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**RECONNAISSANCE OF THE NORTHERN KOYUKUK
VALLEY, ALASKA**

BY
ROBERT MARSHALL

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RECONNAISSANCE OF THE NORTHERN KOYUKUK VALLEY

By ROBERT MARSHALL

FOREWORD

By PHILIP S. SMITH

In the course of the 35 years in which the United States Geological Survey has been conducting investigations of the mineral resources of Alaska, about one half of the Territory has been surveyed on at least exploratory standards. There are, however, many large tracts in which even the major features have not been determined with any degree of definiteness. One of these little-known tracts includes part of the headwater region of the Koyukuk River, the large tributary of the Yukon from the north that rises in the Brooks Range, which forms the watershed separating the southward-flowing rivers from those that flow northward into the Arctic Ocean. Surveys of parts of the Koyukuk region have been made by the Geological Survey at intervals since 1898, and plans have constantly been under consideration for further work in the unmapped portions but have been deferred because more pressing needs called for the available funds and personnel. Fortunately, however, within the last few years many parts of the upper Koyukuk region have been traversed by Robert Marshall, who has made many observations regarding the physical features of this district and has coordinated them with the facts hitherto available. As a result Mr. Marshall has prepared a sketch map showing all the principal streams of the region, has determined from local sources the names of many of the features, and has otherwise contributed to the knowledge of the geography of the region. His record therefore supplements that already published and partly fills the need that has long been felt for more adequate and reliable information about the remote and less accessible parts, and its publication by the Geological Survey should be of service to all those interested in the region. A more comprehensive account of his travels and work in the Koyukuk region is in preparation by Mr. Marshall for private publication.

INTRODUCTION

The Koyukuk River, which is one of the largest tributaries of the Yukon, has its headwaters in the Brooks Range, whose crest throughout much of its extent is slightly north of the 68th parallel of latitude. Southward from this crest to the Arctic Circle, the country tributary to the Koyukuk embraces an area averaging about 110 miles north and south and about 140 miles east and west.

It is doubtful whether any of the famous scenic areas in the United States contain more magnificent scenery than that at the head of the different Arctic tributaries of the Koyukuk River. To the writer the great U-shaped valleys at the head of Ernie Creek, the North Fork, and Clear River are not a whit less stupendous than those of the famous Yosemite, and the grandeur of the deep gorge of the Kenunga Valley is not excelled by any of the magnificent valleys of Glacier National Park. Grizzly Creek flows through a canyon 2 miles across at the top, with walls about 3,500 feet high on the north side and 2,500 feet on the south. Blackface Mountain, at the foot of the Valley of Precipices, has a sheer cliff of about 3,000 feet, resembling Gibraltar in appearance but more than twice as high. The Arrigetch Peaks of the Alatna River are a series of unscalable needle peaks such as probably cannot be duplicated anywhere else in the world. The Alatna and John Rivers flow for miles through high, rocky mountains which rise almost from the margins of the streams. On Hunts Fork of the John River is Loon Lake, from the very shore of which a high, rocky mountain juts thousands of feet in the air, with a great waterfall plunging in several leaps for a drop of at least 2,000 feet.

All through this country in the clear days of winter the pure-white snow, the dark-green spruce trees, and the deep-blue sky mingle in an infinite variety of patterns. In summer the snow is gone, except on the north face of the higher mountains, but in its stead are the black and brown and gray and yellow rocks and the different colors of the varied vegetation, including the wild flowers, which blossom from early May until late August in gorgeous profusion.

During the summers of 1929, 1930, and 1931 and the winter of 1930-31 the writer was in this region engaged in the study of tree growth at its northern limit. In view of the fact that only part of this country had been mapped, it was obviously desirable to make sketch maps of such of the unsurveyed country as was traversed. At first these observations were merely compass bearings taken along the main valleys that were followed, and distances were estimated by the length of time required to traverse them. Later, however, a crude system of compass triangulation was established from sev-

eral mountain peaks. The observations thus made, combined with the instrumental surveys executed by the United States Geological Survey, furnished the basis for a sketch map covering the greater part of the Koyukuk River drainage basin north of the Arctic Circle (pl. 6).

In order, however, not to leave any considerable blank spaces in this area, it was decided to utilize information which the writer had been able to obtain from local prospectors and trappers in the Koyukuk region. Particular effort was made in using this information to accept only such as was furnished by men who had experience and special competence.

From the foregoing statements it is obvious that different parts of the map have different degrees of accuracy. The portions mapped by instrumental surveys of the United States Geological Survey are unquestionably the most nearly correct. The writer's own surveys probably rank second in accuracy. The least precise parts are doubtless those sketched by hunters and prospectors. In order that the user of this map may know the areas covered by the sketches of different kinds the following lists give the sources of the material used.

The United States Geological Survey is the source of the mapping of the main stream and the Middle Fork of the Koyukuk River, the Alatna River, the John River, the Dietrich River as far north as latitude 68° , the entire valley of the Bettles River, and all that has been done in the vicinity of the South Fork. It also mapped the tributaries of the Alatna River from the west, Rockybottom Creek, Unakserak Creek, and the tributaries from the east north of latitude $67^{\circ}40'$.

The writer is responsible for the information on which the names and general positions of most of the individual mountain peaks are based and for the sketching of the courses of the Kutuk River and its tributaries; Hunts Fork and its tributaries, except Kevuk Creek; tributaries of the John River, except Timber, Sixtymile, Crevice, Publituk, and Ekokpuk Creeks; the Wild River and all its tributaries above the mouth of Flat Creek; the tributaries of the main Koyukuk River between the Wild River and the North Fork, except Mud Creek; the valley of the North Fork north of the mouth of Glacier River, except Swede Creek, the Tinayguk River north of Wolf Creek, and Amawk Creek; the tributaries of the Middle Fork south of the mouth of the Hammond River, except Twelvemile, Slate, Emma, and Marion Creeks; the Hammond River and its tributaries; and the Dietrich River north of latitude 68° .

Information and sketches supplied by Charlie Suckik, an Eskimo who has a splendid topographic sense, served as the basis for mapping the Nahtuk River; the Iniakuk River and tributaries; the

Sozhekla (Henshaw) River; the tributary streams entering the main Koyukuk from the north between the Sozhekla and John Rivers; the Malamute River; Sixtymile Creek; the Wolverine River; Kevuk Creek; and Ekokpuk Creek.

The mapping of the following sections was based in the main on information supplied by Ernie Johnson, a prospector who has accompanied the writer on many of his trips; Pegeluk Creek; Timber Creek; Publituk Creek; the Allen River and its tributaries; the tributaries of the Wild River, except those north of Flat Creek; Mud Creek; the North Fork and its tributaries south of the mouth of Glacier Creek; the Tinayguk River and tributaries north of Wolf Creek; and Amawk Creek.

Many of the smaller side streams of the Middle Fork north of the Hammond River (except Gold Creek) and of the Dietrich River are based on sketches made by Jesse Allen and Kenneth Harvey. Information regarding Swede, Slate, Emma, and Marion Creeks was supplied by Jesse Allen.

Additional information regarding certain of the other features shown on plate 6 is based on sketches by Selawik Sam, James Murphy, George Huey, Victor Neck, and Al West.

In addition to the sketching of these various streams, many of the residents of the district have rendered valuable assistance in many other ways. Especial mention should be given to Ernie Johnson, Al Retzlaf, Kenneth Harvey, Jesse Allen, and Albert Ness, who at different times accompanied the writer during the 157 days he spent traveling over the country. These men are not only able field men but also companions with whom it was a great joy to live in the intimacy of the trail.

DRAINAGE

The general outline of the streams that form the headwater portions of the Koyukuk River system is apparent from the accompanying map.

The following table shows the approximate area of the basins of the seven larger branches of that portion of the Koyukuk River lying north of the Arctic Circle and of the principal subsidiary streams tributary to them:

Drainage area, in square miles, of principal tributaries of the Koyukuk River north of the Arctic Circle

Alatna River.....	3, 300
Iniakuk River	750
Kutuk River.....	290
Alatna River north of Kutuk.....	500

South Fork.....	3, 100
Fish Creek.....	¹ 460
Jim River.....	¹ 480
Mosquito Fork.....	¹ 200
South Fork north of Mosquito Fork.....	¹ 440
John River.....	2, 700
Malamute River.....	260
Allen River.....	310
Wolverine River.....	280
Hunts Fork.....	580
John River north of Hunts Fork.....	550
North Fork.....	2, 000
Glacier River.....	400
Tinayguk River.....	290
Clear River.....	250
North Fork north of Clear River.....	590
Middle Fork.....	1, 800
Hammond River.....	360
Bettles River.....	440
Dietrich River.....	380
Wild River.....	650
Sozhekla (Henshaw) River.....	550
Tributaries flowing directly into main Koyukuk River.....	900
	15, 000

The entire drainage basin of the Koyukuk River north of the Arctic Circle is about a quarter again as large as all of Belgium and about equal in area to Massachusetts and New Jersey combined.

In the following table are listed minor streams in this region tributary to the Koyukuk which have drainage areas of 100 square miles or more.

Drainage area, in square miles, of principal minor tributaries of the Koyukuk River north of the Arctic Circle

Kevuk Creek.....	230	Nahtuk River.....	120
Ernie Creek.....	220	Ekokpuk Creek.....	120
Agak Creek.....	180	Jane Creek.....	120
Publituk Creek.....	170	Timber Creek.....	110
Unakserak Creek.....	150	Flat Creek.....	110
Michigan Creek.....	140	Helpmejack Creek.....	110
Mettenpherg Creek.....	140	Tobuk Creek.....	100
Pingaluk River.....	140	Slate Creek.....	100
Sixtymile Creek.....	130		

No consistent scheme of using the terms "river" and "creek" so as to designate the approximate size of the respective areas is practicable. In a general way the major rivers are virtually unfordable except at times of unusually low water. The subsidiary rivers can be forded at frequent intervals during normal stages, but they are impassable at high water. The large creeks can be forded in normal

¹ Approximate.

high water, but in times of extreme flood they too cannot be crossed, and under exceptional conditions even some of the smaller creeks cannot be forded.

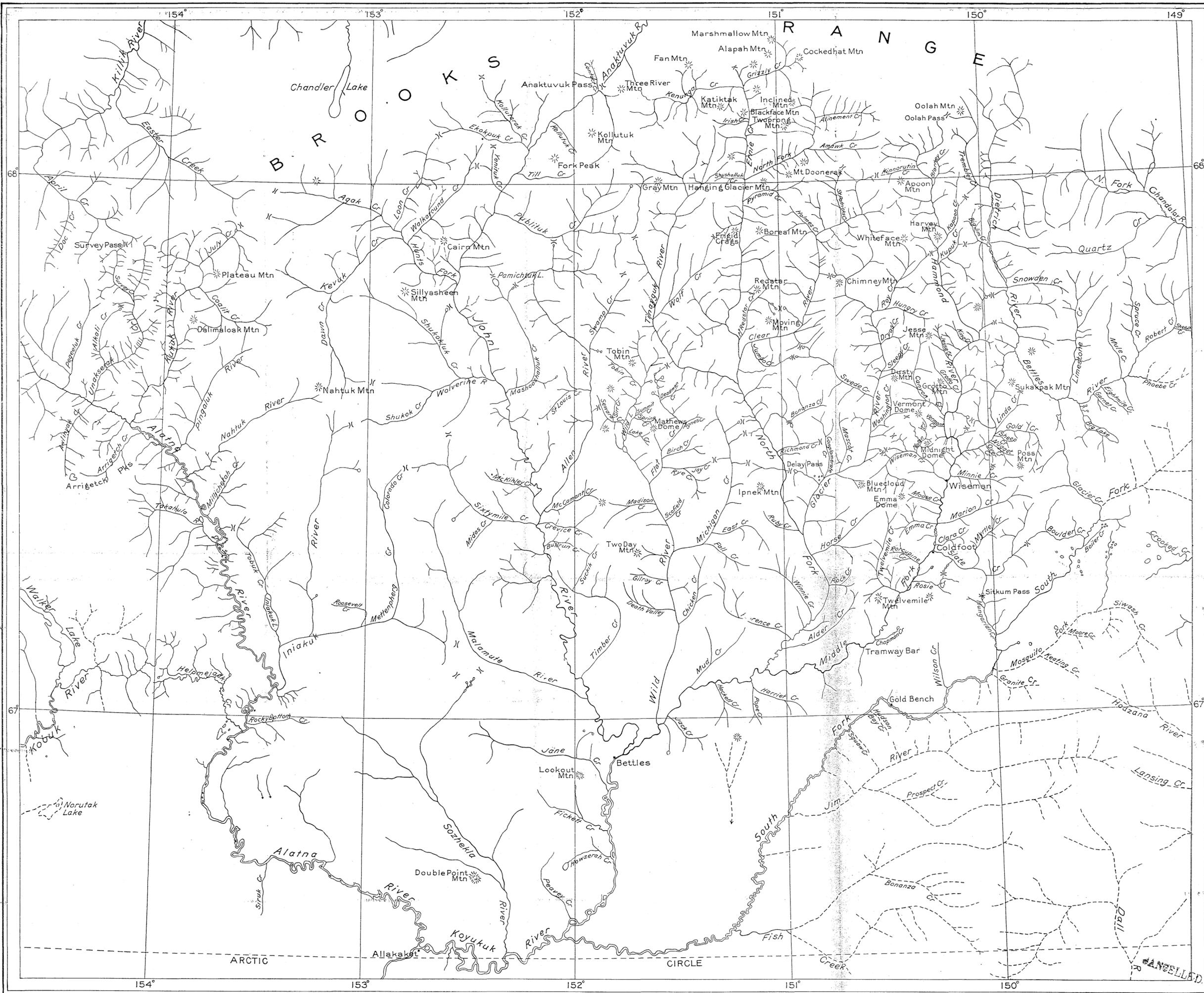
No definite statements can be made about the possibilities of boating on the various streams in the Koyukuk drainage basin, as they depend on three variables—the stage of the water, the size of the boat, and the amount of effort one cares to expend in dragging his boat over the rocks. To speak very generally and base the statement on the writer's concept of that imaginary stage called normal water, that variable the draft of a normal poling boat, and that indefinite condition of not too much dragging, the major rivers of the northern Koyukuk drainage basin are navigable about as follows: The Alatna River to Unakserak Creek, the South Fork to the Mosquito Fork, the John River to Publituk Creek, the Wild River to Wild Lake, the North Fork to Ernie Creek, and the Middle Fork to Bettles River.

MOUNTAINS

The maximum height of the mountain peaks in the range that forms the northern boundary of the Koyukuk River Valley has been variously estimated by casual travelers all the way up to 16,000 feet. However, all reliable observations made from many different mountains scattered throughout this region, checked by such measurements as have been made by vertical-angle readings and by the use of the hypsometer and barometer, are convincing that this extreme estimate is many thousand feet over the true height of the loftiest peaks.

The peak that seems to tower distinctly above any other mountain in the region stands between the head of the North Fork and the valley of the Clear River, in approximately latitude 68° , longitude 151° , and was named by the writer Mount Doonerak from the Eskimo word that means spirit, or, as they would translate it, devil. An estimate of the elevation of this peak, based on observations made by the writer with barometer and hypsometer, indicated that it was about 10,100 feet high. Noel Wien, a well-known Alaskan aviator who flew to Point Barrow shortly after these observations were made, passed this mountain at an altitude of 10,000 feet and estimated that its summit rose about 500 feet above that elevation. In 1931 Joe Crosson, another well-known Alaskan aviator, while flying at an elevation of 9,000 feet, also estimated that the peak was about 500 feet above him. Thus three different estimates of the height of this mountain—9,500, 10,100, and 10,500 feet—indicate that its actual elevation is probably not very far from 10,000 feet.

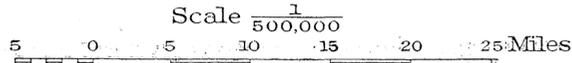
The United States Geological Survey determined by plane-table surveys and vertical-angle measurements that the highest peak at



Compiled principally from
 U.S. Geological Survey maps
 and traverses and records
 of Robert Marshall, 1932.

SKETCH MAP OF DRAINAGE IN NORTHERN KOYUKUK REGION ALASKA

Note: X designates pass



the head of the Noatak River was 8,400 feet above sea level. By using also the foregoing elevation of Mount Doonerak and the elevations of the various points that had been instrumentally determined as scales for comparison, it is apparent that several of the peaks in the unsurveyed parts of the district probably exceed 8,000 feet. Among these peaks are Nahtuk Mountain, between the John and Alatna Rivers; Kollutuk Mountain, just east of the John River; Three River Mountain, at the headwaters of the John and Anaktuvuk Rivers and the North Fork; Katiktak Mountain, in the conglomerate range between Kenunga Creek and the head of the Tinayguk River; Alapah and Marshmallow Mountains, in the Arctic Divide just north of Grizzly Creek; Inclined Mountain, at the culmination of the tilted conglomerate range between Ernie Creek and the head of the North Fork; Boreal Mountain and Mount Doonerak, between the North Fork and the Clear River; and Apoon Mountain, just south of the headwaters of the Clear and Hammond Rivers.

In spite of the jagged and forbidding appearance of these northern mountains, the initiated may find numerous low passes throughout the Brooks Range. These are of immense value to the traveler moving from one drainage basin to another, for they may save many miles of roundabout wandering. In order to make what information the writer possesses available for general use, the map indicates all passes in the Koyukuk drainage area which are known to be traversable by sled.

NOMENCLATURE

The accompanying map includes many names never before recorded on any map. A large number of these are local names which have been in general use for many years. All well-established local names, except a few repetitions or unusually trite ones, have been retained. New names for three of the four canyon creeks in the region have been adopted, and the commonplace and confusing use of East Fork and West Fork for branches of many of the streams have been discarded in favor of more distinctive titles. None of these changes, however, have been made without first receiving local acquiescence and then obtaining the approval of the United States Geographic Board of the names thus selected.

As a rule the native names for geographic objects have been retained. Nahtuk and Kollutuk Mountains and Agak and Kevuk Creeks are examples of such Eskimo names. A few Indian names, such as Sackitlannahoyozza, however, seemed a trifle too cumbersome for preservation and have been replaced by others.

There are innumerable mountains and streams in this unexplored country which, so far as could be learned, had never been named by either whites or Eskimos. For a few of these which had special

significance distinctive designations were given by the writer. In the selection of names for such features preference was given to appropriate euphonious Eskimo words. For instance, the first part of the name Katiktak Mountain is the Eskimo word which means white, and was chosen because this peak is so much higher than the surrounding summits that it stands out white in the autumn when the others still remain black. A second class of designations includes the names of people who have played a prominent part in local history. Thus Allen River is named after Lt. (later Maj. Gen.) H. T. Allen, the first white man who ever visited the region. Some features, such as Marshmallow Mountain and Pyramid Creek, were named for their appearance. A few were named after some special adventure which occurred on them—for instance, Grizzly Creek from a fight between the horses of the writer's party and two grizzly bears. The only name of a stranger to the region that has been given by the writer is Holmes Creek, so named because the creek was discovered on the ninetieth birthday of the great American jurist, Justice Oliver Wendell Holmes.

POPULATION AND SETTLEMENT

The first white men to enter the Koyukuk drainage basin north of the Arctic Circle were Lt. Henry T. Allen and Private Charles Fickett, both of the United States Army. These men visited the region in 1885 in the course of a remarkably venturesome exploratory expedition under the auspices of the War Department. Two years after they left, the first prospectors came into the country, and during the next decade about 20 different men tried rather unsuccessfully to mine gold in the upper Koyukuk drainage basin.

In 1898 occurred the great gold rush to the Klondike and Alaska. In that year about 200 men poured into the upper Koyukuk country, and since that time there have never been less than 75 white people in the region. The major occupation of these people has always been prospecting and mining of gold. Today (1931), 34 years after the first great stampede, there are still 57 people engaged in the quest for gold. The boom days have long passed, however, and whereas in the years of greatest production gold worth \$300,000 to \$400,000 was taken out of the ground annually, in 1931 the total amount recovered was only about \$27,000. Of this about \$14,500 was obtained from winter drift mines, and about \$12,500 was washed out in the summer open-cut mines.

The following table gives the names of all the creeks on which mining activities were in progress in 1931, as well as the number of men who worked on each during the course of the year. That the

total number of men adds to considerably more than the 57 mentioned in the preceding paragraph is due to the fact that some men worked on two or more creeks at different times during the year.

	<i>Miners</i>		<i>Miners</i>
Nolan Creek.....	17	Pingaluk Creek.....	2
Hammond River.....	12	Gold Bench.....	1
Wild River.....	10	Mosquito Fork.....	1
Emma Creek.....	4	Sixtymile Creek.....	1
Jim Gulch (at head of Glacier Creek, 4 miles west of Big Lake).....	4	McCamant Creek.....	1
Porcupine Creek.....	3	Winnie Creek.....	1
Myrtle Creek.....	3	Twelvemile Creek.....	1
Big Lake.....	2	Minnie Creek.....	1
		Gold Creek.....	1

It may be pointed out that of the first seven creeks named in the foregoing list, all except Jim Gulch have been worked more or less uninterruptedly for 27 to 32 years. They are old diggings from which few of the miners have much hope of large fortune. Among the streams on which only one or two men were working in 1931, Pingaluk Creek, the Mosquito Fork, Winnie Creek, and Sixtymile Creek are practically virgin ground.

The total population of this 15,000 square miles of the upper Koyukuk River Valley north of the Arctic Circle on October 1, 1930, was only 127. These people centered chiefly around two major towns. The larger of these—Wiseman—is at the point where Wiseman Creek enters the Middle Fork. At its store some 103 people do the major share of their trading. The smaller town—Bettles—is just below the mouth of the John River, about 85 miles downstream from Wiseman as measured along the winding course of the Koyukuk. The remaining 24 people of the region do their trading here. Allakaket, close to the Arctic Circle, is the trading center for some 38 Eskimos and about 120 Indians. Here also live 2 white missionaries and 1 white storekeeper. In the foregoing enumeration of the population of the upper Koyukuk region the people of Allakaket are not included, because their range is seldom more than a few miles north of the Arctic Circle.

If halfbreed children are classified as belonging to their mothers' race, the 127 people of this upper Koyukuk region were divided as follows:

Race	Men	Women	Children	Total
White.....	70	7	—	77
Eskimo.....	9	11	24	44
Indian.....	1	4	1	6
	80	22	25	127

The distribution of 127 people over an area of 15,000 square miles means that the region has an average population of only about 0.0085 per square mile. Compared with this figure, Alaska, as a whole, is about 12 times as densely populated, the United States proper 5,000 times, Belgium about 80,000 times, and Manhattan Island almost 10,000,000 times.

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