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L. & A.
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Form 504

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

State: Alaska

11—5613

DESCRIPTIVE REPORT.

Topo. Sheet No. 3557 & 3558

LOCALITY:

Kuskokwim River
Reconnoissance by
Asst. H. A. Cotton
on passenger steamer

191 5

CHIEF OF PARTY:

R. R. Lukens, Asst.
C. & G. S. S. Yukon

3557-3558

Form 167

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

Washington, _____, 191

Respectfully { returned / referred / forwarded } to

11—683

Miscellaneous data and copy of this report for use in preparation of sailing notes of Kuskokwim River and completion of Top. Sheets 3557 and 3558 were turned over to Coast Pilot Party Aug 25, 1916

J. Bell

8/25/16

POST-OFFICE ADDRESS:

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

U. S. S. "EXPLORER"

CHIEF, DIV. OF HYD'Y & TOPY
AUG 16 1916
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DESCRIPTIVE REPORT FOR RECONNAISSANCE SURVEY OF KUSKOKWIM RIVER

Topo. sheets 3557 and 3558

BETHEL TO McGRATH

THE EXPEDITION

The data for this report and for the field sheets accompanying it was gathered while on a journey up the Kuskokwim river during July 1915. The work was executed as special duty while assigned to the party of R. R. Lukens, Asst. Comd'g C. & G. S. Stmr. Yukon, which vessel was engaged upon general surveys about the river mouth in the immediate vicinity of Eek Island. The journey was made possible by an agreement between Capt. Lukens and the officials of the Kuskokwim Commercial Co., who were kind enough to grant free transportation on the "Quickstep", a stern wheel river steamer of about 225 net tonnage which the said company operates during the summer season in freighting supplies to up river points from Bethel, this settlement being at the head of deep water navigation and the main supply point for the whole river valley.

THE OBJECT

During 1914 the Stmr. Yukon had made a reconnaissance survey of the Kuskokwim River, connecting Bethel with the Surveys work at the mouth of the river and it was the object of the present journey to carry this reconnaissance survey up the river as far as McGrath. This work was considered a very fitting supplement to the survey of the Kuskokwim Bay giving as it would, much valuble information of the river valley which was opened to commerce with the publication of the Bay charts. While on the river all the possible information was gathered which gave promise of being useful to anyone contemplating any operation on the river or its Tributaries.

THE ITINERY

The commercial steamer Alliance, on which the party of the C. & G. S. Stmr. Yukon took passage from Seattle, arrived off Goodnews Bay June 22, 1915, where the supplies for the Yukon, as well as all of the ship's complement, except myself, were placed ashore and on June 24th the Stmr. Alliance proceeded up the Kuskokwim Bay and into the river. My Knowledge of the country between Goodnews Bay and Eek Island, enabled me to assist the ships officers in keeping in the charted channel as far as Eek Island. At this point a native pilot was engaged who stood by the ship till our arrival at Bethel on June 28th. From that time till July 3rd the cargo of the Alliance was being transfered to the K. C. Co's warehouse or loaded on barges preparatory to going up the river.

On Saturday evening July 3rd the "Quickstep" left Bethel with supplies for up river trading posts. Most of this freight was carried on two barges which were made fast ahead of the "Quickstep". One of these carried about 200 tons for the Northern Commercial Co's post at McGrath and the other about 100 tons for the K. C. Co's post at Tacotna. A third barge with 50 tons of freight was made fast along side and dropped at Akiak on the way up river. The steamers complement consisted of about a dozen native deck hands, about a dozen officers and other employees of the Kuskokwim and Northern Commercial Companies and three or four passengers.

The journey was commenced during a fine spell of weather and the same continued during practically the whole trip. The main exception was the day predeeding our arrival at Bethel on the return passage which was cold and raining, such a day as the people of Bethel say is about characterestic of the low land country. Equally so, fine weather is claimed as characteristic of the up river country during the summer season.

There was little freight consigned to intermediate points along the river, so that the majority of stops made before reaching McGrath were at wood piles to replentish the fuel supply. The "Quickstep" consumed about 15 chord of wood every 24 hours, to supply which it was found necessary to stop about twice a day. The K.C.Co arranged with the natives for the cutting of this wood and have it placed at strategic positions along the rivers course. The down river being an "empty" trip arrangements are generally made to take on a barge load of wood at some point and so make it possible to cover the entire distance with very few stops.

In addition to the above, stops were made at the following points;

Up Stream

AKiak, July 4th.
Aniak, " 5th.

At Cinnabar Hills about 5 miles below Kolmakof, a river fog compelled the party to lay alongside the bank during night of July 5th -6th.

Napaimut, July 6th.
Little Mountain Village, July 6th.
A delay of about one hour occured three miles above Horn Village, on account of a squall.
Crooked Creek, July 7th.
Lousetown, July 7th.
Parks Cinnabar prospect, July 7th.
Sleitmut overnight, July 7th - 8th.
McGrath, July 10th and laying there until July 12th.
Tacotna Forks, July 12th.

Down Stream

Left Tacotna, July 13th.
McGrath, July 13th.
Sleitmut over night July 13th - 14th.
Bethel, arrived 10:00 P.M. July 15th.
On July 17th passage was secured on a small launch for the mouth of the river to rejoin the Stmr. Yukon. The Yukon was boarded about 20 miles above Eek Island where she was met, enroute to Bethel.

GEOGRAPHICAL DIVISION OF THE KUSKOKWIM VALLEY

(A) The low land section;

From Cape Newenham to Jack Smith's Bay, the southern extension of the Kuskokwim Mts. skirt comparatively close to the eastern shore of Kuskokwim Bay. Thence these mountains fall away to the eastward and opposite Bethel are about 50 miles distant from the river. Mountains are first encountered along the rivers course above Kalchagamut, which lies at the Kuskokwim end of the main portage to the Yukon river. The country bordering the Kuskokwim, below this point as far as the sea and extending from the Kuskokwim mountains on one side to the Yukon river on the other, is nothing but one vast stretch of flat tundra covered lowland over which are scattered many lakes and sluggish streams. There are few elevations over 40 - 50 feet and not many approaching that figure and this together with the abundance of water gives rise to a condition of practicaly no natural drainage over this vast territory. Besides the tundra, the main growth is willow although frequent groves of spruce are seen some of which are of considerable extent. Through this country the river follows a very meandering course, which is marked almost continually by cutting banks on one side or the other and frequently on both. Many islands result from part of the rivers waters often breaking through the lowlands instead of following the regular river channel and some of the sloughs thus formed lead several miles inland. Most of the cutting banks are covered with a matted growth of willow, through which passage would be practically impossible and generally, if a making shore is opposite, it is a mud flat of considerable extent and accordingly transportation during the summer season is confined almost entirely to water travel.

From Kalkagamut to Eek Island is about 150 miles along t the river course.

(B) The Highland Section;

The middle portion of the Kuskokwim river cuts directly through the Kuskokwim Mts. and accordingly this section of the river valley can properly be called the Highland section. From Little Mountain Village to the mouth of the Chulitna river, a distance of about 75 miles, the river channel cuts the main portion of the Kuskokwim Range and accordingly along this stretch an almost continous line of peaks and ridges border either shore of the river. This is especially true of the northern shore which frequently rises directly from the river to a height of 1200 feet or more and at no point are the high peaks over a few miles back from the river. Along the southern shore the ridges do not lie continuously so close to the shore and there is frequently a broad stretch of rolling country between the river and the higher peaks; and further, the steep eroding slopes which occur every few miles along the northern shore are seldom witnessed on the southern.

For about 65 miles down stream from Little Mountain Village the river follows more or less closely the mountains to the northward but to the southward a stretch of slightly rolling country intervenes between the river and the mountains which gradually fall back to a distance of about 25 miles in the vicinity of the Yukon portage. Here the southern shore is generally an earthen bluff rising about 15 - 25 feet and occasionally 50 feet above the river but the northern shore is a continuation of the ridges and eroding bluffs described above.

From Aniak to Sleitmut, the river channel is well confined and consists of a series of long reaches and easy bends with an average width of about 2/3 mile and only a few alluvial islands, overgrown with brush and willows, obstruct its course. Both banks are high fast land which offer free passage on foot during the ordinary stages of the river. Below Kolmakof there is considerable spruce but with this exception this track is very sparcely timbered even near the river and the highlands are almost bare. The islands and small lowlands areas are generally covered with a moderate growth of brush and willows andfrequently birch and cottonwood are encountered; The growth at any point is such as to permit easy passage or trail building.

(C) The Interior Basin;

Above Winasale only a few peaks are seen near the river, which from here emerges into a large interior basin lying between the Kuskokwim and Alaskan ranges of Mountains. This large area is mostly a flat region with considerable rolling country, but with only an occasional peak rising above the general level. Its extent is distinctly marked by a ring of distant mountains on the horizon. Through this region the river follows a meandering course that is sometimes almost bewildering, its current is slow and sluggish

and cutting banks mark one shore or the other and frequently both. There is considerable timber which consists about equally of spruce and deciduous growth of willow, birch, cotton wood, etc; the under growth is not sufficient to seriously impede travel but the natural drainage is poor and accordingly there are only a few possible routes for transportation.

An intermediate section;

Between the mouth of the Chulitna River and Vinasale, the river valley can hardly be classed as belonging to either the highland or the basin area; the river here skirts the southern foot hills of the inland section of the Kuskokwim Mts., only occasional approaching the higher peaks. The river banks along this section are quite similar to those between Aniak and Kolmakof, the northern running along the base of highland ridges almost continually and being often marked with steep eroding cliffs while the southern is a rather low earthen bluff, long sections of which are being cut away with the river current. A cutting bank is only seldom seen along the northern shore.

At McGrath the general course of the river changes from west to south and from this point, as far as the hills just north of the Yukon portage, it seems as if the river is continually seeking a channel to the northward but as continually turned aside by mountains peaks and ridges the base of w which it washes but in vain, till finally, instead of reaching the Yukon and becoming a tributary of a larger system, it takes an easy passage through the lowland marshes to the sea.

The lower portion of this intermediate section, lying between the Chulitna and stony rivers, is broken up into and obstructed by many islands, the river's water at times spreading out over to a width of several miles; as the river current is at the same time strong and swift, this is the most difficult section of the river to navagate. This stretch is the main exception to the rule that the channel of the Kuskokwim river is mainly well confined although there are other exceptions along its course through the lowland country.

The country between the Chulitna and Stony rivers is reported as one big marsh, small extentions of which reach across the river into the highlands which border the river to the north. The lowland areas are well timbered but the heights are bare. The timber is mostly spruce with considerable birch, cottonwood, willow etc. Water travel is the only practicable transportation during the summer season.

THE RIVER

The river is frozen over for about seven months a year, the freeze up generally coming about Oct. 1-15 and the break up occurs from May 15-20. As travel is usually handicapped for a month previous to the break up and for a like period after the freeze up, transportation is generally water borne for five months and overland (or ice) for the same period.

Before the spring break up there is an average rise of about 4-6 feet which mounts to 8 feet and over just after the break up, but, on a jam, the river has risen 12-14 feet

above these figures. At Sleitmut on the middle river the ice runs about six days; further up river the run is longer but about Bethel it lasts for only two or three days.

The lowest stage of the river is just before the freeze up when the following depths will be found on the bars;

Bars;

Tuluksac crossing 3-1/2 - 4 feet.
Aniak " 3-1/2 - 4 "
Crossing above Cinnabar Hills 3-1/2 - 4 feet.
" 3 miles above Kolmakof 3-1/2 - 4 feet.
" just above Napaimut 3-1/2 - 4 feet.
Munivak crossing 3 - 3-1/2 feet.
Crossing 5 miles above Salatna 3 - 3-1/2 feet.

Between the Chulitna and Stony rivers the main channel is shoal and swift but scarcely critical. The same holds true below Swift river. These bars mark the maximum depths which can be taken up the river. The first one encountered, Tuluksac river, is about 47 (nautical miles) above Bethel. Up to this point it is claimed 10 - 12 feet can be carried although it was impossible to carry a continuous line of soundings but as the river channel thus far is very narrow for the amount of discharge and no indications of shoal were seen, the claim is considered reasonable and probable. The mouth of the Tuluksac river is the last point where any tidal effect is noticed.

Currents;

The Rapids is a point on the intermediate section of the river which here again approaches the higher peaks lying to the northward. It is 54 miles above Sleitmut. This is the only point the "QUICKSTEP" was unable to get through under its own steam; for about 1 mile it was necessary to put a line ashore to a tree and some ahead with a turn around the capstan. The strength of the current is about 8 - 9,knots.

Around the mouth of Swift river and also from the Chulitna to the Stony river the current has a strength of about 6 knots. It also has about this strength at the rapids above Ohagamut.

All of these bars and rapids are indicated on the field sheets accompanying this report.

The general river current can best be described as follows;

From Bethel to Kalkogamut, easy.
Kalkogamut to Napamute, stiff to swift.
Napamute to Swift River, swift.
Swift River to McGrath, slow and sluggish.

A diagram is enclosed showing the most probable current strengths along the entire course of the river; these values being determined from a consideration of the comparative time made by the "Quickstep" on the upstream and down stream trips and also estimates of local authorities.

During the present journey, what few snags encountered were along the upper stretches of the lowland section. Through the highland section it is probable that fewmsnags are ever encountered, their only possible origin being as a discharge from tributaries. Through the veritable archipelago above

the Chulitna River snags should be expected, although scarcely any were seen on the present trip.

About any point along the shore of the highland section offers a possible landing for a river boat; but on any section of the river it is not difficult to locate a bank sufficiently steep-to to come alongside, the low making shore on the inside of most bends being the main points to avoid. The general position of the northern shore being under a steep bank or cliff would indicate that possible landing sites were here more frequent.

The course followed by the Stmr. "Quickstep" is indicated on the sheets by a dash line, this being the position of the best water according to local knowledge. The only general direction possible is to keep close to the cutting or steepest bank and cross the bars with causion. Most of the uncovering bars lie at the bends with the best water toward a cut bank, the passage often being narrow.

A steamer such as the "Quickstep" (drawing 4-1/2 feet) can ascend the Kuskokwim river for 600 miles above its mouth, the deeper water extending up the East and North fork toward the divide from the Kantishna River of the Yukon system.

Tributaries;

(A) South Fork - About 3 feet can be taken from its junction with the main river for 50 mile as far as Nicholi a small trading post. Rapids prevent further progress. This stream leads into the heart of the Alaskan range and is used to reach the Hartman and other regions. It is also a route to the outside by crossing a divide to the Susitna river system.

(B) Big River - This river lies in the heart of the Interior basin joining the main river from the south about half way between McGrath and South Fork. About 2-1/2 feet can be carried up it and its tributaries for 50 miles. All told the system has 150 miles of water route available for every light draft travel.

(C) Chulitna - About 4 feet can be taken 75 miles up this branch which marks its head of navigation except for poling boats. The Hoholitna can be ascend for 50 miles above the latters mouth. There is nothing but a few prospects over the basin of these streams. A portage is said to lead from the headwaters of the Hoholitna to those of the Mulchatna and offers means of travel toward the Nushagak country.

(D) Tuluksac and Aniak Rivers - Both are navigatable for about 40 miles for 3-1/2 - 4 feet. These streams furnish means of reaching Marvel, Bear, Ophir and other creeks in the Tuluksac Aniak placer district.

(E) Kuethluk River - A 50 ton steamer could ascend this branch for about 25 miles and about 1 foot can be carried for another 25 miles up stream. Canyon Creek is a head water stream of this district.

(F) Kisuralic River - This branch lies to the north and not far distant from the above stream and offers about the same advantages for navigation.

RESOURCES

(A) Furs - The fur trade is the main inducement for the two trading companies which do business on the river, the Kuskokwim Commercial and the Northern Commercial. Mink, fox and musrat are

found on the lowland country; an addition to these ermine, martin and linx are numerious in the interior. Next to fish the natives depend on furs for their livehood and there are 30 - 40 white men in the valley who about do nothing but trap, making a fair living at the same.

There are perhaps three or four ~~in~~ independent fur traders over the region who gather about as many furs as they can handle in a large poling boat or Peterbow canoe.

Typical prices paid for local furs in the spring of 1915 are as follows;

Ermine	$ .60
Martin	3.50 - $ 7.00
Martin (picked)	17.00
Mink	1.00 - 3.50
Fox (red)	5.50 - 7.00
Linx	3.50 - 7.00
Muskrat (bundle of 32)	$2.00 - $4.00 (approx)

(B) Game - Big game abounds in the country about the headwaters of the river, Caribou are found about Mt. McKinley, moose along the North Fork, and mountain goat anywhere in the higher mountains.

From the main forks of the river to the sea, game is very scarce an occasional moose, duck or ptarmigan being all that can be found. In the tundra country below Bethel, ptarmigan are quite plentiful.

Two runs of salmon enter the river, the red and the silver, and there is generally plenty of fish as far up as Sleitmut and a considerable supply above that point. King salmon are secured about the mouth of the river during the early season and for the past two years a small saltery has operated just above Eek Island on the west shore.

The native depend mainly on fish for their f ood supply and many fish camps were passed where 2000 - 3000 lbs. of fish were being dried. The natives have numerous traps, while about half a dozen fish wheels have been constructed by industrious white men. Dried fish is the main article of merchandise on the river, being used by white men and natives, as well as dogs; occasions of travel, of isolation and of want, making it an ever appreciated food upon which to fall back.

(C) Agriculture - At every settlement, a small patch of ground will be found, where lettice, rutabagas, radishes, cabbage, potatoes etc are raised in limited quanities. At Aniak, a settler has cleared a couple of acres which he has devoted to the cultivation of potatoes with considerable success. The best ranch on the river is on the south shore opposite McGrath where a settler has cleared 10 - 15 acres on most of which potatoes are raised and here some fine barley was raised during 1915. This man depends exclusively on his ranch for a living; he owns a couple of horses and considerable up to date farming equipment which he has had brought in from the outside. At Tacotna Forks there is another fanch of about the same pretensions as the last mentioned, but with more attension to live stock, a large batch of chickens and a couple hogs belonging to the said ranch.

The missionaries and school teachers at Bethel and Akiak all possess a fair garden and make an effort to help the natives to raise vegetables for their own use. Through this and other contact with the white people many natives are able to provide themselves with considerable quanities of potatoes rutabagas, etc.

Frost was observed at McGrath on the evening of July 11th, this indicating the care necessary to preserve any crop to maturity. Through the interior there is plenty of sunshine during the short summer season and the inhabitants claim that there is plenty of fertile ground but the population is scarcely sufficient to warrant any large venture in agriculture. Information available would indicate that the upper Kuskokwim valley is similar in every way to the Yukon and Tanana vallies where there are many successful ranches.

(D) Lumber - Local timber can most likely supply the need into an indefinite future, especially on the upper river, but in the vicinith of Bethel the timbered area is small. The missionaries have a saw mill at Bethel which is supplied by logs cut a couple hundred miles up river and floated down stream. At Tacotna Forks there is another saw mill supplied by a cut close to hand? No hard or other choice lumber can be secured except from the outside.

At about any point above Bethel sufficient timber can be secured for allog cabin, a fish wheel, a boat or any of the present necessities of ordinary river life, which timber can supply.

(E)mMinerals - This subject is exhaustively treated in the Geological Survey bulletine 622-H the papers being by Philip S. Smith and A. G. Maddren. Only an outline of the prospects will be stated here.

Apparently the most important gold findings are as follows;

Candle Creek on the Tacotna River,

Occurrence similar to the Iditarod country and promises extended hydraulic development.

Canyon Creek 110 miles northeast of Bethel,

Placer claims yielded $14,000 in 1914 and $75,000 in 1915.

Bear Creek in the Tuluksac-Aniak placer district,

Considerable ground has been covered with portable prospecting drill and hopes are entertained for extended hydraulic development.

Profilable work has been done on Crooked Creek just south of the Iditarod country and on Marvel, Ophir and Salmon Creeks of the Tuluksac-Aniak placer district. Good prospects have been located on several other creeks in the Tuluksac-Aniak placer district and on George River, New York Creek, CaRL Creek and Owhat Creek.

Cinnabar claims,

Parks prospect, and others in the Cinnabar Hills are alongside navigatable water. The former has hopes of development with outside capital.

Copper,

Several claims have been staked on Cobalt Creek in the Russian Mountains (western section of the inland portion of the Kuskokwim Mountains) about 18 miles north of Kolmakof.

Coal,

Coal has been found cropping out from the foot hills along both Eek and Kuethluk rivers but the location is far from any present demand and no development work has determined the

possibilities of the beds. Coal has been feported on Big River and on the Hoholitna.

SETTLEMENT OF THE REGION

The more recent settlement of the region is quite fully described in the above mentioned bulletin of the Geological Survey.

(A) Original inhabitants,

The Mahlamute tribe of Esquimos inhabit the lowland section and are by far the most numerous of the natives. They fish and trap and a few do laboring work for the K.C.Co who reward their efforts with credit slips on the store, similar credit slips generally paying for furs and dried fish which enable the native to secure what white man's cloths and eatables he desires. These people have been more fully described in a seperate paper.

The river valley from the Yukon Portage to Sleitmut is inhabitanted by the Ingalik tribe of interior natives. These people are few and widely scattered oweing no doubt to the poor possibilities of the country to support a population. They are not the fish eaters that the Eskimo are, although depending considerably on this source for food, but also hunt what game is procurable. They live in more substancial structures than the Eskimo but do not gather in larger villages than two or three famalies.

From Vinasale inland the Kolchane Indians are found, of the same family that inhabit most of the interior of the northern portion of the continent. With the exception that these people depend very little on fish for food, but mostly on game, the few remarks on the Ingalik apply to the Kolchane.

To a transient there is but two type of people inhabiting the country, the Esquimo with the oriental cast and fishy smell, and the up river Indian of heavier build and some what cleaner habits, similar to the Indian met else where in America.

(B) Immigration of white people,

The first white settlers were the Russians of the Russian American Co. who established a fort and trading post at Kolmakof in interests of the fur trade. These Russians came cross country from Ft. Alexander at Nushagak and at first brought in their supplies over this route, but later opened a route to their base at St Micheal by way of the Yukon Portage and still later used native boats on the river, a practice follower by that Company's American successor the Alaska Commercial Co.

The Alaska Commercial Co. had two or three posts on the river supplies for which were shipped from that Company's base at Unalaska in small schooners as far as Warehouse Creek whence it was reshipped up the river in bidras the large native skin boats of capacities up to 4 ton.

About 1880 the Moravian missionaries settled at Bethel and later at Akiak, both of which were native settlements and around their establishments trading posts have sprung up.

Bethel being at the head of the deep water navigation is the natural supply points of the river valley for water borne trade, which is by far the most economical for this region. It has a population of between one and two hundred natives and through the winter there are perhaps 75 white people here.

Besides the missionary establishment, comprising a school, church and saw mill there are two stores and a government school.

Akiak is a small native settlement with a missionary church and a government school. Akiachagamut is a native settlement about the size of Akiak.

Tulksac, Ogawick, Kalchagamut, and Ohagamut are Esquimo villages along the river of from 50-100 inhabitants. There are numerous other Esquimo villages back from the river.

Till 1900, but very few prospectors had entered the Kuskokwim valley; but during the winter 1900-1901 a typical dogsled stampede to the region was made by a considerable number of men from Nome, who were working on rumors of discovery of placer gold on the "Yellow River". This stream was never definitely located but many of the stampedes ultimately found their way into the Tuluksac-Aniak region.

After the discovery of placer gold on the Innoko River in 1906, it is estimated that several hundred people left Nome for the Innoko diggings by way of the Kuskokwim River. A few of these stopped at various points along the river and commenced prospecting some of its tributaries. One of these parties ascended the Tuluksac river and discovered gold for the first time in commercial quanities on Bear Creek.

The rush of people to the Iditarod in 1910, following the discovery there of rich placer deposits, led to an overflow into the central Kuskokwim valley and extensive location of claims in the George river and Crooked Creek basins. Georgetown was established as a result of this excitement. Some of the parties descending the Kuskokwim from Georgetown examined the Aniak basin and first located gold on Marvel Creek. Others ascended the Eek, the Kuethluls and the Kisiualic rivers, large streams emptying into the lower Kuskokwim from the northwestern flanks of the Kuskokwim Mts. southwest of Aniak and Tuluksac rivers. The main discovery of gold in the Canyon Creek.

The discovery of placer ground on Candle Creek has encouraged prospecting in the Tacotna river valley?

The movements outlined above have been supplemented by a scattered prospecting over the whole region and are the basis of the major portion of the settlement in the valley. About the only other inducement is the fur trade which is the support of the post at McGrath and of the few people (not over 50) who inhabit the river valley above this point.

Crow, Chuwhak, Little Mt, Horn and Top of the Id. villages are native settlements of 2 or 3 families comprising in all, not over 10-15 persons. Lousetown is a native settlement across George river from Georgetown; several white men stay here. Napaimut is the largest native settlement on the middle river with the exception of Sleitmut, the latter having a population of perhaps one hundred natives, at both places white men conduct small trading posts.

Aniak is the settlement of a couple white men.

Georgetown was a mush-room settlement which flurished

during the winter of 1910-1911 when it had several stores and a saloon. It is now practically deserted.

Russian Mission is a small native settlement about a Russian church. The native priest ministers to the Indians inhabiting the middle river valley.

Kolmakof is the site of the old Russian settlement. A trading post has been maintained here more or less regularly since the settlement of the place but at the present time it is closed.

Crooked Creek is a small native settlement with a trading post carrying only a meagre stock.

Parks place is the settlement of Mr. Parks at his Cinnabar Prospect. A family or two of natives live in the vicinity, as well as several white men who are prospecting for cinnabar.

Toroy and Black River are small native settlements.

Vinasale is a deserted Russian settlement.

McGrath is the site of a Northern Commercial Co. trading post which carries a complete general stock. There are about 15 cabins at the post and perhaps 75-100 white men, half of whom are trappers, use this as a supply point.

Tacotna Forks is about 15 miles by water (7 miles cross country) up the Tacotna river from McGrath, at the forks of this river and Nicholas branch. It was built during the heavy prospecting on the Tacotna River. The K.C.Co. moved their store from Georgetown to this point but have now moved it further up river to Tacotna near Candle Creek. There are about 10 cabins around the Forks and several white people have settled here.

TRANSPORTATION & COMMUNICATION

To the outside the following routes of travel are possible.

1. Via the Yukon River, which can be entered from either St Michael or Skagway. The following portages exist between the Kuskokwim and Yukon rivers.

(A) The Bethel mail trail to Russian Mission on the Yukon, four days travel from Bethel. The route ascends a small stream emptying into the Kuskokwim just south of Bethel.

(B) Kalchagamut to Russian Mission on the Yukon, two days travel.

(C) Kalchagamut to Pimute, one day travel.

(D) Crooked Creek to Iditarod 2-3 days travel.

The last three routes possess summer trails over which it requiers about one additional day of travel.

2. Via the South Fork and Susitna river to Knik and Seward. This is the route of the only government trail in the region, the Seward-Iditarod mail trail, Mail from Seward to Iditarod requiers 13-18 days.

3. The water route up the Kuskokwim River, the main avenue for bringing in supplies. Before the charting of the mouth of the river, navigation across the Kuskokwim Bay was very dangerous as attested by many strandings and unsuccessful attempts to enter the mouth.

Local travel is mainly water borne during the summer and either dog or reindeer sled during the winter. Winter travel between Bethel and McGrath is mainly over the river course with a few cut offs across the river bends. Time to McGrath is about 15 days and 10-15 days thence to Seward.

There are road houses at Bethel, Napaimut, Crooked Creek and Tacotna Forks. Rates $1.00 a meal, $1.00 lodging.

The following statistics were gathered on transportation and labor;

Dog team travel costs about $500 for feed (man & dog) and about 25 miles a day is fair progress. Dogs cost $40-$60 in the winter and a new sled $60-$75.

Passenger transportation		
Seward-McGrath	$150 - $200	
Seward-Iditarod	200 - 225	
Seattle-Bethel	100	Average 3 to 4 passengers a season.
Bethel-McGrath	100	
Freight		
Landed at Bethel	$25 - 30	a ton.
" " McGrath	65 - 70	a ton.
Going out from Bethel	45	a ton.
Local freight		
Bethel-Napaimut	20	
" -Sleitmut	25	

McGrath to Tacotna, two cents per pound.
Tacotna Forks to Tacotna, one & one half cent per pound.
Bethel to Canyon Creek $.05 lb.) Dist. about
Kolmakof to Bear Creek $.05 lb.) 125 miles.

The above two routes are covered in winter by reindeer sled trains. These trains are composed of 6 - 8 teams of one reindeer to one sled, the whole being driven by one native. Each team can handle about 200 pounds of freight.

Hauling on bob sleds with a team of horses cost $.05 per lb. for about a 35 mile haul; such a team can be hired for $20.00 a day. Horses are available only in the vicinity of McGrath.

Packing for 8-10 miles costs 5-7 cents per pound.

Large poling boats cost $100-$150.

White labor at job work commands $1.00 an hour. Mines pay $6.00 a day and board.

Native labor is paid $1.50 - $2.00 a day.

SHIPPING FACILITIES

Several small ocean going vessels have, for the past number of years, maintained a more or less regular communication with Seattle, making a spring and fall trip. The inbound freight is all in the hands of the Northern and Kuskokwim Commercial Co., except that brought in for the Morarian missionaries. The total freight reached a maximum of 3000 ton in 1910. In 1915 about 1000 tons were taken in.

The present freight going up river is taken care of by the K.C.Cos. steamer "Quickstep" but in the busier years the Northern Commercial Co. had a couple steamers on the river, the A "Alice" and the "Lavelle Young". The former is now off the river

and the latter laid up at McGrath. The " Quickstep " generally makes 2 - 3 trips a season. Besides the "Quickstep" there are several small stern-wheelers on the river of from 10 to 20 tons capacity. Two or three of these are at Bethel doing a small business between there and nearby points on the river and lower tributaries. There are also two or three at Lacotna Forks freighting between this point and Lacotna.

Poling boats are usual means of water transporation for individuals and numbers of these can be found at Bethel and McGrath as well as numerous other river points. Several persons have brought in stern post motors for use on these boats and are getting good service from them. These poling boats furnish the only means of getting supplies up the small tributaries where the small stern-wheelers are unable to ascend.

Practically all supplies are brought into the country over the water route. Spring shipments bring in provisions for summer and material for prospective development throughout the valley. The fall shipments are generally food cargoes for the winter season. Typical prices for foodstuffs at Bethel in 1915 follows, practically the same prices existing along the whole river.

Flour	$ .07	a pound
Sugar	.14	A pound
Tea	1.00	a pound
Ham	.35	a pound
Bacon	.40	a pound
Coffee	.75	a pound
Beans	.12	a pound
Rolled Oats	.10	a pound
Butter	.55	a pound
Assorted Can fruit	$4.50	a dozen
Canned Tomatoes	3.50	a dozen
Condensed Milk	8.00 - 11.00	a case

Except fresh meat and some fresh vegetables all foodstuffs come from the outside. Of the vegetables, potatoes are the only thing grown in any quanity.

LIFE

(a) Natives

The natives main dependence for a livelyhood is fish and furs. Catching and drying fish keep them busy for the best part of the summer during which season they temporarily camp at various setes.Most of the fish is for their own consumption although considerable quanities are sold at the trading posts.

During winters and early spring the natives are busy trapping . The cheaper furs thus obtained they use for their own clothing and the better ones are sold to the company stores.

Besides fishing and trapping the only occupation for the native is an occasional laboring job, sometimes for individuals but generally for the commercial companies who employ them to handle freight and cut wood.

(b) Whites

Of the white population, about the most numerous group

are the prospectors who finance or " grub stake " themselves by doing general work about the country for about half the open season and then set out for the most promising regions to try their fortune. Some are cooks, some steam engineers, some river navigators etc but in the case of all,prospecting is their main purpose in the country.

In numbers, the trappers follow the prospectors. This is generally a distinct group of men, few of them ever turning to prospecting, there are less than 50 in the whole river valley.

They generally live and trap alone, most of them ranging large areas about the head-waters of the main forks of the river. In the spring they bring their catch to the river, and dispose of them to trading companies, wait for the first shipment of supplies from the outside, equip themselves for another year and return to the interior.

A small yet rather important commercial group is composed of company officials, company clerks and individual traders. Of the officials two or three live in the country and help run the concerns, about an equal number visit for a couple of months during the summer. The clerks generally make a trip outside every two or three years but are otherwise permanant residents. The small traders cover the country with sled and canoe, most of them staying in for two or three seasons and then going outside for an equal lenght of time.

The " Squaw " man is really the only permanant white settler in the country. Whether trader, trapper or prospector, he is about the only individual who has severed all connections with the " outside " and settled down to make the country his home. All other white men are generally ready to leave as opportunity offers, either for a trip outside or to try their fortunes elsewhere in Alaska if prospects seem to justify the move.

Respectfully submitted

Harold A Cotton

Assistant, Coast & Geodetic Survey.

For much of the above information especial thanks are due to Mr. Frank Joaquin ,Manager of the Kuskokwim Commercial Company and to Capt.Bugge skipper of the Steamer QUICKSTEP both of whom were very obliging with personal assistance and suggestions.

THE SURVEY
A - The Field Work.

THE INSTRUMENTS

The following instruments were taken aboard the Quickstep;

1 Sextant,
1 Chronometer,
1 4" Theodolite,
1 Artificial Horizon,
1 Boat Compass,
Sketch Book, Pencil etc.

The plan was to run a traverse up the river which could be later tied and adjusted to what geographical positions could be determined during the journey or secured from others sources.

POSITIONS

The latitude of Bethel was taken as that determined by the party of the Str. Yukon during 1914. The longitude taken was a mean of the following time altitudes observed while at Bethel August 21 - 22, 1935.

Jupiter (1) Sun (3) Capella (2) Vega (1) The chronometer correction for the reduction of these altitudes depended on corrections determined on August 15 and August 31 by altitudes taken at △ Fisk and △ Astro respectively.

Time altitudes at Bethel gave a chronometer correction just before starting up river and others observed at Warehouse Creek on August 1 gave a correction after completing the work. Interpolation between these latter values gave correction for the reduction of observations for summer lines along the river. The chronometer correction determined during the season are plotted on a seperate sheet.

Time and meridian altitudes were measured with a sextant and artificial horizon. For lines of position determined see list of fixed positions under B - The Office Work.

SKETCHES

As the course of the steamer went continually from one bank of the river to the other it was impossible to base a traverse on the actual course steered. The points marking the courses as recorded were picked up by the distinguishing features of the topography and bearings noted on the boat compass. Distances and courses were determined by noting time consumed to travel them and the corresponding speed of the vessel.

THE SURVEY

Upon the travese as a framework, the shoreline of the river and adjacent topography was sketched by noting bearings and distances to prominent points. Distances were determined by (a) estimate, (b) by the run between a change of bearing or (c) by the depression angle. The latter was only used in the case of shoreline and was measured by swinging a plumb bob on a nail and reading the angle between the direction of the plumb bob line and the point of shore line. The plumb bob was swung in water to dampen its vibrations, the height of eye was determined as 24 feet.

(a) Upstream

The upstream sketches were drawn on a scale of 1/2"- 1 mile. The speed of the steamer was determined by noting the time required to pace the upper deck and keep a beam range on shore i.e. to walk as fast as the steamer was going which was possible on the up river trip where the speed never exceeded 4 knots. As the steamer deck was 101 ft. long the vessel was making a mile (nautical) in as many minutes as it took seconds to pace the deck.

Besides the sketches, rather complete notes were kept going up stream, a detail explaination of which accompanies the sketch book.

(b) Downstream

Going down stream it was impossible to keep as complete a system of sketches and notes as during the upstream trip, for the vessels speed was 10 - 12 knots instead of 2 - 4, Accordingly these sketches were made twice the scale of the others and the only notes kept was the times of passing the several points marking the terminals of the course of the traverses. The method of drawing these sketches made it possible to determine the bearing of the courses (or any other line) at a later time.

The sketches were made on the back of sections of chart paper across the face of which two perpendicular lines were drawn and designated as the cardinal maguetic direction N, E, S, and W. This paper was tacked to a circular board on which were marked all the points of the compass, the above mentioned lines being placed in coincedence with the corresponding headings on the board. The board could be revolved and carried a lubber's line corresponding headings to said line on the compass. The sketch board could thus be kept oriented easily by watching the compass and the sketching proceeded in a similar manner to plane table topography.

The speed down stream was determined on the stadio principle. First, the distance to some object on shore was measured by a depression angle and then the time noted for it to pass abeam between two points, the distance apart of which was 1/10 the distance the eye was held behind them. The line joining these points was parallel to the keel of the ship and the eye was held on a perpendicular to this line at its middle point. Prepaired tables made it possible to make the above determination in a short time. One table gave the distance for a measured depression angle and another table gave the speed corresponding to this distance and the above noted time interval.

THE SURVEY

Heights of peaks etc were estimated or roughly determined by an angle of elevation when an approximate distance could be secured.

B - The Office Work.

Positions

After careful consideration and thorough search through all available data the following positions were assumed as fixed, and the traverse adjusted to them.

A Just below Tuluksac.

One summer and line of adjusted traverse between Bethel and Aniak.

B Aniak.

One summer and Latitude carried forward from Kolmakof.

C Kolmakof.

Latitude from Russian determination by Zagoskin and traverse between Little Mt. Village and Aniak.

D Little Mountain Village.

One summer and latitude carried forward from Kolmakof.

E Crooked Creek.

Latitude from Russian determination by Zagoskin and an interpolated Russian Longitude. In 1843 Zagoskin journeyed up the Kuskokwim from Kolmakof to the site of McGrath, carrying a chronometer with an approx predetermined rate of 7 sec. gaining. Using this for the reduction of time altitudes, he computed a longitude for Crooked Creek and also for the mouth of the Chulitna river. As the error of the latter one could be determined from its position on the sheet, the longitude of Crooked Creek was interpolated between it and Kolmakof.

Zagoskin measured meridian altitudes at mcGrath, Vinasale and the mouth of the Chulitna River which could be compared with latter determinations, such comparisons showing no discrepancy of over 1.5 minutes of Latitude, a probable error of any sextant observations.

F Azimuth and distance from Sleitmut was taken off the Geological Survey plane table sheet executed by Mr. Sargeant, in 1915.

THE SURVEY

G Sleitmut

One meridian altitude and two time altitude, one on the moon's lower Limb and the other on jubiter. The resulting lines of position gave an almost equilateral triangle whose center was about 3/4 mile from either side.

,H Azimuth and distance from Sleitmut taken off Geological Survey plane table sheet executed by Mr. Sargeant, in 1914.

L Swift River

Russian Latitude, Longitude carried forward from sumner of July 9th.

J Two summers seperated by about 2 hours.

K Vinasale

Azimuth and distance from McGrath taken from Geological Survey plane table sheet executed by Mr. Sargeant,in 1914.

L McGrath

A compromise position between one determined by one meridian and three time altitudes, and a position from the Geological Survey plane table sheet executed by Mr. Sargeant in 1915. These positions differ by about one mile and a half miles.

The Plotting

The traverse line was first plotted on tracing paper. The compass rose used to plot magnetic bearings was drawn on a seperate piece of tracing paper which could be placed under the working paper. It could thus be kept near at hand (avoiding the frequent necessity of carrying a parallel line far across the sheet) and could also be easily adjusted to the local variation.

It was impossible to determine any values for the deviation of the compass used, but all courses were short.

As distances were recorded by time and speed, a table was constructed so that they could be plotted in like manner. In rounding bends the time on curve from P C (Point of Curvature) to P C was noted and a second table was constructed to find the T (Tangent distance) from the recorded data

After the traverse was plotted, its several sections were adjusted to the above fixed positions by a proportional increase or decrease of each course as the case demanded. Then the topography was transferred from the sketch to the finished sheets by a system of squares.

THE SURVEY

Computations

Meridian altitudes were reduced the actual way.

Time altitudes were first computed for two latitudes and checked by a computed altitude. All original observations and computations are enclosed. A corresponding number enclosed with a circle will be found through (a) the original observation, (b) the first and (c) the check computation.

The chronometer error for time sights has been discussed.

Note:- It is respectfully requested that a copy of the detailed explanation of the notes for this work as left at the Washington Office, be made a part of this report.

ADJUSTED GEOGRAPHICAL POSITIONS OF
POINTS ALONG THE KUSKOKWIM RIVER

	Point.	Position.	Determination.	Discrepancy of Traverse.	Position by milage above Bethel.	Distance
	Bethel	61-47-50 161-44-45	Several meridian alt. and summer lines.			
A	Just below Tuluksac	61-03-15 160-56-00	One summer line. Traverse Bethel to Aniak.	3.5 Mi.	0-45.5	45.5
B	Aniak	61-39-50 159-41-45	Summer at Aniak Lat. from Kolmakof.	0.5 "	45.5-121.5	76
C	Kolmakof	61-34-15 159-03-45	Lat. from Zagoskin. Lon. by traverse between Little Mt. Vell. & Aniak	0.0 "	121.5-142.5	21
D	Little Mt. Village.	61-31-45 158-39-30	Summer at Little Mt. Vill. Lat. by traverse from Kolmakof.	.5 "	142.5-157.0	14.5
E	Crooked Cr.	61-51-30 158-10-30	Russian Lat. Interpolated Rissian Long.	3.5 "	157 -187.0	30.0
F	Georgetown.	61-54-15 157-58-30	Azimuth & distance from Sleitmut taken off Geological Survey P.T. sheet.	2.0 "	187.0-208.5	21.5
G	Sleitmut	61-42-45 157-05-30	Meridian altitude and summer.	1.5 "	208.5-232.0	23.5
H		61-41-30 156-54-00	Azimuth and distance from Geological P.T. sheet.	0.5 "	232 -242	10
I	Swift River	61-51-45 156-15-15	Russian Latitude. Long. from summer of July 9th.	4.5 "	242 -275	33
J		62-15-00 156-11-30	Two summers.	.5 "	275 -307.5	32.5
K	Vinasale	62-43-00 155-47-15	Az. and dist. from Geological Survey. P.TP sheet.	8.0 "	357.5-307.5	50
L	McGrath	62-57-15 155-37-00	Compromise position between astronomical determination (HAC) and Geological Survey Plane table sheet position.	1.5 "	357.5-391	33.5

MILAGE OF RIVER POINTS
AND
STATEMENT OF TIME EMPLOYED ON THE SEVERAL SECTION OF SURVEY

Settlement.	Dist.	Rapids & Shoals.	Section.	Time, from to.	Dist.	Elapsed time
Bethel.	0		(1)			
Akiachagamut.	20					
Akiak.	32			7:40 p.m. July 3	0-65	18H-35m
Tuluksac.	48			7:30 p.m. July 4	65	
		Tuluksac.				
Ogawick.	71					
Kalchagamut.	86		(2)-6	8:20a.m. July 15	65-107	4h-05m
				2:40 p.m. July 15	42	
Ohagamut.	103					
	110	Ohagamut.				
Crow Village.	115					
Aniak.	121.5		(3)	7:50 a.m. July 5	107-173	
				7:00 p.m. July 6	66	22h-30m
	123	Aniak.				
Russian Mission.	131					
	141.5	Above.				
Chukwhak.	138.5	Cinnabar Hills.				
Kolmakof.	142.5					
	145	Above. Kolmakof.				
Napaimut.	151					
	153	Above. Napaimut.				
Little Mt. Vill.	157					
Horn Village.	170					
Top Id. Village.	175.0		(4)-5	10:50 p.m. July 14		
				12:08 a.m. July 15	173-187	
Oskawalit	176.5				14	1h-18m
Crooked Cr.	187					
Georgetown.	208.5					
Lonstown.	210.0					
Parks Place.	223					
Sleitmut.	232	Swift current between Sleitmut and Stony River	(5) up-stream.	4:00 a.m. July 7	132-187	14h-45m
				8:15 p.m. July 7	45	
			(6)-4	8:00 a.m. July 14	242-232	1h-0m
				9:00 a.m. July 14	10	

MILAGE OF RIVER POINTS
AND
STATEMENT OF TIME EMPLOYED ON THE SEVERAL SECTION OF SURVEY

Settlement.	Dist.	Rapids & Shoals.	Section.	Time, from to	Dist.	Elapsed time.
			(7) up stream.	7:20 a.m. July 8	252.5-242	4h-40m
				12:00 N. July 8	105	
	260	Stony River.				
Toroy.	269		(8) - 3	12:40 a.m. July 14	266.5-252.5	1h-30m
				2:10 a.m. July 14	14	
			(9) up stream	6:30 p.m. July 8		
	272	Below swift River.		9:40 p.m. July 8	172-266.5	2h-30m
					5.5	
	277	Swift River.				
			(10)-2	10:40 p.m. July 13	287-272	
Rapids.	287	Rapids.		12:05 a.m. July 14	15	1h-25m
			(11) up stream.	4:15 a.m. July 9	328-287	13h-10m
	318	Kunivak Bar.		10:00 p.m. July 9	41	
Black River.	349		(12)-1	3:45 p.m. July 13	349-328	2h-0m
				5:45 p.m. July 13	21	
Vinasale.	357.5		(13)	3:20 a.m. July 10	391-349	11h-20m
				5:20 p.m. July 10	42	
McGrath.	391					

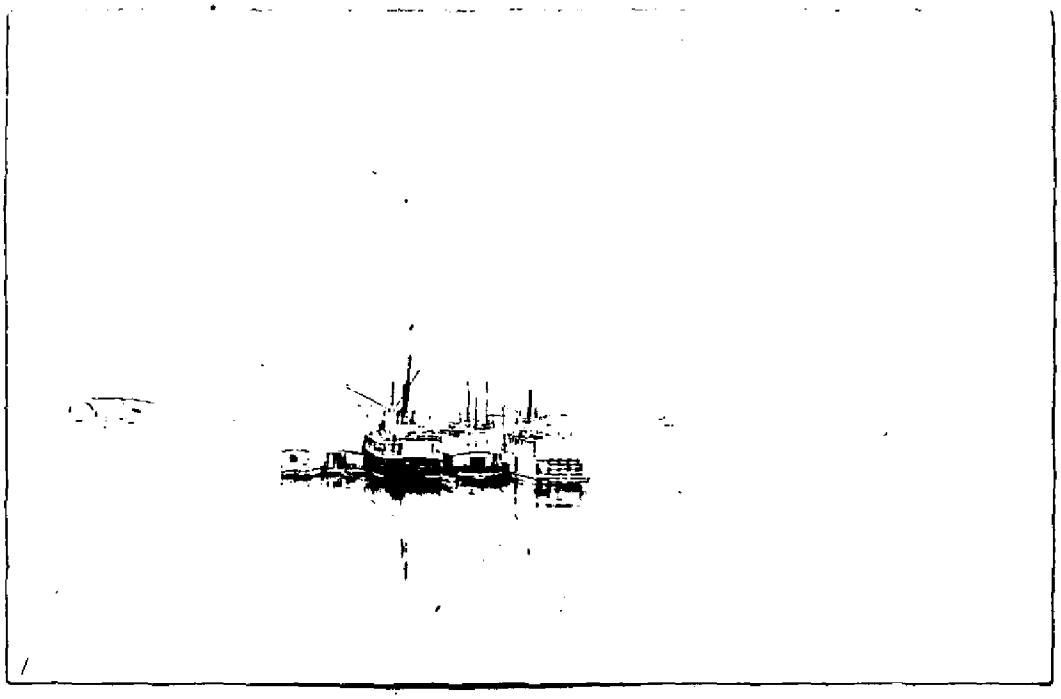
Under column "Shoals and Rapids" the rapids are designated by being underlined

Under column "Section", figures enclosed with circle indicate work done while enroute upstream, figures enclosed with parenthesis indicate work done while enroute down stream, the latter being followed with a double underscored figure which will be found in red on sketch covering that section.

Milage is expressed in nautical miles.

VIEWS ON THE KUSKOKWIM RIVER

File with descriptive reports of Top & Sheets 3557 and 3558

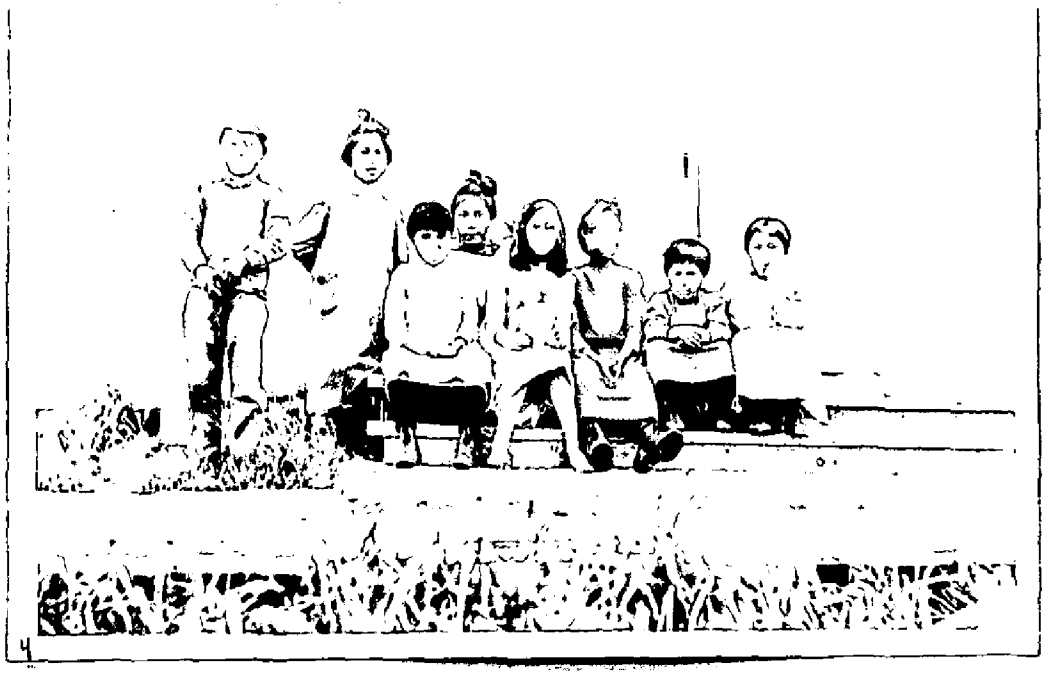


Steamers ALLIANCE and QUICKSTEP and three barges in the foreground;power schooner RUBY in the background.The power schooner BENDER BROTHERS arrived in the harbor the day after this picture was taken,making the largest fleet ever in Bethel at one time/

Saturday afternoon is a holiday among the natives.

VIEWS ON THE KUSKOKWIM RIVER

The three children are half-breeds of the better type.



Half-breed children at the Moravian Orphanage

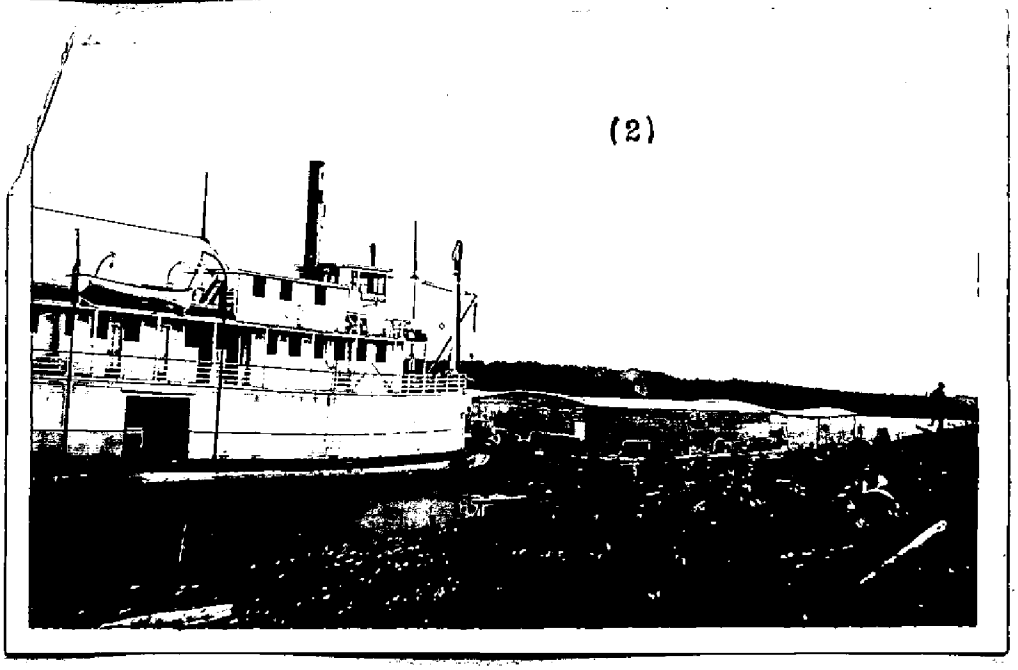
VIEWS ON THE KUSKOKWIM RIVER

(1)

(1)
Esquimo squaws;theywere aboard the YUKON selling bead and basket work.

(2)
Steamer QUICKSTEP bound up river with 300 tons of freight.The barges are made fast ahead.

(2)

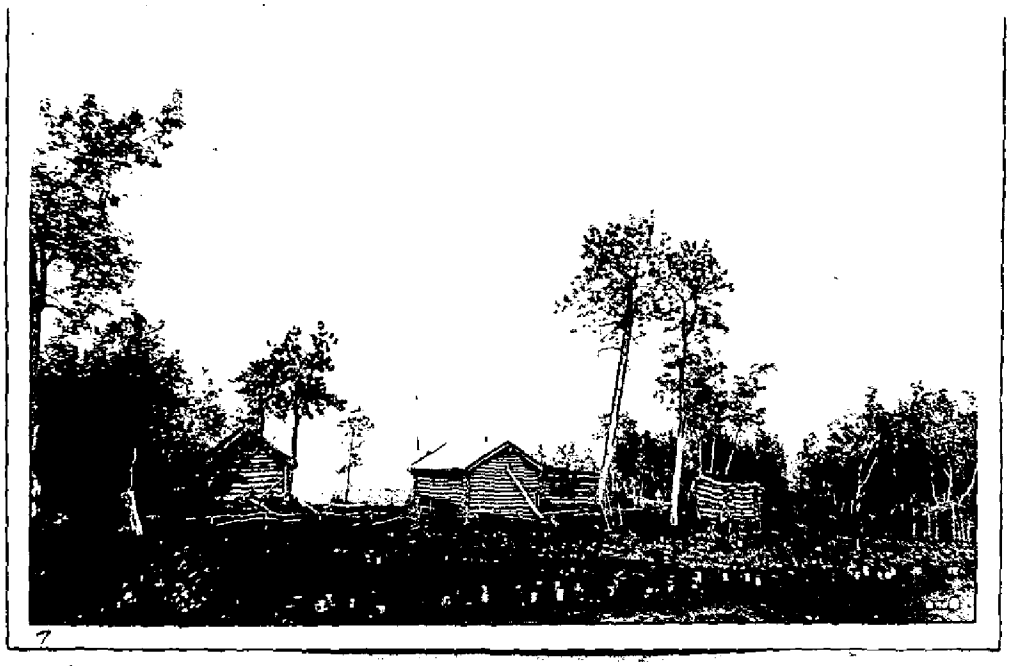


VIEWS ON THE KUSKOKWIM RIVER

(1)
Esquimo squaws;

they had come

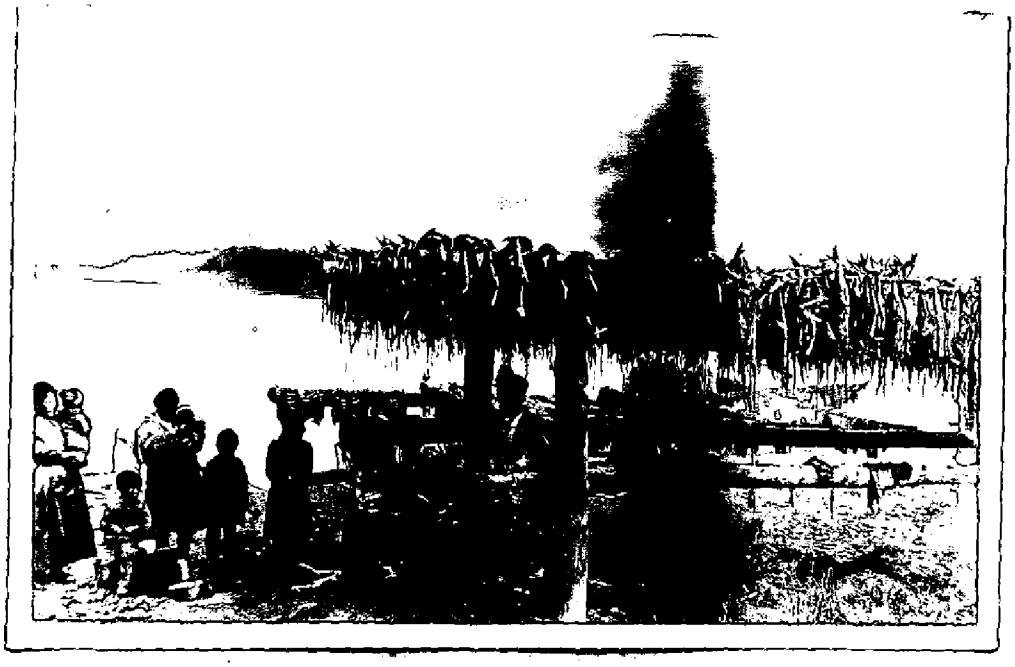
VIEWS ON THE KUSKOKWIM RIVER



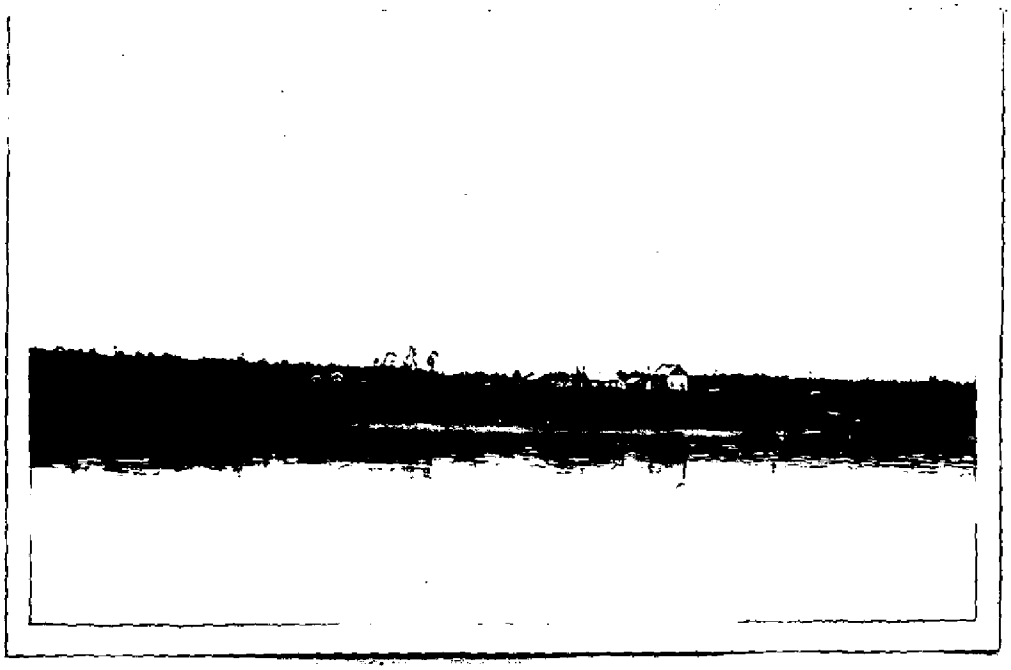
A few acres cleared at Aniak for the cultivation of potatoes.

The best house onthe river,the property of George Hoffman.

VIEWS ON THE KUSKOKWIM RIVER



One of the many fish camps along the river.

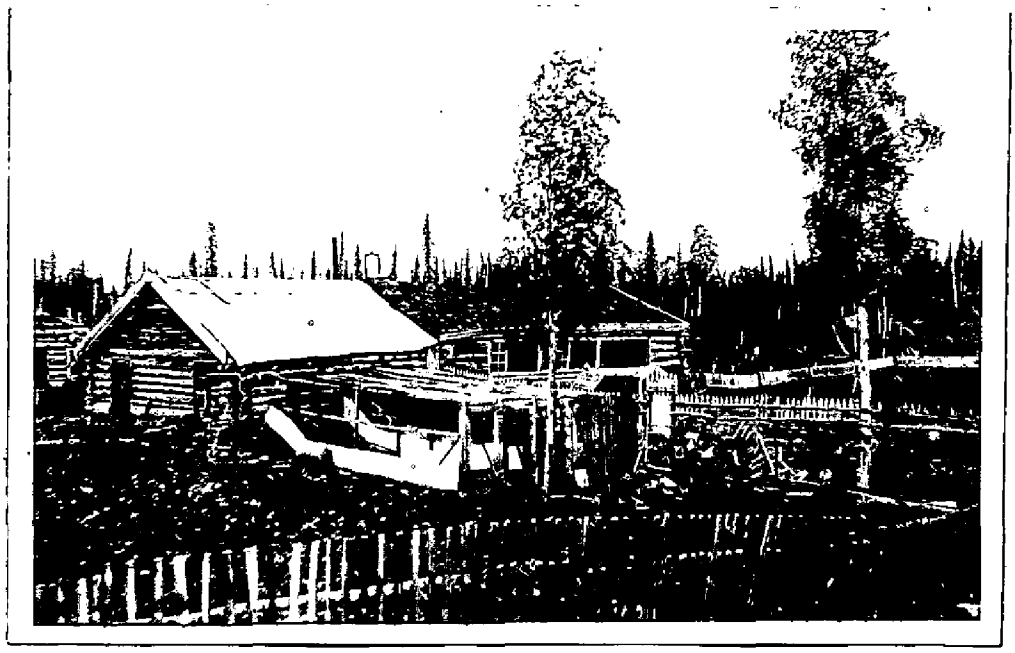


Settlement around Hoffman's Trading Post

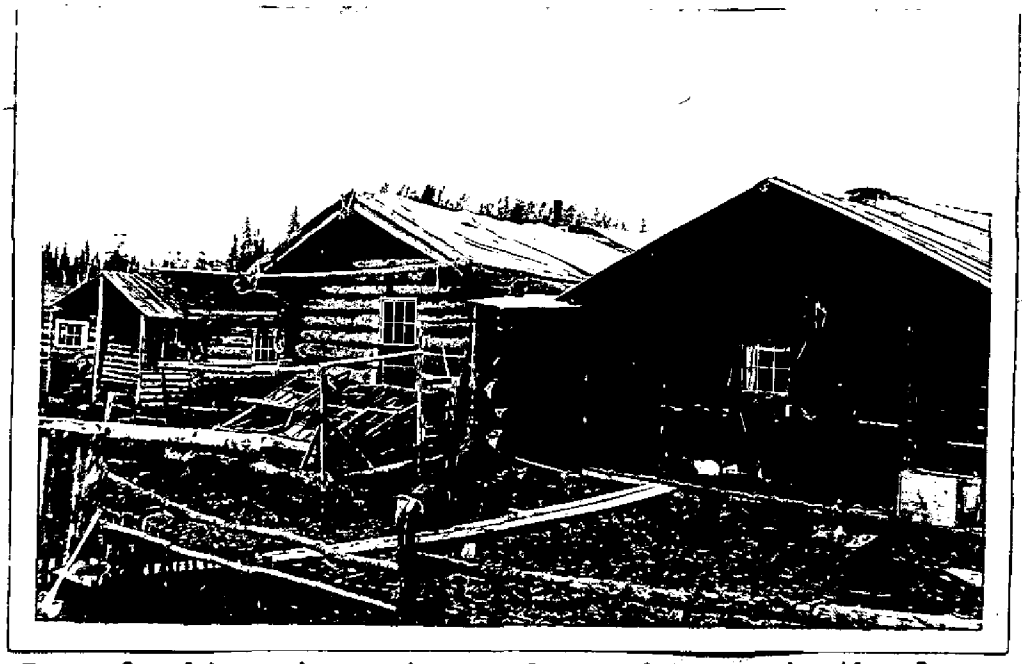
VIEWS ON THE KUSKOKWIM RIVER

Two views of the Northern' Commercial Company's establishment at Mc Grath

VIEWS ON THE KUSKOKWIM RIVER



Poultry yard belonging to road-house at Tacotna Forks



Row of cabins at Tacotna Forks;road-house in the foreground.

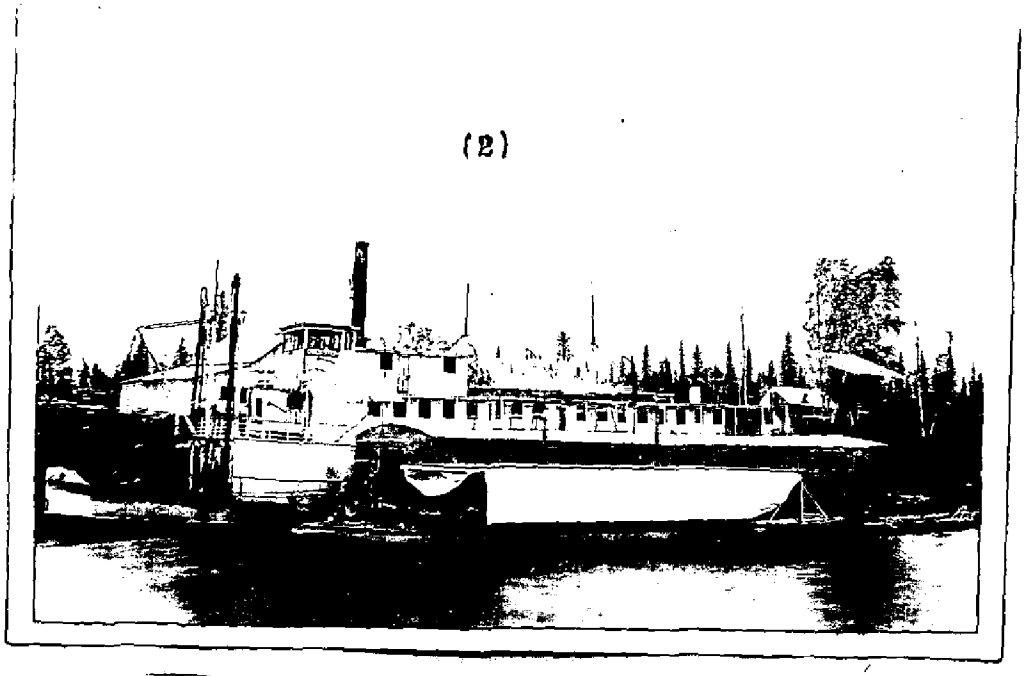
VIEWS ON THE KUSKOKWIM RIVER

(1)

Prospectors encamped at McGrath; they came from below on the Str. Alliance.

(2)

Steamer QUICKSTEP at Tacotna Forks. The small sternwheeler in the foreground was constructed at Tacotna Forks.



3558

Reconnaissance.

Examination of Topographic Sheets

by the

Divisions of Field Work and Field Records.

1. Has the magnetic meridian been determined? .....No.....

2. Is the point occupied for the determination of magnetic meridian designated? .....

3. Is the approximate or rodded location of high water mark in back of mangroves shown? .....

4. Have navigable rivers been surveyed? .....

5. Is interior information given by descriptive legends or otherwise? .....No.....

6. Is the inking of the sheet legible? .....

7. Is projection properly shown? .....

8. Are methods of surveying fully described? .....yes.....

9. Are descriptive legends given concerning conspicuous islets, objects, rocks, and other features given in blank areas? .....
.....

10. Are geographic names given? .....

11. Is full information regarding geographic names given in the descriptive report in accordance with paragraph 557 of the Instructions for Field Work? .....
.....

12. Are the names of topographic signals given? .....

13. Does the sheet have a neat appearance? .....

14. Is sufficient contouring shown, some of which could be obtained by sextant directions from boat positions? .....

15. Is the control good? .....

16. Is the sheet well laid out? .....

17. Is the accuracy of traverses between triangulation stations stated in the descriptive report? .....

.....

18. Are the elevations of prominent rocks or islets given? .....

19. Are the description of reefs, as bare, awash or covered at high or low water given? .....

20. Are objects useful for future surveys indicated? .....

21. Is there a record of marking topographic stations? .....

22. Is the character of the beach shown in various places? .....

23. Is the plane of reference for elevations given? .....

24. Is the low water line determined at important places? .....

25. Is there a full list of data affecting sheet given on title sheet?

.....

26. Is there a list of plane table positions? .....

27. Are the elevations whether that of tree-top or ground indicated? .

.....

28. Does the descriptive report give date of instructions? .....

29. Is a sketch given showing contouring of interior mountainous country beyond limits of sheet? .....

30. Is the general description of the coast given? .....

31. Is there information about obtaining fresh water? .....

32. Have standard symbols for various features been used? .....

33. Is the survey complete? .....

.....

34. Is there a note as to cultivations, roads and other improvements?

.....

35. Is commercial information given in descriptive report? .....

36. Is there a list of landmarks? .....

Remarks

.....

.....

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.....

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3557

Reconnaissance

Examination of Topographic Sheets

by the

Divisions of Field Work and Field Records.

1. Has the magnetic meridian been determined? .....No.....

2. Is the point occupied for the determination of magnetic meridian designated? .....

3. Is the approximate or rodded location of high water mark in back of mangroves shown? .....

4. Have navigable rivers been surveyed? .....

5. Is interior information given by descriptive legends or otherwise? .....No.....

6. Is the inking of the sheet legible? .....

7. Is projection properly shown? .....

8. Are methods of surveying fully described? .....Yes.....

9. Are descriptive legends given concerning conspicuous islets, objects, rocks, and other features given in blank areas? .....
.....

10. Are geographic names given? .....

11. Is full information regarding geographic names given in the descriptive report in accordance with paragraph 557 of the Instructions for Field Work? .....
.....

12. Are the names of topographic signals given? .....

13. Does the sheet have a neat appearance? .....

14. Is sufficient contouring shown, some of which could be obtained by sextant directions from boat positions? .....

15. Is the control good? .....

16. Is the sheet well laid out? .....

17. Is the accuracy of traverses between triangulation stations stated in the descriptive report? .....
.....

18. Are the elevations of prominent rocks or islets given? .....

19. Are the description of reefs, as bare, awash or covered at high or low water given? .....

20. Are objects useful for future surveys indicated? .....

21. Is there a record of marking topographic stations? .....

22. Is the character of the beach shown in various places? .....

23. Is the plane of reference for elevations given? .....

24. Is the low water line determined at important places? .....

25. Is there a full list of data affecting sheet given on title sheet?
.....

26. Is there a list of plane table positions? .....

27. Are the elevations whether that of tree-top or ground indicated? .
.....

28. Does the descriptive report give date of instructions? .....

29. Is a sketch given showing contouring of interior mountainous country beyond limits of sheet? .....

30. Is the general description of the coast given? .....

31. Is there information about obtaining fresh water? .....

32. Have standard symbols for various features been used? .....

3557

33. Is the survey complete? .....

.....

34. Is there a note as to cultivations, roads and other improvements?

.....

35. Is commercial information given in descriptive report? .....

36. Is there a list of landmarks? .....

Remarks

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POST-OFFICE ADDRESS: #204 Burke Building, Seattle, Wash.

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

RECEIVED 1916

Ack'd

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

U.S.S."EXPLORER"

SUPERINTENDENT

Port Bazan, W. Dall Id., Alaska,
July 30th, 1916.

CHIEF, DIV. OF HYDY & TOPY
AUG 16 1916
RECEIVED

To the Superintendent,
Coast & Geodetic Survey,
Washington, D. C.

Sir:-

There is respectfully transmitted herewith two copies of the Descriptive Report to accompany the sheets of the Reconnaissance Survey of the Kuskokwim River from Bethel to McGrath. The original observations, computations, sketches, diagrams, notes etc. used in compiling this report and the said sheets are being sent to the office under seperate cover.

FIELD WORK (H)
FIELD RECORDS (H)
VESSELS, ETC. (H)

In accordance with telegraphic instructions to Assistant F. H. Hardy, a copy of this report was sent to Assistant J. F. Pratt, Inspector at the Seattle Office on May 18th; a copy was also given to Capt. Cottle, master of the power schooner "Kuskokwim River" which vessel the "EXPLORER" met in Ketchikan June 5th.

Respectfully,

Harold A Cotton

Assistant, C. & G. Survey,

Forwarded,

F. H. Hardy

Commanding.

POST-OFFICE ADDRESS:

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

U. S. S. "EXPLORER"

DESCRIPTIVE REPORT FOR RECONNAISSANCE SURVEY OF KUSKOKWIM RIVER

BETHEL TO McGRATH

CHIEF, DIV. OF HYDY & TOPY
AUG 16 1916
RECEIVED

THE EXPEDITION

The data for this report and for the field sheets accompanying it was gathered while on a journey up the Kuskokwim river during July 1915. The work was executed as special duty while assigned to the party of R. R. Lukens, Asst. Comd'g C. & G. S. Stmr. Yukon, which vessel was engaged upon general surveys about the river mouth in the immediate vicinity of Eek Island. The journey was made possible by an agreement between Capt. Lukens and the officials of the Kuskokwim Commercial Co., who were kind enough to grant free transportation on the "Quickstep", a stern wheel river steamer of about 225 net tonnage which the said company operates during the summer season in freighting supplies to up river points from Bethel, this settlement being at the head of deep water navigation and the main supply point for the whole river valley.

THE OBJECT

During 1914 the Stmr. Yukon had made a reconnaissance survey of the Kuskokwim River, connecting Bethel with the Surveys work at the mouth of the river and it was the object of the present journey to carry this reconnaissance survey up the river as far as McGrath. This work was considered a very fitting supplement to the survey of the Kuskokwim Bay giving as it would, much valuble information of the river valley which was opened to commerce with the publication of the Bay charts. While on the river all the possible information was gathered which gave promise of being useful to anyone contemplating any operation on the river or its Tributaries.

THE ITINERY

The commercial steamer Alliance, on which the party of the C. & G. S. Stmr. Yukon took passage from Seattle, arrived off Goodnews Bay June 22, 1915, where the supplies for the Yukon, as well as all of the ship's complement, except myself, were placed ashore and on June 24th the Stmr. Alliance proceeded up the Kuskokwim Bay and into the river. My Knowledge of the country between Goodnews Bay and Eek Island, enabled me to assist the ships officers in keeping in the charted channel as far as Eek Island. At this point a native pilot was engaged who stood by the ship till our arrival at Bethel on June 28th. From that time till July 3rd the cargo of the Alliance was being transfered to the K. C. Co's warehouse or loaded on barges preparatory to going up the river.

On Saturday evening July 3rd the "Quickstep" left Bethel with supplies for up river trading posts. Most of this freight was carried on two barges which were made fast ahead of the "Quickstep". One of these carried about 200 tons for the Northern Commercial Co's post at McGrath and the other about 100 tons for the K. C. Co's post at Tacotna. A third barge with 50 tons of freight was made fast along side and dropped at Akiak on the way up river. The steamers complement consisted of about a dozen native deck hands, about a dozen officers and other employees of the Kuskokwim and Northern Commercial Companies and three or four passengers.

The journey was commenced during a fine spell of weather and the same continued during practically the whole trip. The main exception was the day predeeding our arrival at Bethel on the return passage which was cold and raining, such a day as the people of Bethel say is about characterestic of the low land country. Equally so, fine weather is claimed as characteristic of the up river country during the summer season.

There was little freight consigned to intermediate points along the river, so that the majority of stops made before reaching McGrath were at wood piles to replentish the fuel supply. The "Quickstep" consumed about 15 chord of wood every 24 hours, to supply which it was found necessary to stop about twice a day. The K.C.Co arranged with the natives for the cutting of this wood and have it placed at strategic positions along the rivers course. The down river being an "empty" trip arrangements are generally made to take on a barge load of wood at some point and so make it possible to cover the entire distance with very few stops.

In addition to the above, stops were made at the following points;

Up Stream

AKiak, July 4th.
Aniak, " 5th.

At Cinnabar Hills about 5 miles below Kolmakof, a river fog compelled the party to lay alongside the bank during night of July 5th -6th.

Napaimut, July 6th.
Little Mountain Village, July 6th.
A delay of about one hour occured three miles above Horn Village, on account of a squall.
Crooked Creek, July 7th.
Lousetown, July 7th.
Parks Cinnabar prospect, July 7th.
Sleitmut overnight, July 7th - 8th.
McGrath, July 10th and laying there until July 12th.
Tacotna Forks, July 12th.

Down Stream

Left Tacotna, July 13th.
McGrath, July 13th.
Sleitmut over night July 13th - 14th.
Bethel, arrived 10:00 P.M. July 15th.

On July 17th passage was secured on a small launch for the mouth of the river to rejoin the Stmr. Yukon. The Yukon was boarded about 20 miles above Bek Island where she was met, enroute to Bethel.

GEOGRAPHICAL DIVISION OF THE KUSKOKWIM VALLEY

(A) The low land section;

From Cape Newenham to Jack Smith's Bay, the southern extension of the Kuskokwim Mts. skirt comparatively close to the eastern shore of Kuskokwim Bay. Thence these mountains fall away to the eastward and opposite Bethel are about 50 miles distant from the river. Mountains are first encountered along the rivers course above Kalchagamut, which lies at the Kuskokwim end of the main portage to the Yukon river. The country bordering the Kuskokwim, below this point as far as the sea and extending from the Kuskokwim mountains on one side to the Yukon river on the other, is nothing but one vast stretch of flat tundra covered lowland over which are scattered many lakes and sluggish streams. There are few elevations over 40 - 50 feet and not many approaching that figure and this together with the abundance of water gives rise to a condition of practicaly no natural drainage over this vast territory. Besides the tundra, the main growth is willow although frequent groves of spruce are seen some of which are of considerable extent. Through this country the river follows a very meandering course, which is marked almost continually by cutting banks on one side or the other and frequently on both. Many islands result from part of the rivers waters often breaking through the lowlands instead of following the regular river channel and some of the sloughs thus formed lead several miles inland. Most of the cutting banks are covered with a matted growth of willow, through which passage would be practically impossible and generally, if a making shore is opposite, it is a mud flat of considerable extent and accordingly transportation during the summer season is confined almost entirely to water travel.

From Kalkagamut to Eek Island is about 150 miles along t the river course.

(B) The Highland Section;

The middle portion of the Kuskokwim river cuts directly through the Kuskokwim Mts. and accordingly this section of the river valley can properly be called the Highland section. From Little Mountain Villiage to the mouth of the Chulitna river, a distance of about 75 miles, the river channel cuts the main portion of the Kuskokwim Range and accordingly along this stretch an almost continous line of peaks and ridges border either shore of the river. This is especially true of the northern shore which frequently rises directly from the river to a height of 1200 feet or more and at no point are the high peaks over a few miles back from the river. Along the southern shore the ridges do not lie continuously so close to the shore and there is frequently a broad stretch of rolling country between the river and the higher peaks; and further, the steep eroding slopes which occur every few miles along the northern shore are seldom witnessed on the southern.

For about 65 miles down stream from Little Mountain Village the river follows more or less closely the mountains to the northward but to the southward a stretch of slightly rolling country intervenes between the river and the mountains which gradually fall back to a distance of about 25 miles in the vicinity of the Yukon portage. Here the southern shore is generally an earthen bluff rising about 15 - 25 feet and occasionally 50 feet above the river but the northern shore is a continuation of the ridges and eroding bluffs described above.

From Aniak to Sleitmut, the river channel is well confined and consists of a series of long reaches and easy bends with an average width of about 2/3 mile and only a few alluvial islands, overgrown with brush and willows, obstruct its course. Both banks are high fast land which offer free passage on foot during the ordinary stages of the river. Below Kolmakof there is considerable spruce but with this exception this track is very sparcely timbered even near the river and the highlands are almost bare. The islands and small lowlands areas are generally covered with a moderate growth of brush and willows andfrequently birch and cottonwood are encountered; The growth at any point is such as to permit easy passage or trail building.

(C) The Interior Basin;

Above Ninasale only a few peaks are seen near the river, which from here emerges into a large interior basin lying between the Kuskokwim and Alaskan ranges of Mountains. This large area is mostly a flat region with considerable rolling country, but with only an occasional peak rising above the general level. Its extent is distinctly marked by a ring of distant mountains on the horizon. Through this region the river follows a meandering course that is sometimes almost bewildering, its current is slow and sluggish

and cutting banks mark one shore or the other and frequently both. There is considerable timber which consists about equally of spruce and deciduous growth of willow, birch, cotton wood, etc; the under growth is not sufficient to seriously impede travel but the natural drainage is poor and accordingly there are only a few possible routes for transportation.

An intermediate section;

Between the mouth of the Chulitna River and Vinasale, the river valley can hardly be classed as belonging to either the highland or the basin area; the river here skirts the southern foot hills of the inland section of the Kuskokwim Mts., only occasional approaching the higher peaks. The river banks along this section are quite similar to those between Aniak and Kolmakof, the northern running along the base of highland ridges almost continually and being often marked with steep eroding cliffs while the southern is a rather low earthen bluff, long sections of which are being cut away with the river current. A cutting bank is only seldom seen along the northern shore.

At McGrath the general course of the river changes from west to south and from this point, as far as the hills just north of the Yukon portage, it seems as if the river is continually seeking a channel to the northward but as continually turned aside by mountains peaks and ridges the base of w which it washes but in vain, till finally, instead of reaching the Yukon and becoming a tributary of a larger system, it takes an easy passage through the lowland marshes to the sea.

The lower portion of this intermediate section, lying between the Chulitna and stony rivers, is broken up into and obstructed by many islands, the river's water at times spreading out over to a width of several miles; as the river current is at the same time strong and swift, this is the most difficult section of the river to navagate. This stretch is the main exception to the rule that the channel of the Kuskokwim river is mainly well confined although there are other exceptions along its course through the lowland country.

The country between the Chulitna and Stony rivers is reported as one big marsh, small extentions of which reach across the river into the highlands which border the river to the north. The lowland areas are well timbered but the heights are bare. The timber is mostly spruce with considerable birch, cottonwood, willow etc. Water travel is the only practicable transportation during the summer season.

THE RIVER

The river is frozen over for about seven months a year, the freeze up generally coming about Oct. 1-15 and the break up occurs from May 15-20. As travel is usually handicapped for a month previous to the break up and for a like period after the freeze up, transportation is generally water borne for five months and overland (or ice) for the same period.

Before the spring break up there is an average rise of about 4-6 feet which mounts to 8 feet and over just after the break up, but, on a jam, the river has risen 12-14 feet

above these figures. At Sleitmut on the middle river the ice runs about six days; further up river the run is longer but about Bethel it lasts for only two or three days.

The lowest stage of the river is just before the freeze up when the following depths will be found on the bars;

Bars;

Tulukaac crossing 3-1/2 - 4 feet.
Aniak " 3-1/2 - 4 "
Crossing above Cinnabar Hills 3-1/2 - 4 feet.
" 3 miles above Kolmakof 3-1/2 - 4 feet.
" just above Napaimut 3-1/2 - 4 feet.
Eunivak crossing 3 - 3-1/2 feet.
Crossing 5 miles above Salatna 3 - 3-1/2 feet.

Between the Chulitna and Stony rivers the main channel is shoal and swift but scarcely critical. The same holds true below Swift river. These bars mark the maximum depths which can be taken up the river. The first one encountered, Tulukaac river, is about 47 (nautical miles) above Bethel. Up to this point it is claimed 10 - 12 feet can be carried although it was impossible to carry a continuous line of soundings but as the river channel thus far is very narrow for the amount of discharge and no indications of shoal were seen, the claim is considered reasonable and probable. The mouth of the Tulukaac river is the last point where any tidal effect is noticed.

Currents;

The Rapids is a point on the intermediate section of the river which here again approaches the higher peaks lying to the northward. It is 54 miles above Sleitmut. This is the only point the "QUICKSTEP" was unable to get through under its own steam; for about 1 mile it was necessary to put a line ashore to a tree and come ahead with a turn around the capstan. The strength of the current is about 8 - 9 knots.

Around the mouth of Swift river and also from the Chulitna to the Stony river the current has a strength of about 6 knots. It also has about this strength at the rapids above Chagamut.

All of these bars and rapids are indicated on the field sheets accompanying this report.

The general river current can best be described as follows;

From Bethel to Kalkogamut, easy.
Kalkogamut to Napamute, stiff to swift.
Napamute to Swift River, swift.
Swift River to McGrath, slow and sluggish.

A diagram is enclosed showing the most probable current strengths along the entire course of the river; these values being determined from a consideration of the comparative time made by the "Quickstep" on the upstream and down stream trips and also estimates of local authorities.

During the present journey, what few snags encountered were along the upper stretches of the lowland section. Through the highland section it is probable that fewmsnags are ever encountered, their only possible origin being as a discharge from tributaries. Through the veritable archipelago above

the Chulitna River snags should be expected, although scarcely any were seen on the present trip.

About any point along the shore of the highland section offers a possible landing for a river boat; but on any section of the river it is not difficult to locate a bank sufficiently steep-to to come alongside, the low making shore on the inside of most bends being the main points to avoid. The general position of the northern shore being under a steep bank or cliff would indicate that possible landing sites were here more frequent.

The course followed by the Stmr. "Quickstep" is indicated on the sheets by a dash line, this being the position of the best water according to local knowledge. The only general direction possible is to keep close to the cutting or steepest bank and cross the bars with causion. Most of the uncovering bars lie at the bends with the best water toward a cut bank, the passage often being narrow.

A steamer such as the "Quickstep" (drawing 4-1/2 feet) can ascend the Kuskokwim river for 600 miles above its mouth, the deeper water extending up the East and North fork toward the divide from the Kantishna River of the Yukon system.

Tributaries;

(A) South Fork - About 3 feet can be taken from its junction with the main river for 50 mile as far as Nicholi a small trading post. Rapids prevent further progress. This stream leads into the heart of the Alaskan range and is used to reach the Hartman and other regions. It is also a route to the outside by crossing a divide to the Susitna river system.

(B) Big River - This river lies in the heart of the Interior basin joining the main river from the south about half way between McGrath and South Fork. About 2-1/2 feet can be carried up it and its tributaries for 50 miles. All told the system has 150 miles of water route available for every light draft travel.

(C) Chulitna - About 4 feet can be taken 75 miles up this branch which marks its head of navigation except for poling boats. The Hoholitna can be ascend for 50 miles above the latters mouth. There is nothing but a few prospects over the basin of these streams. A portage is said to lead from the headwaters of the Hoholitna to those of the Mulchatna and offers means of travel toward the Nushagak country.

(D) Tuluksac and Aniak Rivers - Both are navigatable for about 40 miles for 3-1/2 - 4 feet. These streams furnish means of reaching Marvel, Bear, Ophir and other creeks in the Tuluksac Aniak placer district.

(E) Kuethluk River - A 50 ton steamer could ascend this branch for about 25 miles and about 1 foot can be carried for another 25 miles up stream. Canyon Creek is a head water stream of this district.

(F) Kisuralic River - This branch lies to the north and not far distant from the above stream and offers about the same advantages for navigation.

RESOURCES

(A) Furs - The fur trade is the main inducement for the two trading companies which do business on the river, the Kuskokwim Commercial and the Northern Commercial. Mink, fox and musrat are

found on the lowland country; an addition to these ermine, martin and linx are numerious in the interior. Next to fish the natives depend on furs for their livehood and there are 30 - 40 white men in the valley who about do nothing but trap, making a fair living at the same.

There are perhaps three or four independent fur traders over the region who gather about as many furs as they can handle in a large poling boat or Peterbow dance.

Typical prices paid for local furs in the spring of 1915 are as follows;

Ermine	$ .60
Martin	3.50 - $ 7.00
Martin (picked)	17.00
Mink	1.00 - 3.50
Fox (red)	5.50 - 7.00
Linx	3.50 - 7.00
Musrat (bundle of 32)	$2.00 - $4.00 (approx)

(B) Game - Big game abounds in the country about the headwaters of the river, Caribou are found about Mt. McKinley, moose along the North Fork, and mountain goat anywhere in the higher mountains.

From the main forks of the river to the sea, game is very scarce an occasional moose, duck or ptarmigan being all that can be found. In the tundra country below Bethel, ptarmigan are quite plentiful.

Two runs of salmon enter the river, the red and the silver, and there is generally plenty of fish as far up as Sleitmut and a considerable supply above that point. King salmon are secured about the mouth of the river during the early season and for the past two years a small saltery has operated just above Eek Island on the west shore.

The native depend mainly on fish for their f ood supply and many fish camps were passed where 2000 - 3000 lbs. of fish were being dried. The natives have numerous traps, while about half a dozen fish wheels have been constructed by industrious white men. Dried fish is the main article of merchandise on the river, being used by white men and natives, as well as dogs; occasions of travel, of isolation and of want, making it an ever appreciated food upon which to fall back.

(C) Agriculture - At every settlement, a small patch of ground will be found, where lettice, rutabagas, radishes, cabbage, potatoes etc are raised in limited quanities. At Aniak, a settler has cleared a couple of acres which he has devoted to the cultivation of potatoes with considerable sucess. The best ranch on the river is on the south shore opposite McGrath where a settler has cleared 10 - 15 acres on most of which potatoes are raised and here some fine barley was raised during 1915. This man depends exclusively on his ranch for a living; he owns a couple of horses and considerable up to date farming equipment which he has had brought in from the outside. At Tacotna Forks there is another fanch of about the same pretensions as the last mentioned, but with more attension to live stock, a large batch of chickens and a couple hogs belonging to the said ranch.

The missionaries and school teachers at Bethel and Akiak all possess a fair garden and make an effort to help the natives to raise vegetables for their own use. Through this and other contact with the white people many natives are able to provide themselves with considerable quantities of potatoes rutabagas, etc.

Frost was observed at McGrath on the evening of July 11th, this indicating the care necessary to preserve any crop to maturity. Through the interior there is plenty of sunshine during the short summer season and the inhabitants claim that there is plenty of fertile ground but the population is scarcely sufficient to warrant any large venture in agriculture. Information available would indicate that the upper Kuskokwim valley is similar in every way to the Yukon and Tanana vallies where there are many successful ranches.

(D) Lumber - Local timber can most likely supply the need into an indefinite future, especially on the upper river, but in the vicinith of Bethel the timbered area is small. The missionaries have a saw mill at Bethel which is supplied by logs cut a couple hundred miles up river and floated down stream. At Tacotna Forks there is another saw mill supplied by a cut close to hand? No hard or other choice lumber can be secured except from the outside.

At about any point above Bethel sufficient timber can be secured for allog cabin, a fish wheel, a boat or any of the present necessities of ordinary river life, which timber can supply.

(E)mMinerals - This subject is exhaustively treated in the Geological Survey bulletine 622-H the papers being by Philip S. Smith and A. G. Maddren. Only an outline of the prospects will be stated here.

Apparently the most important gold findings are as follows;

Candle Creek on the Tacotna River,

Occurrence similar to the Iditarod country and promises extended hydraulic development.

Canyon Creek 110 miles northeast of Bethel,

Placer claims yielded $14,000 in 1914 and $75,000 in 1915.

Bear Creek in the Tuluksac-Aniak placer district,

Considerable ground has been covered with portable prospecting drill and hopes are entertained for extended hydraulic development.

Profitable work has been done on Crooked Creek just south of the Iditarod country and on Marvel, Ophir and Salmon Creeks of the Tuluksac-Aniak placer district. Good prospects have been located on several other creeks in the Tuluksac-Aniak placer district and on George River, New York Creek, CaRL Creek and Owhat Creek.

Cinnabar claims,

Parks prospect, and others in the Cinnabar Hills are alongside navigatable water. The former has hopes of development with outside capital.

Copper,

Several claims have been staked on Cobalt Creek in the Russian Mountains (western section of the inland portion of the Kuskokwim Mountains) about 18 miles north of Kolmakof.

Coal,

Coal has been found cropping out from the foot hills along both Eek and Kuethluk rivers but the location is far from any present demand and no development work has determined the

possibilities of the beds. Coal has been reported on Big River and on the Hoholitna.

SETTLEMENT OF THE REGION

The more recent settlement of the region is quite fully described in the above mentioned bulletin of the Geological Survey.

(A) Original inhabitants,

The Mahlamute tribe of Esquimos inhabit the lowland section and are by far the most numerous of the natives. They fish and trap and a few do laboring work for the K.C.Co who reward their efforts with credit slips on the store, similar credit slips generally paying for furs and dried fish which enable the native to secure what white man's cloths and eatables he desires. These people have been more fully described in a seperate paper.

The river valley from the Yukon Portage to Sleitmut is inhabitanted by the Ingalik tribe of interior natives. These people are few and widely scattered oweing no doubt to the poor possibilities of the country to support a population. They are not the fish eaters that the Eskimo are, although depending considerably on this source for food, but also hunt what game is procurable. They live in more substancial structures than the Eskimo but do not gather in larger villages than two or three famalies.

From Vinasale inland the Kolchane Indians are found, of the same family that inhabit most of the interior of the northern portion of the continent. With the exception that these people depend very little on fish for food, but mostly on game, the few remarks on the Ingalik apply to the Kolchane.

To a transient there is but two type of people inhabiting the country, the Esquimo with the oriental cast and fishy smell, and the up river Indian of heavier build and some what cleaner habits, similar to the Indian met else where in America.

(B) Immigration of white people,

The first white settlers were the Russians of the Russian American Co. who established a fort and trading post at Kolmakof in interests of the fur trade. These Russians came cross country from Ft. Alexander at Nushagak and at first brought in their supplies over this route, but later opened a route to their base at St Micheal by way of the Yukon Portage and still later used native boats on the river, a practice follower by that Company's American successor the Alaska Commercial Co.

The Alaska Commercial Co. had two or three posts on the river supplies for which were shipped from that Company's base at Unalaska in small schooners as far as Warehouse Creek whence it was reshipped up the river in bidras the large native skin boats of capacities up to 4 ton.

About 1880 the Moravian missionaries settled at Bethel and later at Akiak, both of which were native settlements and around their establishments trading posts have sprung up.

Bethel being at the head of the deep water navigation is the natural supply points of the river valley for water borne trade, which is by far the most economical for this region. It has a population of between one and two hundred natives and through the winter there are perhaps 75 white people here.

Besides the missionary establishment, comprising a school, church and saw mill there are two stores and a government school.

Akiak is a small native settlement with a missionary church and a government school. Akiachagamut is a native settlement about the size of Akiak.

Tulksac, Ogawick, Kalchagamut, and Chagamut are Esquimo villages along the river of from 50-100 inhabitants. There are numerous other Esquimo villages back from the river.

Till 1900, but very few prospectors had entered the Kuskokwim valley; but during the winter 1900-1901 a typical dogsled stampede to the region was made by a considerable number of men from Nome, who were working on rumors of discovery of placer gold on the "Yellow River". This stream was never definitely located but many of the stampedes ultimately found their way into the Tuluksac-Aniak region.

After the discovery of placer gold on the Innoko River in 1906, it is estimated that several hundred people left Nome for the Innoko diggings by way of the Kuskokwim River. A few of these stopped at various points along the river and commenced prospecting some of its tributaries. One of these parties ascended the Tuluksac river and discovered gold for the first time in commercial quanities on Bear Creek.

The rush of people to the Iditarod in 1910, following the discovery there of rich placer deposits, led to an overflow into the central Kuskokwim valley and extensive location of claims in the George river and Crooked Creek basins. Georgetown was established as a result of this excitement. Some of the parties descending the Kuskokwim from Georgetown examined the Aniak basin and first located gold on Marvel Creek. Others ascended the Eek, the Kuethluls and the Kisiualic rivers, large streams emptying into the lower Kuskokwim from the northwestern flanks of the Kuskokwim Mts. southwest of Aniak and Tuluksac rivers. The main discovery of gold in the Canyon Creek.

The discovery of placer ground on Candle Creek has encouraged prospecting in the Tacotna river valley?

The movements outlined above have been supplemented by a scattered prospecting over the whole region and are the basis of the major portion of the settlement in the valley. About the only other inducement is the fur trade which is the support of the post at McGrath and of the few people (not over 50) who inhabit the river valley above this point.

Crow, Chuwhak, Little Mt, Horn and Top of the Id. villages are native settlements of 2 or 3 families comprising in all, not over 10-15 persons. Lousetown is a native settlement across George river from Georgetown; several white men stay here. Napaimut is the largest native settlement on the middle river with the exception of Sleitmut, the latter having a population of perhaps one hundred natives, at both places white men conduct small trading posts.

Aniak is the settlement of a couple white men.

Georgetown was a mush-room settlement which flurished

during the winter of 1910-1911 when it had several stores and a saloon. It is now practically deserted.

Russian Mission is a small native settlement about a Russian church. The native priest ministers to the Indians inhabiting the middle river valley.

Kolmakof is the site of the old Russian settlement. A trading post has been maintained here more or less regularly since the settlement of the place but at the present time it is closed.

Crooked Creek is a small native settlement with a trading post carrying only a meagre stock.

Parks place is the settlement of Mr. Parks at his Cinnabar Prospect. A family or two of natives live in the vicinity, as well as several white men who are prospecting for cinnabar.

Toroy and Black River are small native settlements.

Vinasale is a deserted Russian settlement.

McGrath is the site of a Northern Commercial Co. trading post which carries a complete general stock. There are about 15 cabins at the post and perhaps 75-100 white men, half of whom are trappers, use this as a supply point.

Tacotna Forks is about 15 miles by water (7 miles cross country) up the Tacotna river from McGrath, at the forks of this river and Nicholas branch. It was built during the heavy prospecting on the Tacotna River. The K.C.Co. moved their store from Georgetown to this point but have now moved it further up river to Tacotna near Candle Creek. There are about 10 cabins around the Forks and several white people have settled here.

TRANSPORTATION & COMMUNICATION

To the outside the following routes of travel are possible.

1. Via the Yukon River, which can be entered from either St Micheal or Skagway. The following portages exist between the Kuskokwim and Yukon rivers.

(A) The Bethel mail trail to Russian Mission on the Yukon, four days travel from Bethel. The route ascends a small stream emptying into the Kuskokwim just south of Bethel.

(B) Kalchagamut to Russian Mission on the Yukon, two days travel.

(C) Kalchagamut to Pimute, one day travel.

(D) Crooked Creek to Iditarod 2-3 days travel.

The last three routes possess summer trails over which it requiwrs about one additional day of travel.

2. Via the South Fork and Susitna river to Knik and Seward. This is the route of the only government trail in the region, the Seward-Iditarod mail trail, Mail from Seward to Iditarod requiers 13-18 days.

3. The water route up the Kuskokwim River, the main avenue for bringing in supplies. Before the charting of the mouth of the river, navigation across the Kuskokwim Bay was very dangerous as attested by many strandings and unsuccessful attempts to enter the mouth.

Local travel is mainly water borne during the summer and either dog or reindeer sled during the winter. Winter travel between Bethel and McGrath is mainly over the river course with a few cut offs across the river bends. Time to McGrath is about 15 days and 10-15 days thence to Seward.

There are road houses at Bethel, Napaimut, Crooked Creek and Tacotna Forks. Rates $1.00 a meal, $1.00 lodging.

The following statistics were gathered on transportation and labor;

Dog team travel costs about $500 for feed (man & dog) and about 25 miles a day is fair progress. Dogs cost $40-$60 in the winter and a new sled $60-$75.

Passenger transportation		
Seward-McGrath	$150 - $200	
Seward-Iditarod	200 - 225	
Seattle-Bethel	100	Average 3 to 4 passengers a season.
Bethel-McGrath	100	
Freight		
Landed at Bethel	$25 - 30	a ton.
" " McGrath	65 - 70	a ton.
Going out from Bethel	45	a ton.
Local freight		
Bethel-Napaimut	20	
" -Sleitmut	25	

McGrath to Tacotna, two cents per pound.
Tacotna Forks to Tacotna, one & one half cent per pound.
Bethel to Canyon Creek $.05 lb.) Dist. about
Kolmakof to Bear Creek $.05 lb.) 125 miles.

The above two routes are covered in winter by reindeer sled trains. These trains are composed of 6 - 8 teams of one reindeer to one sled, the whole being driven by one native. Each team can handle about 200 pounds of freight.

Hauling on bob sleds with a team of horses cost $.05 per lb. for about a 35 mile haul; such a team can be hired for $20.00 a day. Horses are available only in the vicinity of McGrath.

Packing for 8-10 miles costs 5-7 cents per pound.

Large poling boats cost $100-$150.

White labor at job work commands $1.00 an hour. Mines pay $6.00 a day and board.

Native labor is paid $1.50 - $2.00 a day.

SHIPPING FACILITIES

Several small ocean going vessels have, for the past number of years, maintained a more or less regular communication with Seattle, making a spring and fall trip. The inbound freight is all in the hands of the Northern and Kuskokwim Commercial Co., except that brought in for the Moravian missionaries. The total freight reached a maximum of 3000 ton in 1910. In 1915 about 1000 tons were taken in.

The present freight going up river is taken care of by the K.C.Cos. steamer "Quickstep" but in the busier years the Northern Commercial Co. had a couple steamers on the river, the A "Alice" and the "Lavelle Young". The former is now off the river

and the latter laid up at McGrath. The " Quickstep " generally makes 2 - 3 trips a season. Besides the "Quickstep" there are several small stern-wheelers on the river of from 10 to 20 tons capacity. Two or three of these are at Bethel doing a small business between there and nearby points on the river and lower tributaries. There are also two or three at Lacotna Forks freighting between this point and Lacotna.

Poling boats are usual means of water transporation for individuals and numbers of these can be found at Bethel and McGrath as well as numerous other river points. Several persons have brought in stern post motors for use on these boats and are getting good service from them. These poling boats furnish the only means of getting supplies up the small tributaries where the small stern-wheelers are unable to ascend.

Practically all supplies are brought into the country over the water route. Spring shipments bring in provisions for summer and material for prospective development throughout the valley. The fall shipments are generally food cargoes for the winter season. Typical prices for foodstuffs at Bethel in 1915 follows, practically the same prices existing along the whole river.

Flour	$ .07	a pound
Sugar	.14	A pound
Tea	1.00	a pound
Ham	.35	a pound
Bacon	.40	a pound
Coffee	.75	a pound
Beans	.12	a pound
Rolled Oats	.10	a pound
Butter	.55	a pound
Assorted Can fruit	$4.50	a dozen
Canned Tomattes	3.50	a dozen
Condensed Milk	8.00 - 11.00	a case

Except fresh meat and some fresh vegetables all foodstuffs come from the outside. Of the vegetables, potatoes are the only thing grown in any quanity.

LIFE (a) Natives

The natives main dependence for a livelyhood is fish and furs. Catching and drying fish keep them busy for the best part of the summer during which season they temporarily camp at various setes.Most of the fish is for their own consumption although considerable quanities are sold at the trading posts.

During winters and early spring the natives are busy trapping . The cheaper furs thus obtained they use for their own clothing and the better ones are sold to the company stores.

Besides fishing and trapping the only occupation for the native is an occasional laboring job, sometimes for individuals but generally for the commercial companies who employ them to handle freight and cut wood.

(b) Whites

Of the white population, about the most numerous

are the prospectors who finance or " grub Stake " themselves by doing general work about the country for about half the open season and then set out for the most promising regions to try their fortune. Some are cooks, some steam engineers, some river navigators etc but in the case of all, prospecting is their main purpose in the country.

In numbers, the trappers follow the prospectors. This is generally a distinct group of men, few of them ever turning to prospecting, there are less than 50 in the whole river valley.

They generally live and trap alone, most of them ranging large areas about the head-waters of the main forks of the river. In the spring they bring their catch to the river, and dispose of them to trading companies, wait for the first shipment of supplies from the outside, equip themselves for another year and return to the interior.

A small yet rather important commercial group is composed of company officials, company clerks and individual traders. Of the officials two or three live in the country and help run the concerns, about an equal number visit for a couple of months during the summer. The clerks generally make a trip outside every two or three years but are otherwise permanant residents. The small traders cover the country with sled and canoe, most of them staying in for two or three seasons and then going outside for an equal lenght of time.

The " Squaw " man is really the only permanant white settler in the country. Whether trader, trapper or prospector, he is about the only individual who has severed all connections with the " outside " and settled down to make the country his home. All other white men are generally ready to leave as opportunity offers, either for a trip outside or to try their fortunes elsewhere in Alaska if prospects seem to justify the move.

Respectfully submitted

Assistant, Coast & Geodetic Survey.

For much of the above information especial thanks are due to Mr. Frank Joaquin ,Manager of the Kuskokwim Commercial Company and to Capt.Bugge skipper of the Steamer QUICKSTEP both of whom were very obliging with personal assistance and suggestions.

THE SURVEY
A - The Field Work.

THE INSTRUMENTS

The following instruments were taken aboard the Quickstep;

1 Sextant,
1 Chronometer,
1 4" Theodolite,
1 Artificial Horizon,
1 Boat Compass,
Sketch Book, Pencil etc.

The plan was to run a traverse up the river which could be later tied and adjusted to what geographical positions could be determined during the journey or secured from others sources.

POSITIONS

The latitude of Bethel was taken as that determined by the party of the Str. Yukon during 1914. The longitude taken was a mean of the following time altitudes observed while at Bethel August 21 - 22, 1945.

Jubiter (1) Sun (3) Capella (2) Vega (1) The chronometer correction for the reduction of these altitudes depended on corrections determined on August 15 and August 31 by altitudes taken at △ Fisk and △ Astro respectively.

Time altitudes at Bethel gave a chronometer correction just before starting up river and others observed at Warehouse Creek on August 1 gave a correction after completing the work. Interpolation between these latter values gave correction for the reduction of observations for summer lines along the river. The chronometer correction determined during the season are plotted on a seperate sheet.

Time and meridian altitudes were measured with a sextant and artificial horizon. For lines of position determined see list of fixed positions under B - The Office Work.

SKETCHES

As the course of the steamer went continually from one bank of the river to the other it was impossible to base a traverse on the actual course steered. The points marking the course as recorded were picked up by the distinguishing features of the topography and bearings noted on the boat compass. Distances and courses were determined by noting time consumed to travel them and the corresponding speed of the vessel.

THE SURVEY

Upon the traverse as a framework, the shoreline of the river and adjacent topography was sketched by noting bearings and distances to prominent points. Distances were determined by (a) estimate, (b) by the run between a change of bearing or (c) by the depression angle. The latter was only used in the case of shoreline and was measured by swinging a plumb bob on a nail and reading the angle between the direction of the plumb bob line and the point of shore line. The plumb bob was swung in water to dampen its vibrations, the height of eye was determined as 24 feet.

(a) Upstream

The upstream sketches were drawn on a scale of 1/2"- 1 mile. The speed of the steamer was determined by noting the time required to pace the upper deck and keep a beam range on shore i.e. to walk as fast as the steamer was going which was possible on the up river trip where the speed never exceeded 4 knots. As the steamer deck was 101 ft. long the vessel was making a mile (nautical) in as many minutes as it took seconds to pace the deck.

Besides the sketches, rather complete notes were kept going up stream, a detail explaination of which accompanies the sketch book.

(b) Downstream

Going down stream it was impossible to keep as complete a system of sketches and notes as during the upstream trip, for the vessels speed was 10 - 12 knots instead of 2 - 4, Accordingly these sketches were made twice the scale of the others and the only notes kept was the times of passing the several points marking the terminals of the course of the traverses. The method of drawing these sketches made it possible to determine the bearing of the courses (or any other line) at a later time.

The sketches were made on the back of sections of chart paper across the face of which two perpendicular lines were drawn and designated as the cardinal magnetic direction N, E, S, and W. This paper was tacked to a circular board on which were marked all the points of the compass, the above mentioned lines being placed in coincedence with the corresponding headings on the board. The board could be revolved and carried a lubber's line corresponding headings to said line on the compass. The sketch board could thus be kept oriented easily by watching the compass and the sketching proceeded in a similar manner to plane table topography.

The speed down stream was determined on the stadia principle. First, the distance to some object on shore was measured by a depression angle and then the time noted for it to pass abeam between two points, the distance apart of which was 1/10 the distance the eye was held behind them. The line joining these points was parallel to the keel of the ship and the eye was held on a perpendicular to this line at its middle point. Prepaired tables made it possible to make the above determination in a short time. One table gave the distance for a measured depression angle and another table gave the speed corresponding to this distance and the above noted time interval.

THE SURVEY

Heights of peaks etc were estimated or roughly determined by an angle of elevation when an approximate distance could be secured.

B - The Office Work.

Positions

After careful consideration and thorough search through all available data the following positions were assumed as fixed, and the traverse adjusted to them.

A Just below Tuluksac.
One summer and line of adjusted traverse between Bethel and Aniak.

B Aniak.
One summer and Latitude carried forward from Kolmakof.

C Kolmakof.
Latitude from Russian determination by Zagoskin and traverse between Little Mt. Village and Aniak.

D Little Mountain Village.
One summer and latitude carried forward from Kolmakof.

E Crooked Creek.
Latitude from Russian determination by Zagoskin and an interpolated Russian Longitude. In 1843 Zagoskin journeyed up the Kuskokwim from Kolmakof to the site of McGrath, carrying a chronometer with an approx predetermined rate of 7 sec. gaining. Using this for the reduction of time altitudes, he computed a longitude for Crooked Creek and also for the mouth of the Chulitna river. As the error of the latter one could be determined from its position on the sheet, the longitude of Crooked Creek was interpolated between it and Kolmakof.

Zagoskin measured meridian altitudes at McGrath, Vinasale and the mouth of the Chulitna River which could be compared with latter determinations, such comparisons showing no discrepancy of over 1.5 minutes of Latitude, a probable error of any sextant observations.

F Azimuth and distance from Sleitmut was taken off the Geological Survey plane table sheet executed by Mr. Sargeant, in 1916.

THE SURVEY

G Sleitmut

One meridian altitude and two time altitude, one on the moon's lower Limb and the other on jubiter. The resulting lines of position gave an almost equilateral triangle whose center was about 3/4 mile from either side.

H Azimuth and distance from Sleitmut taken off Geological Survey plane table sheet executed by Mr. Sargeant, in 1914.

L Swift River

Russian Latitude, Longitude carried forward from summer of July 9th.

J Two summers seperated by about 2 hours.

K Vinasale

Azimuth and distance from McGrath taken from Geological Survey plane table sheet executed by Mr. Sargeant, in 1914.

L McGrath

A compromise position between one determined by one meridian and three time altitudes, and a position from the Geological Survey plane table sheet executed by Mr. Sargeant in 1915. These positions differ by about one mile and a half miles.

The Plotting

The traverse line was first plotted on tracing paper. The compass rose used to plot magnetic bearings was drawn on a separate piece of tracing paper which could be placed under the working paper. It could thus be kept near at hand (avoiding the frequent necessity of carrying a parallel line far across the sheet) and could also be easily adjusted to the local variation.

It was impossible to determine any values for the deviation of the compass used, but all courses were short.

As distances were recorded by time and speed, a table was constructed so that they could be plotted in like manner. In rounding bends the time on curve from P C (Point of Curvature) to P C was noted and a second table was constructed to find the T (Tangent distance) from the recorded data

After the traverse was plotted, its several sections were adjusted to the above fixed positions by a proportional increase or decrease of each course as the case demanded. Then the topography was transferred from the sketch to the finished sheets by a system of squares.

THE SURVEY

Computations

Meridian altitudes were reduced the actual way.

Time altitudes were first computed for two latitudes and checked by a computed altitude. All original observations and computations are enclosed. A corresponding number enclosed with a circle will be found through (a) the original observation, (b) the first and (c) the check computation.

The chronometer error for time sights has been discussed.

Note:- It is respectfully requested that a copy of the detailed explanation of the notes for this work as left at the Washington Office, be made a part of this report.

ADJUSTED GEOGRAPHICAL POSITIONS OF
POINTS ALONG THE KUSKOKWIM RIVER

	Point.	Position.	Determination.	Discrepancy of Traverse.		Position by milage above Bethel.	Distance
	Bethel	61-47-50 161-44-45	Several meridian alt. and summer lines.				
A	Just below Tuluksac	61-03-15 160-56-00	One summer line. Traverse Bethel to Aniak.	3.5	Mi.	0-45.5	45.5
B	Aniak	61-39-50 159-41-45	Summer at Aniak Lat. from Kolmakof.	0.5	"	45.5-121.5	76
C	Kolmakof	61-34-15 159-03-45	Lat. from Zagoskin. Lon. by traverse between Little Mt. Vell. & Aniak	0.0	"	121.5-142.5	21
D	Little Mt. Village.	61-31-45 158-39-30	Summer at Little Mt. Vill. Lat. by traverse from Kolmakof.	.5	"	142.5-157.0	14.5
E	Crooked Cr.	61-51-30 158-10-30	Russian Lat. Interpolated Russian Long.	3.5	"	157 -187.0	30.0
F	Georgetown.	61-54-15 157-58-30	Azimuth & distance from Sleitmut taken off Geological Survey P.T. sheet.	2.0	"	187.0-208.5	21.5
G	Sleitmut	61-42-45 157-05-30	Meridian altitude and summer.	1.5	"	208.5-232.0	23.5
H		61-41-30 156-53-00	Azimuth and distance from Geological P.T. sheet.	0.5	"	232 -242	10
I	Swift River	61-51-45 156-15-15	Russian Latitude. Long. from summer of July 9th.	4.5	"	242 -275	33
J		62-15-00 156-11-30	Two summers.	.5	"	275 -307.5	32.5
K	Vinasale	62-43-00 155-47-15	Az. and dist. from Geological Survey. P.TP sheet.	8.0	"	357.5-307.5	50
L	McGrath	62-57-15 155-37-00	Compromise position between astronomical determination (HAC) and Geological Survey Plane table sheet position.	1.5	"	357.5-391	33.5

MILAGE OF RIVER POINTS
AND
STATEMENT OF TIME EMPLOYED ON THE SEVERAL SECTION OF SURVEY

Settlement.	Dist.	Rapids & Shoals.	Section.	Time, from to.	Dist.	Elapsed time
Bethel.	0		(1)			
Akischagamut.	20					
Akiak.	32			7:40 p.m. July 3	0-65	18h-35m
Tulukaac.	48			7:30 p.m. July 4	65	
		Tulukaac.				
Ogawick.	71					
Kalchagamut.	86		(2)-6	8:20a.m. July 15	65-107	4h-05m
				2:40 p.m. July 15	42	
Chugamut.	103					
	110	Charamut.				
Crow Village.	115					
Aniak.	121.5		(3)	7:50 a.m. July 5	107-173	
				7:00 p.m. July 6	66	22h-30m
	123	Aniak.				
Russian Mission.	131					
	141.5	Above.				
Chukwhak.	138.5	Cinnabar Hills.				
Kolmakof.	142.5					
	146	Above.				
		Kolmakof.				
Napaimut.	151					
	153	Above.				
		Napaimut.				
Little Mt. Vill.	157					
Horn Village.	170					
Top Id. Village.	175.0		(4)-5	10:50 p.m. July 14		
				12:08 a.m. July 15	173-187	
Oskawalik	176.5				14	1h-18m
Crooked Cr.	187					
Georgetown.	208.5					
Lonstown.	210.0					
Parks Place.	223					
Sleitmut.	232	Swift current between Sleitmut and Stony River	(5) up-stream.	4:00 a.m. July 7	132-187	14h-45m
				8:15 p.m. July 7	45	
			(6)-4	8:00 a.m. July 14	242-232	1h-0m
				9:00 a.m. July 14	10	

MILAGE OF RIVER POINTS
AND
STATEMENT OF TIME EMPLOYED ON THE SEVERAL SECTION OF SURVEY

Settlement.	Dist.	Rapids & Shoals.	Section.	Time, from to	Dist.	Elapsed time.
			(7) up stream.	7:20 a.m. July 8	252.5-242	4h-40m
				12:00 N. July 8	105	
	260	Steny River.				
Torey.	269		8 - 3	12:40 a.m. July 14	266.5-252.5	1h-30m
				2:10 a.m. July 14	14	
			(9) up stream	6:30 p.m. July 8		
	272	Below swift River.		9:40 p.m. July 8	172-266.5	2h-30m
					5.5	
	277	Swift River.				
			(10)-2	10:40 p.m. July 13	287-272	
Rapids.	287	Rapids.		12:05 a.m. July 14	15	1h-25m
			(11) up stream.	4:15 a.m. July 9	328-287	13h-10m
	318	Kunivak Bar.		10:00 p.m. July 9	41	
Black River.	349		(12)-1	3:45 p.m. July 13	349-328	2h-0m
				5:45 p.m. July 13	21	
Vinsenle.	357.5		(13)	3:20 a.m. July 10	391-349	11h-20m
				5:20 p.m. July 10	42	
McGrath.	391					

Under column "Shoals and Rapids" the rapids are designated by being underlined

Under column "Section", figures enclosed with circle indicate work done while enroute up-stream, figures enclosed with parenthesis indicate work done while enroute down stream, the latter being followed with ~~par~~ a double underscored figure which will be found in red on sketch covering that section.

Milage is expressed in nautical miles.

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C. & G. SURVEY
L. & A.
FEB 28 1918
Acc. No.

Form 504

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

State:

11—5813

DESCRIPTIVE REPORT.

Inf. Sheet No. 3559

LOCALITY:

191

CHIEF OF PARTY:

3559

DEPARTMENT OF COMMERCE

COAST AND GEODETIC SURVEY

E. LESTER JONES, SUPERINTENDENT

* * * * * * * * *

A PLANE TABLE SURVEY OF THE NORTHEAST PART OF THE EAST COAST OF NAGAI ISLAND, SHUMAGIN ISLANDS, SOUTHWEST ALASKA.

Shoreline by M.O.Nelson, Aid C & G S

Contours by I.M. Dailey, Ass't C & G S

Surveyed during July & August, 1915

By Party of U.S.S.Patterson,

H.C.Denson, Ass't., C & G S., Commanding

* * * * * * * * * *

Scale:- 1/20,000

Contour Interval:- 100 ft.

Shoreline Inked by M.O.Nelson,Aid C & G S

Contours inked by I.M. Dailey, Ass't., C & G S

DEPARTMENT OF COMMERCE

U. S. COAST & GEODETIC SURVEY

E. LESTER JONES, SUPERINTENDENT

* * * * * * * * *

DESCRIPTIVE REPORT

To accompany

TOPOGRAPHIC SHEET

Of the

NORTHEASTERN PART OF NAGAI ISLAND

SHUMAGIN ISLANDS, SOUTHWEST ALASKA

Surveyed during July and August, 1915

Scale:- 1/20,000

Party of U.S.S.Patterson,

H.C.Denson, Ass't., Commanding

I.M. Dailey, Ass't., Topographer

M. O. Nelson, Aid, Topographer

Under Instructions from the Superintendent,

dated March 18, 1915.

Sheet No. 1
Number of Sheets is 2

T-3559

DESCRIPTIVE REPORT TO ACCOMPANY TOPOGRAPHIC SHEET OF THE NORTHEAST PART OF THE EAST COAST OF NAGAI ISLAND, SHUMAGINISLANDS, SOUTHWEST ALASKA.

* ** * * * * * * * ** *

LIMITS. The work done on this sheet extends from the small creek falls shown on the 1914 topographic sheet "E", about 1/3 mi. Southeast of Cape Wedge, (the northern end of Nagai Id.) - in a general southerly direction along the East coast of Nagai Island down to the entrance to Mist Harbor.

GENERAL REMARKS, FORM OF LAND, MOUNTAINS, GENERAL CHARACTER OF SHORE LINE, VEGETATION, etc. The Northeast part of Nagai Island from Cape Wedge to triangulation signal "Wreck", is low with the highest elevation at signal "Wedge" of 749 ft. The shoreline is in general, very irregular, being indented by bights and bays, the largest of which are Northeast Bight, and Mist Harbor,- and all of which afford little protection from bad weather from the Northeast quadrant, except Mist Harbor. In general, the shoreline is rocky, with numerous awash and bare rocks seldom extending more than 100 meters offshore, small stretches of shingle beach are found in most of the bights, but no sand. Grass and tundras grow thickly, save on the shore cliffs, steeper slopes and outcrops of the mountains. Alder brush is plentifully scattered around on the hillsides and valleys, especially bordering the streams.

DANGERS & ISLANDS. No dangers or islet rocks are found to exceed 1/4 mile off-shore between Cape Wedge and the north shore of Northeast Bight. In that northwest pocket of Northeast Bight which nearly divides Nagai Id. at Pirate Shake, there are several dangers. The center of the mouth to this cove is marked by a reef extending East by West. A rock baring 8 feet forms the nucleus. To the south of this reef by about 700 meters lies a rock bare 25 feet, marking the East end of a chain of awash boulders extending to shore. The wrecked three-masted schooner "Czarina" of San Francisco, lies inshore of this reef. A little more than a half-mile Northwest of the central reef, lies a rectangular islet of about 40 feet elevation above the H W mark. Shoal water separates it by 1/4 mile from shore.

Northeast Bight presents no dangers 100 meters outside of tangent lines between the points which jut out at frequent intervals, while kelp indicates the presence of boulders in the bights and indentations.

Rounding the East shore of Northeast Bight and going south toward Mist Harbor, a line 1/4 mile off the tangent points will clear all dangers, including that pinnacle, baring 15 feet, which lies 3/4 mile S S E of signal "Over".

The Northeast tangent of the entrance to Mist Harbor is thickly marked with kelp to about 1/4 mile offshore.

No rocks are to be found more than 200 meters offshore Spectacle Island.

ANCHORAGES. See Hydrographic Party's Descriptive Report for details.

SURVEY METHODS. Main and supplemental triangulation control was generally available. The shoreline was run first and hydrographic signals located by party of M.O.Nelson, Aid. Elevation cuts were taken simultaneously on mountain peaks and prominent hills. Subsequently the contouring on this sheet was done by party of I.M.Dailey, Ass't.

The shoreline of Mist Harbor from Hyd. signal "Pan" to Hyd. signal "Zam" has been reduced and transferred from the 1/5000 Mist Harbor Sheet.

On Bendel Island, the shoreline between triangulation station "Wet" and Hyd. signal "Jar", running North & East, was run on this sheet, while the

Sheet No. 2
Number of Sheets is

T-3559

DESCRIPTIVE REPORT TO ACCOMPANY TOPOGRAPHIC SHEET OF THE NORTHEAST PART OF THE EAST COAST OF NAGAI ISLAND, SHUMAGIN ISLANDS, SOUTHWEST ALASKA.

* * * * *** * * *

-shoreline from hyd. signal "Jar", (the northcentral part of Bendel Island) running east and south, around to triangulation signal "Wet", was run on a backed brown sheet and after a closure of 20 meters, adjusted and transferred. The details are to be found on the Turner Island and Bendel Island Topographic Sheet.

NOTE. There are no sand beaches within the limits of this sheet. All beaches "sanded" on the sheet are of shingle, ~~ax~~ pebbles, or boulders from 2" up in diameter.

Nearly all creeks which are shown coming down gradual~~ly~~ valley slopes have no visible mouths but seep out under the boulder beaches.

No comparison has been made of the declinatoire magnetic observation with the magnetometer observations at Mist Harbor. It may be noted here that the declinatoire showed signs of lag and later "froze" entirely, so that no observation could be made within the limits of the other sheets, viz., of East Bight, Nagai Id.; Bendel & Turner Ids.; & Big Koniuji Id.

M. G. Nelson
Aid, C&GS

Plane Table Positions

Object and Description	Lat.	D.M.	Long.	D.P.	Height ft.	Remarks
Outside pinnacle off Long Rky. Pt. s. of Cape Wedge	55°17'	494	159°51'	831	30	Highest pt.
Offshore pin. (250 m.) 1/2 mi. SE of pt. of Cape Wedge	16	1320		282	30	" "
Offshore pinnacle of	15	1111	50	965	10	" "
Offshore pin. in group, awash rocks	15	413		646	8	" "
Outer one of 2 rocks off pt. 3 mi. S of Cape Wedge	14	1528		467	15	" "
Outer one of 2 rocks off shore 50 m.		695		898	10	" "
Rock off pt. S of small bight	13	1790	51	82	8	" "
W rock just off S pt. of small flat id.		998	52	990	10	" "
Small HW rock off pt. N of islet		1370	53	10	12	" "
Grass top pinnacle		1376	54	245	35	" "
Most prominent Rock in Reef in center of bight		355	52	274	8	" "
Prominent HW pinnacle at outer end reef of awash rocks	12	1527	52	605	25	" "
HW Islet Rock in group of awash rocks just S of point		695		904	5	" "
Rock 100 m. off shore	11	1508	53	535	10	" "
Largest Rock and in center of group of 4 rocks N of point	10	1796		512	20	" "
HW mark on Sharp Point		50	53	1012		
HW mark on Rocky Point	09	970		803		
Grass top pinnacle just off HW mark - shore	08	208	52	210	15	" "
Prominent low rocky pt. tan. center	09	1085	51	793		
" " " " " "	10	850		774		
Pinnacle 30 m. off shore		1193		681	10	" "
" 100 . " " in small bight		1508		215	15	" "
HW Rock on sharp triangular point		1630		56		
HW Rock 30 m. off shore		1745	50	192	7	" "
Largest one of 2 HW Rocks in bight		1485	49	430	10	" "
Large HW rock on NE tan. NE bight (Location A Under)			48			
Small HW rock on NE tan. NE bight 108 m. SE of A Under		1583		648	5	" "
Small HW rock 100 m. off shore		1218		640	6	" "
Center HW mark-sharp pt. NE tan. bight opposite small islet		670		485		Tan HW
Rock Islet 400 m. off point		320		210	15	Highest pt.
Sharp rocky point		528	49	56		HW Tan
Pinnacle 30 m. off shore	09	1362	48	808	20	Highest pt.
Pinnacle double at HW, 200 m. off S pt. tan. of bight	08	1540	49	114	20	" " outer knob
Pinnacle triangular, grass top	06	258	51	408	60	Top center
Pin. 150 m. off shore on outer end of reef - N end Spect. Id.	07	1710	43	140	10	" " round profile at dist.
Low Islet rock 120 m. off shore	06	1740	44	360	6	Highest pt. at S. end
Sentinel Pinnacle	05	986	45	317	40	Top center
HW mark of sharp pt. SE corner flat Storm Water Id.	05	865	45	30		
Long Shed top. Pinnacle		636	44	63	20	Seaward Tan
Long Narrow pinnacle		815	43	504	15	Highest pt.
Chair - Profile Pin. 100 m. off shore S. tan. bight		333	42	758	15	" "
Cone top pinnacle 20 m. off shore	06	1225	42	647	15	" "

Rock 20 m. off shore	07	322	42	416	5	Highest pt.
Small N and center rock in group of 4 HW Rocks		617		408	5	" "
Pinnacle off end of small spur pt.		916		524	10	" "

T-3559

Statistics

Area	Square	Statute Miles	20. (Including Mist Harbor sheet)
Shore line	"	"	40.5
Rivers, Creeks	"	"	18.
Ponds, Lakes	"	"	9.
Top. Stations, number			80
Top. and Hyd. Signals			131
Number of Elevations determined			111

Notes by M.O.N.

The vegetation is limited to tundras, long grass and alder brush.
There is no sand to be found on the limits of this sheet.
Such "sand" symbols as are shown, represent boulders and rock fragments.
Very few lakes and creeks have a visible mouth or outlet, but drain out under tundras or boulder beaches.
The bottom drops off steeply from the HW beach nearly everywhere, so that except in a few bights and coves, no LW line could be shown on the scale used.

Applied to chart 8859 Dec. 1942 J.M.O.