPENDIX I

PRELIMINARY STATEMENT ON THE GITKSAN VILLAGES AND CHIEFS ASSOCIATED WITH THE KITWANGA FORT NATIONAL HISTORIC SITE

This appendix will be a preliminary statement on the various Gitksan villages and chiefs of the Kitwanga area associated with Kitwanga ta'awdzep during the span of its occupation as a fortress.

It is preliminary because in addition to possible errors by this writer, the research involved is based on information which is oral (in the form of tape recordings or transcriptions of narrations), or derived from oral traditions which were transcribed by earlier researchers, such as W. Robinson (Men of Medeek), W. Beynon and M. Barbeau (unpublished field notes). As such, they are subject to the greater or lesser variations typical of unwritten accounts.

By means of introduction, affiliations of 'phratry', (to use M. Barbeau's terminology in Totem Poles of the Gitksan) are very significant to the Gitksan Indians. The word refers to a kind of 'federation of clans' and there are four of them amongst the Gitksan -

1) Frog-Raven
2) Eagle
3) Wolf
4) Fireweed

Although the present-day villages of the Gitksan combine members of several of these four phratries, this was not always the case. There
are indications that often a village comprised only one or two phratral
groups which developed out of family groupings. For example, field
notes of W. Beynon, 1924, (informant Maggie Wells, Eagle, Kitwanga,)
when discussing the origins of her ancestor Ska'yeen* mentions that
there was 'only one chief', Ligi'nihla, at Git'angat (near present-day
Doreen on the Skeena River). As each phratry was headed by a chief,
this indicates that there was only one phratry, in this instance, the
Eagle phratry. Again from archival sources, this time field notes of
M. Barbeau, interviewing Jim Lagaxnits, Frog-Raven, with interpretation
by Alfred Sinclair, we read that 'the ancient village' of Gitlusek
(formerly just below Cedarvale) had 'just one crest/phratry/in that
village', namely Frog-Raven. The head-chief there was Wii Hlengwax. As
for the Wolf 'tribe', Skwilikstat, a former village several miles
above / upstream on the Skeena River? / Cedarvale is cited as being
theirs. (Stephen and Mrs. Morgan, Mrs. Morgan being of the Wolf tribe,
1924 field notes of M. Barbeau). Although similar information was not
directly found regarding the Fireweed tribe of the Kitwanga area (there
are only a few members there who have come relatively recently), the
book Men of Medeek, by W. Robinson and W. Wright, describing the
history of this tribe at Kitselas, gives similar information. Interest­
ingly, it also corroborates the information given above for the other
tribes.

Discussion about motivations for the various groups amalgamating
will not be dealt with here beyond a few brief comments. Despite the
abundance of natural resources, they were not limitless, and conflict
arose over competition for them. The reasons for co-operating, there­
fore, must have been equally strong. Increased needs for friendly
social interactions were probably minor ones; regulations prohibiting
marriage between people of the same phratry and requirements for
defence may have been the major ones. It is in regards to the point
about defence that the Kitwanga fort (ta'awdzep) is of such interest.

*The orthography is that used in L. Hindle & B. Rigsby, A Short
Practical Dictionary of Gitksan.
After a 'deadly' revenge attack on his village by the Fireweeds of Kitselas, Gok, the leader at that time of the Eagles of the Kitwanga area, escaped to the bank of the Skeena River and "with a scattering of warriors he crossed to the other side. Up the valley of the Kitwancool /River/ they followed the trails, until three miles to the north they rallied on a small round hill to make their final stand against the foe....lights were seen in the four houses that sat on the summit. Here lived four families of the Totem of the Crow /Frog-Raven/...."

In the end, despite the opportunity of fending off the attackers by means of the 'great logs' which were to be pushed down over the crest of the hill, Gok decided to pay ransom instead. And to this end, he 'borrowed buckskins' from the Frog-Raven people. Thus collaboration could take the form either of combining forces for defence, or of sharing commodities which were valued for 'ransom' purposes. (Men of Medeek pp. 73-75)

From the Barbeau notes mentioned earlier concerning the Frog-Raven tribe in the ancient village of Gitlusek, we are given a listing of the relative importance of the main chiefs in order of rank from the head chief down. They are as follows:

1) Wii Hlengwax
2) Nekt
3) Halus
4) Axgoot

Perhaps each of these chiefs originally had their own house on the ta'awdzep. However, as other groups came to join them, they probably doubled up in some way, as varying accounts give the maximum number of houses on the hill as six; on the other hand, some say five, others four.

Subdivisions within individual groups (headed by a chief) and a different attitude to recording the time frame of events by the Gitksan have presented difficulties in sorting out just who may have been living
on the Kitwanga Fort Hill. For example, one person gives the names of the four chiefs as being:

Nekt, and Hlohlaxw (Frog-Raven),
Gilawo' (Eagle) and
Tenemget (Wolf)

(Barbeau field notes, Jim Lagaxnits Frog-Raven chief)

Regarding Nekt, there is general agreement that a chief of this name lived on the hill - in fact, most accounts claim that it was he who fortified it for its presumed second occupation (there may have been other prehistoric ones) - the difficulty surrounding him is that there are sufficient variations in the accounts of his place of origin and exploits, plus wide variation as to possible dates of occurrence, that Barbeau has used the term 'semi-historical' to describe him. It is outside the scope of this appendix to sort out the controversies between villages and phratries or enter into speculations concerning Nekt.

Nevertheless, it may be noted that one informant, Mrs. A. Sutton, of Cedarvale, calls Kitwanga Fort Hill 'ta'awdzeps Nekt', i.e. Nekt's fortress.

As for the other names mentioned, Hlohlaxw, the other Frog-Raven, it is not familiar to either Agnes Sutton, nor Fred Johnson, both of the Frog-Raven phratry, though of different branches; yet Barbeau cites it as being a name of the house of Lalt (Frog-Raven), of which Fred Johnson is now the present holder! Perhaps over time, some of the names in 'houses' fall out of use. A further complication arises out of the fact that some families lived together in one house on the hill, only to separate after leaving it. For some this involved going back to their original state; for others, it meant adaptation to an increase in numbers. For example, Barbeau noted that for the Wolf group,

"They were only one house there. But after living on tahodzep, there were two subdivisions: Hlots and Tenemget." (Axti'ix another main Wolf chief is not mentioned directly.)

Similarly for the Frog-Ravens, at least at one point, Axgoot had
separated from Hlengwax and Halus.

"These three were only one house on te'odzep."

An interesting feature of the fortifications is that of a trap door. Some accounts mention that one of the houses was so protected. It is not clear as to the exact name of the chief at that time, (Frog-Raven family), nor to the name of the family group. The chief's name may be Yaxyak or Txahaphapxw. If the former, the family name is also Yaxyak (which had at one time moved to Kitwancool); if the latter, to the family of Lalt. Further, another name is connected with that of Yaxyak (which means 'hanging down'). It is Doxansxw, mentioned both by Willis Morgan (Tape 1, Side 1) and Leonard Bright. The latter translated the name as 'braced something, to hold something in the ground'. Both of these names may refer to the fact that at least one of the houses on the hill was build partially on stilt-like structures, due to limited space.

As for the Eagle tribe, Gok, Ska'yeen, Tewalasxw, Ligi'nihla are all names more commonly mentioned in connection with the ta'awdzep than the name mentioned above, Gilawo'. There is only one reference to any of the Fireweed phratry being on the hill (Willis Morgan, Tape 3, Side 1). I do not consider this to be sufficient evidence to make an argument to that effect and I therefore consider that (unless in very recent time after contact with 'Euro-Canadians') they were not represented on the Kitwanga ta'awdzep.

As there is no agreement as to the number of houses on the ta'awdzep, and the composition of any one family changed from year to year, especially as to which chief took the headship, it seems to me fruitless to attempt to comment further in this line. It is more appropriate, perhaps, to again point out that the three tribes which had, over the years, migrated into the area of Kitwanga from their respective ancestral villages, were all, at one time or another, living in houses on the ta'awdzep. The fourth tribe, the Fireweed,
which was less evident in the local history, was not.

Another aspect of interest, however, is the nature of the habitations. Some people indicated that only the chiefs (and presumably their warriors) lived there, that the rest of the people lived in safer areas. Others claim that although the hill looks small, 'everyone' lived there. Perhaps there is confusion over the fact that the surrounding flat areas may have been used at least for fishing and berrying camps in the summer. Interestingly, while Barbeau, in his book on the totem poles of the Gitksan, mentions Txa skabaxs, a Frog-Raven chief who joined Hlengwax's house on the ta'awdzep, (and subsequently moved to Kitseguykla) Fred Johnson on a tape of June '79, mentions him as living on the 'flat part'. It would seem that only much more extensive archaeological studies than were possible in this year's project, would help sort out such questions.

A more detailed look at the relationship of chiefs with the Kitwanga fort historic site, including further references and an attempt at linking the chiefs' names with the English names of the chiefs, both past and present, will be contained in a report by the same writer for Western Region, Historic Parks and Sites, Parks Canada, to be completed by the end of March, 1980.
APPENDIX II

Preliminary Report
on Animal Remains from the
Kitawnga Fort National Historic Site

Anne Meachem Rick

Zooarchaeological Identification Centre
National Museum of Natural Sciences
Ottawa, Ontario
December 20, 1979
INTRODUCTION

Kitwanga Fort National Historic Site, British Columbia, is situated in the valley of the Kitwanga River, a tributary of the Skeena. This mountainous region is the territory of the Gitksan Indians of northern British Columbia. The site itself is something of a mystery, but seems to consist of an early historic period occupation from about 1795 to 1835 as well as a smaller late prehistoric occupation. The fort was originally a refuge from attack by the Skidegate Haida from the Queen Charlotte Islands and was finally abandoned about 1835 with the establishment of a Hudson's Bay Company post at Port Simpson and the introduction of rifles to the area, which made the fort indefensible.

The site was excavated in 1979 by Dr. G.F. MacDonald, Senior Archaeologist, National Museum of Man, for Parks Canada. Animal remains were transferred to the Zooarchaeological Identification Centre for analysis after the 1979 field season.

Most bone found at Kitwanga was recovered from hearths in three of the five house areas. Bone material was almost all calcined and in some places had fused into cement-like blocks which were collected intact. The sample sent to ZIC for analysis consists of material obtained by general excavation and screening, but does not include the blocks.

This preliminary analysis includes description and identification of the bones submitted, as well as Minimum Numbers of Individuals (MNI) calculated for hearth material in Houses 1, 2 and 3. A few comments have also been made, but this report is in no way intended to be a full faunal analysis. Future data manipulation and research may follow submission of this report if the initial results seem promising.
METHODS

All bone are listed on ZIC data sheets, where they are described as fully as possible. Because a slightly "shorthand" method of recording was used, the reader may have to refer to the list of abbreviations on page 182 to clarify certain points.

Table 1 provides a summary of all identified Kitwanga bone. A detailed list of site bone in each bag of vial appears in Table 6*. For convenience, bags and vials containing only unidentifiable fragments were removed from Table 6 and appear separately as Table 4*.

A fragments summary and Minimum Numbers of Individuals for hearths of Houses 1 through 3 are presented in Table 2. Table 3* is a detailed list of all provinences used in preparing Table 2. Table 5* gives a list, by bag or vial, of all fragments used in preparation of Tables 2 and 3. MNI was calculated using all available information rather than a simple element count. However, the fragmentary and calcined nature of the faunal remains meant that little subsidiary data could be obtained. The unit of MNI calculation is the house hearth; referring to Table 3, all bones in proveniences listed under Operation 1 were combined to produce the House 1 MNI, Operation 2 proveniences were grouped for the House 2 MNI and Operation 3 proveniences for the House 3 MNI.

Faunal remains were identified using the skeletal reference collection of the ZIC.

Discussion of such ecological matters as species ranges and availability, habitat preferences, etc. have deliberately been avoided in this preliminary report because of time limitations.

* NOTE: Tables 3, 4, 5 and 6 are not included in this appendix.
Abbreviations used in bone data recording - Kitwanga, British Columbia

f - fragment
C - calcined
B - burned (some original bone color remaining)
    - not burned or calcined
P - proximal
D - distal
epi - epiphysis
a. pr. - anconeal process of ulna
c. pr. - coronoid process of ulna
pmx - premaxilla
mx - maxilla
mand - mandible
cmc - carpometacarpus
mc - metacarpal
mt - metatarsal
tt - tibiotarsus
tmt - tarsometatarsus
T - tarsal
T. c. - central tarsal
phal. phalanx
abd. - abdominal
caud. - caudal

H - hare
Bv - beaver
Pc - porcupine
MM - medium mammal
MLM - medium to large mammal
UM - unidentified mammal (no size estimate)
MB - medium bird
UF - unidentified fish
CU - class uncertain
At Kitwanga the faunal list is small because of the fragmentary and calcined nature of the bone material. Nonetheless, at least 13 vertebrate species are present. Whereas some identifications have been made to the species level, others are more general and bones could only be assigned to a group of species, subfamily or family. A brief discussion of the rationale behind the identifications is appropriate here.

Mammals comprise the largest group of identified fragments. Six species are definitely present: hare (Lepus americanus), hoary marmot (Marmota caligata), beaver (Castor canadensis), porcupine (Erethizon dorsatum), marten (Martes americanus) and cow (Bos taurus). The marmot was identified on the basis of a single relatively complete unburned bone from an animal of large size, thus excluding the smaller woodchuck (Marmota monax). Unfortunately, all other Marmota fragments are calcined so that their original size cannot be determined, and they have been lumped in a composite Woodchuck/Marmot category.

Bear bones are represented by foot elements. Since both the black bear (Ursus americanus) and grizzly (Ursus arctos) occur in the region, identification can proceed no further than genus (Ursus). One piece of bone from a large rodent was consigned to a composite Beaver/Porcupine category.

An unburned loon cervical vertebra is within the size range of the Artic loon (Gavia arctica) and a dabbling duck carpometacarpus fragment.
(also unburned) may be from either a small mallard (*Anas platyrhynchos*) or a large pintal (*Anas acuta*). One eagle bone represents either a bald (*Haliaeetus leucophalus*) or golden (*Aquila chrysaetos*) eagle, since both general range through the area and the element is not diagnostic.

As many as seven members of the grouse/ptarmigan family, Tetraonidae, may occur in the Kitwanga vicinity. Due to the broken and calcined nature of most tetraonid fragments from the site as well as to problems of identification between species, all were assigned to a single general category. Tetraonids in the area probably include the blue grouse (*Dendragapus obscurus*), spruce grouse (*Canachites canadensis*) ruffed grouse (*Bonasa umbellus*), sharp-tailed grouse (*Pediocetes phasianellus*) and as many as three ptarmigan: willow ptarmigan (*Lagopus lagopus*), rock ptarmigan (*Lagopus mutus*) and white-tailed ptarmigan (*Lagopus leucurus*). Measurements of two unburned grouse/ptarmigan elements in the faunal collection indicate that one or more of the smaller species is present, not the larger blue or sharp-tailed grouse. However, remains of these species could be present in the calcined, unmeasurable material.

Fish remains at Kitwanga consist primarily of vertebrae, whole or fragmentary. Nearly all of these can be assigned to the subfamily Salmoninae, represented in the site area by various salmons (*Oncorhynchus*) and trout (*Salmo* and *Salvelinus*). A single vertebra seems to be from a whitefish, subfamily Coregoninae (probably *Coregonus clupeaformis* or *Prosopium williamsoni*). The faunal remains contain no identifiable cranial elements but five pectoral and pelvic girdle bones are present and recognizable as salmon (*Oncorhynchus*).

Unidentifiable bone from a site is always worth examining, for it can often yield information concerning animal size or at least vertebrate class. In this instance remains are usually so fragmentary that much size information has been lost. Also, a site which contains both hare and bird bone in fair quantities makes separation by class difficult, for unidentifiable hare fragments can be mistaken for bird bone and vice versa. About all that can be said of the unidentifiable component at Kitwanga is that it seems to reflect the composition of the identifiable bone component.
REMARKS

A few items of interest are noted here to stimulate further discussion and thought.

Medullary bone, a granular bony material found in long bones of female birds during the breeding season, was noted in three specimens: an ulna and a tibiotarsus fragment from #32, identified as grouse/ptarmigan and an unidentified bird radius fragment from #213. This indicates that at least some birds were captured in spring.

All 45 bear bones are foot elements. This probably reflects that fact that only these small elements of the bear skeleton survived cultural treatment relatively intact and identifiable. However, one cannot disprove the alternate theory that only bear feet (as amulets or in pelts?) were brought to the site.

Butchering marks or other types of cuts are difficult to see on calcined bone, as are signs of artifact production. Only three fragments are modified. A calcined fragment less than 20 mm long (533) has a slight polish which may be artificial. An unburned hare innominate (#536) contains two fine cuts medially on the pubis, but function of such cuts is unclear. A cow phalanx (#1B) shows two crosswise cuts dorsally and a single cut ventrally at the proximal end, all perhaps resulting from skinning activity.

Some bone at the site has been chewed by carnivores, but it is difficult to estimate just how much might have been chewed since diagnostic chew marks are not usually visible on calcined bone.
Table 1. Summary of all identified bone from the Kitwanga site.

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Pieces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hare</td>
<td>456</td>
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<tr>
<td>Woodchuck/Marmot</td>
<td>5</td>
</tr>
<tr>
<td>Marmot</td>
<td>1</td>
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<tr>
<td>Beaver</td>
<td>45</td>
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<tr>
<td>Porcupine</td>
<td>16</td>
</tr>
<tr>
<td>Beaver/Porcupine</td>
<td>1</td>
</tr>
<tr>
<td>Bear</td>
<td>45</td>
</tr>
<tr>
<td>Marten</td>
<td>1</td>
</tr>
<tr>
<td>Cow</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>572</strong></td>
</tr>
<tr>
<td>Artic loon</td>
<td>1</td>
</tr>
<tr>
<td>Mallard/Pintail</td>
<td>1</td>
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<tr>
<td>Eagle</td>
<td>1</td>
</tr>
<tr>
<td>Grouse/Ptarmigan</td>
<td>37</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>40</strong></td>
</tr>
<tr>
<td><strong>Oncorhynchus</strong> (Salmon)</td>
<td>5</td>
</tr>
<tr>
<td>Salmoninae (Salmon and Trout Subfamily)</td>
<td>354</td>
</tr>
<tr>
<td>Coregoninae (Whitefish Subfamily)</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>362</strong>*</td>
</tr>
<tr>
<td><strong>GRAND TOTAL</strong></td>
<td><strong>974</strong>*</td>
</tr>
</tbody>
</table>

* These totals include two Salmonidae vertebrae not otherwise listed. The vertebrae could belong to either salmon, trout or whitefish.
Table 2. Summary of identified bones and Minimum Number of Individuals (MNI) from hearths at Kitwanga, British Columbia

<table>
<thead>
<tr>
<th>Taxon</th>
<th>House 1</th>
<th></th>
<th></th>
<th></th>
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<td>-</td>
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<td>1</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Beaver</td>
<td>8</td>
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<td>1</td>
<td>6</td>
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<td></td>
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<td></td>
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<tr>
<td>Porcupine</td>
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<td>-</td>
<td></td>
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<tr>
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<td>Oncorhynchus (Salmon)</td>
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<td>1</td>
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<td></td>
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<tr>
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<td>1</td>
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<td>3</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coregoninae (Whitefish</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
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<tr>
<td>Subfamily)</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Salmonidae (Salmon, Trout and Whitefish Family)</td>
<td>1</td>
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<td>-</td>
<td>1</td>
<td>-</td>
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<tr>
<td>Total</td>
<td>112</td>
<td>5</td>
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<td>2</td>
<td>12</td>
<td>3</td>
<td></td>
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</tbody>
</table>
APPENDIX III

Wood and Charcoal Sample Analysis
for the Kitwanga National Historic Site

Dendrochronological analysis by L.A. Jozsa, M.L. Parker, P.A. Bramhall
Species identification by R.M. Kellogg and S. Rowe.

Western Forest Products Laboratory
Vancouver.
The objective of Contract WR 156-79 (Wood Sample Analysis), between Forintek Canada Corp. and Parks Canada, Western Region, is to identify wood species and conduct dendrochronological analyses on wood and charcoal samples from the Kitwanga National Historic Site, Battle Hill.

To fulfill this obligation, tentative master tree-ring chronologies were built for western hemlock (*Tsuga heterophylla* (Raf.) Sarg.) and western red cedar (*Thuja plicata* Donn) living-trees from the Kitwanga area. These chronologies were used for crossdating with archaeological specimens.
Wood and Charcoal Sample Analysis for the
Kitwanga National Historic Site

Dendrochronological analysis by L.A. Jozsa, M.L. Parker, P.A. Bramhall.
Species identification by R.M. Kellogg and S. Rowe.

Conclusions

1. Identification of archaeological samples of charcoal revealed a predominance of lodgepole pine (56.5%) followed by western red cedar (18.0%) and poplar species (16.8%). The remaining samples (8.6%) were represented by species of spruce, alder, willow, birch and maple.

2. A noteworthy observation is that no western hemlock was found in the charcoal specimens even though this tree species is a very dominant component of the living forest in the Kitwanga area.

3. Visual crossdating between living trees and archaeological charcoal samples was not possible.

4. The archaeological specimens show more sensitive tree-ring patterns (much year-to-year variation) than do the very complacent living trees (little year-to-year variation).

5. One western red cedar archaeological sample was dated in the period of 1680 — 1749 by a special computerized dating technique.

6. Dating was hindered by two facts. Firstly, the tree samples available from the logging site were not really old enough; i.e., that the charcoal samples may have come from trees that predated the ones from which the reference specimens were collected. Secondly, the archaeological samples were of too poor quality; i.e., had an insufficient number of rings or had uneven grain orientation.

Recommendations

1. Living trees, 400 — 500 years of age, should be sampled in order to ensure that the archaeological samples do not predate the living tree chronology.

2. It also would be desirable to find old lodgepole pine trees, not only because this species was the most common in the archaeological collection but also because of high sensitivity of the charcoal annual ring patterns.
INTRODUCTION

Dendrochronological studies were conducted in the Kitwanga area for several purposes:

1. To identify and determine the composition of genera and tree species of the woody archaeological material;

2. To attempt to date the archaeological tree-ring samples excavated from the Kitwanga National Historic Site (Battle Hill);

3. To build living-tree chronologies that will be useful for dating, dendroclimatic and other environmental studies;

4. To evaluate the dendrochronological quality of several species of trees in the area.

EXPERIMENTAL

A. Living trees

Samples used in this pilot study were taken from 12 western hemlock (*Tsuga heterophylla* (Raf.) Sarg.) and 12 western red cedar (*Thuja plicata* Donn) disks. Cross-sectional disks were cut from freshly felled logs in the Kitwanga area in mid-October, after the 1979 growing season.

Because of the limited time and funds available for this study, 4 disks were selected for each of western hemlock and western red cedar, using age (number of annual rings) and lack of decay as the main selection criteria. Two radii were cut from each disk, 16 in all for the two species, to be used for X-ray analysis. These radial strips were glued between two mounting sticks and sawn to transverse sections of a uniform 1.96-mm thickness. An in-motion X-ray scanning machine was used to make radiographs of the uniformly surfaced radial strips. Each of the 8 western red cedar radii was scanned on a computerized densitometer from the first ring from the pith to the last complete ring on the sample, 1979. For western hemlock, one tree had to be eliminated after being X-rayed because of the difficulty in crossdating the two radii from the same disk. During the densitometer scanning, one hemlock radius was aborted because of parity error on the magnetic tape, resulting in five satisfactory radial strips (3 trees) being incorporated into the western hemlock summary chronology. All of the eight radial scans (4 trees) were compiled for the western red cedar summary chronology.

The general techniques in X-ray densitometry used to derive the ring-width and ring-density data have been described by Parker et al., (1977).
B. Archaeological material

Identification of 161 samples of wood charcoal from the Battle Hill site was carried out. In many cases a given sample contained multiple fragments of charcoal. Several fragments might have been examined in making the identification, but no effort was made to systematically examine them all.

Each one of the archaeological samples was carefully examined (in a non-destructive manner) and assessed for dendrochronological potential. Most of the samples in the collection were charcoal and charred wood. Only samples of softwood origin were considered because of the inherent problems with hardwoods. The most serious drawback was found to be the limited number of annual rings (fewer than 10) and the very poor demarcation between those rings on the hardwood samples.

Softwood charcoal samples with 15 or more annual rings were set aside, even though the generally accepted standard for a lower limit is about 50 rings. The reason for this criterion is that short annual ring series (especially the complacent ones) tend to produce inconclusive chance-related multiple crossdates.

The hand-picked candidate specimens were cut on a band saw to a uniform 2.5 mm thickness. This dimension was found to be a good compromise for a thickness that would reduce the effect of parallax and at the same time provide sufficient strength to reduce fragmentation. Adhesive tape was used to minimize crumbling and fragmentation. Radiographs were made by the in-motion technique described by Parker and Jozsa, (1973). Grain angle deviations were measured for each sample and compensated for by tilting the X-ray generator head to ensure optimum image sharpness.

C. Crossdating living trees

A low-power, binocular microscope and a light table were used to examine radiographs for clarity and for annual-ring patterns. Each sample was examined in this manner and it was ensured that each annual ring in a sample corresponded to the true annual increment. The matching of ring-width and ring-density patterns, or crossdating, is usually started with the last completely formed annual ring. In the Kitwanga living tree material 1979 was the last complete ring.

D. Chronology building

In building a master chronology, the ring widths and densities of all the sample trees are combined on a year-to-year basis into a single average for each parameter in order to minimize variations found in individual trees.

Before this summarizing can be done, however, each series must be standardized to remove growth trends due to age and tree vigor.
This was accomplished by using the Digital Filter Index program (Parker, 1970) that fits a trend line to approximate the expected growth rate. Then the actual ring-width (or density) for each year was divided by the weighted running mean value for ring width (or density) to obtain an index value reference. The filtered index values derived by this technique accentuate year-to-year variations and permit analysis of the extremely complacent tree-ring material such as that found in the Kitwanga area. Statistics such as mean sensitivity, standard deviations and a number of other values are calculated by this program for the purpose of evaluating the quality of the tree-ring series.

E. Crossdating archaeological specimens

Crossdating is the method employed to date specimens of wood or charcoal of unknown age. The patterns of narrow and wide rings or low and high density latewood bands in such a specimen are compared with patterns of ring series of other trees in the region (master chronology).

If the specimen came from a site near the trees used in building the master chronology, is of sufficient quality, and was contemporaneous with the known and dated ring sequences, the patterns will match at some point and the specimen can be dated. Usually a minimum of 50 years is necessary for crossdating to be reliable. The problem with shorter series, especially when dealing with complacent tree-ring records, is the possibility of accidental or "chance" fits.

With one exception, the Battle Hill charcoal material has to be classified as poor quality for definitive crossdating.

F. Shifting Unit Dating Program

The Shifting Unit Dating Program (SUDP) was designed to detect crossdating between chronologies that is not apparent by visual comparison of samples or plots. The SUDP uses computer techniques to crossdate tree-ring series by cross correlation analysis.

A portion (unit length) of an undated tree-ring series is correlated with a dated master tree-ring series in all possible positions. The positions and the correlations of the three best matches between the unit and the master series are recorded.

The correlation coefficient values derived by this procedure indicate not only the number of cases of agreement and disagreement between variables but also the relative degree of correspondence.

Results obtained by these statistics were cross-checked by broken-line plot comparisons of master and undated tree-ring series.
RESULTS AND DISCUSSION

The study area, shown in Figure 1, is classified as Coastal Western Hemlock by Krajina with approximately 30 inches of annual precipitation.

Both western red cedar and western hemlock living trees showed very little annual variation in ring width or density from year to year, resulting in a highly complacent chronology from 1670 to 1979 and 1703 to 1979 respectively, making crossdating difficult. This lack of sensitivity means that the trees were growing in an environment where conditions of sufficient moisture and proper temperature were present during the growing season. This also results in a "weak climatic signal" for this particular site. Figure 2 illustrates the quality of living-tree annual ring patterns for Kitwanga.

The inner-most rings (pith years) for the oldest collected western hemlock and western red cedar trees are 1698 and 1660 respectively. Tree numbers, ages and intervals scanned are shown in Table I.

The results of the archaeological sample identification are presented in Table II. Species abbreviations are those based on botanical nomenclature as proposed by R.J. Day of the University of Toronto. A key to the abbreviations follows Table II.

For those samples other than lodgepole pine and western red cedar, identification only to the genus level was possible. There are more than one species of each of these genera indigenous to the Kitwanga area and these are not separable on the basis of their wood anatomy.

For the most part the fragments within a sample appeared to be from the same species. A few cases will be noted where two species were found within one sample. It is highly probable that a more thorough examination would reveal other samples containing multiple species. The identified samples were distributed as follows:

<table>
<thead>
<tr>
<th>Sample Identification</th>
<th>Number of samples</th>
<th>% of Total Identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lodgepole pine</td>
<td>91</td>
<td>56.5</td>
</tr>
<tr>
<td>Western red cedar</td>
<td>29</td>
<td>18.0</td>
</tr>
<tr>
<td>Poplar or cottonwood</td>
<td>27</td>
<td>16.8</td>
</tr>
<tr>
<td>Spruce</td>
<td>7</td>
<td>4.3</td>
</tr>
<tr>
<td>Alder</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Willow</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Birch</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Maple</td>
<td>1</td>
<td>0.6</td>
</tr>
</tbody>
</table>

No attempt was made to identify the samples of bark. The bark anatomy of species indigenous to the Kitwanga area is not well documented so that positive species identification would be a fairly major undertaking. The soil-like samples were, in general, not identified due to the time restraint. An initial inspection of a few of these samples revealed that any wood present was in the form of highly-deteriorated, very small fragments. It might be possible to sift these samples and with careful work make an identification if it were important to the analysis of the site. In addition there were approximately 33 samples in which no attempt at identification was made because of the time restraint.
It is noteworthy that no western hemlock was found in the archaeological collection since this tree species is a dominant component of the living forest in the Kitwanga area.

Charcoal samples with 15 or more annual rings were earmarked for dendrochronological analysis, even though the generally accepted standard for a lower limit for ring width analysis is about 50 rings. Thirty-two samples were found by this selection process, 15 western red cedar and 17 lodgepole pine (Fig. 3). Of these, only 16 specimens produced acceptable radiographs for densitometer scanning.

Archaeological charcoal samples, on the whole, appear to be more sensitive (much year-to-year variation) in both ring-width and maximum-ring-density pattern, than do the living trees. This indicates there is variation in site quality in the Kitwanga area. For this reason the old, living trees should be sampled from sites that show marked annual variation in these parameters. Such a site will have well-draining, porous soil with rock outcrops and a south-facing slope of about 45 degree angle. Such a microsite will benefit from maximum solar radiation input the year around and the hydrological activity (runoff, evaporation, snow free periods, local wind etc.) will result also in a more stressful growing season.

It is also evident in Figure 3 that the western red cedar charcoal fragments originate from mature, large trees that have ring boundaries with very slight curvature, whereas the lodgepole pine samples have ring boundaries with pronounced curvature, indicating the close proximity of the pith (small stems or branches).

The four individual western red cedar, living-tree, filtered index chronologies, for ring-width and maximum ring-density, are shown in Figure 4 and Figure 5 respectively. Growth pattern variations for individual trees can be seen clearly for both tree-ring variables. For ring width, in Figure 4, a large portion of the inconsistencies (which are related to nonclimatic factors) falls between 1670 and 1757, the juvenile wood part of the radii. Growth pattern, which is associated with climatic variation, shows up in this type of broken-line plot as a reinforcing signal (i.e., when averages are made, these signals are retained and result in marker years). The following dates show this quality in the ring-width pattern: 1727, 1750, 1758, 1771, 1790 – 1805, 1824, 1840 – 41, 1870 – 83 (in both narrow and wide ring patterns), 1886, 1892, 1916 – 21, 1941 – 47 and 1967 to 1969.

For maximum ring-density the first good marker year is 1768, approximately 70 ring-years from the pith. Other good marker years are: 1795, 1801 – 2, 1810, 1849, 1893 – 96, 1917 – 19 and 1943. By comparing the two variables in Figures 4 and 5, it is evident that the maximum density signal is more definitive than the ring width signal. There is less variation, not only generally, but especially in the marker years.

Western hemlock master chronologies also were built for studying the response function of this species. Unfortunately the trees were too young for crossdating with the archaeological material.

A number of specimens must be examined and crossdated from any given site to ensure that no inconsistency appears. In addition, the average of replicated measurements from a large number of trees provides the best chronology, because the growth variation that is associated with climatic variation, which is common to all trees in a given area, is retained when such averages are made. A large portion of the effects of nonclimatic factors
which differ among individuals and from site to site is minimized by the averaging process. Such a chronology was available for the Kitimat area, approximately 125 km south of Kitwanga.

Kitwanga living-tree master chronologies were crossdated with Kitimat in order to evaluate the potential of using an existing long chronology from the general area. Although matches were made between both western hemlock and western red cedar for the two sites, the Kitimat master chronology was not adequate to date short series of Kitwanga archaeological material. The Shifting Unit Dating Program was used with unit length of 150 years, for crossdating the two sites.

Western red cedar charcoal sample No. 111-1 (with 70 annual rings) and No. 110-1 (with 40 annual rings) crossdated with one another visually and by the SUDP. The quality of agreement is shown graphically in Figure 6. Positive radiographic images of the two samples are included also in the illustration to show annual ring detail. The maximum density pattern of No. 110-1 is of poor quality because of the blurred image, hence the poor agreement on the broken-line plot for this variable.

Sample No. 111-1 also crossdated with the living, western red cedar, maximum density chronology by the SDUP in the period of 1680 – 1749. The results of the cross-dating procedure by SUDP is given in Table III and the broken-line plot is shown (Fig. 7).

Of the 70 annual rings (undated series), 50 years were designated for the unit length. Successive 50 year units were correlated with the master chronology at all possible locations until the entire undated series (21 separate runs) had been matched with the entire dated interval from 1670 to 1969. The validity of crossdating was evaluated then by the sequential placement of the 50-year units in Column B and A-B, and the values of the correlation coefficients.

Because of little year-to-year variation in the annual ring width pattern and the juvenile nature of this part of the living trees, the ring width variable produced inconclusive results for sample No. 111-1.

In addition to the above match by the SUDP, many other unsuccessful runs were made by cross correlating both ring width and maximum density components of undated archaeological samples with the Kitwanga and Kitimat western hemlock and western red cedar master series. Two possible reasons why no conclusive crossdating was produced through the use of SUDP are that: a. archaeological samples predate living-tree chronologies, or b. the samples had an insufficient number of annual rings or poor resolution.

Work with this complacent tree-ring material from the Kitwanga area indicates that maximum density is superior to ring-width pattern for crossdating purposes. It also can be concluded that dating of archaeological tree-ring samples is possible, but study samples of higher quality, both archaeological and living-tree, should be sought in the future in the Kitwanga area.


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Figure 1. Location of study area, Kitwanga, B.C.
Figure 2. Living-tree annual ring patterns in the Kitwanga area.
## TABLE I  List of living trees used in master chronology building.

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**Sample Identification Key**

- **THp** = Thuja plicata — western red cedar
- **PNC —** = Pinus contorta var. latifolia — lodgepole pine
- **PO** = Populus sp. — could be black cottonwood or trembling aspen
- **AL** = Alnus sp. — could be any of four alder species
- **B** = Betula sp. — could be any of two birch species
- **SA** = Salix sp. — could be any of four or more willow species
- **AC** = Acer sp. — probably Acer glabrum var. douglasii, Douglas maple, because of the geographic location.
- **PI** = Picea sp. — could be any of two spruce species
- **No ID** = No identification possible.
Figure 3. Archaeological charcoal samples.
Figure 4. Western Red Cedar Ring-Width Chronologies for Four Trees
Figure 5. Western Red Cedar Maximum Ring-Density Chronologies for Four Trees
Figure 6. Matching Tree-ring pattern of archaeological charcoal sample 110-1 and 111-1.
### Table III: Computerized Shifting Unit Dating Program Output

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<td>0.395 0.376 0.317 -1679 -1842 -1677</td>
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</table>

Average correlation: 0.470 0.344 0.326 \( \frac{(0.470 - 1.365)}{0.344} \)

**TABLE III** Computerized Shifting Unit Dating Program Output.
Figure 7. Western Red Cedar Living-Tree (1670 to 1799) and Archaeological Charcoal Sample No. 111-1 (1680 to 1749) Maximum Density Chronologies
APPENDIX IV

Archaeobotany of the Kitwanga Fort Project
Skeena River, British Columbia

J.H. McAndrews and R.D. Fecteau
Department of Botany
Royal Ontario Museum
Toronto
INTRODUCTION

Thirty-one samples were submitted for botanical analysis by George F. MacDonald, Senior Archaeologist, National Museum of Man, National Museums Canada, Ottawa. Thirteen soil samples were received on November 5, 1979, eleven seed samples were received on November 13, 1979 and six soil samples were received on November 27, 1979.

OBJECTIVES

Analysis of palaeobotanical remains from archaeological soils was undertaken to obtain data concerning: 1) the nature and importance of plant subsistence to the occupants; 2) the season of occupation; 3) the effect of natural fire episodes and man-made hearth fires on plants; 4) the separation of historic from prehistoric component and 5) the nature and function of house structures.

POLLEN ANALYSIS

Pollen analysis and a thermal analysis for organic carbon and calcium carbonate was done on seven samples. Six were archaeological soil: C15 and C19 were ash samples; 108, 115 and 116 were hearth samples, 85 was soil lining a pit. A spring detritus sample from a depth of 25 cm was also analysed to serve as a comparison with the archaeological soil.
Method

Two subsamples were weighed, one was used for pollen analysis and the other was dried to determine moisture content and ashed at 550°C for organic carbon content and at 1000°C to determine CaCO$_3$ content. The pollen concentration and organic C and CaCO$_3$ percentages are based on dry weight.

The soil samples concentrated for fossil pollen weighed 20 to 30 g. Before fossil pollen concentration was begun 23,700 Lycopodium spores were added to the subsample. Fossil pollen concentration was by the method of Cwynar et al. (1979) except that both 150 um and 15 um sieves were used before acetolysis. The introduced Lycopodium spores were counted together with the fossil pollen and spores. Counting proceeded until 100 fossil pollen were identified. The ratio of introduced Lycopodium spores to fossil pollen was used to calculate the fossil pollen concentration per g dry weight of soil.

Results

The organic C, CaCO$_3$ and fossil pollen are given in Table 1. The C content was high in the spring detritus relative to the soils. CaCO$_3$ was relatively low in the pit soil and spring detritus. All samples had abundant charcoal and undigestible plant fragments. Fungal fragments were common indicating an oxidizing environment.

The pollen was rather well preserved. Sample 119 did not produce an adequate abundance of pollen for an efficient percentage analysis. Fossil pollen varied by a factor of 10, from 200 to 2,300 pollen per g in the soil samples. The highest concentration (31,900) occurred in the spring detritus.
Discussion

The spring sample serves as a control for the analyses. Its high content of organic C and low CaCO$_3$ are consistent with a non-calcareous organic detritus. As expected, the mineral-rich soil had lower organic C but unusually high carbonate (except sample 85 that lined a pit). The carbonate was probably derived from the burning of fishbone. Another possibility is the burning of feces but this is unlikely because of the paucity of seeds in the samples.

In general the tree pollen reflects forest dominance by conifers. The local pine and spruce is well represented whereas the pollen of fir and western hemlock must be derived from trees growing outside the site locality. The pollen of poplar is absent because it does not preserve.

The spring sample confirms the growth of a local stand of alder and suggests a local stand of birch. In contrast the archaeological soil contains abundant pollen of weedy herbs, particularly grass, composite and chenopod pollen indicating weedy vegetation. Despite local growth of hazel and presence of hazel nuts, only one pollen grain was found. Most pollen is derived from wind pollinated species and except for the composites there are surprisingly few pollen of insect pollinated taxa such as heaths, soapberry and the families exemplified by carrot, pink and evening primrose.

The pollen assemblage does not compare closely with the seed assemblage except that soil samples C15, 108 and 85 (but not 115) have both abundant chenopod pollen and goosefoot seeds. Thus the pollen and seed data are complementary, they cannot be used to predict one another.

MACROFOSSIL ANALYSIS

Nineteen soil samples and 11 seed samples were submitted for plant
macrofossil identification.

The following is the archaeological context of the soil samples; 64, 108, 115, 116, 109, 110 and 111 were hearth samples; 65, 119 and 120 were pit samples; C15 was an ash sample; 66 and 67 were dump samples; 85 was from a pit lining; 78 and 118 were from post moulds; 16, 76 and 79 are "level" samples.

Method

All soil samples were floated and concentrated in a sieve with a mesh size of 0.5 mm. A total of 1,750 mL of float residue was recovered from flotation of 18,375 mL of soil; this is a reduction to 10% of original volume. A total of 2,461 seeds were present; 2,209 were uncarbonized and 252 were carbonized (Tables 2 and 3). Charred seeds were picked from float residue under 10X magnification with a stereo-microscope. Uncharred seeds were identified but not picked, except for unknowns. Seeds were identified using seed identification manuals (Montgomery 1977, Martin and Barkley 1973) and by comparison with reference specimens.

Charcoal was prepared for examination by breaking the specimen to obtain a fresh transverse (cross) section (McAndrews, et al. manuscript). Charred wood from nine samples was classified into three categories, 1) pine, 2) conifer (gymnosperm) wood and 3) diffuse porous (angiosperm) wood.

Results

The concentrate was mostly uncharred plant debris such as roots, wood and leaf fragments. Charred seeds were present (Table 2) but uncharred
seeds were more common (Table 3). Bone was often present.

There was a total of 14 taxa of charred seeds (N=252) and 22 taxa of uncharred seeds (N=2209) (Table 4).

Two species, bearberry and hawthorne occur only as charred specimens. Charred seeds were present in 13 of 19 soil samples and 2 of 12 seed samples. Uncharred seeds were present in all but 2 soil samples and 7 of 12 seed samples.

Results - Soil samples

Sample C15 ash (007T, 001A, E13 NO, Lot 5, 15P)
Charred seeds include blueberry, sedge and goosefoot. Charred sedge seeds are rare with the other occurrence in sample 66. The unusual dearth of uncharred seeds is shared with sample 118. Uncharred spruce needle fragments are present.

Sample 64 central hearth (7T1C, House 1, level 3)
The charred seed assemblage is small. Seeds of two small fleshy fruits are present, elderberry and blueberry. One goosefoot seed and one grass seed (unique in the charred seed assemblage) were also identified. Eight seeds were assigned to the goosefoot family. Goosefoot seeds were the only uncharred seeds in the sample. Like the previous sample, uncharred spruce needle fragments were also present.

Sample 108 central hearth 2 (7T2D, DBD 18 cm)
The concentrate contained insect parts and some small bone fragments. Charred seeds were absent. The uncharred assemblage contained seeds of the small fleshy fruits of saskatoon berry, raspberry and blueberry and of two weeds, goosefoot and sedge.

Sample 115 central hearth, House 4 (7T4, 13P west side, Battle Hill, 5-15 cm DBC)
This sample contained insect parts and was essentially barren of seeds.
It contained one unidentified, poorly preserved, charred seed and one uncharred cherry (*Prunus*) seed.

**Sample 67 side hill dump under House 4 (7T4A, level 2, 5-10 cm)**

This sample contained pebbles, snails, insect parts and small bone fragments. Charred seeds occurred in small numbers including seeds of the small fleshy fruits, raspberry and elderberry and seeds of two weeds, plantain and knotweed. These weed seeds are rare, each appear in only one other sample, i.e. plantain (a single seed) in dump sample 66 and knotweed (40 seeds) in pit sample 65.

Sample 67 contains the third largest number of uncharred seeds with ten taxa; most numerous are elderberry and raspberry. Seeds of two weedy plants, goosefoot and sedge are abundant, especially goosefoot. Cherry, dandelion, plantain vetch, birch and 11 seeds that compare closely with violet were also present.

**Sample 66 side hill dump under House 4, level 1, 0-5 cm (7T4A, 20P W12 S4)**

Insect parts and snails are present. Charred seeds were limited to small fleshy fruits and weeds. Raspberry (most abundant), elderberry, cherry and dogwood are present. Cherry and dogwood are represented by single seeds. Weeds are represented by single seeds of sedge and plantain.

This sample contains the second largest concentration of uncharred seeds. Two weeds dominate the assemblage, sedge and goosefoot. Knotweed, campion, dandelion, violet and birch are present. Grass was identified by the presence of glumes. Soapberry is confined to this sample. A moss (cf. *Isothecium*) is present.

**Sample 16 (7T5A, level 2, 5-10 cm DBS S 0-50 cm E 0-40 cm)**

Insect parts, snails and spore balls were in the concentrate. This sample is essentially barren of charred seeds with one unidentified specimen. The few uncharred seeds are represented by raspberry and elderberry, goosefoot and sedge. A hazel nut shell fragment was also
identified.

Sample 78 "post" feature (7T9C 13P, near bottoming out, level 9, DBS 45 cm, DBD 48-52 cm)
Charred seeds are absent.
Uncharred seeds are mostly goosefoot. A few seeds of saskatoon berry and elderberry were also present.

Sample 85 folded bank pit lining, level 13 (7T9E extension)
The concentrate included small uncharred bark fragments, insect parts, spore balls and clumps of dirt.
One charred elderberry seed was identified.
The uncharred seed assemblage was limited to three elderberry, three goosefoot and two sedge seeds.

Sample 116 central hearth, House 5 (7T10 24.5 ME/.5 m S oper. 10, 5-15 cm DBS)
The concentrate was composed of ash and many small mammal bones; a fish vertebra was also present. This sample was virtually barren of seeds. Charred seeds were absent. One uncharred dandelion seed and one snowberry seed were present.

Sample 109 central hearth, House 3, level 1 (7T3T1)
The concentrate contained insect parts and clumps of dirt. Nine charred goosefoot seeds were present.
The uncharred seed assemblage is dominated by sedge and dandelion. Goosefoot, strawberry and saskatoon berry also occur in small numbers.

Sample 110 hearth (7T3T1 17P, from W. section of rock feature - DBS 17-25 cm)
Insect parts were present in the concentrate. The sample contained two charred goosefoot seeds and one uncharred strawberry seed. Strawberry seeds are limited to this sample and sample 109.
Sample 119 ash pit (7T1T1 06P, in wall - see p. 57 and floor plan T1 S3 E14 DBD, 37-40 cm S10-100 cm E 40-80 cm)

Leaf fragments, small bone fragments and insect parts were present in the concentrate. This sample contains charred seeds of three small fleshy fruits; saskatoon berry, bearberry and hawthorne. This sample has the largest quantity of bearberry seeds and the only occurrence of hawthorne. One charred goosefoot seed was also present.

Uncharred seeds of sedge and dandelion also occur.

Spruce needle fragments were also present.

Sample 76 (7T3B 07 28/7/79 - House 3, level 4, 15-20 cm N 0-100 cm W 20-100 cm)

The concentrate contained insect parts and larvae. The sample was barren of charred seeds. Twenty uncharred seeds were identified, i.e. 18 goosefoot seeds, one elderberry seed and one sedge seed.

Sample 118 House post feature (7T1T1 06P 10/8/79, 15-17E 30-35 DBS from house post feature)

The sample was essentially barren except for one unidentified uncharred seed.

Sample 65 (7T9G 20P 27/7/79, SE corner of pit, level 3, 10-15 cm, palisade).

The sample contained small bone fragments, probably mammal, and insect parts.

This sample contained the greatest number of seeds, both charred and uncharred. Four taxa of charred and eight taxa of uncharred seeds are present. The charred seed assemblage is dominated by knotweed. Charred knotweed occurs elsewhere only in dump sample 67. The greatest concentration of elderberry occurs here together with a few saskatoon berry seeds. One bearberry seed was also identified. The uncharred seed assemblage in this sample accounts for 40% of the seeds of all samples. It has 811 goosefoot followed in descending order of abundance by elderberry, sedge, saskatoon berry, raspberry, dragon head
(Dracocephalum parviflorum) and cherry. Two seeds, one in the grass family and one in the rose family could not be further identified. Ninety-four identifiable seeds have yet to be identified. Analysis of these seeds is being continued.

Sample 111 ash from hearth (7T9K 06P 9/8/78, 5-15 cm DBS, lot 2) This sample was essentially barren of seeds. No charred seeds were present. Four uncharred goosefoot seeds and two elderberry seeds were present; one seed was unidentified.

Sample 120 puberty pit (7T5B, 10/8/79 07P, bottom of pit - humus layer DBU 70-75 cm, S 0-20 cm E 80-100 cm) The concentrate of miscellaneous plant fragments, charred and uncharred, also contained insect parts. This sample was one of three samples containing charred bearberry, the others were samples 65 and 119. One bearberry was identified. Two charred raspberry seeds were also present.

The uncharred seed assemblage is dominated by raspberry. One whole hazel nut and hazel nut fragments were present. Dandelion, vetch, birch seeds also occurred and one seed assigned to the composite family was identified.

Sample 79 (7T1A, lot 8, 15P 72 cm) This sample was barren of seeds except for one uncharred goosefoot seed.

Results - Seed samples

Sample S 10
This sample contained uncharred hazel nuts, 7 whole, 48 halves and 10 fragments.

Sample S 12
Like sample S 10 only uncharred hazel nuts were present.
Sample S 13
The three uncharred seeds are red-osier dogwood. Two charred seeds could not be identified.

Sample 133
This sample contained one uncharred pin cherry seed.

Sample 152 B
This sample contained an uncharred nutshell fragment of hazel.

Sample 152 C
The uncharred seed is choke cherry.

Sample 183
Five charred choke cherry seeds were present. Charred cherry seed fragments were also present.

Sample 215
This sample contains three uncharred choke cherry seeds. All seeds have a hole at the proximal end suggesting insect boring.

Sample 431
This sample contained dirt clumps; no seeds were present.

Results - charred wood
Charred wood from most samples was small (4 mm) thus making a positive identification difficult, however, some fragments were large enough to make a partial identification.

Pine charcoal was identified in six of nine samples (Table 5). The pieces of indeterminable conifer were too small to be sure that the resin canals of pine were absent. The diffuse porous angiosperm wood could be poplar. There is no apparent correlation between species and features.
Discussion

The interpretation of the seeds found in the archaeological soil is difficult. Their relative sparseness (except sample 65) indicates that they are more or less randomly distributed and do not represent caches. Except for birch, the seeds are from shrub and herb species that mostly occupy weedy habitats. Most species occur on the site today and the seeds could be modern and intrusive or could have persisted in the soil since occupation. The charred seeds are likely to be in situ because they are less likely to decay than uncharred seeds.

With regard to their seeds, plant species have varying strategies of reproduction (Grime 1979). Most Canadian tree species have seeds that germinate within a few months of dispersal to produce a more or less annual crop of seedlings; these seedlings usually die unless an opening in the canopy occurs. Such species with limited dormancy usually have thin-coated seeds that decay rapidly and do not persist in the soil. On the other hand, many weed species such as cherry and goosefoot (Chenopodium) have seeds capable of prolonged dormancy. These seeds have relatively thick seed coats and persist in the soil as a seed bank until they are stimulated to germinate by change in light and temperature that is associated with soil disturbance and the renewal of a weed habitat.

Soil disturbance during human occupation produces a weedy habitat and weed vegetation. Local burning would produce charred weed seeds and these together with unburned weed seeds would result in the archaeological soil becoming a seed bank. Thus the charred seeds are in situ and the uncharred seeds are probably contemporaneous. The presence of pollen of weedy plants supports the conclusion that the seeds are in situ.

CONCLUSIONS
1. Hazel nut and the berries of blueberry, hawthorn, saskatoon raspberry, elderberry, chokecherry and strawberry were available and perhaps eaten, but there is no evidence that they were quantitatively important.

   Goosefoot seeds are abundant and could have been collected for food.

   There is no indication of crop plants.

2. The seed assemblage hints at a summer-autumn occupation because the edible fruits ripen then. However, because the seeds belong to "weedy" species that probably grew spontaneously on the site, their seeds could be naturally introduced into the soil.

3. There is no evidence as to the season of burning. The seeds, needles and wood are all available on the soil surface and could be burned at any season.

4. Assuming that uncharred seeds eventually decay and only charred seeds persist, then samples with mostly charred seeds would be relatively older. Applying this criteria, samples C15 and 119 are older than samples 65, 66 67 and 78. However, samples 65, 66 and 67 are near the surface and the uncharred seeds could be modern intrusives.

5. The botanical analyses provide no insight as to feature function.

6. The surprisingly high calcium carbonate content of samples C15, 108, 115, 116 and 119 indicate much burned bone in contrast to the spring sample and sample 85.

7. The pollen analysis indicates the regional forest was dominated by conifers. Birch and alder were locally abundant around the spring. Analyses of the archaeological soils indicate local weedy herbs.

ACKNOWLEDGEMENTS

We thank G. Christine Manville for moss identification and preparation of samples for pollen analysis, Darakshan Siddiqqi for checking seed identifications and Jo-Ann Huskinson who typed the report.
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Table I. Pollen and spore counts in six samples. Identified pollen totals 100. Sample 119 impossible to count.

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<th>Trees</th>
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<th>Herbs</th>
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Catalogue number

% Organic carbon × 100
% CaCO₃

of dry weight
Table 2. Charred seeds from the Kitwanga Fort Project, Skeena River, B.C.

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Table 4. List of macrofossils from the Kitwanga Fort Project, Skeena River, B.C. Asterisk indicates plants used by natives. (Turner 1975)

<table>
<thead>
<tr>
<th>Uncharred</th>
<th>Charred</th>
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<tr>
<td>* Corylus cornutä beaked hazel BETULACEAE</td>
<td>* Corylus sp. hazel BETULACEAE</td>
</tr>
<tr>
<td>* Amelanchier sp. saskatoon berry ROSACEAE</td>
<td>* Amelanchier sp. saskatoon berry ROSACEAE</td>
</tr>
<tr>
<td>* Cornus sp. dogwood CORNACEAE</td>
<td>* Arctostaphylos uva-ursi bearberry ERICACEAE</td>
</tr>
<tr>
<td>Cornus stolonifera red-osier dogwood CORNACEAE</td>
<td>* Cornus sp. dogwood CORNACEAE</td>
</tr>
<tr>
<td>* Fragaria sp. strawberry ROSACEAE</td>
<td>* Crataegus sp. hawthorne ROSACEAE</td>
</tr>
<tr>
<td>* Prunus sp. cherry ROSACEAE</td>
<td>* Prunus sp. cherry ROSACEAE</td>
</tr>
<tr>
<td>* Prunus pensylvanila pin cherry ROSACEAE</td>
<td>* Prunus virginiana choke cherry ROSACEAE</td>
</tr>
<tr>
<td>* Prunus virginiana choke cherry ROSACEAE</td>
<td>* Rubus sp. raspberry ROSACEAE</td>
</tr>
<tr>
<td>* Rubus sp. raspberry ROSACEAE</td>
<td>* Sambucus sp. elderberry CAPRIOFOLIACEAE</td>
</tr>
<tr>
<td>* Sambucus sp. elderberry CAPRIOFOLIACEAE</td>
<td>* Sambucus sp. elderberry CAPRIOFOLIACEAE</td>
</tr>
<tr>
<td>* Shepherdia canadensis soapberry ELAEAGNACEAE</td>
<td>* Vaccinium sp. blueberry ERICACEAE</td>
</tr>
<tr>
<td>Symphoricarpos sp. snowberry CAPRIOFOLIACEAE</td>
<td>Carex sp. sedge CYPERACEAE</td>
</tr>
<tr>
<td>* Vaccinium sp. blueberry ERICACEAE</td>
<td>* Chenopodium sp. goosefoot CHENOPODIACEAE</td>
</tr>
<tr>
<td>Carex sp. sedge CYPERACEAE</td>
<td>Plantago sp. ribgrass Plantain PLANTAGINACEAE</td>
</tr>
<tr>
<td>* Chenopodium sp. goosefoot CHENOPODIACEAE</td>
<td>Polygonum sp. knotweed POLYGONACEAE</td>
</tr>
<tr>
<td>Dracocephalum parviflorum dragon head LIBIATAE</td>
<td>Picea sp. spruce (needle) PINACEAE</td>
</tr>
<tr>
<td>Galium sp. bedstraw RUBIACEAE</td>
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<tr>
<td>Plantago cf. lancelota ribgrass plantain PLANTAGINACEAE</td>
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<tr>
<td>Polygonum sp. knotweed POLYGONACEAE</td>
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<tr>
<td>Silene sp. campion CARYOPHYLLACEAE</td>
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<tr>
<td>Taraxacum officinale dandelion COMPOSITAE</td>
<td></td>
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<tr>
<td>? Vicia sp. vetch LEGUMINOSAE</td>
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<tr>
<td>Viola sp. violet VIOLEACE</td>
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<tr>
<td>* Betula sp. birch BETULACEAE</td>
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<tr>
<td>COMPOSITAE</td>
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<td>ROSACEAE</td>
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<td>Picea sp. (needle) PINACEAE</td>
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Nbr. FAMILIES 19
Nbr. TAXA 22

Nbr. FAMILIES 12
Nbr. TAXA 14
Table 5. Charred wood from the Kitwanga Fort Project, Skeena River, B.C.

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<td>Pinus</td>
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<tr>
<td></td>
<td>diffuse porous</td>
<td>pine</td>
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<tr>
<td>16</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>65</td>
<td>-</td>
<td>+</td>
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<tr>
<td>67</td>
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</tr>
<tr>
<td>120</td>
<td>+</td>
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APPENDIX V

Botanical Species Identification for the Kitwanga National Historic Site Area

James Pozar
B.C. Forest Service, Smithers,
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<tr>
<th>TREES</th>
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<tr>
<td>POPULUS TREMULIDES</td>
<td><strong>Aspen</strong></td>
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<tr>
<td>P. TRICHOCARPA</td>
<td><strong>Black Cottonwood</strong></td>
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</tr>
<tr>
<td>BETULA PAPYRIFERA</td>
<td><strong>Paper Birch</strong></td>
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</tr>
<tr>
<td>PINUS CONTORTA</td>
<td><strong>Lodgepole Pine</strong></td>
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<tr>
<td>PICEA GLANCA X SITCHENSIS</td>
<td><strong>Spruce</strong></td>
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<thead>
<tr>
<th>SHRUBS</th>
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<tr>
<td>ALNUS INCANA (-A. TENUIFOLIA)</td>
<td><strong>Speckled Alder</strong></td>
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<tr>
<td>CORYLUS CORNUTA</td>
<td><strong>Beaked Hazelnut</strong></td>
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<tr>
<td>AMELANCHIER ALNIFOLIA</td>
<td><strong>Saskatoon</strong></td>
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<tr>
<td>PRUNUS VIRGINIANA</td>
<td><strong>Chokecherry</strong></td>
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<tr>
<td>SYMPHORICARPOS ALBUS</td>
<td><strong>Snowberry</strong></td>
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<td>POSA ACICULARIS</td>
<td><strong>Prickly Rose</strong></td>
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<td>LONICERA INVOLUCRATA</td>
<td><strong>Black Twinberry</strong></td>
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<td>CORNUS STOLONIFERA</td>
<td><strong>Red Osier Dogwood</strong></td>
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<td><strong>False Box</strong></td>
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<td>VIBURNUM EDULE</td>
<td><strong>Squashberry, Highbush Cranberry</strong></td>
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<td>SORBUS SCOPULINA</td>
<td><strong>Mountain Ash</strong></td>
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<td>RIBES LACUSTRE</td>
<td><strong>Swamp Gooseberry</strong></td>
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<td>R. OXYACANTHOIDES</td>
<td><strong>Yellow Gooseberry</strong></td>
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<td>SPIRAEA DOUGLASII</td>
<td><strong>hardback</strong></td>
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<td>SHEPHERDIA CANADENSIS</td>
<td><strong>Soopalalie, Soapberry</strong></td>
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<td>RUBUS IDAEUS</td>
<td><strong>Wild Raspberry</strong></td>
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<td>R. PARWIFLORUS</td>
<td><strong>Thimbleberry</strong></td>
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<tr>
<td>SALIX BEBBIANA, S. SCULENANA,</td>
<td><strong>Willows</strong></td>
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<td>S. LASIANDRA</td>
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HERBS & DWARF SHRUBS

FRAGARIA VIRGINIANA ➔ Strawberry
EPILOBUIU AUGUSTIFOLIUIM ➔ Fireweek
ASTER CILIOLATUS, A. CONSPICUIS ➔ Asters
SOLIDAGO CANADENSIS ➔ Goldenrod
THALICTRUM OCCIDENTALE ➔ Meadow Rue
ACHILLEA MILLEFOUIUM ➔ Yarrow
ARALIA NUDICAULIS ➔ False Sarsapaidla
SMILACINA RACEMOSA ➔ False Solomon's Seal
GALIUM BOREALE ➔ Northern Badstraw
G. TRIFLORUM ➔ Sweet Bedstraw
GERANIUM REICHARDSONI ➔ White Geranium
GEUM MACROPHYLLUM ➔ Avens
HERACLEUM LNALUM ➔ Cow Parsnip
CAREX MACOVIANA ➔ Sedge
CASTILLEJA MINIATA ➔ Paintbrush
CAMPANULA ROTUNDIFOLIA ➔ Harebell
VIOLA CANADENSIS ➔ White Violet
V. Glabella ➔ Yellow Stream Violet
PYROLA ASARIFOLIA ➔ Large-flowered Wintergreen
POTENTILLA ARGUTA ➔ Cinquefoil
ACTAEA RUBRA ➔ Bane Berry
EQUISETUM QRVENSE, E. PRATENSE ➔ Horsetails
DISPORIUM TRACHYCARPUM ➔ Fairy Bells
VICIA AMERICANA ➔ American Vetch
LATHYRUS NEVADENSIS ➔ Purple Peavine
CLINTONIS UNIFLORA ➔ Queen's Cup
AINICA
VACCINUM CAESPITOSUM ➔ Dwarf Blueberry
GYMNOCARPUS DRYOPTARIS ➔ Oak Fern
CIRCAEA ALPINA ➔ Enchanter's Nightshade
ANEMONE LYALLII ➔ Wood Anemone
SANICULA MARILANDICA ➔ Snakeroot
DELPJINIUM GLAUCUM ➔ Larkspur
ELYMUS GLANCUS
AGROPYRON TRACHYCAULUM
  SSP. PINITATERALE
STIPA RICHARDSONII
S. OCCIDENTALIS
KOELERIA MACRANTHA
ORYZOPSIS ASPERIFOLIA
HEUCHERA CHLORANTHA
  Blue Wildrye
  Wheatgrass
  Needle-and-
  Thread grasses
  Junegrass
  Indian ricegrass
  Alumroot

WEEDY ALIENS
TARAZACUM OFFICINDE
PHLEUM PRATENSE
  Dandelion
  Timothy
PLANTAGO MAJOR
PHINANTHUS MINOR
  Plantain
  Yellow Rattle

Fields
BROMUS INERMIS
TRIFOLIUM PRATENSE
CHRYSANTHEMUM LEACANTHEMUM
MEDICAGO SATERIA
RUMEX ACETOSELLA
  Smooth Brome
  Red Clover
  Ex-eye Daisy
  Alfalfa
  Sheep Sorrel

WEEDY NATIVES
POA PRATENSIS
AGROSTIS SCABRA
ACHILLEA MILLEFOLIUM
EQUISETIUM ARVENSE
  Kentucky Bluegrass
  Tickle Grass
  Yarrow
  Grassland/scrub

S. Slope
Earlier probably open grassland
7 natural vegetation influenced by fire, slope, aspect and aboriginal people.

AMELANCHIER ALINIFOLIA
PRINUS VIRGINIANA
ROSA ACICULARIS
CORYLUS CORNATA
POPULUS TREMULOIDES
SYMPHRICARPOS ALBUS
AGROPYRON TRACHYCANLUM SSP. UNILATERALE
POA PRANTENSIS
PHLEUM PRATENSE
CREPIS CAPILLARIS Hawkweed
STIPA COLUMBIANA (S. OCCIDENTALIS)
CAREX ? PRATICOLA OR PACKYSTACHIYA
ASTER CONSPICUS
SMILANCINA STELLATA
KOELERIA MACRANTHA
GALIUM BOREALE
ALLIUM CERNUM
LATHRUS NEVADENSIS

SPRING SHRUBS
ALNUS INCANA (-A. TENUIFOLIA)
CORNUS STOLONIFERA
RUBUS PARIFLORUS
CORYLUS CORNUTA
SAMBUCUS RACEMOSA
RIBES LACUSTRE
RUBUS IDAEUS
HERBS

ACTAEA RUBSA
OSMORHIZACHILENSIS
ARALIA NIDICAULIS
EQUISETUM ARVENSE, E. PRATENSE
CINNA LATIFOLIA
DISPOSUM TRACHYCARPUM
VIOLA BLABELLA
MITELLA NUDA
THALICTRUM OCCIDENTALE
SMILACINA RACEMOSA, S. STELLALA
ATHYRIUM FILEX-FEMINA
GALIUM TRIFLORUM
CIRCAEA ALPINA
HABENARIA SACCATA
APPENDIX VI

REPORT ON THE ANALYSIS OF OBSIDIAN ARTIFACTS FROM THE KITWANGA FORT N.H.S.

D.E. NELSON
DEPARTMENT OF ARCHAEOLOGY
SIMON FRASER UNIVERSITY

Submitted to G. McDonald,
National Museum of Man, Ottawa

January, 1980
The obsidian samples submitted to the SFU Archaeology Department for identification were analyzed using the x-ray fluorescence technique described by Nelson et al (1975). The relative concentrations of the elements K, Ca, Ti, Fe, Zn, Pb, Rb, Sr, Y, Zr and Nb in these samples were compared to those obtained in an identical manner on samples from the majority of the known obsidian sources on the Northwest Coast. They were also compared with the relative concentrations of obsidian sources that are not known to the SFU laboratory; however, these sources must exist as obsidian artifacts of unique and unknown relative elemental concentrations appear in Northwest coast sites.

The flakes examined in this study all were found to be made from obsidian originally obtained from the Mt. Edziza volcanic complex located in N.W. British Columbia. (A list of the source identification for each flake is given in Table 1). In this volcanic complex several separate eruptions have yielded obsidian flows separated by distances of a few km. (This complex has been described by Souther (1972).) An XRF analysis of obsidian samples obtained from Dr. Souther showed that the separate flows he identified had very similar, but distinguishable, relative trace element concentrations. (Nelson et al 1975).

These separate sub-groupings have been labelled Edziza - 1 through Edziza - 5. However, the numbers of samples analyzed for each sub-group are in some cases not large enough to allow us to be absolutely certain of the differences between these sub-groups. Some of the sub-groups described must then remain tentative until a very thorough study can be done on the obsidian flows in the Mt. Edziza complex.

The flakes identified as "Edziza - 3" were very likely obtained from obsidian cobbles that are found within or close to a small valley that is just south of Raspberry Pass in the Mt. Edziza area. Obsidian from this sub-group is known to have been widely traded prehistorically (R. Carlson and E. Nelson, unpublished data) and the valley itself contains considerable evidence of obsidian-working activity (Fladmark and Nelson, 1977). The samples labelled "Edziza - 2" likely were obtained from an area a few km to the north of Raspberry Pass. This
sub-group is also known to have been used prehistorically. However, we have less information on the Edziza - 2 source area.

In summary, we can be quite certain that the artifacts were made from Mt. Edziza obsidian. For each flake, we can also suggest specific quarry locales within the Mt. Edziza complex, but this last must remain tentative until a very detailed study of the complex can be done.

REFERENCES

Nelson, D.E., D'Auria, J.M. and Bennett, R.B.
1975
Archaeometry 17(1), 85-97.

Souther, J.G.
1972

Fladmark, K.R. and Nelson, D.E.
1977
Report on a preliminary reconnaissance of a portion of Mt. Edziza Provincial Park, submitted to the B.C. Heritage Advisory Board.
Table 1

<table>
<thead>
<tr>
<th>McDonald artifact number</th>
<th>SFU analysis number</th>
<th>Source identification</th>
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<tr>
<td>259</td>
<td>EN92-2</td>
<td>Edziza - 3</td>
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<tr>
<td>285</td>
<td>&quot; -3</td>
<td>&quot;</td>
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<tr>
<td>310</td>
<td>&quot; -4</td>
<td>&quot;</td>
</tr>
<tr>
<td>311 (small flake)</td>
<td>&quot; -5</td>
<td>&quot;</td>
</tr>
<tr>
<td>311 (large flake)</td>
<td>&quot; -6</td>
<td>&quot;</td>
</tr>
<tr>
<td>337</td>
<td>&quot; -7</td>
<td>&quot;</td>
</tr>
<tr>
<td>355 (small flake)</td>
<td>&quot; -8</td>
<td>&quot;</td>
</tr>
<tr>
<td>355 (medium flake)</td>
<td>&quot; -9</td>
<td>Edziza - 2</td>
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<tr>
<td>355 (large flake)</td>
<td>&quot; -10</td>
<td>&quot;</td>
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<tr>
<td>411</td>
<td>&quot; -11</td>
<td>&quot;</td>
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<tr>
<td>446</td>
<td>&quot; -12</td>
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<td>473</td>
<td>&quot; -15</td>
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Appendix IX

Analytical Investigation of samples from the Kitwanga National Historic Site

1. Identification of Bark Samples - John E. Dawson
2. Surface Analysis of Copper Objects - Henry Unglik
3. Radiography of Ferrous Artifacts - Louis Laflèche & Charles Costain
4. Consolidated Hearth Ash - John Stewart & Charles Costain
5. Food Material Analysis - Monteiro Helleur
1. Identification of Bark Samples - John E. Dawson, National Museums of Canada

Bark samples number 250, 307, 328, 395 and 440 were identified as paper birch (Betula papyrifera March).
2. Surface Composition of the examined artifacts obtained with the EDX semi-quantitive analysis.

Henry Unglik, Conservation Division

<table>
<thead>
<tr>
<th>Artifacts</th>
<th>Material (approx. percentage)</th>
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<tbody>
<tr>
<td>9</td>
<td>copper</td>
</tr>
<tr>
<td>38</td>
<td>&quot;impure&quot; copper 1-3% Pb - 1 - 3% Bi</td>
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<tr>
<td>20D</td>
<td>copper</td>
</tr>
<tr>
<td>136</td>
<td>&quot;</td>
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<tr>
<td>149G</td>
<td>&quot;</td>
</tr>
<tr>
<td>208</td>
<td>&quot;</td>
</tr>
<tr>
<td>209</td>
<td>&quot;</td>
</tr>
<tr>
<td>330</td>
<td>&quot;impure&quot; copper with 2 - 4% Pb</td>
</tr>
<tr>
<td>362</td>
<td>high leaded brass 55 - 65% Cu, 19 - 33% Zn 16 - 22% Pb</td>
</tr>
<tr>
<td>373</td>
<td>copper</td>
</tr>
<tr>
<td>430</td>
<td>&quot;</td>
</tr>
<tr>
<td>464</td>
<td>&quot;</td>
</tr>
<tr>
<td>483</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

In all cases some iron (Fe) was also detected all of which probably comes from iron corrosian products.
3. Radiography of 5 ferrous artifacts - Charles Costain, Conservation Scientist
Louis Laflèche, Technician
Conservation Division

Five objects were submitted for radiography. They include an adze (#342), a gun barrel (#415), a knife blade (#308), a dagger (#527) and a blade (#255). No significant features were visible on the radiographs.

John Stewart, Acting Senior Conservation Scientist
Charles Costain, Conservation Scientist
Conservation Division Ottawa.
I Summary:

The consolidated hearth ash is composed of a highly porous brown matrix of calcite with white inclusions of hydroxyapatite. The hydroxyapatite is the normal mineral constituent of bone and has not been altered by the action of the fire. The calcite matrix, on the other hand, most probably results from the formation of calcium oxide from the action of the fire on the hydroxyapatite. This calcium oxide would have rapidly been slaked by water to give calcium hydroxide which in turn would pick up carbon dioxide from the atmosphere to form the calcite.

II Results:

A) Gross Examination

The samples were cross sectioned to reveal a brown matrix with numerous white inclusions (maximum size 5mm by 1mm (Fig. 1). The matrix had a munsel colour 7.5YR and the inclusions a bone white colour.

Fig. 1 Cross section sample 210.

B) Density

A sub-sample was given a thin coating of parafin wax to render it water tight, its apparent density was then determined by weighing in air and submerged in water. The apparent density was 1.25 g/cm³, this is the density of the whole object including pore space and solid material.
A further sub-sample was ground to pass a 200 mesh sieve (ASTM) and its density determined by weighing 5 g into a 10ml volumetric flask and making to volume with water and weighing. This gives the true density, density of solid material, as 2.5 g/cm$^3$. The sample then has a porosity or void space of 50%.

C) Mineral Identification

Mineral identification was done using x-ray diffraction and the International Centre for Diffraction Data standard patterns.

The white inclusions were identified as hydroxyapatite ($\text{Ca}_5(\text{PO}_4)_3(\text{OH})$) and the matrix as calcite ($\text{CaCO}_3$) with lesser amounts of $\alpha$-quartz ($\text{SiO}_2$).

III Conclusion:

The samples from the consolidated hearth ash are formed of a porous brown matrix with white inclusions. They were most probably made by burning bone, some of which remained as hydroxyapatite giving the white inclusions and some of which were decomposed to form calcium oxide which with weathering produced calcite. The $\alpha$-quartz in the matrix, as well as the brown colour are a result of ash contamination. The extent of this contamination plus a final characterization of the material waits on a full analysis being presently completed.
5. Kitwanga Pot Segment, Food Materials Analysis

L. Monteiro Helleur
Conservation Technician
Analytical Section

Kitwanga Pot Segment (#347): Preliminary Findings

If the residue in the pot segment was food material, substances such as fatty acids and/or proteins would be expected. Preliminary tests showed nitrogen present. However, there is no evidence of protein or amino acids in either the sample or extracts of the sample. Infrared spectroscopy of the material in the pot showed the presence of organic matter but no specific compound was identifiable. However, various extracts of the pot material showed presence of unsaturation and the possibility of fatty acids. Further work is required involving gas-liquid chromatographic analysis, in order to determine if indeed there are any fatty acids present and, if so, their relative proportions. From this data it is hoped that any food types of residues thereof may be identified.