

THE ENVIRONMENTAL EFFECTS OF THE YUKON GOLD RUSH 1896 - 1906:

ALTERATIONS TO LAND, DESTRUCTION OF WILDLIFE, AND DISEASE

by

**Bruce L. Willis
Department of History**

**Submitted in partial fulfilment
of the requirements for the degree of
Master of Arts**

**Faculty of Graduate Studies
The University of Western Ontario
London, Ontario
July 1997**

© Bruce L. Willis 1997



National Library
of Canada

Acquisitions and
Bibliographic Services

395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale
du Canada

Acquisitions et
services bibliographiques

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-28687-8

Canada

ABSTRACT

THE ENVIRONMENTAL EFFECTS OF THE YUKON GOLD RUSH 1896 - 1906: ALTERATIONS TO LAND, DESTRUCTION OF WILDLIFE, AND DISEASE

This thesis examines the environmental effects of the Yukon Gold Rush from 1896 to 1906. The Gold Rush was the first major change occasioned by non-natural forces or human beings to the land and water in the Yukon. Prior to the Gold Rush, the native people followed a wandering existence tied to the seasonal movement of wildlife and fish camps. Suddenly, with the discovery of gold in 1896, thousands of non-natives travelled down various river systems to Dawson City. The federal authorities were not prepared to handle the problems this influx created. They permitted the miners open access in the Klondike Valley. Large fires were caused along the Yukon River by the incoming miners who logged vast areas near Dawson City. This resulted in the immediate disappearance of wildlife. Placer mining, using dredges and hydraulic technology, eliminated plant life, destroyed fish and drove wildlife from the area. In the Klondike region and along the Yukon River native and non-native hunters reduced the size of the moose and caribou populations. The arriving population brought diseases with them which seriously reduced the size of the Han population.

ACKNOWLEDGEMENT

I would like to thank the patience and understanding of my wife and the extraordinary assistance I have received from my thesis advisor, Dr. Gerald Killan, Principal of King's College. Without their support, this thesis would never have been completed.

TABLE OF CONTENTS

	Page
Certificate of Examination	ii
Abstract	iii
Acknowledgement	iv
Table of Contents	v
Introduction	1
1 The Yukon Before the Gold Rush	
Introduction	7
The Natural Environment	7
The Gold Rush Region	9
Yukon First Nations: An Introduction	13
The Non-native Arrivals	17
Wildlife and Fish	20
Disease	25
Mining	27
Conclusion	30
2 The Gold Rush Changes to the Land	
Introduction	31
Government Policy	32
The Environmental Effects of Forest Alterations	33
Logging	38
Fish and Wildlife Regulation	44
Conclusion	47
3 The Impact of Placer Mining on Fish and Wildlife Habitat	
Introduction	49
Government Policies	49
Overview of Placer Mining	50
Hand Mining	53
Hydraulic Mining	53
Dredges	57
Transportation Improvements	61
Permafrost Alterations	64
Alterations to Vegetation	65
The Effect on Wildlife	66
Mercury	67
Fish	69
Conclusion	71

4	The Environmental Effects of the Gold Rush on the Indian People	
	Introduction	73
	Government Policy	73
	Populations of the Han and Tutchone Indians	74
	Disruptions to the Han People	76
	Dawson City	85
	Disease	85
	Conclusion	100
5	Conclusion	102
6	Maps	
	1 Map of Present Yukon	8
	8 Yukon River near Dawson City, 1896	77
7	Tables	
	3 Changes to the Population of the Klondike and Moosehide Han Settlements between 1897 and 1906	97
8	Appendices	
	1 Map 2, Dawson Area, Yukon Territory, 1991	106
	2 Map 3, Stewart River Area, Yukon Territory, 1988	107
	3 Map 4, Auriferous Gravels, Bonanza and Hunker Creeks, Klondike Mining District, 1906	108
	4 Map 5, Northwestern Canada, 1898	109
	5 Map 6, Yukon River to the Pelly River, 1887	110
	6 Map 7, Various Routes to the Klondike, 1898	111
	7 Ten Aerial Photographs of the Klondike River, 22 August 1990, between Bonanza and Hunker Creeks	112
	8 Table 1, Death Records for the Han Settlements at Dawson and Moosehide, 1897 to 1906	113
	9 Table 2, Baptism Records for the Han Settlements at Dawson and Moosehide, 1897 to 1906	119
	Bibliography	122
	Vita	134

The Environmental Effects of the Yukon Gold Rush 1896 - 1906

Alterations to Land, Destruction of Wildlife, and Disease:

Introduction

Until 1896, the Yukon had undergone little economic development and minimal governmental control. Suddenly, beginning that year, the Gold Rush transformed the Yukon within a few years from wilderness into an important mining and commercial centre in the Klondike Valley and at Dawson City.¹ Within one generation the aboriginal population was transformed from a vigorous society of hunters and gatherers to a debilitated community dependent on a federal bureaucracy. The changes to the land and the original people who inhabited the region were devastating and the many effects of that devastation remain to this day.

The Yukon has always been perceived by non-natives from two antithetical viewpoints. Some have perceived the region as a pristine wilderness where travellers could experience frontier life. Commencing with the Gold Rush, others have seen the Yukon as a land of unlimited potential and enormous wealth based on the extraction of its mineral resources. As well, starting with the railway at the turn of the century and later with the Alaska Highway, the Yukon has been viewed as a place where rapid progress could occur without undue interference from government bureaucracy and regulation.

The focus of this thesis is the negative impact of the Gold Rush along the Yukon River and in the Klondike Valley. It will examine environmental degradation brought about by miners and mining practices which effected immediate changes to wildlife habitat, water levels, and water quality. These changes hastened the end of the indigenous peoples' sustainable way of life and decimated their society.

¹ Harold A. Innis, discusses the economics of the Yukon during and after the Gold Rush in "Settlement and the Mining Frontier in *Canadian Frontiers of Settlement*" W.A. MacIntosh and W.L.G. Joerg, eds., (Toronto: Macmillan Company of Canada, IX, 1936).

For more than a century our understanding and awareness of environmental impacts have been improving, but, for one reason or another, environmental policy invariably lagged behind. This paper will suggest that it is critical to have protective policies and supportive regulations in place so that environmental damage of the kind which happened during the mining frenzy of the Gold Rush will not recur.

An analysis of the regulation and use of land and water in the Yukon presents various challenges, not least of which is that few studies have been made of the subject, notwithstanding the fact that native people have inhabited the region for more than 30,000 years². At present the environmental historiography of the Yukon pertains to the Indian use of land, the fur trade and the Gold Rush. Catherine McClellan's book, *A History of the Yukon Indians: Part of the Land, Part of the Water*,³ is more relevant as it describes the use of land and water by native people. In *Yukon Wildlife: A Social History*,⁴ Robert McCandless deals with the creation and enforcement of wildlife law in the Yukon. However, McClellan does not deal with the effect of mining or other industrial activities on the native peoples' use of the land.

Two other studies have been of assistance. Margaret Carter's book, *A History of the Use of Wood in the Yukon to 1903*⁵, provides an extensive and accurate review of timber industry in the Yukon including the number of timber licenses issued, the areas logged and the amount of timber taken. N. Seigel and C. McEwan provided basic

² A.C. McClellan, *A History of the Yukon Indians: Part of the Land, Part of the Water* (Vancouver: Douglas & McIntyre Ltd. 1987), p. 17.

³ *Ibid.*

⁴ Robert G. McCandless, *Yukon Wildlife: A Social History* (University of Alberta Press: Edmonton, 1985).

⁵ Margaret Carter, *A History of the Use of Wood in the Yukon to 1903* (Ottawa: National Historic Sites Service, 1973).

information on fishing in *A Historical Overview of Fishing in the Yukon*.⁶ Other general histories have been helpful in providing reliable information on the Yukon. These include Ken S. Coates, *Best Left as Indians Native-White Relations in the Yukon Territory 1840-1973*,⁷ and Ken S. Coates and William R. Morrison, *Land of the Midnight Sun, A History of the Yukon*.⁸ A major source of information in relation to the Klondike gold fields was contained in Hugh S. Bostock, *Selected Field Reports of the Geological Survey of Canada, 1898 to 1933*.⁹ The most valuable information came from the Anglican Church Diocese of Yukon Records¹⁰ which provided significant and reliable evidence for determining death rates and their causes for the Dawson and Moosehide settlements for the Han people between 1897 and 1906.

The federal government owned the land and water resources of the Yukon. Ottawa's policies for water and land use during the Gold Rush perpetuated the frontier mentality that the Yukon was wide open for development. Its plan was to utilize these resources for maximum profit and to establish a legal framework for resource extraction. The lack of local input in decisions and policies, combined with Ottawa's desire to maximize resource extraction, created a long-term environmental problem.

The flora and fauna of the Yukon, particularly in the Klondike Valley, and the

⁶. N. Seigel and C.A. McEwan, *A Historical Overview of Fishing in the Yukon* (Whitehorse: Northern Biomes Ltd. Environmental Services for Department of Fisheries and Oceans, June 1984). No first names were listed in their text.

⁷. Ken S. Coates, *Best Left as Indians Native - White Relations in the Yukon Territory, 1840-1973* (Montreal: McGill-Queen's University Press, 1993).

⁸. Ken S. Coates and William R. Morrison, *Land of the Midnight Sun, A History of the Yukon* (Edmonton: Hurtig Publishers, 1988).

⁹. Hugh S. Bostock, *Selected Field Reports of the Geological Survey of Canada* (Ottawa: Department of Mines and Technical Surveys, 1957).

¹⁰. Anglican Church. Diocese of Yukon. *Records*. Yukon Archives. Series IV-1, box 51, f. 6. 1896; COR O/53, f. 5, box 56, 1897; Series 1-1C box 14, f. 6. 1897; Series 11.6.a, box 56, f. 5-9.

aboriginal use of land and waters, are reviewed in Chapter One. Until the Gold Rush, Yukon Indians were able to utilize the natural resources of the region without restriction. As seasonal nomads, they moved from the river to the mountains in accord with the migrations of the caribou. In their passage from area to area, they depended on various fish and animal populations. During the summer, Yukon Indians moved to the rivers and lakes to stock up on fish for the coming seasons. In the fall, they hunted. When their fish stocks ran out in January or February, they were forced to disperse into smaller groups to hunt. Their mobility was restricted only at break up during spring, when it was impossible to use the rivers and lakes. Evidence provided in this Chapter supports the view that the small native population did not overfish or overhunt prior to the Gold Rush.¹¹

The small scale impact of the first miners who panned for gold and of the mining settlements they established between 1874 and 1895 is also discussed in this Chapter. While hoping for financial benefits, the government of the day did not sufficiently address the long term costs of large scale development or anticipate the environmental impact of the mines they were promoting.

Although the actual discovery of gold occurred in August 1896, it was not until news of large shipments of gold from the Klondike the following year that thousands of goldseekers from all over the world turned their attention to the Yukon. By 1899, parts of the Yukon wilderness had been transformed into a place of railways, street lights and hydro electricity, with regular sternwheeler service up and down the river system. All of these developments, which will be discussed in Chapters Two, Three and Four seriously modified or despoiled the natural environment.

¹¹. The Yukon covers over 482,000 square kilometres. In *Best Left as Indians*, Coates argues that the federal estimate of 2600 First Nation peoples living in the Yukon in 1896 was too high. The small size of the population in relation to the size of the Yukon supports the view that the First Nations did not overhunt until the Gold Rush. See p. 9.

The effects of fires and deforestation on the natural environment and the government's ineffective protection of the Indians are discussed in Chapter Two. Fires along the Yukon Valley ignited by travellers to Dawson, combined with the extensive tree cutting near Dawson City and along the Yukon's steamship routes, destroyed countless numbers of trees. This, in turn, resulted in an immediate loss of wildlife habitat. Along the rivers, large tracts of forest were cut as fuel for the steamship boilers, as well as for the fuel and construction needs of the mines and mining settlements. Notwithstanding warnings from federal officials that certain restrictions on timber cutting should be instituted, the government continued to issue unrestricted numbers of timber licences. The government also failed to enforce existing fish and wildlife regulations which caused food shortages and other problems for both the Han Indians residing near Dawson City, and for the other bands along the banks of the Yukon River from Whitehorse north to the Stewart River.

Mining changed the Klondike Valley in major ways. In Chapter Three, the effects of placer mining, dredging, the draining of lakes and the alteration of watersheds are analyzed. Hydraulic mining created large flumes to carry water. Numerous dams had to be built. This disruption or alteration of water courses had a detrimental effect on fish. In addition, mercury was used with serious long term environmental consequences. Beginning in 1900, dredging destroyed stream beds and river vegetation. Dredging was a major method of mining in the Klondike Valley until the First World War. After the war, it continued on a much smaller scale until 1966. Along hundreds of miles of creeks and rivers large buckets removed all vegetation and left miles upon miles of sterile tailings behind the dredge. All these activities altered the landscape and destroyed the natural vegetation. To this day, some of the creeks and streams around Dawson City remain devoid of fish and plant life.

The sudden increase in population in the Yukon from a few thousand residents in 1896 to tens of thousands of people by 1898 is discussed in Chapter Four. This influx of people resulted in a serious reduction of wildlife stocks which upset the fragile balance

which had existed for centuries between native Indians and the landscape. In the Dawson area, the traditional native patterns of hunting and fishing were seriously disrupted by the changes wrought by the new mining population.

Disease was another consequence of the huge congregation of goldseekers. At Dawson, raw sewage was deposited directly into the Yukon River from whence it drifted three miles down river to Moosehide, the location of the new reserve set aside for the Han. This in turn caused a typhoid outbreak at Dawson City between 1898 and 1900. Other diseases brought in by miners such as influenza and tuberculosis also decimated the Han population who had little immunity to these infections.

Tens of thousands of miners, environmental ignorance and a national policy agenda based on use and profit resulted in an oppressive system of land and water usage that continued throughout the Gold Rush. The intention of the federal government was to extract as much revenue from the Yukon while taking minimal responsibility for the protection of the natural environment or the Indian people. The result was the relocation of the Han Indians to a reserve near Dawson and the beginning of the first chapter in a long history of federal government control over the Yukon.

CHAPTER ONE

The Yukon Before the Gold Rush

Introduction

The Yukon comprises a large geographic area of over 482,000 square kilometres of mountains, valleys, lakes and rivers (see Map 1, page 8). Throughout the Yukon prior to the arrival of the non-natives, the Indian people travelled over the lakes, rivers and trails to hunt and fish. Their prey included bear, caribou, moose, sheep and hares. Summers were spent at fish camps along the many rivers and lakes of the region.

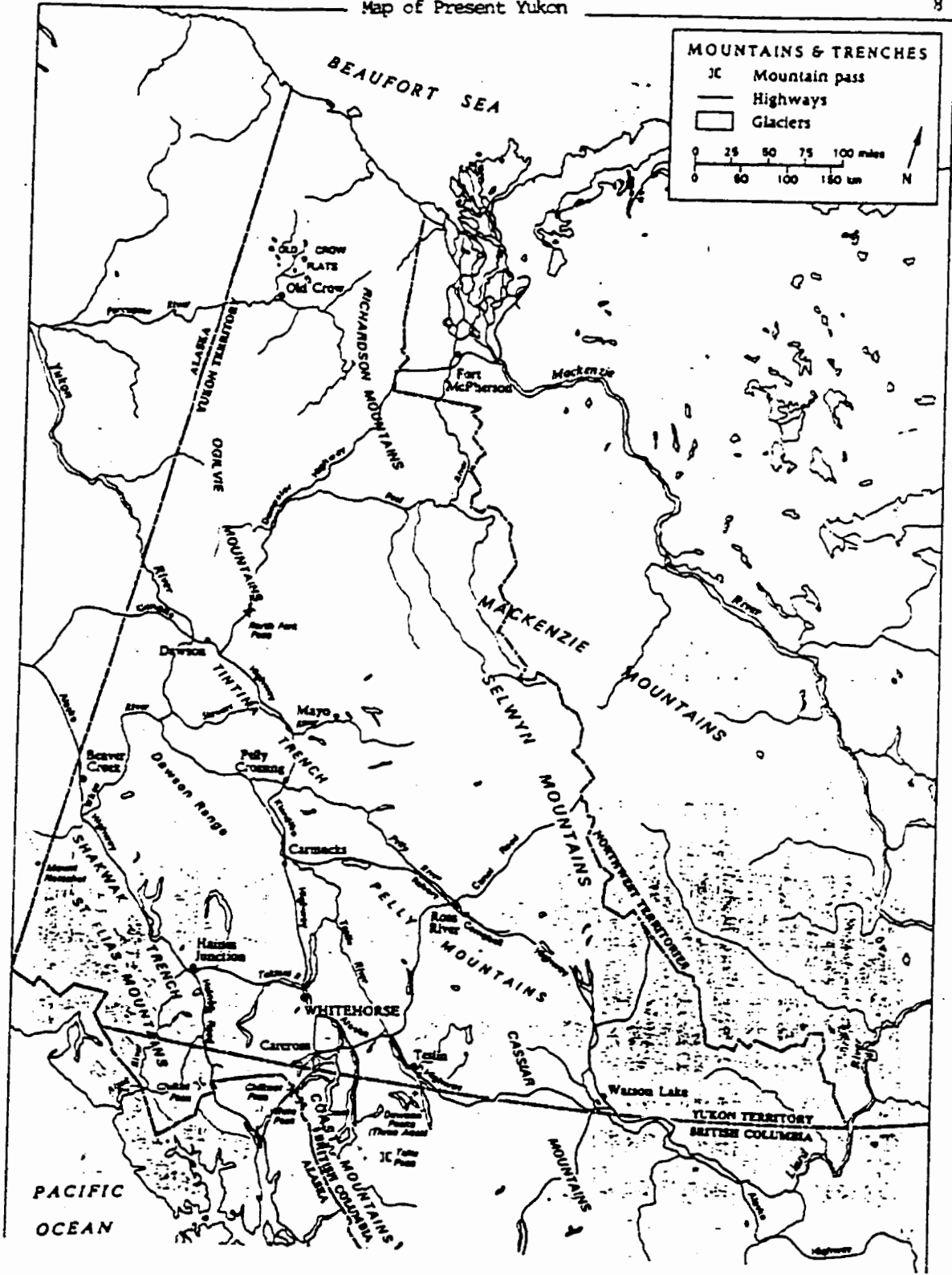
The first non-natives to inhabit the Yukon were traders from the Hudson Bay Company (HBC) who arrived during the 1830's. Thirty years later, missionaries came to convert the Kutchin natives in the north Yukon. Little changed until the advent of placer mining in the 1870's. The total population of the territory in 1895 before the commencement of the Gold Rush was less than three thousand people.

The first sign that the federal government took an interest in the territory was the decision to send a Geological Survey into to the region in 1887. Eight years later, the North West Mounted Police arrived to maintain law and order following the advent of the mining industry.

The environmental changes to land and water by the Gold Rush were limited to the transportation routes of the Yukon River Valley north from Whitehorse to Dawson City, and the Klondike Valley east of Dawson. Understanding the changes during the Gold Rush first requires an overview of the geography of the Klondike River basin.

The Natural Environment

The Yukon has experienced several ice ages. Approximately 18,000 years ago before a changing climate resulted in warmer temperatures, the Yukon was covered by



the Cordillera ice sheet. The ending of this ice age changed the shape of the land. The most immediate change with the ending of the ice age was the disappearance of the Bering Straits land bridge connecting Russia to western North America. The weight of the retreating ice caused glacial erosion which included the removal and transportation of large pieces of bedrock and surface debris. The melting of the ice released vast quantities of water, debris and sediment which settled to form the valley bottoms and flatlands.¹ The Yukon is strongly affected by the cold environment. This in turn limits the region to a limited growing season with continuous, discontinuous and sporadic permafrost. The last ice age that covered parts of the Yukon left high country, mountains, lakes and rivers.

The Yukon stretches easterly from the Coastal Mountains of the Pacific to the Richardson and Selwyn Mountain ranges of the northeast, and from the Cassiar Mountains of the south to the Ogilvie Mountains of the north and thence into the Beaufort Sea. Four major river systems work their way through the region. The Yukon River begins in Atlin, Tagish, Bennett and Marsh Lakes and proceeds northwesterly to Alaska ending in the Bering Sea, a distance of some 3,000 kilometres. The Peel River System in north east Yukon flows to the Mackenzie River in the Northwest Territories before discharging into the Arctic Ocean. The Liard River system flows into the Mackenzie River and thence into the Arctic Ocean. The Alsek River originates in the St. Elias Mountains southeast to Whitehorse and flows southwest into the Pacific Ocean.

The Gold Rush Region

The Gold Rush began in August 1896 in the Klondike Valley which forms part of the Yukon plateau. The actual Gold Rush began in the summer of 1897 when news of the Klondike discovery reached San Francisco and Seattle. It peaked by the end of

¹. Robert M. Bone, *The Geography of the Canadian North* (Toronto: Oxford University Press, 1992), pp. 28-31 and 33, 35 and 36.

1900 and by 1904, the rush was over.² However, the Klondike gold fields have continued to produce gold down to the present. Over time erosion deeply trenched it into a number of smaller streams, some of which were 150 to 250 metres in depth.³ Beneath these, the bedrock of the whole Klondike district had been subjected to enormous geological pressure which had flexed and squeezed the massive igneous rocks into foliated schists. The valley bottoms were marshy and partly wooded. The creek gravels included gold, small boulders and pebbles mixed with sand and muck. The gravels were covered with ice age sediments and glacial wash which included vegetable remains, roots, the bones of prehistoric sheep, goats, bear, buffalo, musk ox and mammoth.

Placer gold⁴ was found throughout the Klondike Valley gold district which covered approximately 1,600 square kilometres. The Klondike gold district is bounded to the north by the Klondike River, a tributary of the Yukon River and to the south by the Indian River, also a tributary of the Yukon River. During the Gold Rush the major finds were in Bonanza Creek and its rich tributary Eldorado Creek, Bear Creek, Hunker Creek, Too Much Gold Creek and All Gold Creek. Along these waterways, large gold deposits were discovered in the gravels which lay near the bottom of the creek valleys.

² Melody Webb, Yukon, *The Last Frontier* (Toronto: U.B.C. Press, 1993) p. 125 and 141 believes that the rush really started after the arrival of gold in San Francisco and Seattle in August 1897 and was over three and a half years later; William R. Morrison, *Showing the Flag The Mounted Police and Canadian Sovereignty in the North, 1894-1925* (Vancouver: U.B.C. press, 1985) p. 31 and 56, suggests that the rush began in the autumn of 1897 after news of the strike became common knowledge. He advocates that the rush was over by 1901 but thousands continued to come to Dawson after 1899 notwithstanding the large departures of miners who left to seek gold in Alaska; Ken S. Coates, *Best Left as Indians*, p. 39 takes the position that the gold rush started in 1897 and "dwindled to a trickle" by 1905; Coates and Morrison, *Land of the Midnight Sun*, pp. 85, 145 and 146, believe that by the fall of 1897, thousands travelled north to the Klondike. They are of the opinion that as early as the end of 1898, the population in the Yukon began to diminish and that the gold rush was over by 1904.

³ Hugh S. Bostock, "Yukon Territory," in *Selected Field Reports of the Geological Survey of Canada 1898 to 1933* (Canada: Department of Mines and Technical Surveys, 1957). The balance of this page and the next page, unless otherwise indicated, on the Klondike landscape and forest cover is from pp. 18-22, 65-68 and 82.

⁴ Michael Gates, in *Gold at Fortymile Creek Early Days in the Yukon* (Vancouver: University of British Columbia Press, 1994), p. 151 describes placer gold as free particles found in gravels. The method of recovery is known as placer mining.

Map 2⁵ is a current map of the Dawson City area including the Klondike Valley and shows the course of the Yukon River northwest to the International Boundary. This map, updated in 1991, reveals the waste along the Klondike Valley. Map 3⁶, updated in 1988, shows the various creeks of the Klondike Valley including Bonanza, Hunker, Eldorado, Too Much Gold and All Gold Creeks.

The richest finds were only forty five to sixty centimetres above the bedrock and underneath anywhere from half a metre to over six metres of permanently frozen sphagnum bog or peat (black vegetable matter). R.G. McConnell produced a report in 1907 discussing the Klondike high level gravels including the geology and topography of the Klondike Valley.⁷ Attached to the report was a map of the auriferous gravels on Bonanza and Hunker Creeks prepared during 1906. This map describes in great detail the various gravels along the Klondike River and for the various creeks running south from it.⁸

The Klondike River drained into the Yukon River and although the valley was relatively narrow, in places the river was as wide as four hundred metres. The river flowed at a speed of approximately eight kilometres an hour. It had many low wooded islands and shifting sand bars and was fed by a number of streams. The streams were small, not exceeding four and a half metres in width and separated from one another by long gravel ridges. Alongside the water the gravel had been ridged or terraced into

⁵ Map 2, Appendix 1, Canada, Centre for Mapping Department of Energy Mines and Resources, 1991, Dawson, Yukon Territory, scale 1:250,000.

⁶ Map 3, Appendix 2, Canada, Centre for Mapping Department of Energy Mines and Resources, 1988, Stewart River, Yukon Territory, scale 1:250,000.

⁷ R.G. McConnell, *Report on Gold Values in the Klondike High Level Gravels* (Ottawa: Government Printing Bureau, 1907).

⁸ Map 4, Appendix 3, was completed for the McConnell Report on Gold Values during 1906. It was completed by J. Keele and F.H. MacLaren from Surveys conducted by the Geological Survey. The scale was 2,640 feet to the inch.

ledges by ancient water levels; these had an average height of 900 metres above the valley bottoms. The valley bottoms were marshy and partly wooded, the sides of the entire valley were covered by forests. As elevations increased, the forest thinned out and above 800 metres, the vegetation was limited to alpine and Arctic plants.⁹

Survey reports from the period indicate that the original forests contained white and black spruce, white birch, canoe birch, black poplar, and aspen.¹⁰ In 1898, mature birches in the valley bottoms had diameters measuring from 35 to 45 centimetres. Where drainage was poor, or where permafrost existed, plant life included tussock grasses, sphagnum and lichens with shrub birch and ericaceous shrubs around the areas of muskeg. Unfrozen and burned areas had a cover of aspen, birch and balsam poplar.¹¹

Among the animal species one would expect to find within this boreal ecosystem, were caribou, moose, dall sheep, wolves, coyotes, red foxes, bears, ermines, weasels, mink, lynx, beavers and porcupine.¹²

A report on the region's fauna prepared by Dr. Hart Merriam, an American botanist who travelled in the Yukon during 1899, sheds light on the rich diversity of the forest of one hundred years ago.¹³ Near Dawson, he observed that spruces became

dwarfed and entirely subordinate to the poplars which crowd their bushy tops

⁹ John Macoun in "List of Plants Collected by J.J. Tyrrell in the Klondike Region in 1899" *The Ottawa Naturalist*, December 1899, p. 209 listed a large number of plants which were similar to plants grown in the meadows, bogs, woods and river bottoms near Ottawa.

¹⁰ Bostock "Report of the Klondike Gold Fields" contained in *Yukon Territory Selected Reports*, pp. 65-68.

¹¹ E.T. Oswald and J.P. Senyk, *Ecoregions of the Yukon Territory* (Ottawa: Department of Fisheries and Oceans, Canada 1977), p. 49; Bostock, "Yukon Territory" in selected Field Reports, p. 67.

¹² Oswald and Senyk, *Ibid.*, p. 49.

¹³ Dr. C. Hart Merriam, North America Fauna No. 19, *Results of a Biological Reconnaissance of the Yukon River Region* (Washington: United States Department of Agriculture Government Printing Office, 1900), pp. 13, 24-45. The balance of this page and the first paragraph of the next page is from this source.

together for miles and miles. The spruces are in the gulches and in small clumps elsewhere, and a few are scattered about, their dark-green spike tops showing off well against the billowy mass of the lighter foliage of poplar and birch. The undergrowth remains much the same, and deep moss covers the ground and rocks. In damp sandy places along shore and on islands occasionally overflowed a bright-green scouring rush (*Equisetum*) grows so abundantly as to be a characteristic plant. The alpine juniper (*Juniperus nana*) is found occasionally on hillsides not too thickly grown with poplars, and on the more open hillsides the landscape is brightened by masses of fireweed (*Chamaenerion angustifolium*), for even here forest fires are not a novelty.

Dr. Merriam noted that woodland caribou inhabited the high ground along the river routes to Dawson and in the Klondike Valley. He observed dall mountain sheep at Lakes Bennett and Tagish. In his report, he also noted the location of mountain goats near the Chilkoot Trail, at the White Pass Mountain and near Lake Tagish. Other animals in the Klondike Valley and along the Yukon River route to Dawson included moose, dall sheep, wolves, coyotes, squirrels, mice, red foxes, bears, ermines, weasels, lynx, beaver and porcupines and even wolverines.

Yukon First Nations: An Introduction

According to oral tradition, the native peoples of the Yukon believed that they originally came from a distant country lying far to the north by travelling over the Bering Straits land bridge. Of the present inhabitants, the Gwitchin¹⁴, Han, Kaska, Tagish, Northern Tutchone and Southern Tutchone, are Athapaskans. The remaining native group, the Teslin, are linked linguistically and culturally to the Coastal Tlingit¹⁵. For thousands of years, these tribal bands followed a wandering existence tied to the seasonal movements of the caribou, moose, bear, sheep and other large mammals for food,

¹⁴. In the nineteenth century the Gwitchin were referred to as Kutchin. Richard Slobodin refers to them as Kutchin in his article "Kutchin" contained in June Helm, (ed.), *Handbook of North American Indians*, Volume 6, Subarctic. (Washington: The Smithsonian Institute, 1981); (Hereafter cited as *Handbook of North American Indians*).

¹⁵. The Gold Rush had a major impact on the Han and the Northern and Southern Tutchone and the Tagish. For this reason, only these First Nations are discussed in detail in this thesis.

clothing and shelter. It was a life style which required both an extensive territory and extensive use of the land and water within that territory.

For the most part, the Indians travelled in the path of their game in isolated groups only congregating during the summers at traditional fish camps where the entire settlement met for the salmon run. Much of the fish and game obtained was dried for later consumption. Occasionally, these food sources failed to suffice the native peoples through the long, dark and harsh winters. As animal populations diminished or the pattern of annual animal migration suddenly changed, food shortages and, on occasion, starvation, could occur.

The Tagish occupied an area in the southern Yukon west of the Inland Tlingit, encompassing the Cassiar area including Marsh and Tagish Lakes. Prior to the Gold Rush, their population ranged between fifty and eighty individuals.¹⁶ The salmon run was limited, but the number of large fresh water lakes supplied plenty of whitefish and trout. In the late summer, the Tagish would travel to the higher areas to hunt caribou, moose, sheep and wood chucks.¹⁷ With stores replenished, they would remain in their camps until January when smaller groups would disperse to hunt and trap.

The Tutchone ranged over the southern Yukon to the west of the Tagish. Their traditional area stretched from what we now know as Alaska in the west to the Northwest Territories in the east and as far north as the Stewart River, north of Mayo. In the fall they hunted moose, mountain goats, caribou and mountain sheep. Smaller game included marmots, ground squirrel and hares. The Tutchone had to cover hundreds of miles in

¹⁶ Frederick Schwatka, in his *Report of a Military Reconnaissance in Alaska in 1883* (Washington: U.S. Government Printing Office, 1884), p. 83, estimates in 1883 that they were no more than 50; George Dawson, in his *Report on an Exploration in the Yukon District N.W.T. and Adjacent Northern Portion of British Columbia 1887*, Geological and Natural History Survey of Canada, Volume 3, part 1 (Montreal: William Foster Brown Co., 1889), p. 204B estimated that their population was between seventy to eighty.

¹⁷ Catherine McClellan, "Tagish," in *Handbook of North American Indians*, p. 483.

response to the shifting movements and availability of their game. From the end of the hunt in early winter, they would congregate in larger groups until late winter when they would again disperse to replenish their food stocks. In summer, they caught salmon and fresh water fish.¹⁸ As a supplement to fish and game, the Tutchone relied on berries, the inner bark of various trees and Hedysarum roots.¹⁹

The Han Indians inhabited the mid western area of the Yukon south of Dawson City and north to Circle Alaska. According to Cornelius Osgood, their primary food source was fish.²⁰ The Yukon and Klondike Rivers were the prime salmon areas. Other fresh water fish included lake trout, grayling, white fish and suckers. This constant source of food allowed the Han to live for the major part of each year at traditional fishing places. They left the fish camps only in February and March, and later in September and October, to hunt for moose, caribou and other game. By October, they returned to the fish camps where they stayed until the caribou hunt in February and March.²¹

In the latter part of the nineteenth century, four Han settlements existed. The first settlement was upstream near Eagle, Alaska on the Yukon River along the Canadian-American border known as Charlie's Village. Further south was Johnny's or David's Village. Eleven kilometres downstream from present-day Dawson City found a third settlement at Nuclaco across the Yukon River from Fort Reliance. The population of

¹⁸. Catherine McClellan, "Tutchone," *Handbook of North American Indians*, supra, p. 493.

¹⁹. *Ibid*, p. 496.

²⁰. Cornelius Osgood, "The Han Indians: A Compilation of Ethnographic and Historical Data on the Alaska-Yukon Boundary Area," *Yale University Publications in Anthropology*, 74 (New Haven, Conn. 1971), p. 115; Ken S. Coates, *Best Left as Indians: Native White Relations in the Yukon Territory 1840-1973* (Montreal: McGill University Press, 1991), p. 11.

²¹. John R. Crow and Philip Obley, "Han," in *Handbook of North American Indians*, supra pp. 507-509.

Nuclaco in 1883, including visitors, was estimated to be approximately 150.²² A fourth settlement existed at the prime salmon run at the junction of the Klondike and Yukon Rivers.

Map 5 was produced in January 1898 which shows the northwestern part of the Dominion of Canada. Charlie's Village and Johnny's (John's) Village are shown on this map while Nuclaco is not shown. Nuclaco was located across from Fort Reliance, which is shown on map 5. The fourth village was at Dawson City which was later moved in 1897 to Moosehide, which is also indicated on map 5.²³

The use of the land and waters by the native peoples of the Yukon Territories had a minimal impact on the region's ecosystem. The various Yukon First Nations had traded with each other for centuries.²⁴ Commencing in the 1830's when the Europeans arrived in the Yukon, the various Indian settlements continued to trade with other Indian settlements or directly with the Hudson's Bay Company (HBC) in order to obtain trade goods and later guns. By the 1830's, guns became a staple trading item for Yukon Indians which dramatically enhanced their ability to hunt game. However, the large number of caribou and moose relative to the small size of the Yukon Indian population did not result in serious game depletions until approximately 1900 when overhunting by natives and non-natives occurred.

During the 1880's, the combined population of both the Han Indians²⁵ and the

²² Donald W. Clark, *Fort Reliance, Yukon. An Archaeological Assessment*, Mercury Series, Archaeological Survey of Canada Paper 150 (Hull: Canadian Museum of Civilization, 1995), p. 35.

²³ Map 5, Appendix 4, NAC National Map Collections, Map of the Northwestern Part of Canada, Surveyor-General's Office, Department of the Interior, Ottawa, January 1898.

²⁴ Ken S. Coates and William R. Morrison, *Land of the Midnight Sun. A History of the Yukon*, (Edmonton: Hurtig Publishers, 1988), p.13.

²⁵ Osgood, *The Han Indians*, p. 33; He estimated the total population to be 430.

Tutchone Indians living from Lake Laberge to Stewart did not exceed seven hundred people.²⁶ The small number of Han/Tutchone in relation to the expanse of their territory did not deplete fish or wildlife stocks in the traditional hunting and fishing areas even after firearms were introduced. They did, however, have one habit which had an impact on the environment - the use of fire.

It was customary for the indigenous peoples, particularly those Athapaskans living further to the east in the present day Northwest Territories, to use fire to open up an area to attract bear and moose. The Indians also set fires in the spring, on windless days, to burn areas to minimize the risk that larger fires might spread and to create trails.²⁷ Near Fort Resolution, caribou hunters were known to have built fires where trails forked - one fire close to one trail and a second near to the other. After the fires had burnt out, the hunters would choose the lucky trail by noting the pile of burnt remains which best resembled caribou tracks.²⁸ It is believed that this practice also occurred in the Yukon.²⁹

The Non-native Arrivals

Before 1870, the British government administered the Yukon through the HBC established in 1821.³⁰ The earliest European laws for the Yukon came with the traders

²⁶ Catherine McClellan, states that the population of Kah-Tuna near Fort Selkirk in 1883 numbered between 175 and 200. "Tutchone," *Handbook of North American Indians*, p. 495.

²⁷ Jamie Bastedo, *Shield Country Life and Times of the Oldest Piece of the Planet* (Calgary: The Arctic Institute of North America, 1994), p. 60.

²⁸ *Ibid.*, Bastedo, p. 60, quoting S.S. Janzen, "The Burning North - A History of Fire and Fire Protection in the Northwest Territories" (Master's thesis, The University of Alberta, 1990), p. 23. Fort Resolution is in the Northwest Territories south west of Yellowknife.

²⁹ Carter, *A History of the Use of Fire*, describes this practice in the Yukon without specifying which First Nation used it.

³⁰ An Imperial Statute, the Act for Regulating the Fur Trade, enacted in London in 1821, gave the HBC the authority to regulate the fur trade to the Hudson Bay Company.

of the HBC. The Company also served as the sole administrative body since there were no other civil or military authorities present. The opening of the first HBC's forts in the 1840's marked the establishment of the organized fur trade. Except for those forts established briefly in the central and southern Yukon,³¹ the fur trade mainly flourished in the Northern Yukon at Fort Yukon at the junction of the Yukon and Porcupine Rivers. The Kutchin provided furs to the HBC traders at Fort Yukon. There were no records kept by the HBC indicating a decline in fur received at Fort Yukon during the nineteenth century until the arrival of other traders after 1874.³² In 1887, the amount of furs annually produced in the Yukon was substantial.³³ Fort Resolution in the Han territory was founded in 1874 by Leroy McQuesten on behalf of the Alaska Commercial Company. This post continued until 1886 when the company established a new post at Fort Nelson at the mouth of the Stewart River.³⁴ After the abandonment of Fort Nelson the following year, a new fur trade settlement appeared at the Fortymile River on the west side of the Yukon River.

The latter half of the nineteenth century witnessed the beginnings of scientific interest in the region. The interest of the United States in acquiring Alaska prompted the beginnings of several voyages of scientific discovery in the Yukon during the 1860's. Within a four year period, several groups travelled into the Yukon, including W.D. Dall, the leader of an expedition to Alaska between 1866 and 1868, Frederick Whympier, who

³¹ Between 1842 and 1870, five trading posts were established in the Yukon. Lapierre House on the Porcupine River in 1842, Fort Pelly Banks on the Pelly River in 1846, Fort Frances Lake in 1846, Fort Yukon on the Porcupine River in 1847 and Fort Selkirk at the junction of the Yukon and Pelly Rivers between 1848 and 1852 in Tutchone territory. Both Fort Frances and Pelly Banks were abandoned soon after opening.

³² Kenneth Stephen Coates "Furs Along the Yukon: Hudson Bay Company and Native Trade in the Yukon River Basin 1830-1893" (Masters Thesis, University of Manitoba, 1979).

³³ Dawson, *Report on an Exploration*, p. 28B. Dawson indicated that in 1867 the annual value of furs reaching the HBC at Fort Yukon was \$50,000.00. Dawson estimated in 1897 that the annual value of furs produced in the Yukon to be \$27,000.00, which may indicate either a decline in the amount of furs received or a decline in price. Dawson suggested in 1887 that there was no evidence of a scarcity of furs.

³⁴ Clark, *Fort Reliance*, pp. 3, 20.

travelled from the Bering Sea to Fort Yukon in 1868 and Charles Raymond, who travelled along the Yukon River the following year. They, along with the fur traders and missionaries, recorded their observations in diaries, letters and reports. This coincided with the beginning of missionary and mining activity.³⁵

Between 1831 and 1843³⁶, a series of expeditions were mounted on behalf of the HBC to explore the Liard basin for a useable trade route to the Northwest Coast.³⁷

³⁵. Alexander Murray, *Journal of the Yukon 1847-48*, edited by L.J. Burpee (Ottawa: Government Printing Bureau 1910); William Carpenter Bompas, *Letters 1865-1900* (Yukon Archives: MSS 125, 81/83); Robert Campbell, *Two Journals of Robert Campbell 1808-1853* (Seattle: Limited Edition, 1951); A.K. Isbister, "Some Account of Peel River North America," *Journal of the Royal Geographical Society*, 15, -332 for a description of the Hudson's Bay establishment of Fort McPherson in 1845; Robert McDonald, *Journals 1863-1913* (Yukon Archives: MSS 85/97, 1862-1875 F-192, 1876-1893 F-193, 1894-1913 F-194); Charles Raymond, "Reconnaissance of the Yukon River 1869," *Compilations of Narratives of Exploration in Alaska* (Washington: Government Printing offices), p. 19; Mortimer Trimmer, ed., *The Yukon Territory: The Narratives of W.D. Dall Leader of the Expedition to Alaska 1866-1868* (London: Downey & Company Ltd., 1989), pp. 105, 107 and 111; Frederick Whympier, "A Journey from Norton Sound Bering Sea to Fort Youcon," *Journal of the Royal Geographical Society*, 38 (1868), p. 219. Whether one relies on the sketches prepared by early explorers such as Murray, *Journal of the Yukon 1847-48*; or Campbell, *Two Journals*; the limitation of time and pre-conceived prejudices must be taken into account by way of explaining why such records must be carefully scrutinized. In her study, Julie Cruikshank, *Reading, Voice, Oral and Written Interpretation of the Yukon's Past* (Vancouver: Duncan & McIntyre, 1991) notes that while scientific studies of tree rings in the Yukon suggest extreme cold for the years 1845, 1849 and 1850, and that observations made by Campbell in his reports to the Hudson Bay Company leave the recorded impression of the central Yukon in those same years as being extremely cold with game being scarce, these observations would be inaccurate for other time periods. The absence of a written recorded history of the first people of the Yukon creates a further limitation for the period prior to European contact. The advantage of utilizing oral history is that time limitations are minimized since they are voiced over a life time of observing animal and plant life cycles. Another factor to consider is language. Most of the Yukon First Nation Peoples are of Athapaskan background. According to Cruikshank, the differences between English and these languages may create the potential for misleading translations. Bearing these caveats, as an underlying concern, it is only from the journals, letters and reports of European observers that a record can be established of the use of land and water for the nineteenth century.

³⁶. Kenneth Stephen Coates, "Furs Along the Yukon: Hudson's Bay Company Native Trade in the Yukon River Basin 1830 - 1893" (Master's thesis, University of Manitoba, 1979).

³⁷. In 1831, an expedition went to west of Frances Lake in the Southern Yukon; an 1834 expedition crossed Dease Lake into the Stikine area; in 1837, Robert Campbell established a trading post south of the present day Yukon at Dease Lake; and in the same year, Thomas Simpson and Peter Dease explored the western Mackenzie Region; in 1839 and 1842, John Bell explored the Peel River and later the Porcupine River in the Yukon Region; in 1842 Robert Campbell travelled to the intersection of the Yukon and Pelly Rivers after having been part of two previous expeditions in 1838 and 1840; in 1843, Andrew McBeth explored the Gravel River. A description of these exploratory voyages is contained in Campbell, *Two Journals*.

Robert Campbell, a Hudson Bay Company trader and explorer, recorded his experience on first meeting the Tutchone during the winter of 1838-1839.

But the great attraction was the natives, whom we came across generally in large bands in camps; they all were very friendly & we always landed to have a talk with them. They were astonished at seeing us & our boat, as they had never seen either a white man or a boat before ... They were destitute of almost every article of civilized usage. The only arms that they had were the bow & arrow; their substitute for axe & knife was a bone or stone; their "kettle" was made of small fibres of the roots of trees, mostly split & then knitted up tight & close like a blanket; after using it for a time it becomes water proof & is then fit for cooking purposes; the method being to heat stones in the fire & throw them into the "kettle" with a pair of tongs formed by bending a stick, and keep on doing so until the water is boiling & the food cooked.³⁸

Wildlife and Fish

Campbell reported the abundance of fish in the Yukon - Pelly area in 1840: "Four kinds of salmon ascend the river in great numbers in their season, and then comes a busy harvest time for the Indians, who assemble in large camps along the river and handle their spears with great dexterity."³⁹ The supply of fish was sometimes enormous. He noted that fish were so abundant that the grizzly bears which existed on them became so fat the Tutchone would not eat them.⁴⁰

Salmon taken by the Han during the nineteenth century were not solely for food, they were also used as barter in the inter-tribal trading of European trade goods. Prior to 1846, neither the Han nor the other tribes with whom the Han traded had access to guns since trading furs for rifles had not yet occurred at the HBC forts; but, by the 1860's, the Han had substituted firearms for the traditional bows and arrows.⁴¹

³⁸. Campbell, *Two Journals*, pp. 48-50, 96-97.

³⁹. *Ibid.*, p. 13.

⁴⁰. *Ibid.*, pp. 48-50, 96-97.

⁴¹. Clark, *Fort Reliance*, pp. 114-115.

Despite the years of abundance, starvation was a recurring factor due to the occasional disappearance of salmon and of local wildlife such as hare, the changing patterns of larger animal migrations,⁴² the exceptionally cold winters, and the difficulty of movement during spring break-up.⁴³ In 1871, Robert McDonald, an Anglican missionary living with the Kutchin in the Northern Yukon, recounted episodes where the hunt obtained minimal results with little game stocked for winter.⁴⁴ This scarcity occurred again in 1875 and 1877. In 1879, the Peel River Indians were forced to eat their leather lodge skins to survive. McDonald recounted incidents of starvation in 1880, in 1889, and again in 1891. He explained that migrating herds of caribou were not found throughout those years.

Severe changes in weather had a dramatic impact on hunting. In the Dawson area, winter arrived in October and hunting was impossible after temperatures dropped below minus thirty degrees Celsius. It was not until May that the rivers and lakes became free of ice and canoe travel became possible. During the spring thaws, when the ice was unreliable, there were long periods when hunting was impossible because neither sleds nor canoes could be used.⁴⁵ Yet normally, in the interior of the Yukon, moose would be found.

⁴² John R. Crow, and Philip Obley, "Han" in *Handbook of North American Indians*, p. 509 state that as trading increased after 1869, caribou was not hunted as much since their skins were not a major trading item.

⁴³ Catherine McClellan and Glenda Denniston, "Environment and Culture in the Cordillera," in *Handbook of North American Indians*, supra p. 37; Ken S. Coates and William R. Morrison, *Land of the Midnight Sun, A History of the Yukon* (Edmonton, Hurtig Publishers Ltd. 1988), p. 12. Hares relied on snow to bend birch and alder bushes. Where a winter occurred with little snow, the hares could not reach the birch and alder bushes which meant many would perish. Hare populations peak and diminish. When hare populations declined in January and February, starvation could occur, if larger game was not found.

⁴⁴ McDonald, Journals, October 15, 1874, 2 August 1877, 20 June 1879, 23 February 1880, 6 August 1880, 16 December 1880, 21 April 1891, 4 December 1871, 1 February 1875, 3 February 1875, 14 February 1879, 5 March 1880, 20 March 1889, 6 December 1889, 31 December 1889, 4 February 1891. This is the source for the balance of this paragraph.

⁴⁵ Gates, *Gold at Fortymile*, p. 4.

The Kutchin Indians living near the Fort Yukon area used a "deer barriere" whereby deer would be herded to a narrow point that was blocked with waiting hunters. The use of a deer barriere could also include snares to entrap the deer.⁴⁶

In 1887, when the Canadian government sent George Dawson on an expedition to explore the area's geography, the abundance of game in the area was notable:

The moose is more or less abundant throughout the entire inland region, and together with the caribou, which is similarly ubiquitous, constitutes a great part of the food of the Indians. We found the moose particularly plentiful along the Upper Liard River, and it is stated that the country drained by the White River is noted among the Indians as a moose and beaver region. The caribou is everywhere common, but is scarcely seen in the valleys or lower country during the summer, when it ranges over the high, alpine moors and open slopes of the mountains.⁴⁷

Map 6⁴⁸ was produced by Mr. William Ogilvie as part of the Report of the Geological Survey 1887 which dealt with explorations of Northern British Columbia and the Yukon District. This map is also useful for identifying the route taken by the goldseekers from Skagway north along the Yukon River to the Pelly River, south of Dawson City.

⁴⁶. Robert Kennicott, "Journal of Robert Kennicott May 19, 1859 - February 11, 1862." Contained in *The First Scientific Exploration of Russian America and the Purchase of Alaska*, ed. James A. James, (Evanston: Northwestern University Press, 1942). Journal entries for March 25 and March 26, 1862. While weather and geology differed, modern anthropologists confirm that river travel, large summer fish camps and winter hunt camps of small groups extended throughout the Yukon region; James VanStone, in *Athapaskan Adaptations: Hunters and Fishermen of the Sub Arctic Forest*, (Chicago: Aldine, 1975), writes about the Yukon Indian pattern of hunting and fishing at large summer gatherings and by smaller hunting groups in the winter; Cornelius Osgood, another anthropologist, confirms the use of fish traps and nets described by both Murray and McDonald, in *The Han Indians*.

⁴⁷. George M. Dawson, *Report on An Exploration*, p. 25B-26B.

⁴⁸. Map 6, Appendix 5, was prepared by William Ogilvie as the third Map for the George M. Dawson Report of an Exploration. The map was corrected in January 1898. This map was a facsimile reprint printed in 1988 by the Yukon Historical and Museums Association to accompany the Centenary report of George M. Dawson's 1887 Yukon Expedition Report.

Numerous authors have described First Nation use of various kinds of fish traps and weirs.⁴⁹ Gaffing by the use of a hook on the end of a pole was also utilized together with a weir. Yukon Indians used gill nets made from twisted willow bark. Nets were used to fish for salmon, grayling, trout and whitefish in the Yukon River. Another fishing method involved placing specially-constructed willow baskets as barricades, which were set across the smaller channels of the river. Later these fish traps would be considered obstructions to non-native river traffic.

Frederick Whymper, an American scientist travelling through the Yukon, near Fort Yukon in 1868, observed the Kutchin Indians using wires, land nets and spears. The Yukon River salmon run that season was plentiful. Whymper also saw fleets of birch bark canoes from which the paddlers dipped their hands in the waters to bring up fish.⁵⁰

Dawson also noted the abundance of anadromous salmon, which according to the local Indians would run up the Pelly River for a considerable distance past the confluence with the Lewes (Yukon) River. During the summer of 1887 he noted a large number of salmon along with white fish, lake trout, pike and suckers.

During the same year, William Ogilvie, while still a surveyor in the area, observed half a dozen families camped on an island in the Yukon River. This was just past the junction with the salmon-filled Klondike River and they had driven stakes across

⁴⁹ D. Leechman, *Vanta Kutchin*, Anthropological Series No. 33, Bulletin No. 130, (Ottawa: National Museum of Canada, 1954); Osgood, "The Han Indians," p. 66-68; C. McClellan, *My Old People Say*, Publications in Ethnology No. 6, 1, (Ottawa: National Museums of Canada, 1975), p. 64; E. Rostlund, *Freshwater Fish and Fishing in Native North America* (Berkeley: University of California Press, 1952), p. 90-99; Murray, *Journal of the Yukon*, journal entry 6 July 1848. These authors are the authority for this paragraph.

⁵⁰ Whymper, "A Journey from Norton Sound," p. 232.

the river's mouth to force some of the salmon to enter their fish traps.⁵¹

As late as 1892, E.J. Glave described the obviously successful way of life of the Indians he met in the Yukon River Valley:

"During the winter the natives of the interior roam over the land in small parties, hunting and trapping, but return here with their spoils of black and brown bear, black, cross, grey, white and red fox, wolverine and otter, lynx, beaver, etc., and exchange them for blankets, guns, powder, and tobacco which the Chilkat Indians bring to them from the coast."⁵²

Based on these reports, the Yukon Indians during the nineteenth century normally enjoyed adequate fish and game. Where incidents of starvation occurred it was largely caused by herd movements out of the traditional hunting areas. Prior to the Gold Rush Yukon Indians freely used the land and waters without impairing the sustainability of wildlife or fish.

It is not possible to conclude that the experience of the Indians in the Klondike region or along the Yukon was the same, for McDonald was writing specifically about the Northern Yukon where fur trading posts had existed for a number of years. However, river travel, summer fish camps and winter encampments derived from several distant camps extended throughout the Yukon.⁵³ Yukon Indians enjoyed a generally healthy state before the introduction of epidemics brought by the non-natives.

Disease

The arrival of Europeans created the opportunity of direct dealing with the HBC.

⁵¹. William Ogilvie, *Early Days in the Yukon and the Story of its Gold Finds* (London, John Lane, The Bodley Head, 1913), p. 117. He observed this on 1 September 1887.

⁵². E.J. Glave, "Pioneer Pack Horses in Alaska: The Advance," *The Century Illustrated Monthly Magazine*, Vol. 44, nos. 5 and 6, p. 682.

⁵³. VanStone, *Athapaskan Adaptations*; Osgood, "The Han Indians." Their views as anthropologists confirm the observations of Murray and McDonald.

As the HBC established trading posts in the Yukon, they brought epidemic diseases that decimated the Kutchin.⁵⁴ The Yukon Indians had not been exposed to the diseases that arrived with the HBC traders.⁵⁵ Virgin soil epidemics occur where a population, such as the Yukon Indians, had no prior contact with European diseases and therefore were almost immunologically defenceless.⁵⁶ Since no one in the Indian settlements had built up immunities against these new diseases, when the virgin soil epidemic arrived, almost the entire population simultaneously became ill. One example was the arrival of smallpox to the north western parts of Canada and Alaska.⁵⁷

Smallpox imported by Siberian merchants first afflicted the Alaskan coastal Tlingit Indians as early as 1785. During the years from 1836 to 1840, and throughout 1843 and 1844, fur traders with the Russian-American Company helped spread the disease up the

⁵⁴. Shephard Krech, III, "On the Aboriginal Population of the Kutchin," *Arctic Anthropology*, vol. 15 (1978), 89-104, quoted in Coates & Morrison, *Land of the Midnight Sun*, p. 30.

⁵⁵. T. Kue Young, *Health Care and Cultural Change, The Indian Experience in the Central Subarctic* (Toronto: The University of Toronto Press, 1988), p. 34; this view is shared by Cole Harris, "Smallpox Around the Strait of Georgia in 1782", *Ethnohistory* 41:4 (Fall 1994), p. 591 who was of the opinion that Europeans caused disease wherever they went in the western hemisphere. Two other articles have reviewed the belief of a number of historians that diseases brought from the old world greatly reduced the Indian population in the new world. See Alfred W. Crosby, "Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America"; *The William and Mary Quarterly* 34 Series, vol. 33 (1976), p. 289; D. Ann Herring "There Were Young People and Old People and Babies Dying Every Week. The 1918-1919 Influenza Pandemic at Norway House" *Ethnohistory* 41:1 (Winter 1994), p. 73; In a recent text by James B. Waldrum, D. Ann Herring and T. Kue Young, *Aboriginal Health in Canada: Historic, Cultural, and Epidemiological Perspectives* (Toronto, University of Toronto Press, 1995) pp. 44-46 review the authors who espouse the view that infectious diseases brought from Europe caused a severe decline in the Indian population of North America. However, they do indicate that other authors are of the view that infectious diseases were not a significant cause in the reduction of the Indian population. One of the reasons may be that certain diseases did not arrive until the 17th Century, long after purported epidemics struck the Caribbean and Mexico. See Dean R. Snow and Kim M. Lanphear "European Contact and Indian Depopulation in the Northeast: The Timing of the First Epidemics", *Ethnohistory* 35:1 (Winter 1988), p. 591.

⁵⁶. Crosby, *Virgin Soil Epidemics*, p. 287. Crosby was of the view that they were "immunologically almost defenceless" since they had not built up immunities. See also Waldrum et al *Aboriginal Health*, p. 44.

⁵⁷. Crosby, *Ibid.*, p. 295.

Yukon River almost as far as the Porcupine River.⁵⁸ Smallpox struck the Indians of the Yukon interior between 1835 and 1840.⁵⁹ To the east, starting in 1781, smallpox struck the Cree living between the Mackenzie and Hudson's Bay.⁶⁰ In the south, Europeans brought smallpox to the Strait of Georgia in 1782, and to the central part of British Columbia in 1862 from whence it swept the Fraser Valley and the Northwest coast.⁶¹

As the Indians were drawn into the trapping-trading economy, their well-being became important to the foreign trading companies, so it was for both commercial and for humanitarian reasons that the HBC supplied smallpox vaccine to the Indians in 1838.⁶² But inoculation was sometimes too late. Before the Russians could administer the smallpox vaccine, some 3,000 natives had died.⁶³

In his journals, McDonald also refers to the arrival of scarlet fever epidemics in the 1860's. The first one occurred in the winter of 1865-1866. His Fort Yukon entry for 10 November reads: "Very cold today. Reached the Fort at 4:30 p.m. Found that it was -51 degrees yesterday and -19 degrees this morning. Several of the sick worse. Tidings of 16 deaths having occurred in Sahnyatis camp." During the next ten days, he recorded further deaths in other Indian encampments; 13 casualties at one, 14 at another.

⁵⁸ E. Wagner Stearn and Allen E. Stearn, *The Effect of Smallpox on the Destiny of the Amerindians* (Boston: Bruce Humphries Inc. 1945), p. 65.

⁵⁹ Coates, in *Best Left as Indians*, pp. 10-11, notes that illnesses other than smallpox struck the Kutchin at Fort Yukon between 1847 and 1851.

⁶⁰ Young, *Health Care*, p. 35.

⁶¹ Stearn and Stearn, *The Effect of Smallpox*, p. 99.

⁶² Young, *Health Care*, p. 36.

⁶³ Stearn and Stearn, *The Effect of Smallpox*, p. 65.

On 19 November the number of dead was 14 out of 42.⁶⁴ Two years later, his journals show that this disease still ravaged the local population.⁶⁵

Such deaths were widespread around the trading posts where men from distant encampments congregated. Considering the small size of their winter camps, the effect of losing so many family members must have been terrible. From a survival perspective, insofar as it was the hunters who were dying, the effect was at times catastrophic. In one instance, 8 of the 11 men in one camp died.⁶⁶ McDonald concluded that the disease was scarlet fever.⁶⁷

Mining

The intent of the federal government on acquiring Rupert's Land and the Northwest Territories in 1870 was to administer the region's resources from Ottawa with a minimum of local input: "The Dominion has purchased the whole of the North West, and it belongs to Canada" asserted Prime Minister John A. Macdonald.⁶⁸ Subsequently, the federal government, from 1870 to 1896, administered the Yukon from a great distance, by exploiting the resources, and restricting local control.⁶⁹ Morris Zaslow

⁶⁴. McDonald, *Journals*, entries for November 10, 11, 14 and 19 1865. His entry for 11 December records 26 deaths in the Gens du Large country, 12 men, 8 women and 6 children. On 17 January 1866 he observed that at the other two trading posts at Peel River and Lapierre House, a large number of deaths occurred.

⁶⁵. *Ibid.*, 31 August 1867.

⁶⁶. *Ibid.*, 11 January, 1866.

⁶⁷. McDonald, *Journal*, 14 April 1856; Coates *Best Left*, p. 11 also confirm it was scarlet fever.

⁶⁸. From a speech by Sir John A. Macdonald in *House of Commons Debates 1875* (Ottawa: 1876), p. 656.

⁶⁹. Henry James Guest, "City of Gold: Dawson, Yukon Territory 1896-1918." (Ph.D. diss., Winnipeg: University of Manitoba, 1982); John A. Bovey, "The Attitudes and Policies of the Federal Government Towards Canada's Northern Territories 1870-1930." (Master's thesis, University of British Columbia, 1967) 111; Kenneth Coates, *Canada's Colonies: The History of the Yukon and North West Territories* (Toronto: James Lorimer & Sons, 1985), p. 10. In fact, the policies continued up to 1979; only then did the Federal Government permit local control of the Yukon Legislature.

summarized the government's colonial attitude towards the Northwest Territories during these years as one in which the resources were to be used as wellsprings of revenue and political patronage for the country as a whole.⁷⁰

The earliest regulations for mineral regulations for Dominion lands were enacted in 1883. The mining regulations drafted by the Department of Interior permitted any person to explore vacant Dominion lands not reserved or approved by the government for other purposes. In 1887, the government enacted, by Order in Council, a number of mining regulations for quartz (hard rock) and placer mining.⁷¹ The purpose of the 1887 mining regulations was to provide open access to all vacant Dominion lands in order to permit mining exploration and development.⁷² These enactments encouraged full use of the land for mining and permitted the use of water for the working of a mining claim.⁷³

The Free Miners Certificates were sanctioned by the government to encourage prospecting for minerals throughout the Yukon. Unfortunately, since the Indians did not appear to be settled in any one spot they were not perceived as owning their traditional hunting and fishing grounds, so even though they were not in competition with the miners for gold, their land was quickly taken up when they were not in residence.⁷⁴

⁷⁰. Morris Zaslow, *The Opening of the Canadian North 1870 - 1914* (Toronto: McClelland & Stewart, 1971), p. 14.

⁷¹. *Order in Council*, Number 9, 1887.

⁷². *Ibid.*, s. 2.

⁷³. *Ibid.*, s. 23 and 24.

⁷⁴. William Cronon in his book, *Changes to the Land, Indians, Colonists and the Ecology of New England*, (New York: Hill and Wong 1983), observed that the Puritans in New England were of the same opinion since the Indians moved so much and performed little work they could not lay claim to the land they occupied. This problem would surface during the Gold Rush.

During the 1870's a few miners had begun to pan for gold in the Yukon.⁷⁵ In 1879, gold was discovered in the Cassiar district to the south of the Yukon.⁷⁶ During this period, prospecting and drift mining was limited to the Big Salmon River, the Stewart River and the Sixty Mile River.⁷⁷ At this time both the industry and mass transportation were undeveloped and resource extraction was limited to the amount men could pan in a season and carry out on pack horses, sleds or canoes.

In 1884, mining activity intensified with the discovery of gold on the Stewart River. Three years later mining started on the Fortymile River.⁷⁸ Gold mining on the Stewart was short lived⁷⁹ but the establishment of a mining settlement on the Fortymile initiated a small scale influx of gold miners particularly from California and British Columbia.⁸⁰ George Dawson estimated, that in 1887, the total number of miners in the upper Yukon country was fewer than 250⁸¹ but there were enough of them to entrench mining practices which had originated elsewhere.

The communities of Ogilvie, Stewart, Fortymile and Fort Selkirk began as mining centres. The site of Fortymile became the most important of the settlements (see Map 5). By 1892, it had a population of approximately 500.⁸² By 1894-95 one thousand

⁷⁵. Ogilvie, *Early Days in the Yukon*, p. 100.

⁷⁶. George Wrong, *Review of Historical Publications Relating to Canada*, Vol. II. (University of Toronto Library: Published by the Librarian. n.d.), p. 180.

⁷⁷. Gates, *Gold at Fortymile*, p. 18.

⁷⁸. *Ibid.*, pp. 21, 36; Coates, *Best Left*, p. 33.

⁷⁹. Coates, *Best Left*, p. 33.

⁸⁰. Gates, *Gold At Fortymile*. p. 33.

⁸¹. Dawson, *Report of An Exploration*, p. 182B

⁸². Frank Duarden, *The Development and Structure of the Settlement System in the Yukon* (Whitehorse: Department of Library and Information Resources, 1981), p. 24.

non-natives resided in the Yukon Valley.⁸³

Placer gold lay amidst rocks and gravel above the bedrock. Miners employed various methods to mine the gold. Before the Gold Rush, the major method was drift mining which involved sinking a shaft downwards to bedrock. Since the overburden was frozen, the challenge lay in removing the various frozen layers of permafrost to extract the gold, which lay amidst the gravels, over bedrock. Around the Fortymile River, water was diverted by the use of dams, ditches or flumes.⁸⁴ Water was also used to remove the overburden on the Fortymile River and its various creeks. The size of the small mining population working in this area had a limited effect on the aquatic environment.⁸⁵

Conclusion

At the time the first mining settlements were established, the Han and Tutchone Indians were still maintaining a sustainable way of life by hunting and fishing. No evidence exists to show overconsumption of game or fish before 1896 even though firearms had replaced bows and arrows and hunting and fishing was done for the purposes of trade. Smallpox and scarlet fever struck the Kutchin and the Han during 1839, 1840 and again during 1865 to 1866. These diseases seriously reduced the population of the Kutchin and Han Indians. It is also clear that the small number of non-native miners who were reliant on simple technology had a negligible impact on the landscape and on the quality and quantity of game along the Yukon River. This would change during the Gold Rush, when thousands of goldseekers overhunted and overfished with disastrous consequences to the Han and Tutchone people.

⁸³. Gates, *Gold at Fortymile*, p. 88.

⁸⁴. *Ibid*, pp. 152 - 153.

⁸⁵. The effect of flumes and dams on fish is discussed in Chapter Three.

CHAPTER TWO

The Gold Rush: Changes to the Land

Introduction

In assessing the environmental effects of the Gold Rush, it is important to examine the attitude of the federal government. Ottawa was slow to react to events transpiring in the Yukon; but eventually, the government realized that at very little cost in terms of administrative work or capital outlay, it could assert sovereignty over a hitherto disputed region while generating substantial revenues for the federal treasury. By offering licences to goldseekers, for instance, it could make them pay for their brief encounter with the Yukon. They failed to anticipate the size of the influx of goldseekers, and neglected to respond to warnings by the police of overhunting and overfishing. When informed by local administrators of concerns over deforestation, the federal government failed to impose conservation policies. As it happened, the government's pro-development attitude resulted in irremediable changes to the landscape and a serious decline due to disease in the population of the Han Indians.

The rush for gold did not occur until the fall of 1897 when it became sudden and overwhelming. At the beginning of 1896, only several thousand non-Indian miners, traders and missionaries resided in the Yukon.¹ Two years later, the territory was overrun with tens of thousands of newcomers who quickly wrought serious and far ranging changes to the land. The federal government, concerned primarily with maximizing resource extraction, did little to ensure environmental protection. The

¹ The population of the Yukon increased substantially during the Gold Rush. Ken S. Coates, *Best Left as Indians: Native-White Relations in the Yukon Territory, 1840-1973* (Montreal: McGill-Queen's University Press, 1993), p. 9 states that the native population of the Yukon was 2,600 in 1895, which was based on the federal government estimates of 2,600 that Coates believes was likely too high; Coates and Morrison, *Land of the Midnight Sun*, believe that the Indian population in 1898 was approximately 2,000; Morrison, *Showing the Flag*, p. 59 estimates that in 1898 there were approximately 2,000 Indians in the Yukon; Gates, *Gold at Fortymile Creek*, pp. 8 and 88 was of the view that until 1880, there were only a handful of non-natives in the entire Yukon basin. He was of the opinion that during the winter of 1895-1895, the Yukon Valley had a non-native population of approximately 1,000.00. The population of Dawson City during 1898 is discussed in Chapter Four.

Minister of Indian Affairs took the view that the Yukon Gold Rush would be a short lived event. He argued that the Yukon Territory was "not the same as any other gold mining country in the world and the difference consists in the fact that it is good for nothing except mining which in all probability will be temporary. The miners were not going to reinvest their profits in developing the country. There would be no long term benefit for Canada unless some of the profits were skimmed off at once."²

Before the Gold Rush, there had always been a Han Indian summer fishing camp at the confluence of the Klondike and Yukon Rivers. Shortly after the gold discovery on Bonanza Creek on 17 August 1896, the fishing camp became known as Dawson City. When the news of the gold strike in the Klondike reached Seattle and San Francisco in June 1897, the rush began to stake the Yukon. By early 1898, Dawson was transformed into a town of some three hundred buildings and a population estimated between 16,000³ and 30,000 people. The Yukon had become a major mining centre, and for a while, Dawson City with its citizens boasted the largest urban population west of Winnipeg. As for the Han, their fishing camp was no more.

Government Policy

The federal government exploited the new territory in order to pay for the cost of maintaining it. During the early years of the Gold Rush, the ability of government to deal adequately with the myriad problems created by the Yukon fell far short of what was required. The Minister of the Interior, Clifford Sifton, laboured to find the solutions to the Yukon's problems from Ottawa, three thousand miles distant. He wrote to J.F. Lister on 23 July 1897 that he had "been working, eating and sleeping with the Yukon Territory for the last three weeks, but ...[had] found no difficulty in mapping a plan for

² D.J. Hall, quoting a letter from Clifford Sifton to Frank Oliver M.P., 11 August 1897, in *The Young Napoleon 1861-1900*. Vol 1 of *Clifford Sifton* (Vancouver: U.B.C. Press, 1981), p. 166.

³ Tappan Adney, *The Klondike Stampede*, Originally published by Harper & Brothers Publishers, 1900 (Vancouver: U.B.C. Press, 1995), p. 178, states the size to be approximately 16,000. For a discussion of the various estimates of the size of Dawson in 1898 see Chapter Four.

organization and administration."⁴

Sifton exercised extraordinary powers over the Yukon. As Minister of the Interior, he was responsible both for surveying and mapping the north, and for Indian Affairs. The Commissioner of the Yukon reported directly to Sifton. The appointed council in the territories existed only to advise the Commissioner. In essence, all major decisions concerning the Yukon were executed by Sifton through his agent, the Commissioner of the Yukon Territory.

The government continued a long lasting policy of issuing Free Miners Certificates which opened the Yukon to unlimited numbers of prospectors. Once a claim was established, a miner had unrestricted use of the site, including timber and water resources. Ottawa's primary concern was to determine how much revenue the miners should pay to Ottawa. As for Sifton, he exercised his responsibilities over the Yukon's lands and waters with one major objective in mind--to transform the Yukon into a major mining centre that would generate maximum revenues for the federal treasury.⁵

The Environmental Effects of Forest Alterations

The Yukon can be divided into treeless barrens, and boreal forest.⁶ In the moderately warm south central area, which includes the Yukon River Valley, the largest tree species such as white spruce and lodgepole pine are found on the lower slopes and on the plateaux, black and white spruce on cooler sites, aspen and sagebrush grassland

⁴. NAC, *Sifton Papers*, Ottawa Letterbooks, 1898-1899, MG 27, vols. 221-295, Sifton to J.F. Lister, 23 July 1897.

⁵. D.J. Hall, *The Lonely Eminence 1902 - 1929*, Vol. 2 of Clifford Sifton (Vancouver: University of British Columbia Press 1981), p. 5. The Governor General was of the opinion that: "the Dominion Govt. seems to have looked upon the Yukon as a source of revenue, as a place to make as much out of as they could, & have used the proceeds largely for political corruption instead of the development of the country, & in so doing are in a fair way to kill the goose that laid the golden egg." NAC, *Minto Papers*, Minto to J.C. Chamberlain, 19 August 1900, pp. 79-91.

⁶. A description of Yukon forests past and present can be found in Chapter One.

on drier sites and alpine fir closer to the treeline.⁷ North and east of this, in the colder Pelly River Valley, white and black spruce become shrubby, black spruce bogs are found in moist lowlands, aspen and white spruce on drier sites, and balsam poplar on flood plains, while lodgepole pine is common, and alpine fir sparse. In the north central area around the Klondike River Valley near Dawson, black spruce and white birch are common, aspen and white spruce are found only on drier sites, and lodgepole pine is scarce.⁸ Prior to the Gold rush the forest had been a backdrop, subject only to natural cycles of disease, fires and wind damage. Cutting had been limited due to the modest requirements of the indigenous peoples and the few non-native settlers.

Suddenly, in the late 1890's, the forest became an extraordinarily valuable commodity to the miners and their settlements. As well as being the major source of fuel for cooking, heating, and melting permafrost, its timbers were vital for boat construction, cabin and barrack buildings, dams, dredges, flumes, railway ties, roads, steamship fuel and underground mining supports.

In the natural course of events, lightning fires destroy the habitat of some species but open up areas to sunlight and with each successive stage of forest regrowth provide food for other species.⁹ While much of the forest was cut to further development, marked changes were caused by fires. In the Yukon in the summertime, where the climate is normally dry, lightning causes a regular cycle of fires. In any one place, lightning may ignite small fires once in every 25 years. Major lightning fires covering thousands of hectares in size occur only from 100 to 200 years.¹⁰ The likelihood of

⁷ E.T. Oswald and J.P. Senyk, *Ecoregions of the Yukon Territory*, p. 49.

⁸ *Ibid.*

⁹ Leo G. Waisberg, "Boreal Forest Subsistence and the Windigo: Fluctuation of Animal Populations," *Anthropologies*, Vol. 17, No. 2, 1975, p. 16-188.

¹⁰ E.C. Pielou, *The World of Northern Evergreens* (Ithaca: Comstock Publishing Associates, A Division of Cornell University Press, 1988), p. 116.

major fires was exacerbated in the old growth Yukon forests by the flammable reindeer mosses which mantled the resinous evergreens and the yellow green mosses which carpeted the ground.¹¹ This made them particularly susceptible to the odd spark in the dry summer months when travellers crowded the Yukon trails.

During the Gold Rush there were two major routes to the Klondike. One was a water route from the Pacific along the Yukon River to Dawson. The other began at Skagway, Alaska and climbed over the coastal mountains by the Chilkoot Pass, proceeding along the waterways to Dawson via Lakes Bennett, Tagish and Marsh and the Yukon River. Using the Skagway route to Dawson, incoming prospectors, miners, tradesmen, officials, police, wives, children and other hangers-on with all their paraphernalia travelled on flotillas of rafts and boats, some capable of holding as many as 300 people. Every so often the flotillas would stop and the passengers would go off into the forest to make fires for warmth, comfort and cooking. Many such fires were left burning either by accident or deliberately. Map 7¹² was published as a supplement to the *Railway and Shipping World* in 1898. It shows the various routes to the Klondike. On the left hand side of the map, the two major routes to Dawson are underlined; one coming from Alaska down the Yukon River, the other north from Skagway to the Yukon River.

The alarm and frustration of the North West Mounted Police over the fire problem was expressed in their report in 1897:

An enormous amount of damage was done by fires last summer. These were started by camp fires left burning all along the shores. Notices and warnings were posted up and persons notified individually, but apparently to no purpose. It was impossible, too, to detect the delinquents. The ground is covered with

¹¹ Robert Bell, "Forest Fires in Northern Canada" in *American Forestry Congress*, Atlanta, Ga. Meeting 1888 (Washington: Gibson Bros, Printers and Bookbinders, 1889), p. 1.

¹² Map 7, Appendix 6, appeared as a supplement to the *Railway and Shipping World*, Toronto, 1898. This map is reproduced from an original in the Map Library, University of Western Ontario, produced by the Association of Canadian Map Libraries, 1981.

rotten vegetation and roots in which the fire smouldered for days perhaps before the wind would fan it into a flame. As soon as this occurred the police would leave for the scene of the outbreak, but the persons guilty of leaving the fire had invariably left the place hours or days before.¹³

They also observed that there was "very little timber of any size left in the district."¹⁴

Julius Price was one of many travellers who wrote about the burned areas along the route to Dawson each summer from 1896 to 1899:

It is no exaggeration to state that when we passed through in June [1896] the whole country was ablaze from the banks of the river to the summits of the highest hills where there was timber to burn, and I feel much inclined to add that in my opinion if there is no heavy rain to check these fires, there will be scarcely a particle of timber left growing in the country in a year's time.¹⁵

Two years later Price's worst fears were realized:

All this immense and irretrievable amount of destruction of fine timber is, without any doubt whatever, caused by the thousands of prospectors and others who have passed this way since the beginning of summer. They stop to camp or cook a meal, light a fire, and when they have done, off they go, leaving the glowing embers in the ground, where the slightest breeze blows them amongst the dry moss; and in an incredibly short time a big blaze ensues, which spreads from tree to tree with a rapidity that must be seen to be believed, and which never stops until it has completely burnt itself out. All this wilful destruction might have been avoided had these vandals had the consideration to throw a bucket of water over their fire when leaving.¹⁶

Many travellers to Dawson left camp fires still burning to accommodate the next

¹³ NAC. Can. *Sessional Papers*, 1898, Report of the North West Mounted Police, A Series for 1897 - 1898, p. 50.

¹⁴ *Ibid.* p. 78.

¹⁵ Julius Price, *From Euston to the Klondike: The Narrative of a Journey through British Columbia and the North-West Territories in the Summer of 1898* (London: Sampson Low Marston & Co. 1898), p. 128-149.

¹⁶ *Ibid.*, p. 248-249.

group of incoming travellers.¹⁷ As a consequence, parts of the shores near Teslin Lake and Hootalinqua were devastated. Price described the immediate desolation left in the wake of the fires along both sides of the Yukon River:

Our camping-ground was as dismal a spot as could well be imagined, being at the corners of a burnt-out forest. All was dead and black. Gaunt and twisted charcoal skeletons of fine trees swayed and creaked drearily in the night breeze; even the very grass and moss had been destroyed by the ruthless element, and there was no sign of life anywhere.¹⁸

In fact, logging practices were an additional cause of forest fires. "The wood which is spruce, with here and there a little birch, is cut green, loosely piled and set on fire, which burns off the branches, carbonizes the bark and partly dries out the wood" which led to further fires.¹⁹ The area affected by this practice of intentional fires was throughout the Klondike Valley. The mix of tree species in the Yukon River Valley was changed forever by these fires. In the burned areas of the Klondike Valley, black spruce predominated in the untouched creek bottoms. In less disturbed creeks, where placer mining had left deposits of well-drained, coarse textured soil, silt and clay, there was succession to a predominance of white spruce. Black spruce cones survive much higher temperatures than white spruce and produce seeds much sooner.²⁰ In the north of Canada, it can take up to sixty years after a lightning fire for forests of black and white spruce to become established.²¹ The reason is due to the short summer season and the existence of permafrost in the central and northern Yukon, which slows the growth of

¹⁷. Kathryn Winslow, *Big Pan Out*, (New York: W.W. Norton, 1951), p. 139; Hon. Stratford Tollemache, *Reminiscences of the Yukon*, (London: Edward Arnold, 1912), p. 49.

¹⁸. Price, *From Euston to the Klondike*, p. 132-133.

¹⁹. NAC, *Can. Sessional Papers*, 1903, "Report of the Superintendent of Mines", p. 37.

²⁰. Bastedo, *Shield Country*, p. 102.

²¹. *Ibid.* p. 164.

vegetation.²² For these reasons, the regrowth of northern forests takes a much longer period than in the south of Canada.

Other changes were less permanent. During 1898 and 1899, major man-made forest fires destroyed hundreds of hectares of wildlife habitat along both sides of the Yukon River and south of Whitehorse.²³ If a series of fires occurred between 1896 and 1899, the result would have been the elimination of trees, leaving only shrubs in the areas of repeated fires.²⁴ But studies show that the diversity of fauna and their population increases after a fire.²⁵ As the Indians knew, fire improves the habitat for moose. In the southern range for Barrens caribou, forest fires augment the growth of lichens and other forage plants available for grazing. Sharp-tailed grouse and Canadian geese prefer burned areas. Hares and bears also thrive after a forest fire. On the other hand, small mammals which spent most of their lives in trees, would disappear.

Logging

In addition to fires caused by the influx of prospectors and miners, the Yukon landscape was dramatically changed by extensive logging. As early as 1896, Inspector Constantine of the North West Mounted Police warned the government that miners travelling down the Yukon River had cut a large number of logs.²⁶ "The timber for the building and lumber is fast disappearing along the [Yukon] River; and it is only a

²² Bone, *The Geography of the Canadian North*, p. 34.

²³ Charlene Porsild, "Culture, Class and Community: New Perspectives on the Klondike Gold Rush 1896-1905" (Ph.D., diss., Ottawa: Carleton University, 1994), p. 118.

²⁴ E.T. Oswald and B.N. Brown, *Vegetation Establishment During 5 Years Following Wildfire in Northern British Columbia and Southern Yukon Territory* (Victoria: Forestry Canada, 1990), p. 1.

²⁵ J.S. Rowe and G.W. Scotler "Fire in the Boreal Forest," *Quaternary Research*, (1973) Vol 3, 450 at 458-459. This article is the authority for the balance of this paragraph.

²⁶ NAC, *Constantine Papers*, Letterbook 1895-1896, MG 30, E55, Vol. 5.

question of a few years until there will be none near here."²⁷ The federal government was criticized by some for granting logging concessions to individuals and companies, notwithstanding the fact that timber was limited in the Klondike area.²⁸ Miners who needed firewood would not hesitate to burn available trees.²⁹ By 1898 timber was already scarce at Lakes Tagish, Bennett and Marsh.³⁰

By August 1897, the government began to draft regulations to regulate logging.³¹ The following year, when the new regulations came into effect, loggers had to obtain permits to cut all types of timber for logging berths of up to eight square kilometres in size.³² Under the new regulations, no more than five berths of five square miles (eight square kilometres) could be issued to any one applicant. Much of the timber in these berths, located conveniently on the flats along the river banks, was reserved for the use of river steamers. Once the regulations were in place, the Canadian government revoked the licensing authority of the North West Mounted Police and issued it to timber agents.³³

The need for wood quickly escalated as the Gold Rush developed. As early as 1898, fifty-one timber berths were used to produce saw logs for mining, construction,

²⁷ NAC, William Ogilvie Correspondence, January 18, 1896, RG 18, Vol. 119, File 160.

²⁸ A.N.C. Treadgold, *An English Expert on the Klondike* (Toronto: George N. Morang & Company Linbel, 1899), p. 66.

²⁹ *Ibid.*

³⁰ NAC, Can. *Sessional Papers*, 1899 Vol. 15, Report of the North West Mounted Police, A Series, p. 84.

³¹ *Order-in-Council*, 4953, August 1897.

³² *Order-in-Council*, 45031, 28 February 1898.

³³ Carter, *A History of the Use of Wood*, p. 151.

and steamer fuel.³⁴ The increasing number of steam ships burnt up wood at an alarming rate. During the summer of 1899, the North West Mounted Police estimated that 50 steamers were serving the upper Yukon. In addition, some 411 scows and 417 boats carried passengers and freight near Dawson and on the Pelly, Stewart, Teslin and Tagish rivers and various lakes.³⁵

Between 1897 and 1900, as many as 137 steamers, barges and tugs, all fuelled by wood, plied the various rivers and lakes of the Yukon.³⁶ A sternwheeler burned 80 cords between Whitehorse and Dawson on the downstream run, while the return trip required 180 cords.³⁷ Steamers were forced to stop at wood camps along the river every four to five hours to replenish their wood supplies. The police also reported that between spring breakup and the fall, 4,400 cords of firewood were used by the steamers en route between the end of the Chilkoot trail on Bennett Lake and Whitehorse.³⁸ This estimate did not include boats travelling between Bennett and Atlin or on the trip north out of Whitehorse. Approximately 70,000 cords were cut in the Yukon for river steamers, building and mining during 1900.³⁹

Warnings from government officials about the long term consequences of forest depletion were both urgent and eloquent. In the sessional report for 1900, the federal government censured the prospectors and begged leave:

^{34.} Kathy Bissett, *A History of Logging in the Yukon 1896-1970*, Vol. 1, (Whitehorse: Canada/Yukon Economic Development Agency, 1993), p. 7.

^{35.} NAC, Can. *Sessional Papers*, 1900, "Report of the North West Mounted Police," 63, Victoria A Series, pp. 12, 30.

^{36.} Melody Webb, *Yukon: the Last Frontier* (Vancouver: U.B.C. Press, 1993), p. 211.

^{37.} Bissett, *A History*, p. 10.

^{38.} NAC, Can. *Sessional Papers*, 1900, "Report of the North West Mounted Police", p. 12, 30.

^{39.} Bissett, *A History*, p. 10.

To call the attention of the department to the wanton destruction of timber throughout the country. Prospectors seem to have a mania for setting fires, and if strict measures are not taken to prevent this vandalism the timber on the mountain sides and river flats will be destroyed in a very few years. To those who have faith in the Yukon Territory as a permanent mining country, the rapid disappearance of the green forest is harrowing, and it will, unquestionably, in a short time affect the navigability of the river.⁴⁰

In the same year, Commissioner Ogilvie laid blame on the fuel consumption of the steam ships:

During a recent trip up river from Dawson as far as Cassiar Bar, a distance of 350 miles, I noted with extreme regret the fast disappearance of timber. Last fall I made a rule that no trees would be cut for fuel exceeding seven inches in diameter at the butt, but even with this rule in force the timber is fast disappearing, as the majority of the trees are under that size. When we consider that we have on the river, between Dawson and White Horse, steamers plying which consume upwards of a hundred cords of wood for each round trip, and that the average trip takes about ten days, we see that during the four and a half months of navigation the amount used aggregates upwards of 13,000 cords. I state it with regret, but I feel positive that I am within the bounds of truth when I say that twelve months from this date there will be very little fuel for the steamers available adjacent to the river, and, as has already been remarked in this report, away from the river a short distance the timber consists almost entirely of poles only a few inches in diameter, and a considerable area would have to be gone over to collect a cord of wood.⁴¹

In spite of these warnings, the number of logging permits issued by the government did not diminish. In 1902, the Superintendent of Mines reported that little wood remained around creeks which were being worked for gold.⁴² This led to the stratagem of cutting timber on steep hillsides, which was "corded where it fell and by

⁴⁰. NAC, Can. *Sessional Papers*, 1900, 13, App. 20. "Report of the Surveyor General." Victoria A Series, p. 89.

⁴¹. NAC, Can. *Sessional Papers*, 1900, 33V, "Report of the Commissioner of the Yukon Territory," 63 Victoria, A Series, pp. 21-22.

⁴². NAC, Can. *Sessional Papers*, 1903, "Report of the Superintendent of Mines," p. 37.

removing the supportive props the whole pile thundered down to the riverbank like an avalanche...". Other wood choppers, not fortunate enough to live near hillsides, waited for winter and then sledged their wood to the riverbanks."⁴³ The largest old growth white spruce from about 35 to 45 centimetres in diameter was found in the lower Yukon Valley. On the Klondike hillsides white and black spruce, poplar and birch were smaller. At 800 metres, only alpine and Arctic shrubs remained; the useable timber was gone.⁴⁴ Thus, the further north the miners went, or the higher they climbed in their search for wood, the less they found.

The rate of timber use was unsustainable, especially in the vicinity of Dawson City, as evidenced by the shortages and the sharp increase in fuel prices.⁴⁵ The Northern Navigation Company, a firm in direct competition with the British Navigation Company, had as many as thirty seven wood camps along the Yukon River and its price per cord averaged between \$8.00 to \$15.00 with an occasional cord selling for \$45.00.⁴⁶ By 1901, the Dawson and Whitehorse Navigation Company advocated a ceiling on the amount that could be charged for wood.⁴⁷ An editorial in the *Dawson Daily News* noted that the government was aware of the problem and predicted that coal was the fuel of the future because "wood for the purpose of fuel is becoming scarcer around Dawson every season, and it is safe to say that the cost and difficulties in floating it down here from the upriver points will be increased and make the price of wood

⁴³. *Ibid.*

⁴⁴. Bostock, "Yukon Territory," p. 23.

⁴⁵. Mary Lee Davis, in *Sourdough Gold* (Boston: W.A. Wilde Company 1933), p. 100 stated that in 1898 lumber in Dawson was two hundred and fifty dollars per thousand feet.

⁴⁶. *Ibid.*, pp. 217-219.

⁴⁷. NAC, Department of the Interior, RG15 EIA f. 2104, general correspondence of the field office, D. Sullivan to the Commissioner of the Yukon Territory, 25 January 1901.

almost prohibitive."⁴⁸

As the wood supply declined and the price of fuel wood climbed, the steamboat companies turned to coal and petroleum products as alternative sources of fuel. As early as 1897, the Alaska Commercial Company extracted brown coal, or lignite, from the Nation River to fuel riverboats.⁴⁹ Unfortunately, lignite coal was soft and dirty, and contained high levels of sulphur which caused fires in steamboat stacks.⁵⁰ Other coal sources were found near the Klondike River forty miles above Dawson.⁵¹ In 1900, the Alaska Exploration Company began developing mines eleven kilometres from the Klondike River in the Coal Creek and Rock Creek Valleys. The North American Trading and Transportation Company mined at Cliff Creek, another tributary of the Yukon eighty eight kilometres downstream from Dawson. As a steamship fuel, it was soft and dirty with a dangerously high sulphur content, and most steamships reverted back to wood.

The low quality of coal in the Yukon opened the door for oil. At heavy expense, the Alaska Commercial Company erected large storage tanks and modified the furnaces of its steamers to burn oil. The absence of dirt and cinders, the elimination of tedious delays to "wood-up," and the increased steaming capacity appeared to offer great advantages. By 1907, more than fifty thousand barrels were imported annually.⁵² Three companies competed for steamship traffic during this period; the Northern

⁴⁸. "Coal the Coming Fuel," *Dawson Daily News*, 20 November 1899, p. 3.

⁴⁹. Webb, *Yukon: the Last Frontier*, pp. 219-220.

⁵⁰. J.C. Cantwell, *Report of the Operations of the U.S. Revenue Steamer "Nunivak" on the Yukon River Station Alaska 1899-1900*, United States Congress, Senate Exec. Doc. 58th Con., 2nd sess. Washington: D.C., 1921, p. 714:40, 60-61, 119-120.

⁵¹. Bostock, *Yukon Territory*, pp. 23, 31-33; Innis, "Settlement and the Mining Frontier," p. 262. These are the sources unless otherwise noted for the balance of this paragraph.

⁵². Webb, *Yukon the Last Frontier*, p. 220.

Navigation Company, the North America Transportation and Trading Company, and the British Yukon Navigation Company.⁵³ It was only the Northern Navigation Company that switched to the use of oil. Nevertheless, because oil was very expensive to ship and store, wood continued to predominate as the fuel of choice.⁵⁴

The destruction of trees by fire along the Yukon Valley north from Whitehorse and indiscriminate logging in the Klondike Valley not only altered the appearance of the Yukon landscape but the hydrology of the region as well. Forest managers now recognize the long lasting hydrological effects of deforestation. Forest fires raise the soil temperature which causes deep thawing, run off and evaporation of the subsurface water. This results in a lower water table.⁵⁵ Removal of forest cover affects water retention and stream flow due to quicker movement of ground water to stream channels and from stream channels to rivers. This creates a potential for flash flooding.⁵⁶ The cutting of logs was limited to the Klondike Valley and areas along the rivers where logs were cut for the steamships.⁵⁷

Fish and Wildlife Regulation

The arrival of tens of thousands of miners and adventurers caught government officials off guard. The government had not anticipated the effect of large numbers of newcomers exploiting the fish stocks along the Yukon River and around Dawson City. By 1899, in response to reports of dramatically increased levels of fishing in the Yukon, the Minister of Marine and Fisheries assumed responsibility for introducing fishing

⁵³. *Ibid.*, pp. 220-221.

⁵⁴. *Ibid.*, p. 220.

⁵⁵. Leslie A. Viereck, *Ecological Effects of River Flooding and Forest Fires in the Taiga of Alaska* (Fairbanks: University of Alaska 1985), p. 65.

⁵⁶. Monique Ross, *Forest Management in Canada* (Calgary: Canadian Institute of Resource Law, University of Calgary 1995), p. 29.

⁵⁷. The Yukon River was the major route between Whitehorse and Dawson City.

regulations and charged the North West Mounted Police with enforcing them. The Minister gave the following instructions to the North West Mounted Police officers:

It is impossible for the Department here to determine in which waters commercial fishing should be permitted at all. This must, therefore, be determined by you on the spot, and I hereby authorize you to permit and issue commercial licenses in such waters only as you think will fairly stand such fishing and to refuse them when you think desirable. You will also limit the number of these commercial licenses to be issued in each lake, where you allow them at all, so as to prevent any over fishing. It is not the desire of the Department to encourage these commercial licenses, rather otherwise and you will do well to limit both their numbers and the waters or lakes where they may fish with them.⁵⁸

In May 1900, the Minister appointed the first Fishery Inspector for the Yukon to replace the police in preventing overfishing. That was soon followed by the appointment of local fish wardens. A decline in fish stocks was already being experienced; indeed, Deputy Minister F. Gourdeau expressed concern that "the increased value of fish as a food for the vastly increased population will ...imperil the fisheries unless protection of an effective character be carried out in order to prevent the extermination of valuable kinds of fish."⁵⁹

The major obstacle to controlling fishing was the fact that miners on claims could fish without a license. As the fishery inspector commented: It is impossible to give anything near a correct estimate of the amount taken in this way as the miners are scattered over the entire territory."⁶⁰ Regrettably, one species of fish - salmon - was given no protection at all. In fact, the Department of Marine and Fisheries gave up any attempt to regulate or protect salmon fishing in the Yukon. The reason given was the

⁵⁸. NAC, C. Gauthier, Correspondence, *Department of Marine and Fisheries*, RG18, 192, f. 457, 1899.

⁵⁹. NAC, F. Gourdeau to T. Stewart, 30 January 1900, Correspondence, Department of Marine and Fisheries, RG 23. 328, f. 2812.

⁶⁰. NAC, Can. *Sessional Papers*, 1904, 22 "Report of the Deputy Minister Marine and Fisheries," 3-4 Edward VII, A Series, p. xxxviii. As a result, no enforcement of fishing on licensed mining grants occurred.

lack of conservation efforts in the adjacent shared Alaskan waters.

It does not appear the salmon which ascend the Yukon River require protection to the same extent, for the reason that after entering the Rivers [sic], they are afforded little or no protection in the United States territory; but are merely slaughtered in the lower portions of the river. There is no object in protecting [the salmon species] in the upper waters when every effort is made to exterminate them before they reach Canadian territory. Hence all who wish to fish for salmon in Yukon territory might be allowed to do so on payment of a license fee.⁶¹

By 1902, the North West Mounted Police reported a decline in the fish population of Lake Laberge,⁶² located north of Whitehorse. Complaints were also received that same year from the Indians at Little Salmon, located near the Yukon River between Whitehorse and Dawson. They protested that it "is not right for these white men to come there as though the lake belongs to them and if they continue fishing...the Indians will not be able to catch enough to keep them from starving."⁶³ In 1903, the North West Mounted Police expressed concern about declining fish in Tagish and Marsh Lakes, south of Whitehorse. Their report observed that fish were "...fast disappearing and a hatchery should be established more especially for whitefish." As a result, the commercial fishermen were asked to move their operations elsewhere.⁶⁴ In 1903, the North West Mounted Police believed that commercial fishing of whitefish on Lake Laberge for several years resulted in a decline in fish size due to the use of small mesh sizes.

R. W. Harris, a Yukon lawyer, wrote to Clifford Sifton in May 1897 complaining

⁶¹. *Ibid.*

⁶². NAC, 1902, Annual Report of the North West Mounted Police, p. 40.

⁶³. NAC, North West Mounted Police correspondence, 2 July 1902, RG 18 D1 vol. 5 A604 quoted in Seigel and McEwan, *A Historical Overview of Fishing*, pp. 26-30, 4.

⁶⁴. *Ibid.*

about the government's failure to protect game taken by the goldseekers. Sifton advised in a return letter that it was not possible for him to deal with the grievances of the Indians but that he would give careful consideration to their complaints after the recall of Parliament in the fall of 1897.⁶⁵

The North West Mounted Police also expressed concerns with respect to the survival of wildlife. In Dawson City, in January 1899, Inspector Harper wrote:

A great many moose were brought to town during the past summer and sold from the butcher shops in town, also lately ptarmigan, grouse and rabbits have been abundantly exhibited in front of the different restaurants and butchers' shops. The game ordinance was not enforced here last summer. This I think was a mistake, as if the quantity of moose that was brought in last summer is brought in every year, very few will shortly exist in the country, and I would recommend that the game ordinance be strictly enforced in this territory.⁶⁶

The Tutchone and Han complained that they had to travel much further to catch their game.⁶⁷ Notwithstanding the police warning, the federal government did not enforce existing game regulations or introduce new legislation.⁶⁸ It was not until 1901 that new rules were enacted by the Yukon legislative to control hunting in the territory. By then, serious reductions in wildlife had occurred around Dawson City and along the Yukon River north from Whitehorse.

Conclusion

Unfortunately, no evidence exists to show the strict enforcement of the Game

⁶⁵. NAC, *Sifton Papers*, Ottawa Letterbooks, Sifton to R.W. Harris, 13 May 1897. No action was taken for several years.

⁶⁶. NAC, *Can. Sessional Papers, 1899, (No. 15)*, North West Mounted Police, 62 Victoria, A Series.

⁶⁷. McCandless, *Yukon Wildlife*, p. 33.

⁶⁸. *Ibid.*

Ordinance in Dawson after 1898. Some of the decline of fish and wildlife during the Gold Rush was caused by the loss and change of habitat by fire, clear cutting and noise and by unsustainable consumption in and around Dawson City and along the Yukon River north of Whitehorse. Although informed about these problems and warned of the consequences by its appointed officials and fish wardens the government seemed unable to ameliorate the situation and put no effective regulations in place. Meanwhile, mining reached its maximum production between 1897 and 1904 which would cause an even greater impact on the natural environment.

CHAPTER THREE

The Impact of Placer Mining on Fish and Wildlife Habitat

Introduction

In the Klondike Valley, and along the waterways north from Whitehorse to Dawson City, the loss of, and change to habitat by fire, clear cutting and unsustainable consumption of resources caused a noticeable decline in forest stocks, fish and wildlife populations during the Gold Rush. However, these changes were not permanent. Forests recovered in areas previously affected by fires and logging. This is to be contrasted with the Klondike Valley including both sides of the Klondike River, Bonanza, Hunker and Eldorado Creeks, where various mining techniques on a large scale resulted in permanent widespread environmental damage, which has lasted to this day.

The extraction of gold by large scale hydraulic mining and dredging after 1896 caused immediate and irreversible detrimental effects.¹ The impact of placer mining on riparian vegetation in the creeks resulted in a decline in various fish species. The erection of dams prevented the migration of salmon and other fish. Mining practices also produced long term contamination of water to the food chain in the Klondike Valley by the use of mercury.² All in all, during the Gold Rush, thousands of miners, road builders and railway contractors irrevocably changed the face of the Klondike Valley.

Government Policies

"All streams and rivers could be freely claimed from the Crown". The suggestion of reserving all the mineral lands of the Yukon Territory, explained Clifford Sifton, Minister of the Interior "would in all probability totally fail by reason of the impossibility

¹ Dredges continued to be used until 1966 in the Klondike Valley. Since 1966, mining has continued on many of the Klondike Valley Creeks.

² This is discussed later in this Chapter.

of enforcing it.³ In the same letter, Sifton rejected government control because of his belief that it would put an end to the discovery of new mining locations, which in turn would eliminate the riches that flowed from such mines.⁴ The only limit, he stipulated, was on the number of claims allowed per applicant. Sifton also rejected the notion of restricting mining activities. He believed that the orderly development of the mining industry, would enable the government to have administrative control over the region.⁵ Orderliness proved a vain hope. As it happened, the rapid development of the population of the gold fields exceeded all attempts by the government to control the Yukon under the authority of the federal gold commissioner. Unlike the provinces which normally administered mining, the federal government had minimal experience in the day to day administration of a major mining area.⁶

Overview of Placer Mining

Placer mining was originally done by individuals or small groups of men using shovels, picks and windlass cranks. They burned wood to melt permafrost and to shore up their drifts. Seasonal water flows provided adequate water for washing out the gold. Mining regulations were initially designed to provide enough placer ground for such miners to operate.

As international mining men with considerable capital became stake holders, they initiated improvements in technology such as hydraulic mining and dredging. These methods of gold extraction, while efficient, were environmentally devastating. A dredge, for example, extracted gravel and vegetation to a depth of eighteen metres. The total removal of plant cover, alteration of water channels, and the resulting piles of tailings

³. NAC, *Sifton Papers*, Sifton to W.H. Collins, 29 July 1897.

⁴. *Ibid.*

⁵. *Ibid.*, Sifton to Thomas Fawcett, 29 July 1897.

⁶. Innis, *Settlement and the Mining Frontier*, p. 225.

which obstructed water flow not only destroyed the fish habitat in the immediate area but placed a huge burden of sediment in the rivers over long distances. In other cases, natural meandering stream courses were replaced by straight water channels which removed the eddys and quiet pools required for spawning.

The government responded to the new technological inventions and their increased utilization by changing grant allocations and passing some twenty amendments to placer regulations between 1897 and 1905. A placer grant permitted miners to excavate and remove the entire surface and subsurface area of the granted claim down to bedrock. Vast quantities of pay gravel were processed by an ever increasing number of miners and mining corporations. In 1898, mining statistics for the first part of the year showed there were 9 134 placer claims and 275 quartz claims in the Yukon.⁷ By September the number of claims had jumped to 17,000.⁸ In 1898 alone, 34,364 Free Miners Certificates were issued.⁹ Not only did the number of grants increase, but the size as well. In January 1898, creek, river and hill claims were augmented to 250 feet (83 metres) in the general direction of the creeks or gulches.¹⁰

The years of maximum gold production in the Klondike occurred from 1899 to 1901. Almost the entire production for the Yukon between 1896 and 1903 came from

⁷. NAC, Can. *Sessional Papers*, 1899 Volume 15, "Report of the Department of the Interior", p. xxiv.

⁸. NAC, Can. *Sessional Papers*, 1900 Volume 33W.

⁹. NAC, Can. *Sessional Papers*, 1899 Volume 15, "Report of the Department of the Interior", p. xxiv.

¹⁰. *Order-in-Council*, 2461, 18 January 1898. The earlier placer grants were 100 feet (30 metres) on creeks and rivers; perhaps the impetus for the change was initiated by this letter from Commissioner Walsh to Sifton on 20 December 1897: I am convinced that the 100 feet (30 metres) claim for this country is too small and will prevent thousands of miles of the country being explored, which I consider would be a great misfortune. If we had any more Bonanzas or Eldorados it would be better that even a few should profit than that the treasure should lie in the earth undisturbed perhaps forever. It is better to have the commercial profits incident to mining development than nothing at all.

Bonanza, Eldorado, Hunker and Dominion Creeks and the Bonanza Benches.¹¹ During 1899, the Mining Recorder's Office renewed 4,358 grants and granted 7,758 new placer grants.¹² In 1900 the government granted a further 6,330 claims.¹³ The majority of placer licenses issued between 1898 and 1901 were for the Dawson District¹⁴ while along the creeks, a number of small settlements sprouted to accommodate the miners,

¹¹. Bostock, "Yukon Territory," p. 109; NAC, Can. *Sessional Papers No. 26*, 1904, Geological Survey Department, 3-4 Edward VII, Series A, p. 35. The annual return was:

1896	.....	\$ 300,000
1897	.....	2,500,000
1898	.....	10,000,000
1899	.....	16,000,000
1900	.....	22,275,000
1901	.....	18,000,000
1902	.....	14,500,000
1903	.....	12,500,000

In the McConnell, Report of Gold Values, p. 33 summarizes for 1906 the Estimated Past Production and Probable Future Output of Eldorado, Bonanza, Bear and Hunker Creeks and the Klondike River, Hill and Valley Gravels:

	Estimated Past Production	Estimated Future Output
Eldorado Creek	\$25,000,000	\$ 2,600,000
Upper Bonanza Creek	15,500,000	3,225,000
Lower Bonanza Creek	11,000,000	11,500,000
Klondike River Flats	1,000,000	6,500,000
Bear Creek	1,000,000	600,000
Hunker Creek	<u>14,000,000</u>	<u>7,500,000</u>
	67,500,000	31,925,000
Upper Bonanza and Eldorado Hills	24,000,000	8,213,532
Lower Bonanza Hills	750,000	7,528,720
Klondike River Hill gravels	small production	956,000
Hunker Creek Hills	<u>2,500,000</u>	<u>5,019,370</u>
	27,250,000	21,717,620
Creek values brought down	<u>67,500,000</u>	<u>31,925,000</u>
Totals	\$94,750,000	\$53,642,620

¹². *Dawson Daily News*, Golden Cleanup Edition. (Dawson City, Yukon Territory: 1902), p. 64.

¹³. *Ibid.*, The number of claims and renewals between November 1898 and November 1899 was 12,116. Since each claim was up to 250 feet in length, for that twelve month period the claims totalled 600 miles.

¹⁴. *Ibid.*

notably Magnet City on Bonanza Creek, Grand Forks on Upper Bonanza Creek, Carmacks Forks and Caribou City on Dominion Creek and the Chute and Wills Village on Gold Run Creek.¹⁵

Hand Mining

At the beginning of the gold rush, drift mining was the most widely used method of placer mining. It involved stripping the overburden above the placer gravels. Before reaching the first gravel layer, often located high above the bedrock, between over one metre to five metres of permanently frozen bog or peat had to be thawed by fire. As the overburden thawed, it was hauled out by the bucketful and dumped either on unclaimed land as part of the tailings, or in the river where it muddied the water downstream. Additional fires were built over the same spot and the process repeated. Sometimes the miner would use powder to blow the walls of the drift channel down into the stream.¹⁶ With limited manpower and a minimum of tools, the surface disturbance from drift mining was limited. However, once they had reached the rich gravels or bedrock, mercury was used on the riffles in the sluice boxes to amalgamate with the gold and separate it from the ore and was then vaporized off in the refining process.¹⁷ Mercury would later be used in the dredging process.¹⁸

Hydraulic Mining

Arthur Treadgold, a former Oxford Don, visited the Yukon in 1898. He was one of the first advocates to encourage the diversion of water from the Klondike River to

¹⁵. Can. *Sessional Papers*, 26, p. 35; *Dawson Daily News*, p. 13; Innis, in "Settlement and the Mining Frontier," p. 207, stated that approximately 23,000 miners were employed in the Klondike Valley as of 10 January 1899.

¹⁶. Innis, *Settlement and the Mining Frontier*, p. 206.

¹⁷. Tim Osler, *Study of Mercury Usage in Placer Mining Operations in the Yukon Territory and North Western British Columbia* (Whitehorse: Environmental Protection Series, 1983), p. 13. An examination of the effect of mercury use is discussed at the end of this Chapter.

¹⁸. Zaslav, *The Opening of the Canadian North*, p. 120.

other creeks by the use of dams and flumes. He wrote in "An English Expert on the Klondike":

The Klondike gravels are permanently frozen, but experience proves that this need be no bar to hydraulicing. Strip off the surface muck with its timber and moss and drain the bedrock throughout, and the northern sun, helped powerfully with power, perhaps, and the stream from the nozzle, will melt all the difficulty out of the frozen gravels. Especially important to remember is the function which hydraulic power can be made to perform in the operation of stripping. If the present streams on the creeks can easily wash away the surface muck when turned aside into and forced to flow through trenches cut in that muck, how much more easily will the mighty force of the stream from the nozzle break down and clean off such surface deposit.¹⁹

By late 1898, Treadgold was in regular communication with Clifford Sifton²⁰ regarding the creation of elevated water supplies along the Klondike Valley. Treadgold urged Sifton to permit a gigantic water supply system to service the Klondike Valley on a scale similar to that used in California.²¹ This would be accomplished by the damming of various rivers and the transportation of water by a series of flumes. Treadgold recognized that there was insufficient water for hydraulicing. He explained:

Conclusive proof that there is real difficulty in the water supply is found in the fact that winter dumps, which should have easily been washed out, all of them by June 30, were not all disposed of until well into August last summer. Some of the richest parts are also mostly in want of water. Nor can the difficulty be got over by little reservoirs, such as are being built on Skookum gulch: a gigantic supply must be organized as long ago, in California.²²

Intrigued by the potential of hydraulic mining, Sifton hoped that it would

¹⁹. A.N.C., Treadgold, *An English Expert on the Klondike* (Toronto: George N. Morang & Company Limited, 1899), p. 59.

²⁰. NAC, *Sifton Papers*, Ottawa Letterbooks, 1898-1899.

²¹. The Federal Government granted Treadgold a major concession which controlled much of the Klondike River watershed which was later rescinded.

²². Treadgold, *An English Expert*, p. 68.

ultimately improve the Yukon's long term economic prospects. He approved the request for hydraulic concessions. In a letter to Prime Minister Wilfrid Laurier he wrote that:

It is the chance of a lifetime to have the [Yukon] country put upon an enduring basis and development started upon a scale hitherto unknown in mining in Canada. Too much hyper-criticism of details will wreck the whole plan, and if it fails the production will gradually fall off until some similar scheme is brought up again, probably some years from now.

I think it is of great importance to have it put through. Practically the only thing that is being asked for is the use of the water in the Klondike river. All the other matters referred to in the application are mere matters of detail which almost necessarily follow from the granting of the franchise and the necessities of the enterprise.

. . . the best consideration that I can give to the whole subject leads me to recommend that the scheme be adopted without any very material modifications.²³

Approval for this new method of mining soon followed.

The government began to grant hydraulic concessions to a number of individuals and companies in 1898²⁴ which allowed the diversion and damming of water courses to raise water levels. These hydraulic concessions, usually of five mile lengths (eight kilometres), were issued along the creeks. From 1899 to 1902 some 130 separate concessions, totalling in excess of 1,000 kilometres of waterways, were granted.²⁵

As explained by Treadgold, owners of hydraulic concessions used water pressure to destroy vegetation along creek beds. Water was transported by wooden flumes or

²³. NAC, *Sifton Papers*, Sifton to Laurier, 8 March 1900. pp. 797-799.

²⁴. Innis, *Settlement and Mining Frontier*, p. 246 mentions that the first hydraulic concession was granted in 1898 comprising 2½ miles.

²⁵. Yukon Archives, *Report*, Office of the Gold Commissioner, 6 September 1902, RR 85, vol. 1739.

canals.²⁶ Steam thawers heated boilers that pressurized water to melt the overburden. Such boilers consumed a third less wood than the fires, and were used both in summer and winter.²⁷ Where there was adequate elevation, pressurized nozzles were used to push the gravel and plants into sluice boxes.²⁸

A typical hydraulic plant was located at the mouth of Adams Creek which utilized two pumping engines. The main pumping engine had a capacity of 3,000 gallons per minute. Another hydraulic mining operation was carried out by the Anglo Klondike Company in 1902 on Fox Gulch and Boulder Creek which flumed and siphoned water a distance of five kilometres. Over a twenty-two day period, this operation sluiced a total of 29,000 cubic metres of vegetation and gravel. The Electric Power Company of Dawson also operated several hydraulic pumping stations along Bonanza Creek.²⁹

By 1904 the following ditches were constructed for hydraulic sluicing:³⁰

Company	Length Miles	Company	Length Miles
Anglo-Klondike Co.	7	Delhie, Hunker Creek	5
Fuller Norwood Co.	9	Lyonnaise Synd	4½
White Channel Hyd. Co.	5½	Acklen Co.	9
O. R. Brener	6	O.R Brener, Hunker Cr.	7
N. A. T. & T. Co.	7½	Dolen et al, Last Chance	4
Bonanza Mining Co.	5		

²⁶ Lewis Green, *The Gold Hustlers: Dredging the Klondike 1898-1906* (Vancouver: University of British Columbia Press 1977), p. 19.

²⁷ Innis, *Settlement and the Mining Frontier*, p. 218.

²⁸ *Ibid.*, p. 19.

²⁹ Bostock, "Yukon Territory", p. 39, quoting from *Sessional Paper*, 26, "Geological Survey Department Summer Report 1904."

³⁰ NAC. Can. *Sessional Papers*, 1906, "Report of the Superintendent of Mines," Department of the Interior, 5-6 Edward VII Series A, p. 25.

A number of other miners used shorter ditches of between one-half and one kilometres in length. Prior to 1906, owners of hydraulic concessions located them in creeks above fish bearing streams for the high level gravels. They flumed or pumped the water downwards to the sluice boxes located below.³¹ This practice required the building of many small dams.³²

Dredges

In January 1898, Clifford Sifton also decided to proceed with long term dredging leases³³ to permit mineral extraction in the submerged river beds.³⁴ The concept of dredging was simple. Water was added to an excavated area to float the dredge. As the dredge moved forward, a series of bucket belts on the dredge removed vegetation, rocks and gravels, which were fed into sluice boxes. The gold was retained while the gravel and larger stones travelled to the rear of the dredge and were left behind as tailings. The constant movement of the dredge left hundreds of kilometres of tailings. Dredges destroyed the original creek topography leaving behind mounds of gravel and rock. Mercury was used to remove gold trapped in the linings of dredge sluice boxes.³⁵ The

³¹. Bostock, *Yukon Territory*, pp. 103, 111.

³². Since miners were permitted unrestricted mining because of their licence from the Department of the Interior, the Department of Marine and Fisheries was not granted jurisdiction to enforce fisheries regulations. No enforcement was possible. In British Columbia where the Department had jurisdiction, they experienced serious concern on the use of dams that blocked the movement of salmon. NAC, *Annual Report*, Department of Marine and Fisheries (Ottawa: printed by S.E. Dawson Printer to the King's most Excellent Majesty 1904), pp. IXI 38. However, in the Yukon the fisheries officers did not have the authority to deal with placer mining and could not destroy or modify the use of flumes and dams during the Gold Rush.

³³. During 1899, 811 kilometres of dredging leases were issued to miners to dredge for minerals in the submerged beds of rivers, NAC, *Can. Sessional Papers*, 13, pp. 46, 47. During 1899, 784 kilometres of dredging leases were issued, NAC, *Can. Sessional Papers*, 1900, Report of the Department of the Interior, 68 Victoria, Series A, p. 46.

³⁴. The lease could run up to twenty years.

³⁵. Zaslow, *The Opening of the Canadian North*, p. 120; Osler, *Study of Mercury*, pp. 14, 15. An examination of the effect of mercury use is discussed at the end of this Chapter.

mercury from the sluice boxes flowed into both land and water.³⁶

Dredge buckets reached down to eighteen metres, leaving coarse shingles with boulders in one pile and fine silt in another. In his report to the Smithsonian Institution many years later, H.M. Cadell, described "a long embankment of stones, ribbed from side to side with deep furrows corresponding to each forward step of the dredger, and running up the glen in a serpentine course." He likened the results of years of dredging to the damage done by a retreating glacier:

This "human moraine" heap entirely blocks up and interrupts the course of the original stream, and produces a series of more or less stagnant pools in the loops it makes in its meanderings between the sides of the gully. If the latter is broad, there may be two or three parallel embankments, with pools of muddy water between them, amid which the stream has to find its way past as best it can. The mud that is washed out in the process lodges in these lagoons and buries up the bases of the stony ridges.³⁷

Besides creating pools of muddy water, the dredges produced larger mounds of gravel that covered entire valleys, dammed up gullies and created new lakes. Wherever there was a little incline, shallow overburden, and little water, dredging was unremitting, and with each new dredging operation the topography of the landscape was altered forever.³⁸

Beginning in 1900, dredging commenced on Bonanza Creek³⁹ and expanded

^{36.} The effect of mercury usage is discussed later on in this Chapter.

^{37.} H.M. Cadell, "Klondike and the Yukon Goldfields," in *Annual Report of the Smithsonian Institution* (Washington: D.C., 1914), p. 377.

^{38.} *Ibid.*

^{39.} R.G. McConnell, "Report of the Klondike Goldfields," Geological Survey Memoir, 284 1903, Canada: Department of Mines and Resources, Report 1965.

from there to Bear Creek and the Klondike River flats.⁴⁰ By 1903, the Golden Crown Mining Company began work on the Stewart River using a dredge of 114 tons. In 1905, the Canadian Klondike Mining Company began operating at the mouth of Bear Creek with dredges that used over two cubic metre buckets powered by 600 horse power steam turbine. These dredges extended their bit downwards eighteen metres to bedrock and were comparable to those operating in California with an output of 80,000 cubic metres a month.⁴¹ During 1906, the Bonanza Basin Gold Dredging Company was operating with two cubic metre buckets at the mouth of the Klondike River, the Yukon Gold Company had three dredges with two cubic metre buckets on Lower Bonanza Creek⁴² and elsewhere on the Klondike creeks. five dredges were at work producing between 400 to 3,750 cubic metres per dig.⁴³

Dredging leases permitted operators to work river beds and bars from the natural banks downwards to nine metres,⁴⁴ but operators with the latest machines were able to extend this to nineteen and a half metres. In the annual sessional report for 1906, it was observed that one new dredge was particularly well suited for attacking the deep gravels of the Klondike:

The dredge is provided with two endless chains of buckets, buckets for each chain, occupying the front and rear of the structure. The chain of buckets situated at the front or bow performs the function of excavator and hoist, the other that of tailings-stacker. The lips of the buckets of the former are armed with strong prongs of nickel steel, those of the latter are plain. A 75 horse-power boiler furnishes the steam-power, 65 horse-power being required to operate the plant.

⁴⁰. NAC, Can. *Sessional Papers*, 1903 "Report of Steamship Inspection, 21" pp. 179, 304; Bostock, "Yukon Territory," pp. 4, 208.

⁴¹. NAC, Can. *Sessional Papers*, 1906, "Report of Superintendent of Mines," 25, p. 27.

⁴². Green. *The Gold Hustlers*, p. 303.

⁴³. Bostock, *Yukon Territory*, pp. 4, 208.

⁴⁴. Yukon Archives, Office of the Assistant Gold Commissioner, 6 September 1902, letter 1175, f.6.

The excavating buckets elevate and empty the gravel into a rotating perforated trommel, the axis of which is inclined about 10°. The gravel tumbled by the rotation of the drum is washed by jets of water, which proceed under pressure from a perforated pipe, which passes along the axis of the trommel.⁴⁵

Although there was no precise assessment of the vegetation in the Klondike creeks prior to dredging, this ecological zone would normally support black spruce, sphagnum, muskeg and feathermoss with discontinuous bands of white spruce, alder riparian forest, and riparian willow and alder shrubs.

Dredges continued to operate in the Klondike Valley after 1906.⁴⁶ In 1920, the Canadian Number 1 Dredge was taken apart and transported over Hunker Summit and rebuilt on Dominion Creek. There, dredges continued to churn much of the Klondike River and creeks in the Klondike Valley until 1966, when, due to the increasing cost of gold production, dredging ceased in the Yukon. After 1966, mining without dredges continued in the Klondike Valley Creeks.

The largest staking of claims with the greatest number of miners took place between 1898 and 1899. By 1901, the size of the Yukon population had declined from approximately 40,000 people in 1898⁴⁷ to approximately 27,000⁴⁸ in 1901. In January 1899, 23,000 miners were employed in the Klondike Valley⁴⁹ but only some 18,000 in 1901.⁵⁰ By 1904, the Gold Rush was over. Each year thereafter, the population

⁴⁵ NAC, Can. *Sessional Papers*, 1906 "Report of the Superintendent of Mines, 25" pp. 23, 27.

⁴⁶ Green, *The Gold Hustlers*, pp.297-301 are the sources for this paragraph.

⁴⁷ Zaslow, *The Opening of the Canadian North*, p. 143 states approximately 40,000; Coates and Morrison, *Land of the Midnight Sun*, p. 147, estimated the population to be 40,000.00.

⁴⁸ Coates and Morrison, *Ibid*.

⁴⁹ Innis, *Settlement and the Mining Frontiers*, p. 207.

⁵⁰ Coates and Morrison, *Land of the Midnight Sun*, p. 147.

continued to decline and by 1911, the entire population of the Yukon was only 8,500 people.⁵¹ In 1905, the police force was reduced from 300 to 228 officers.⁵² The major shift from land mining to dredging occurred by 1904 due to the fact that gold no longer was in large placer deposits but was found in limited and scattered placer areas.⁵³

Since dredges were used in the Klondike River between 1900 and 1966 and on many of the Klondike Valley creeks, the beginnings of long term changes to flora and fauna occurred during those years. The long term use of dredges after 1906 caused the greatest amount of environmental destruction for both sides of the Klondike River and many of the creeks of the Klondike Valley. A series of photographs taken in 1990 along the Klondike River east of Bonanza Creek and west of Hunker Creek shows the effect of dredge tailings.⁵⁴ Since mining took place along the Klondike River from 1900 to 1966, it is probable that the majority of this destruction occurred after 1906.

Transportation Improvements

The Gold Rush brought in steamers, roads and trains to transport passengers and freight. In the Klondike Valley, roads linked the various communities. By 1898 a road extended from Dawson City to Grand Forks. By the end of 1899 roads connected Dawson City with Dominion, Hunker, Grand Forks and Bonanza Creeks. Further roads were constructed between 1900 and 1902.⁵⁵ In order to construct a road, the top layer of overburden had to be removed, exposing the gravel to direct sun which melted the permafrost. The same process was implemented in the construction of a fifty kilometre

⁵¹. *Ibid.*

⁵². Morrison, *Showing the Flag*, p. 70.

⁵³. *Ibid.*

⁵⁴. Photos, Klondike Valley, Appendix 8. Geographic Air Survey Ltd., Klondike Valley 22 August 1990. These photos show the sequence of placer mining in the Klondike River east of Dawson City.

⁵⁵. Innis, "*Settlement and the Mining Frontier*," pp. 215-216.

railway line built on exposed gravel between Dawson, Grand Forks and Sulphur Springs in 1906.⁵⁶ The most dramatic long term effect of roads and the railway in the Klondike Valley was the elimination of permafrost in the areas affected.⁵⁷

Changes to the land were accompanied by changes to the Yukon waterways. Rocks in the way of navigation were destroyed with explosives. The federal government constructed a wing dam at Caribou (Carcross) to assist large steamers.⁵⁸ This was soon followed by a breakwater constructed between 1895 and 1901 on Lake Laberge north of Whitehorse. In 1899, a dam was built on the Yukon River above Whitehorse at the outlet of Marsh Lake.⁵⁹ This dam was built without fishways. Some years later, a report documented the deleterious environmental effects of a dam built without fishways:

The Dam of the White Pass and Yukon route unquestionably does interfere with the passage of fish upstream, not the year round but only when the dash boards of the Dam are in place leaving the fish only the spillway on the sides to come up through, ... Whitefish will not rise or make an attempt to (go) up and over the spillway; Trout may do, also Grayling. It has been noted by people who have come up to the Dam, that below...the water was full of fish, as soon as the dashboards were removed the fish disappeared (sic), presumably upstream...⁶⁰

The construction of roads and railways often occurred without federal government approvals. As an example, during construction of the White Pass and Yukon Railway between Skagway, Alaska and Whitehorse, Yukon, the rail lines were placed without

⁵⁶ Gordon Bennett, "Yukon Transportation: A History." *Canadian Historic Sites: Occasional Papers in Archaeology and History* (Ottawa: National Historic Parks and Sites Branch, 1978), p. 73.

⁵⁷ The effect of the destruction of permafrost is discussed later in this Chapter.

⁵⁸ *Ibid.*, p. 38. The railway ran only for a few years and was left intact.

⁵⁹ Seigel and McEwan, *A Historical Overview*, p. 30.

⁶⁰ *Ibid.*, pp. 30-31, quoting Correspondence from the R.C.M.P., 5 August 1932, PAC, RG 23 Vol. 995 f. 721-4-27 (1), p. 17.

government authorization.⁶¹ In a letter sent by Commissioner William Ogilvie to Clifford Sifton, Ogilvie complained about the failure of the construction company to abide by government regulations:

I then asked them if they had complied with the requirements of the law. They did not know what the law required. I told them it would be impossible for them to proceed until such times as they had filed a copy of their plans and profile with the Honourable the Minister of Railways at Ottawa. They said they had none north of the summit, that they intended to proceed with the survey and construction simultaneously and that, up to the time of our conversation, they had not determined where the line would be; consequently could not make any plan or profile of it.⁶²

In the end, the American contractor went ahead without the government's approval. The consequences were disastrous. Considering the distance between Ottawa and Dawson City, there was little the federal government could do to prevent the badly needed railway from being completed.

In September 1899, the contractor decided to lower the water level of Lewis Lake in the southern Yukon by three metres to assist in the construction of a grade along the lake. On September 14, the construction crew commenced cutting a one metre trench at the end of the lake. A small stream was opened. The plan was to limit the width to six metres and the depth to five centimetres. As it happened, the accelerating flow of water began to rip out a ragged ditch. As the flow increased, it tore more sand and gravel from the banks of the ditch and created a thirty metre wide river. The entire channel from the upper lake collapsed, releasing a large quantity of water that swept everything in its path. Ultimately, a thirty metre waterfall poured from the lower lake into the valley and flooded the Watson River. Within a couple of days, mud was observed in Lake Bennett, Tagish Lake and the entire Watson River Valley. This

⁶¹. The Whitehorse portion extended southwards where both ends met at Carcross, Yukon.

⁶². NAC, *Sifton Papers*, Commissioner Ogilvie to Sifton, 31 August 1898.

catastrophe drained Lewis Lake, once twenty one metres deep.⁶³ Most southern Yukon lakes have an abundant supply of fish and are important staging areas for birds. The destruction of Lewis Lake eliminated an important habitat for fish and waterfowl. The effect was permanent.

Permafrost Alterations

During the Gold Rush, as mining companies increased their capital investments, their demand for bigger dredges and larger hydraulic operations transformed thousands of hectares of creek beds in the Klondike Valley. The result was a major change to the general topography of the area. The Klondike area has widespread discontinuous permafrost. During most placer operations in this area, permafrost was removed from both the surface and subsurface layers.⁶⁴ Placer mining resulted in the elimination of permafrost on some valley sides and creek bottoms.⁶⁵ These changes were permanent and resulted in the growth of different vegetation over the permafrost ground cover. The effect of permafrost on plants is to slow their growth. Permafrost causes plants to be waterlogged with limited aeration of the soil, which leaves the plant roots short of oxygen.⁶⁶

Major elimination of permafrost occurred on Bonanza, California, Hunker and Dominion Creeks and the Bonanza Benches. Mining on the Klondike, using fire or steam, caused the thawing of gravels and the melting of permafrost.⁶⁷ Where a placer operator left a well drained gravel tailing pile, this resulted in the permanent elimination

^{63.} Roy Minter, *The White Pass Gateway to the Yukon*, (Fairbanks: The University of Alaska Press, 1987), p. 323.

^{64.} Hardy and Associates, *Fish and Wildlife Recovery*, p. 82.

^{65.} Hardy & Associates, *Fish and Wildlife Recovery, in Placer Mined Areas of the Yukon* (Calgary. Department of Fisheries and Oceans, 1978), p.107.

^{66.} Bastedo, *Shield Country*, p. 108

^{67.} Bostock, *Yukon Territory*, pp. 102, 109.

of permafrost.

In addition to the changes in vegetation communities, removal of permafrost from the placer mined areas will influence the local hydrological regime. Storage and release of water from active ice layers above the permafrost may have important implications to the flow regime in the creeks during the summer season. Removal of the permafrost and removal of the active layer by placer mining activities may reduce water storage capabilities of the watersheds and skew the hydrograph so that less water would be available in the late summer periods from melting of active layer ice.⁶⁸

Alterations to Vegetation

The Gold Rush was a time of intense alterations to the land and waters around the Klondike Valley. During this period, no thought was given to the environmental effects of placer mining. It is only in the past thirty years that scientific attention has turned to ascertaining the effects of mining on the flora and fauna. Modern studies on the environmental impacts of placer mining in the Yukon have focused on hydraulic mining and dredging. Depending on the technology and geography, different environmental effects are demonstrated where alterations to vegetation, wildlife and fish have occurred. The use of these reports is premised on the assumption that placer mining will have a detrimental effect on both flora and fauna. However, since these recent studies were not done during the Gold Rush we must accept their findings with caution.

The federal government has conducted numerous studies in the Klondike area to assist in developing standards to regulate placer activities on Yukon rivers.⁶⁹ One

⁶⁸. Hardy and Associates, *Fish and Wildlife Recovery*, pp. 105, 107. The study did not elaborate on the new growth caused by the removal of permafrost.

⁶⁹. K. Liber, M.D. Paine, C.A. McPherson and B.J. Kelemen, *Effects of Placer Mining Sediments on Juvenile Chinook and the Eggs of Arctic Grayling* (Vancouver: Department of Fisheries and Oceans 1992); Hardy and Associates, *Fish and Wildlife Recovery*; Osler, *Study of Mercury Usage*; D.J. McLeay, A.J. Knox, J.G. Malick, I.K. Birtwell, G. Hartman and G.L. Ennis, *Effects on Arctic Grayling (Thymallus arcticus) of Short-Term Exposure to Yukon Placer Mining Sediments: Laboratory and Field Studies* (Vancouver: Department of Fisheries and Oceans 1983); Envirocon Limited, *Investigation of the Magnitude and Extent of Sedimentation from Yukon Placer Mining Operations* (Hull: Indian Affairs and Northern Development, 1986).

major habitat study was conducted by Hardy and Associates in 1978 for the Department of Indian and Northern Affairs.⁷⁰ The purpose was to examine forty six abandoned mining sites in the mid 1970's. The study was conducted to estimate where dredging left the worked areas utterly devoid of vegetation. The first observation was that water formerly available from precipitation and snow melt was no longer retained, and without this moisture, succession plants were slow to grow. It was found that it took twenty-seven years before the first willows, balsam poplars and cinque foil shrubs began to form around the piles of tailings and one hundred years for their full growth.

The miles of rock and gravel tailings left by the dredges were even slower to revegetate. The recovery rates for a small number of vascular plants including dwarf shrubs, low shrubs, tall shrubs, and tall herbs were less than 5% after forty years and less than 40% after sixty years. It took at least one hundred years before significant vascular plant cover was re-established. In some places unconsolidated mountains of boulders without silt or clay were still devoid of any vegetation after sixty years or longer.

The Effect on Wildlife

There is no recorded evidence to suggest that the decrease of wildlife in the Klondike area during the Gold Rush was due to anything other than hunting and fires.⁷¹ However, several recent studies in the Klondike Valley assist in ascertaining the effects of placer mining during the Gold Rush. Placer mining first removed the trees and then the soil upon which food species like dwarf shrubs and herbaceous plants grow. One mammal, the red backed vole, ate mushrooms and lichen that grew on trees in the

⁷⁰. Hardy and Associates. *Fish and Wildlife Recovery*, pp. 3-5, 11, 22, 75, 76-81. This is the source for the remainder of this page and the next page unless otherwise noted.

⁷¹. See Chapter Two.

Klondike Valley.⁷² The dwarf shrub and herbaceous cover provided a secure habitat. The destruction of this vegetation due to placer mining during the Gold Rush resulted in the removal of this species. Without food or shelter, the red backed vole would not be able to return to the affected area for over a century, until the vegetation had regenerated.

Similarly, we now know that the food supply for moose would have been destroyed by placer mining since the removal of soils destroyed the habitat required by the willows and vascular plants. In placer tailings that were well drained, which included silt and clay subsoils, it took over forty years for the willows and other shrubs to become re-established. Once those willows and shrubs became re-established, then the moose would return to the area. As with voles and moose, the slowness of plant regeneration in the perturbed areas would also have prevented other wildlife such as birds and caribou from returning until the re-establishment of willows and other vegetation.⁷³

Mercury

Mercury use in the Klondike was widespread. Any area that was hand mined prior to 1925 still shows trace amounts.⁷⁴ Bonanza Creek and its tributaries, Eldorado and Upper Bonanza appear to be the only creeks which still show evidence of heavy mercury contamination. Samples taken from excavations in 1982 show that all recovered gold demonstrated a high level of contamination.⁷⁵

⁷² Due to parameters irrelevant to this study the wildlife examined by Hardy and Associates, were limited to moose and red backed voles; Adrian Forsyth, in *Mammals of the Canadian Wild* (Camden East: Camden House Publishing Ltd. 1985), states that clear cut logging and environmental disturbance cause the red backed voles to become locally extinct, p. 244.

⁷³ It is assumed that other animals which relied on vegetation disappeared until the vegetation reoccurred.

⁷⁴ Osler, *Study of Mercury*, p. 16.

⁷⁵ *Ibid.*, p. 48.

Elemental mercury was used as part of the placer mining 'cleanup' process. By amalgamating with the precious metal it drew gold particles from the gravels. This primary process required that water was continuously poured over placer gravels which lay on copper plates to which the mercury was amalgamated in the bottom of the sluice boxes. The water, and significant quantities of mercury, then descended into the tailing piles and from thence into the ground and waters.⁷⁶

Mercury and mercury compounds are highly toxic. When mercury enters a lake or stream attached to sediments, it can be converted into methyl mercury "a soluble organic compound formed by the activity of anaerobic bacteria." This is particularly true in slightly acidic waters. Once in soluble form it has a high affinity for biotic tissues and is readily taken up by other organisms. It then becomes part of the food web with great potential for sub lethal and sometimes lethal effects on fish, wildlife and humans.⁷⁷ Organic mercury is a serious danger because it can accumulate in the tissues of fish and animals, including people.

Since mercury is an organic concentrate it does most damage to predator species that consume mercury over longer periods of time. Long-term exposure to inorganic or organic mercury in humans will damage the kidneys, brains and developing fetus. Bears and humans with a high fish or mushroom intake are particularly vulnerable. Fish accumulate mercury either directly from the water, from the consumption of aquatic organisms by taking in mercury attached to sediments through their gills.⁷⁸ Wildlife

^{76.} *Ibid.*, p. 116.

^{77.} Canadian Council of Resource and Environmental Minutes, *Canadian Water Quality Guide Lines*. (Ottawa: Environmental Canada, 1991), pp. 38-41. The highest mercury levels in sediments are found in those rich in organic materials. The biological half-life for mercury in fish is two years; Oliver S. Owen, *Natural Resource Conservation, an Ecological Approach*, second ed. (New York: Macmillan Publishing Co. Inc., 1975), pp. 536-537. In Minimata Bay, between 1953 and 1960, mercury contamination caused the deaths of three people and disabled eleven. Disabilities ranged from blindness and paralysis to coma.

^{78.} *Canadian Water Quality Guidelines*, pp. 6, 40.

and humans eating fish affected by mercury would have suffered mercury poisoning. Although there is no conclusive evidence that mercury poisoning affected individuals during the Gold Rush, it is likely, in the light of present research, that any fish remaining in the disturbed creeks of the Klondike Valley would have been contaminated by methyl mercury. Ingestion of mercury attached to the huge quantities of suspended sediments flushed into the creeks and rivers by the placer miners would have been unavoidable.

Fish

During the Gold Rush period, dams were constructed without fishways. Salmon were prevented from obtaining access to upstream spawning areas. Waterways were also diverted and blocked due to the continuous sluicing of placer ground. Blockages or delays that effect fish migration can be devastating to the fish. Migration is necessary for spawning, feeding and as a method of escaping predators. In addition, placer mining affected fish habitat by destroying the natural stream channel:

Placer mining affects the physical habitat in a stream through destruction of the channel. This is an inevitable outcome of the process as it is necessary to remove the organic overburden of the banks and riparian zone adjacent to the stream. These excavations cut through successive inorganic layers within the stream channel and valley floor and down to the gold-bearing fluvial deposits which can extend to bedrock. Processing of the gold-bearing deposits completely eliminates the stream channel during a typical commercial mining operation. The post mining channel is usually straight and the stream flows along bedrock with no pools and with velocity barriers or other migratory blocks (e.g., settling pond dams).⁷⁹

Not only were the natural channels destroyed by placer mining but injurious levels of sedimentation also resulted. Normal sediments are fine particles of clay, silt and rock which are released by runoff and ground water into rivers and lakes. They are

⁷⁹. Dames and Moore, *A General Review of the Effects of Gold Placer Mining Including Site Specific Reviews on Selected Subarctic Alaskan River Basins* (Anchorage: Alaska State Office, Bureau of Land Management, nd.), pp. 2-6, 27, 42-43. Unless otherwise indicated this is the source for the balance of this page and for the next page.

suspended for a time and then in the natural course of events settle to the sides or bottom. In the Klondike, the sediments which were flushed into natural waterways would also have included larger obstructing pieces of rock and gravel and quantities of vegetable and animal matter which had lain unrotted or partly rotted in the frozen soils for centuries. "Generally, the greater the amount of sediment released and the longer the duration of release, the greater will be the detrimental effects on the habitat of assorted aquatic populations."⁸⁰

The types of fish in existence in the Klondike Valley before the gold rush included salmon, grayling and whitefish. By dumping huge quantities of mud and organic matter into the waters, placer mining increased turbidity which reduced light penetration and photosynthesis.⁸¹ Underwater plants which rely on solar radiation for growth provide habitat for micro-organisms such as bacteria and fungi which are food for other aquatic organisms on which adult fish feed. Turbidity also hinders the ability of fish to find food. As well, turbidity and temperature are related and may result in rapid changes which can be critical for small organisms. The Klondike sediments would also have caused the water to become anaerobic as the oxygen in the water was depleted during the decomposition of the organic matter. While this can enhance the ability of mercury to take on the methyl mercury form, it has a suffocating effect on the benthic communities of flora and fauna which live in the creek and river bottoms.

Suspended sediments can be stressful to underyear grayling and lessen their survival rates due to the direct effects of placer mine sediments on Arctic grayling. Where the fish were not forced downstream, it was found that fish growth was depressed and feeding responses slower. This in turn, reduced response rates to natural

⁸⁰. Department of Fisheries and Oceans, *A Rationale for Standards Relating to the Discharge of Sediments into Yukon Streams from Placer Mines* (New Westminster: British Columbia, Department of Fisheries and Oceans, 1983), p. 3.

⁸¹. McLeay et al., *Effects of Arctic Grayling*, p. 35. This is the source unless otherwise noted for the balance of this page and the first paragraph of page 67 unless otherwise noted.

environmental fluctuations and resistance to disease.

The deleterious effects on this species can also be applied to salmon and whitefish. As with grayling, other salmonid fish are susceptible to damage from high ionic silt content which clogs and abrades their gills. As visual feeders, in highly turbid waters, they are at a disadvantage when they are unable to see their insect prey. However, as the dissolved oxygen content of the water is depleted in breaking down organic placer waste, the benthic insects would most probably have been killed. It has also been shown that suspended sediments and increased bottom sedimentation reduce the survival of chum salmon eggs.⁸²

Thus, placer mining in narrow valleys eliminated grayling. After the cessation of placer mining, it took between three and seven decades to restore their habitat to normal levels.⁸³ Where no reclamation took place, it took over one hundred years before stocks returned to normal. In areas where streams were cut to bedrock, it took sixty years for 25% of the bank vegetation to return. In areas where there are low frequency floods, it is estimated that it will take up to one hundred years, after placer mining has ceased, for bank vegetation to regrow and to reestablish the stream channels.⁸⁴

Conclusion

The permanent destruction of the landscape from cut or burnt forest to piles of rubble and bare bedrock was only matched in its perniciousness by the complete disruption and pollution of the hydrology of the Klondike valleys. The federal government allowed this wilful destruction of habitat which eliminated some wildlife

⁸². Department of Fisheries and Oceans, *A Rationale for Standards*, pp. 8, 11.

⁸³. Hardy & Associates, *Fish and Wildlife Recovery*, pp. 4, 40-44.

⁸⁴. Dames and Moore, *A General Review*, pp. 2-6.

species and fish stocks completely and drove others away from the area for a number of decades. Roads, railways and mine tailings irrevocably changed the appearance of the Klondike region, but the greatest impact on wildlife and fish came from the destruction of habitat. Within several years, a scarcity of fish occurred on lakes north of Whitehorse. The First Nations increasingly were forced to travel further afield in search of the scarce game. The greatest threat to native survival was soon to arrive with the introduction of new diseases brought by the goldseekers.

CHAPTER FOUR
The Environmental Effects of the Gold Rush
on the Indian People

Introduction

The Gold Rush irreversibly altered the traditional way of life of the Tutchone and Han people. Prior to the gold discovery at Bonanza Creek in 1896 the Han people had a permanent settlement at the junction of the Klondike and Yukon Rivers which they used as a summer fish camp and for winter quarters. Almost overnight, the native settlement became Dawson City as thousands of miners and fortune seekers crowded into the area. Local game disappeared and huge numbers of caribou and moose were slaughtered to feed the much expanded population. At the same time, placer mining throughout the Klondike Valley depleted fish stocks on many of the creeks. The Han and Tutchone Indians were forced to travel further afield in search of both fish and wildlife. The response of the federal government was to remove the native peoples to reserves, one of which was on 160 acres at Moosehide south of Dawson.

Government Policy

The position of the government was to extract as much revenue from the gold fields without contributing to the creation of a large bureaucracy. Apart from creating Indian reserves, the government did not attempt to regulate hunting and fishing by the newcomers for several years or to compensate the Indian people for the use of land used for gold production. It was far easier to deal with the pressing demands of miners than to reach an accommodation with the Han Indians. Apart from a reservation at Moosehide, three miles down stream from Dawson, frequent requests for more land were rebuffed, as were treaties, because of fears that gold in the Klondike Valley might be found on reserve lands. Besides, Ottawa also considered the Gold Rush to be a temporary anomaly which would only last a few years and that the land once exploited for its mineral wealth would then be available for traditional uses.

Populations of the Han and the Tutchone Indians

In the 1880's the population of the Han was estimated by anthropologist Cornelius Osgood to be approximately 430 people.¹ In the report of his survey of the Klondike region for 1887, George Dawson estimated that some 250 Indians lived along sections of the Yukon River between the Lewes and the Porcupine Rivers.²

There is some dispute with respect to the size of the population of the Han settlement in 1896 at the confluence of the Klondike and Yukon Rivers. In his written description about a visit to the settlement at the junction of the Yukon and Klondike Rivers in 1896 for the US Government, J.E. Spurr wrote that he observed most of the Han Indians awaiting the arrival of salmon. Since salmon habitually arrive in June, it is assumed to have been June 1896. At that time, he estimated the population to be 200 people.³ By October that same year, Frederick Flewelling, the resident Anglican missionary at Dawson, reported their population to be 100.⁴ The Gold Rush affected other First Nations, particularly those settlements along the Yukon River from Whitehorse to Dawson. Four years later in 1902, only 810 Tutchone were counted in the lower Yukon River Valley between Selkirk and Whitehorse.⁵

¹ Osgood, *The Han Indians*, p. 32.

² Dawson, *Report on an Exploration*, p. 202B. This was based on Frederick Schwatka's trip down the Yukon River in 1883 where he estimated the entire population of Indians from the mouth of the Lewes to the Porcupine to be approximately 250. This would include portions of the Northern Tutchone, the Han and some of the Kutchin Indians.

³ J.E. Spurr, *Through the Yukon Gold Diggings* (Boston: Eastern Publishing Company, 1900), p. 105. He did not mention the date of his visit in 1896 other than that the Indians were awaiting the arrival of salmon.

⁴ Frederick Fairweather Flewelling, *Diary, 1896-1898*. Yukon Archives, MSS 013 82/76, entry for 17 October 1896. He had the advantage of living with the Han for several years. The difference might be ascribed to the fact that it was both a winter and summer settlement with a smaller population during spring and fall hunting seasons, or to Spurr's miscalculations. Three years later, notwithstanding these variations, Adney was told by the Han that they feared further fatalities because they "could not afford to lose any more." By 1900, Adney thought that the number of Moosehide Han had been reduced to between 60 and 70.

⁵ T.W. Jackson to the Superintendent of Indian Affairs, 13 January 1902, in Correspondence, Department of Indian and Northern Affairs, Yukon Archives MSS A30 82/130.

As described in Chapter One, the Han relied on the annual runs of salmon, grayling and whitefish as their main food source and, even though it is known that they traded in fish, there is no evidence prior to the Gold Rush to suggest that their indigenous hunting practices put fish and wildlife stocks under stress.⁶ Similarly, in the latter half of the 19th century the area between Dawson City and Fort Yukon sustained a substantial moose population.⁷ Tappan Adney, who lived in Dawson after 1897, observed that moose and caribou were abundant throughout the Klondike Valley.⁸

Tappan Adney had hunted with the Moosehide Han in January 1898. His trip up the Klondike Valley to hunt moose and caribou took approximately one month. "The salmon in the Yukon," he wrote, "are abundant, the moose nowhere on the North American continent are so large as on the rivers entering the Yukon or more plentiful; and the Barren ground caribou or wild reindeer runs in bands often numbering thousands." Adney also noted that the Klondike with its broad valley and mountainous banks provided an admirable feeding ground for moose.⁹ On another hunting trip in 1900, Adney recorded that the Han Indians killed 80 moose and 65 caribou and sold most of the meat to miners in Dawson.¹⁰ He also observed an abundance of wolverine, bears and caribou. "The caribou of the Klondike region occurs in small bands over the country on the higher hill tops where it feeds on the gray moss; but it is generally local

⁶. Osgood, *supra*, p. 815; William Ogilvie, *Early Days in the Yukon*, p. 117 stated that Deer River or Tondac of the Indians, (later the Klondike River) was a famous salmon run when he visited it on 1 September 1887.

⁷. Clark, *Fort Reliance*, p. 38.

⁸. Tappan Adney, *The Klondike Stampede*, (originally published New York: Harper Bros., 1900 Vancouver University of British Columbia Press, 1995), p. 444.

⁹. The Klondike Valley was eminently suitable for moose, according to Forsyth in *Mammals of the Canadian Wild*, p. 21. He describes the habitat for moose as wooded areas, swamps, streams and muskeg in the boreal forest.

¹⁰. Tappan Adney, "The Indian Hunter of the Far Northwest, *Outing Magazine*, 6, 1902, pp. 631-624. This is the source for the balance of this paragraph.

in its range migrating at times in bands so vast as to stagger belief."

Ferdinand Schmitler, a United States Army doctor, was another non-native observer who wrote his impressions of the Han Indians near Eagle Alaska.¹¹ Their seasonal activities seem to have changed little; during the summer of that year he saw them catch whitefish, grayling and salmon. They dried King salmon in July for the winter months, and went hunting during the fall and late winter.¹²

Disruptions to the Han People

In 1896 William Ogilvie was assigned the task of mapping the Yukon River from Pyramid Island to the Yukon Alaska Boundary.¹³ Ogilvie drew in his micrometer map portions of the Yukon River including the intersection of the Yukon and Klondike Rivers. He called the Klondike River the Deer River or Tondac of the Indians. The River was shallow and about twenty-two metres wide. He sketched a description of the area including the intersection of the Klondike and Yukon Rivers which is shown at Map 8¹⁴. At this time, there were approximately twenty permanent log cabins in the Han settlement at the Klondike and Yukon Rivers. Before the year was out the Han had sold their homes to incoming miners for cash and so began the transformation from fishing camp to the mining camp which became part of Dawson City.¹⁵

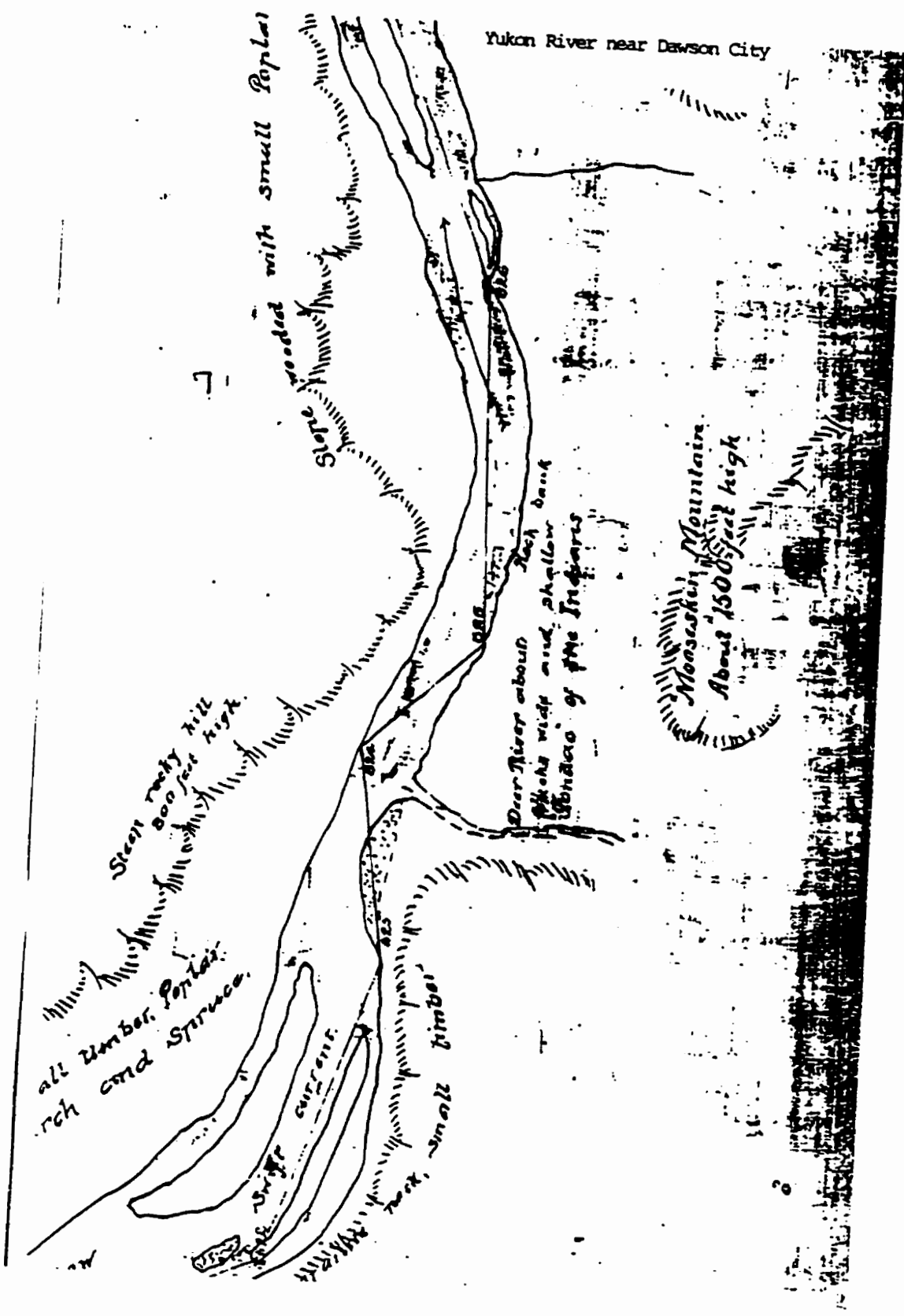
¹¹ Ferdinand Schmitler, "Upper Yukon Customs and Folklore." *Annual Report of the Smithsonian Institute*, vol. 56, number 4, Washington: 1910, pp. 8-9. The distance between Eagle, which was on the border between the Yukon and Alaska, north west of Dawson City and Moosehide was approximately 120 kilometres up the Yukon River. Therefore, Schmitler's observations of Han people can also be applied to the Moosehide Indians of the same period.

¹² *Ibid.*

¹³ William Ogilvie, D.C.S. Plan 58597 Canada Land Survey Records.

¹⁴ Map 8, next page. Plan of the micrometer of the Yukon River from Pyramid Island to the Yukon Alaska Boundary Sheet 3, 1896.

¹⁵ William Carpenter Bompas, *Letters 1865-1900 Yukon Archives CRG*, Vol. 19, f. 4682, 28 October 1896.



When Anglican Bishop William Bompas learned of the sale of the cabins in October 1896, he wrote to the government claiming that the miners' purchases included only the cabins and not the property. He sought from Ottawa \$2,000.00 compensation for the land on which the cabins stood. Bishop Bompas was also concerned about the activities of the miners, who had acquired the cabins. "The miners wish to retain the site of the Old Indian Village for a second town, and already saloons are opened in some of the Old Indian houses where they first stood."¹⁶ Bompas had written a number of letters to the federal government over the previous four years expressing concern over the newcomers providing spirits to the Indians. He viewed the arrival of the miners with distaste and wished the removal of the Han away from the ever increasing number of saloons. This concern led to his request to the federal government for a plot of waterfront land at Dawson City for mission purposes and Indian occupation.¹⁷ The following year, the Minister, Clifford Sifton, replied that it was the government's position that since the plot requested formed part of the un-surrendered portion of the Northwest Territory, he was not yet inclined to set aside a reserve for the Han Indian people.¹⁸

From the beginning of Bompas' campaign to protect the Han Indians, Inspector Charles Constantine of the North West Mounted Police attempted to discredit Bompas' concerns. In his letter to the Department of the Interior, Constantine claimed no more than ten Indian houses were located at Dawson. These cabins served as the only winter quarters for the band.¹⁹ As for the Indians, they seemed happy with the turn of events. "The Indians have expressed themselves as greatly pleased at the arrival of the miners

^{16.} *Ibid.*

^{17.} *Ibid.*

^{18.} Hayter Reed, Deputy Superintendent of Indian Affairs to Bishop Bompas, 19 March 1897, Anglican Church, Diocese of Yukon Records, Yukon Archives Series 1-1C, box 14, F. 6, 1897.

^{19.} Inspector Constantine to Department of the Interior, 19 November 1896, *Yukon Territorial Records*, Correspondence, Yukon Archives, CRG, Vol. 19, f. 4682. This letter is the source for this paragraph.

as it means plenty of food, plenty of money and better times generally for them. In winter they always have a ready market for their game and in summer can make good money as boatmen and trackers." Inspector Constantine resisted the idea of protecting the Han from non-native encroachment. "The Indians living at the mining camps were not dependent on fishing for their livelihood. . . . This year notwithstanding the failure of the salmon catch which was very late before they could be persuaded to go out and in consequence fish has been very scarce at this post." The policy of the government, as Inspector Constantine understood it, should be to treat native and non-natives alike. "It certainly would be a gross injustice to debar the whites from fishing and make them entirely dependent upon bands of Indians who will neither fish nor hunt as long as they can buy food. The Whites are the providers and workers in this country and should enjoy all privileges."

Hayter Reed, the Deputy Superintendent of Indian Affairs, wrote to Bishop Bompas on 19 March 1897, again advising him that, "the Department has no jurisdiction over Indians in the un-surrendered territory; nor does it appear how - without having entered any treaty - the Indians can be otherwise dealt with than white settlers or immigrants relative to such matters as your Lordship refers, although doubtless the lands affecting the sale, barter or supply of intoxicants to them could be enforced by competent authority."²⁰ As it turned out, the government's position soon changed, slightly, in order to set up a reserve.²¹

²⁰. Hayter Reed, Deputy Superintendent of Indian Affairs to Bishop Bompas, 19 March 1897, Anglican Church, Diocese of Yukon Records, Yukon Archives Series I-1C, box 14, F. 6, 1897.

²¹. In 1897 the Yukon was still a district in the Northwest Territories until 1898 when it became a separate territory. The position of the government in 1897 changed several months later when a reserve was established at Moosehide. NAC, Can. *Sessional Paper*, 1900, 30 June 1899 Victoria Series A, p. xxii: The Department of Indian Affairs distinguished between parts of Canada covered by treaties and areas outside of treaty limits. Finally, in 1899 the Department of Indian Affairs decided that the time was ripe for entering into treaty relations with the Indians influenced by the Gold Rush, in order to set at rest "...the feeling of uneasiness which was beginning to take hold of them and laying the foundation for permanent, friendly and profitable relations between the races" *Ibid.*, p. xix. However, no treaties were ever negotiated other than by the establishment of several reserves.

By 1897, prospectors were actively exploring for gold in the area around the Han settlement. The Free Miners Certificates permitted the newcomers to cut trees and to fish without any restrictions. Worse still, from Bishop Bompas' perspective, the use of alcohol was increasing dramatically. Accordingly, the Anglican Church, through the efforts of Bishop Bompas, engaged in a lengthy campaign to relocate the Han, by now in desperate straits, after having sold their homes and succumbing to the temptations of alcohol. In response, the federal government proposed to remove them to Moosehide, almost two kilometres downstream from Dawson and away from the main areas of mining and commerce. The Han readily acceded, but in the act of relocating in June 1897,²² they apparently relinquished their claim to the settlement at the mouth of the Klondike and Yukon Rivers.

Once the Dawson Indians relocated to Moosehide, the Anglican Church took steps to protect them from further encroachments. Benjamin Totty, the new missionary at Moosehide, wrote to the federal government requesting that the reserve be properly demarcated. Subsequently, in a series of letters, he expressed concern about keeping miners away from the reserve and requested an enlargement of the reserve. "There are claims staked and cabins built," he wrote, "on ground which properly belongs to us."²³ The government resisted any extension of the reserve beyond one hundred and sixty acres. William Ogilvie wrote to the Secretary of the Department of the Interior and advised that since "...gold bearing gravels have been made in that vicinity. . . before I recommend any extension of the 160 acres, I will await the development of the ground, as gold mining ground."²⁴

²² Jas A. Smart, Deputy Minister of the Interior to Bishop Bompas, 12 August 1897, Anglican Church, Diocese of Yukon, Records. Smart confirmed that the Indians were moved to Moosehide on 15 June 1897.

²³ Benjamin Totty, to the Department of Indian Affairs, 14 December 1898, *Yukon Territorial Records*, Correspondence, Yukon Archives, CRG91, Vol. 7, f. 1187.

²⁴ William Ogilvie, to the Department of the Interior, 11 December 1900, *Yukon Territorial Correspondence*, Yukon Archives, CRG91, Vol. 7, f. 1187, 1900.

From the outset, the newcomers to Dawson actively began to fish for salmon.²⁵ The government had not anticipated that the fish stocks along the Yukon River and its tributaries would be so quickly depleted but even after they became aware of the problem, Ottawa let several years pass before taking steps to regulate fishing.

The Han people, who had long occupied the territory in the Yukon River basin between eastern Alaska and east of the Yukon's gold bearing creeks, bore the full brunt of the Gold Rush. Suddenly, these independent hunters and gatherers found themselves engaged in a money-based economy. Lured by the prospect of commercial gain, other Han Indians and natives from as far away as the Porcupine and Peel Rivers migrated to Dawson City to supply the demands of miners for moose and caribou. As early as 1894, Inspector Constantine had expressed his concern that the local Indians were supplying moose and caribou to mining camps and not keeping enough for themselves. Miners hunted game which put additional pressure on the natural resources formerly used by the Han. Later, as the moose, caribou and fish stocks were depleted, the Han assisted in cutting wood for the steamers which plied the river between Whitehorse and Dawson.²⁶

Tappan Adney observed a party of non-native hunters on the Klondike in the fall of 1897. kill 47 caribou before running out of ammunition.²⁷ The following year, parties of white men again travelled up the Klondike this time in search of moose and slaughtered the animals as they drank at ponds.²⁸ Soon the effect of this practice was noted by the police. "Large game is not very plentiful in this vicinity," reported

²⁵ Coates, *Best Left*, p. 42.

²⁶ NAC, "North West Mounted Police Report, 1902," *Annual Report*., p. III; Report of Inspector Starnes, p. 57, Report of Inspector Wood, p 18.

²⁷ Adney, *The Indian Hunters*, p. 633.

²⁸ *Ibid*, p. 63; Innis, *Settlement and the Mining Frontier*, p. 205 stated that a road was built in 1898 south from Dawson to Grand Forks.

Superintendent Steele. "The Indians have to go some twenty miles back to hunt."²⁹

Nothing was done to try and conserve game. Bishop Bompas believed Commissioner William Ogilvie planned to move the Han Indians, forcibly if need be, further downstream from their reserve at Moosehide. Ogilvie agreed that the Han should move, but only on a voluntary basis.

The proximity of Moosehide to Dawson was a disadvantage from several points of view in connection with the Indian reserve. Primarily the reserve had been stripped of all timber, and owing to residence of such a large number of whites as are congregated in Dawson, it was desirable to preserve as far as possible the timber for the use of the Town. . . . Further, the Indians complained of a want of game. This fact must necessary subsist in close proximity to any densely populated area such as Dawson and the main centres around it. For that reason, I suggested a point at some distance from Dawson.³⁰

Since the Han Indians did not wish to move, they remained at Moosehide without the advantage of local game and continued to suffer from disease. By 1901, almost a thousand non-natives trapped and hunted moose and caribou in the areas previously occupied by the Han people.³¹ Killing moose and caribou for the city market reached its zenith during the winter of 1903-1904 when some 1,500 caribou were killed in the Klondike River basin.³² Whether the depletion of moose and caribou was primarily due to native market hunting of game or by non-natives market hunters, it had the same effect. Game quickly disappeared around Dawson City.

²⁹ Can. *Sessional Papers*, 63, "Report of the North West Mounted Police 1900," p. 34.

³⁰ Bompas, Letters, William Ogilvie to Bishop Bompas, 27 September 1900, *Yukon Territorial Records*, CRG 91, vol. 7 f. 1187, 1900.

³¹ Porsild, *Culture, Class and Community*, p. 118, quoting a dispatch from McCook in the United States Consulate, Dawson City, to Hill, 19 September 1901.

³² McCandless, *Yukon Wildlife*, p. 49.

"Of all the aboriginal groups in the Yukon," wrote Charlene Porsild, "it was probably the Han who were most deeply and permanently affected by the swelling tide of humanity that moved from the coast toward the junction of the Klondike and Yukon Rivers."³³ Tappan Adney observed that by 1898, the Han Indians were few in number. He believed, based on what the Han Indians told him, that their numbers would continue to decline on a yearly basis.³⁴ When he went moose hunting with the Klondike band in 1898, he was warned that several of the hunters were worried that Adney might mistake them for a moose and shoot them. As the Indian guide explained "...he thought it best I should hunt alone in the future as they now had few Indians and could not afford to lose any."³⁵ In Osgood's opinion, "a few hundred Indians the total population of the Han Nation were simply lost among tens of thousands of white immigrants whose diggings along every tributary of the Yukon and along every side stream of the tributaries utterly changed the physical form of the Han Territory."³⁶

In 1902, T.W. Jackson, a lawyer practising in Whitehorse wrote to the Department of Indian Affairs advising that he was acting on behalf of Jim Boss, Chief of all the Indians south of the Stewart River to Lake Laberge. Jackson had been retained by Jim Boss to seek a treaty with the federal government. The impetus was the number of newcomers who directly competed with the Indians for food. Jackson was seeking compensation and a treaty with the government to remedy:

...the rights of the Yukon Indians to compensation because of the taking possession of their lands and hunting grounds by the white people. He states [to me] that before the advent of the white man the Indians had no difficulty in procuring game sufficient for their wants whereas at the present time,

³³. Porsild, *Culture Class and Community*, p. 96.

³⁴. Adney, *Indian Hunters*, p. 624.

³⁵. Adney, *Moose Hunting*, p. 6.

³⁶. Osgood, *The Han Indians*, p. 138.

because the use of white trappers and hunters taking possession of the country the Indians are unable to subsist as they were formally able to do, and the consequence is that in the comparatively short space of eight years their numbers have decreased from several thousand to less than one thousand at the present. He further states that every winter since the white man came into the country it has become more difficult for the Indian to live and no winter has passed that bands removed from Police posts have not lost many of their numbers from want and starvation.

Jim Boss, I may state is a very intelligent man and is fairly well off and I am told is very liberal with his own means in assisting his own Indians. He says "tell the King very hard we want something for our Indians because they take our land and game."³⁷

Jackson further reported his client's estimate that the number of Indians under his leadership would decrease by 20% unless something was done by spring because of the lack of game. Starvation was believed to be inevitable.³⁸ A copy of the letter was sent to James Ross, Commissioner of the Yukon Territory. In a paternalistic reply, Ross ordered that the North West Mounted Police would be distributing assistance to those affected as stated on a handwritten note attached to the letter.³⁹ Due to the distribution of food, no reports indicated a loss of life due to starvation.

The Gold Rush altered the relationship of the Han Indians with the land and water. The Han sold their traditional fishing camp and winter grounds at Dawson. They traded moose meat and caribou to miners in return for cash. Non-natives hunted moose and caribou which dramatically reduced the herd size near Dawson. And yet, notwithstanding the seriousness to the Han of the disappearance of fish in the Klondike Valley and the depletion of moose and caribou near Dawson, these problems paled in comparison to another problem - disease.

³⁷. T.W. Jackson to the Superintendent General of Indian Affairs, 13 January 1902. Yukon Archives MSS A30 ACC 82/130.

³⁸. However, no evidence of starvation resulted.

³⁹. *Ibid.*

Dawson City

Until the introduction of steam thawing by 1900, little work was undertaken in the gold fields of the Klondike Valley during the long harsh winters which began in October and lasted until the ice breakup in May. Estimates of the number of new arrivals for Dawson are difficult in the absence of census data. An official census was not undertaken until 1901; by then the population was 27,219.⁴⁰ Previously, Dawson City attained its maximum population between 1898 and 1899 when some 30,000 citizens resided there.⁴¹ So many people concentrated in one place had profound environmental results. Dawson soon became a major source of water pollution and a breeding ground for disease.

Disease

Dawson City was not the only mining settlement in the Yukon but at the height of the Gold Rush it boasted a population in the tens of thousands. Within a radius of fifty miles, a further 23,000 people lived in smaller settlements and camps. A major problem at this time was the total lack of sanitation. Waste and garbage lay about the streets of the tent city, and was dumped into the Yukon River. Further upstream along the Klondike River mining waste flowed down to Dawson City and into the Yukon River. In 1897, one traveller to Dawson City vividly observed that "the town is the most unsanitary place imaginable. I know a man who made a bet that he could go down to

⁴⁰ NAC. *Can. Sessional Papers*, 1905, Report of the Commissioner, 10 August 1904, 4-5 Edward VII Series A, p. 3.

⁴¹ The 30,000 number was reiterated by John Dafoe (1931), John Dafoe, *Clifford Sifton in Relation to his Times* (Toronto: The Macmillan Company of Canada Limited, 1931), p. 187. Morris Zaslow (1971) suggested the population peaked at 40,000 during the period of 1898 - 1899 for the entire Yukon, Zaslow, *The Opening of the Canadian North*, p. 146. Tappan Adney (1900) estimated that the population of Dawson between 1897 and 1898 was 17,000 to 18,000, Adney, *The Klondike Stampede*, p. 386; Ken Coates (1988), estimates 16,000, Ken Coates, *Canada's Colonies*, p. 80; Rose Helper (1945), estimated 20,000, Rose Helper, *The Yukon Gold Rush: A Study in Social Disorganization and Reorganization* (Master's thesis, Toronto: University of Toronto, 1945); Charlene Porsild, believed the population to be 16,203 "Culture, Class and Community", p. 47; Arthur T. Walden believed that 30,000 to 40,000 people came to Dawson in 1898, Arthur T. Walden, *A Dog Puncher in the Yukon*, (Boston: Houghton Mifflin Company 1931), p. 69; Harold A. Innis, *Settlement and the Mining Frontier*, p. 191 believed that there were 17,000 to 18,000 people in Dawson with 4,000 to 5,000 at the mines.

the main street and travel the whole way jumping from one dead horse to another or to a dead dog and he won his bet."⁴²

In early 1898, Bishop Bompas expressed fears that outbreaks of disease could soon be anticipated. "I fear great confusion and much sickness at Klondike the coming summer", he wrote in May, 1898.⁴³ To Major Walsh, he confided, "I consider the Indians to be injured both physically and morally and that unless helped they will probably in the course of a generation be destroyed. The Whites are liable to bring in with them various diseases with which the Indians become infected... My suggestion is that in return for the wealth which the government and the Miners are obtaining from this Indian country the Indians should be provided at government expense with free medicines and medical attendance."⁴⁴

One further complication was that Dawson City was built on a swamp. In the spring of 1898 melted ice put most of Dawson under one and a half metres of water.⁴⁵ Waste accumulated during winter was suddenly drawn into the Yukon River, the city's source of drinking water.⁴⁶ Twenty thousand individuals shared two public toilets which were located near the Yukon River. Not surprisingly, by mid summer of 1898 typhoid fever arrived in Dawson.⁴⁷

⁴² Walden, *A Dog-Puncher*, p. 145.

⁴³ Bompas, 10 May 1898, *Letters to Families and Friends 1865-1900*, archives of origin, McCord Museum, Montreal, Yukon Archives. MSS 125, 81/38.

⁴⁴ *Ibid.*, Bompas to Major Walsh, 27 May 1898, NAC, *Sifton Papers*, Yukon Correspondence, MG 27, v. 295, 1898. It is not known whether Bompas' fear was based on first hand experience of Yukon Indians being infected by diseases brought in by non-natives.

⁴⁵ Henry James Guest, "City of Gold, Dawson, Yukon Territory 1896-1918" (Ph.D., diss., Winnipeg: University of Manitoba, 1982), p. 181.

⁴⁶ M.K. Lux, "Disease and Growth of Dawson City: The Seamy Underside of a Legend," *The Northern Review*, 3/4, 1989, p. 99.

⁴⁷ Adney, *The Klondike Stampede*, pp. 99, 351.

Typhoid fever is caused by the salmonella typhi, a type of bacteria.⁴⁸ The bacteria is deposited in water or food by a human carrier and is then spread to other persons. With bacterial infections it is possible to obtain repeat infections. This is unlike the viral diseases that were prevalent during the nineteenth century; if people survived such viral infections, they could develop an immunity. The incubation period for typhoid fever is generally between one and three weeks.⁴⁹ Carriers discharge typhoid bacilli in their feces after the first week of the disease.⁵⁰ Due to the large overflow of water in Dawson during 1898 and the flooding of the public pit toilets and cesspools, the expansion of typhoid fever was assured.⁵¹ The salmonella typhosa can survive long enough to pass down rivers and infect the water supplies of a downstream community.⁵² The survival period for salmonella typhosa can last up to four days.⁵³

During 1898 typhoid fever spread throughout Dawson City and the surrounding areas which caused the deaths of a number of individuals. Typhoid raged until the

⁴⁸. I. Jackson Tartakow and John H. Vorperian, *Foodborne and Infectious Diseases Their Epidemiologic Characteristics* (Westport AVI Publishing Inc. 1981), p. 24. They state that early in the disease typhoid bacilli are found in the blood which will also appear in the feces and occasionally in the urine after the first week; Abram S. Benson, editor *Control of Communicable Diseases Manual*, Sixteenth Edition (Washington: American Public Health Association, 1995), p. 502 and 503 describes typhoid fever as a systemic bacterial disease caused by the salmonella typhi, the typhoid bacillus spread by food and water contaminated by feces and urine of carriers.

⁴⁹. Jackson, et al *Foodborne and Infectious Diseases*, p. 24

⁵⁰. *Ibid.*, Typhoid fever is a systemic infectious disease characterized by continued fever, malaise, anorexia (loss of appetite), slow pulse, the involvement of lymphatic tissues with particular ulceration of peyer's patches in the small intestine, enlargement of the spleen, cutaneous rose spots on the trunk and diarrhoea and constipation. At the turn of the century in the United States a large number of deaths were recorded due to typhoid fever.

⁵¹. Fred W. Tanner and Louise P. Tanner, *Food Borne Infectious and Intoxications*, Second Edition (Champaign Illinois, The Garrard Press, 1953), pp. 185-187 discusses the spread of typhoid fever in water or ice.

⁵². *Ibid.*, p. 185, They cite the pouring of Chicago sewage, infected with the salmonella typhosa, downstream to St. Louis and the creation of typhoid in the downstream city.

⁵³. *Ibid.*, Moosehide was only three miles downstream from Dawson. It is entirely probable that the waters infected with salmonella typhosa infected the Han at Moosehide during 1898.

freeze-up. Miners came to Dawson City for a few days, and unknowingly picked up the disease. They would return to their camps where the effects of typhoid fever often caused their deaths.⁵⁴ Starting in July, 1898, typhoid fever in Dawson City caused the deaths of between one and two individuals almost every day until September.⁵⁵ In July and October, 1898, two of the members of the North West Mounted Police died from typhoid fever.⁵⁶ Typhoid had also reached Tagish.⁵⁷ At the end of August 1898, W.E. Thompson, the Police Assistant Surgeon reported an epidemic of typhoid fever with eighteen policemen suffered from the disease⁵⁸ in that month. In September 1898, Commissioner Ogilvie complained about the great deal of sickness in Dawson and in the overcrowding of the hospitals.⁵⁹ In November he complained again of the high influx of patients at the two hospitals.⁶⁰ The following month, Dr. J.W. Good, the Public Health Officer in Dawson, recorded that 70 of 157 patients in the two hospitals had contracted typhoid fever.⁶¹ The authorities attempted to secure a supply of pure water and began to enforce strict sanitary measures because of their belief that the cause of

⁵⁴. Walden, *A Dog-Puncher*, p. 146.

⁵⁵. Treadgold, *An English Expert*, p. 71. The number of individuals who died is in dispute. Dr. W.N. Robertson, *Yukon Memories* (Toronto: The Hunter-Rose Company Limited 1930), p. 241; Lux, *Disease and Growth of Dawson City*, p. 114 note 8 states that no more than 9 patients died of typhoid during 1898, 6 in 1899 and 1 in 1900; Adney, *The Klondike Stampede*, p. 350, states that between April 1897 and April 1, 1898, seven or eight died from typhoid fever; Davis, *Sourdough Gold*, p. 129, states that as late as October 6, 1898, one hundred and five patients mostly suffering from typhoid were in the St. Mary's Hospital. Innis, *Settlement and the Mining Frontier*, p. 209, states that typhoid fever killed an average of one to two individuals per day between July and September 1898.

⁵⁶. Report of Assistant Surgeon W.E. Thompson, 20 December 1898, *Can. Sessional Papers*, 15, North-West Mounted Police, p. 115.

⁵⁷. *Ibid.*

⁵⁸. *Ibid.*

⁵⁹. Ogilvie to Sifton, 14 September 1898, NAC, *Sifton Papers*, Yukon Correspondence.

⁶⁰. *Ibid.*, letter dated 12 November 1898 from Commissioner Ogilvie.

⁶¹. Report of Dr. J. W. Good, Health Officer, 26 December 1899, NAC, *Can. Sessional Papers*, 15, North-West Mounted Police, 1900, p. 78.

typhoid was bad food and impure water.⁶² Typhoid continued for the next two years.⁶³

During 1899, Dr. Good posted notices restricting the availability of water for public use and warning that typhoid could only be prevented by the exclusive use of boiled water.⁶⁴ In December, he wrote: "What were the conditions in which we found Dawson? We found, practically, one vast swamp, which is usually navigable in the early spring, still in almost a primitive condition, or even worse. cess pools and filth of all kinds, occupying irregular positions, typhoid fever and scurvy rife in the land."⁶⁵

In 1899, Dawson's sanitary situation improved but at the expense of the Yukon River, when temporary drainage ditches were constructed to carry the refuse and surface water from Dawson into the river and downstream to Moosehide. In 1902, the sewers overflowed and flooded the town once again because the exits were blocked by ice and refuse. These temporary drains remained in place until 1920.⁶⁶ During 1900 a new attempt was made to enforce sanitary measures. The Territorial Council placed two large garbage scows on the river front in from the City. The scows dumped garbage into the Yukon River. Complaints were made about the filthy conditions of the waterfront at Dawson. The foot of Eight Street became a health hazard due to the accumulation of rubbish along the shore which made the river so shallow that riverboats were prevented from landing at Dawson City.⁶⁷

⁶² *Ibid.*, p. 76.

⁶³ Lux, *Disease and Growth of Dawson City*, Note 8, p. 114 indicate that typhoid struck between 1898 and 1901.

⁶⁴ *Ibid.* p. 77.

⁶⁵ Good, Report 26 December 1899, p. 76.

⁶⁶ Lux, in her study of the Alphabetical Death Register found that the flood of 1902 did not cause the recurrence of typhoid fever and that the last typhoid death was in 1901. "*Disease and Growth of Dawson City*," Note 8, p. 114.

⁶⁷ Guest, *City of Gold*, p. 182.

The situation deteriorated the following year. In 1901 the medical officer picked a spot in the Klondike River to deposit refuse. Unfortunately, the Klondike River did not flow fast enough. As a result, garbage accumulated along the length of the Dawson water front.⁶⁸ The final solution was to dump garbage into the Yukon River. The current then took the refuse downstream.

Before the Gold Rush, diseases brought by non-natives struck the Kutchin Indians who lived to the north of the Han territory. The Kutchin probably infected other Indian nations.⁶⁹ An epidemic of mumps struck Fort Yukon in 1851.⁷⁰ The Anglican missionary who worked with the Kutchin in 1863, Robert McDonald, believed that scarlet fever infected the Yukon Indians, causing a number of deaths in 1865.⁷¹ Frederick Schwatka who travelled along the Yukon in 1883 identified measles as another disease infecting the Han.⁷² Schwatka believed that because the Yukon River was extensively used for travel, people carrying various diseases would pass the disease to settlements along both sides of the Yukon River.⁷³ The Han travelled regularly to Fort Yukon in the Kutchin territory during the 1840's, 1850's and 1860's.⁷⁴ It is possible that both mumps and scarlet fever were transmitted from the Kutchin⁷⁵ to the Han.

⁶⁸. Porsild, *Culture, Class and Community* p. 100-110.

⁶⁹ See Chapter One.

⁷⁰. Coates, *Best Left*, p. 10.

⁷¹. McDonald, *Journals*, 14 April 1866.

⁷². Frederick Schwatka, *Along Alaska: Great River* (Chicago: George M. Hill, 1900), p. 292.

⁷³. *Ibid.* Measles is a viral disease.

⁷⁴. Crow and Obley, *Han*, p. 509, 511.

⁷⁵. Crown and Obley, *Han*, pp. 509-511, indicate that it was during the period of white contact, commencing in 1873, that epidemics struck the Han. The last outbreak of mumps was in 1851 and scarlet fever in 1865. There is no evidence that these diseases were reintroduced during the Gold Rush.

Suddenly during the Gold Rush, thousands of goldseekers congregated at Dawson and the surrounding gold fields of the Klondike Valley. Often they arrived hungry. Unfortunately, many of the arrivals brought infectious diseases with them. In the southern part of the Yukon, goldseekers brought influenza with them that infected a number of Indians, with many of them dying daily.⁷⁶ A viral infection⁷⁷, influenza is spread from one person to another by sneezing and coughing, or through hand contact or eating utensils.⁷⁸ The Han Indians traded meat for cash and shopped in the stores run by non-natives. The Han hunters and traders faced the greatest exposure to disease.⁷⁹ At Moosehide they shared accommodations and hunted together. Fortunately for Dawson, the severe impact of influenza that ravaged the Indians in the southern Yukon had a minimal impact. At Dawson City, influenza caused the death of at least one Han Indian.⁸⁰ Whether more deaths were caused by influenza is not known since the records maintained by the Anglican Church in the Diocese of Selkirk did not describe any cause of death until 1899. Subsequently, when the various ministers at Moosehide attempted to describe the cause of death, they often failed to mention the nature of the disease or were very general in the description of the cause of death. Since a number of deaths were listed as either "decline" or "pneumonia" it is possible that they were actually caused by influenza.

⁷⁶. Ken S. Coates, *The Northern Yukon: A History* (Ottawa: Parks Canada, 1979), quoting Colonel Henry Inman, Buffalo Jones, *Forty Years of Adventure* (London: 1899), p. 454.

⁷⁷. R. Edgar Hope Simpson, *The Transmission of Epidemic Influenza* (New York Plenum Press, 1992), p. 43, describes influenza as an acute viral infection; Thomas D. Brock et al. *Biology of Microorganisms*, seventh ed. (Englewood Cliffs, New Jersey: Prentice Hall, 1994), p. 185, state that a virus is a living germ that is incorporated into the living protoplasm of the cell to reproduce. Once they reproduce they multiply into the infected organism until they are either destroyed or destroy the infected organism.

⁷⁸. Edwin O. Jordan, *Epidemic Influenza* (Chicago: The American Medical Association, 1927), p. 440.

⁷⁹. Coates, *Best Left*, p. 12.

⁸⁰. Anglican Church, *Diocese of Selkirk*. Records, Yukon Archives, COR O/53 box 56, f. 5, 1897-1907. These are attached as Appendices 8 and 9. No records existed for the Dawson Han Indians prior to 1897.

By the end of June, 1898, dysentery began in Dawson City,⁸¹ which became widespread the following month.⁸² W.E. Thompson, the Assistant Surgeon of the North West Mounted Police observed in August 1898: "We had an unusual number of cases among the men, very few escaping."⁸³ Bacillary dysentery is transmitted by the faecal-oral route, primarily hand-to-mouth contact.⁸⁴ Where outdoor latrines are used, its incidence is higher.⁸⁵ The most important factor in its control is the availability of water for frequent handwashing.⁸⁶

The miners also brought smallpox to Dawson in 1900.⁸⁷ Smallpox is also an acute viral infection spread by touching or coughing.⁸⁸ After the arrival of smallpox in 1900 a local Ordinance required compulsory vaccination.⁸⁹ The general concern over diseases also resulted in Bishop Bompas inoculating the Han Indians at Moosehide for smallpox.⁹⁰ None of the Han appear to have died from smallpox during the Gold Rush.

^{81.} Treadgold, *An English Expert*, p. 71.

^{82.} *Ibid.*

^{83.} Thompson, *Report* 20 December 1898, p. 115. This is caused by the bacillus dysenteriae. The symptoms include extreme diarrhoea.

^{84.} Guy P. Youmans et. al, *The Biologic and Chemical Basis of Infectious Diseases*, (Philadelphia: W.B. Saunders Company, 1980), pp. 526 to 533. They refer to the genus shigella as one of the causes of dysentery. The effects of dysentery caused by the genus shigella include abdominal cramps, blood in the stool and diarrhoea.

^{85.} *Ibid.*, p. 533.

^{86.} *Ibid.*

^{87.} Lux, *Disease and Growth*, p. 108.

^{88.} C.W. Dixon, *Smallpox* (London J. & A. Churchill Ltd., 1962), p. 1.

^{89.} Lux, *op. cit.*, p. 108.

^{90.} Osgood, *The Han Indians*, p. 142.

Yukon Territory Records describe the cause of death during this period in Dawson but do not indicate whether the deceased was native or non-native.⁹¹ The federal government maintained a record of the causes of death of natives in the Yukon but did not identify the settlements in the register.⁹²

The Anglican Church's Diocese of Selkirk's death records provide the only accurate source of determining the mortality rate for the Dawson and later Moosehide Indians.⁹³ The death records are shown at Appendix 8 for the settlements at Dawson and later Moosehide. Prior to 1896, the resident minister was located at Fortymile.

⁹¹. Lux, citing the "Alphabetical Death Register" Yukon Territorial Records, CRG 91, vol. 225, reel 2980, 1898-1903, in "Disease and Growth of Dawson City," Note 8, p. 114.

CAUSE OF DEATH	1898	1899	1900	1901	1902	UNKNOWN	TOTAL DEATH
Accident	-	11	8	3	-	2	24
Pneumonia	2	1	15	6	1	-	25
Typhoid	4	9	6	1	-	-	20
Drowning	5	7	4	-	-	-	15
Foul play	-	6	4	2	-	1	13
Suicide	1	1	4	1	-	1	8
Unknown	23	26	24	10	8	25	116
Other	3	7	14	3	-	-	27
TOTAL	38	68	79	26	9	29	249

This death register is purportedly for all deaths in Dawson from 1898 to 1903. It does not match the Anglican records taken from the Diocese of Selkirk, Appendices 8 and 9. It is probable that the alphabetical death register was for non-natives since the Moosehide reserve was established in 1897 and did not form part of Dawson City.

⁹². Coates, *Best Left as Indian*, p. 104 describes the native mortality for the entire Yukon as follows:
Causes of Death, Native People, Selected Disease

Years	Tuber- culosis	Pneu- monia	Old Age	Infant Death	Heart	Influ- enza	Menin- gitis	Whooping Cough	Measles	Total Deaths
1900-04	39	11	6	2	-	-	-	-	4	157
1905-09	24	3	2	2	3	-	-	-	-	90.

The Anglican records found in the Diocese of Selkirk Records, Appendices 8 and 9, were for Dawson and later Moosehide.

⁹³. See Appendix 8. Anglican Church, Diocese of Yukon, records, Yukon Archives, COR O/53 box 56, f. 5, 1897-1907.

Beginning in October 1896, with the arrival of Frederick Flewelling, a new ministry was established for the Han settlement at Dawson. In June 1897 the reserve was moved to Moosehide (see Map 5). There appears to be no church records maintained for the Han Settlement of Dawson until March 17, 1897 when the first recorded death was made.⁹⁴ Other records showing the number of deaths for the Han of the Dawson / Fort Selkirk area from 1895 to 1898 did not specify the specific settlement. Between 1895 and 1898, 39 deaths and 12 births were recorded.⁹⁵ Anglican Church records indicate that between March 17, 1897 and December 14, 1906, seventy-four Han Indians were buried either at Klondike (the camp at Dawson) or after September, 1898 at Moosehide.⁹⁶ The Anglican death records covered native deaths for the Klondike cemetery and after September 24, 1898 at Moosehide.

The Anglican Church also maintained a record of baptisms for the settlements at Dawson and later Moosehide.⁹⁷ Unfortunately, a record was not made of all birth dates. Generally, the records indicated the birth dates of the infants baptised.⁹⁸ In other cases where the missionaries did not list the birth date, it is therefore unclear whether the baptism was for a child or an adult.⁹⁹ The records began for Moosehide

⁹⁴. See Appendix 8.

⁹⁵. Coates, *Best Left as Indians*, p. 13. There is an overlap for part of 1897 and 1898 between the Anglican Records, Appendix 9, for Dawson and Moosehide and the Selkirk Settlements.

⁹⁶. *Ibid.* The mortality data discussed in the following paragraphs are all from Appendix 8. The total deaths were eighty-six, but 8 Han were not living at Klondike or Moosehide. For 4 of the deaths, the residence was not known - they simply died at the hospital. If these were people from Moosehide, the death rate would in fact be 78, rather than 74.

⁹⁷. Anglican Church, Diocese of Selkirk Baptism Records. Series 11.5.a, box 56, f. 5-9. See Appendix 9.

⁹⁸. The baptism records, Appendix 9, show the residence of each person who underwent the ceremony. In several instances we know they were adults. In two cases, they were baptised at the police cells awaiting execution for murder, as shown in the entries for July 20, 1899 and July 29, 1899.

⁹⁹. A total of 116 baptism ceremonies took place between April 11, 1897 and October 18, 1901. Appendix 9. Of these, forty four Indians were resident at Klondike or Moosehide. Two additional baptisms were performed at Moosehide but were for two non-natives.

on April 11, 1897.¹⁰⁰ Since the minister was located at Moosehide, he would have some information with respect to his own congregation. Of the forty four Indian baptisms, forty were clearly children. The remaining six baptisms performed in 1898 and 1899 may have been for either adults or children. There is no record of births for Klondike or Moosehide prior to April 11, 1897.¹⁰¹

Assuming that the record of Anglican missionary Frederick Flewelling, who lived at the Klondike and later Moosehide settlements between 1876 and 1898 was correct, the population was approximately 100 in October 1896. Between October 1896 and March 17, 1897, there is no record of deaths recorded. Nor is there a record of baptisms until April 11, 1897. The death rate for 1897 and 1898 totalled 17.¹⁰² while seven baptisms took place during the same period.¹⁰³ A serious decline in the population began during 1897 and 1898.

During 1898 during the outbreak of typhoid, six deaths were recorded between April and November. Of the thirteen deaths recorded in 1899, four were due to chest and throat infection, chest infection or haemorrhage from lungs. These deaths could have been due to tuberculosis. The rest, except for a case of influenza in a newborn, seem to have died from long term systematic illnesses, again, possibly tuberculosis or typhoid fever.

¹⁰⁰. See Appendix 9.

¹⁰¹. Anglican baptism records. See Appendix 9. The birth rate of Klondike and Moosehide during 1897 to 1906 was between 40 and 46.

¹⁰². See Appendix 8.

¹⁰³. However, if those Indians with no date of birth shown were adults, the actual number of infants baptised was 1. The decrease in population was between 10 and 16, depending on whether the baptism was for children or adults.

Tuberculosis is caused by the bacillus, *mycobacterium tuberculosis*.¹⁰⁴ It is usually spread by inhalation of droplet nuclei in infected sputum by coughs, sneezes or by shouting. The bacillus can multiply in the lungs, which in turn can cause active lung lesions, abscesses and high fevers. From the lungs it can spread by the lymph system or in the bloodstream to any organ in the body including the bones. Scarring and tuberculous cavities can restrict lung function and cause loss of energy and wasting. Tuberculosis can persist for months or years, can be rapidly fatal, or can smoulder for a lifetime. Overcrowding and poor nutrition such as occurred at Moosehide and parts of Dawson City provide an environment conducive to the spread of this disease. The arrival of newcomers during the Gold Rush coincided with a dramatic increase in tuberculosis. There is no indication that tuberculosis infected the Han people prior to this.¹⁰⁵ However, once regular contact with newly arrived carriers of this disease occurred in combination with the normal Han pattern of close contact with one another, a serious epidemic was inevitable. Thirteen deaths due to tuberculosis were recorded. Since the Anglican register also listed chest and throat infections, it raises the possibility that these deaths were also due to that disease. Considering the size of the Han population at the Klondike and Moosehide settlements, tuberculosis was a major cause of death. Assuming that the population was approximately 100 in October 1896, and if it is assumed that the population remained stable between November 1896 and March 1897, the changes to the population of the Klondike and Moosehide settlements is as follows:¹⁰⁶

¹⁰⁴. Larry I. Lutwick, *Tuberculosis* (London: Chapman & Hall Medical Publications, 1995), pp. 32-34; D. L. Miller and R. T. D. Farmer, eds. *Epidemiology of Diseases* (Oxford: Blackwell Scientific Publications, 1982), p. 32. These are the sources for the balance of this paragraph.

¹⁰⁵. Coates, *Best Left*, p. 104.

¹⁰⁶. See Appendices 8 and 9.

TABLE 3: Changes to the Population of the Klondike and Moosehide Han Settlements between 1897 and 1906.

Year	Births	Deaths	Approximate Population
1897	4	8	96
1898	2	9	89
1899	5	11	83
1900	3	19	67
1901	3	10	60
1902	6	1	65
1903	2	2	65
1904	4	3	66
1905	6	5	67
1906	6	6	67.

This is derived from Appendices 8 and 9 which represents the only detailed and accurate source for native births and deaths for the settlements at Dawson and later Moosehide. The Anglican minister recorded each entry along with his signature.¹⁰⁷

After 1901 there was a gradual decline in the death rate. From 1902 to 1906, there were only 24 entries in the death register. Of these, five were listed as having "no cause," and three were from non-specific injury or decline. Bacterial or viral infections like bronchitis, lung infection, erysipelas (streptococcal), and brain disease (meningitis, usually a bacterial infection) carried off four more. Thirteen were positively diagnosed as dying from tuberculosis.¹⁰⁸ Between 1897 and 1906, for those dying at Klondike and Moosehide, the cause of death was shown for only forty three out of seventy six deaths. Of the remaining entries, a large number simply mention decline or no cause. Infection and disease were described as the cause of twenty six deaths for Klondike and

^{107.} The difficulty with the birth records is that they do not distinguish between adults and children. These are shown in the second column under birth date at Appendix 9, however where no date is shown, they may be either adults or children. The permission of the Anglican Church to reproduce this list was given on the condition that no names would be used.

^{108.} See Appendix 8.

Moosehide. The Anglican death records did not list any deaths caused by diphtheria until 1907.¹⁰⁹ Considering the change in population of the Klondike and Moosehide settlements, it is estimated that at least twenty five percent of the people who died between 1899 and 1906, died from a listed illness or disease.¹¹⁰ This does not include the eighteen deaths listed during 1897 and 1898, since no cause of death is shown for those years.

Historian Charlene Porsild recently accepted J.E. Spurr's estimate that there were approximately 200 Han living in their settlement at the mouth of the Klondike River. She calculated that the reduction in population at Moosehide over a five year period from 200 people in 1896 to 81 in 1906 was the result of both disease and the contamination of the water supply.¹¹¹ The Anglican mortality register for 1897 and 1898 did not describe the cause of death for any disease in that year. According to various historians, typhoid fever arrived in Dawson in 1898 due to the contaminated water supplies. It is probable that at least six Han were killed by typhoid during 1898. Considering that typhoid continued between 1899 and 1901, it is possible that other deaths of the Han were attributable to this disease.

In summary, the evidence suggests that three diseases were responsible for the decline of the Han between 1897 and 1906. The first brought in by miners, was typhoid fever which passed into the unsanitary drains and drinking water supply.¹¹² Influenza

¹⁰⁹. See Appendix 8 entries for 1907. Crow and Obley "Han", contained in *Handbook of North American Indians*, vol. 6, p. 511 state that epidemics especially of diphtheria were still common during this period of the Gold Rush.

¹¹⁰. This was based on a specific disease.

¹¹¹. Porsild, "Culture, Class and Community," pp. 105-106. From her sources it appears that she arrived at her conclusion without using the Anglican Death Records or Flewelling's estimate. Her view that diseases caused the deaths of a large number of Han has been confirmed elsewhere, however, it can also be proved that the Gold Rush was the actual cause of less than a portion of these deaths.

¹¹². Lux, *Disease and Growth*, pp. 97-99. As mentioned earlier, Lux, found that the last typhoid death was in 1900.

was likely brought in the same way and transmitted by close contact. Although only one death from influenza is mentioned specifically in the Anglican Death Register, it could have been a second cause for their decline because it weakened systems already stressed by other diseases and malnutrition. The third major cause for the decline of the Han was undoubtedly tuberculosis. With the large influx of miners during the Gold Rush which resulted in crowded and unsanitary conditions it became inevitable that bacterial and viral infections were passed on to the Han. With respect to the viral infections, with the important exception of smallpox inoculations, there were no other immunizing agents available to doctors. Natural immunity may have already occurred from contact with the disease in previous years. This likely explains why there were no recorded deaths from measles or smallpox and only one from influenza.

After 1906, the Han continued to die from tuberculosis and the introduction of a new epidemic, diphtheria¹¹³. The Han were seriously affected by the Gold Rush. They suffered a serious reduction in population due to disease introduced by the goldseekers. Notwithstanding the reduction in the non-native population of Dawson and the gold fields, the Han suffered further epidemics of influenza, mumps and measles between 1919 and 1925.¹¹⁴ For a number of decades this century, the Han were isolated from white culture other than by contact with miners or government agents.¹¹⁵ They continued to trap, hunt and fish. By the 1960's, they had abandoned Moosehide and had moved to Dawson.¹¹⁶

¹¹³. Crow and Obley "Han", contained in the *Handbook of North America Indians*, vol 6., p. 511. The Han population during the 1960's in Dawson was believed to be between 215 and 260.

¹¹⁴. *Ibid.*

¹¹⁵. *Ibid.*

¹¹⁶. *Ibid.*

Conclusion

Before the Gold rush, the Han and Tutchone Indians hunted and fished in a sustainable way and without limitations. When Dawson was at its highest population, over hunting and indiscriminate slaughter of wildlife by natives and non-natives alike, drastically reduced the population of moose and caribou and the availability of local fish. By 1898, ten times as many non-native hunters and fishermen competed with the Indians for moose, caribou and salmon. The end result of this was to force fewer and fewer Indian hunters to go further afield for game. The Han themselves added to their problems by selling the moose they killed to the miners. However, notwithstanding hunger and the demoralizing confines of Moosehide, the real disaster for the Han was their decimation by disease.

The major decline in the population of Klondike and Moosehide Han of approximately 20% was due to typhoid fever, influenza and tuberculosis. With respect to influenza and tuberculosis, age, sex and occupation were no barrier to these new diseases for which the Han had no immunity. While contact with the miners put Indian hunters and day labourers at risk, within the confines of the Moosehide camp, women, children and old people were at even greater risk from the contaminated water supply which carried typhoid downstream from Dawson. Despite all this, the federal government believed that the Yukon Indians were not in need of assistance. In 1903, the police reported the condition of the Indians to be "better than at any time during the past 6 years" and that "their hunting, fishing and trapping have evidently been a success for they are well supplied with food."¹¹⁷ This conclusion was incorrect since the following year, the North West Mounted Police had to supply food to the Tutchone Indians. In addition to the despoliation of their clean water, fish stocks, forest cover, fur bearing animals, and health, the real legacy of the Gold Rush for the Han and Tutchone Indians

¹¹⁷. *Sessional Papers*, 26, Report of the North West Mounted Police, 1904, 3-4 Edward VII A 1905, p. 12.

was their loss of dignity and freedom to walk the trails and use the waters as they had done for generations past.

CONCLUSION

Until the Gold Rush, the Yukon was mantled by old growth boreal forest filled with wildlife and pristine waters teeming with fish. Non-native traders, scientists and missionaries all attest to the remarkable abundance of fish and game. Throughout this vast region, small numbers of native people hunted in small tribal bands and congregated in traditional fishing places during the spawning season. Occasionally, local wildlife and salmon failed to appear. This, combined with the difficulty of movement between the seasons and the exceptionally cold winters, sometimes resulted in starvation. Prior to the Gold Rush, Kutchin and Han had previously been decimated by disease. Their acquisition of rifles during the nineteenth century did not result in overhunting because of the small number of natives in relation to the vastness of the Yukon. This changed during the Gold Rush. At the height of the Gold Rush, from 1898 to 1904, there was a serious reduction in caribou and moose around Dawson City caused by both native and non-native hunters. As hunters, fishermen and traders, the Indian people had developed forms of housing, nutrition, hunting and transportation, which were entirely appropriate to their homelands. Before the Gold Rush, the Han and Tutchone of the Yukon river basin had a viable lifestyle, which had proved sustainable for centuries.

As thousands of people arrived after 1896 to look for gold, the delicate natural balance was upset and change occurred rapidly. Miners, travelling north to Dawson City along the Yukon River, started fires on both sides of the River and along the shores of Teslin and Hootalinqua Lakes. Where a succession of fires occurred in the same location, the regrowth of trees was prevented, which in turn resulted in general shrub cover. Where fires burnt vegetation along the Yukon River, it required sixty years for the forests to regenerate. Logging cleared large tracts of land along the wood camps of the steamship routes and in the Klondike Valley. In those areas it took decades before the slow growing boreal forest was sufficiently renewed to support wildlife again.

Initially, little lasting damage was done by hand miners working, but as the

miners sought to reach the gold deep in the fluvial gravels, small operators were replaced by mining corporations. Hydraulic mining companies included the Anglo-Klondike Co., Fuller Norwood Co., White Channel Hydraulic Co. and Bonanza Mining Co.¹¹⁸ The dredging companies included Lewes River Mining and Dredging Company (1901-1908), The Canadian Klondike Mining Company (1905-1921), the Bonanza Basin Gold Dredging Company (1906-1909) and the larger Yukon Gold Company (1906-1925). By 1900, new technology such as hydraulic mining and dredging permanently altered much of the landscape of the Klondike Valley from the Klondike River south to the Indian River and along the various creeks and higher channel gravels. Dredging fundamentally altered the creeks in the area, which continued to destroy vast tracts of land until 1966 when dredging ceased. After 1966 mining continued on many of the creeks in the Klondike Valley. There is no doubt that much of the destruction continued after 1906 but the policy and practice of total devastation in this area was started during the Gold Rush.

The most damaging and irreversible impact of the Gold Rush on the environment was caused by large scale mining techniques, particularly hydraulic mining with its flumes, dams and dredging. Where dredging occurred, it would take up to forty years for small plants, including shrubs, to regenerate to approximately 5% of their original coverage. Where dredges left large piles of well drained tailings in many parts of the Klondike Valley, nothing has regrown except for the occasional willow or birch tree. Dams and dredging caused permanent changes to hydrological regimes. Hydraulic mining also destroyed fish habitat and some species of fish, while dredging destroyed whole creeks and left permanent trails of sterile tailings over hundreds of kilometres of creeks and rivers. After placer mining ceased in the Klondike Valley, it has taken between thirty to seventy years for grayling habitat to return to normal levels. Where no reclamation occurred, it will take up to 100 years for a return to normal. As well, mercury use was ubiquitous and mercury remains in the soil to this day.

¹¹⁸. Green, *The Gold Hustlers*, pp. 303-307, is the source for this sentence and the following sentence.

Goldseekers changed the appearance of the Yukon with a network of roads, railways, dams, and mine tailings. But the indigenous Yukoners were changed in less visible ways. The real tragedy was suffered by the Han people. They lost their homes, their lands and then their sustenance. Worse still, their population was decimated by typhoid fever, influenza and tuberculosis. While the exact population numbers will never be known it is quite clear that as the number of non-natives climbed into the tens of thousands, those of the Han, modest to begin with, dramatically declined. By the end of the Gold Rush the once independent Han had been seriously reduced in population living beside a polluted river and destitute of food. The Gold Rush seriously reduced the Han population. With the reduction in the non-native population in the Dawson and Klondike Valleys, the Han returned to isolation to hunt, trap and fish. They have long since left their reserve at Moosehide and are today a viable dynamic presence in Dawson.

The Gold Rush began a long process of mining exploration in the Yukon. The federal government totally ignored its fiduciary responsibility to the Yukon Indians. By its actions it opened the entire Yukon, particularly the Klondike Valley to mineral exploration and development. The government encouraged the miners to exploit water, timber, game and fish. Its method of providing paper licences to paying newcomers while failing to protect the inherent rights of the First Nation Indians underlines the national policy of exploitation for small gains. While sovereignty is not at issue in this paper, the newcomers undoubtedly helped to pay the costs of an official and uniformed presence in the Yukon region.

If the government attempted to protect the interests of the Yukon Indians, it may have prevented the environmental devastation which persists to this day. But for the granting of wholesale timber licences and the failure to regulate game and fishing legislation, it is unlikely that the Indians would have sought relief and treaties from the federal government. Indeed, had the government anticipated the number of miners and laid a sanitary infrastructure in Dawson City, perhaps the typhoid fever would not have devastated Dawson. Had reasonable control of the dredging and hydraulic mining been

taken, the riverine environment and fish stocks would, by now, have returned to normal. What remains are creeks in the Klondike Valley devoid of salmon.

This thesis has shown that the Yukon Gold Rush between 1896 and 1906 resulted in permanent alteration to the Klondike Valley with fish disappearing from Klondike creeks which were severely modified by dredging and hydraulic mining. In areas where fires burned deeply and melted the permafrost the vegetation has been changed permanently. Other environmental impacts were short lived and succession has returned much of the forest to normal. Perhaps the greatest irony was the fact that Sir Clifford Sifton, who was largely responsible for the environmental destruction in the Yukon, was later appointed in 1909 to chair the Federal Commission on Conservation. That Commission was established to study a number of public health, land, wildlife and forestry issues as part of a federal-provincial scheme for conservation.

APPENDIX 1

Map 2 - Dawson Area, Yukon Territory, 1991

See Pocket on inside back cover

NOTE TO USERS

Oversize maps and charts are microfilmed in sections in the following manner:

LEFT TO RIGHT, TOP TO BOTTOM, WITH SMALL OVERLAPS

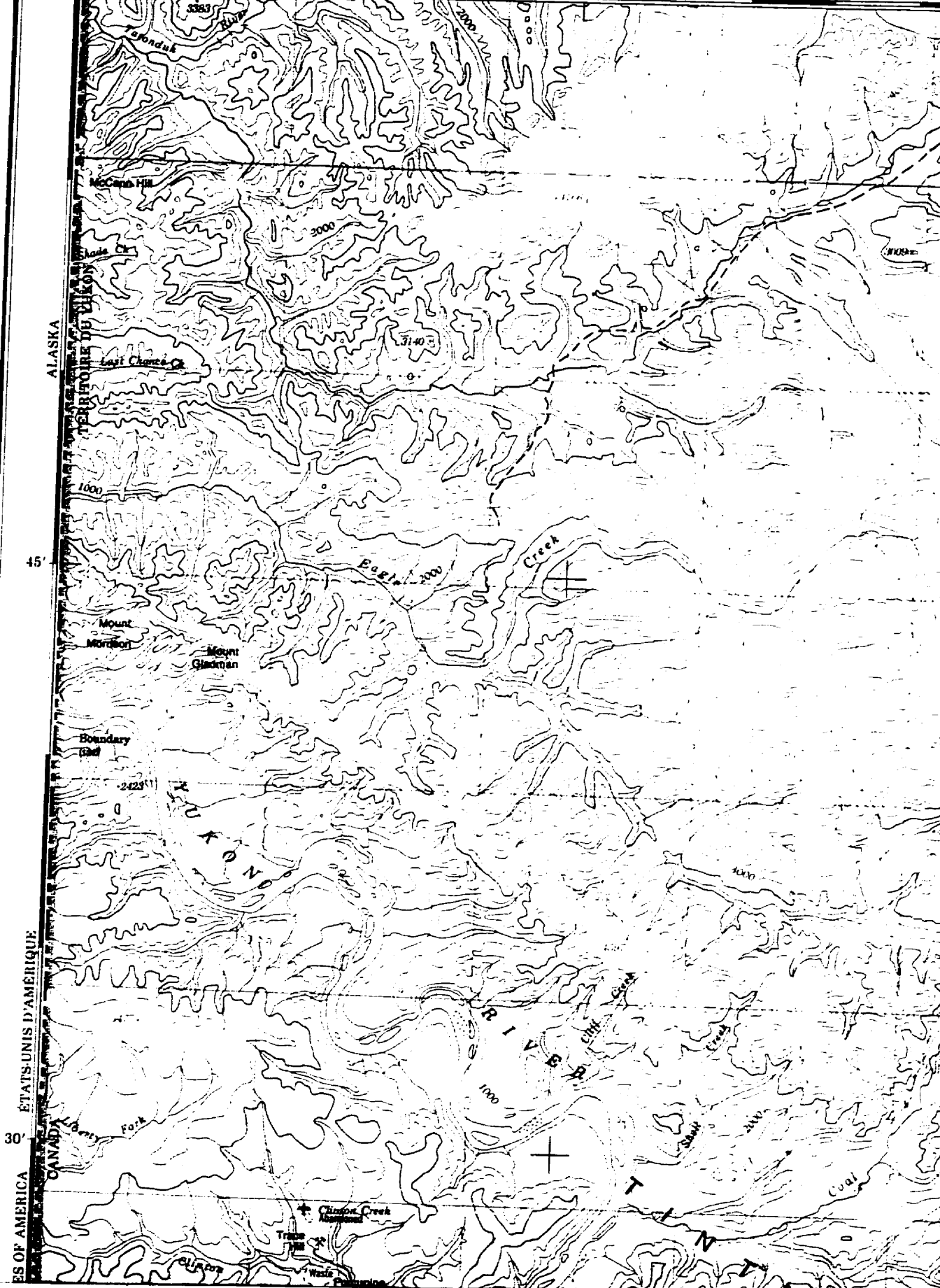
The following map or chart has been microfilmed in its entirety at the end of this manuscript (not available on microfiche). A xerographic reproduction has been provided for paper copies and is inserted into the inside of the back cover.

Black and white photographic prints (17"x 23") are available for an additional charge.

UMI

141°00' 45' 30' 15'

65°00' 45' 30'



140°00'

45'

30'

15'

T A I G A

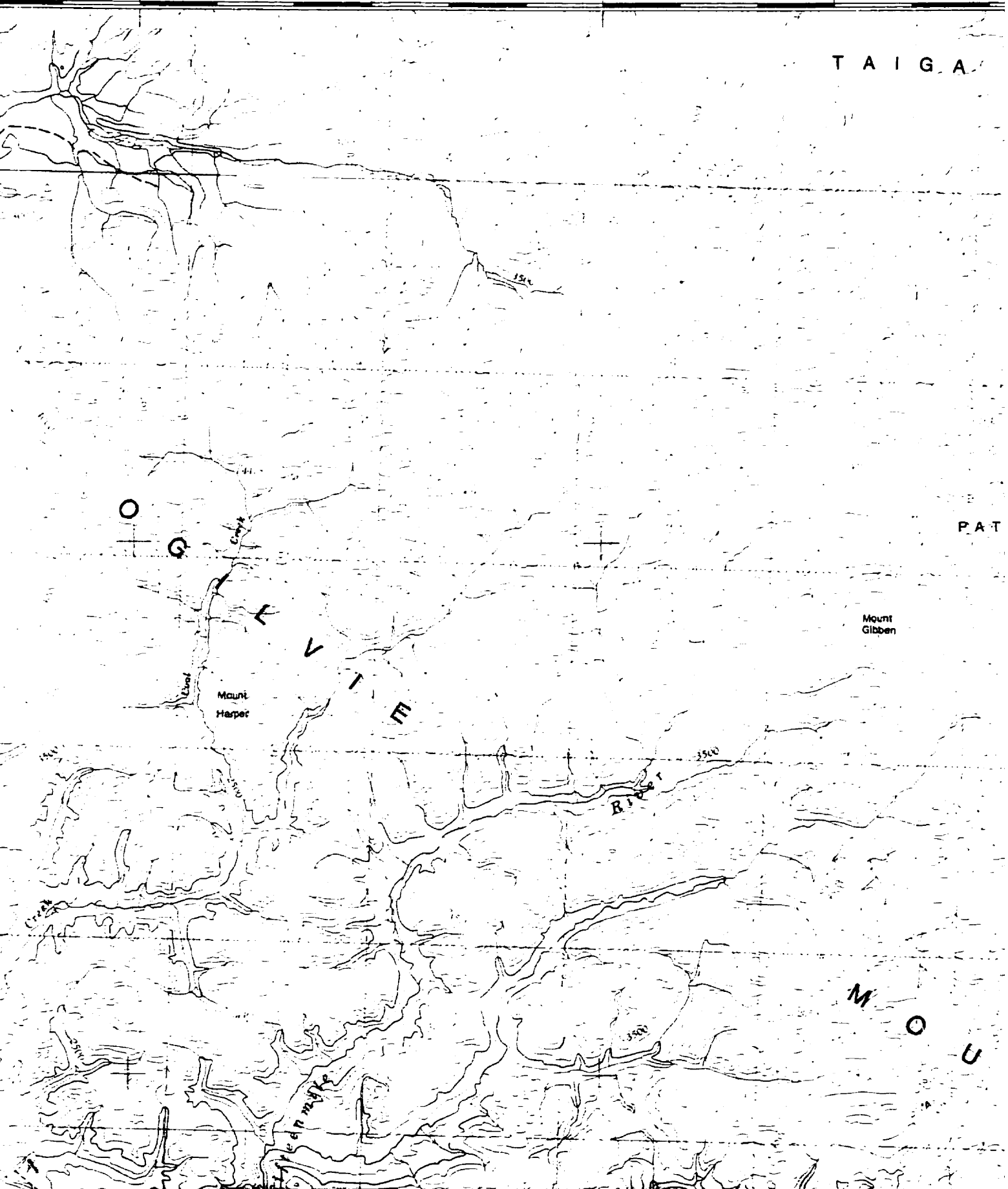
P. A. T.

Mount
Gibben

Mount
Harper

Bliss

M O U



139°00'

45'

30'

15'

A I G A

V A L L E Y

E C F C

E B F B

K I T R A N G E

B L A C K S T O N E

T A I G A

Mount Martha
Mt. Abraham

Infant Peak

Vista Ridge

Andler

Outfitter's Lake

Mount Chapman
Chapman

Mount Vines

M C F A R L

P L A T E A U

P A T R O L R A N G E

P U D D I N G

Cathart Lake

White Hat
Hills

Tom Moun Lake

Long Moun Lake

Seela
Creek
Pass

S E E L A

B L A C K S T O N E

Waterfall Mountain

Blackstone Mountain

Mt. Austin

Rake Mountain

Arrow Creek

Austin Pass

Fox Creek

Henry Creek

Mt. Adney

Juniper Lake

Angelcoma Peak

R A N G E

R A N G E

Mount Boyle

North Pass

M O U N T A I N

R A N G E

Whitcrown Mountain

Incline Mountain

North Fork Mountain

Cathedral Mountain

Prude Mountain

Asare Lake

Mount Frank

Rocky Mt.

Fold Mt.

C L O U D S

Mount Bremer

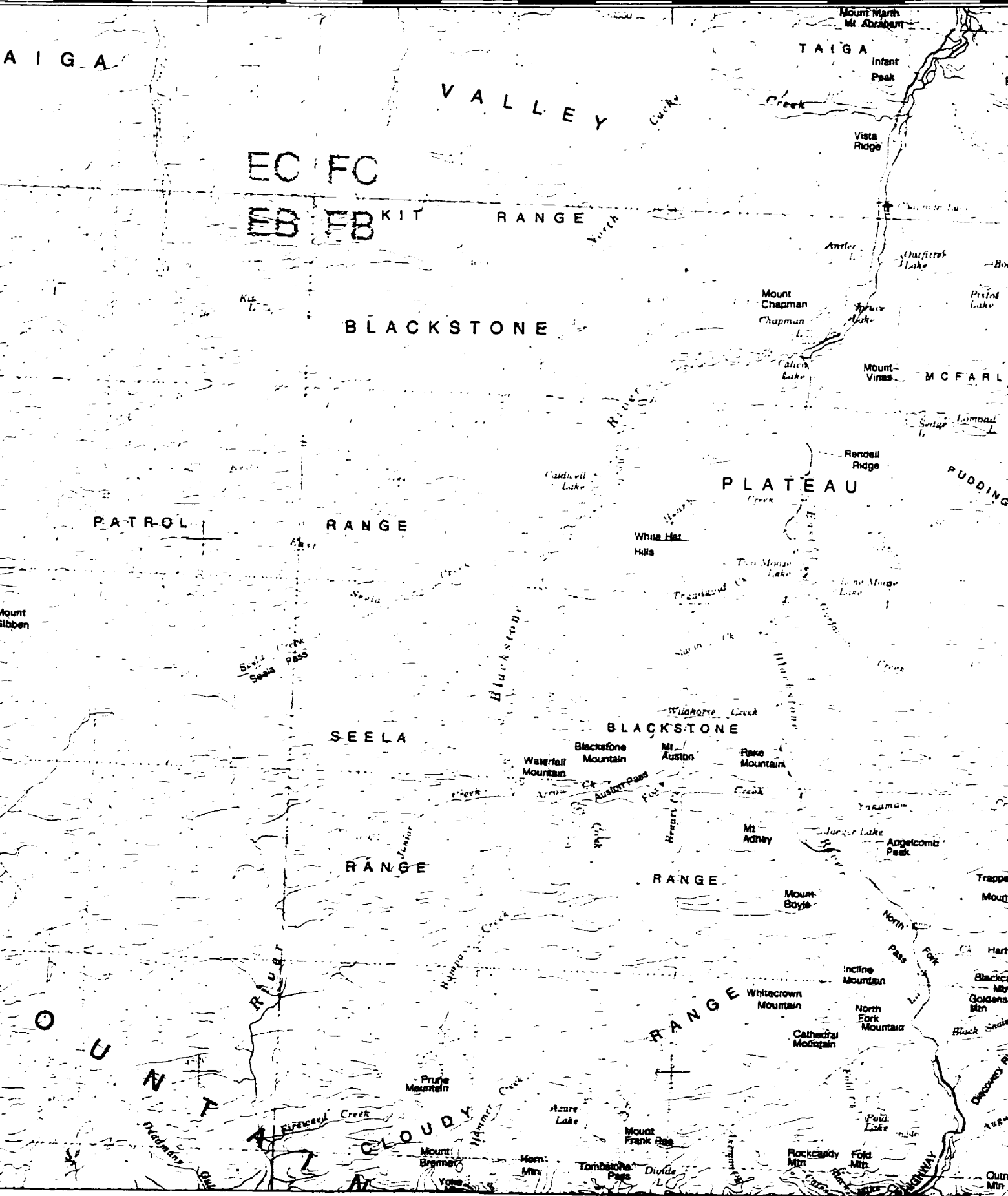
Hom Mt.

Tombstone Pass

Divide

Rocky Mt.

Out Mt.

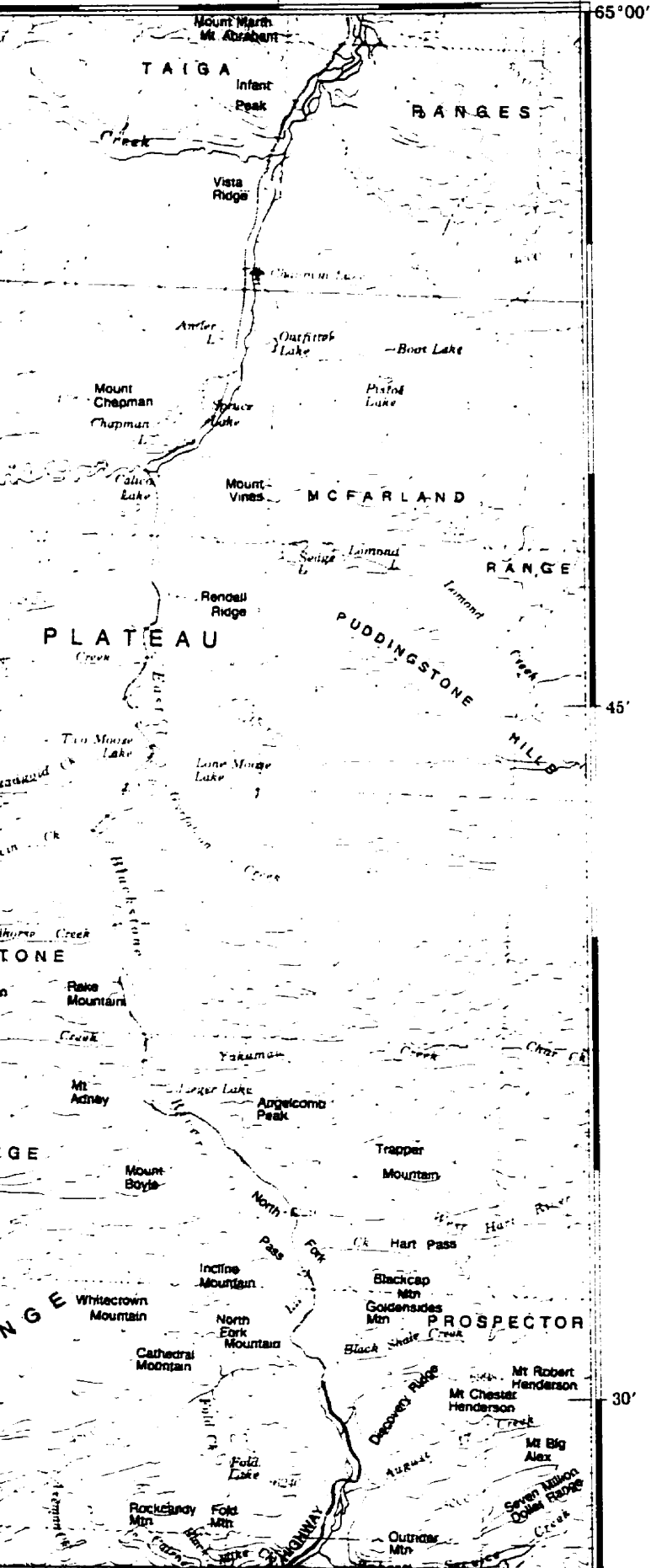


Fort McPherson 347 km

15'

138°00'

65°00'

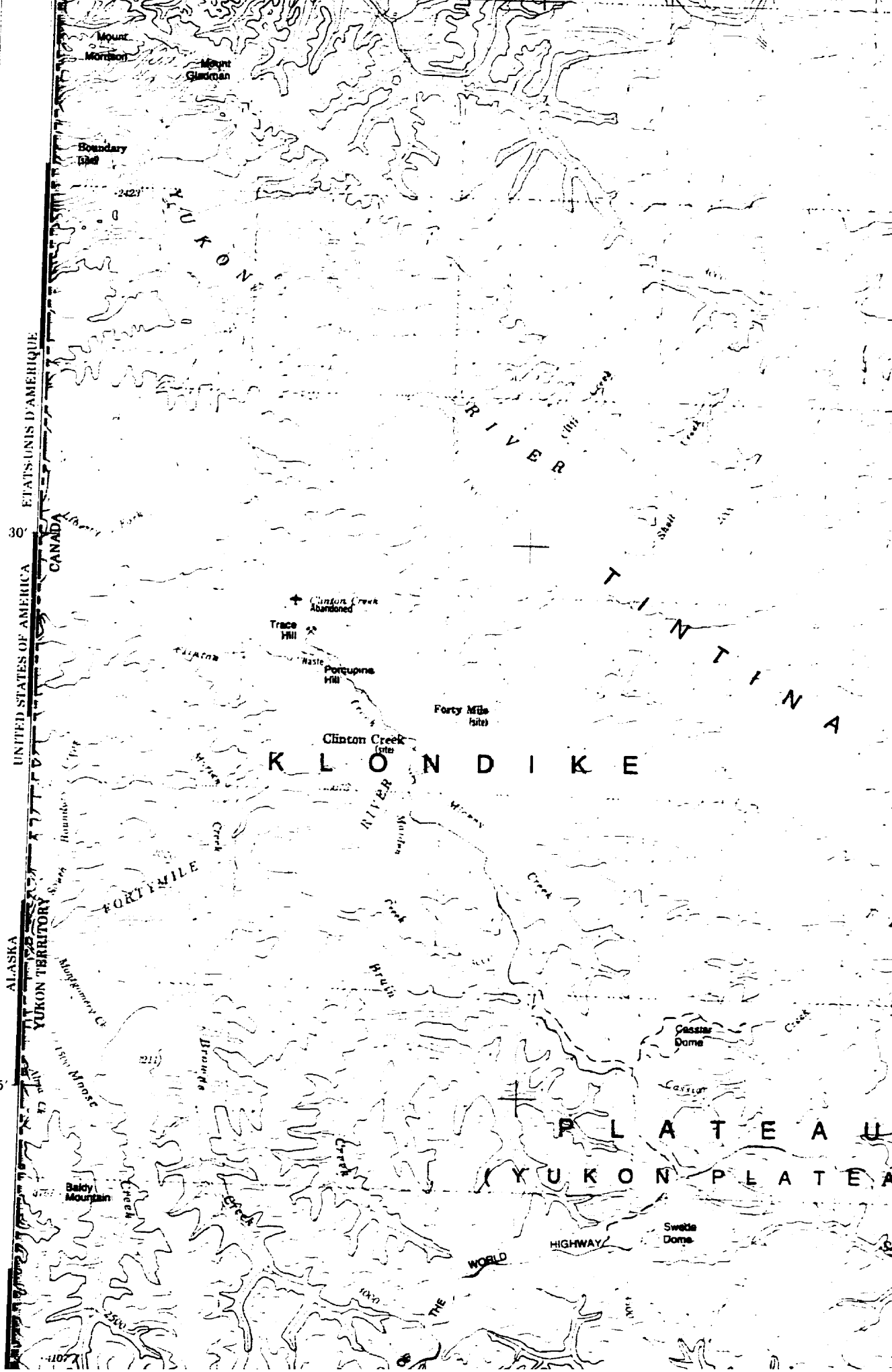


Military users. refer to this map as	SERIES A 502	SERIE
Reference de cette carte pour usage militaire:	MAP 116 B & 116 C	CARTE
	ÉDITION 3 MCE	ÉDITION

45'

30'

TEN THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 7
QUADRILLAGE UNIVERSEL TRANSVERSE DE MERCATOR
DE DIX MILLE MÈTRES



Mount Morrison
Mount Glackman

Boundary (old)

UNITED STATES OF AMERICA
ETATS-UNIS D'AMERIQUE

30°

CANADA

Clinton Creek Abandoned

Trace Hill

Waste Porcupine Hill

Forty Mile site

Clinton Creek (site)

KLONDIKE

FORTY MILE

ALASKA

YUKON TERRITORY

15°

Montgomery Cr.

1150' Moose

Balyo Mountain

Cassiar Dome

Cassiar

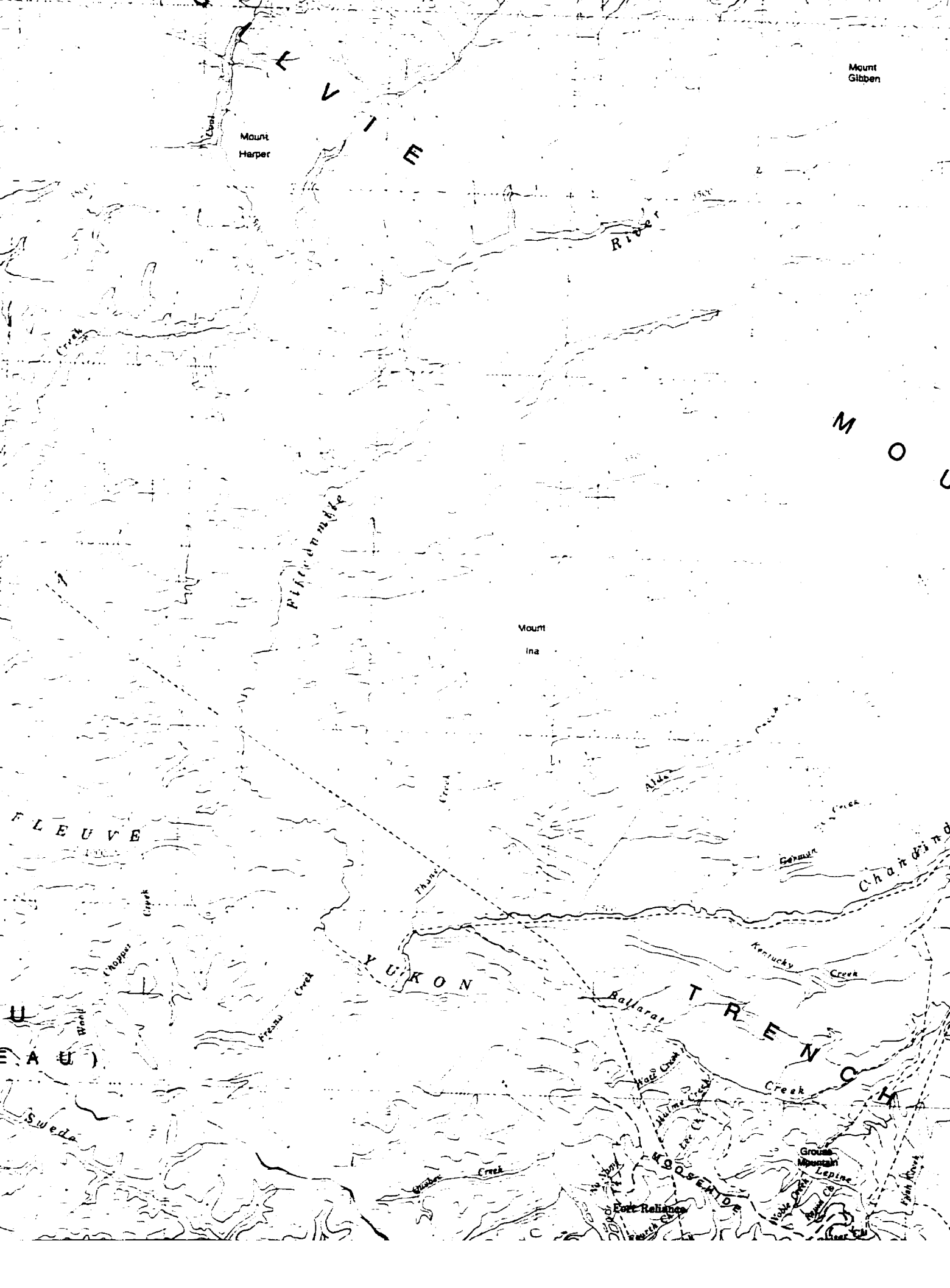
PLATEAU

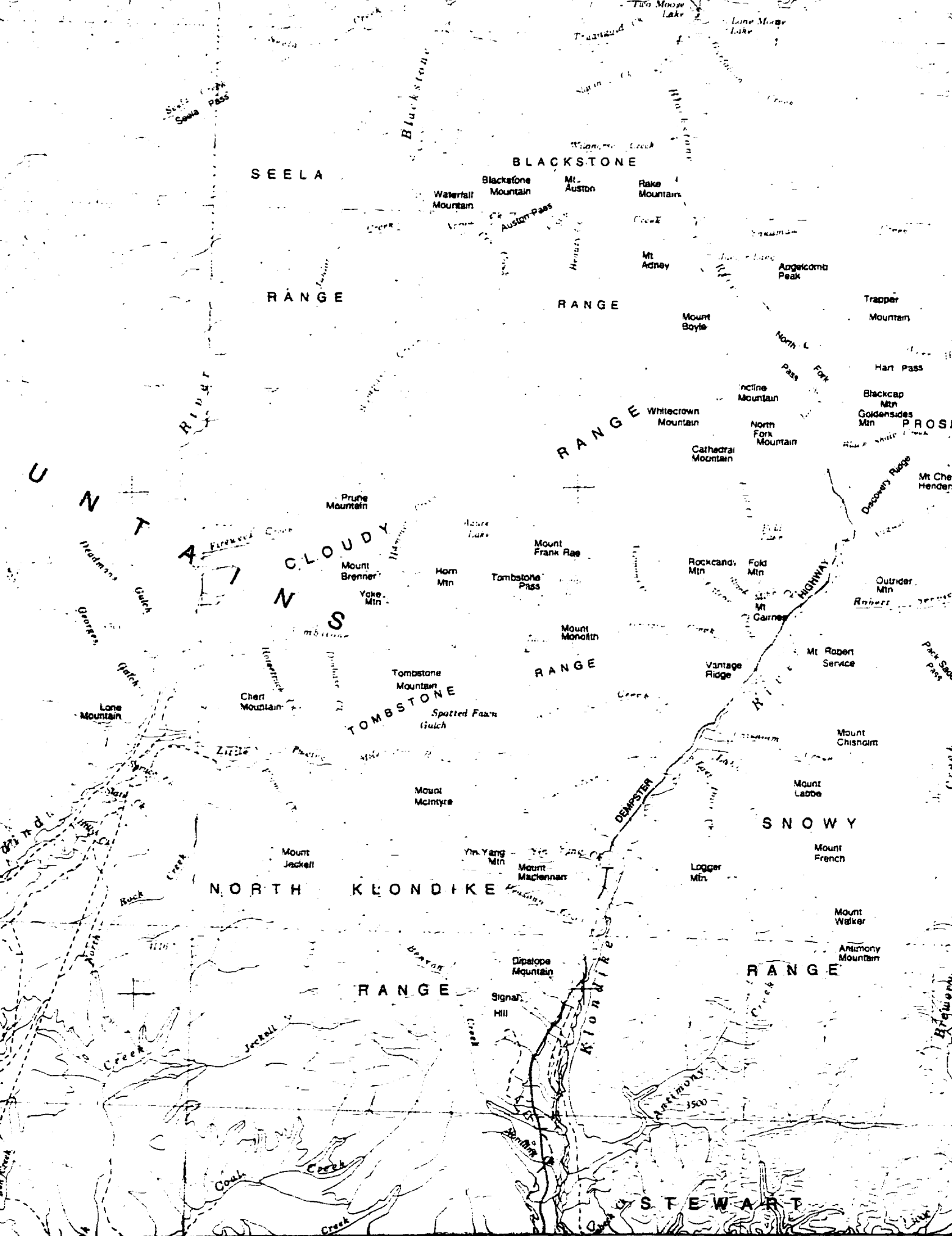
(YUKON PLATEAU)

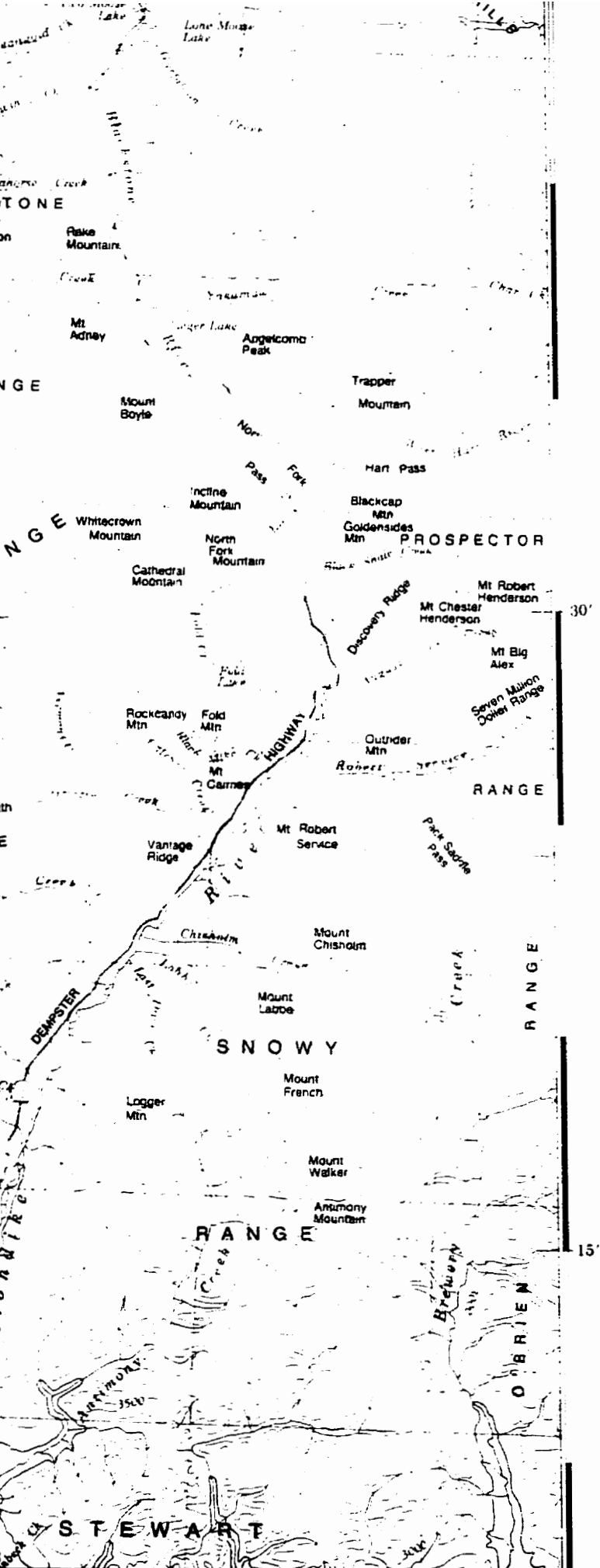
Swable Dome

WORLD HIGHWAY

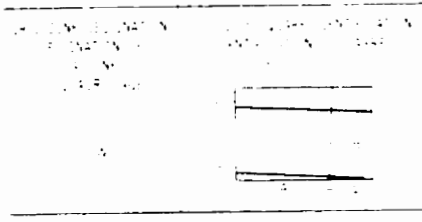
THE







TEN THOUSAND METRE
 UNIVERSAL TRANSVERSE MERCATOR
 ZONE 7
 QUADRANGLE UNIVERSEL TRANSVERSE DE MERIDIAN
 DE DIX MILLE METRES



EXEMPLE DE METHODE
 POUR L'ESTIMATION DE LA LONGUEUR D'UN LIGNEMENT
 EXEMPLE DE LA METHODE POUR
 LA DETERMINATION DE LA LONGUEUR D'UN LIGNEMENT

REFERENCE POINT
 POINT DE REPERE CHURCH HOUSE

SQUARE Read after 10000 metres
 CARRE Lire les lettres du chiffre de 10000

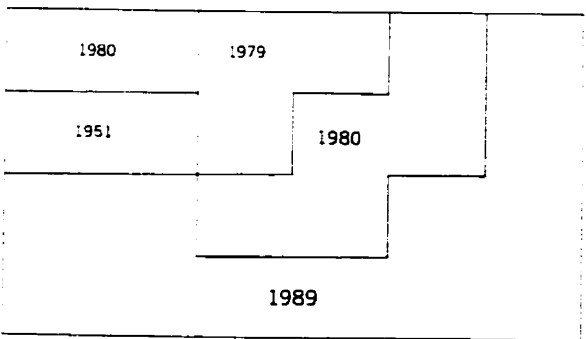
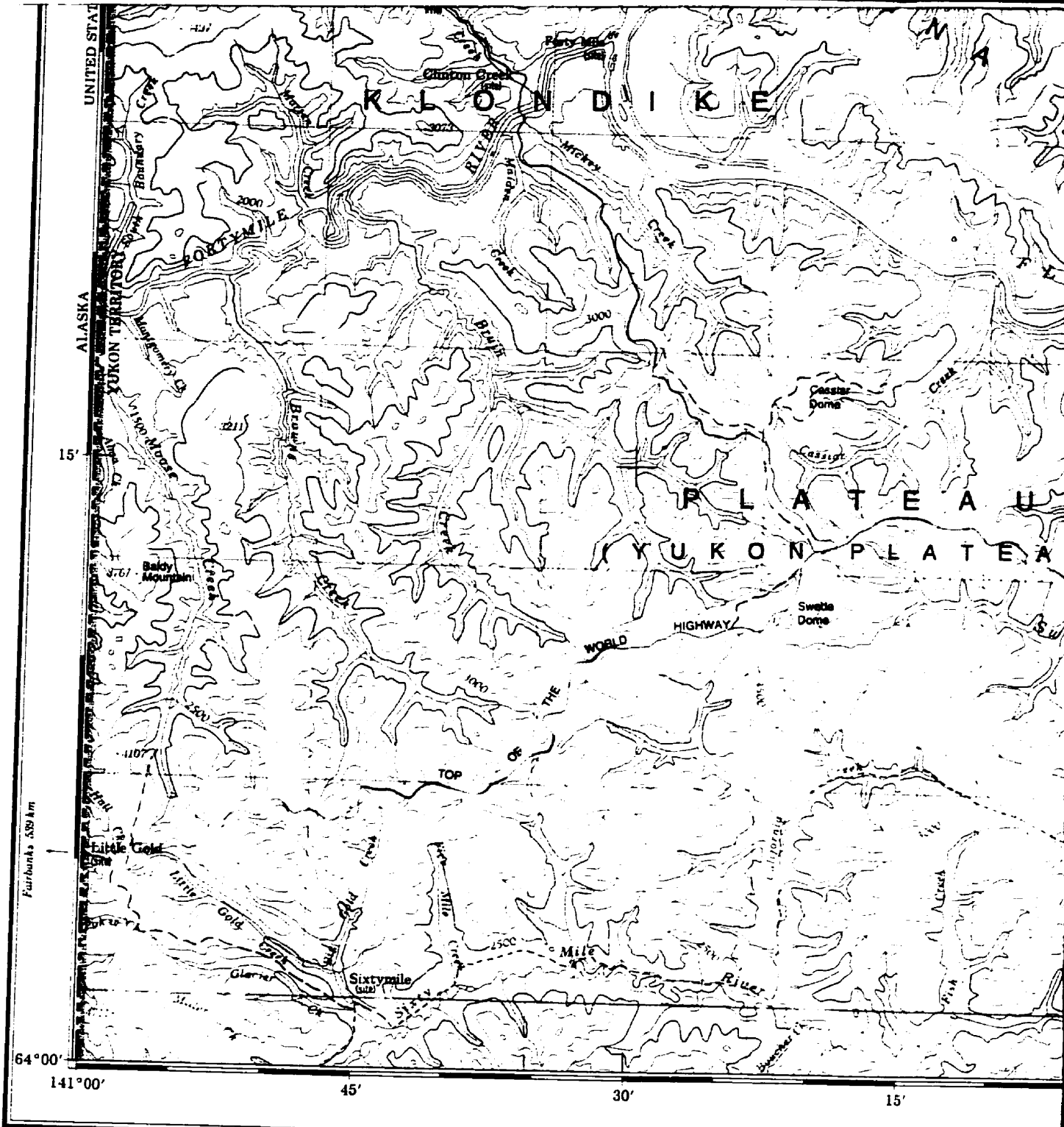
FASTING Read number on right
 Lire le chiffre à droite du point

ABSCISSA Note number to left
 du quadrillage immédiatement à gauche
 du repère

ESTIMATE LENGTH OF QUADRANGLE
 Lire le chiffre à droite du point

ESTIMEZ le nombre de traverses du carré
 à gauche du repère immédiatement à gauche

NORTHING Read number on right
 immédiatement à droite du point



Updated for features visible on 1986 satellite imagery
 Mise à jour pour illustrer les éléments cartographiques visibles sur les images satellite de 1986.

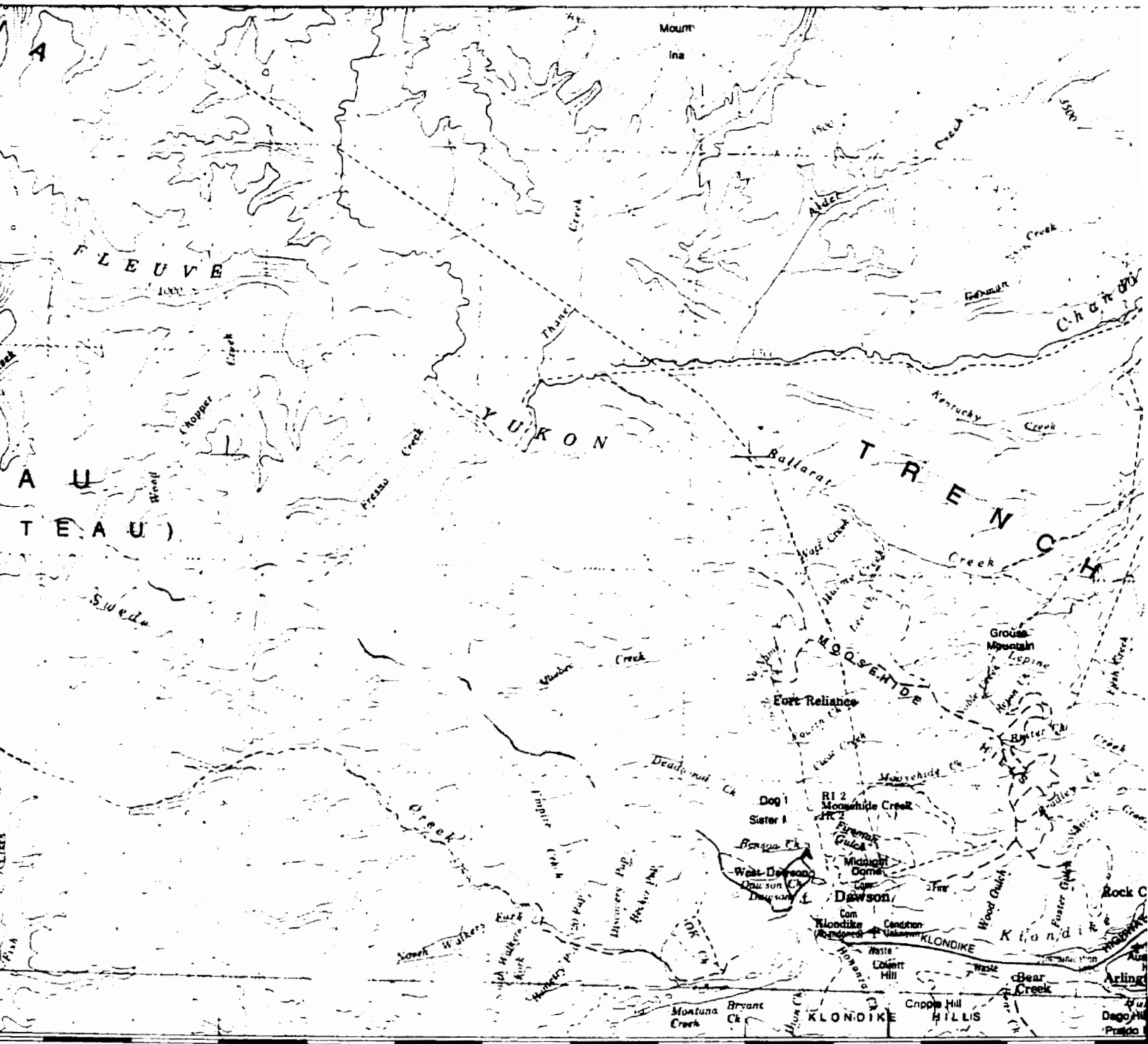
PRODUCED BY THE CANADA CENTRE FOR MAPPING,
 DEPARTMENT OF ENERGY, MINES AND RESOURCES.
 DERIVED FROM 1:50 000 MAPS, INFORMATION CURRENT AS
 SHOWN IN DIAGRAM, PUBLISHED 1991.

COPIES MAY BE OBTAINED FROM THE CANADA MAP OFFICE,
 DEPARTMENT OF ENERGY, MINES AND RESOURCES, OTTAWA,
 OR YOUR NEAREST MAP DEALER.

© 1991, HER MAJESTY THE QUEEN IN RIGHT OF CANADA,
 DEPARTMENT OF ENERGY, MINES AND RESOURCES.

Roads	Routes	
hard surface	revêtement dur	<u> </u> dual highway double chaussée 2 lanes
hard surface	revêtement dur	<u> </u> 2 voies
loose or stabilized surface, all weather	gravier, agglomère, toute saison	<u> </u> 2 lanes or more 2 voies ou plus
loose surface, dry weather	de gravier, temps sec	
cart track	de terre	
trail, cut line or portage	sentier, percée ou portage	

FOR COMPLETE REFERENCE SEE REVERSE SIDE POUR UNE LISTE COMPLETE DES SIGNES, VOIR AU VERSO



140°00' 45' 30' 15'

MAPPING SOURCES
CURRENT AS

Information concerning bench marks and horizontal survey monuments can be obtained from Geodetic Survey Canada Centre for Surveying, Ottawa

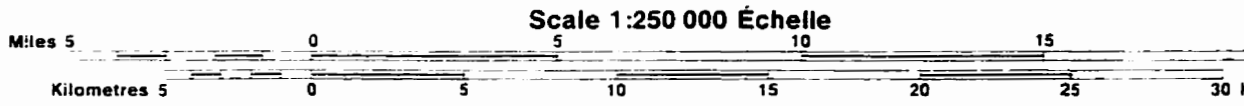
PRINTING OFFICE
OTTAWA

CANADA
DES

DAWSON

YUKON TERRITORY TERRITOIRE DU YUKON

Highway	Blue line
2 lanes	Blue line with 2 dashes
1 lane	Blue line with 1 dash
Trail	Dashed line
Boundary	Dotted line
Water	Blue wavy lines
Contour	Brown dashed lines

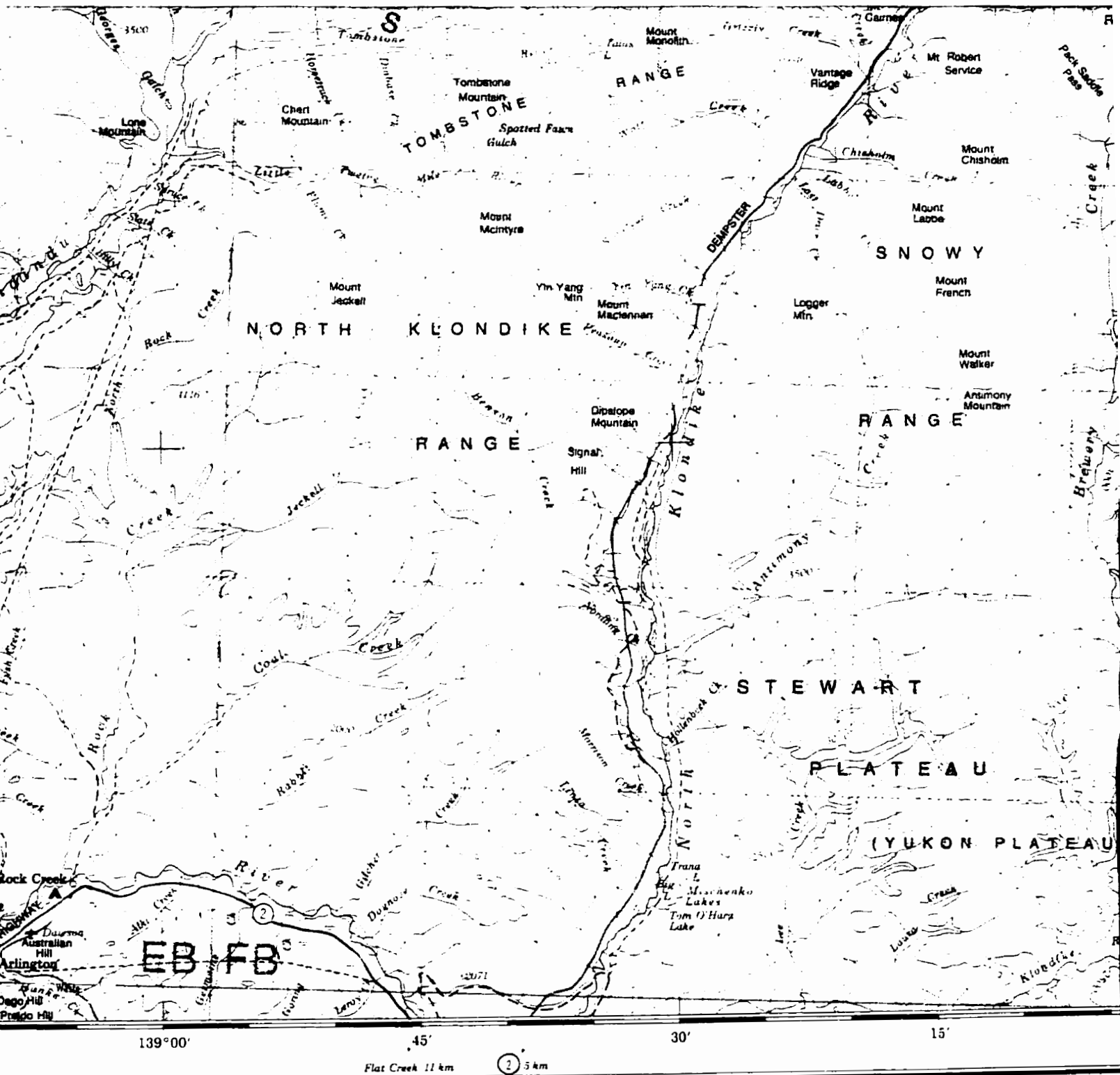


Magnetic declination 1990 varies from 30°11' easterly at centre of west edge to 31°15' easterly at centre of east edge. Mean annual change decreasing 11.3'

En 1990 la déclinaison magnétique varie de 30°11' vers l'est au centre du bord ouest à 31°15' vers l'est au centre du bord est. La variation annuelle moyenne décroît de 11.3'

ES SIGNES. VOIR AU VERSO

Pour
et les
des



139°00'

45'

30'

15'

Flat Creek 11 km

5 km

Pour tout renseignement concernant les séries de nivellement et les bornes géodésiques, prière de s'adresser à la Division des levés géodésiques, Centre canadien des levés, Ottawa

ETABLI PAR LE CENTRE CANADIEN DE CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES. TIRÉE DE CARTES À 1/50 000. RENSEIGNEMENTS À JOUR TELS QU'INDIQUÉS DANS LE DIAGRAMME. PUBLIÉE EN 1991.

CES CARTES SONT EN VENTE AU BUREAU DES CARTES DU CANADA, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES, OTTAWA, OU CHEZ LE VENDEUR LE PLUS PRÈS.

© 1991 SA MAJESTÉ LA REINE DU CHEF DU CANADA, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

CONVERSION SCALE FOR ELEVATIONS

ECHÈLLE DE CONVERSION DES ALTITUDES

Metres	30	20	10	0	50	100	150	200	250	300	Metres			
Feet	100	50	0	100	200	300	400	500	600	700	800	900	1000	Feet

CONTOUR INTERVAL 500 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

EQUIDISTANCE DES COURBES 500 PIEDS
Altitudes en pieds
Système de référence géodésique nord-américain, 1927
Projection transverse de Mercator

44	41	13
56	JSA E U 3 A	116 B & 116 F
	JSA E U 3 A	116 B & 116 C
	JSA E U 3 A	115-0 & 115 N

Index to adjoining Maps of the National Topographic System
Tableau d'assemblage du Système national de

DAWSON
 116 B & 116 C
 EDITION 3 EDITION

Index to adjoining Maps of the National Topographic System
 Tableau d'assemblage du Système national de référence cartographique

144°	141°	138°	135°	132°
63°	USA E.U.A.	USA E.U.A.	USA E.U.A.	USA E.U.A.
	116 G & 116 F	115 B & 115 C	115 D & 115 N	115 P
66°				

PROJECTIONS DES ALTITUDES
 CONVERSIONS DES ALTITUDES

250	1000 Pieds
300	1000 Pieds
900	1000 Pieds
800	1000 Pieds

EXAMPLE OF METHOD USED
 EXEMPLE DE LA METHODE EMPLOYEE

TO GIVE A REFERENCE TO METRES: 1000 METRES
 POUR FAIRE DES REPRES A 1000 METRES PRES

1. 0 1 2 3 4 5
 0 1 2 3 4 5
 0 1 2 3 4 5

REFERENCE POINT: CHURCH, ECU, SE, 116 D, 116 C
 POINT DE REPERE: CHURCH, ECU, SE, 116 D, 116 C

SQUARE READ AFTER 1000 METER SQUARE
 CARRÉ LUS APRÈS 1000 MÈTRES CARRÉS

EASTING READ NUMBER IN POINT
 NORDING READ NUMBER EN POINT

ABSOLUTE NOTE: 116 D, 116 C
 NOTE ABSOLUE: 116 D, 116 C

TO GIVE A REFERENCE TO METRES: 1000 METRES
 POUR FAIRE DES REPRES A 1000 METRES PRES

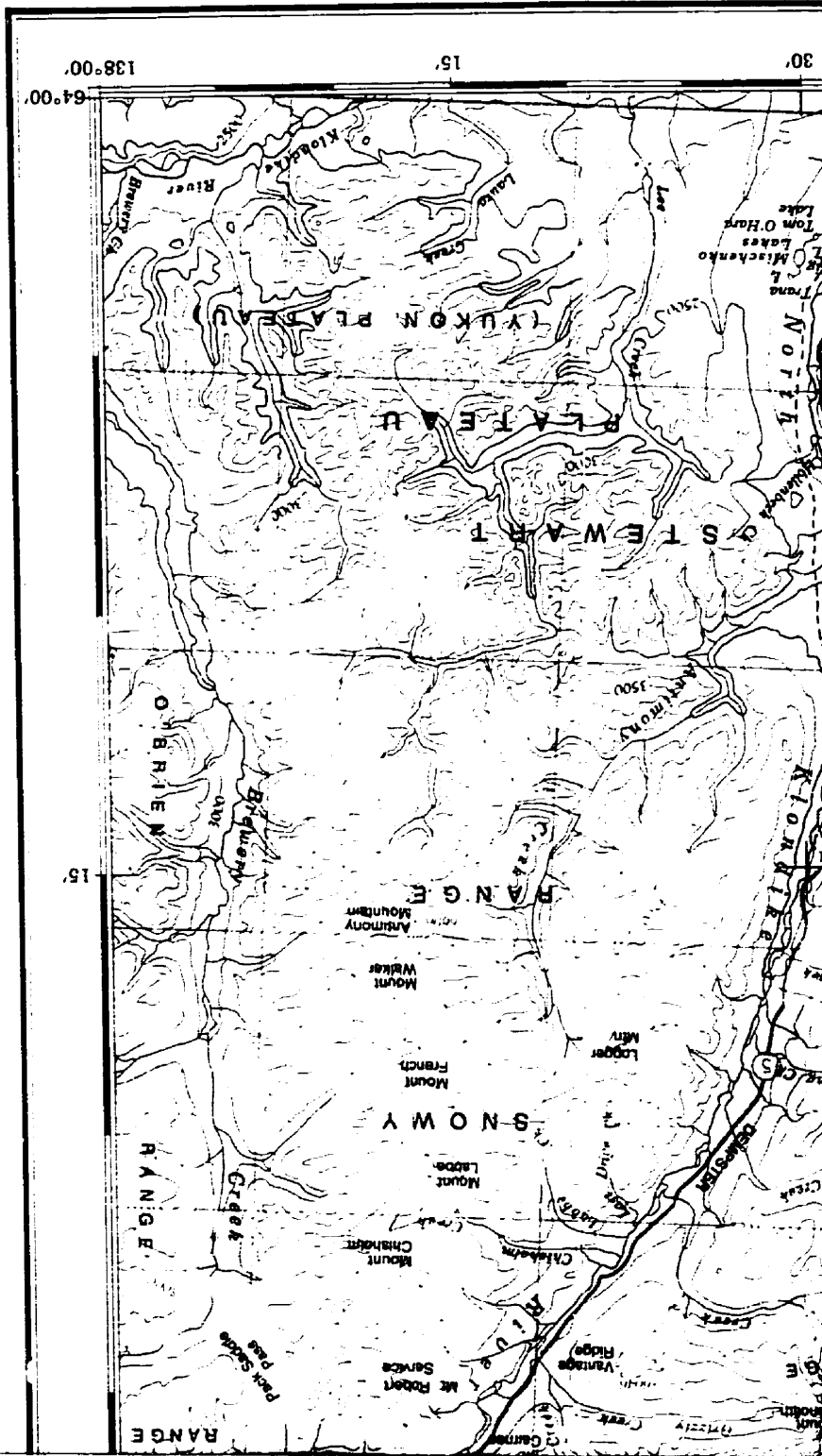
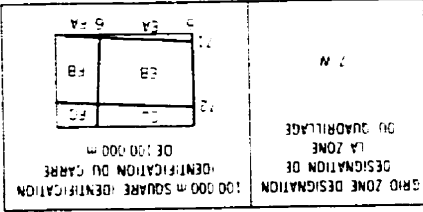
1. 0 1 2 3 4 5
 0 1 2 3 4 5
 0 1 2 3 4 5

REFERENCE POINT: CHURCH, ECU, SE, 116 D, 116 C
 POINT DE REPERE: CHURCH, ECU, SE, 116 D, 116 C

SQUARE READ AFTER 1000 METER SQUARE
 CARRÉ LUS APRÈS 1000 MÈTRES CARRÉS

EASTING READ NUMBER IN POINT
 NORDING READ NUMBER EN POINT

ABSOLUTE NOTE: 116 D, 116 C
 NOTE ABSOLUE: 116 D, 116 C



APPENDIX 2

Map 3 - Stewart River Area, Yukon Territory, 1988

See Pocket on inside back cover

NOTE TO USERS

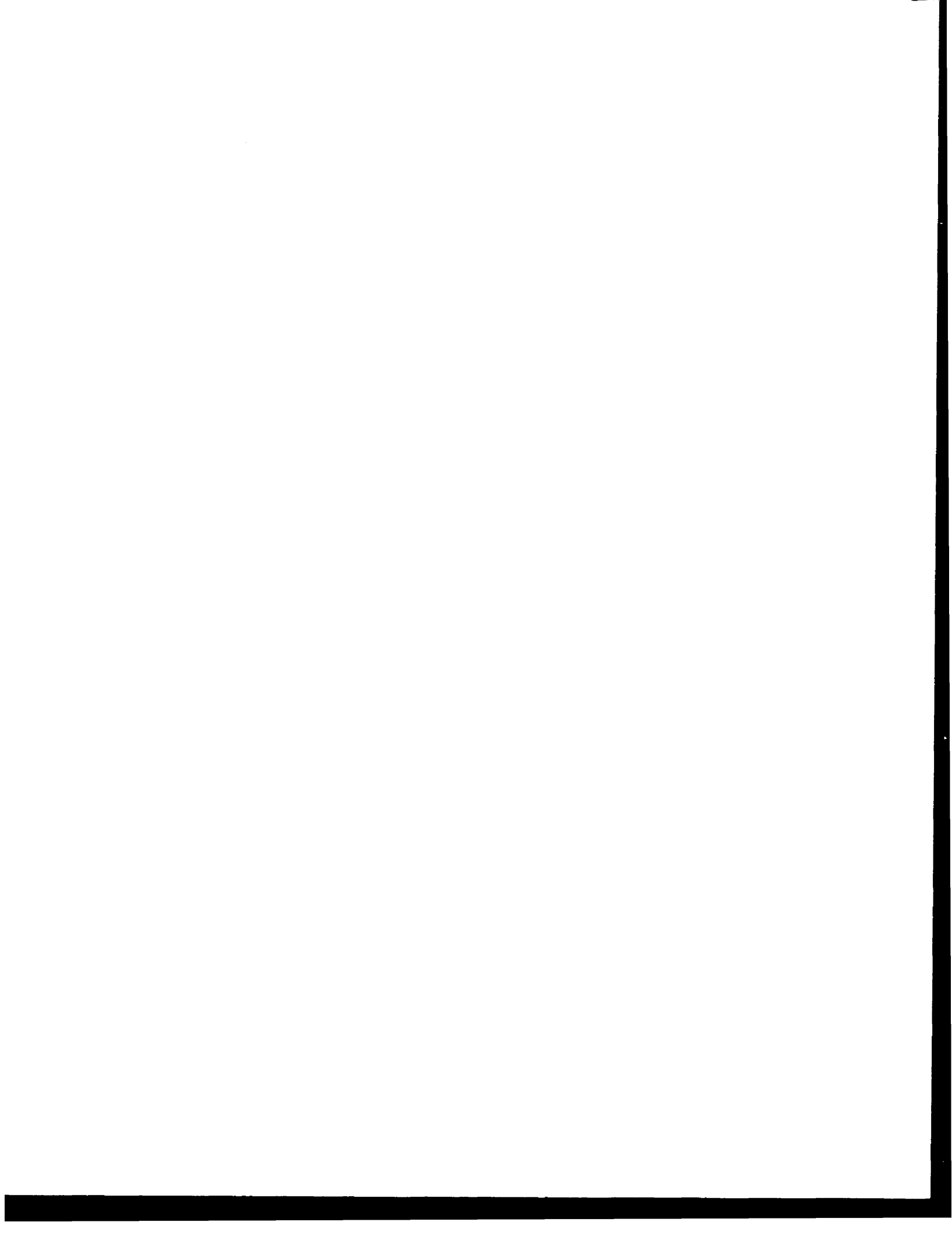
Oversize maps and charts are microfilmed in sections in the following manner:

LEFT TO RIGHT, TOP TO BOTTOM, WITH SMALL OVERLAPS

The following map or chart has been microfilmed in its entirety at the end of this manuscript (not available on microfiche). A xerographic reproduction has been provided for paper copies and is inserted into the inside of the back cover.

Black and white photographic prints (17"x 23") are available for an additional charge.

UMI



CONVENTIONAL SIGNS

2024-2025

Sign Name	Symbol
1. AHEAD	—
2. AHEAD	—
3. AHEAD	—
4. AHEAD	—
5. AHEAD	—
6. AHEAD	—
7. AHEAD	—
8. AHEAD	—
9. AHEAD	—
10. AHEAD	—
11. AHEAD	—
12. AHEAD	—
13. AHEAD	—
14. AHEAD	—
15. AHEAD	—
16. AHEAD	—
17. AHEAD	—
18. AHEAD	—
19. AHEAD	—
20. AHEAD	—
21. AHEAD	—
22. AHEAD	—
23. AHEAD	—
24. AHEAD	—
25. AHEAD	—
26. AHEAD	—
27. AHEAD	—
28. AHEAD	—
29. AHEAD	—
30. AHEAD	—
31. AHEAD	—
32. AHEAD	—
33. AHEAD	—
34. AHEAD	—
35. AHEAD	—
36. AHEAD	—
37. AHEAD	—
38. AHEAD	—
39. AHEAD	—
40. AHEAD	—
41. AHEAD	—
42. AHEAD	—
43. AHEAD	—
44. AHEAD	—
45. AHEAD	—
46. AHEAD	—
47. AHEAD	—
48. AHEAD	—
49. AHEAD	—
50. AHEAD	—
51. AHEAD	—
52. AHEAD	—
53. AHEAD	—
54. AHEAD	—
55. AHEAD	—
56. AHEAD	—
57. AHEAD	—
58. AHEAD	—
59. AHEAD	—
60. AHEAD	—
61. AHEAD	—
62. AHEAD	—
63. AHEAD	—
64. AHEAD	—
65. AHEAD	—
66. AHEAD	—
67. AHEAD	—
68. AHEAD	—
69. AHEAD	—
70. AHEAD	—
71. AHEAD	—
72. AHEAD	—
73. AHEAD	—
74. AHEAD	—
75. AHEAD	—
76. AHEAD	—
77. AHEAD	—
78. AHEAD	—
79. AHEAD	—
80. AHEAD	—
81. AHEAD	—
82. AHEAD	—
83. AHEAD	—
84. AHEAD	—
85. AHEAD	—
86. AHEAD	—
87. AHEAD	—
88. AHEAD	—
89. AHEAD	—
90. AHEAD	—
91. AHEAD	—
92. AHEAD	—
93. AHEAD	—
94. AHEAD	—
95. AHEAD	—
96. AHEAD	—
97. AHEAD	—
98. AHEAD	—
99. AHEAD	—
100. AHEAD	—

100554R

Number of plants in the field

Number of plants

Number of plants

Number of plants

Number of plants

Number of plants in the field

Number of plants

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Number of plants in the field

Number of plants

Lake or pond, silted, intermittent, lake or pond

ABBREVIATI

10/10/10
10/10/10
10/10/10

10/10/10

10/10/10
10/10/10
10/10/10
10/10/10
10/10/10

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

...

1. The first part of the document is a list of names and addresses of the members of the committee. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. J. B. Jones, and Mr. W. C. Brown.

2. The second part of the document is a list of the names and addresses of the members of the committee who were present at the meeting. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. J. B. Jones, and Mr. W. C. Brown.

3. The third part of the document is a list of the names and addresses of the members of the committee who were absent from the meeting. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. J. B. Jones, and Mr. W. C. Brown.

4. The fourth part of the document is a list of the names and addresses of the members of the committee who were excused from the meeting. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. J. B. Jones, and Mr. W. C. Brown.

5. The fifth part of the document is a list of the names and addresses of the members of the committee who were not present at the meeting.



10/10/2010

10/10/2010

10/10/2010

10/10/2010

10/10/2010

10/10/2010

APPENDIX 2

Map 3 - Stewart River Area, Yukon Territory, 1988

See Pocket on inside back cover

NOTE TO USERS

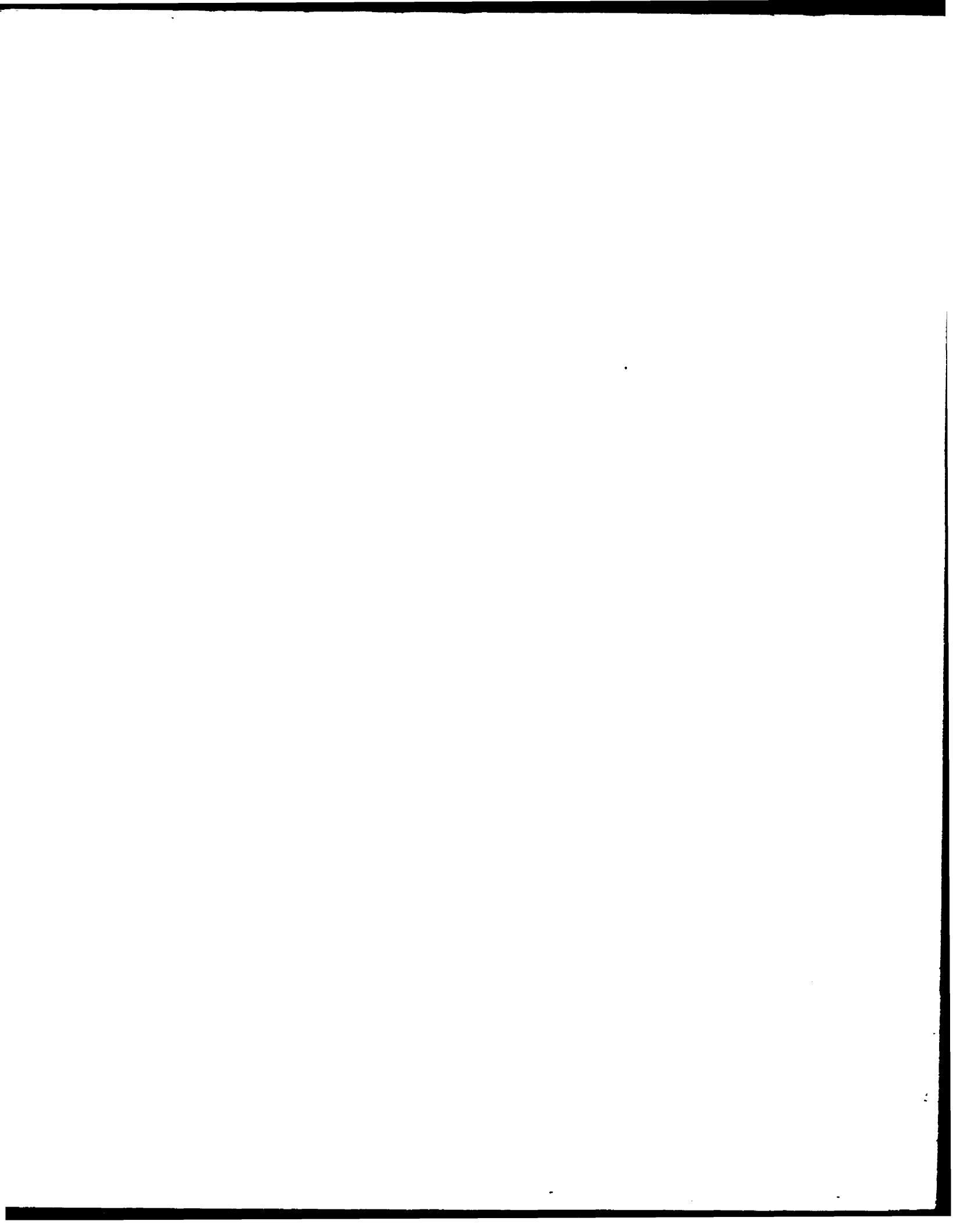
Oversize maps and charts are microfilmed in sections in the following manner:

LEFT TO RIGHT, TOP TO BOTTOM, WITH SMALL OVERLAPS

The following map or chart has been microfilmed in its entirety at the end of this manuscript (not available on microfiche). A xerographic reproduction has been provided for paper copies and is inserted into the inside of the back cover.

Black and white photographic prints (17"x 23") are available for an additional charge.

UMI





Dawson 39 km

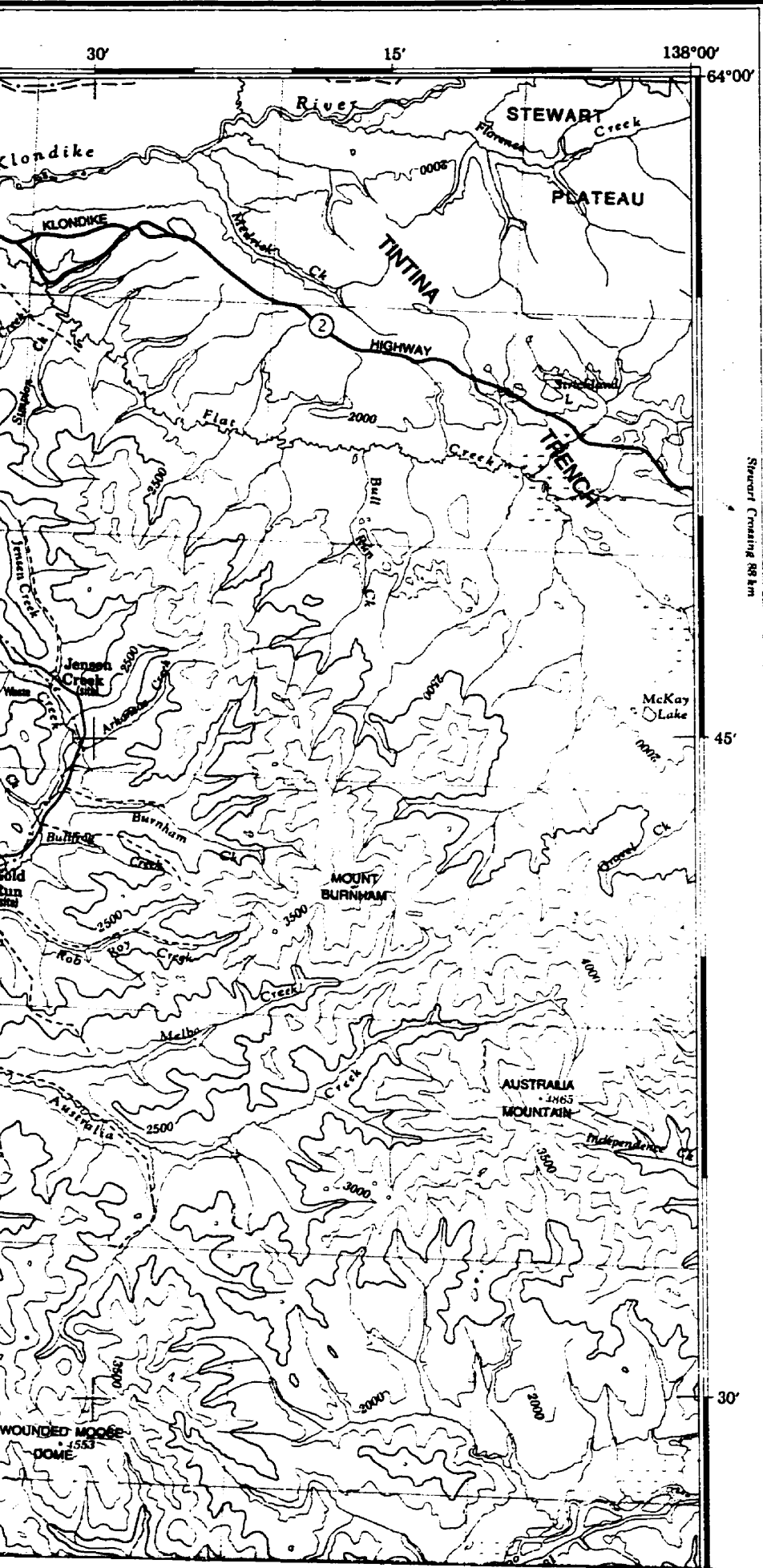
15'

139°00'

45'

30'





Military users. refer to this map as:	SERIES A 502	SERIE
Référence de cette carte pour usage militaire:	MAP 115-0 & 115 N	CARTE
	EDITION 2 MCE	EDITION

Stewart Crossing 88 km

TEN THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 7
QUADRILLAGE UNIVERSEL TRANSVERSE DE MERCATOR
DE DIX MILLE METRES



MOUNT TYRRELL

RUBY MOUNTAIN

REINDEER MOUNTAIN

Ogilvie

Stewart River

SHAMROCK DOME

MOUNT STEWART

L O N D I K E

U K O N

Y U K O N

Stewart River

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

Thirteen Mile Creek

Seriad Creek

Henderson Creek

Shamrock Creek

Stewart River

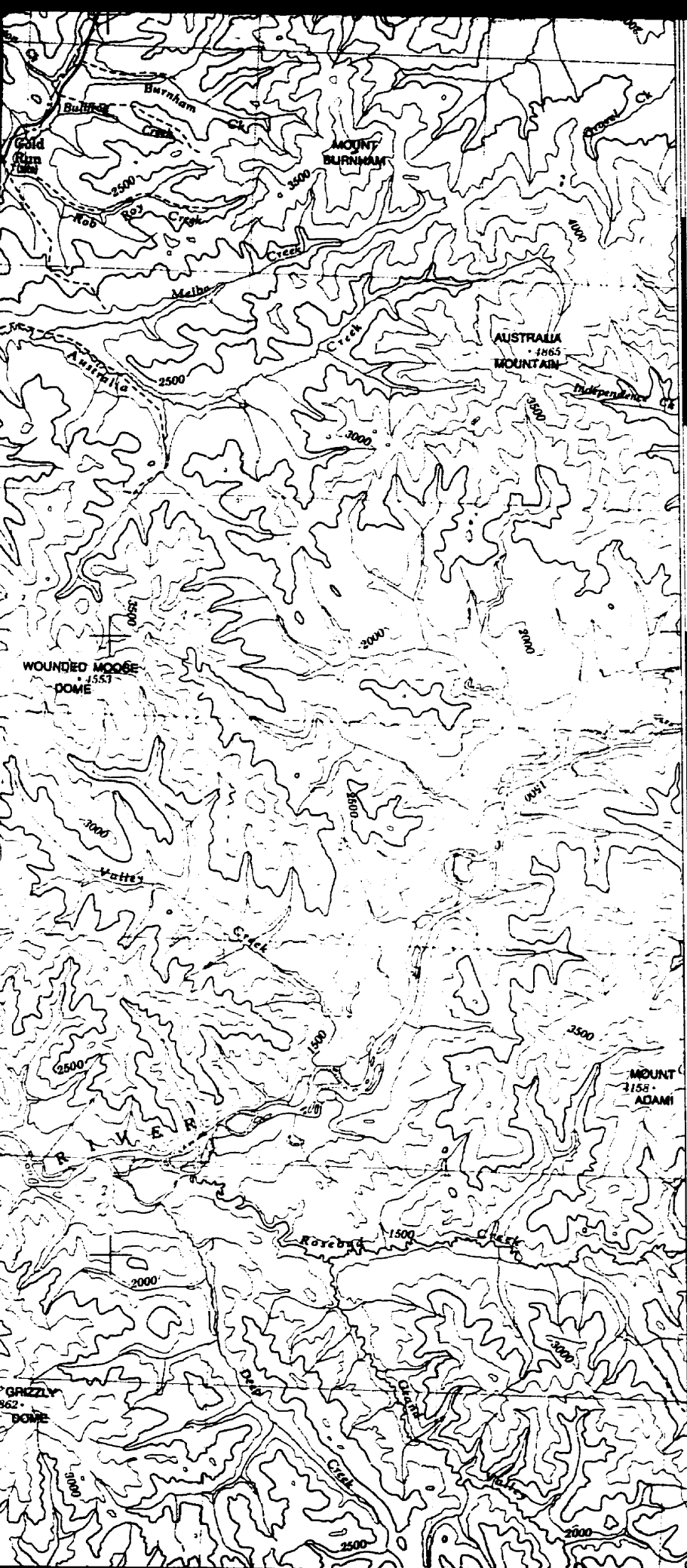
Shamrock Creek

Shamrock Creek

Shamrock Creek

Shamrock Creek

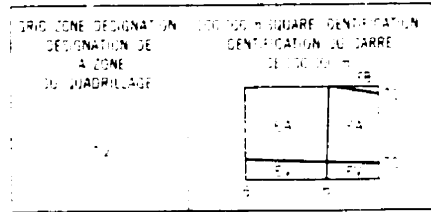




30'

15'

TEN THOUSAND METRE
 UNIVERSAL TRANSVERSE MERCATOR GRID
 ZONE 7
 QUADRILLAGE UNIVERSEL TRANSVERSE DE MERCATOR
 DE DIX MILLE METRES



EXAMPLE OF METHOD USED
 TO GIVE A REFERENCE TO NEAREST 1000 METRES
 EXEMPLE DE LA METHODE EMPLOYEEE
 POUR FIXER DES REPRES A 1000 METRES PRES.

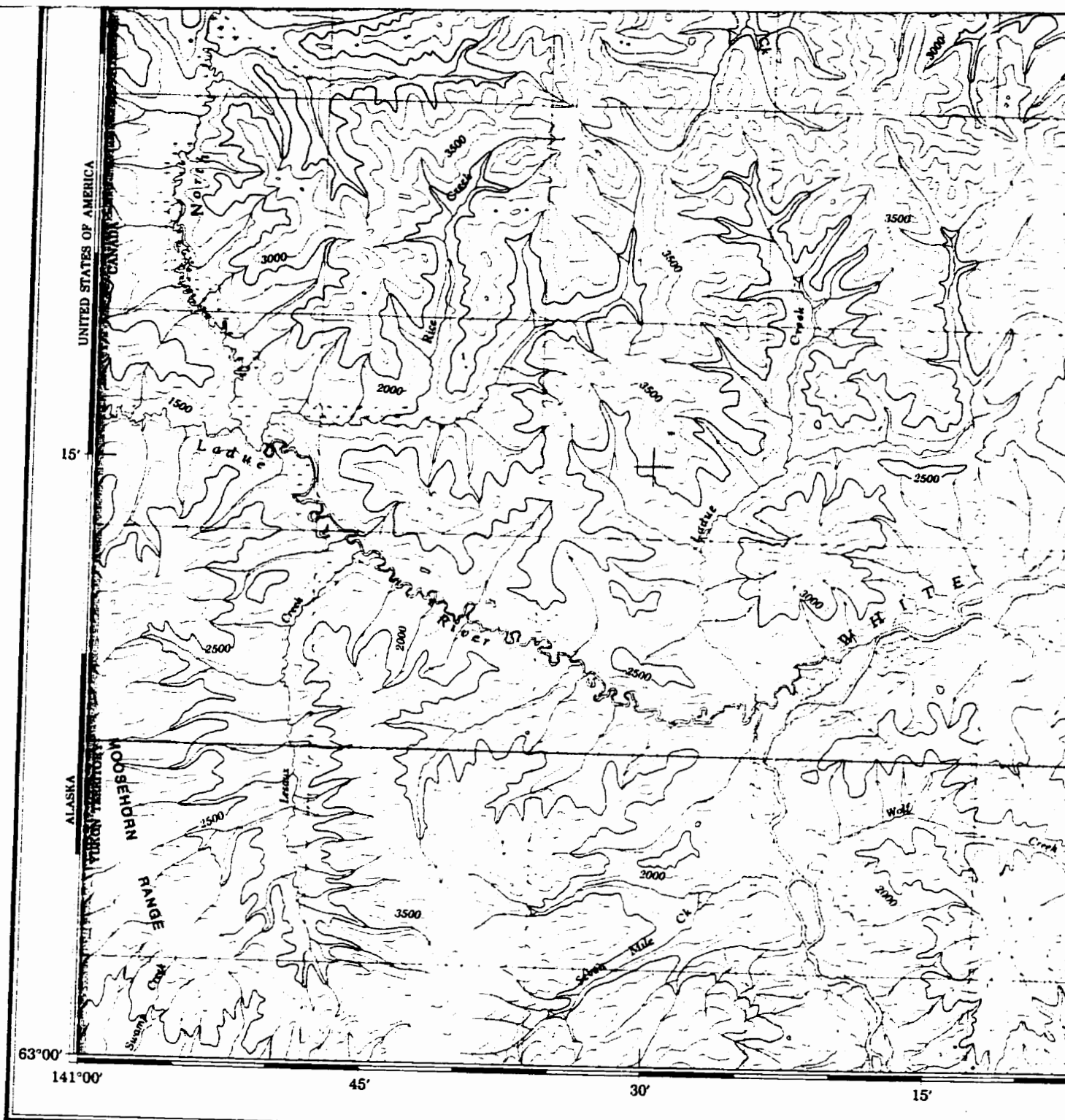
1. —————

2. —————

3. —————

2 3 4 5

REFERENCE POINT POINT DE REPERE	CHURCH EGLISE	45 4000 0. JESUS.
SQUARE CARRÉ	Read letters of 100 000m square Lire les lettres du carré de 100 000m	NU
EASTING ABSCISSE	Read number on grid line immédiately to left of point du quadrillage immédiatement à gauche du repere Estimate tenths of a square from this line eastward to point Estimer le nombre de dixèmes du carré entre cette ligne et le repere en direction est	4 5
NORTHING ORDONNEE	Read number on grid line immédiately below point Noter le chiffre de la ligne	45



63°00'
141°00'

45'

30'

15'

1961	
	1952
1960	1949

PRODUCED BY THE CANADA CENTRE FOR MAPPING (OTTAWA), DEPARTMENT OF ENERGY, MINES AND RESOURCES. DERIVED FROM 1:50 000 MAPS. INFORMATION CURRENT AS SHOWN IN DIAGRAM. PUBLISHED IN 1988.

COPIES MAY BE OBTAINED FROM THE CANADA MAP OFFICE, DEPARTMENT OF ENERGY, MINES AND RESOURCES, OTTAWA, OR YOUR NEAREST MAP DEALER.

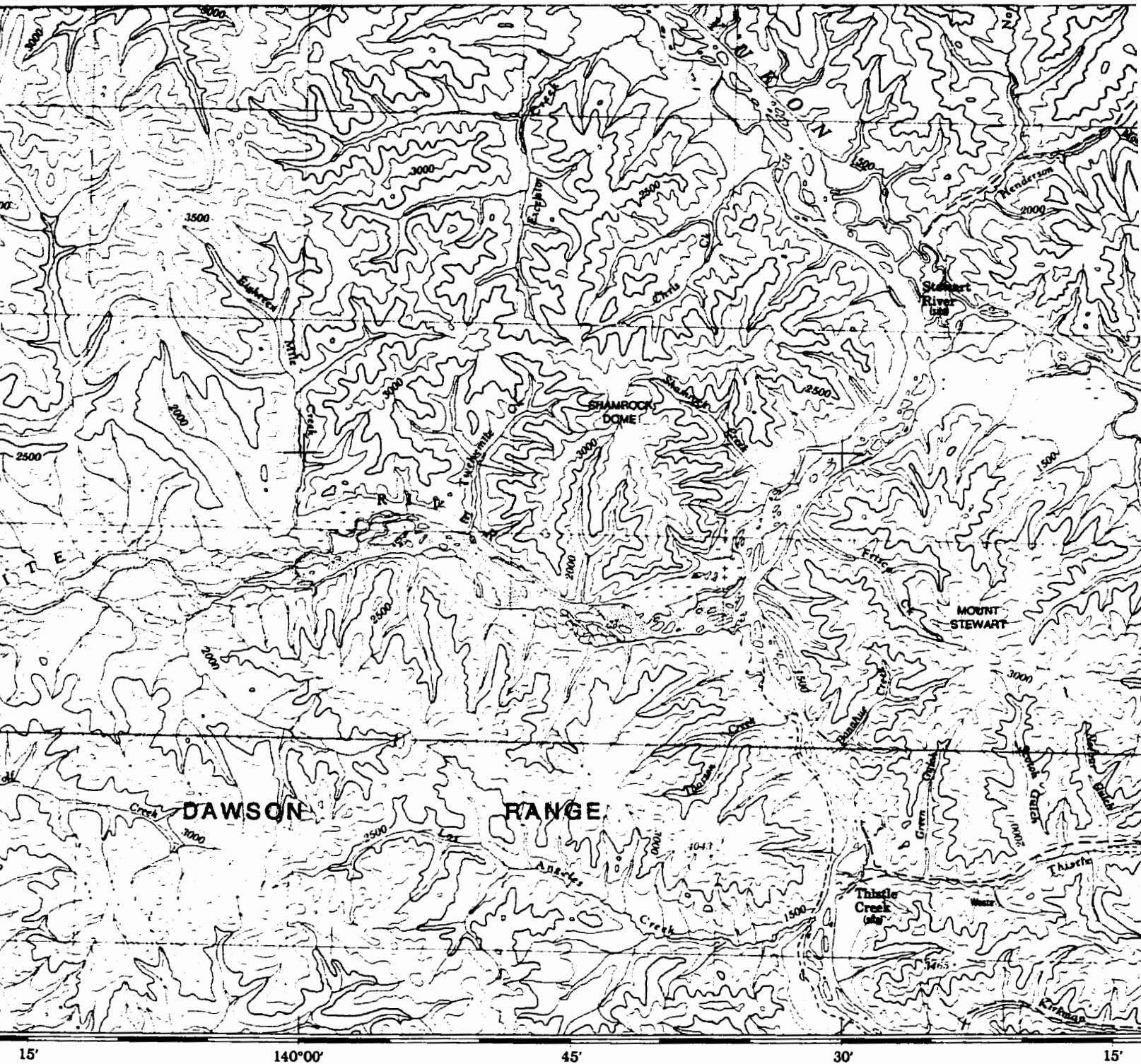
© 1988. HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF ENERGY, MINES AND RESOURCES.

Roads:	Routes:	
loose or stabilized surface, all weather	gravier, aggloméré, toute saison	2 lanes or more
loose surface, dry weather	de gravier, temps sec	2 voies ou plus
cart track	de terre	
trail, cut line or portage	sentier, percée ou portage	

Updated for all major features using satellite imagery obtained in 1986

FOR COMPLETE REFERENCE SEE REVERSE SIDE POUR LA LISTE COMPLETE DES SIGNES, VOIR

Les principales caractéristiques ont été mises à jour à l'aide des images prises par satellite en 1986



FOR MAPPING (OTTAWA).
 LINES AND RESOURCES.
 INFORMATION CURRENT AS
 OF 1988.

Information concerning bench marks and horizontal survey
 monuments can be obtained from Geodetic Survey, Canada
 Centre for Surveying, Ottawa.

THE CANADA MAP OFFICE,
 AND RESOURCES, OTTAWA.

STEWART RIVER

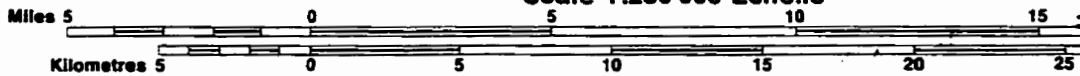
YUKON TERRITORY TERRITOIRE DU YUKON

IN RIGHT OF CANADA.
 LINES AND RESOURCES.

Scale 1:250 000 Échelle

Season 2 lanes or more
 2 voies ou plus

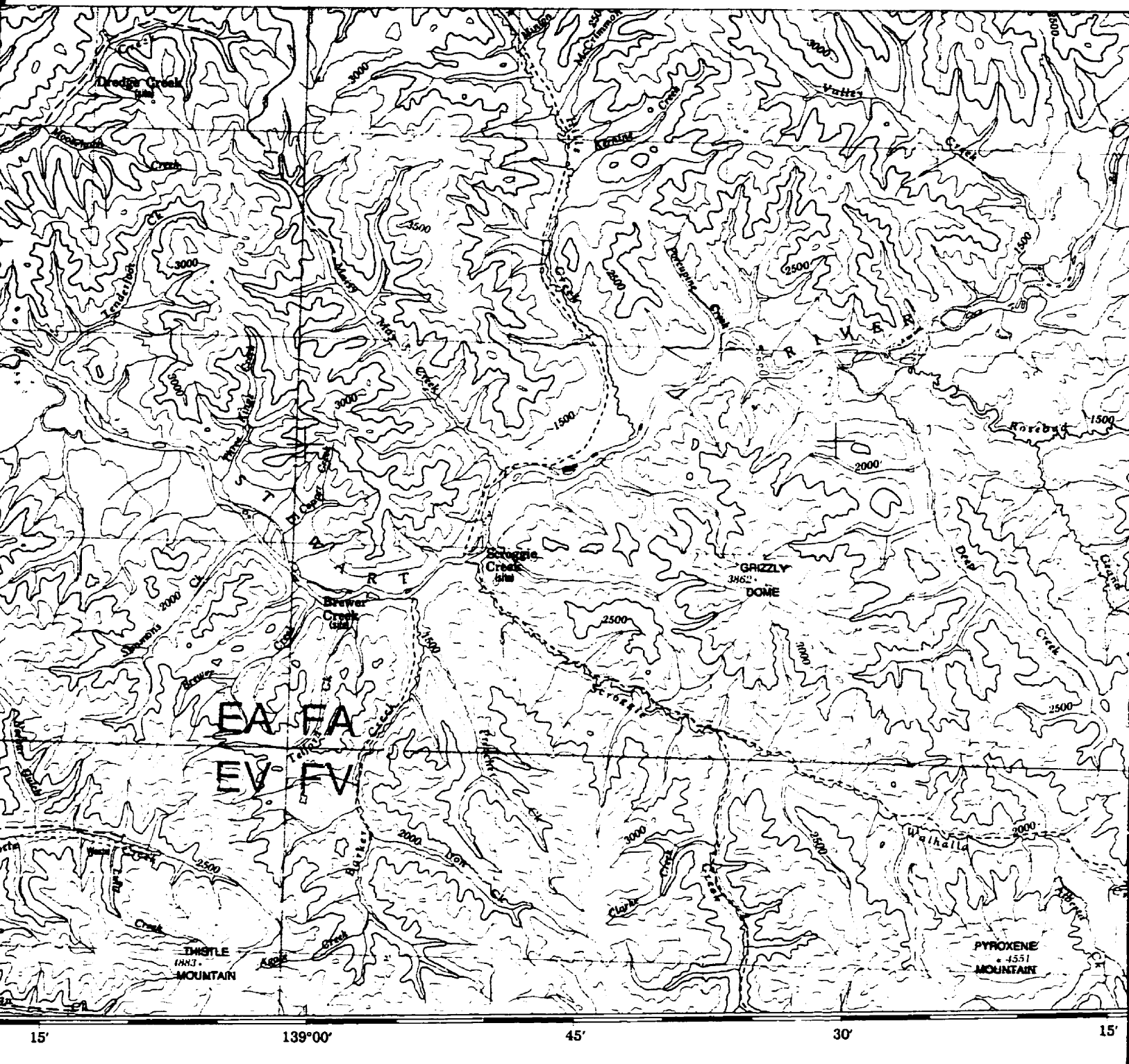
..... less than 2 lanes
 moins de 2 voies



UNE LISTE COMPLÈTE DES SIGNES, VOIR AU VERSO

Magnetic declination 1988 varies from 29°45' easterly at centre
 of west edge to 30°38' easterly at centre of east edge. Mean
 annual change decreasing 14.7.

En 1988, la déclinaison magnétique varie de 29°45' vers l'est au
 centre du bord ouest à 30°38' vers l'est au centre du bord est.
 La variation annuelle moyenne décroît de 14,7.



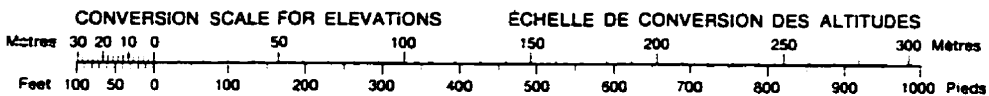
Pour tout renseignement concernant les lignes et les bornes altimétriques, s'adresser aux Levés géodésiques, Centre canadien des levés, Ottawa.

ÉTABLIE PAR LE CENTRE CANADIEN DE CARTOGRAPHIE (OTTAWA), MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES. TIRÉE DE CARTES À 1/50 000. RENSEIGNEMENTS À JOUR TELS QU'INDIQUÉS DANS LE DIAGRAMME. PUBLIÉE EN 1988.

CES CARTES SONT EN VENTE AU BUREAU DES CARTES DU CANADA, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES, OTTAWA, OU CHEZ LE VENDEUR LE PLUS PRÈS.

© 1988, SA MAJESTÉ LA REINE DU CHEF DU CANADA, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES.

KON

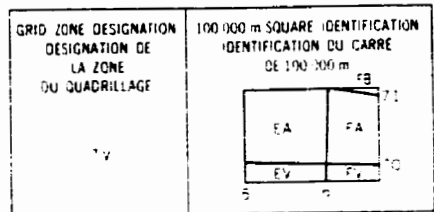
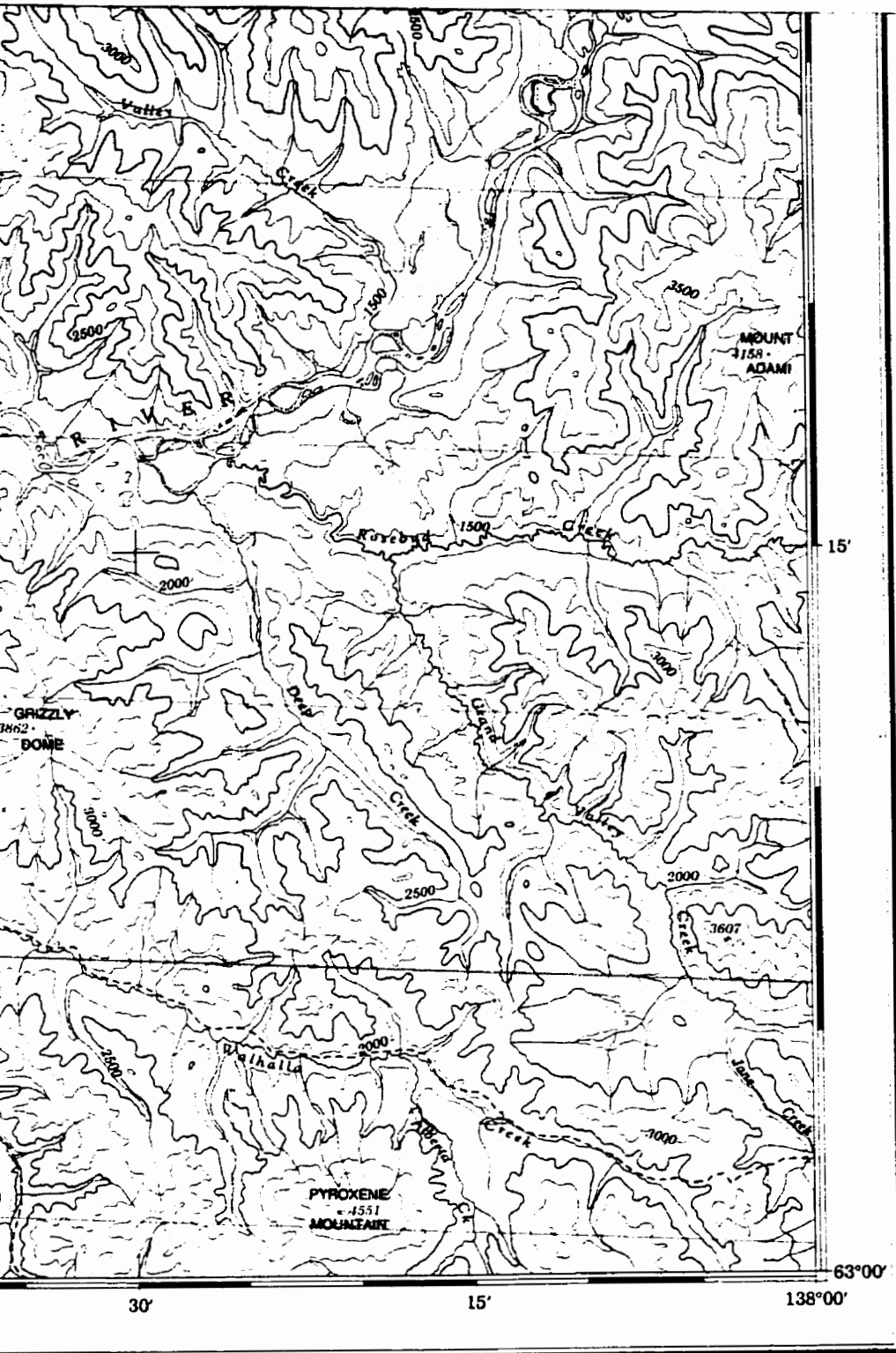


CONTOUR INTERVAL 500 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

EQUIDISTANCE DES COURBES 500 PIEDS
Altitudes en pieds
Système de référence géodésique nord-américain, 1927
Projection transverse de Mercator

142°	USA E-UD A
63°	
142°	USA E-UD A
62°	
142°	USA E-UD A
62°	
142°	Index to adjacent Tableau d'assemblage

145' vers l'est au
centre du bord est.



EXAMPLE OF METHOD USED
TO GIVE A REFERENCE TO NEAREST 1000 METRES
EXEMPLE DE LA METHODE EMPLOYÉE
POUR FIXER DES REPERES A 1000 METRES PRES

1. ————
0 ————
3. ————
2 3 4 5

REFERENCE POINT POINT DE REPERE	CHURCH EGLISE	15 00000 15 00000
------------------------------------	------------------	----------------------

SQUARE Read letters of 100 000 m square
CARRÉ Lire les lettres du carré de 100 000 m

EASTING Read number on grid line immediately to left of point
ABSCISSE Lire le chiffre de la ligne du quadrillage immédiatement à gauche du repère

Estimate length of square from this line eastward to point
Estimer le nombre de dixèmes du carré entre cette ligne et le repère en direction est

15	00
15	15

NORTHING Read number on grid line immediately below point
ORDONNÉE Lire le chiffre de la ligne du quadrillage immédiatement en dessous du repère

Estimate length of square from this line northward to point
Estimer le nombre de dixèmes du carré entre cette ligne et le repère en direction nord

15	15
15	15

GRID REFERENCE
REFERENCE AU QUADRILLAGE

NU4504

Reporting beyond U.S. only direction prefix and zone designation as 14VNU4504
Si vous faites connaître votre position à qu'on ne la trouve à plus de 15, pour importer la direction, indiquez également la zone du quadrillage tel que 14VNU4504

MAPPIE (OTTAWA)
LES RESSOURCES
LES A JOUR TELS
1988.

DES CARTES DU
DES ET DES RES-
PLUS PRES.

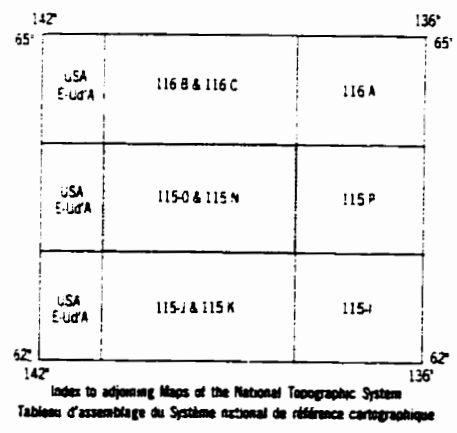
CANADA
LES RESSOURCES.

CONVERSION DES ALTITUDES

200 250 300 Mètres

700 800 900 1000 Pieds








































DISTANCE DES COURBES 500 PIEDS
Altitudes en pieds
référence géodésique nord-américain, 1927
projection transverse de Mercator



STEWART RIVER
115-0 & 115 N
EDITION 2 ÉDITION

CONVENTIONAL SIGNS

(Black unless otherwise stated)







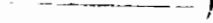
































Dual highway		
Road, hard surface, all-weather, more than 2 lanes		}
Road, hard surface, all-weather, 2 lanes		
Road, hard surface, all-weather, less than 2 lanes		
Road, loose or stabilized surface, all-weather, 2 lanes or more		}
Road, loose or stabilized surface, all-weather, less than 2 lanes		
Road, loose surface, all-weather		
Cart track or winter road		
Trail, foot, animal, cart, etc.		
Road, under construction		
Highway interchange with number		
Highway route marker		
Built-up area		
Railway, single-track		
Railway, multiple-track		
Railway, narrow-gauge		
Railway, abandoned		
Railway station, stop		
Bridge		
Tunnel		
Ferry		
Navigable river		
Seaplane base, seaplane anchorage		
Airport, airfield		
Building		
Church, school		
Town		
Village or settlement		
Highway		
Tower, chimney, similar objects		
Well, or gas		
Exposed wreck		
Pipeline, above-ground, underground		
Telephone line		
Power transmission line		
Campsite, picnic site		
Mine		
Gravel or sand pit, quarry		
Levee or dyke		

GLOSSAIRE

Arandonnée de	Acacia	Route à deux chaussées séparées
Arrière	Aleu	Route pavée, toutes saisons, plus
Bévue	Alouette	Route pavée, toutes saisons, 2 vo
Bâtiment	Alouette	Route pavée, toutes saisons, mo
Bâtiment	Alouette	Route de gravier ou surface durc
Bâtiment	Alouette	toutes saisons, 2 voies ou plus
Bâtiment	Alouette	Route de gravier ou surface durc
Bâtiment	Alouette	toutes saisons, moins de 2 voies
Bâtiment	Alouette	Route de gravier, temps sec
Bâtiment	Alouette	Chemin de terre ou d'acier
Bâtiment	Alouette	Sentier, marche ou passage
Bâtiment	Alouette	Route en construction
Bâtiment	Alouette	Echelle pour l'aveugle
Bâtiment	Alouette	Signalisation routière
Bâtiment	Alouette	Automatisme
Bâtiment	Alouette	Chemins de fer, voie unique
Bâtiment	Alouette	Chemin de fer, voies multiples
Bâtiment	Alouette	Chemin de fer, voie étroite
Bâtiment	Alouette	Chemin de fer, abandonné
Bâtiment	Alouette	Voie étroite, simple
Bâtiment	Alouette	Route
Bâtiment	Alouette	Tunnel
Bâtiment	Alouette	Transversier
Bâtiment	Alouette	Voie de navigation
Bâtiment	Alouette	Évacuation, travaux, travaux
Bâtiment	Alouette	Arrière, terrain d'atterrissage
Bâtiment	Alouette	Bâtiment
Bâtiment	Alouette	Église, école
Bâtiment	Alouette	Voie
Bâtiment	Alouette	Voie de stationnement
Bâtiment	Alouette	Voie étroite
Bâtiment	Alouette	Tour, cheminée, constructions ser
Bâtiment	Alouette	Puits, pétrole, gaz
Bâtiment	Alouette	Éclairage
Bâtiment	Alouette	Rivière sur terre, sous terre
Bâtiment	Alouette	Ligne téléphonique
Bâtiment	Alouette	Ligne de transport d'énergie
Bâtiment	Alouette	Terrain de camping, terrain de jeu
Bâtiment	Alouette	Mine
Bâtiment	Alouette	Gravière ou sablière, carrière
Bâtiment	Alouette	Levee ou digue

SIGNES CONVENTIONNELS

(Noir à moins d'indication contraire)

Route à deux chaussées séparées		
Route pavée, toutes saisons, plus de 2 voies		Route
Route pavée, toutes saisons, 2 voies		
Route pavée, toutes saisons, moins de 2 voies		
Route de gravier ou surface durcie, toutes saisons, 2 voies ou plus		Route
Route de gravier ou surface durcie, toutes saisons, moins de 2 voies		
Route de gravier, temps sec		
Chemin de terre ou d'hiver		
Sentier, chemin ou portage		
Route en construction		Route en construction
Echangeur, avec numéro		Echangeur
Signalisation routière		Signalisation routière
Agglomération		Agglomération
Chemin de fer, voie unique		
Chemin de fer, voies multiples		
Chemin de fer, voie étroite		
Chemin de fer abandonné		
Signe ferroviaire		
Pont		
Tunnel		
Traversier		
Fer de navigation		
Éclairage à l'électricité, à l'huile, à gaz, à pétrole		Éclairage
Avionnet, terrain d'aviation		
Bâtiment		
Église, école		
Yole		
Village ou étagement		
Lieu historique		
Tour, cheminée, constructions semblables		
Puits, pétrole, gaz		
Écluse, barrage		
Poêle sur terre, sous terre		
Ligne téléphonique		
Ligne de transport d'énergie		
Terrain de camping, terrain de bivouac		
Mine		
Gravière ou sablière, carrière		
Levee ou digue		

Railway station, stop

Bridge

Tunnel

Ferry

Navigation light

Seaplane base, seaplane anchorage

Airport, airfield

Building

Church, school

Town

Village or settlement

Hamlet

Tower, chimney, similar objects

Well, spring

Exposed wreck

Pipeline, above ground, underground

Telephone line

Power transmission line

Dam site, dam, dike

Mine

Gravel pit, sand quarry

Quarry, pit

International boundary, with agreement

Proposed international boundary

County and district border

Township boundary, unsurveyed

Township boundary, surveyed

Railroad boundary

Section line

Surveyed line, lot line

Horizontal control point

Spot elevation, precise, non-precise

Stream or shoreline, indefinite

Irrigation canal, ditch

Lake, intermittent

Flooded and inundated land, seasonal

Marsh or swamp

Alkali flat

Dry river bed with channels

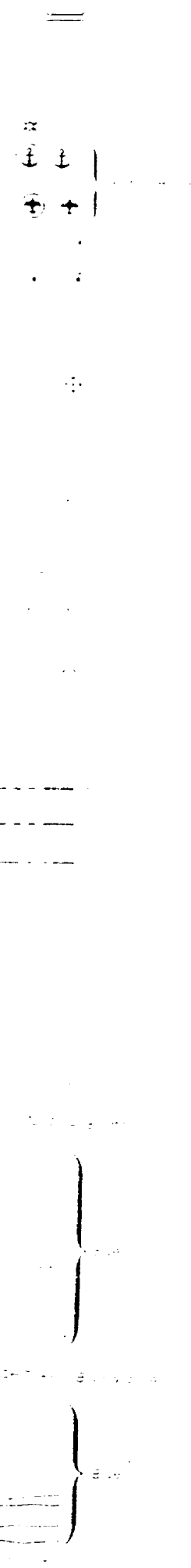
String bog

Tundra ponds, tundra polygons

Falls

Rapids

Rocks



Gare, arrêt sur signal		
Pont		
Tunnel		
Traversier		
Feu de navigation		
Base d'hydravions, ancrage d'hydravions		} Aiguillage
Aéroport, terrain d'aviation		
Bâtiment		
Eglise, école		
Zoo		
Verger ou étagement		
Usine, atelier		
Tour, cheminée, constructions semblables		
Puits, pétrole, gaz		
Épave, mine		
Région de surface, système		
Ligne téléphonique		
Ligne de transport d'énergie		
Terrain de randonnée, terrain de jeu, parc		
Mine		
Traversier, système, ponton		
Levier, ponton		
Frontière internationale, limite domaniale		
Limite de propriété, limite communale		
Limite de commune, ponton		
Limite de terrain d'aviation, de base		
Limite de terrain d'aviation, ponton		
Limite de terrain, ligne		
Ligne de section		
Ligne ardentée, ligne de pont		
Repère, plan métrique		
Point coté, précis, impécis		
Cours d'eau, niveau, impécis		} Eau
Défilé, inondation, fusse		
Lac intermittent		} Eau
Terrain inondé, inondé en saison		
Marais ou marécage		} Eau & Eau
Terrain plat, lacain		
Lit de cours d'eau, tar, avec chenaux		} Eau
Foncière à filaments		
Étangs de toundra, polygones de toundra		} Eau
Crutes		
Rapides		} Eau
Roches		

International boundary with monument	-----	1000
Province, territory or state boundary	-----	1000
County or district boundary	-----	1000
Township, canton, parish boundary	-----	1000
Township boundary, unsurveyed	-----	1000
Reserve park boundary	-----	1000
Section line	-----	1000
Surveyed line, lot line	-----	1000
Horizontal control point	-----	1000
Spot elevation, precise, non-precise	-----	1000
Stream or shoreline, indefinite	-----	1000
Irrigation canal, ditch	-----	1000
Lake, intermittent	-----	1000
Flooded land, inundated land, seasonal	-----	1000
Marsh or swamp	-----	1000
Alkali flat	-----	1000
Dry river bed, with channels	-----	1000
String bog	-----	1000
Fundra points, fundra points	-----	1000
Falls	-----	1000
Rapids	-----	1000
Rocks	-----	1000
Rocky reef	-----	1000
Dams, small, large	-----	1000
Foreshore flats	-----	1000
Contours	-----	1000
Approximate contours	-----	1000
Depression contours	-----	1000
Cliff	-----	1000
Escarpment	-----	1000
Esker	-----	1000
Strand line	-----	1000
Sand	-----	1000
Moraine, scree	-----	1000
Palsa bog	-----	1000
Pingo	-----	1000
Glacial crevasse	-----	1000
Wooded area	-----	1000

Frontière internationale avec bornes-reperes

Limite de province, de territoire ou d'état

Limite de comté ou de district

Limite de township ou canton, de paroisse

Limite de township ou canton non arpentée

Limite de réserve de parc

Ligne de section

Ligne arpentée, ligne de lot

Repere diamétrique

Point cote, précis, imprecis

Cours d'eau ou rive, imprecis

Terrain inondation, fosse

Lac intermittent

Terrain inondé, inondé en saison

Marais ou marécage

Terrain d'infiltration

Lit de pontons d'eau tar, avec trous, aux

Fondrières, ruisseaux

Étangs de trou d'eau, bougines, de trou d'eau

Crêtes

Rapides

Roches

Rochers, rochers

Barrières, petits ruisseaux

Estrans

Courbes de niveau

Courbes de niveau, approximatives

Courbes de cuvette

Falaise

Escarpement

Esker

Lignes de rivage

Sable

Moraine, abouiss

Fondrière de base

Pingo

Crevasse glaciaire

Région boisée

Terrain boisé

APPENDIX 3

**Map 4 - Auriferous Gravels, Bonanza and
Hunker Creeks, Klondike Mining District, 1906**

See Pocket on inside back cover

NOTE TO USERS

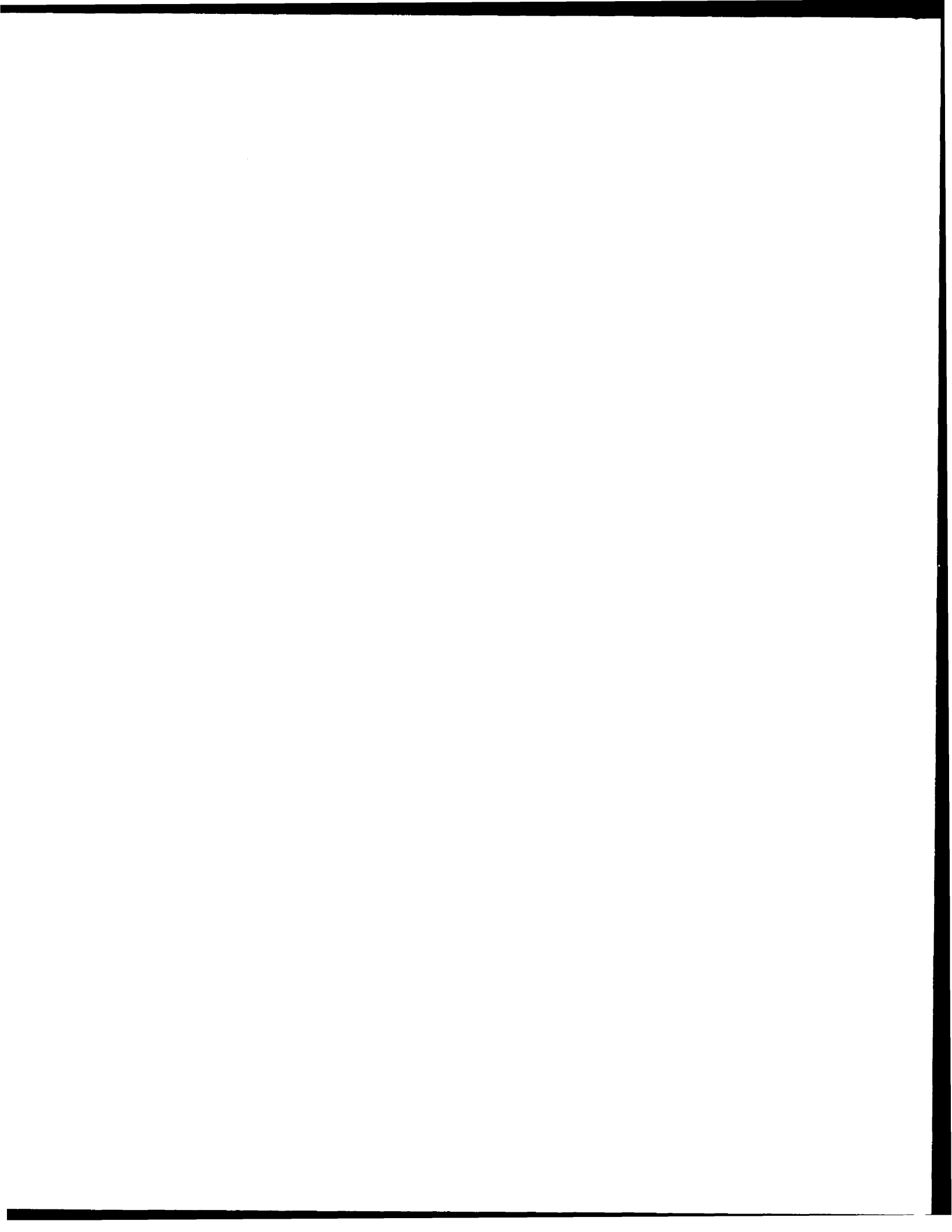
Oversize maps and charts are microfilmed in sections in the following manner:

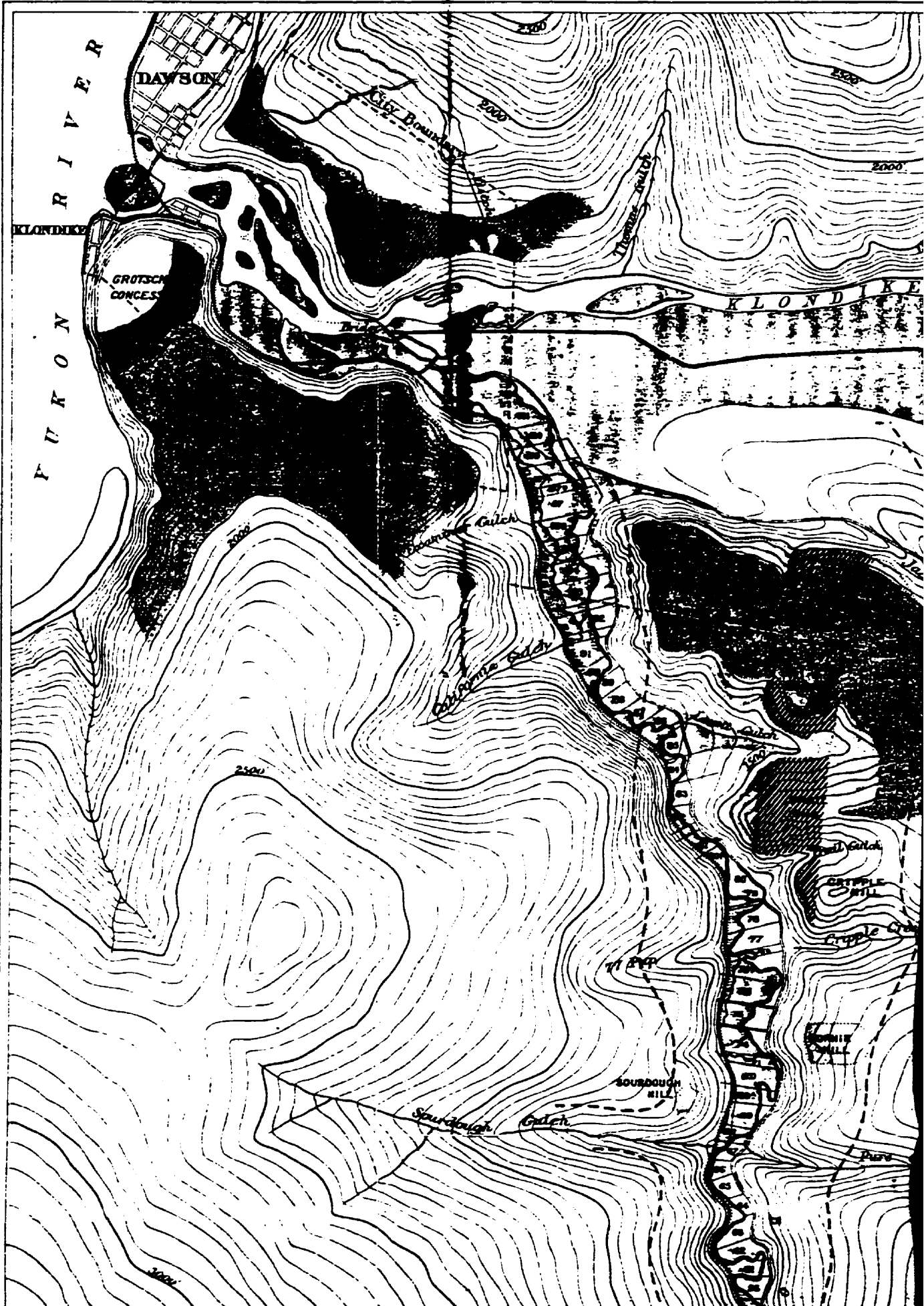
LEFT TO RIGHT, TOP TO BOTTOM, WITH SMALL OVERLAPS

The following map or chart has been microfilmed in its entirety at the end of this manuscript (not available on microfiche). A xerographic reproduction has been provided for paper copies and is inserted into the inside of the back cover.

Black and white photographic prints (17"x 23") are available for an additional charge.

UMI





YUKON RIVER

DAWSON

City Boundary

GROTSCH CONCES

KLONDIKE

YUKON

Cassidy Gulch

Spaulding Gulch

Cripple Hill

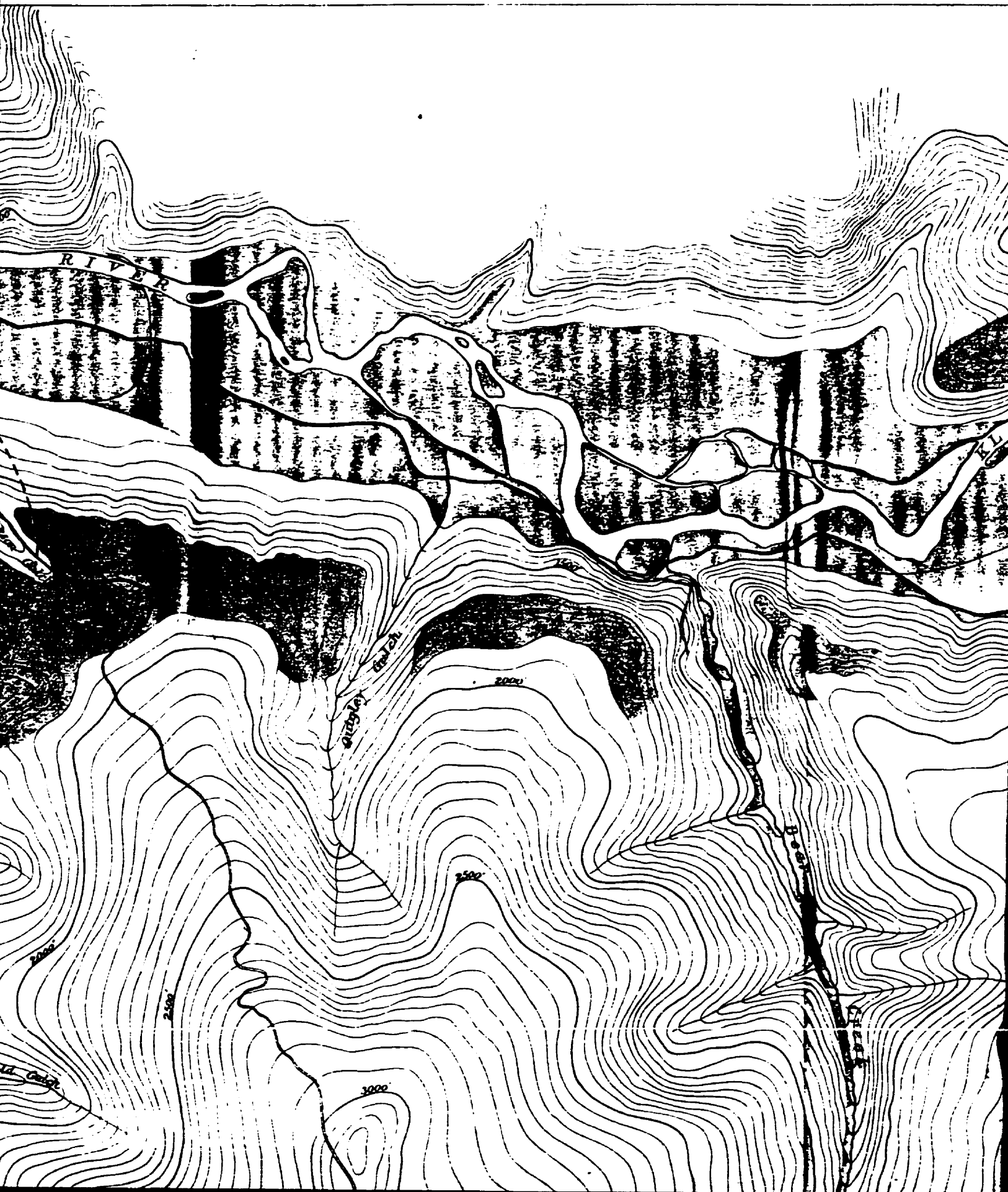
Cripple Cr.

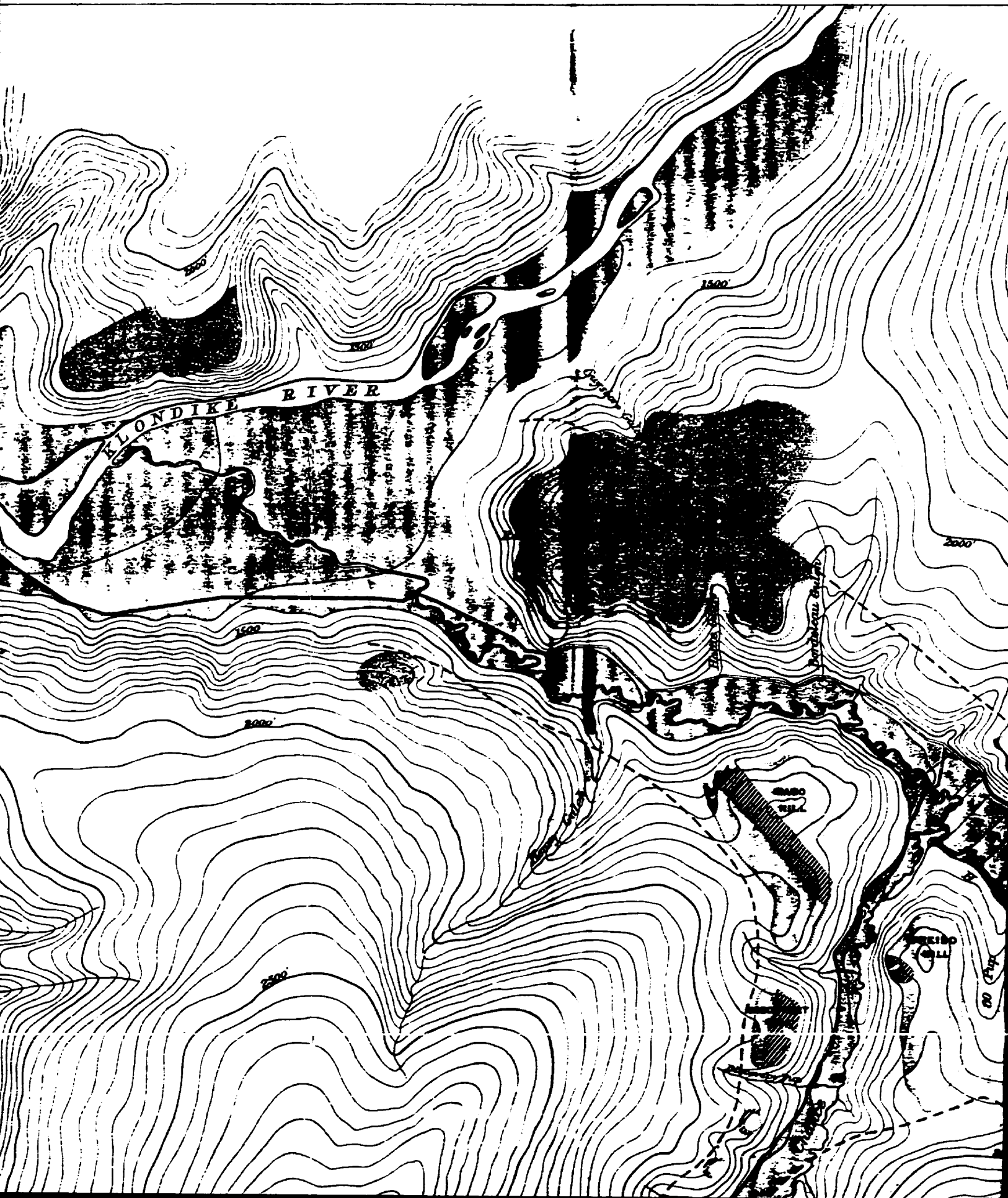
Sourbough Hill

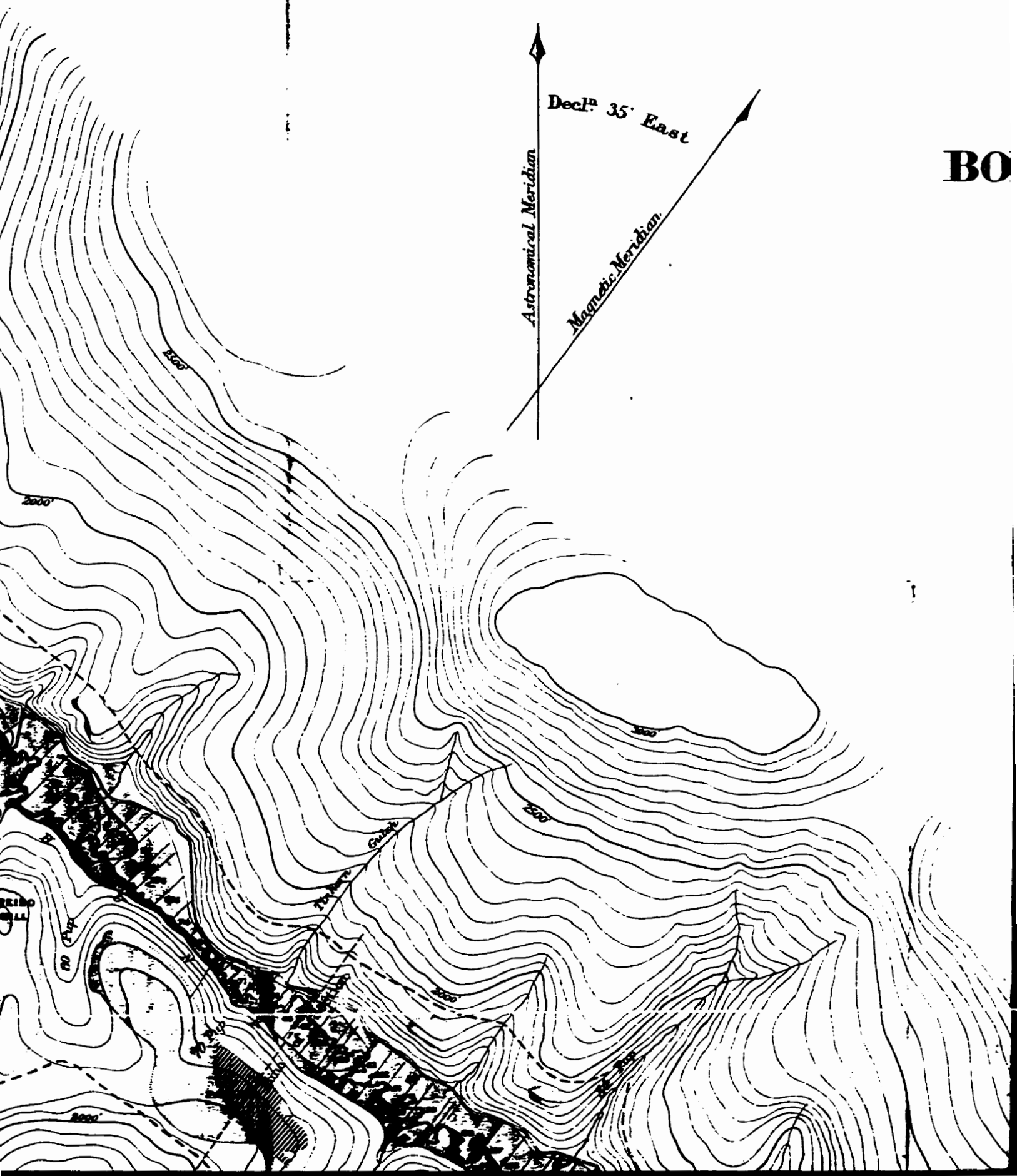
Spaulding Gulch

Gulch

Hill







Declⁿ 35' East

Astronomical Meridian

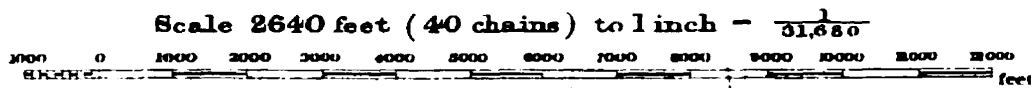
Magnetic Meridian

BO


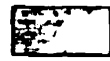


Map of the
AURIFEROUS GRAVELS
 ON
BONANZA AND HUNKER CREEKS
 KLONDIKE MINING DISTRICT, Y. T.

To illustrate report by
R. G. MCCONNELL, B. A.



1906.



Explanation of Colours and Signs

-  *Creek and river gravels*
 -  *White channel gravels*
 -  *Klondike gravels*
 -  *Approximate position of coarse gold pay-streak*
- } *High level gravels*

--- *Approximate original boundaries of White channel gravels*

-  *Roads*
-  *Gold discovery points*

1500' *Heights in feet above sea level*

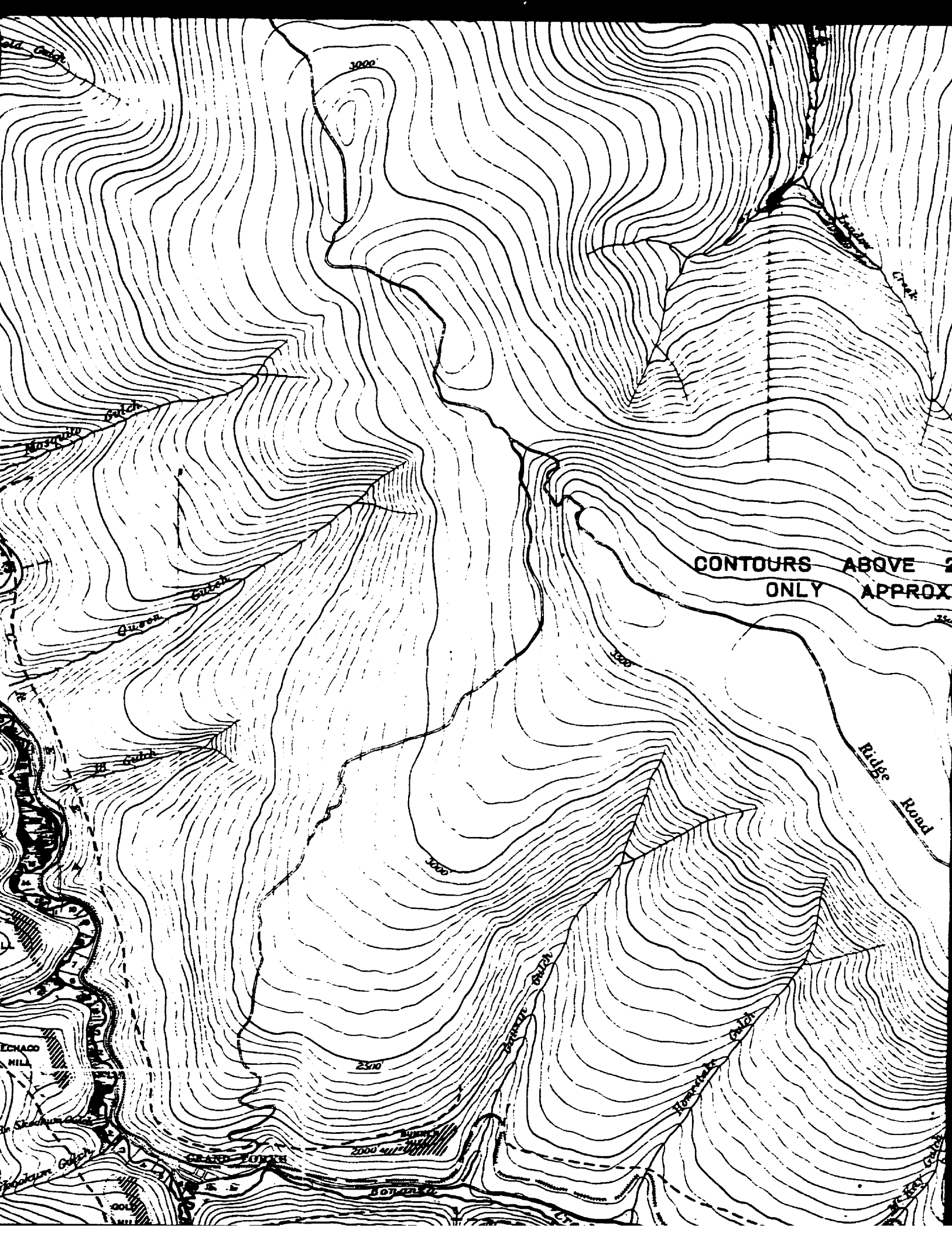
Contour interval 50 feet

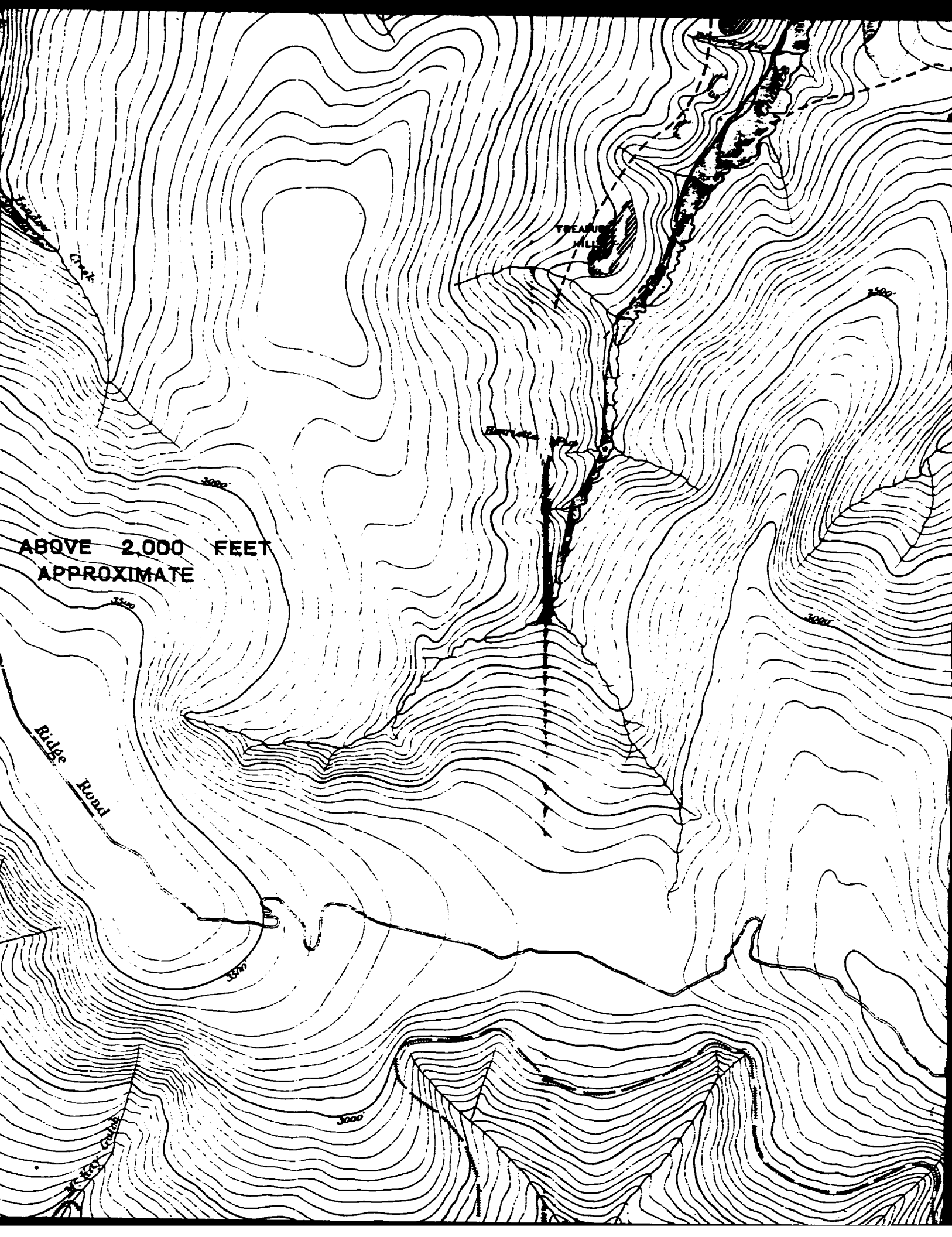
Note: Contours above 2000 feet are only approximate

*Compiled by J. Keele & P. H. MacLaren from surveys made by P. H. MacLaren
 and F. O'Farrell of the Geological Survey; from official plans of the Department of
 the Interior and of Railways & Canals, and from maps of the Geological Survey.*

Drawn for photolithography by R. B. Yorston.







ABOVE 2,000 FEET
APPROXIMATE

TREASURE
HILL

Ridge Road

Treasure Hill Road

Creek Road

3000

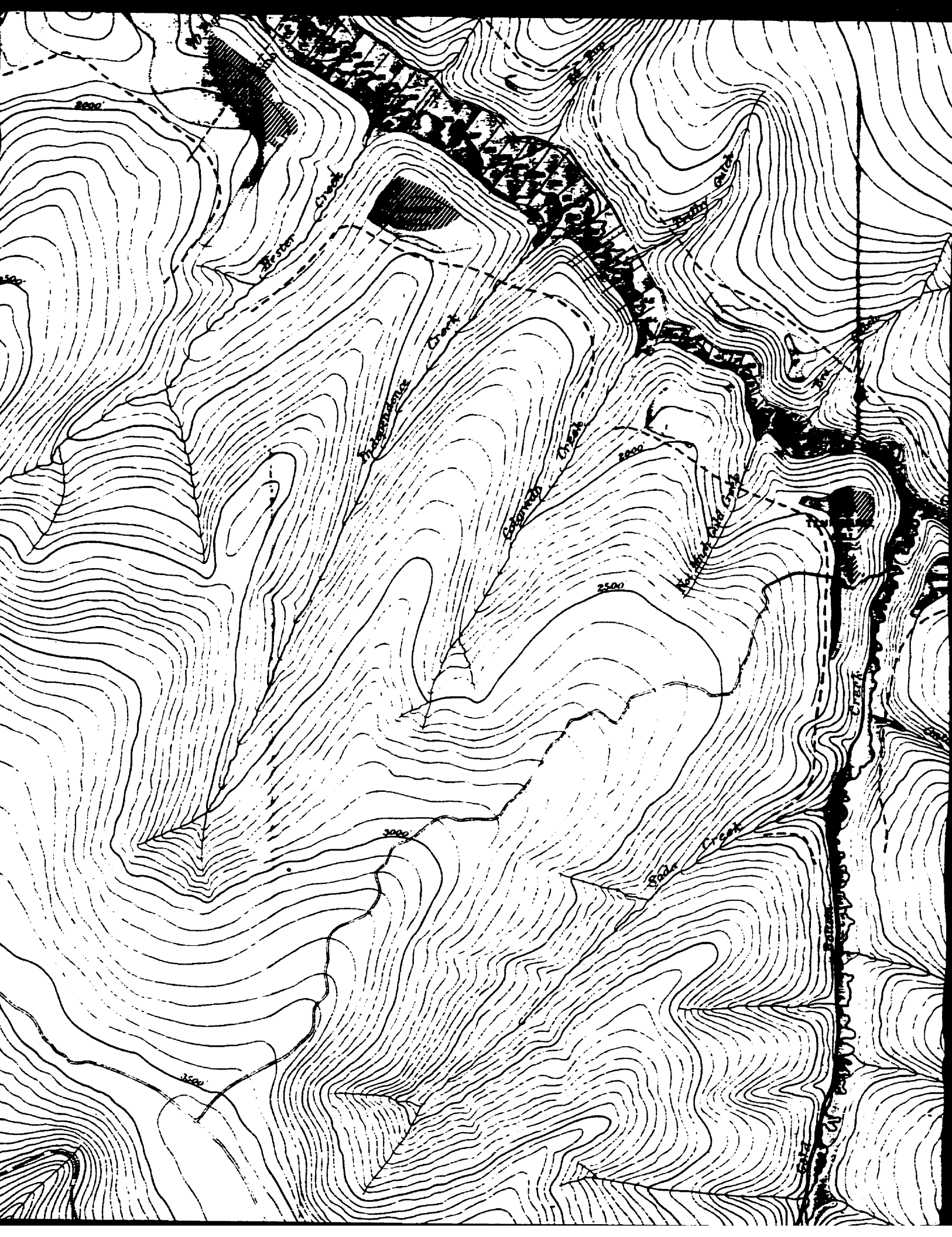
3500

3500

3000

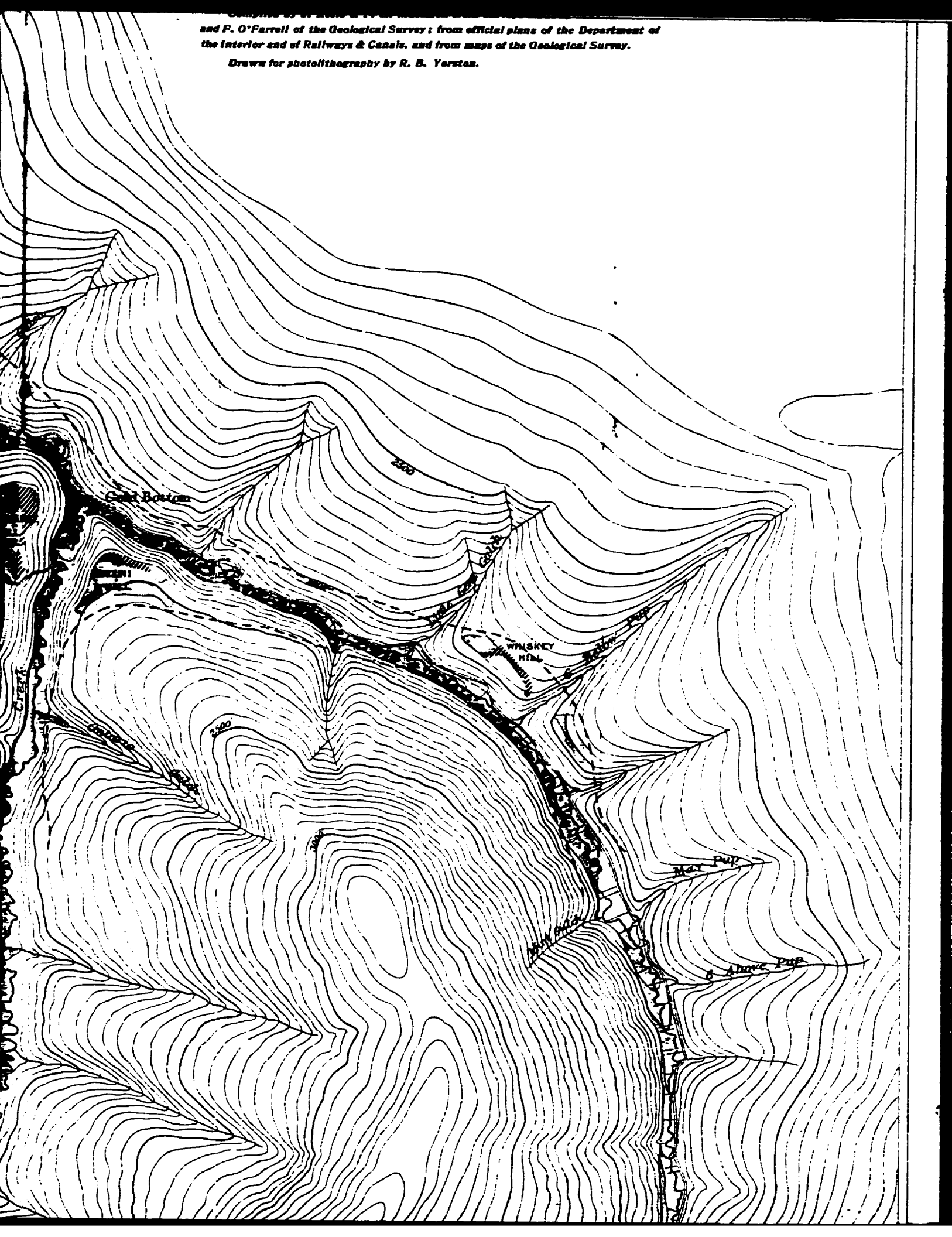
3500

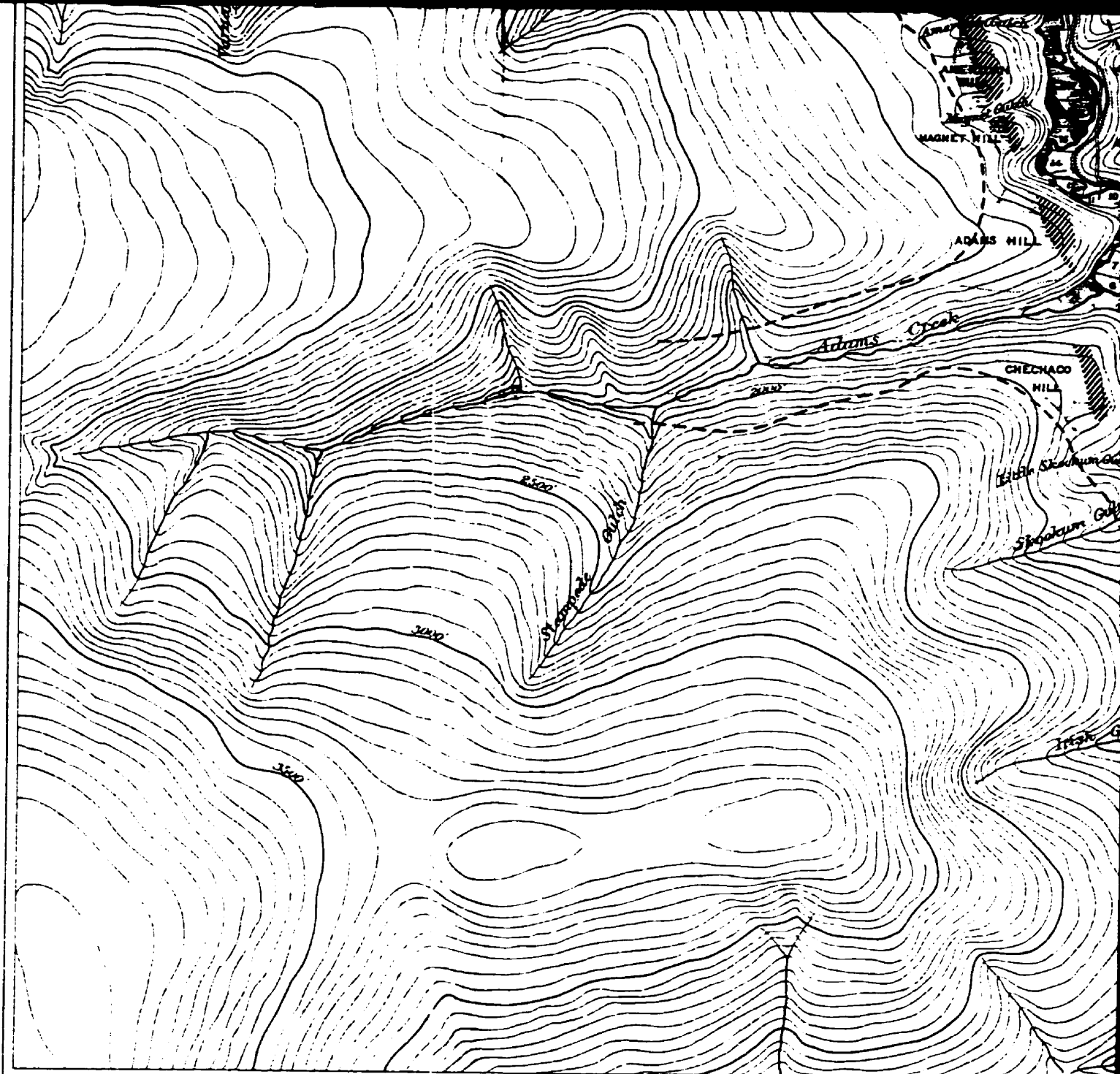
3000



Compiled by G. B. ...
and F. O'Farrell of the Geological Survey; from official plans of the Department of
the Interior and of Railways & Canals, and from maps of the Geological Survey.

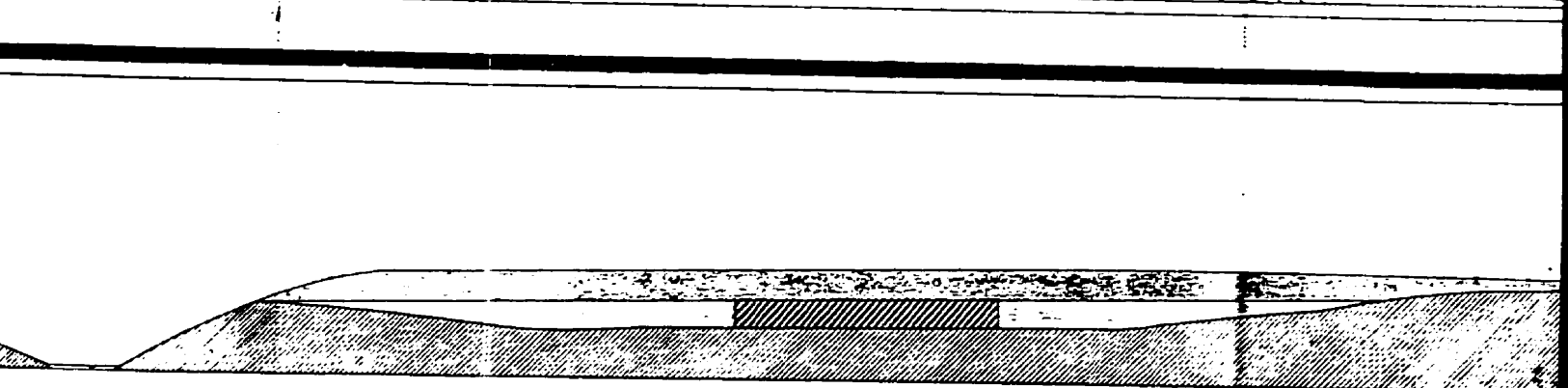
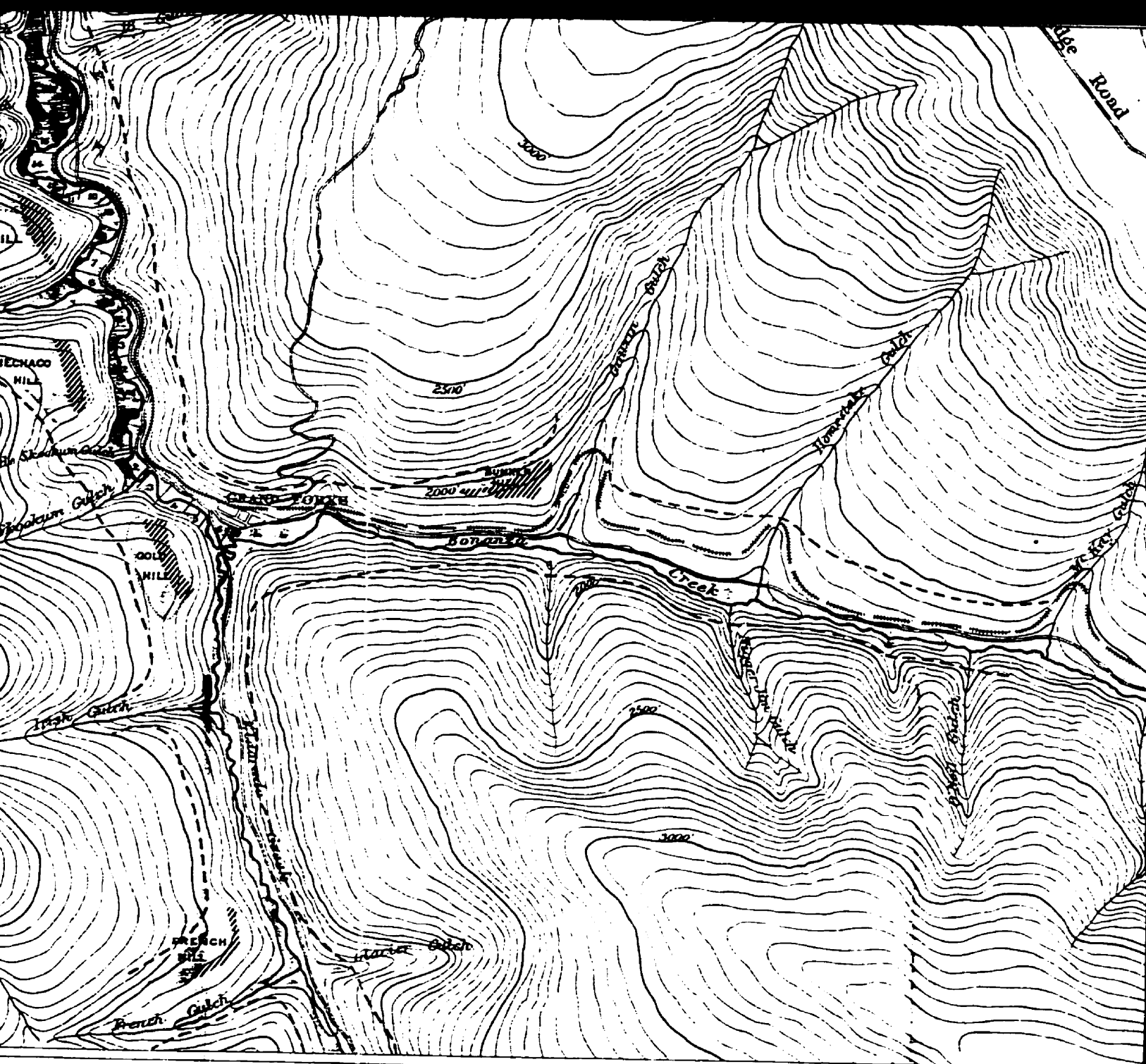
Drawn for photolithography by R. B. Yarston.





C.O. Senécal, B.A.Sc., Geographer and Chief Draughtsman.



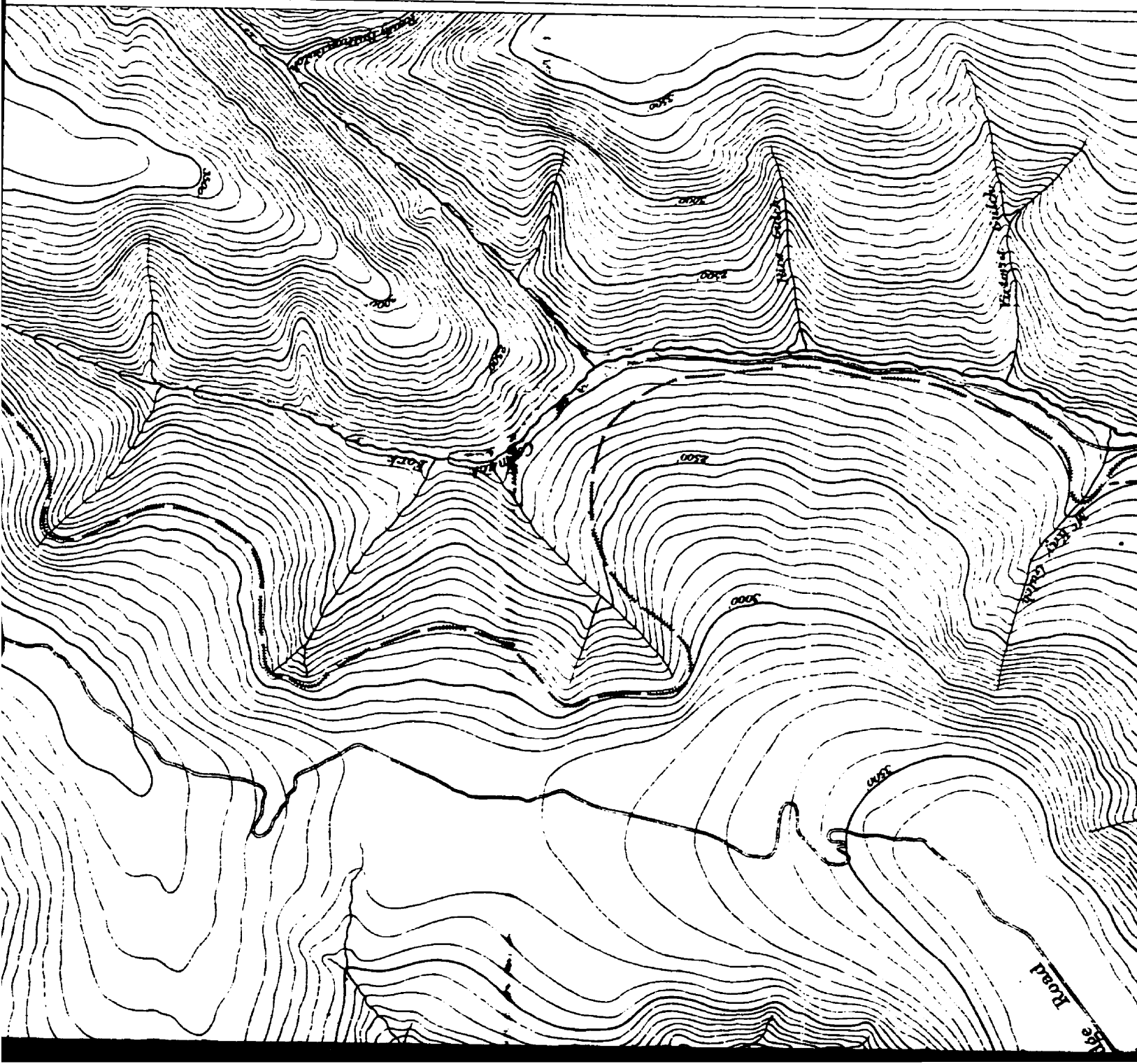
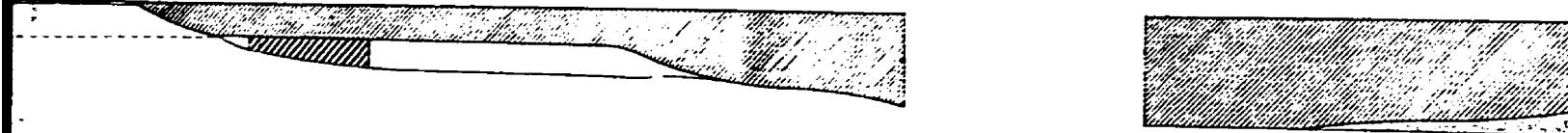


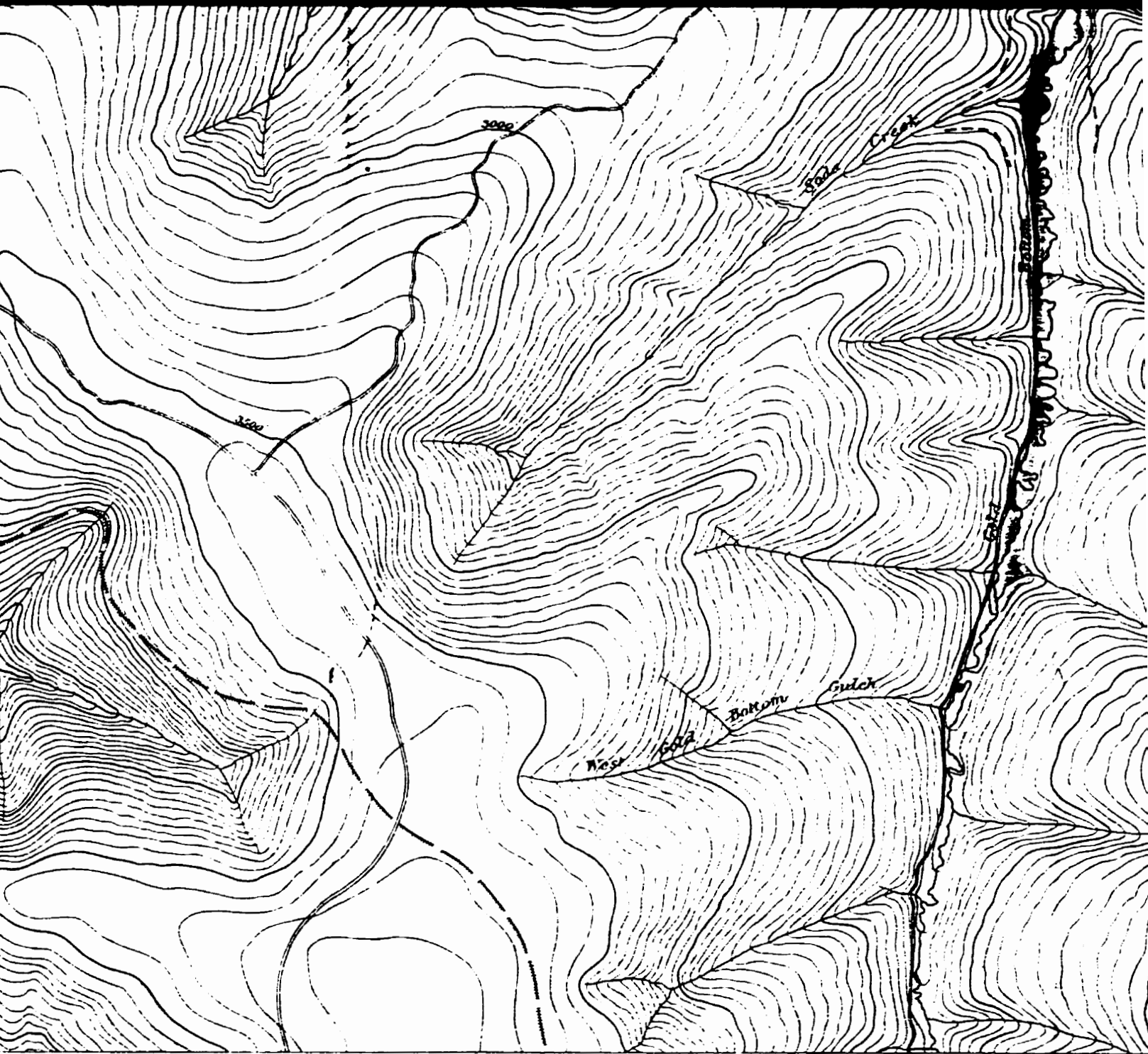
SECTION ACROSS BONANZA VALLEY AT LOVETT HILL

Scale 1000 feet to 1 inch

Scale 1000 feet to 1 inch

SECTION ACROSS BONANZA VALLEY AT KING

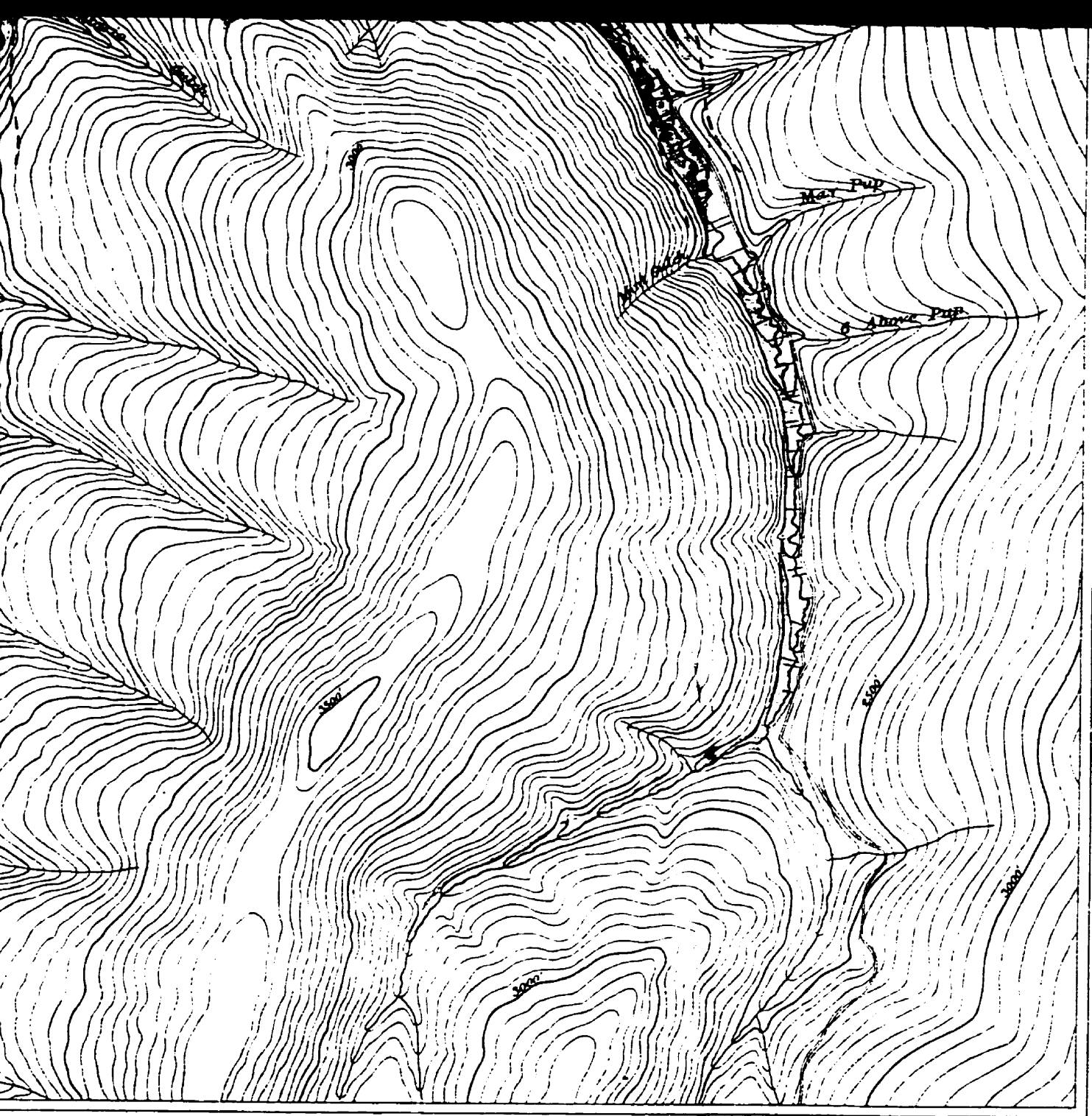




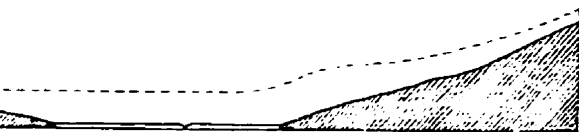
VALLEY AT KING SOLOMON HILL
 1 inch



SECTION ACROSS HUNKER VALLEY
 Scale 1000 feet to 1 inch



Nº 1011
Price 10¢



VALLEY AT PARADISE HILL

1/2 inch

APPENDIX 4

Map 5 - Northwestern Canada, 1898

See Pocket on inside back cover

NOTE TO USERS

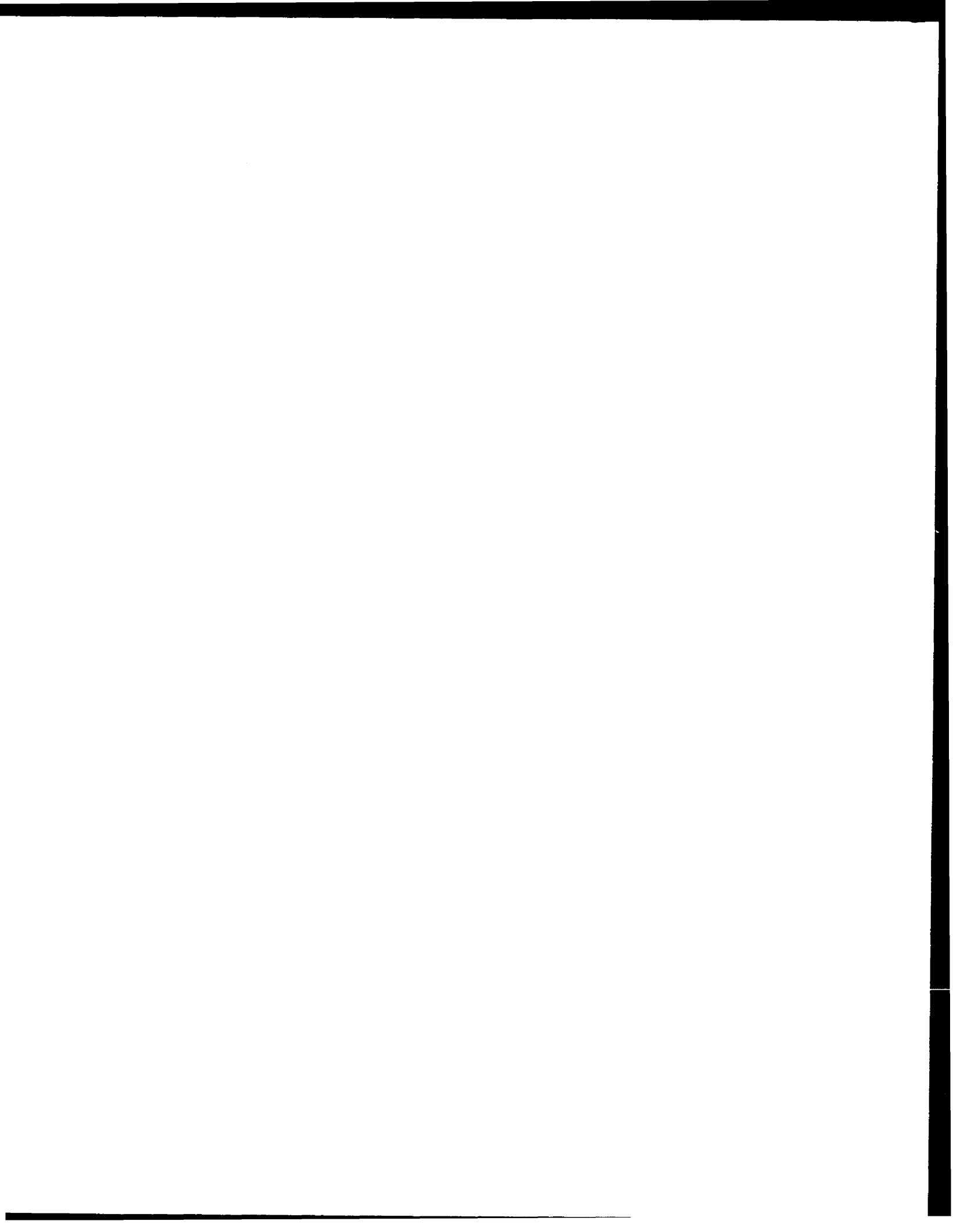
Oversize maps and charts are microfilmed in sections in the following manner:

LEFT TO RIGHT, TOP TO BOTTOM, WITH SMALL OVERLAPS

The following map or chart has been microfilmed in its entirety at the end of this manuscript (not available on microfiche). A xerographic reproduction has been provided for paper copies and is inserted into the inside of the back cover.

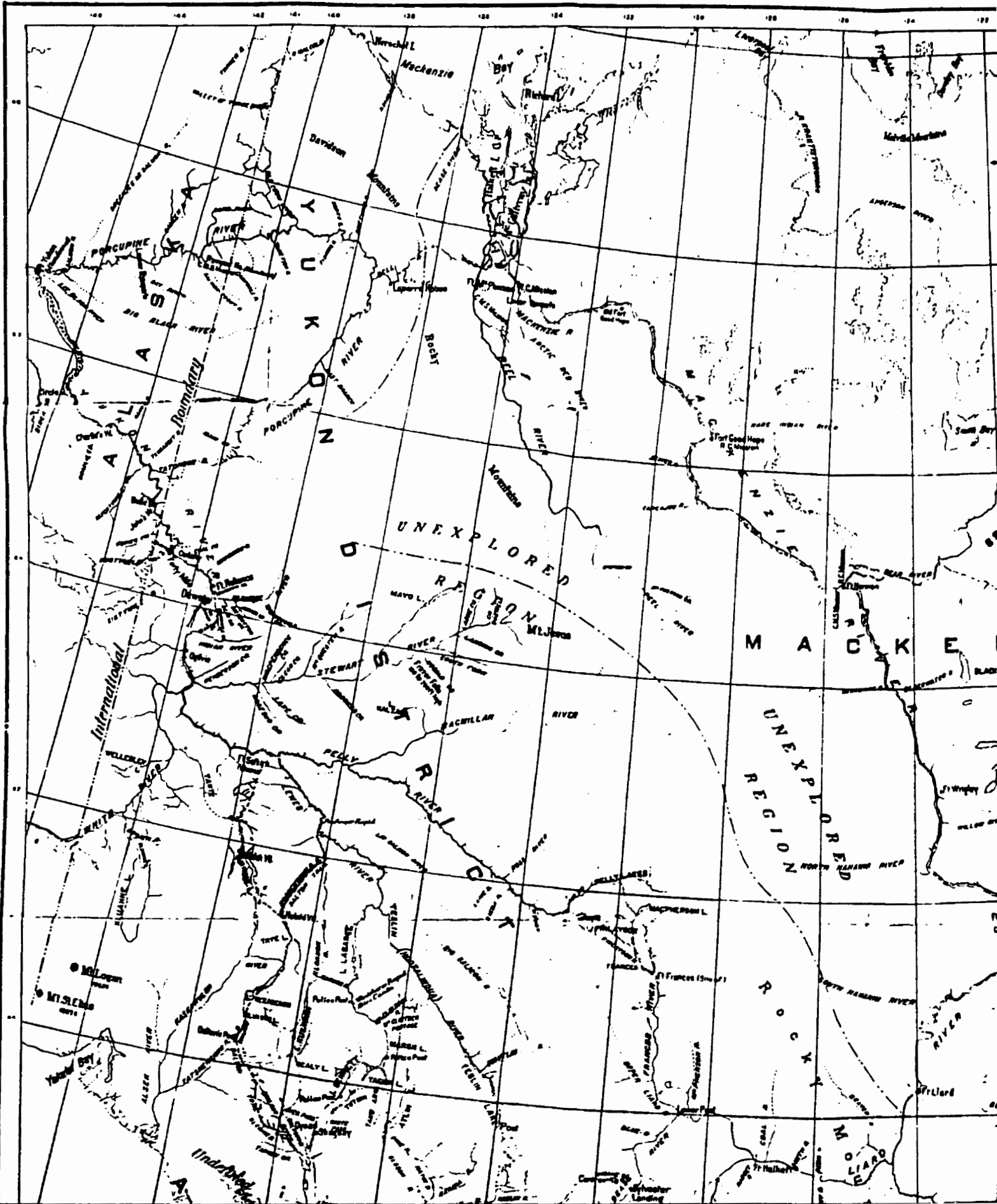
Black and white photographic prints (17"x 23") are available for an additional charge.

UMI



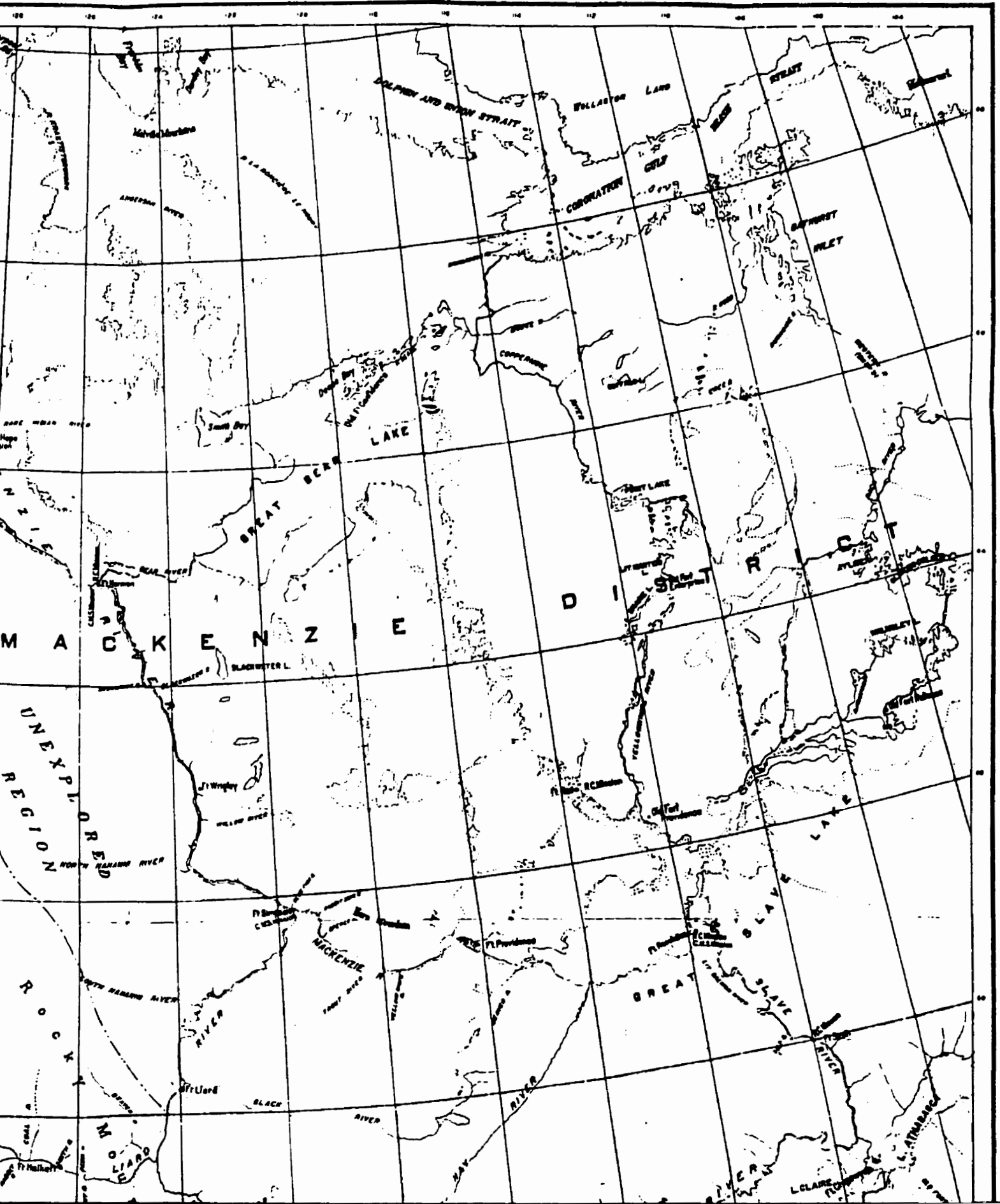
MAP OF THE NORTH-WESTERN PART OF 1

Preliminary Edition.



EASTERN PART OF THE DOMINION OF CANADA.

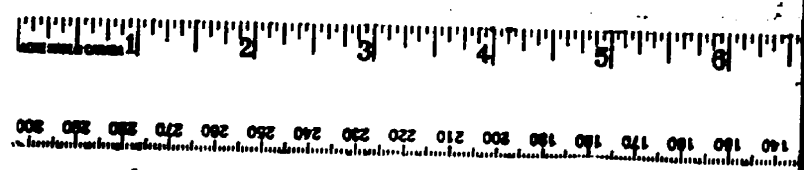
Preliminary Edition.





Copyright 1917 by the UNITED STATES GOVERNMENT

SCALE 50 MILES TO ONE INCH



APPENDIX 5

Map 6 - Yukon River to the Pelly River, 1887

See Pocket on inside back cover

NOTE TO USERS

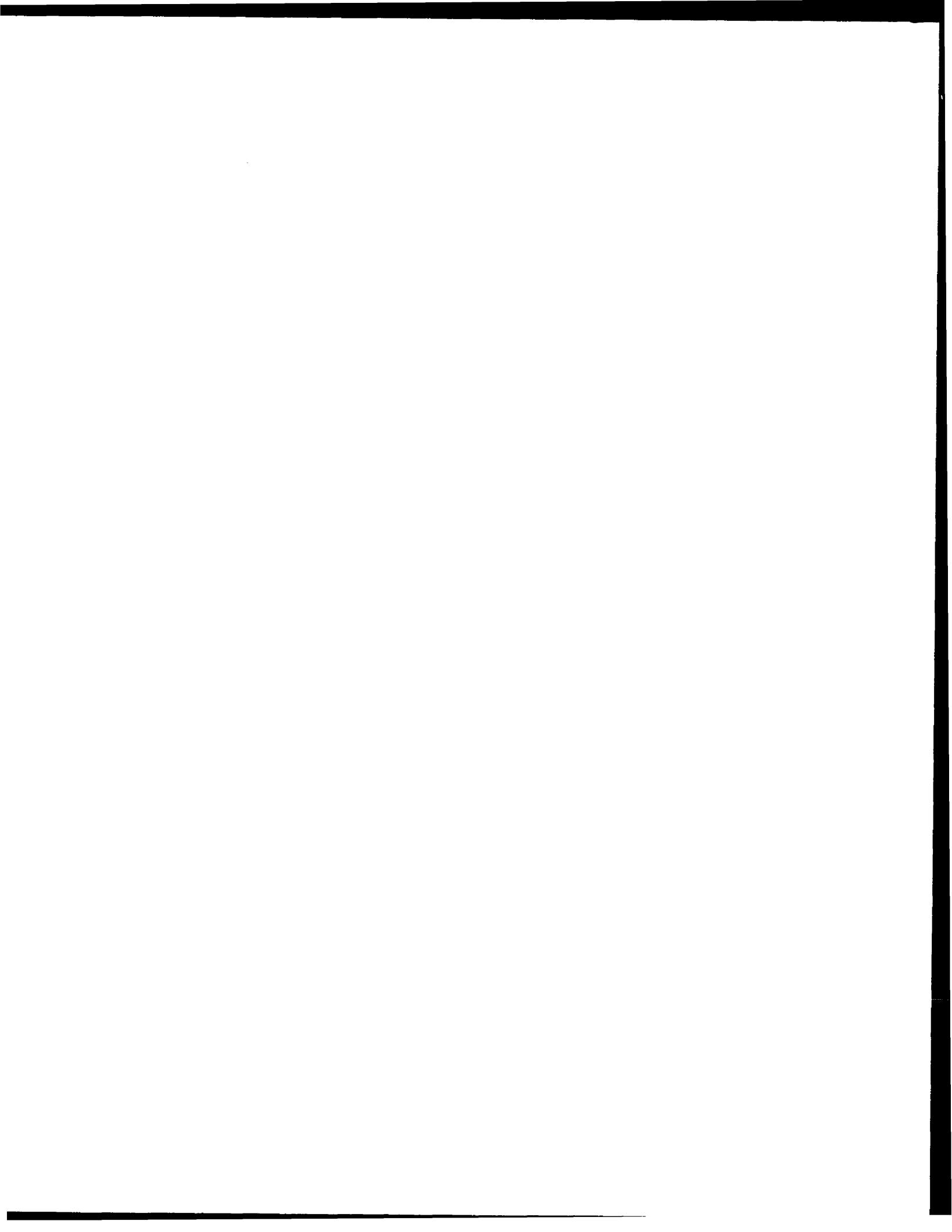
Oversize maps and charts are microfilmed in sections in the following manner:

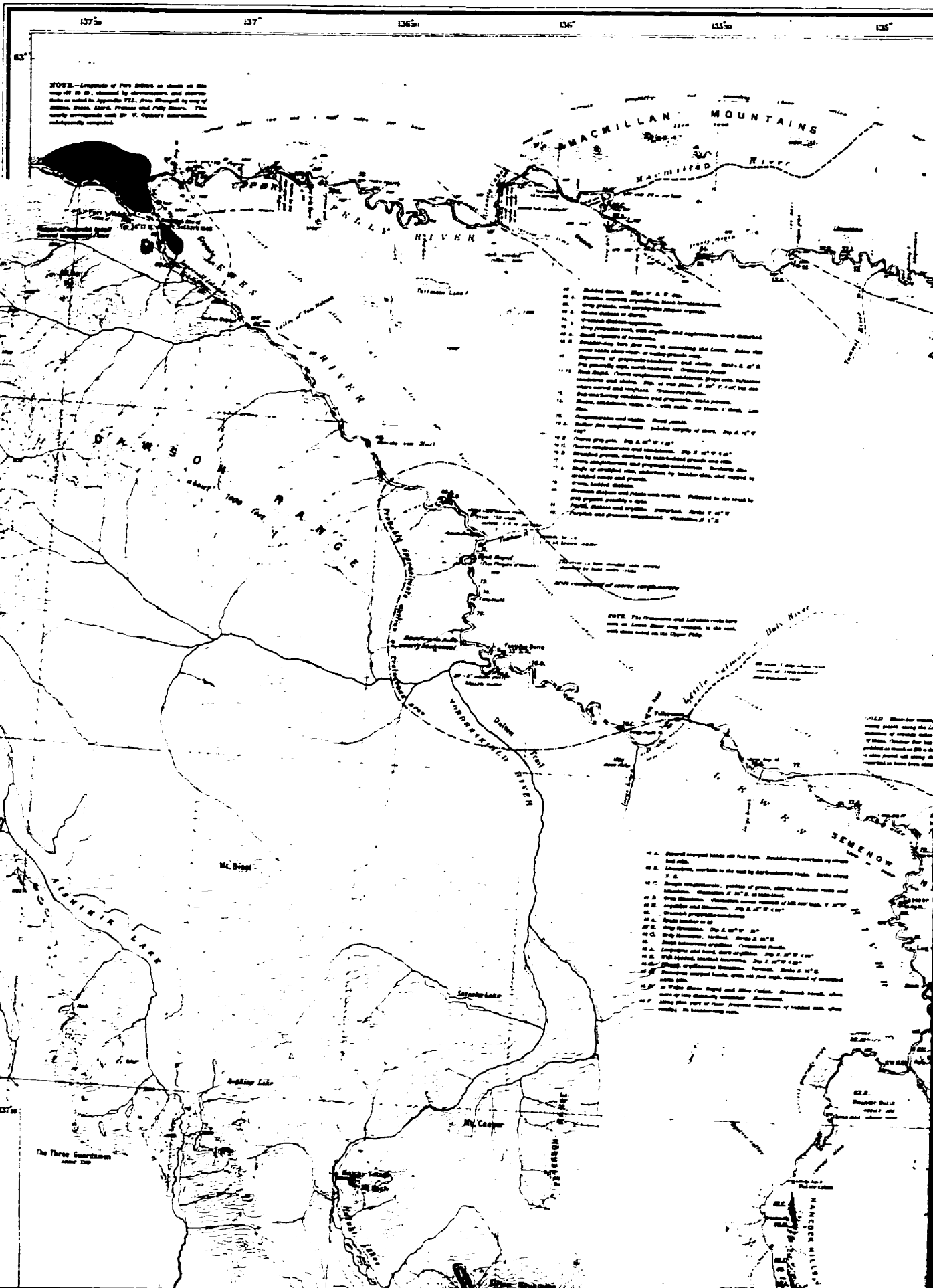
LEFT TO RIGHT, TOP TO BOTTOM, WITH SMALL OVERLAPS

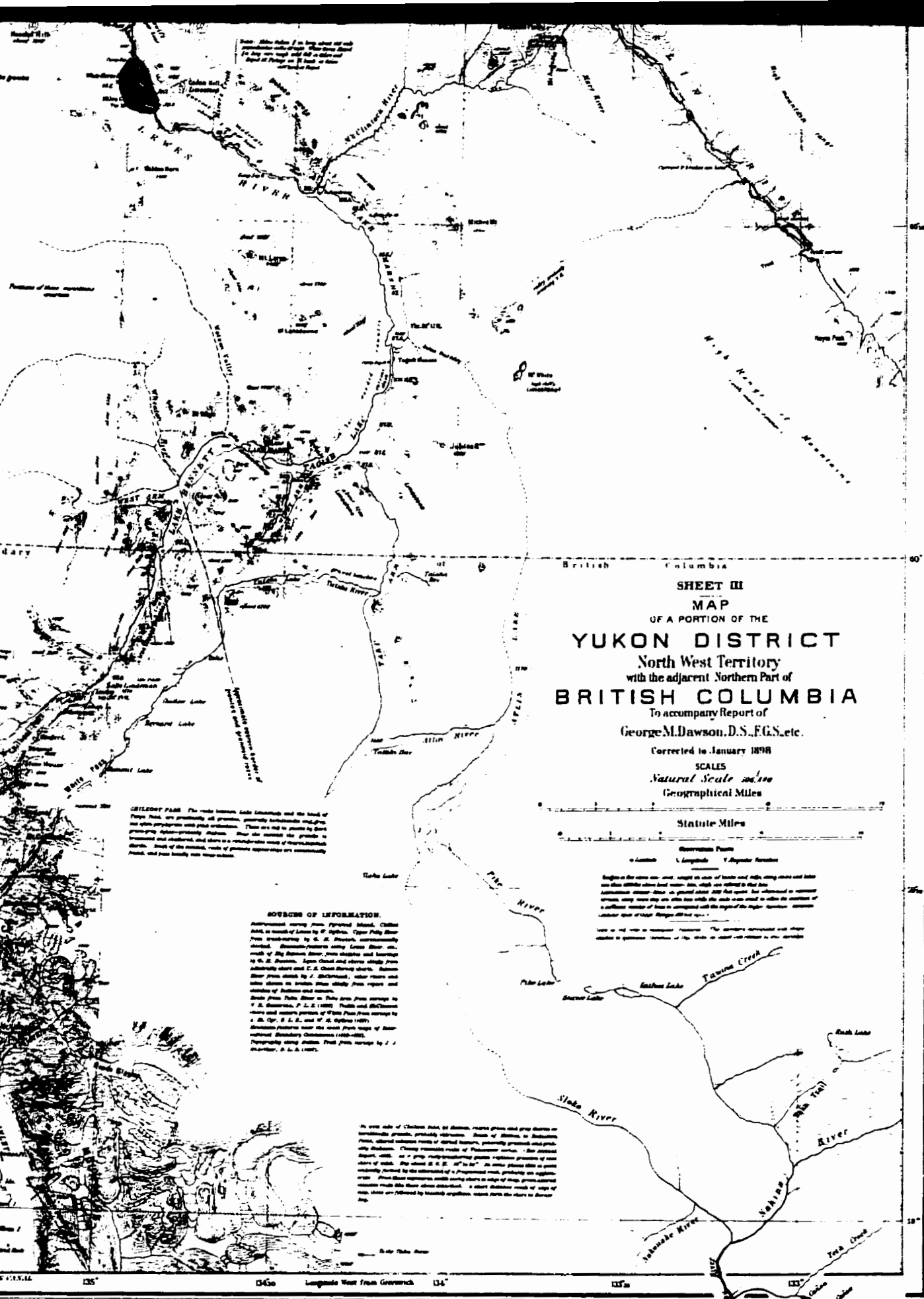
The following map or chart has been microfilmed in its entirety at the end of this manuscript (not available on microfiche). A xerographic reproduction has been provided for paper copies and is inserted into the inside of the back cover.

Black and white photographic prints (17"x 23") are available for an additional charge.

UMI







SHEET III
MAP
 OF A PORTION OF THE
YUKON DISTRICT
 North West Territory
 with the adjacent Northern Part of
BRITISH COLUMBIA
 To accompany Report of
 George M. Dawson, D.S., F.G.S., etc.
 Corrected to January 1898
 SCALES
Natural Scale 20,000
 Geographical Miles



Observation Points
 * Landmark † Longitude ‡ Boregauge Station
 Heights in this map are not correct in case of lands and hills along rivers and lakes
 and also within some low water-lands, which are related to the low
 water-lands shown here in general about 100 feet apart. An allowance is necessary
 unless they are otherwise noted with the note given above to allow the amount of
 a sufficient number of feet in accordance with the height of the higher mountains. (See
 letter to the Hon. Secy. of the Interior, 1887, p. 10.)
 Lines in red refer to mountain ranges. The numbers associated with these
 indicate the greatest elevation of the peaks in feet and meters in their respective
 orders.

GILBERTY PLAINS The wide bottom lands (Gilberty) and the head of
 Pease River, are probably all prairie, generally horizontal and gray
 and often composed of fine sand and gravel. There are no signs of
 any former glacial action. There are some fine gravelly
 terraces and alluvial, and there is a considerable mass of
 drift, but the nature, mode of glacial appearance are unrecognizable
 and from localities near the river.

SOURCES OF INFORMATION.
 Information derived from the following sources:
 1. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 2. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 3. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 4. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 5. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 6. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 7. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 8. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 9. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.
 10. Reports of Lt. Col. G. M. Dawson, D.S., F.G.S., etc.

In some parts of the Yukon District, the
 mountains are of great height and
 are of great extent. The mountains
 are of great extent and are of great
 height. The mountains are of great
 extent and are of great height. The
 mountains are of great extent and
 are of great height. The mountains
 are of great extent and are of great
 height. The mountains are of great
 extent and are of great height.

APPENDIX 6

Map 7, Various Routes to the Klondike, 1898

See Pocket on inside back cover

NOTE TO USERS

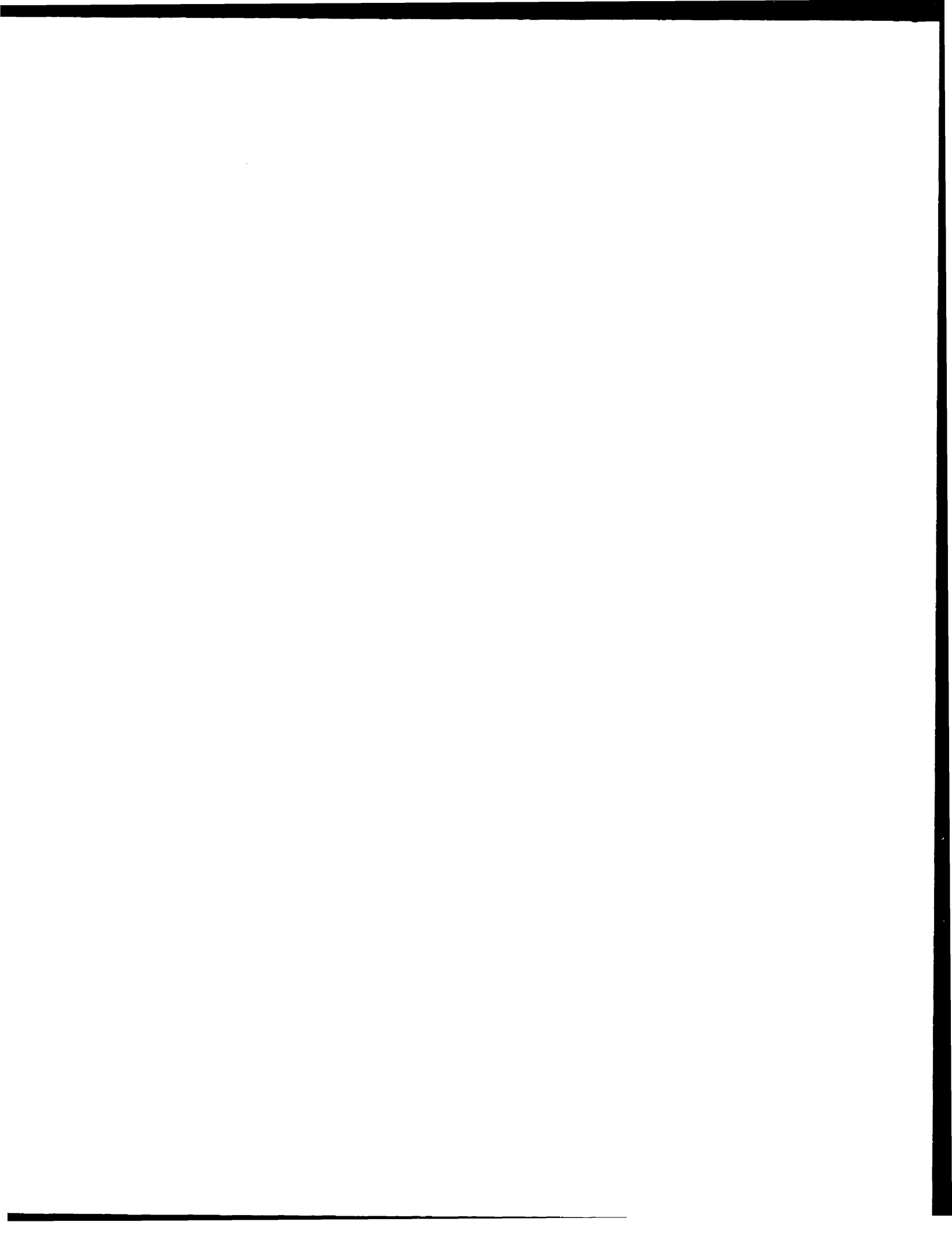
Oversize maps and charts are microfilmed in sections in the following manner:

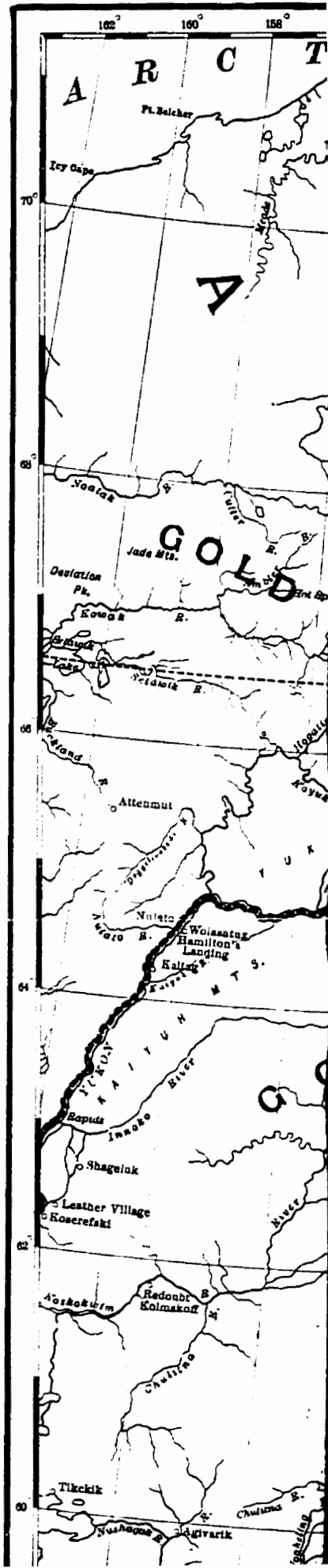
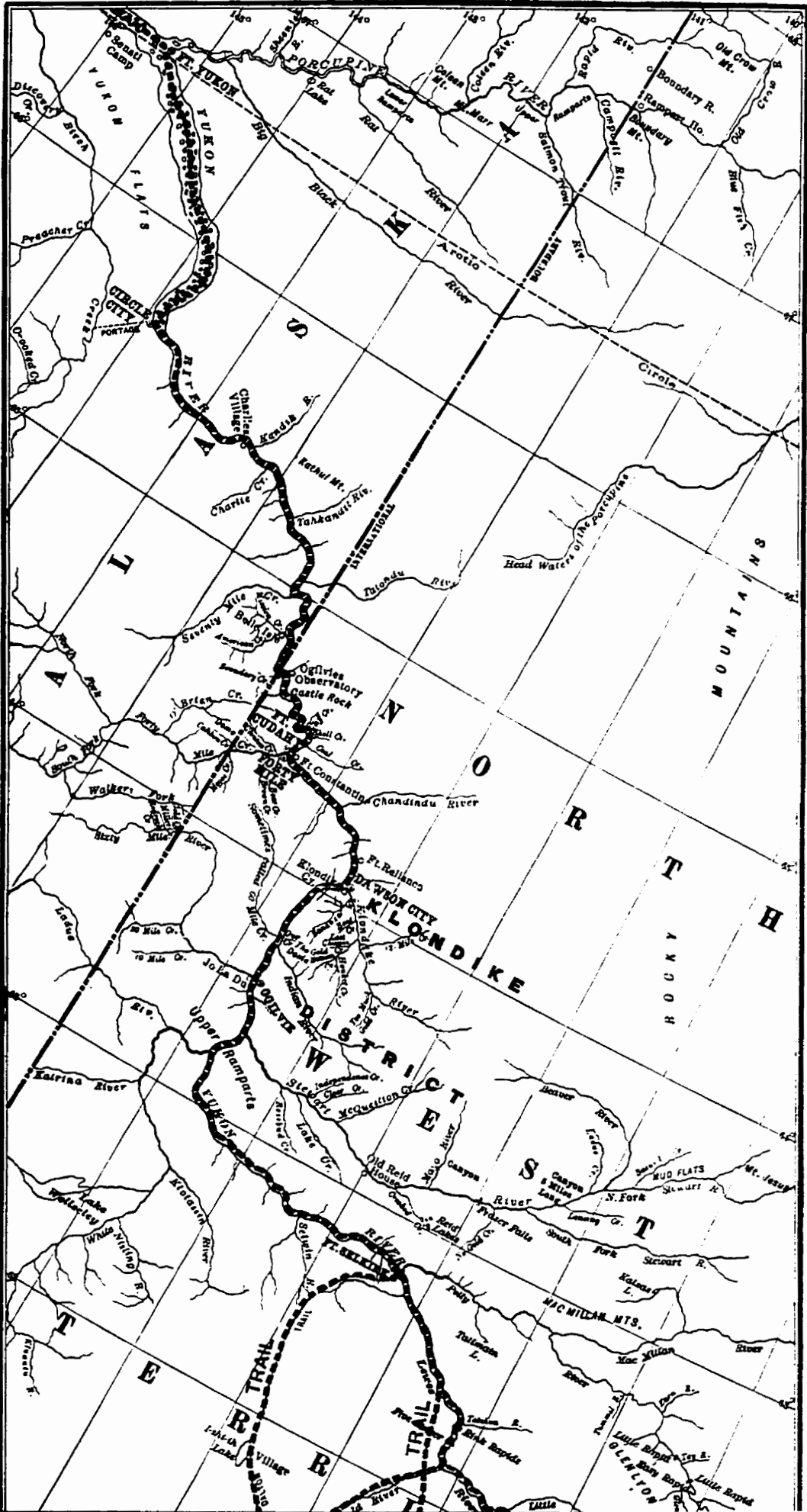
LEFT TO RIGHT, TOP TO BOTTOM, WITH SMALL OVERLAPS

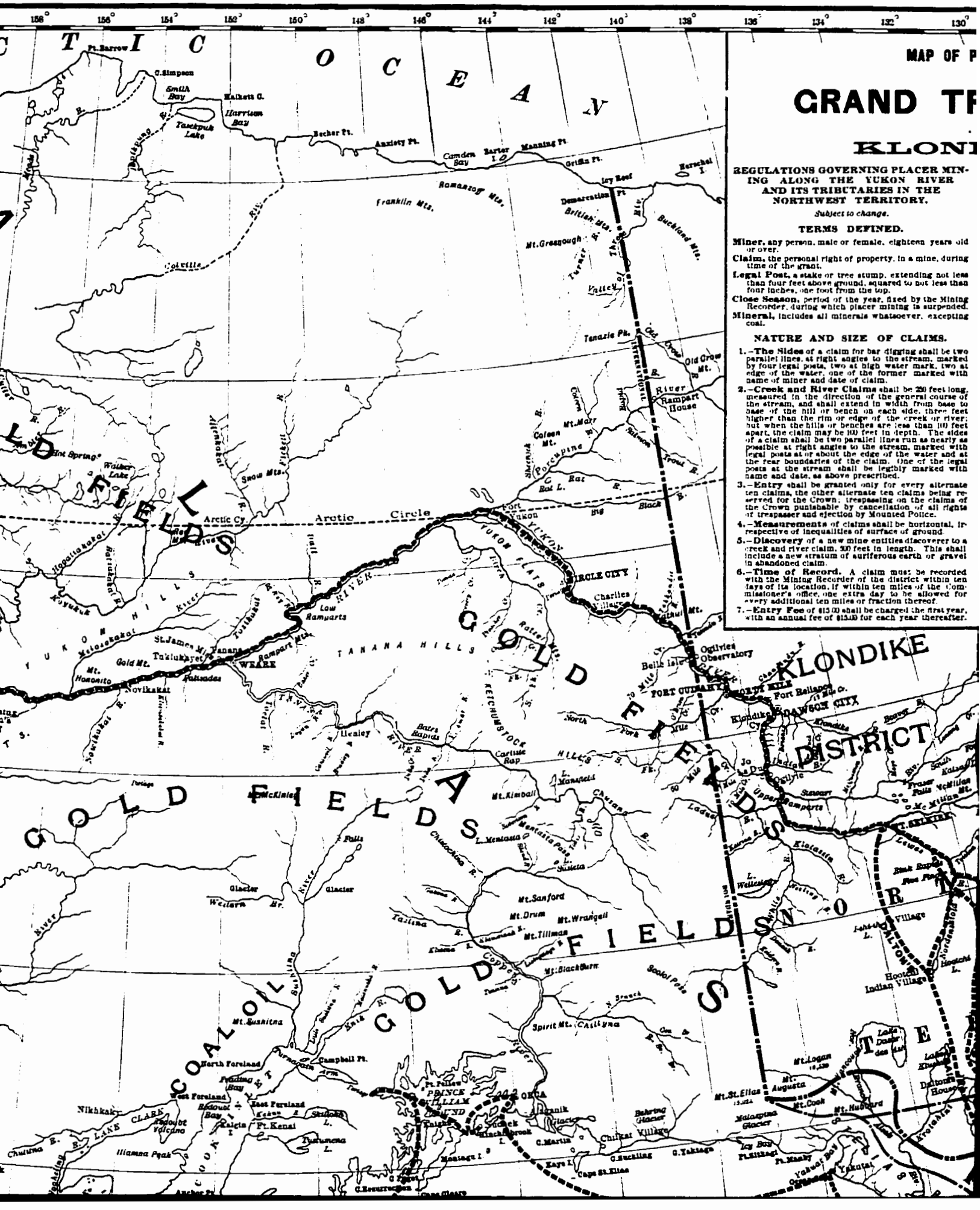
The following map or chart has been microfilmed in its entirety at the end of this manuscript (not available on microfiche). A xerographic reproduction has been provided for paper copies and is inserted into the inside of the back cover.

Black and white photographic prints (17"x 23") are available for an additional charge.

UMI







GRAND TR KLONDIKE

REGULATIONS GOVERNING PLACER MINING ALONG THE YUKON RIVER AND ITS TRIBUTARIES IN THE NORTHWEST TERRITORY.

Subject to change.
TERMS DEFINED.

- Miner**, any person, male or female, eighteen years old or over.
- Claim**, the personal right of property, in a mine, during time of the grant.
- Legal Post**, a stake or tree stump, extending not less than four feet above ground, squared to not less than four inches, one foot from the top.
- Close Season**, period of the year, fixed by the Mining Recorder, during which placer mining is suspended.
- Mineral**, includes all minerals whatsoever, excepting coal.

- NATURE AND SIZE OF CLAIMS.**
1. - The sides of a claim for bar digging shall be two parallel lines, at right angles to the stream, marked by four legal posts, two at high water mark, two at edge of the water, one of the former marked with name of miner and date of claim.
 2. - Creek and River Claims shall be 200 feet long, measured in the direction of the general course of the stream, and shall extend in width from base to base of the hill or bench on each side, three feet higher than the rim or edge of the creek or river; but when the hills or benches are less than 100 feet apart, the claim may be 100 feet in depth. The sides of a claim shall be two parallel lines run as nearly as possible at right angles to the stream, marked with legal posts at or about the edge of the water and at the rear boundaries of the claim. One of the legal posts at the stream shall be legibly marked with name and date, as above prescribed.
 3. - Entry shall be granted only for every alternate ten claims, the other alternate ten claims being reserved for the Crown; trespassing on the claims of the Crown punishable by cancellation of all rights of trespasser and ejection by Mounted Police.
 4. - Measurements of claims shall be horizontal, irrespective of inequalities of surface of ground.
 5. - Discovery of a new mine entitles discoverer to a creek and river claim, 300 feet in length. This shall include a new stratum of auriferous earth or gravel in abandoned claim.
 6. - Time of Record. A claim must be recorded with the Mining Recorder of the district within ten days of its location, if within ten miles of the Commissioner's office, one extra day to be allowed for every additional ten miles or fraction thereof.
 7. - Entry Fee of \$15.00 shall be charged the first year, with an annual fee of \$10.00 for each year thereafter.

KLONDIKE DISTRICT

Fort Yukon
Fort Reliance
Fort Selkirk
Fort Richardson
Fort Yukon
Fort Reliance
Fort Selkirk
Fort Richardson
Fort Yukon
Fort Reliance
Fort Selkirk
Fort Richardson

Yukon River
Tanana River
Klondike River
Stikine River
Pelly River
Alaska River
Copper River
Chitina River
Tanana River
Klondike River
Stikine River
Pelly River
Alaska River
Copper River
Chitina River

Goldfields
Tanana Hills
Klondike Hills
Stikine Hills
Pelly Hills
Alaska Hills
Copper Hills
Chitina Hills

Arctic Circle
60° N

158° 156° 154° 152° 150° 148° 146° 144° 142° 140° 138° 136° 134° 132° 130°

MAP OF PORTION OF CANADIAN NORTHWEST AND ALASKA.

SHOWING ROUTES OF THE GRAND TRUNK RAILWAY SYSTEM, AND ITS CONNECTIONS, TO . . . KLONDIKE GOLD FIELDS.

REGULATIONS GOVERNING PLACER MINING ALONG THE YUKON RIVER AND ITS TRIBUTARIES IN THE NORTHWEST TERRITORY.

Subject to change.

TERMS DEFINED.

Miner, any person, male or female, eighteen years old or over.

Claim, the personal right of property, in a mine, during time of the grant.

Legal Post, a stake or tree stump, extending not less than four feet above ground, secured to not less than four inches, one foot from the top.

Close Season, period of the year, fixed by the Mining Recorder, during which placer mining is suspended.

Mineral, includes all minerals whatsoever, excepting coal.

NATURE AND SIZE OF CLAIMS.

- 1.-The sides of a claim for bar digging shall be two parallel lines, at right angles to the stream, marked by four legal posts, two at high water mark, two at edge of the water, one of the former marked with name of mine and date of claim.
- 2.-Creek and River Claims shall be 200 feet long, measured in the direction of the general course of the stream, and shall extend in width from base to base of the hill or bench on each side, three feet higher than the rim or edge of the creek or river, but when the hills or benches are less than 100 feet apart, the claim may be 100 feet in depth. The sides of a claim shall be two parallel lines run as nearly as possible at right angles to the stream, marked with legal posts at or about the edge of the water and at the rear boundaries of the claim. (One of the legal posts at the stream shall be legibly marked with name and date, as above prescribed.)
- 3.-Entry shall be granted only for every alternate ten claims, the other alternate ten claims being reserved for the Crown; trespassing on the claims of the Crown punishable by cancellation of all rights of trespasser and ejection by Mounted Police.
- 4.-Measurements of claims shall be horizontal, irrespective of inequalities of surface of ground.
- 5.-Discovery of a new mine entitles discoverer to a creek and river claim, 200 feet in length. This shall include a new stratum of auriferous earth or gravel in abandoned claim.
- 6.-Time of Record. A claim must be recorded with the Mining Recorder of the district within ten days of its location, if within ten miles of the Commissioner's office, or six days if it is allowed for every additional ten miles or fraction thereof.
- 7.-Entry Fee of \$15.00 shall be charged the first year, with an annual fee of \$15.00 for each year thereafter.

8.-A Royalty of ten per cent. shall be levied and collected on gold mined, on the gross output of each claim. The sum of \$25.00 shall be deducted from the gross annual output of a claim (when estimating the amount upon which the royalty is to be calculated) if paid at a banking office, to the Gold Commissioner or Mining Recorder. Default of payment constituted after ten days' notice, or fraud by withholding any part of royalty, punishable by cancellation of the claim.

9.-Renewal of Entry is required annually, with return of receipt and replacing of receipt.

10.-One Grant Only shall be given a miner in one locality, but he may hold any number of claims by purchase; and any number of miners may unite to work their claims; they must register their agreement with the Commissioner, and pay \$3.00 registry fee.

11.-Exclusive Right. Every miner shall have exclusive right to work his claim, or build residence thereon, and to all proceeds therefrom. Holders of adjacent claims may be granted such right of entry as necessary for the working of their claims. The Commissioner may also grant permits to miners to cut timber, as prescribed by regulations.

12.-Water Rights. Every miner is entitled to so much of the water, flowing past his claim, as is necessary for working the same, not already lawfully appropriated, and is allowed to drain his own claim free of charge.

13.-Abandonment. A claim unworked for three consecutive years by the owner or person on his behalf, is deemed abandoned, unless sickness or leave of absence, given by the Commissioner, is shown to be the cause. On satisfactory evidence, the Commissioner may cancel the entry and declare the claim abandoned.

14.-Miners' Certificates, entitling the holder to all rights and privileges of a free miner for one year under any mining regulations of the Government of Canada, will be issued to applicants on payment of a fee of \$10.00, and can be had from the Collector of Customs at Montreal, Que., Toronto, Ont., and Victoria, B. C.; Department of Interior, Ottawa, Ont., and the Government Agents at Dawson City, in the Yukon District.

UNITED STATES PLACER MINING LAWS.

(Prepared from the Revised Statutes of the United States.)
Subject to change.

The term "placer claim," as defined by the supreme court of the United States, is: "Ground within defined boundaries which contains mineral in its earth, sand or gravel; ground that includes valuable deposits, not in veins, and not fixed in rock, but which are in loose state, and may in most cases be collected by washing or amalgamation without milling."

The manner of locating placer mining claims differs from that of locating claims upon veins or lodes. In locating a vein or lode claim, the United States statutes provide that no claim shall extend more than twenty-five feet on each side of the middle of the vein at the surface, or 100 feet along the vein, and that no claim shall be limited by mining regulations to less than twenty-five feet on each side of the middle of the vein at the surface. In locating claims called "placer," however, the law provides that no location of such claim upon surveyed lands shall include more than twenty acres for each individual claimant. The supreme court, however, has held that one individual can locate as many locations as he can purchase and rely upon his possessory title; that a separate patent for each location is unnecessary. It is never, however, to show proof of citizenship or intention to become citizens. This may be done in the

case of an individual by his own affidavit; in case of an association incorporated by a number of individuals, by the affidavit of their authorized agent, made on his own knowledge or upon information and belief; and in the case of a company organized under the laws of any state or territory, by the filing of a certified copy of the charter or certificate of incorporation.

A patent for any land claimed and located may be obtained in the following manner: "Any person, association or corporation authorized to locate a claim, having claimed and located a piece of land, and who has or has complied with the terms of the law, may file in the proper land office an application for a patent under oath, showing such compliance, together with a plat and field notes of the claim or claims in common made by or under the direction of the United States surveyor general, showing accurately the boundaries of the claim or claims which shall be distinctly marked by monuments on the ground, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat, previous to the application for a patent; and shall file an affidavit of at least two persons that such notice has been duly posted, and shall file a copy of the notice in such land office; and shall thereupon be entitled to a patent to the land in the manner following: The registrar of such land office, upon the filing of such application, plat, field notes, notices and affidavits, shall publish a notice that such application has been made, for a period of sixty days, in a newspaper to be by him designated, as published nearest to such claim; and he shall post such notice in his office for the same period. The claimant at the time of filing such application, or at any time thereafter, within sixty days of publication, shall file with the registrar a certificate of the United States surveyor general that 800 worth of labor has been expended or improvements made upon the claim by himself or grantor; that the plat is correct, with such further description by reference to natural objects or permanent monuments as shall identify the claim and furnish an accurate description to be incorporated in the patent. At the expiration of the sixty days of publication, the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication.

If no adverse claim shall have been filed with the registrar of the land office at the expiration of said sixty days, the claimant is entitled to a patent upon the payment to the proper officer of \$5 per acre in the case of a lode claim, and \$2.50 per acre for a placer.

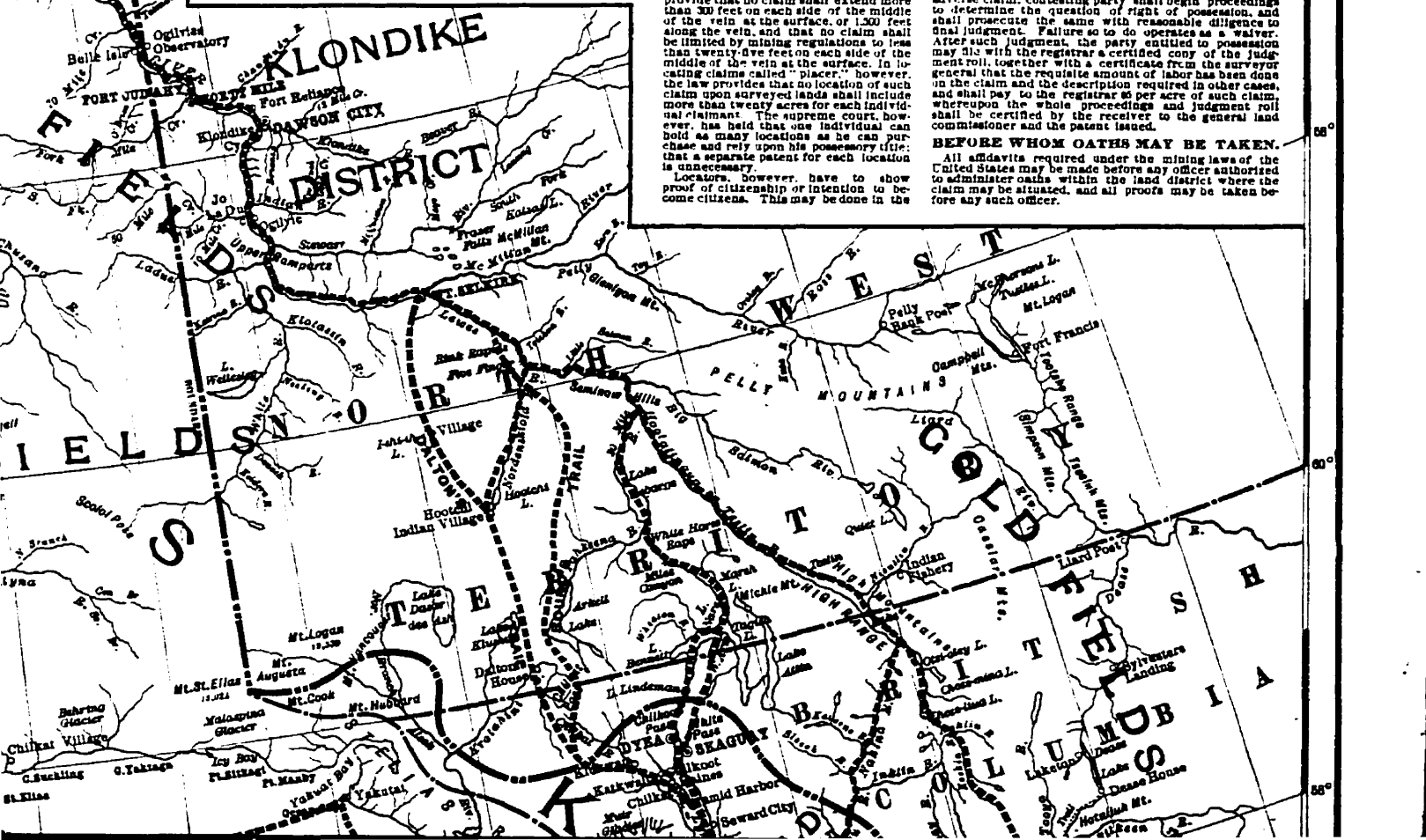
The location of a placer claim and keeping possession thereof until a patent shall be issued are subject to local laws and customs.

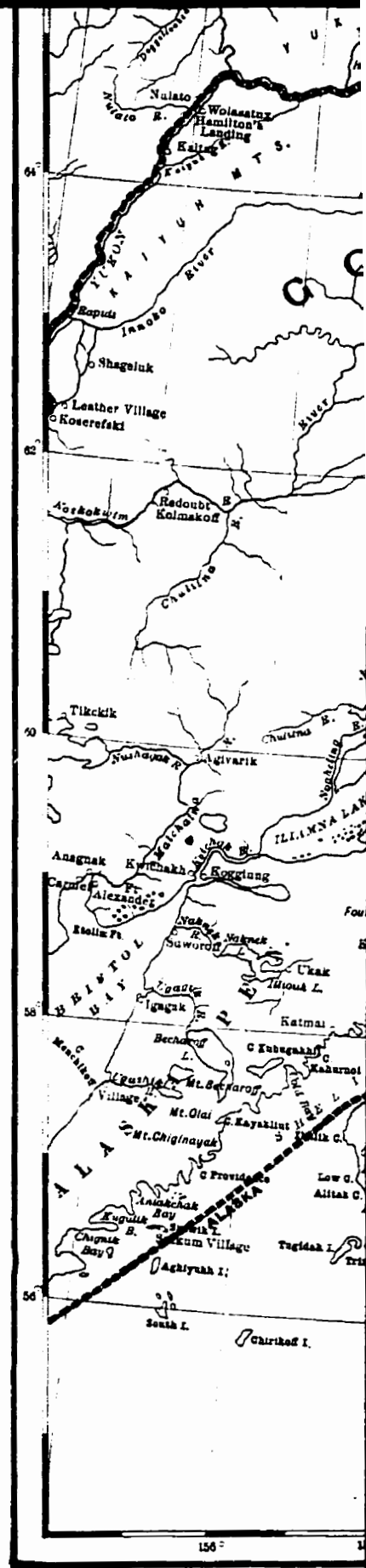
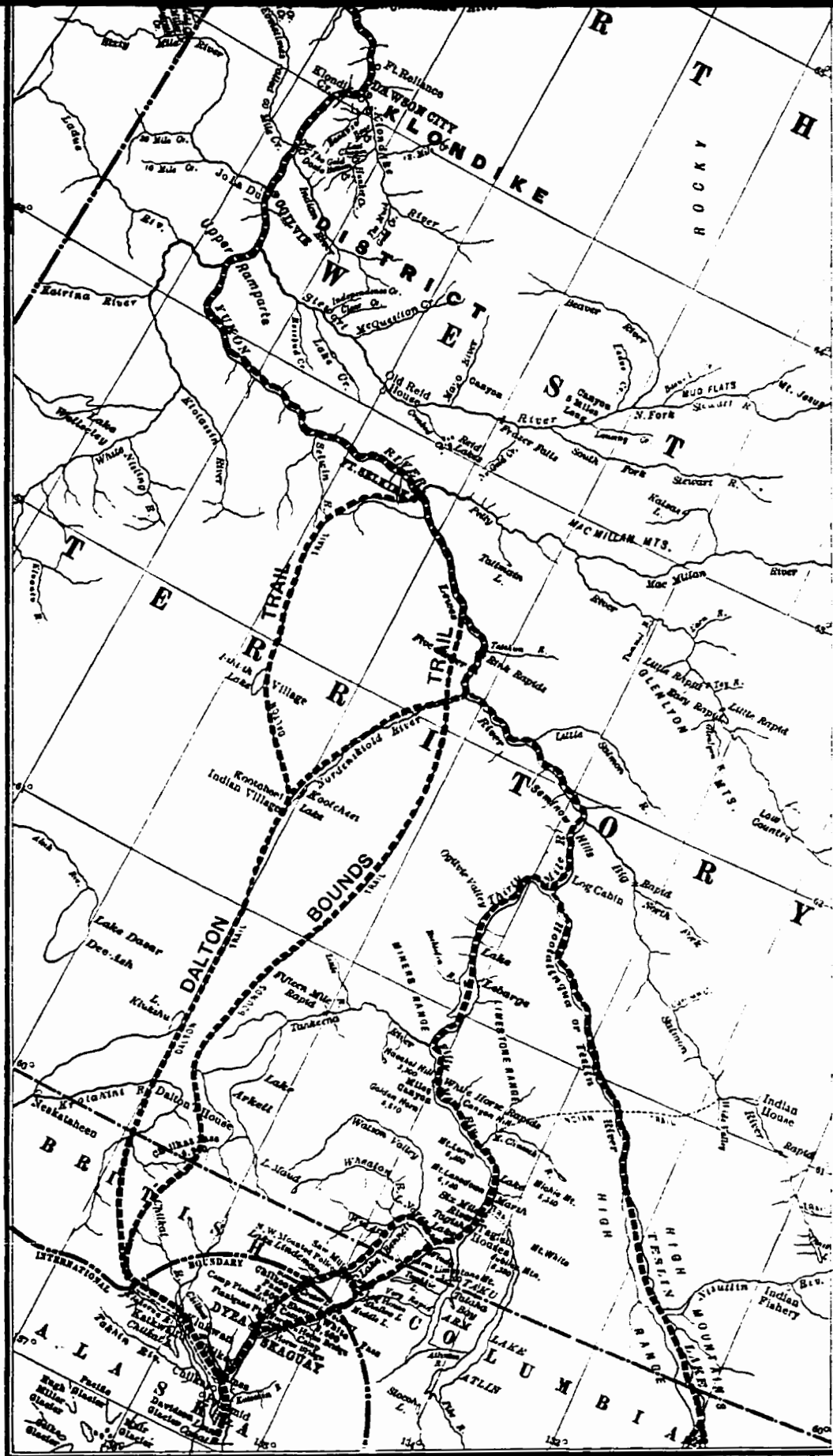
HOW TO MAKE AN ADVERSE CLAIM.

When an adverse claim is made during the sixty day period of publication, it must be under oath of the person or persons making the same, and shall show the nature, boundaries and extent of such adverse claim; and all proceedings, except publication of notice and filing affidavits thereon, are stayed until the controversy is settled by a court of competent jurisdiction or the adverse claim is waived. Within thirty days after filing adverse claim, contesting party shall begin proceedings to determine the question of right of possession, and shall prosecute the same with reasonable diligence to final judgment. Failure so to do operates as a waiver. After such judgment, the party entitled to possession may file with the registrar a certified copy of the judgment roll, together with a certificate from the surveyor general that the requisite amount of labor has been done in the claim and the description required in other cases, and shall pay to the registrar the fee for each claim whereupon the whole proceedings and judgment roll shall be certified by the receiver to the general land commissioner and the patent issued.

BEFORE WHOM OATHS MAY BE TAKEN.

All affidavits required under the mining laws of the United States may be made before any officer authorized to administer oaths within the land district where the claim may be situated, and all proofs may be taken before any such officer.

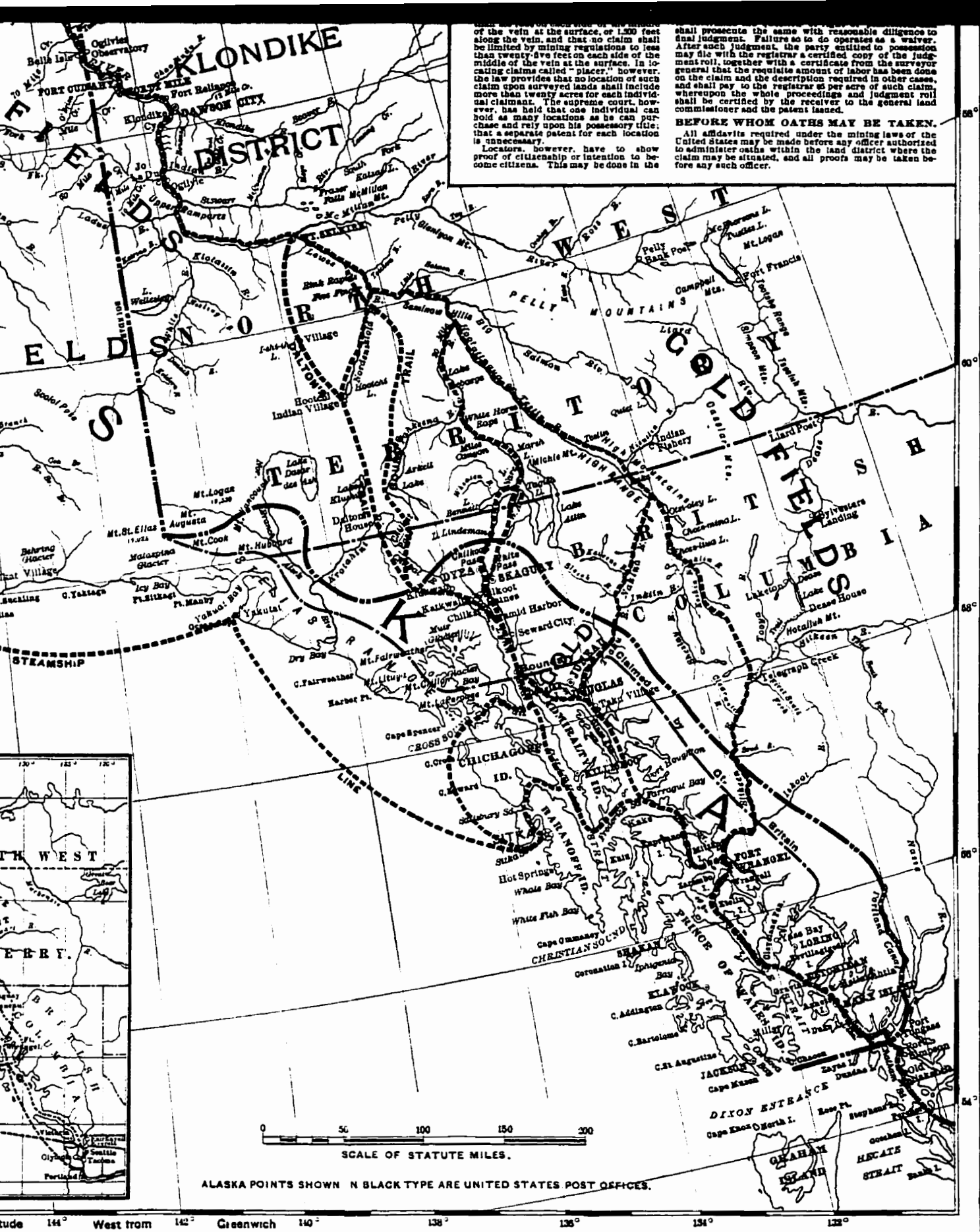




This map appeared as a supplement to the Railway and Shipping World, Toronto, 1898, col., 44.3 x 58.0 cm. Reproduced from an original in the Map Library, University of Western Ontario. This edition limited to 500 copies. Copy No. 376



ASSOCIATION OF CANADIAN MAP LIBRARIES
 ASSOCIATION DES CARTOTHEQUES CANADIENNES



shall be made on the surface of the vein or of the surface of the vein at the surface of 120 feet along the vein, and that no claim shall be limited by mining regulations to less than twenty-five feet on each side of the middle of the vein at the surface; in locating claims called "placer," however, the law provides that no location of such claim upon surveyed lands shall include more than twenty acres for each individual claimant. The supreme court, however, has held that one individual can hold as many locations as he can purchase and rely upon his possessory title; that a separate patent for each location is unnecessary. Locators, however, have to show proof of citizenship or intention to become citizens. This may be done in the

shall prosecute the same with reasonable diligence to final judgment. Failure so to do operates as a waiver. After such judgment, the party entitled to possession may file with the registrar a certified copy of the judgment roll, together with a certificate from the surveyor general that the requisite amount of labor has been done on the claim and the description required in other cases, and shall pay to the registrar \$5 per acre of such claim, whereupon the whole proceedings and judgment roll shall be certified by the receiver to the general land commissioner and the patent issued.

Cette carte apparut comme un supplément de Railway and Shipping World, Toronto, 1898, coul., 44.3 x 58.0 cm. Reproduite à partir d'un original de la Map Library, University of Western Ontario. Edition numérotée de 1 à 500. Exemplaire No. 376

APPENDIX 7

Ten Aerial Photographs of the Klondike River, 1990

See Pocket on inside back cover

5-1-12143



AZ169-71



10000

42157



GEOGRAPHIC AIR SURVEY LTD
10000



1

AZ1140.73



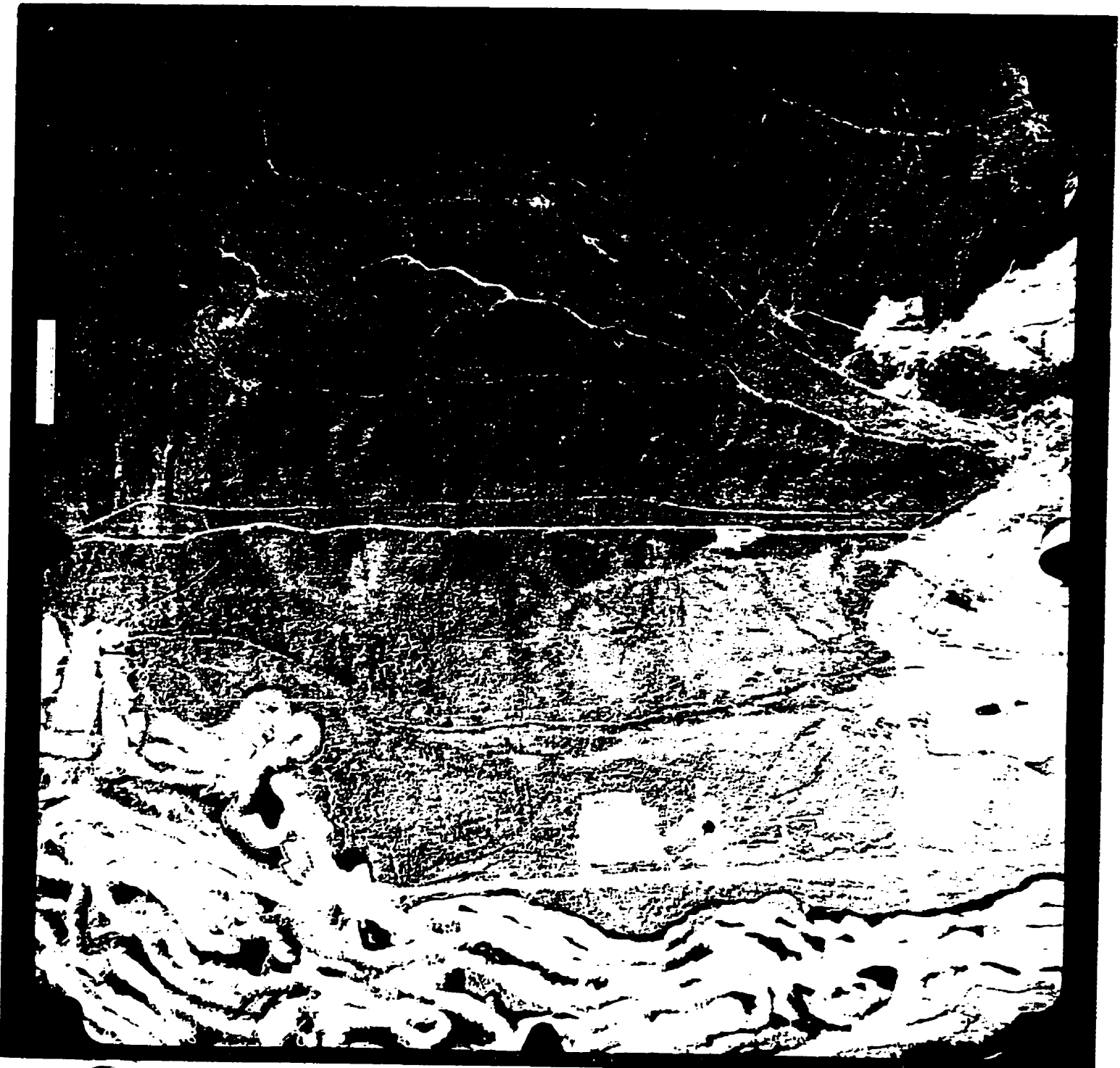
GEOGRAPHIC AIR SURVEY LTD
1 AIRPORT ROAD, MANDALAY, NEPEEN, ONTARIO, CANADA M7R 1A1



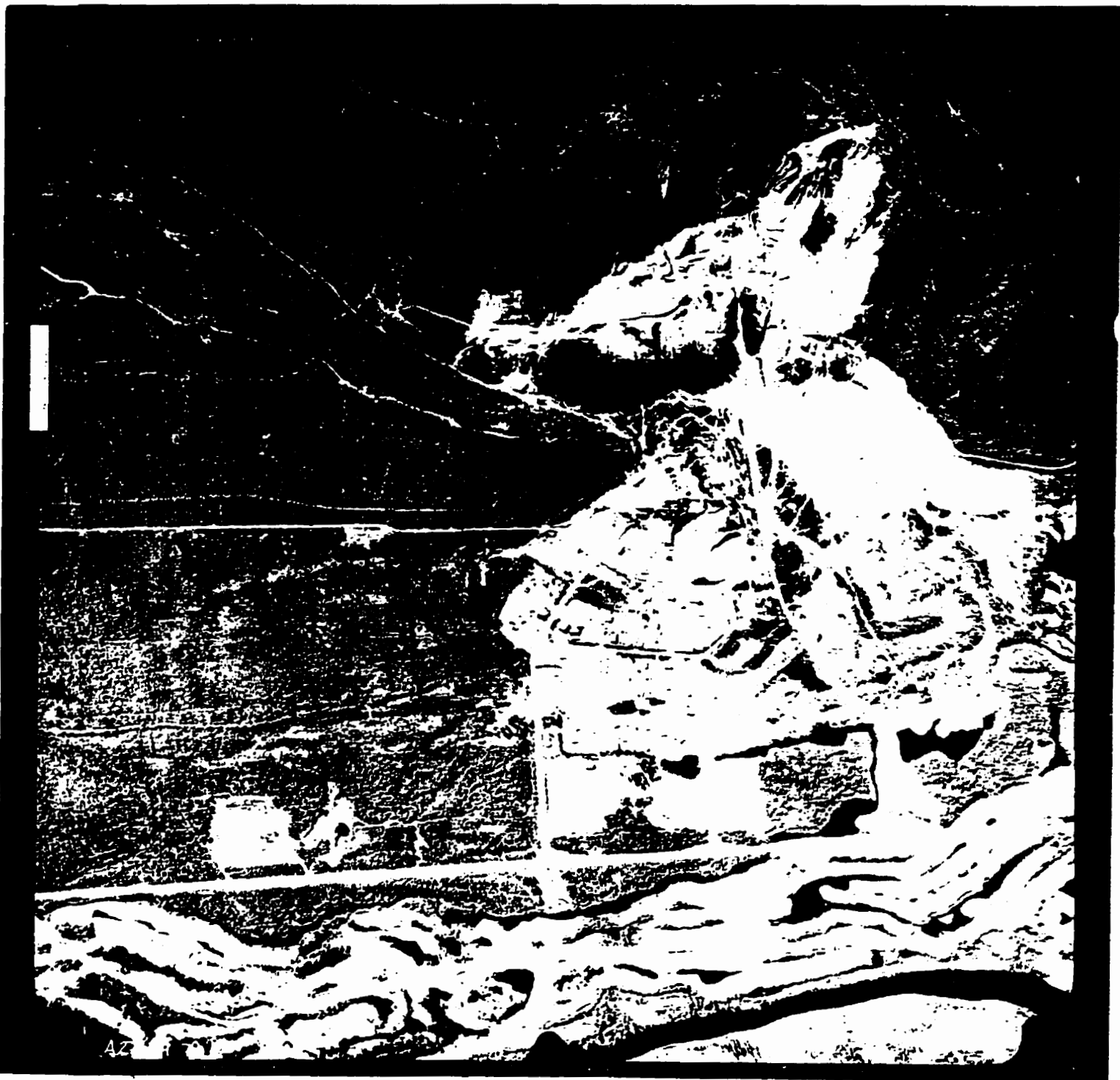
AZ 10 15



GEOGRAPHIC AIR SURVEY LTD.
1000 BROADWAY, MONTREAL, QUEBEC, CANADA H3C 2K1



GEOGRAPHIC AIR SURVEY LTD.
1000 WEST 100th STREET, CALGARY, ALBERTA, T2C 0B8, CANADA



100

AZ

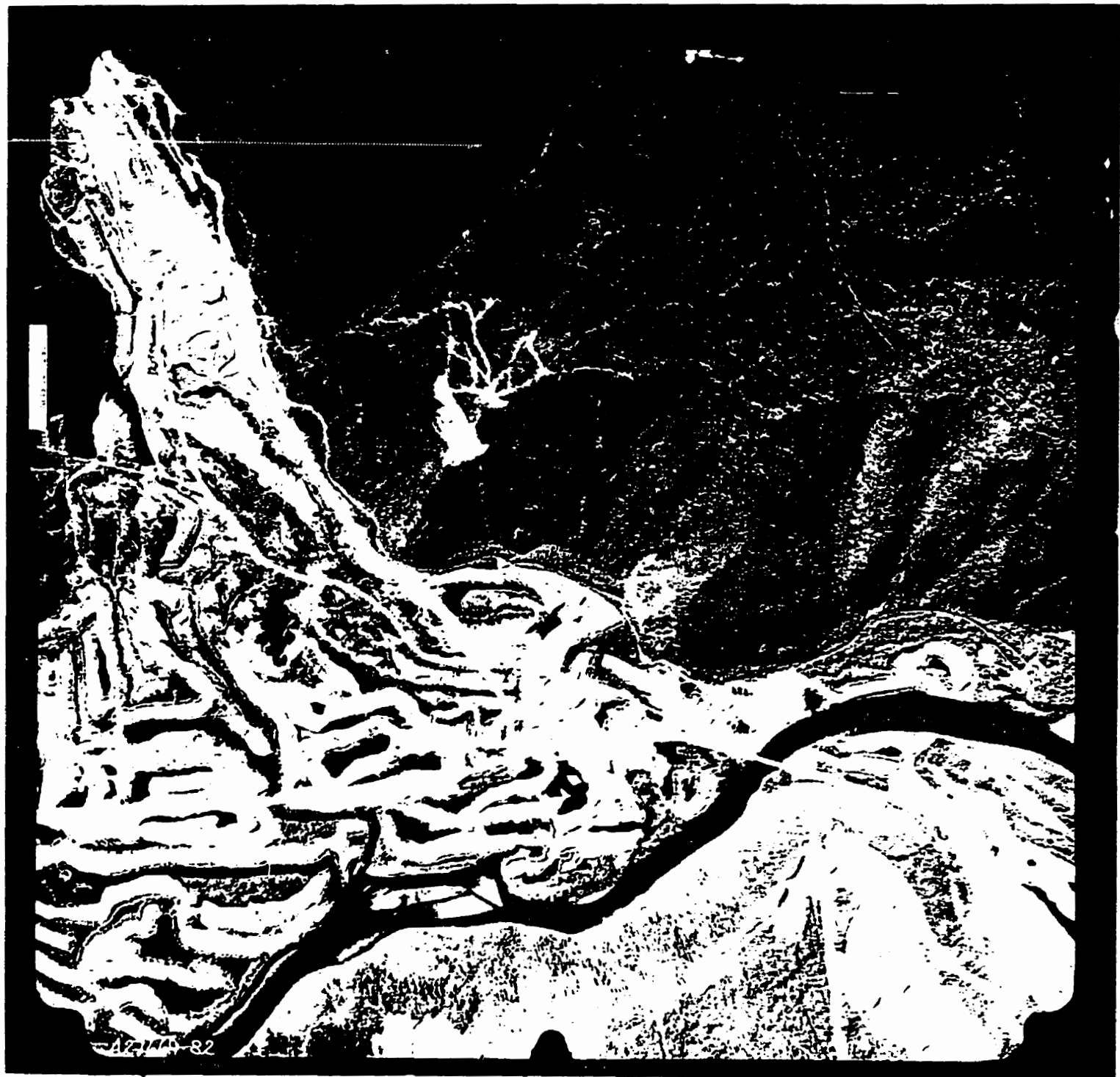


GEOGRAPHIC AIR SURVEY LTD.
1 AIRPORT ROAD, MARMORA, ALBERTA, CANADA T0C 0H0

GEOGRAPHIC AIR SURVEY LTD.

22-1004-80





42744-82

GEOGRAPHIC AIR SURVEY LTD.

7000 100th AVE. S.W. EDMONTON, ALBERTA T6C 0B6 CANADA

APPENDIX 8

TABLE 1: Death Records for the Han Settlements at Dawson and Moosehide, 1897 - 1906. Taken from the Anglican Church, Diocese of Yukon Records, Yukon Archives, COR O/S3 box 56, f. 5. 1897-1907.

SEX	AGE	PLACE	DATE	CAUSE OF DEATH
1897				
Male	15	Klondike	March 17	
Male	21	Klondike	March 17	
Male	29	Klondike	August 31	
Male	4 mths	Klondike	October 6	
Female	60	Klondike	October 31	
Male	30	Klondike	November 1	
Female	45	Klondike	November 4	
Female	45	Klondike	November 6	
1898				
Female		Klondike	January 7	
Male		Klondike	February	
Male		Klondike	February	
Male	5	Klondike	March 20	
Female		Klondike	April 30	
Female	4	Klondike	June 17	
Male	50	Moosehide	September 24	

Female		Moosehide	September 21	
Male		Moosehide	July 4	
Male		12 Mile Crk	November	
1899				
Male	50	Moosehide	January 10	chest & throat infection
Female	60	Moosehide	February 18	chest infection
Male	50	Rock Creek	March 27	accidentally shot while hunting
Male	65	Moosehide	April 30	ill a few weeks
Female	9	Moosehide	May 6	internal disease long illness
Male	50	Moosehide	May 7	chest infection 9 days Dr. Norquay
Male	70	Fort Reliance	August 3	haemorrhage from lungs
Female	65	Moosehide	August 23	pneumonia
Male	17	Moosehide	August 29	decline
Female	45	Moosehide	September 15	childbirth
Female	1 wk	Moosehide	September 22	influenza
Female	75	Moosehide	October 1	old age
Male	40	Moosehide	October 9	sudden death cause unknown
1900				

Female	65	Moosehide	February 19	death by burns
Male	8	Moosehide	February 19	a burning camp
Female	6	Moosehide	February 19	a burning camp
Male	3	Fort Reliance	May 14	wasting
Male	1	Moosehide	May 18	no cause
Female	25	Moosehide	May 26	decline 6 months
Female	40	Moosehide	June 5	chest disease
Male	40	Moosehide	July 16	decline 6 months
Female	14	Moosehide	August 23	from effects of burns
Female	20	Moosehide	September 8	no cause
Male	14 mths	Moosehide	September 11	no cause
Female	40	Moosehide	September 17	consumption
Female	old wife	Moosehide	October 5	no cause
Female	old wife	Moosehide	October 6	chest complaint
Female	45	Moosehide	October 12	no cause
Female	30	Moosehide	October 18	consumption
Male		Moosehide	November 12	consumption
Female	70	Moosehide	December 4	old age several weeks
Male	46	Moosehide	December 6	consumption several months
Female	6 mths	Moosehide	December	sores
1901				
Female	5	Moosehide	January 25	scrofulous sores

Female	60	Moosehide	February 10	no cause
Male	19	Moosehide	February 26	no cause
Male	2	Moosehide	February 27	no cause
Female	28	Moosehide	March 27	no cause
Male	5 wks	Moosehide	April 8	no cause
Female	6	Moosehide	April 14	
Male	43	Hospital	May 31	no cause Dr. MacDonald
Female	2	Moosehide	June 3	no cause
Male	15 mths	Moosehide	July 3	no cause
Female	few hrs	Moosehide	November 9	bleeding
Male	26	Good Samaritan	November 27	consumption Dr. McArthur
1902				
Male	32	Moosehide	July 11	decline
Male	26	Hospital	August 31	Dawson, injuries and decline
Male	4 days	Steamboat slough	October 2	no cause
1903				
Male	14 mths	Moosehide	February 7	no cause
Male	43	Moosehide	August 1	decline
Female	14	Peel River	September 17	decline

1904				
Male	45	Moosehide	January 23	bleeding and consumption
Male	23	St. Mary's Hospital	March 19	consumption 4 or 5 months Dr. Barrett
Female	18 mths	Moosehide	October 13	no cause Dr. Thompson
Male	19	Moosehide	December 13	consumption Dr. W.E. Thompson
1905				
Male	6	Moosehide	January 5	consumption Dr. W.E. Thompson
Male	50	Moosehide	February 9	consumption Dr. W.E. Thompson
Female	26	Moosehide	March 9	Erysipelas Dr. W.E. Thompson
Male	4	Moosehide	May 26	no cause
Female	3	Moosehide	June 14	no cause
1906				
Male	15	Little Salmon River	February 14	brain disease
Female	6	Moosehide	April 30	bronchitis Dr. Thompson
Male	3	Moosehide	July 23	Dr. Thompson
Male	15	Klondike, Moosehide	August 12	consumption, Good Samaritan Hospital

Female	4	Moosehide	October 8	sick 1 month
Female	27	Moosehide	October 9	consumption, 3 months
Female	2	Moosehide	December 14	lung infection 3 weeks
Male	13	Twelve Mile	January 16	consumption
1907				
Female	3	Moosehide	November 2	diphtheria

APPENDIX 9

TABLE 2: Baptism Records for the Han Settlements at Dawson and Moosehide, 1897-1906. Taken from the Anglican Church, Diocese of Selkirk Congregation of Moosehide Baptism Records, series 11.b.a, box 56, f. 5-9, between April 11, 1897 and October 18, 1906 for Klondike and Moosehide

RESIDENCE	BIRTHDATE	BAPTISM DATE
Klondike	no date	March 27, 1897
Klondike	no date	April 11, 897
Klondike	no date	April 11, 1897
Klondike	no date	April 11, 1897
Moosehide	no date	December 14, 1898
Moosehide	December 25, 1898	January 1, 1899
Moosehide	no date	February 19, 1899
Moosehide	June 20, 1899	June 25, 1899
Moosehide	June 1899	August 27, 1899
Moosehide	September 13, 1899	September 18, 1899
Moosehide	1899	September 17, 1899
Moosehide	February 16, 1900	February 25, 1900
Moosehide	March 26, 1900	April 7, 1900
Klondike	April 30, 1899	November 25, 1900

Moosehide	September 1, 1901	September 13, 1901 (this baptism was of a white child)
Moosehide	November 9, 1901	November 9, 1901
Moosehide	December 3, 1901	December 8, 1901
Moosehide	February 8, 1901	February 16, 1902
Moosehide	April 1902	May 4, 1902
Moosehide	June 19, 1902	June 29, 1902
Moosehide	August 29, 1902	August 31, 1902
Moosehide	October 10, 1902	October 19, 1902
Moosehide	October 26, 1902	November 2, 1902
Moosehide	December 24, 1902	January 4, 1903
Moosehide	January 30, 1903	February 1, 1903
Moosehide	August 2, 1903	August 18, 1903
Moosehide	October 15, 1903	October 28, 1903 (this child was white)
Moosehide	March 4, 1904	March 27, 1904
Moosehide	April 10, 1904	April 17, 1904
Moosehide	October 6, 1904	October 16, 1904
Moosehide	December 24, 1904	January 1, 1905
Moosehide	May 9, 1905	March 22, 1905

Moosehide	March 24, 1905	April 2, 1905
Moosehide	April 28, 1905	May 21, 1905
Moosehide	September 16, 1905	October 15, 1905
Moosehide	June 10, 1905	July 11, 1905
Moosehide	October 25, 1905	November 5, 1905
Moosehide	January 3, 1906	January 11, 1906
Moosehide	March 10, 1906	April 1, 1906
Moosehide	April 14, 1906	April 22, 1906
Moosehide	June 4, 1906	July 8, 1906
Moosehide	August 2, 1906	August 16, 1906
Moosehide	September 20, 1906	October 30, 1906

BIBLIOGRAPHY

A. Original Sources

I. Manuscripts

National Archives of Canada, (N.A.C.) Ottawa

Campbell, Robert. 995. f. 721- 4- 27, *Correspondence*. MSS A20 F 2/130 1902. f. 721-4-27.

Constantine, Charles. *Constantine Papers. Letterbook* 1895-1896. MSS. MG 30, E55. Volume 5.

Department of the Interior. *Correspondence*. RG 15 E1A f. 2104.

Department of Marine and Fisheries. *Correspondence*. RG 18 192 f. 457, 1899. RG 28, Volume 318, f. 2812, 1900.

Minto, Lord. *Minto Papers*. MG 30. 1900.

North West Mounted Police. *Correspondence*. RG 18 192 f. 457, 1899. RG 18 D1 Volume 5, A604, 1902.

Ogilvie, William. *Correspondence*. Series 18, 1896, RG 18. Volume 119, File 160.

Sifton, The Honourable Sir Clifford. *Sifton Papers*. Ottawa Letterbooks and Yukon Correspondence. MG 27. Vols. 221-295. 1897 - 1899.

Yukon Archives

Anglican Church. Diocese of Yukon. *Records*. Yukon Archives. Series IV-1, box 51, f. 6, 1896; COR O/53, f. 5, box 56, 1897; Series 1-1C box 14, f. 6, 1897; Series 11.6.a, box 56, f. 5-9.

Bompas, William Carpenter. *Letters to Families and Friends 1865-1900*, archives of origin. McCord Museum, Montreal. MSS 125, 81/38; CRG vol. 19, f. 4682, 28 October 1896; 19 November 1896.

Campbell, Robert. *Letters H.B.C.A.* D5/28 Fos. 47-48.

- Flewelling, Frederick Fairweather. *Diary, 1896-1898*. MSS 013 82/76.
- McDonald, The Reverend Robert. *Journals 1863 - 1913*. MSS 85/97, 1862-1875 F-192, 1876-1893 F-193, 1894-1913 F-194.
- Yukon Government. *Commissioner of the Yukon Territory*, Files, 10 June 1898.
- Yukon Territorial Records. *Correspondence*. CRG vol. 19, f. 4682, 28 October 1896; 19 November 1896. CRG 91, vol. 7 f. 1187, 1900; CRG 91, vol. 225, reel 2980, 1898-1903, MSS ACC 82/130; 13 January 1902.
- _____. *Correspondence*. Office of the Assistant Gold Commissioner. YA Letter 1175, f. 6. 13 May, 1908.
- _____. *Correspondence*. Department of Indian and Northern Affairs. MSS A 20 82/130. 1902.
- _____. *Report*. Office of the Gold Commissioner. YA RR 85, vol. 1739. 6 September. 1902.

II. Published Material

- Adney, Tappan. "The Indian Hunter of the Far Northwest." *Outing Magazine*. 6, March. 1902.
- _____. *The Klondike Stampede*. Originally published by Harper and Brothers Publishers, 1900. Vancouver: University of British Columbia Press, 1995.
- _____. "Moose Hunting with the Trochutin." *Harpers New Magazine*. DXCVIII, March 1900.
- Bell, Robert. "Forest Fires in Northern Canada." *American Forestry Congress*. Atlanta Meeting 1888. Washington: Gibson Bros. Printers & Bookbinders, 1889.
- Bostock, Hugh S. "Yukon Territory." In *Selected Field Reports of the Geological Survey of Canada 1898 to 1933*. Ottawa: Department of Mines and Technical Surveys, 1957.
- Cadell, H.M. "Klondike and the Yukon Goldfields," in *Annual Report of the Smithsonian Institute*. Washington, D.C.: 1914.

- Campbell, Robert. *Two Journals of Robert Campbell 1808-1853*. Seattle: Limited Edition, 1951.
- Cantwell, J.C. *Report of the Operations of the U.S. Revenue Steamer "Nunivak" on the Yukon River station Alaska 1899-1900*, United States Congress, Senate Exec. Doc. 58th Cong., 2nd. sess. Washington: D.C., 1921.
- Dawson Daily News*. Dawson City, Yukon Territory: 20 November 1899, 1902.
- Dawson, George F. *Report on an Exploration in the Yukon District N.W.T. and Adjacent Northern Portions of British Columbia 1887*. Geological and Natural History Survey of Canada. Vol. 3, part 1. Montreal: William Foster Brown Co., 1889.
- Glave, E.J. "Pioneer Pack Horses in Alaska": The Advance. In Two Parts. *The Century Illustrated Monthly Magazine*. Vol. 44, numbers 5 and 6.
- Isbister, A.K. "Some Account of Peel River North America." *Journal of the Royal Geographical Society*, 15, 332-245.
- Inman, Colonel Henry. *Buffalo Jones. Forty Years of Adventure*. London: 1899.
- Kennicott, Robert. "Journal of Robert Kennicott May 19, 1859 - February 11, 1862." Contained in *The First Scientific Exploration of Russian America and the Purchase of Alaska*. Ed. James, James A. Evanston: Northwestern University Press, 1942.
- Macoun, John. "List of Plants Collected by J.J. Tyrrell in the Klondike Region in 1899." *The Ottawa Naturalist*. December 1899.
- McConnell, R.G. *Report of Gold Values in the Klondike High Level Gravels*. Ottawa: Government Printing Bureau, 1907.
- McConnell, R.G. "Report of the Klondike Goldfields." *Geological Survey Memoir*, 284, 1903. Canada: Department of Mines and Resources. Reprint 1965.
- Merriam, C. Hart. *Results of a Biological Reconnaissance of the Yukon River Region. North American Fauna, Number 19*. Washington: United States Department of Agriculture Government Printing Office, 1900.
- Murray, Alexander H. *Journal of the Yukon 1847-48*. Edited by L.J. Burpee. Ottawa: Government Printing Bureau, 1910.

- Ogilvie, William *Early Days in the Yukon and the Story of its Gold Finds*. Ottawa: Thorburn and Abbott, 1913.
- Price, Julius. *From Euston to the Klondike: The Narrative of a Journey through British Columbia and the North-West Territories in the Summer of 1898*. London: Sampson Low Marston & Co. 1898.
- Raymond, Charles. "Reconnaissance of the Yukon River 1869," *Compilation of Narratives of Exploration in Alaska*. Washington: Government Printing Offices, n.d.
- Robertson, W.N. *Yukon Memories*. Toronto: The Hunter-Rose Company Limited, 1930.
- Schmitler, Ferdinand. "Upper Yukon Customs and Folklore." Washington: The Smithsonian Institute, 56, 4. May, 1910.
- Schwatka, Frederick. *Along Alaska: Great River*. Chicago: George M. Hill, 1900.
- _____. *A Summer in Alaska*. St. Louis: J.W. Henry, 1894.
- _____. *Report of a Military Reconnaissance in Alaska in 1883*. Washington: US Government Printing Office, 1884.
- Spurr, J.E. *Through the Yukon Gold Diggings*. Boston: Eastern Publishing Company, 1900.
- Tollemache, The Hon. Stratford. *Reminiscences of the Yukon*. London: Edward Arnold, 1912.
- Treadgold, A.N.C. *An English Expert on the Klondike*. Toronto: George N. Morang & Company Limited, 1899.
- Trimmer, Mortimer, ed. *The Yukon Territory: The Narratives of W.D. Dall Leader of the Expedition to Alaska 1866-1868*. London: Downey & Company Ltd., 1898.
- Walden, Arthur, T. *A Dog Puncher in the Yukon*. Boston: Houghton Mifflin Company, 1931.
- Whymper, Frederick. "A Journey from Norton Sound Bering Sea to Fort Youcon." *Journal of the Royal Geographical Society*, 38, 1868.

III. Government Publications

- Canada. Department of the Interior. "Report of the North West Mounted Police." *Annual Reports 1902, 1903.*
- _____. Department of Marine and Fisheries. *Annual Report 1903, 1904.*
- _____. Report of the North West Mounted Police. 1902.
- _____. Report of the Steamship Inspector, 1903.
- _____. Report of the Superintendent of Mines, 1906.
- _____. Geological Survey of Canada. Ogilvie, William. DCS. Canada Land Survey Records. Plan 58597, sheet 3, 1896.
- _____. House of Commons Debates. 1875 - 1876. The Right Honourable Sir John A. Macdonald, p. 656.
- _____. *Sessional Papers*, 61, 1898; 13, 1899; 15, 1899; 63, 1899; 13, 1900; 15, 1900; 33v, 1900; 33W, 1900; 63, 1900; 68, 1900; 21, 1903; 63, 1903; 22, 1904; 26, 1904; 28, 1904; 25, 1905; 26, 1905; 25, Summary Report 1906.

Statutes and Orders in Council

Canada. *Dominion Lands Act*, 23 June 1870

- _____. *Orders in Council*, number 9, 1887; number 4595, 1896; 21 May, 1897; August 1897; number 4953, 1897; number 2461, 18 January 1898; number 45031, 28 February 1898; 21 March 1898; 3 August 1898.

B. Secondary Sources

I. Books

- Bastedo, Jamie. *Shield Country: Life and Times of the Oldest Piece of the Planet*. Calgary: The Arctic Institute of North America, 1994.
- Benson, Abram S. ed. *Control of Communicable Diseases Manual, Sixteenth Edition*. Washington: American Public Health Association, 1995.

- Bennett, Gordon. "Yukon Transportation: A History." *Canadian Historic Sites: Occasional Papers in Archaeology and History*. Ottawa: National Parks and Historic Sites Branch, 1978.
- Bissett, Kathy. *A History of Logging in the Yukon 1896-1970*. Vol. 1. Whitehorse: Canada/Yukon Economic Development Agency, 1993.
- Bone, Robert N. *The Geography of the Canadian North*. Toronto: Oxford University Press, 1992.
- Brock, Thomas D. et al. *Biology of Microorganisms*. 7th ed. Englewood Cliffs, New Jersey: Prentice Hall, 1994.
- Canada. Department of Fisheries and Oceans. *A Rationale for Standards Relating to the Discharge of Sediments into Yukon Streams from Placer Mines*. New Westminster: 1983.
- _____. Department of Indian and Northern Development; Hardy and Associates. *Fish and Wildlife Recovery in Placer Mined Areas of the Yukon*. Calgary: 1978.
- _____. Envirocon Limited. *Investigation of the Magnitude and Extent of Sedimentation from Yukon Placer Mining Operations*. Hull: 1986.
- _____. Liber, K., et al. *Effects of Placer Mining Sediments on Juvenile Chinook and the Eggs of Arctic Grayling*. Vancouver: 1992.
- _____. McLeay, D.J. et al. *Effects on Arctic Grayling (Thymallus arcticus) of Short-term Exposure to Yukon Placer Mining Sediments: Laboratory and Field Studies*. Vancouver: 1983.
- Canadian Council of Resource and Environment Ministers. *Canadian Water Quality Guidelines*. Ottawa: Environment Canada, 1991.
- Carter, Margaret. *A History of the Use of Wood in the Yukon to 1903*. Ottawa: National History Sites Service, 1973.
- Clark, Donald W. *Fort Reliance, Yukon: An Archaeological Assessment*. Mercury Series, Archaeological Survey of Canada Paper 150. Hull: Canadian Museum of Civilization, 1995.

- Coates, Kenneth Stephen, *Best Left as Indians: Native White Relations in the Yukon Territory 1840-1973*. Montreal: McGill University Press, 1991.
- _____. *Canada's Colonies: the History of the Yukon and North West Territories*. Toronto: James Lorimer & Sons, 1985.
- _____. *The Northern Yukon: A History* (Ottawa: Parks Canada 1979).
- Coates, Kenneth Stephen and Morrison, William R. . *Land of the Midnight Sun: A History of the Yukon*. Edmonton: Hurtig Publishers, 1988.
- Crow, John R. and Obley, Philip. "Han." In *Handbook of North American Indians*. Vol. 6, Subarctic. Sturtevant, William C. Ed. Washington: The Smithsonian Institute, 1981.
- Cruikshank, Julie. *Reading, Voice, Oral and Written Interpretation of the Yukon's Past*. Vancouver: Duncan & McIntyre, 1991.
- Dafoe, John. *Clifford Sifton in Relation to His Times*. Toronto: The Macmillan Company of Canada Ltd., 1931.
- Dames and Moore. *A General Review of the Effects of Gold Placer Mining Including Site Specific Review on Selected Subarctic Alaskan River Basins*. Anchorage: Alaska State Office, Bureau of Land Management. nd.
- Davis, Mary Lee. *Sourdough Gold, The Log of a Yukon Adventure*. Boston: W.A. Wilde Company, 1933.
- Denniston, Glenda, and McClellan, A. Catherine. "Environment and Culture in the Cordillera." In *Handbook of North American Indians*. Vol. 6, Subarctic. Sturtevant, William C. Ed. Washington: The Smithsonian Institute, 1981.
- Dixon, C.W. *A History of Smallpox*. London: J.A. Churchill Ltd., 1962.
- Duarden, Frank. *The Development and Structure of the Settlement System*. Whitehorse: Department of Library and Information Resources, 1981.
- Forsyth, Adrian. *Mammals of the Canadian Wild*. Camden East: Camden House Publishing Ltd., 1985.
- Gates, M. *Gold at Fortymile Creek, Early Days in the Yukon*. Vancouver: University of British Columbia Press, 1994.

- Green, L. *The Gold Hustlers: Dredging the Klondike 1898-1906*. Vancouver: University of British Columbia Press, 1977.
- Hall, D.J. *The Lonely Eminence 1902-1929*, Vol. 2, of *Clifford Sifton*. Vancouver: University of British Columbia Press, 1981.
- _____. *The Young Napoleon 1861-1900*. Vol. 1, of *Clifford Sifton*. Vancouver: University of British Columbia Press, 1981.
- Innis, Harold A. "Settlement and the Mining Frontier." in MacIntosh W.A. and Joerg, W.L.G. eds. *Canadian Frontiers of Settlement*. Toronto: Macmillan Company of Canada, IX, 1936.
- Jordan, Edwin O. *Epidemic Influenza*. Chicago: The American Medical Association, 1927.
- Lauriault, Jean. *Identification Guide to the Trees of Canada*. Markham: Fitzhenry & Whiteside, 1989.
- Leechman, D. *Vanta Kutchin*. Anthropological Series No. 33. Bulletin No. 130. Ottawa: National Museums of Canada, 1954.
- Lutwick, Larry. *Tuberculosis*. London: Chapman & Hall Medical, 1995.
- McCandless, Robert G. *Yukon Wildlife: A Social History*. Edmonton: The University of Alberta Press, 1985.
- McClellan, A. Catherine. *A History of the Yukon Indians: Part of the Land, Part of the Water*. Vancouver: Douglas & McIntyre Ltd., 1987.
- _____. and Denniston, Glenda. "Environment and Culture in the Cordillera." In *Handbook of North American Indians*. Vol. 6, Subarctic. Sturtevant, William C. Ed. Washington: The Smithsonian Institute, 1981.
- _____. *My Old People Say*. Publications in Ethnology No. 6, 1. Ottawa: National Museums of Canada, 1975.
- _____. "Tagish." In *Handbook of North American Indians*. Vol. 6, Subarctic. June Helm, Washington: The Smithsonian Institute, 1981.
- Miller, D.L. and Farmer, R.D.T. eds. *Epidemiology of Diseases*. Oxford: Blackwell Scientific Publications, 1982.

- Minter, Roy, *The White Pass, Gateway to the Yukon*. Fairbanks: University of Alaska Press, 1987.
- Mizer, Helen Eckel, and Wilson, Marion. *Microbiology in Patient Care*. New York: MacMillan Publishing Co. Inc., 1974.
- Morrison, William R. *Showing the Flag The Mounted Police and Canadian Sovereignty in the North 1881-1925*, Vancouver: University of British Columbia Press, 1985.
- Obley, Philip and Crown, John R. "Han." In *Handbook of North American Indians*. Vol. 6. Subarctic. June Helm, Washington: The Smithsonian Institute. 1981.
- Osler, Tim R. *Study of Mercury Usage in Placer Mining Operations in the Yukon Territory and North Western British Columbia*. Whitehorse: Environmental Protection Series. 1983.
- Oswald, E.T. and Brown, B.N. *Vegetation Establishment During 5 Years Following Wildfire in Northern British Columbia and Southern Yukon Territory*. Victoria: Forestry Canada, 1990.
- Oswald, E.T. and Senyk, J.P. *Ecoregions of the Yukon Territory*. Ottawa: Department of Fisheries and Oceans Canada. 1977.
- Owen, Oliver S. *Natural Resource Conservation, An Ecological Approach*. 2nd ed. New York: MacMillan Publishing Co. Inc. 1975.
- Pielou, E.C. *The World of Northern Evergreens*. Ithaca: Comstock Publishing Associates, Cornell University Press, 1988.
- Ray, Arthur J. *Indians in the fur trade: their role as trappers, hunters and middlemen in the lands southwest of Hudson's Bay 1600-1870*. Toronto: University of Toronto Press, 1974.
- Ross, Monique. *Forest Management in Canada*. Canadian Institute of Resource Law. Calgary: University of Calgary, 1995.
- Rostlund, E. *Freshwater Fish and Fishing in Native North America*. Berkeley: University of California Press, 1952.

- Seigel, N. and McEwan, C.A. *Historical Overview of Fishing in the Yukon*. Environmental Services for the Department of Fisheries and Oceans Whitehorse: Northern Biomes Ltd., June 1984.
- Simpson, R. Edgar Hope. *The Transmission of Epidemic Influenza*. New York: Plenum Press, 1992.
- Slobodin, Richard. "Kutchin." In *Handbook of North American Indians*. Vol. 6. Subarctic. Sturtevant, William C. Ed. Washington: The Smithsonian Institute, 1981.
- Stearn, Allen E. and Stearn, E. Wagner. *The Effect of Smallpox on the Destiny of the Amerindians*. Boston: Bruce Humphries Inc., 1945.
- Tanner, Fred W. and Tanner, Louise P. *Food Borne Infections and Intoxications*. 2nd ed. Champagne Illinois: The Garrard Press, 1953.
- Tartakow, I. Jackson, and Vorperian, John H. *Foodborne and Infectious Diseases Their Epidemiologic Characteristics*. Westport: AVI Publishing Inc., 1981.
- VanStone, James. *Athapaskan Adaptations: Hunters and Fishermen of the Sub Arctic Forest*. Chicago: Aldine, 1975.
- Viereck, Leslie A. *Ecological Effects of River Flooding and Forest Fires in the Taiga of Alaska*. Fairbanks: University of Alaska, 1985.
- Vorperian, John H. and Tartakow, I. Jackson. *Foodborne and Infectious Diseases Their Epidemiologic Characteristics*. Westport AVI Publishing Inc., 1981.
- Waldrum, James, Herring, D. Ann and Young, T. Kue. *Aboriginal Health in Canada, Historic, Cultural, and Epidemiological Perspectives*. Toronto: University of Toronto Press, 1995.
- Webb, Melody. *Yukon: The Last Frontier*. Vancouver: University of British Columbia Press, 1993.
- Winslow, Kathryn. *Big Pan Out*. New York: W.W. Norton, 1951.
- Wright, A. *Prelude to Bonanza: The Discovery and Exploration of the Yukon*. Sidney. Gray's Publishing Ltd., 1976.

- Wrong, George, ed. *Review of Historical Publications Relating to Canada*. Vol. II. University of Toronto Library: Published by the Librarian. n.d.
- Youmans, Guy, et al. *The Biologic and Clinical Basis of Infectious Diseases*. Philadelphia: W.B. Saunders Company, 1980.
- Young, T. Kue, Waldrum, James, and Herring, D. Ann. *Aboriginal Health in Canada, Historic, Cultural, and Epidemiological Perspectives*. Toronto: University of Toronto Press, 1995.
- Young, T. Kue, *Health Care and Cultural Change the Indian Experience in the Central Subarctic*. Toronto: The University of Toronto Press, 1988.
- Zaslow, Morris. *The Opening of the Canadian North 1870-1914*. Toronto: McClelland and Stewart Inc., 1971.

II. Articles

- Crosby, Alfred W. "Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America." *The William and Mary Quarterly*. 34 Series Vol. 33, 1976.
- Harris, Cole. "Smallpox Around the Strait of Georgia in 1782." *Ethnohistory*, 41:4 Fall 1994.
- Herring, D. Ann. "There were Young People and Old People and Babies Dying Every Week. The 1918-1919 Influenza Pandemic at Norway House." *Ethnohistory*. 41:1 Winter 1994.
- Lux, M.K. "Disease and Growth of Dawson City: The Seamy Underside of the Legend." *The Northern Review*, 3/4, 1989.
- Osgood, Cornelius. "The Han Indians: A Compilation of Ethnographic and Historical Data on the Alaska-Yukon Area." *Anthropology*. Vol. 74. New Haven, Conn.: Yale University Publications, 1974.
- Rowe, J.S. and Scotler, G.W. "Fire in the Boreal Forest." *Quaternary Research*, 3, 1973.

Snow, Dean R. and Lamphear, Kim M. "European Contact and Indian Depopulation in the Northeast: The Timing of the First Epidemics." *Ethnohistory*. 35:1 Winter 1988.

Waisberg, Leo G. "Boreal Forest Subsistence and the Windigo: Fluctuation of Animal Populations." *Anthropologies*, 17, No. 2. 1975.

III. Theses

Bovey, John A. "The Attitudes and Policies of the Federal Government Towards Canada's Northern Territories 1870-1930." Master's thesis, University of British Columbia, 1967.

Brady, Michael A. "Natural Vegetation of Mining Disturbances in the Klondike Areas, Yukon Territory." Master's thesis, University of British Columbia, 1984.

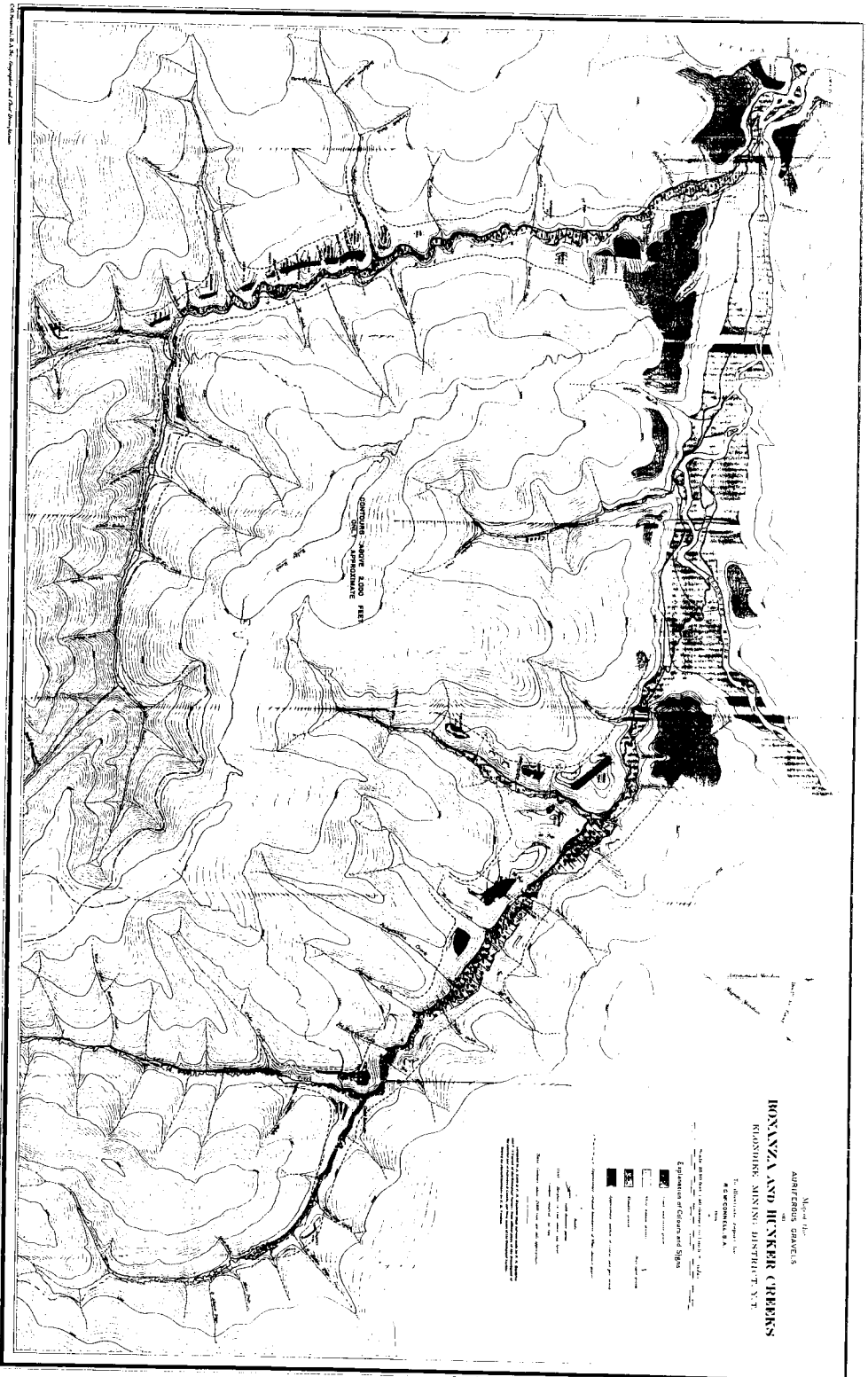
Coates, Kenneth Stephen. "Furs Along the Yukon: Hudson's Bay Company and Native Trade in the Yukon River Basin 1830-1893." Master's thesis, University of Manitoba, 1979.

Guest, Henry James. "City of Gold: Dawson, Yukon Territory 1896-1918". Ph.D. diss., Winnipeg: University of Manitoba, 1982.

Helper, Rose. "The Yukon Gold Rush: A Study in Social Disorganization and Reorganization." Master's thesis, Toronto: University of Toronto, 1945.

Janzen, S.S. "The Burning North - A History of Fire and Fire Protection in the Northwest Territories." Master's thesis. University of Alberta, 1990, quoted in Bastedo.

Porsild, Charlene. "Culture, Class and Community: New Perspectives on the Klondike Gold Rush 1896-1905." Ph.D., diss., Ottawa: Carleton University, 1994.

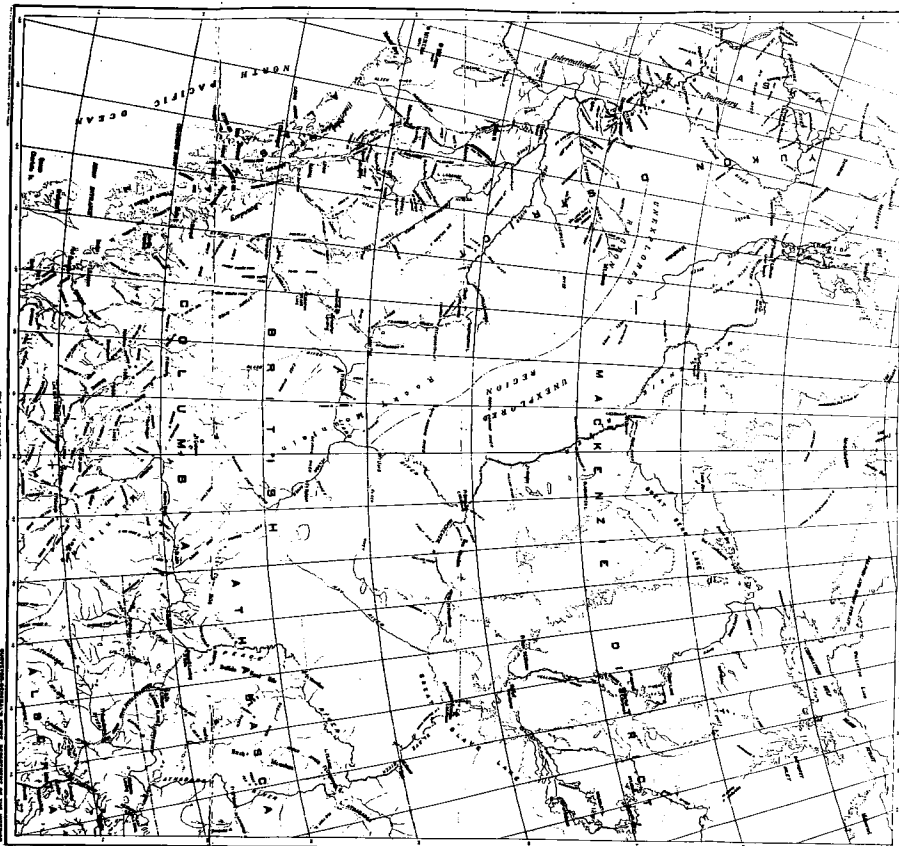


Map of the
IRONSAX AND HEXTER CREEKS
 HAMPSHIRE, VERMONT, DISTRICT V.T.
 4-8-CONVENT, N.Y.

Scale: 1 inch = 1 mile
 Elevation of Contour and Signs
 1000
 2000
 3000
 4000
 5000
 6000
 7000
 8000
 9000
 10000
 11000
 12000
 13000
 14000
 15000
 16000
 17000
 18000
 19000
 20000

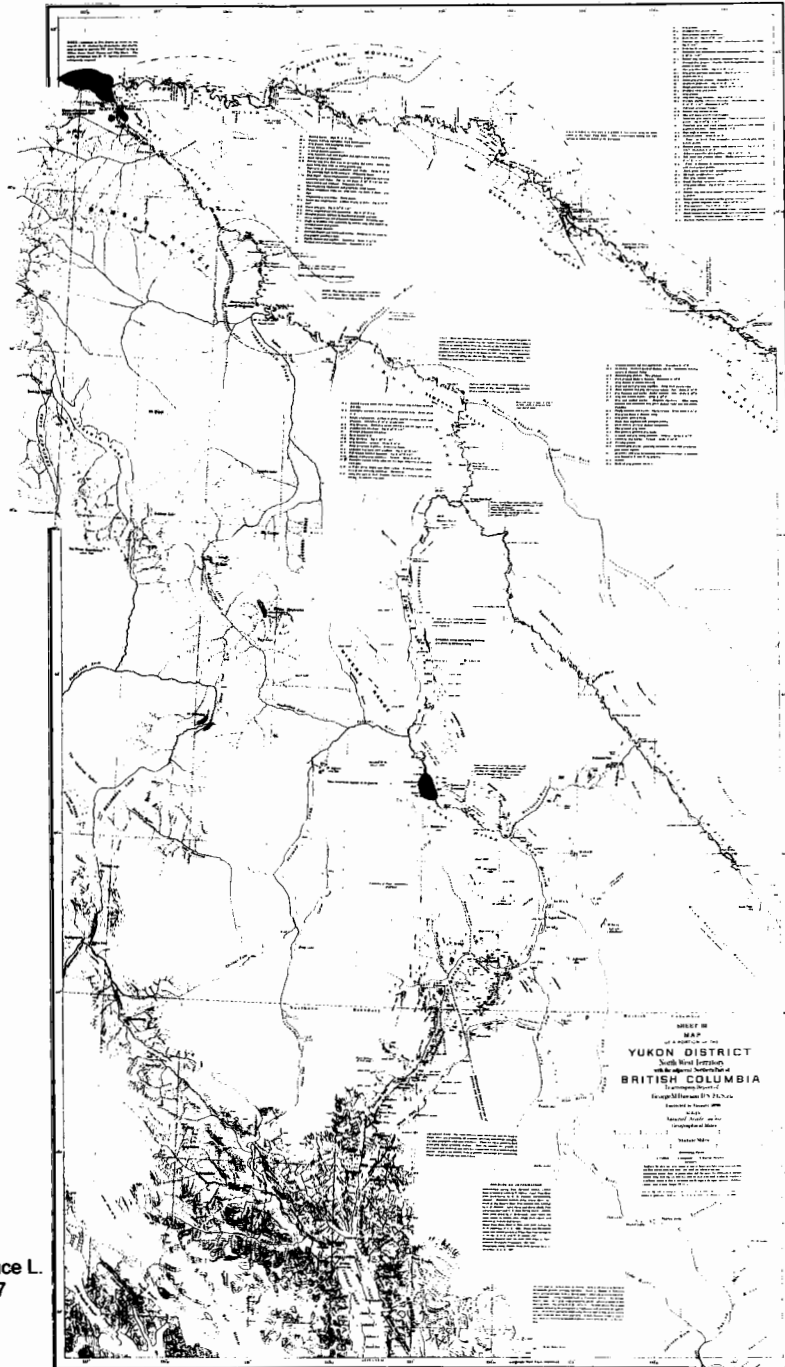


MAP OF THE NORTH-WESTERN PART OF THE DOMINION OF CANADA.



Willis, Bruce L.
MC-28687
c. 1997

Map of the North-Western Part of the Dominion of Canada
Scale: 1:500,000
Projection: Lambert Conformal Conic
Datum: NAD 83
Source: Canadian Topographic Survey
© 1997



Willis, Bruce L.
MQ-28687
c. 1997

