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# RECONNAISSANCE OF PORCUPINE VALLEY, ALASKA

BY  
GERALD FITZGERALD

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Mineral resources of Alaska, 1940  
(Pages 219-243)

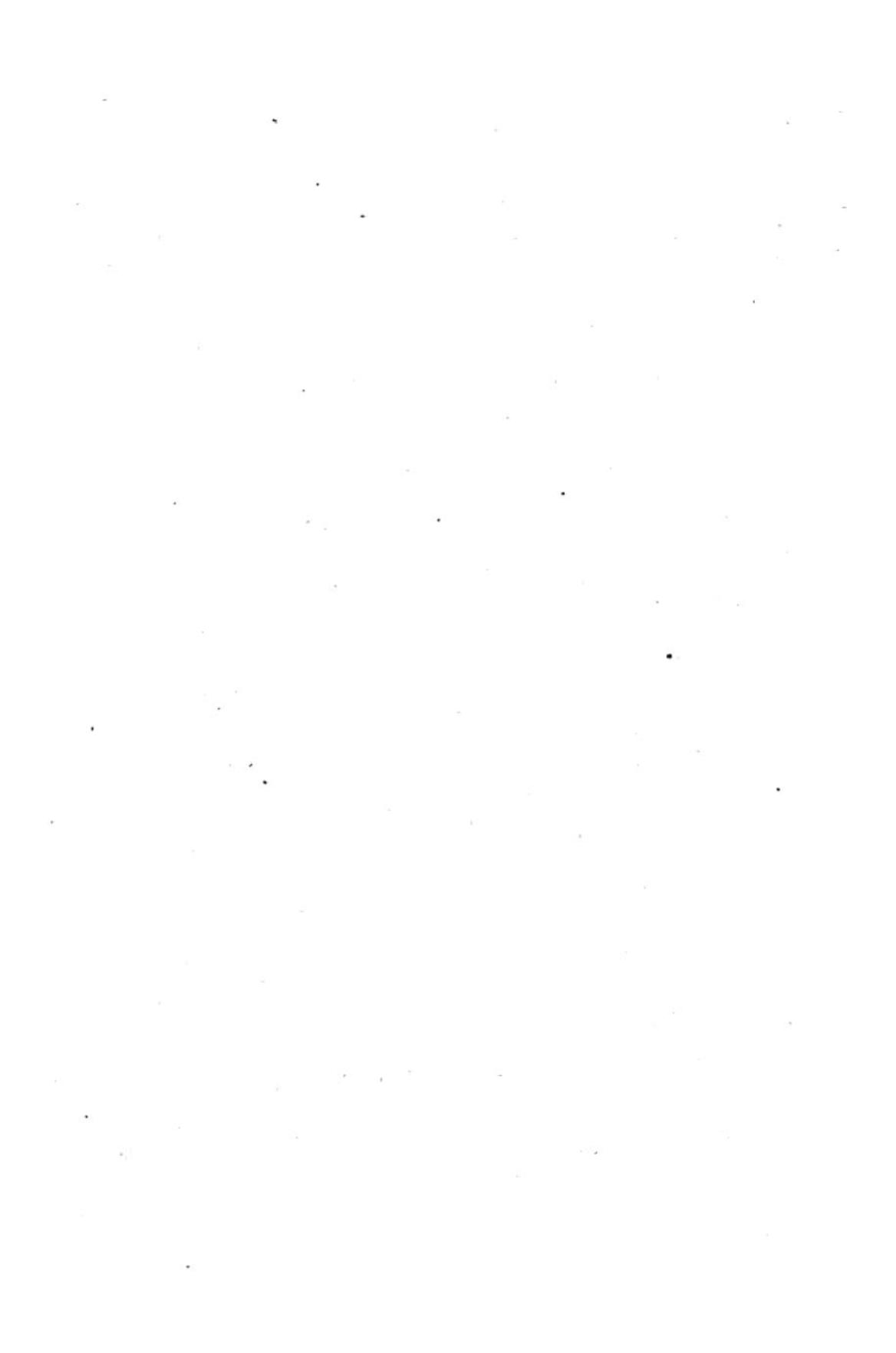


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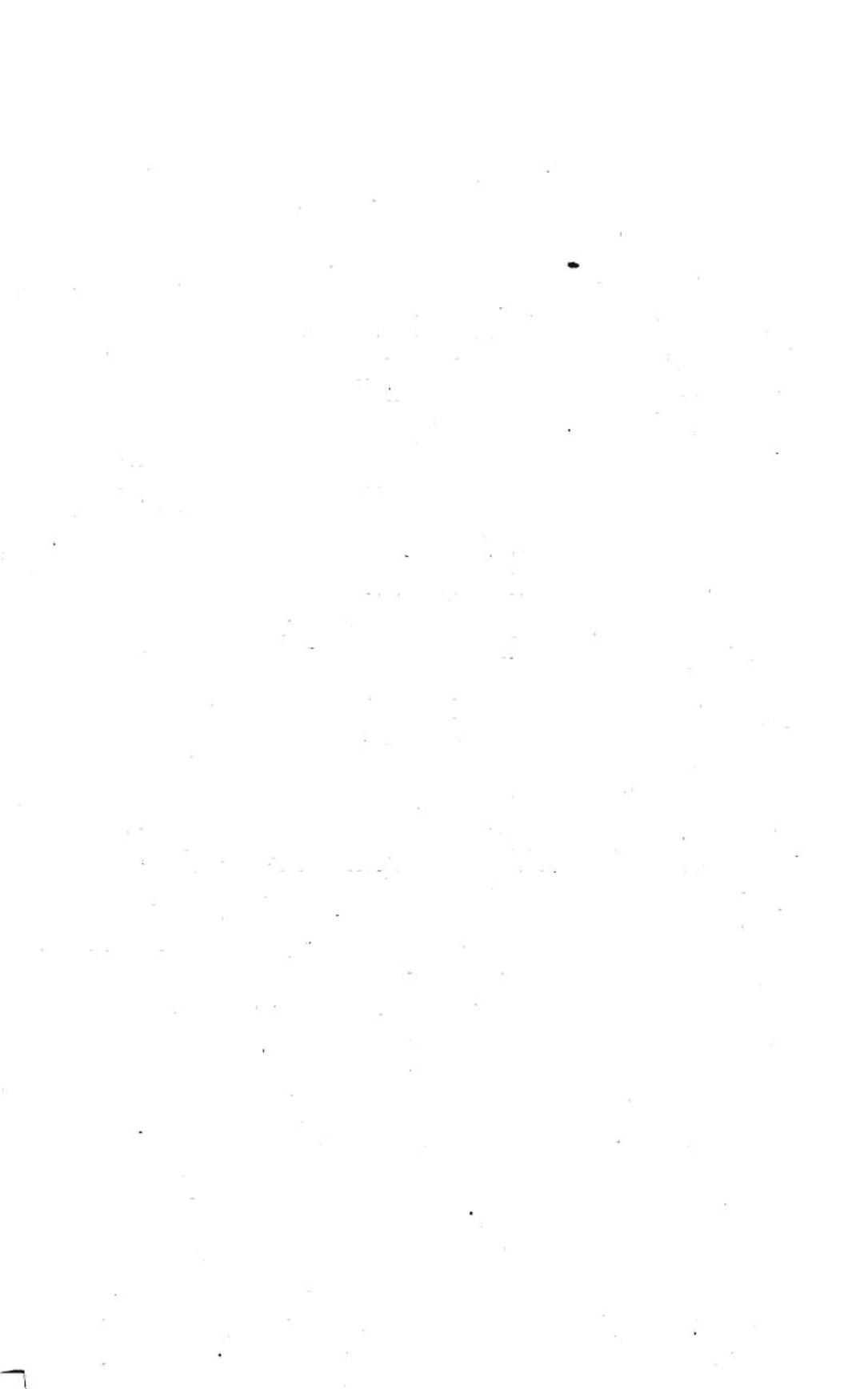


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# RECONNAISSANCE OF PORCUPINE VALLEY, ALASKA

By GERALD FITZGERALD

## ABSTRACT

The term porcupine Valley is applied in this report to the part of the drainage basin of the Porcupine River that lies in northeastern Alaska between the Alaska-Canada boundary and the confluence of the Porcupine and Yukon Rivers. It includes an area of approximately 3,000 square miles.

The main Porcupine River is probably more than 500 miles long, but less than half of this length is in Alaska. Its principal tributaries upstream from its junction with the Yukon are the Little Black River, Black River, Sheenjok River, Coleen River, Rápíd River, Campbell River, Salmon Trout River, and Sunagun Creek.

The Porcupine Valley comprises the following physiographic units: An alluvial basin called the Yukon Flats; an area of moderate relief, the Coleen Hills; an intermediate basin, the Coleen Lowland; and bordering the international boundary, a Highland province in which the highest summits are more than 4,000 feet above sea level.

This area was first explored in 1842 by members of the Hudson's Bay Co., which for nearly 60 years controlled the fur trade along the Porcupine River between Fort Yukon and Rampart House on the international boundary. Members of the Geological Survey first visited the river in 1889, and since then several Survey parties have carried on field work in parts of the valley.

The transportation needs of the inhabitants of Porcupine Valley are served during the summer by river steamer from the Yukon, by small river boats, and by airplanes; and in winter airplanes on skis and dog teams are used for travel and transportation of supplies and equipment.

The climate is sub-Arctic and is marked by great seasonal variations in temperature, scant rainfall, and few severe storms.

The forests consist mainly of spruce, with scattered cottonwood, birch, willow, and alder brush. Some of the ordinary garden vegetables are successfully grown. The animal life is varied and includes bear, moose, caribou, mountain sheep, and most of the fur-bearing animals common to interior Alaska. Ducks and geese are plentiful, especially at the time of the fall migration, and several kinds of food fish are found in the Porcupine River and its tributaries.

The area here described has less than a dozen permanent white inhabitants; these are trappers living on tributary streams. Fort Yukon, which is near the junction of the Porcupine and the Yukon, the point of entrance to the Porcupine Valley, had a population of 274 in 1940. A few natives live in small settlements along the river and its tributaries.

### LOCATION OF THE AREA

The Porcupine Valley, as described in this report, is an irregular area of about 3,000 square miles in northeastern Alaska, north of the Arctic Circle, between parallels  $66^{\circ}35'$  and  $68^{\circ}$  north latitude and meridians  $141^{\circ}$  and  $145^{\circ}20'$  west longitude. (See fig. 12.) The area

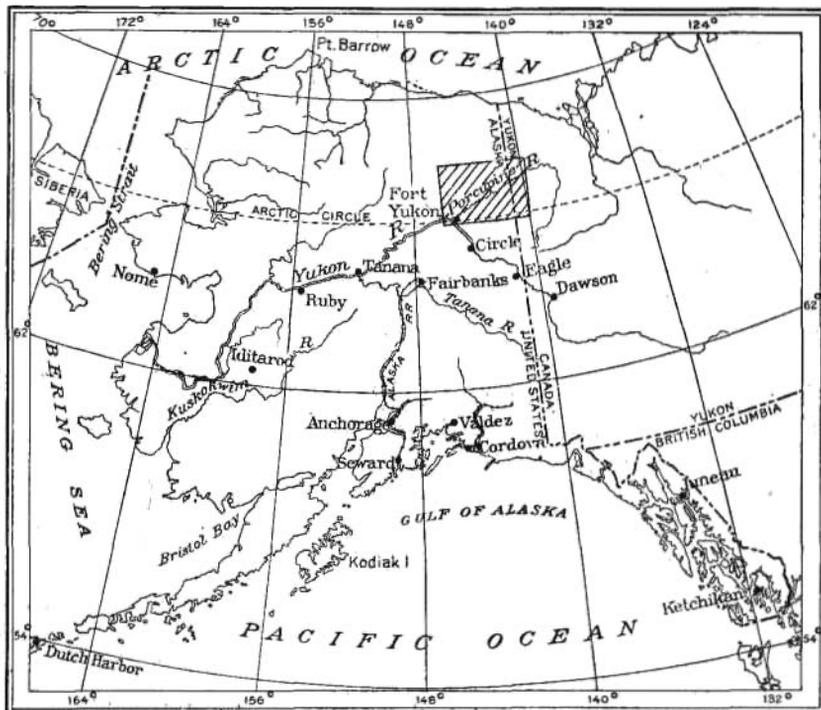


FIGURE 12.—Index map showing location of Porcupine Valley.

mapped includes the Porcupine River and its tributaries from the Alaska-Canada boundary to the confluence of the Porcupine with the Yukon River near Fort Yukon.

### EARLY EXPLORATIONS AND SURVEYS

The Porcupine River was first explored by officials of the Hudson's Bay Co. According to Dawson,<sup>1</sup> J. Bell, in charge of the Hudson's Bay post on Peel River, portaged from that river to the Porcupine River during 1842 and descended it for several days before returning. Again, in 1846, Bell crossed to the Porcupine and this time descended it to its junction with the Yukon. Fort Yukon was founded the following year by A. H. Murray, another employee of the Hudson's Bay Co.

<sup>1</sup> Dawson, G. M., Report of an exploration in the Yukon district, N. W. T., and adjacent northern portion of British Columbia, 1887: Canada Geol. Survey Ann. Rept., new ser., vol. 3, pt. 1, rept. B, pp. 135-138, 1889.

In 1861 Robert Kennicott,<sup>2</sup> of the Smithsonian Institution, following the old Hudson's Bay Co. route, crossed the divide to the head of Porcupine River and wintered at Fort Yukon.

From 1847 to 1869 the Hudson's Bay Co. controlled the fur trade of a large area from its post at Fort Yukon. The Russians from the lower Yukon made no serious attempt to interfere with the English traders on the upper Yukon, although Lukeen, the Russian trader at Nulato, made a trip up that river in 1863 for the purpose of investigating the fur trade at Fort Yukon.

The United States purchased Alaska from Russia in 1867, and two years later, on August 9, 1869, Capt. C. W. Raymond,<sup>3</sup> of the United States Army, arrived at Fort Yukon for the purpose of determining its position. Astronomic observation established this position to be west of the 141st meridian (the boundary line), and the United States flag was raised over the buildings and the Hudson's Bay trader ordered to vacate. The trading post was reestablished by the company at Howling Dog Rock, or what is now known as the Red Gate, at that time thought to be well within British territory. After having been established at this site for more than 15 years, the post was again moved eastward. The old buildings were burned, and a new post was built at the mouth of the Salmon Trout River in 1887. This post, now known as Old Rampart, was maintained by the Hudson's Bay Co. for only one winter, as in 1889 the position of the international boundary line was determined to be about 35 miles farther up the Porcupine River. This time the buildings were taken down and transported still farther upstream to a point now called Rampart House, just east of the 141st meridian. After a few years the Hudson's Bay Co. abandoned the post, which later became a Church of England Mission and still later a small trading post operated by Dan Cadzow. After Cadzow's death the post was abandoned, and at the time of the writer's visit in 1939 it was entirely deserted, although a small number of natives are said to live there during the trapping season.

In 1873 a party of seven prospectors, led by Jack McQuestion, portaged from the Mackenzie River to the Porcupine River and floated down to Fort Yukon.

R. G. McConnell,<sup>4</sup> of the Canadian Geological Survey, crossed from the Mackenzie to the Porcupine in 1888 and descended to the Yukon.

The first instrumental survey of the Porcupine River was made by

<sup>2</sup> Smithsonian Inst., Report of the secretary, 1861: Smithsonian Inst. Ann. Rept. 1861, pp. 39-40, 1862; Kirby, W. W., A journey to the Youcan, Russian America: Smithsonian Inst. Ann. Rept. 1864, pp. 416-420, 1865.

<sup>3</sup> U. S. Engineer Dept., Reconnaissance of the Yukon River, Alaska Territory, by Capt. C. W. Raymond, 113 pp., Washington, Government Printing Office, 1871.

<sup>4</sup> McConnell, R. G., Report on an exploration in the Yukon and Mackenzie Basins, N. W. T.: Canada Geol. Survey Ann. Rept., new ser., vol. 4, rept. D, pp. 134-139, 1890.

J. H. Turner,<sup>5</sup> of the United States Coast and Geodetic Survey, who reached what is now Rampart House in the fall of 1889 with the purpose of making a preliminary determination of the international boundary line at the Porcupine River. I. C. Russell, of the Geological Survey, accompanied the Turner party up the Porcupine as far as Old Rampart and returned to Fort Yukon a few days later on the same steamer that had carried the party up river. After completing winter observations at Rampart House, the Turner party made a trip by dog team to the coast near Herschel Island, returned to the Porcupine River, and on July 15, 1890, started downstream. Twenty-two days were spent on this down-river trip, during which a plane-table traverse was made of the Porcupine River from the boundary to Fort Yukon.

During the early winter of 1905 Roald Amundsen,<sup>6</sup> the Norwegian explorer, in the course of his celebrated journey through the Northwest Passage, made a trip from Herschel Island by dog team and skis up Firth River, crossed the divide to the Coleen River, and followed that river to the Porcupine. From the mouth of the Coleen the party traveled by the Porcupine River trail to Fort Yukon and by the mail trail up the Yukon to the telegraph station at Eagle, where Amundsen reported to the outside world the first successful trip through the long-sought passage from the Atlantic to the Pacific Ocean.

In 1907 E. M. Kindler,<sup>7</sup> of the Geological Survey, made a geologic reconnaissance of the Porcupine Valley between Fort Yukon and the Canadian Boundary. A small-scale geologic map was published with his report.

From 1909 to 1912 the International Boundary Survey<sup>8</sup> carried on work along the 141st meridian within the Porcupine River watershed. Representatives of the Boundary Commission visited the Porcupine and Black Rivers in 1909 to select transportation routes for further work along the boundary. On June 22, 1910, a Boundary Survey party reached Rampart House by river steamer and during the year carried triangulation 10 miles north of the Porcupine River along the 141st meridian. During 1911, with Rampart House as a base of operations, surveys were made both north and south of the river. In 1912 Boundary Survey parties again reached Rampart House by

<sup>5</sup> U. S. Coast and Geodetic Survey, Supt., Report of the year ending with June 1890: U. S. Coast and Geodetic Survey Ann. Rept. 1890, pp. 78, 95-97, 1891.

<sup>6</sup> Amundsen, Roald, *The Northwest Passage*, vol. 2, pp. 234-235, London, Archibald Constable & Co., Ltd., 1908.

<sup>7</sup> Kindler, E. M., *Geologic reconnaissance of the Porcupine Valley, Alaska*: Geol. Soc. America Bull., vol. 19, pp. 315-338, 1908.

<sup>8</sup> International Boundary Commission, *Joint report upon the survey and demarcation of the international boundary between the United States and Canada along the 141st meridian from the Arctic Ocean to Mount St. Elias*, pp. 43-79 [n. p., 1918].

steamer, proceeded overland northward and completed the work of triangulation, topographic mapping, stadia measurements, and final monumenting of the 141st meridian between Porcupine River and the Arctic Ocean.

In 1911, A. G. Maddren,<sup>9</sup> of the Geological Survey, with J. M. Jessup as assistant, accompanied a Boundary Survey field party for the purpose of making a geologic investigation along the 141st meridian from the Porcupine River northward to the Arctic Ocean. Field work was begun early in June and was carried on simultaneously with topographic surveys made by the Boundary Survey party. A strip of country 4 miles wide and 100 miles long was surveyed on a field scale of 1:45,000. Field work was completed late in August, and the survey parties returned from the Arctic slope to the Porcupine River.

The Porcupine River was visited in 1926 by another Geological Survey party, consisting of J. B. Mertie, Jr.,<sup>10</sup> geologist, J. O. Kilmartin, topographer, and two camp men, who left Fort Yukon on June 6 in two large canoes equipped with outboard motors and proceeded up the Porcupine River to the Sheenjek River and thence up that stream. Topographic and geologic maps of a part of the upper Sheenjek River Valley were made, and late in July the party returned to Fort Yukon.

## PRESENT FIELD WORK

### ITINERARY AND WORKING CONDITIONS

With instructions to survey as much of the Porcupine River and its tributaries as time and weather conditions would permit during the field season of 1939, the writer arrived at Fort Yukon on June 13 with Charles U. Southwick and Joe DeGrade as assistants. A 22-foot river boat belonging to the Geological Survey was reconditioned, launched, and equipped with a 22-horsepower outboard motor. Groceries, camp equipment, gasoline, and oil were purchased from the local stores. On June 17, while there was a fair stage of water in the river, the party left Fort Yukon with more than a ton of supplies and equipment. After an uneventful trip up the Porcupine River, during which some time was spent building signals for triangulation, the party arrived at Rampart House and the international boundary line, 210 miles from Fort Yukon, on June 22. From the camp at Rampart House the writer and an assistant, carrying instruments,

<sup>9</sup> Maddren, A. G., *Geologic investigations along the Canada-Alaska Boundary*: U. S. Geol. Surv. Bull. 520, pp. 297-314, 1911.

<sup>10</sup> Mertie, J. B., Jr., *The Chandalar-Sheenjek district, Alaska*: U. S. Geol. Surv. Bull. 810, 1927.

bedding, and food for several days, made back-packing trips to points along the 141st meridian. After completing work in the vicinity of the boundary, the party started down the Porcupine on June 30, mapping as it went, and on July 20 reached the mouth of the Coleen River. There a Peterboro canoe, brought upstream by a freight boat, awaited the party. Because of unusually low water, it was impossible to get the large motor-equipped boat into the Coleen River. The writer and one assistant therefore loaded the canoe with two weeks' provisions, surveying instruments, and camp equipment and started up the Coleen River on July 25. Difficulties of lining or "tracking" upstream, bucking swift water, pulling shallow bars, and dodging "sweepers" and caving banks made the rate of progress only 12 to 17 miles a day. A plane-table survey of the river was made on this upstream trip, and occasional stops were made for side trips to reach nearby hills and prominent points from which to expand survey work. Stormy weather stopped further work after the party had gone upstream about 75 miles, and the return trip to the camp on the Porcupine River was made in two days.

The first 2 weeks of August were spent in traversing the Porcupine River from the mouth of Coleen River to Graphite Point and mapping the low hills bordering the lower Ramparts. On August 16 the party again left the main river and started a survey up Black River, one of the larger tributaries from the south. Both the river boat and the canoe were used for this trip, which extended more than 100 miles upstream.

The return trip down the Black River to the Porcupine was begun on August 30. Survey work on the lower Porcupine River was completed, and the party reached Fort Yukon on September 6. Here the equipment was stored and the party disbanded.

#### METHODS OF MAPPING

During the trip upstream on the Porcupine in June the Geological Survey party had erected signals and flags on prominent points along the river. Many of these were later located by graphic plane-table triangulation from International Boundary Survey stations along the 141st meridian. This procedure gave a base line of 13 miles from which to cut in points as far down the Porcupine Valley as the mouth of the Coleen, where signals on Mount Coleen and Mount Marr were located. Vertical control was carried from elevations established by the International Boundary Survey along the 141st meridian. Solar azimuth observations were made with a small transit—three on Porcupine River, two on Black River, and one on Coleen River.

Standard plane-table equipment was used for topographic survey-

ing, and all prominent mountain tops that could be reached from the river in the time available were occupied as plane-table stations. In addition to the use of the vertical angle intersection method for contouring relief, the Porcupine River was traversed by the micrometer method from the boundary to Graphite Bluff, a distance of about 100 miles, and from the mouth of the Sheenjek River to a point near the confluence of the Porcupine and the Yukon Rivers. Micrometer-stadia traverse was also carried 70 miles up the Coleen River and 120 miles up the Black River. For most of this traverse a vertical 10-foot base was used, and shots ranged from 1,000 feet to more than 2 miles. Approximately 2,500 square miles was mapped on a field scale of 1:180,000, including more than 250 miles of micrometer traverse on a scale of 1:96,000, which was reduced to the smaller scale when compiled for publication. (See pl. 18.)

In connection with a long-range program for mapping many of the larger streams and lowland areas of Alaska by means of aerial photography, the Geological Survey during the summer of 1940 photographed the Yukon River from Circle to Fort Yukon, the Porcupine River from its mouth to a point about 10 miles above the mouth of the Sheenjek, and the Black River from its mouth to a point several miles above Salmon Village. The photographs were taken with a multiple-lens aerial camera from an altitude of about 16,000 feet, which gave a picture scale of approximately 1:30,000. They were compiled by a modified radial-line aerial triangulation method developed by the Geological Survey for multiple-lens photographs. This picture-scale compilation was reduced photographically to a scale of 1:125,000. A part of it is reproduced here as plate 19 to illustrate the complex drainage pattern of the Yukon Flats adjacent to the lower Porcupine River. A somewhat generalized reduction of the photographic compilation of the lower Porcupine and Black Rivers was used in the preparation of plate 18.

In the last two years the Army Air Forces has photographed all the area included in this report, and it is believed this information will be available for publication some time during 1944.

#### ACKNOWLEDGMENTS

The writer is indebted to many people at Fort Yukon and to trappers and natives along the Porcupine and Black Rivers for information and assistance. Special thanks are due to Jim Jackson and his crew on the river freighting boat for special favors during the summer of 1939 and to W. B. Rodman and Rev. C. P. Shelton. C. U. Southwick and Joe DeGrade were unusually competent assistants, as well as pleasant companions, in the field and in camp.

## PHYSICAL FEATURES OF THE AREA

## DRAINAGE

## PORCUPINE RIVER

## General features

The Porcupine River is one of the largest tributaries of the Yukon River. Its source is in Yukon Territory not more than 120 miles northeast of Eagle, on the Yukon River. It flows generally N. 30° E. for an air-line distance of 150 miles, then from the vicinity of Bell River, a short tributary from the east, the Porcupine swings in a great arc northwestward for 60 miles air line to the mouth of the Old Crow River, a large tributary from the north, and thence the general course of the river to its mouth is S. 70° W. The Porcupine River enters Alaska 45 miles air line below the mouth of the Old Crow River, and joins the Yukon 130 miles air line below the international boundary, but the distance by river from the boundary to Fort Yukon, at the mouth of the Porcupine, is 210 miles. Less than half of the course of the main Porcupine River is through Alaska and within the scope of this paper. For purposes of description this part may be divided into four sections; as named from east to southwest these are the Upper Ramparts, the Coleen Lowland, the Lower Ramparts, and the Yukon Flats.

## Upper Ramparts

The Upper Ramparts extend from the international boundary to Red Gate (see plate 18), a distance of about 40 miles by river. This section is characterized by a nearly continuous cliff wall, which ranges in height from more than 500 feet near the boundary to 250 feet at the mouth of the Salmon Trout River. R. G. McConnell,<sup>11</sup> of the Canadian Geological Survey, in describing his trip down the Porcupine in 1888 wrote:

The Ramparts is a local name employed by the traders to designate a contracted, walled valley or canyon. The portion of the valley of the Porcupine which passes under this name is exceedingly picturesque. In the upper part the banks rise steeply from the water's edge on both sides to heights of from 300 to 500 feet, and their green slopes are everywhere broken by shattered pinnacles and bold crags and cliffs of brilliantly tinted dolomites and quartzites standing almost on edge. As we descend, the enclosing walls become higher and steeper, and the lighter shades are replaced by more sombre hues. Some miles above Rapid River a band of basalt, edged with vertical cliffs, appears above and gradually descends in the banks of the canyon until it reaches the bottom, and from this on, the gorge is bounded by even, precipitous walls carved out of this rock. The uniformity of this part of the valley is interrupted at intervals by deep gashes cut by tributary streams through the basalt covering.

<sup>11</sup> McConnell, R. G., Report on an exploration in the Yukon and Mackenzie Basins, N. W. T.: Canada Geol. Survey Ann Rept., new ser., vol. 4, rept. D, p. 129, 1891.

Of these the principal one is Rapid River, which enters the Porcupine about 7 miles above the post. A mile below Rapid River is the Halfway Pillar, a projecting column of rock, which was supposed by the traders to be equidistant from Lapiere House and Fort Yukon.

With the exception of one small island that lies just east of the boundary, the Porcupine River through the Upper Ramparts is confined to one channel. The river gradient is about  $6\frac{1}{2}$  feet to the mile, and at normal water there are 12 riffles in this stretch of river. In two of these the current is swift enough to cause trouble for the inexperienced boatman, especially if his boat is heavily loaded. The first of these riffles is just below Old Rampart, where the river in its narrow valley floor crosses at right angles over a coarse gravel bar and impinges against a high rock cliff on the right bank. The other riffle likely to cause trouble is about halfway between Old Rampart and the mouth of Rapid River, where the stream flows swiftly in a wide shallow channel over coarse gravel and boulders. Many of the other riffles are short and swift, but none, even the two mentioned above, cause the experienced boatman much difficulty unless the water is very low. Between the riffles are stretches of river with a current of only 2 to 4 miles an hour. The longest of these is a stretch of about 8 miles at the lower end of the Upper Ramparts. This part of the river, because of the slack current, usually freezes early in the fall, and late river freighting boats are sometimes caught by early ice, and the crews are forced to winter at Old Rampart or to haul their freight upstream by dog team.

Extensive gravel bars exposed at normal water are not numerous in the Upper Ramparts, and as a rule the stream gravels are rather coarse. Large bars of fine sand and silt occur at two places, on the right side, just above the mouth of Rapid River and 1 mile above the mouth of Campbell River. The Red Gate, which marks the western entrance to the Upper Ramparts, is of interest as a landmark. (See pl. 20, B.) It is so named because of the red coloration in the canyon walls, which are almost vertical for 300 feet or more above the river. At the time of the Hudson's Bay Co.'s activities on the Porcupine River, the south wall of the Red Gate was known as Howling Dog Rock. The dogs used in tracking freight barges upstream were unable to haul loaded boats past this vertical cliff, and while the boats were being pulled up by men with long ropes the dogs had to scramble up the steep back slope of the rock and down again to join the party, or would remain behind and howl.

#### Coleen Lowland

The Coleen Lowland section of the Porcupine River extends from the Red Gate downstream for a distance of 37 miles to the eastern entrance of the Lower Ramparts. The river gradient through the

lowland area is noticeably less than in the Upper Ramparts, but because of numerous wide gravel bars and narrow channels around the islands this stretch of river is difficult to navigate at low water. Four miles below the Red Gate a wide gravel bar, known locally as Martin's Bar, splits the river into several swift channels. During the low water of midsummer this is probably one of the most troublesome spots on the Porcupine for river freighters. Not infrequently boats are grounded here for days, and their crews must unload and double trip or even portage the riffle.

Just below Martin's Bar the river turns abruptly north, flanked on the left by a 60-foot cut bank. This bend, known as the Fishhook Bend, is a large meander of the river across a wide flood plain and is about 12 miles long. In the northwestern part is a timber and brush-covered island about  $1\frac{1}{2}$  miles long, around which the river channels are shallow and, in places, swift. A number of mud slides appear to be filling the right channel. On the western side of the bend the river splits again into two channels around a timber-covered island, which is being cut away rapidly on the upstream side, filling that channel with snags and "sweepers." Between the lower end of Fishhook Bend and the mouth of the Coleen River, a large tributary from the north, the river divides in several places, forming large gravel bars and attaining a maximum width of 200 yards at normal water. The banks bordering the flood plain of the river are from 30 to 80 feet high.

About a mile below the mouth of the Coleen River the shoulder of a submerged bedrock reef is exposed in midstream during high water, and a mile below this rock is a large, timber-covered island. At low water a gravel bar on the north side of the island has been used as a landing field for a small airplane. For 10 miles below the island the river is confined to one channel at normal water.

#### Lower Ramparts

The Lower Rampart section of the Porcupine River extends from a point about 13 miles below the mouth of Coleen River to the eastern edge of the Yukon Flats, a distance by river of about 16 miles. Through the Lower Ramparts, a stretch of about 10 miles, the river is nearly straight and has an estimated current speed of about 3 miles an hour. Cliffs 50 to 60 feet high, composed mainly of limestone with thin beds of black shale and quartzite, border the river. The color contrasts in the canyon walls produce a striking effect.

#### Yukon Flats

The Yukon Flats section of the Porcupine River includes the part between Graphite Point (see pl. 18) and the mouth of the Porcupine, a distance of 65 miles air line but more than 100 miles by river. On

passing Graphite Point and entering the Yukon Flats the river changes abruptly in character, flowing in a meandering course through the timbered flats with a current of 3 or 4 miles an hour. Its many loops, sharp turns, and in places bewildering network of channels and sloughs presents many problems to the inexperienced boatman, especially during high water. The main channel is difficult to recognize because of the cloudy water, and it is not unusual for a boatman to travel several miles in what appears to be deep water, only to encounter shallow gravel bars that completely obstruct navigation or a new-cut channel through the timber which suddenly narrows and is completely blocked by "sweepers" (fallen trees) and snags.

The width of the main channel through the Yukon Flats at the normal stage of water ranges from 200 yards to 800 yards, and averages about 400 yards. Several of the side channels are nearly 400 yards wide and are more than 10 miles long. They increase in number and complexity as the Porcupine approaches the Yukon. Aerial photographs disclose numerous additional tributary streams joining the outer loops of some of these meandering side channels. About  $1\frac{1}{4}$  miles below Fort Yukon a slough a mile long connects the Porcupine River with the Yukon, although the main Porcupine parallels the Yukon for several miles below this slough to the westernmost confluence of the two rivers. Plate 19 shows this part of the river in detail. The river banks of the Porcupine through the Yukon Flats are composed of fine gravel, silt, and sand. They are from 15 to 20 feet high at low water and are nowhere more than a few feet above high water. Large gravel bars are numerous. Flood waters often undercut the river banks until the overhanging shelf of peat, trees, and brush drops into the stream with the result that snags and sweepers dangerous to navigation are common.

#### TRIBUTARIES

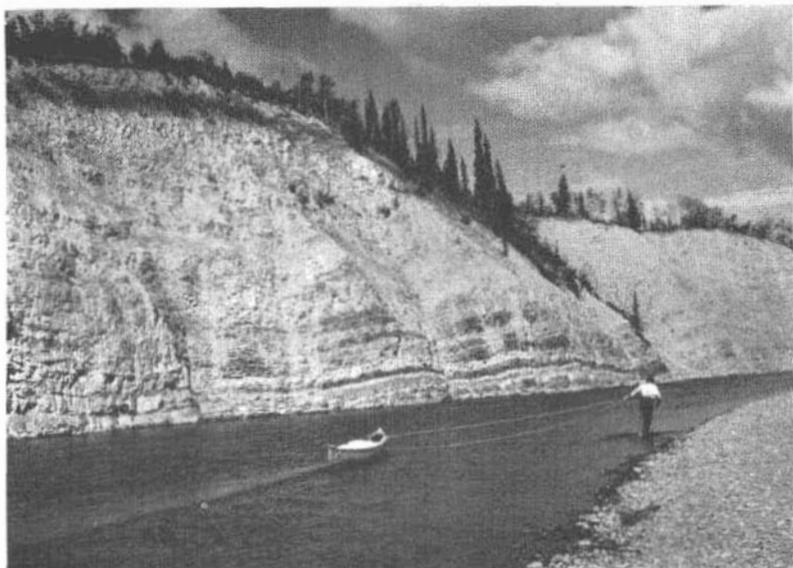
The principal tributaries of the Alaskan part of the Porcupine River, from the lower river upstream, are Little Black River, Black River, Sheenjek River, Coleen River, Salmon Trout River, Rapid River, Campbell River, and Sunagun Creek.

Little Black River joins the Porcupine in the Yukon Flats 17 miles above Fort Yukon. It is unmapped except for an area of a few miles near its mouth, a map of which was compiled from aerial photographs. The river has not been visited by members of the Geological Survey, but according to reports by natives, it is a sluggish stream, meandering for more than a hundred miles through the Yukon Flats. Its source is said to be in the mountains along the international boundary about a hundred miles south of the point where the Porcupine crosses the boundary.

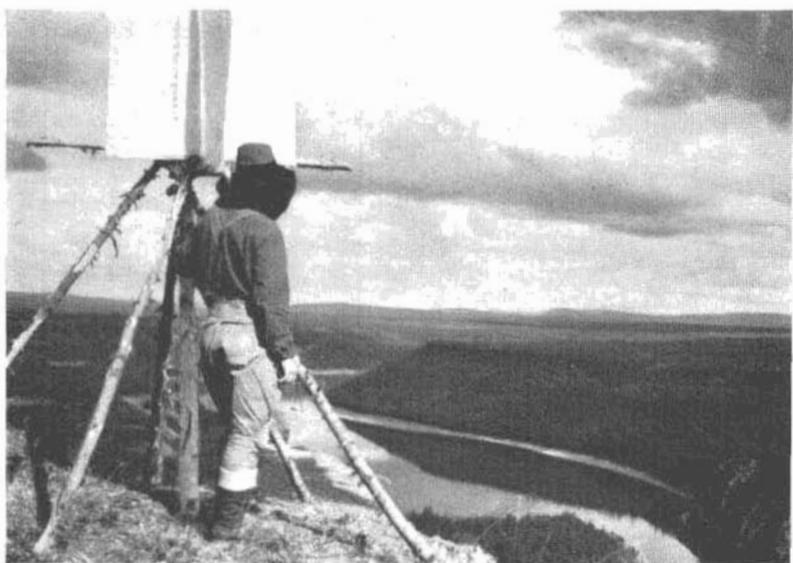
Black River, one of the larger tributaries, joins the Porcupine in the Yukon Flats about 25 miles above Fort Yukon. At a normal stage of water it has two mouths, which are about 2 miles apart and are locally known as the south mouth and the north mouth. At high water the channels to the north and south mouths form a flood plain meander of the Porcupine River, about 9 miles long. River boats generally use the north mouth to enter the Black River, although either channel can be used at a fair stage of water. The river is characterized by great sweeping meanders and loops for more than a hundred miles through the Flats, and oxbow lakes are numerous and well developed. Fishhook village is 75 miles by river from the south mouth but only 28 miles air-line distance. Natives using small boats often save several miles of river travel by portaging from one bend to another. The river banks, composed of silt and peat, are seldom more than 20 feet above low water. They are covered with spruce and cottonwood and, on well-drained ground, some birch.

The western part of the river has an average width at normal water of 150 yards. For 35 miles upstream from the Porcupine high bars of fine gravel are found on the inner side of every bend. These bars afford ideal camping places at almost any stage of water. For the next 40 miles good gravel bars are not so common, and the river banks in general are lower and grass covered. Much of the river to this point is deep enough at normal stage for boats drawing 2 feet of water, but in several places where the stream widens out gravel bars and riffles make navigation difficult during low water, even with a boat of shallow draft.

The first high bluff is about 6 miles above Fishhook Village on the southern, or left, side. It is the northwest end of a timber-covered ridge between 120 and 150 feet high, which marks the eastern edge of the Yukon Flats for some distance south of Black River. The river flows for a short distance at the foot of the ridge, which here has a steep and rocky slope of about 70 feet. East of this ridge the river meanders for several miles through the timber-covered flats. On the north, or right side of the river, about 13 miles above Fishhook Village, the river flows at the foot of a steeply sloping ridge in a series of riffles and slack water where the stream bed is rocky and uneven and in places quite shallow. Below this ridge, where the river flows out into the flats, there is a mile-long bar, locally known as Deadmans Riffle. At low water it is impossible to cross this bar with a loaded boat without lining, poling, or dragging for a short distance. Upstream from the ridge for 10 miles the valley on both sides of the river is wide, flat, timber-covered, and dotted with many small lakes, some of which, especially to the south, are more than a mile long. This part of the river was not traversed by the writer, but according to informa-



A. RAMPARTS OF LOWER COLEEN RIVER.



B. PORCUPINE VALLEY, LOOKING NORTHEAST FROM STATION AT RED GATE.



A. NATIVE VILLAGE AT FORT YUKON.



B. RIVER FREIGHTING ON PORCUPINE RIVER.

tion from the natives, several large tributaries join it above the mouth of a stream called Salmon River, which flows southwest from the hills bordering the international boundary. Some of these eastern tributaries are said to be navigable by a river boat for long distances at normal water. The main Black River flows from the south, roughly paralleling the boundary line, for many miles. In this upper part it is said to be confined to one fairly deep channel with a current, in long stretches, of not more than 2 miles an hour.

The Sheenjek River has not yet been mapped south of latitude  $67^{\circ}30'$ . The northern part of the valley has been described by Mertie.<sup>12</sup>

Coleen River is one of the largest tributaries of the Porcupine River from the north. Within the mapped area (see pl. 18) it flows S.  $30^{\circ}$  W. for about 35 miles and then changes its course abruptly to S.  $45^{\circ}$  E. to join the Porcupine. In its upper part the river flows along the west side of a wide alluvium-filled valley, in many places with several narrow braided channels. Toward the mouth the valley narrows to a canyon as the stream cuts through the Coleen Hills northeast of the Lower Ramparts of the Porcupine (see pl. 20, A). This canyon, cut in banded limestone, shale, and quartzite, closely resembles the Lower Ramparts of the Porcupine, which it almost parallels. Most of the flood-plain bars are composed of coarse gravel overlain with fine sand and silt. Driftwood is strewn over the bars, often in great piles on the higher ground near the brush line. At low water the numerous bars make it comparatively easy to line a shallow-draft boat upstream, although the main channel is often hard to recognize where the stream is braided. Trappers and natives familiar with the river take loaded river boats, usually equipped with outboard motors, more than 100 miles up the Coleen. Such trips are usually made in the early spring or during high water, in order to avoid the troublesome shallow bars and the riffles. On the lower river sweepers and snags are common. No large tributaries flow into the Coleen River within the area mapped, but according to reports several large streams join it 30 or 40 miles above Owens Cabin. At least two of these drain the divide between Sheenjek River and the Coleen. The headwater streams which flow generally south or southwest originate in the mountains that flank the south face of the Brooks Range.

Salmon Trout River is formed by the junction of several small streams that head in the mountains along the international boundary. The main stream flows a little north of west for 11 miles and joins the Porcupine at Old Rampart. Its valley floor is narrow, and the right wall is marked by high steep slopes and numerous cut banks.

<sup>12</sup> Mertie, J. B., Jr., Preliminary report on the Sheenjek River district: U. S. Geol. Survey Bull. 797, pp. 99-123, pl. 2, 1929; The Chandalar-Sheenjek district: U. S. Geol. Survey Bull., 810, pp. 87-139, pls. 1, 2, 1930.

The water is very clear and bars of fine gravel and sand are common. During the days of the Hudson's Bay post at Old Rampart, this river was said to be one of the best fishing streams in the district.

Rapid River, another large tributary from the north, heads east of the international boundary and northeast of the area shown on plate 18. It flows for 40 or 50 miles in a general southeasterly direction from the mountains bordering the boundary, then almost due south through a lake-dotted lowland, and enters the Porcupine through a steep-walled canyon that is about 2 miles long. The stream is not available from the Porcupine because of the very steep, boulder-strewn rapids that extend three quarters of a mile upstream from its mouth, but above this the stream is deep and confined to one channel.

Campbell River, tributary to the Porcupine from the southeast, is really a large creek that heads in low mountains west of the boundary. Below the confluence of its two main tributaries, which are each about 7 miles long, it flows west to join the Porcupine through a narrow, highwalled valley or canyon. The gradient of the stream is steep and its clear water flows over or between large boulders. Grayling are numerous and unusually large for a small stream.

Sunagun Creek is a good-sized stream that heads in the hills along the international boundary about 13 miles north of Rampart House. It flows south for most of its length west of the boundary and enters the Porcupine through a canyon 500 or 600 feet deep.

#### RELIEF

The Porcupine Valley from its mouth to the international boundary may be divided for the purpose of describing its relief into four provinces—the Yukon Flats, the Coleen Hills, the Coleen Lowland, and a Highland province bordering the international boundary. (See fig. 13.)

#### YUKON FLATS

The great alluvial basin through which the Yukon River flows from Circle to Fort Hamlin, a distance of 185 miles, extends up the Porcupine Valley for 65 miles air line and includes the area through which the Black River and Little Black River flow west of longitude  $143^{\circ}30'$ , as well as the lower Sheenjok River, south of latitude  $67^{\circ}20'$ . The northern border of the Yukon Flats in the Porcupine Valley extends N.  $60^{\circ}$  W. from Graphite Point, on the Porcupine River, for about 30 miles to the Sheenjok River, and thence S.  $75^{\circ}$  W. The eastern border extends from Graphite Point S.  $10^{\circ}$  W. for at least 40 miles. The maximum width of the portion of the Yukon Flats drained by the lower Porcupine and its tributaries is at least 75 miles from north to south and 65 miles from east to west.

The Yukon Flats are not densely timbered. Aerial photographs taken by the Geological Survey for mapping purposes indicate that heavy stands of timber, mainly spruce, border the main streams only, and that a short distance away from these streams there are large open areas only sparsely covered with scattered trees and low brush.

As the name implies, the Yukon Flats are almost entirely devoid of relief. The gradient along the lower Porcupine River from Fort Yukon to Graphite Point, an air-line distance of 65 miles, is about 2 feet to the mile. The gradient of Black River from its mouth to

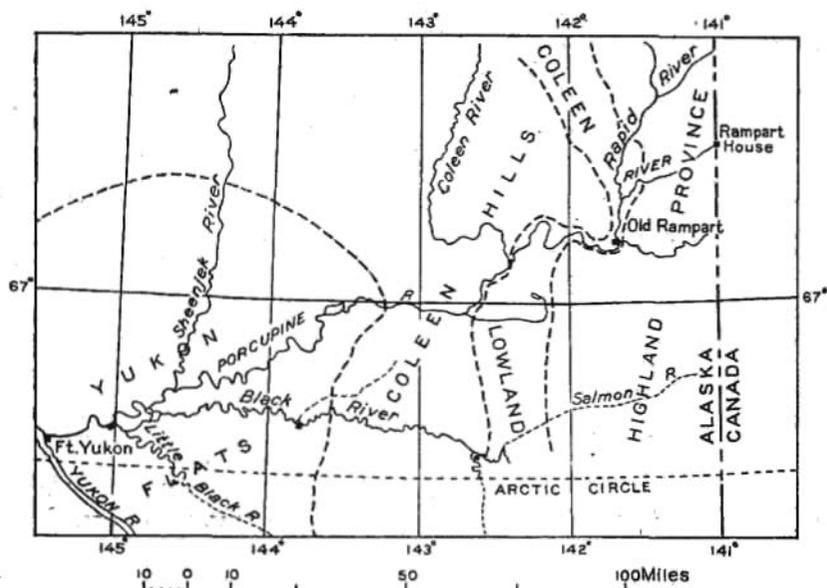


FIGURE 13.—Physiographic provinces of Porcupine Valley.

Fishhook Village, an air-line distance of 45 miles is  $2\frac{1}{2}$  feet. The land surface in the Porcupine Valley has a pronounced slope south-westward.

#### COLEEN HILLS

The Coleen Hills are considered to include the highland north and south of the Porcupine River between Graphite Point and the Red Gate. This area embraces the low rolling hills between Black River and Porcupine River at the eastern edge of the Yukon Flats, the Coleen-Sheenjek divide, and the chain of hills from the Lower Ramparts northeast to and including Rabbit Mountain. Graphite Point is the first high bluff and rock outcrop seen along the river when ascending the Porcupine. It is 60 feet high and marks the northeastern limit of the Yukon Flats, being the end of a spur from the low, rolling hills that form the divide between the lower Coleen

and Sheenjek River Basins. North of the Lower Ramparts, which cut through the Coleen Hills, more or less gentle slopes lead to the rounded, smooth ridges and domed tops of the upland, which in few places rises more than 1,200 feet above the river.

Two tops stand out as landmarks—Mount Coleen, a round-topped dome with an elevation of 2,324 feet, 8 miles north of Lower Ramparts, and Mount Marr, elevation 1,900 feet, 3½ miles west of Mount Coleen. The summits of these mountains are above the timber or brush line and can be seen for many miles up and down the Porcupine River. Both are visible on clear days from high points along the 141st meridian near the Porcupine River. A low saddle connects the two mountains. Northwest of Mount Marr, along the western divide of the Coleen River, the highland gives way to low, rolling timbered ridges about 200 feet high. Two of these ridges extend eastward, about 8 miles apart, across the flats to the Coleen River and are landmarks along this part of the valley, which otherwise is devoid of relief. To the north a ridge about 600 feet above the valley appears on the right side of the Coleen. This ridge trends in a northeasterly direction, and the river flows at the foot of steep rocky cliffs on the eastern face of the ridge for several miles. North of the Coleen the topography is characterized by irregular rounded hills and ridges connected by low saddles, the average elevation being about 1,500 feet. Very few of these ridges are above timber or brush line.

Rabbit Mountain, elevation 3,014 feet, is perhaps the dominant topographic feature of the Coleen Hills. It rises rather steeply from the extensive lowland east of Coleen River. Because of the swampy character of the surrounding flats it is difficult to approach this mountain during the summer except from the south. A native trail from Old Rampart follows the low timbered ridge northwest to Rabbit Mountain and probably crosses the Coleen several miles above Owens Cabin.

South of the Lower Ramparts the gently rolling hills are only a few hundred feet above the Porcupine River. These hills trend, in general, southwestward and form part of the east boundary of the Yukon Flats. They connect in a more or less continuous ridge with the highland that approaches the right side of Black River. The hills are entirely covered with timber.

#### COLEEN LOWLAND

The Coleen Lowland extends from the eastern entrance of the Lower Ramparts northeast to the Red Gate, where it is constricted by the long ridge that connects Rabbit Mountain, in the Coleen Hills to the north, with a high, rounded mountain at the western edge of the Highland

province. The greater part of the Coleen Lowland lies south and east of the Porcupine River. This part extends south for many miles and probably includes the north-south valley of the upper part of the Black River. Between the Lower Ramparts and the Red Gate the Porcupine flows through the lowland in a great meander called Fishhook Bend. Five miles southeast of the mouth of the Coleen River a dome-topped unnamed mountain rises steeply from the surrounding Coleen Lowland to an elevation of 2,060 feet, and serves as a prominent landmark.

A narrow intermediate lowland at somewhat higher altitude above the river connects the northern and southern lowland areas. This lowland extends along the north side of the Porcupine above the Red Gate for a distance of about 8 miles, then northward along both sides of the river for 9 miles to Rapid River. The northern part of the Coleen Lowland includes the lower Rapid River Valley above the canyon and extends, with a width of 10 miles or more, northwest, between Rabbit Mountain and Spike Mountain, toward the Upper Coleen, a distance from the Porcupine River of at least 40 miles.

#### HIGHLAND PROVINCE

The Highland province extends eastward from the Coleen Lowlands to the international boundary and beyond. Within the area mapped it is characterized by somewhat subdued topography. The average elevation of most of the higher, rounded tops in the area is about 2,000 feet above sea level, or about 1,400 feet above the river at Old Rampart. To the south and southwest the elevation increases to more than 3,000 feet. South of the Upper Ramparts the rolling hills and ridges are drained by short tributaries of the Porcupine. One of the landmarks of this province is a limestone ridge about 2,000 feet high, 5 miles northeast of Old Rampart. It stands out from the surrounding features because of the light-colored rocks on its rugged crestline.

South of the Porcupine, at the international boundary, a high divide trends north-south. Near the boundary the Rampart walls are almost 700 feet high, and above the canyon on both sides of the river there is a nearly level terrace a mile wide. About 3 miles from Rampart House, south of the river and about 1,000 feet west of the boundary, is a rocky point 2,260 feet high, known locally as Canalaska Mountain, that forms a prominent landmark visible for many miles down the Porcupine. South of Canalaska Mountain for a considerable distance the divide is on or very near the 141st meridian. An old trail follows the smooth open ridges of the divide, passing over rounded summits and into shallow saddles, crossing and recrossing the boundary. Farther south, near the head of Salmon Trout River, the ridges are higher and narrower, and the slopes steeper. The elevation of the summits is from 2,000 to 2,800 feet.

Between Salmon Trout River and a large tributary of Black River, that crosses the international boundary just south of the Arctic Circle, the topographic relief is much stronger, several summits being over 4,000 feet high.

Between the Porcupine River and Rapid River the main divide lies east of the boundary. It has several summits more than 3,000 feet high. West of the boundary and south of Rapid River a high ridge from the north-south divide terminates in several short spurs with small rounded, rocky summits that slope steeply to the eastern edge of the Coleen Lowland. The steep slopes give the effect of rugged topography in sharp contrast with the smooth, rounded topography to the east and south.

North of the Rapid River Valley, at the north edge of the area mapped, is a high divide which trends west. From the divide a long, high spur extends south, bordering the east edge of the Coleen Lowland. It is topped by a sharp conical peak 3,824 feet high, locally known as Spike Mountain. Spike Mountain is the outstanding landmark within the mapped area. It is visible from points far down the Porcupine River and was sighted in 1927 by J. B. Mertie and the writer from Index Mountain, in the Chandalar-Sheenjek district, more than 80 miles distant.

## TRANSPORTATION AND COMMUNICATION

The Yukon River serves as the great natural highway for this part of Alaska during the summer. The American & Yukon Navigation Co. operates boats on a regular schedule from Whitehorse, Y. T., down the Yukon River and up the Tanana River as far as Nenana, where connection is made with the Alaska Railroad. Trips on this route have been very popular with tourists, who enter Canada by way of Skagway and proceed along the White Pass route to the head of navigation on the Yukon. Fort Yukon is one of the most interesting stops because of the large native village and the Mission there and the fact that the settlement lies a few miles north of the Arctic Circle. In addition to river steamers, launches are used on the river to haul freight and mail between settlements. (See pl. 21, A, B.)

Most of the heavy freight for the settlements on Porcupine River is brought down the Yukon by river steamer to Fort Yukon, where it is reshipped up the Porcupine by means of shallow-draft launches pushing 30- to 40-foot scows, each carrying 80 tons or more. Two or more round trips are made monthly with these outfits during the open season. Experience, skill, and patience as well as large quantities of expensive gasoline are required to deliver a full load of freight to Old Crow Village, 275 miles up the Porcupine, during the low-water stage of the river in late summer. Some tourist parties have made the trip

from Peel River in the Mackenzie River drainage basin, over the Rat River portage to Bell River, and down the Porcupine to the Yukon, using either light canoes or portable folding boats.

During the early days of the Hudson's Bay Co.'s operations on the Yukon and Porcupine Rivers, supplies were brought to the trading posts by way of Fort McPherson on the Peel River, over the divide to Bell River, and down the Porcupine. Later, supplies were brought upstream from Fort Yukon to Old Rampart House on scows tracked by native crews. The first river steamer to ascend the Porcupine River was the "Yukon," which, during the late summer of 1889, transported a United States Coast and Geodetic Survey party under J. H. Turner to a point about 50 miles below Rampart House. There low water made it necessary to unload the passengers and freight; the steamer returned downstream and Turner and his party worked for two months tracking their supplies up the river to Rampart House in a whaleboat and a lighter.

Because of the difficulties of overland transportation and the slowness of ordinary river transportation, the airplane is playing an increasingly important part in carrying passengers, mail, and freight to many remote parts of Alaska. There is an air field at Fort Yukon but most of the airplanes serving this region are based at Fairbanks, 150 miles to the southwest. Land planes are commonly used for both freight and passengers because of their ability to carry greater payloads; but pontoon planes often land in the river at Fort Yukon and make trips to points more easily reached by water landings. At several places in remote parts of the Porcupine Valley, supplies for trappers and an occasional prospector can be landed by airplane during the late summer or early fall, when the rivers are low and the exposed gravel bars can be used as landing fields. During the winter airplanes serving this region are equipped with skis, and though trips to the Porcupine district are less frequent than in summer, good landing places are much more easily found. Practically all airplanes operating in Alaska are equipped with two-way radios, which often are a means of sending and receiving emergency messages. Dog teams are still used by the natives and trappers for winter travel, but most of the mail and freight is now transported by airplane.

The United States Signal Corps formerly maintained a radio station at Fort Yukon, but it has been discontinued and at the time of the writer's visit messages were handled through a station operated by the Northern Commercial Co. Amateur radio operators handle messages at certain remote points not served by the Signal Corps or commercial stations. Canada's entry into the war and certain emergency regulations forced amateurs in Canada to discontinue operations and dismantle their equipment in the fall of 1939. As a result, direct com-

munications between Old Crow Village and other Canadian settlements, and points in Alaska, was eliminated.

### CLIMATE

The Porcupine Valley, in common with most of northern Alaska, has a sub-Arctic climate characterized by great seasonal variations in temperature, rather scant rainfall, and few severe storms. Winter weather may be expected from October to April. From May through September the weather is usually mild. In late June and July 1939 temperatures between 95° and 100° F. were recorded at Rampart House on several days. Weather Bureau records taken at Fort Yukon show an average snowfall of 45 inches. This precipitation is fairly well distributed throughout the year and is probably somewhat lighter at Fort Yukon than in the upper Porcupine Valley.

As a rule the first killing frost occurs before the middle of September at Fort Yukon and probably 10 days earlier at Rampart House. The winters are long and very cold, although wind storms and prolonged blizzards are rare. Temperatures of 70° below zero have been recorded at Fort Yukon and Rampart House.

The spring break-up of ice in the Yukon occurs about the middle of May at Fort Yukon, but it is often the first of June before the ice goes out of the Porcupine at Rampart House. The ice does not disappear from many of the lakes along the Porcupine River until late in June.

### VEGETATION

Forests of spruce cover much of the Porcupine Valley, poplar or cottonwood is common over most of the area, and birch is found on many of the well-drained ridges and hills from Graphite Point to the international boundary. Willow and alder brush grow in the low swampy areas, and buckbrush or dwarf black birch is abundant. Trees are scrubby and stunted on the uplands but may attain a diameter of 2 feet or more in the lowland areas. The timber line is about 1,500 feet above sea level, so most of the rolling hills of the Porcupine Valley below the Upper Ramparts are wooded.

Large areas in the Porcupine Valley have been burned over by forest or brush fires at one time or another, and stands of virgin timber have been replaced by second growths of spruce, poplar, or birch, which make travel difficult. Recent fires have swept much of the area between Porcupine River and Black River.

Timber is cut from spruce stands along the lower Porcupine for the sawmill at Fort Yukon. Cordwood also is cut on this part of the river and rafted downstream to the village.

Redtop and bunch grass suitable for horse feed can be found along

the river banks and in the valleys of many of side streams and gulches in the rolling hills above Graphite Point. A few red raspberries are found, usually at abandoned camp or cabin sites, and blueberries are plentiful during July and August on the hills from Mount Marr to the international boundary. The low-bush cranberry grows over the same hills, but the red currant is restricted to heavily timbered areas along the valley floors.

At Fort Yukon and at several cabins along the Porcupine and upper Black Rivers such hardy garden vegetables as potatoes, beets, turnips, carrots, radishes, cabbages, lettuce, and rhubarb are grown without difficulty in an average summer. Tomatoes and cucumbers are grown in hot houses at Fort Yukon. In addition to the numerous well-kept vegetable gardens, many flower gardens flourish at Fort Yukon from June to September.

### ANIMAL LIFE

The larger game animals of the Porcupine Valley include moose, caribou, bear, and mountain sheep. In recent years none of these appear to be very numerous; but during the caribou migration in late August and September, hundreds of these animals cross the Porcupine River between Rampart House and Oil Crow Village, and many are killed by the natives along this stretch of river. Rampart House survived as a trading post for many years because of the migration of the caribou, which furnished food and clothing for the natives. The natives report that caribou can be found in the hills and low mountains near Spike Mountain during the spring and summer. Moose, several of which were seen by the Geological Survey party during the summer of 1939, were reported by the natives to be increasing in numbers. During the summer they are usually found in the low, timbered valleys and around lakes and ponds, where they are hunted by the few natives in the district, not only for food but also for the hides from which many necessary articles of footgear and clothing are made. Bear appear to be quite common over most of the area. Several were seen along the Coleen River and in other parts of the district by members of the Survey party. Mountain sheep were not seen, but were reported to be present in small numbers near the head of Salmon Trout River and around Spike Mountain.

The fur-bearing animals of the region include muskrat, fox, lynx, marten, mink, squirrel, land otter, wolf, and coyote. Porcupines, for which the river is named, were not seen during the summer of 1939.

Game birds such as ptarmigan and grouse, formerly found in great numbers throughout the Porcupine Valley, have been noticeably scarce during the past few years. These birds, like rabbits, appear in increasingly large numbers for a few years and then decrease for 2

or 3 years, after which another cycle begins. Ducks and geese in great numbers and of many varieties nest in the Porcupine Valley, especially in the Black River area, where numerous oxbow lakes and the quiet stretches of the river itself afford ideal nesting and feeding places. During the fall migration, which takes place here late in August and early September, great flocks of ducks and geese were constantly seen winging southward low over the tree tops from one crowded lake to another. Large numbers of geese flew protestingly from one gravel bar to another ahead of the river boat as the Geological Survey party made its way upstream on Black River. On the downstream trip, when the speed of travel was much more rapid, the boat would sweep around a river bend and into large flocks of geese before they could take flight. During the late summer great numbers of ducks and geese are shot by hunters for food.

Fish play an important part in the lives of the native people. If they cannot be taken in sufficient quantity to provide food for the natives and for their sled dogs, caribou and moose meat must supply the deficiency. Some native families from the Porcupine Valley spend the summer on the Yukon River catching salmon for winter use. Fish of several kinds were noted by the writer in the streams of Porcupine Valley, but salmon, which form a considerable part of the food supply along the Yukon River, were scarce. The natives report that in former years salmon were taken in great numbers along the Porcupine River, but the run has steadily decreased, and in recent years few are caught at any of the camps above the Lower Ramparts. Whitefish, grayling, and pike seem to be plentiful and are taken in nets by the natives. Trout were caught in some of the small clear-water creeks. In the Coleen River grayling as much as 24 inches long are abundant and are dried and smoked by natives and trappers for dog food. Along Black River some salmon, as well as grayling, whitefish, and pike, are caught.

## SETTLEMENTS

The largest settlement on the Porcupine River, Old Crow Village, is located in the center of a rich fur-trapping district at the mouth of Old Crow River, Yukon Territory, 65 miles east of the international boundary. The village has a population of about 200 and includes a trading post, school, church, and a Royal Northwest Mounted Police Station.

Fort Yukon, on the Yukon River near its confluence with the Porcupine, is the largest settlement in the district here described and is the point of entry for the Porcupine Valley. The 1940 census gives the population of Fort Yukon as 274. Although it is one of the oldest English-speaking settlements in Alaska, its permanent white population is now less than 50. From the early days to the present time

it has been the principal trading post for the fur trappers of the upper Yukon. It has two well-stocked stores, a roadhouse, a small sawmill, a combined dance hall and moving picture theater, a school for white children, and a school for natives. The native village is the largest on the Yukon River and consists mainly of well-built log cabins. (See pl. 21, A). The Episcopal Church has a large establishment at Fort Yukon. The good-sized, well-constructed log buildings include the famous Hudson Stuck Memorial Hospital, a mission, and a church. The hospital is modern and well equipped and has rendered great service to both natives and whites from the large area encompassed in the upper Yukon and Porcupine Valleys.

Old Rampart, one of the largest settlements on the Porcupine River west of the 141st meridian, is about 175 miles from Fort Yukon. In 1939 Old Rampart had a population of about 30. It has a small trading store and several well-built log cabins.

Rampart House on the boundary was once a large trading post and a good-sized native village. Although it appeared deserted when visited by the Survey party during the summer of 1939, the buildings were in good condition and included a large frame dwelling house, a store building, a church, and about a dozen well-constructed log cabins. A few natives from Rampart House were reported spending the summer at Old Crow.

Along the Porcupine River, between Fort Yukon and Rampart House, are 25 or 30 trappers' cabins and several small settlements, some of which seemed deserted during the summer of 1939. Named in order upstream from Fort Yukon are "Seventeen Mile" at the mouth of Little Black River; Old Village, about 5 miles below the Lower Ramparts; Burnt Paw, about 6 miles below the mouth of the Coleen; Old Rampart; and Rampart House. With the exception of the last two none of these settlements in recent years have contained more than two or three Indian families.

Fishhook and Salmon River Villages are the only settlements on Black River. Fishhook, about 75 miles upstream from the river's mouth, has a small trading post but no school or church. The population is listed as 33, all natives. Salmon River Village, about 100 miles above Fishhook, has a population of 15 or 20, according to native reports.

Most of the trappers from the Porcupine and Black Rivers go downstream in May at the end of the muskrat season and spend the summer at Fort Yukon. By the first of September most of these people have started upstream in boats heavily loaded with supplies for winter trapping. Practically all the trappers have up-to-date radio receiving sets capable of year-round reception from the new broadcasting station at Fairbanks, consequently, most of them are well informed about world events as well as current fur prices.

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UNITED STATES DEPARTMENT OF THE INTERIOR  
Harold L. Ickes, Secretary  
GEOLOGICAL SURVEY  
W. E. Wrather, Director

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Bulletin 933

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# MINERAL RESOURCES OF ALASKA

REPORT ON PROGRESS OF  
INVESTIGATIONS IN  
1940

PAPERS BY

PHILIP S. SMITH, FRED H. MOFFIT  
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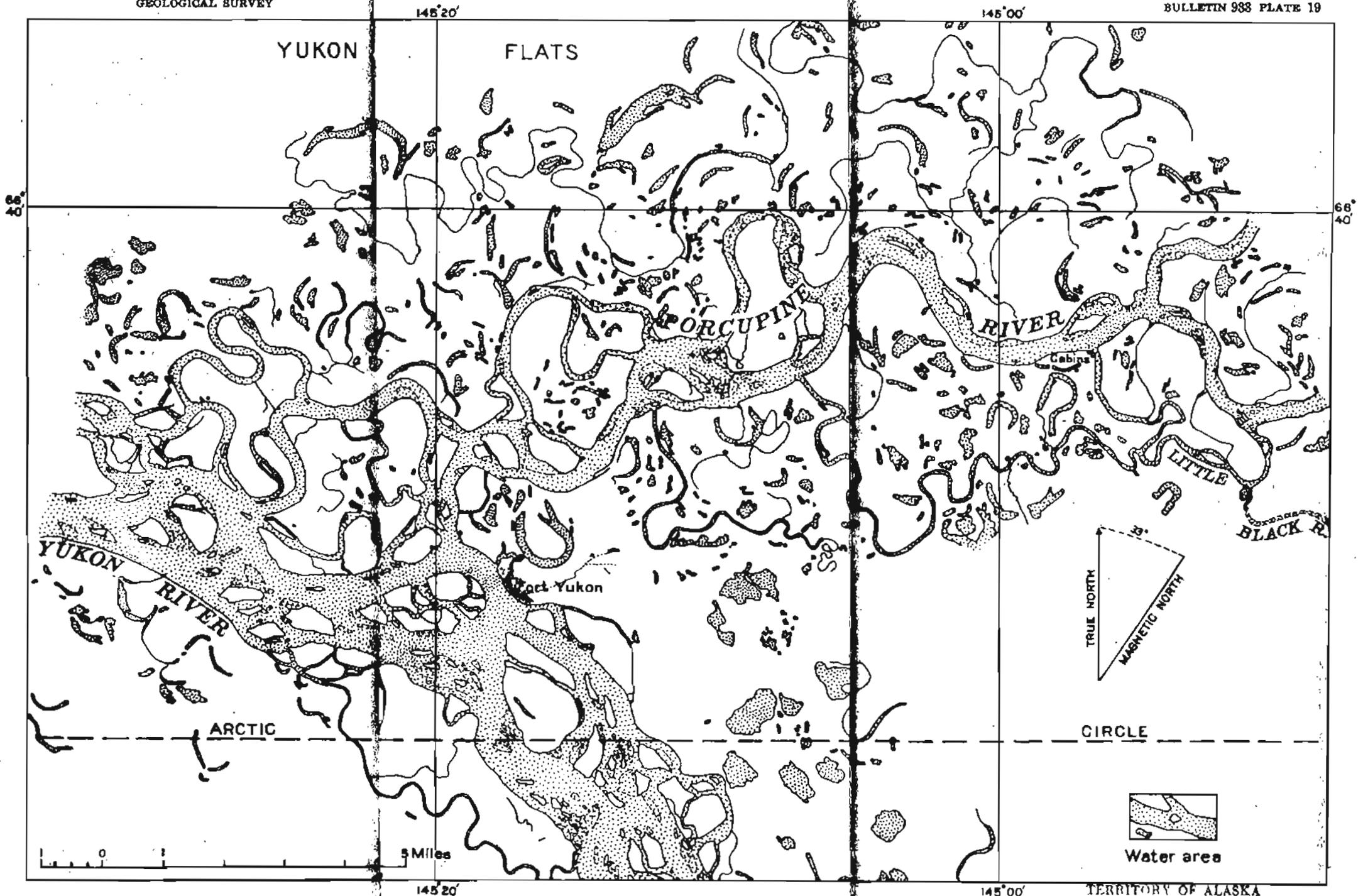
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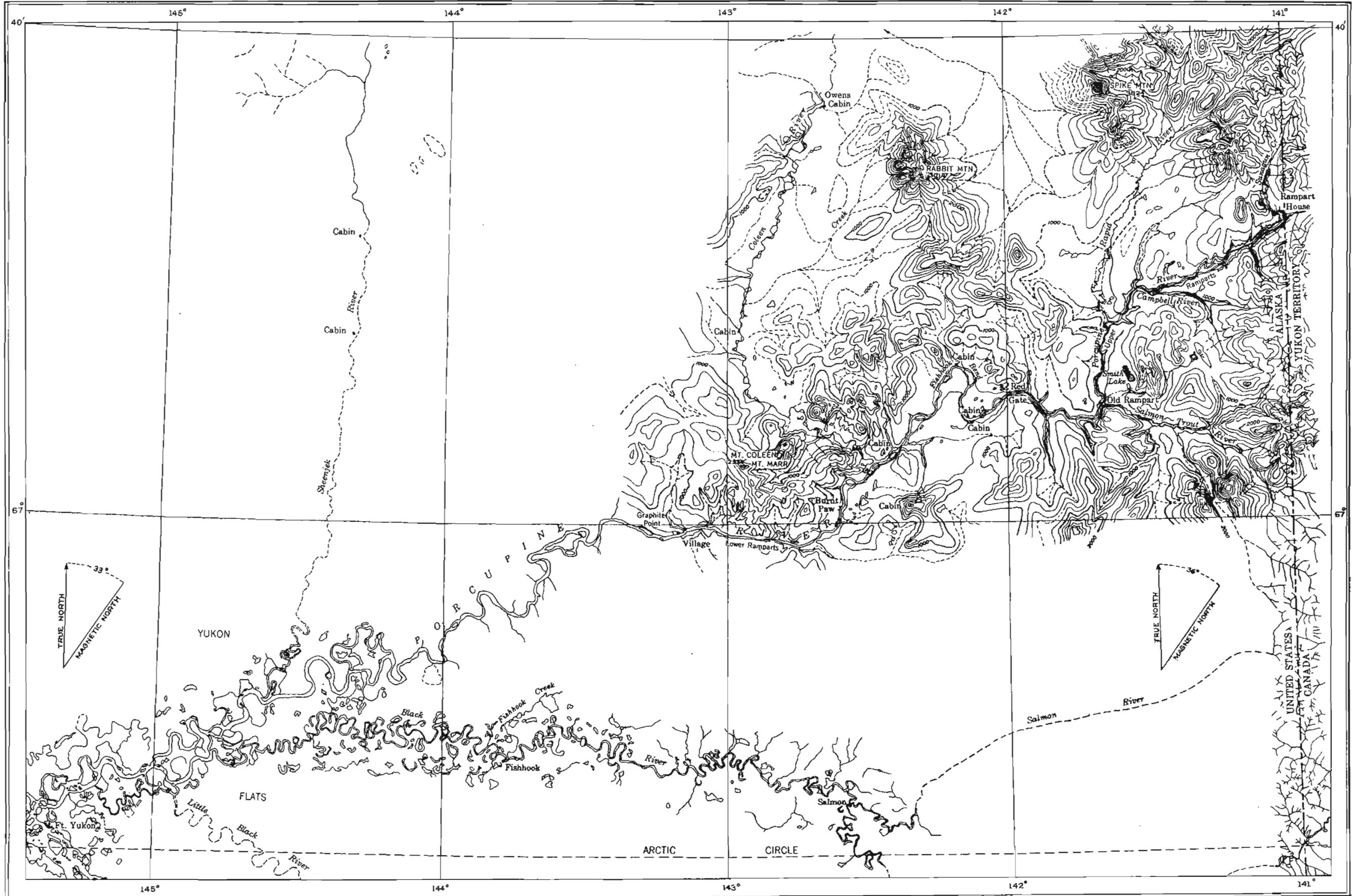
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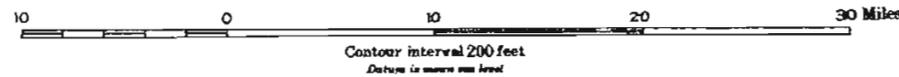


PLANIMETRIC MAP OF LOWER PORCUPINE RIVER, ALASKA

TERRITORY OF ALASKA  
DEPARTMENT OF MINES  
JUNEAU, ALASKA



Topography by Gerald Fitzgerald, Topographic Engineer  
Control and topography along 141st meridian by  
International Boundary Commission, 1907 to 1913  
Surveyed in 1939



TOPOGRAPHIC MAP OF PORCUPINE VALLEY, ALASKA

TERRITORY OF ALASKA  
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