ergetic efforts of the committee will undoubtedly succeed in arousing a general interest in the matter and in raising the necessary funds. The educational value of a garden like the one proposed can hardly be overestimated, as it affords to the inhabitants of the city those advantages which, as a rule, only those living in the country enjoy.

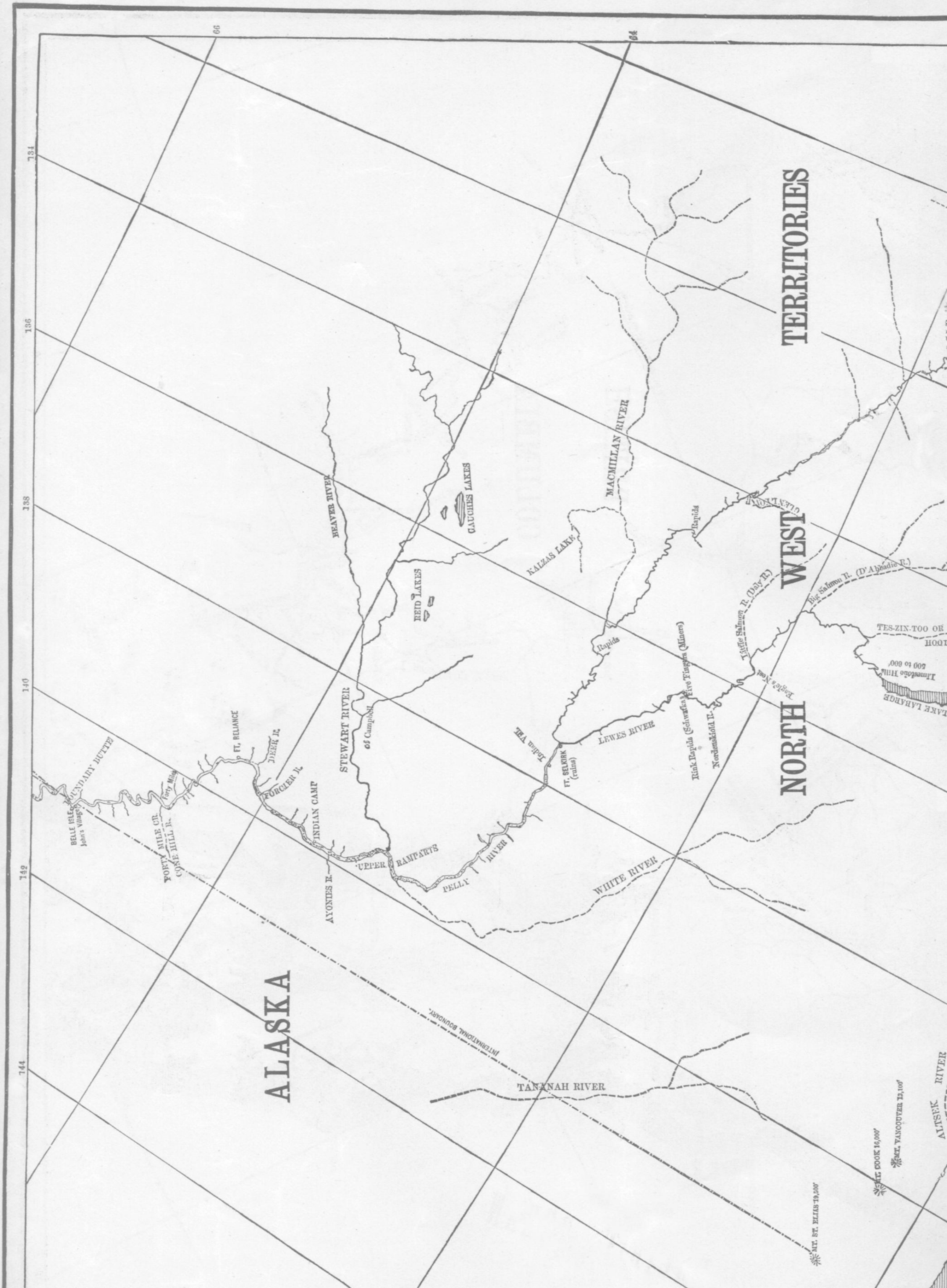
THE AMERICAN PHILOSOPHICAL SOCIETY has paid considerable attention to the subject of a universal language; and on Oct. 21, 1887, a committee was appointed, of which Prof. D. G. Brinton was chairman, to examine into the scientific value of Volapük. The committee recently presented its report, and the society adopted the following resolution: "That the president of the American Philosophical Society be requested to address a letter to all learned bodies with which this society is in official relations, and to such other societies and individuals as he may deem proper, asking their co-operation in perfecting a language for learned and commercial purposes, based on the Aryan vocabulary and grammar in their simplest forms; and to that end proposing an International Congress, the first meeting of which shall be held in London or Paris." The introductory remarks to the report of the committee, referring to the desirability of an international scientific terminology, will be approved by all scientists; but many will rather join Max Müller's appeal to the learned writers of the world to express themselves in English, German, French, Spanish, Italian, or Latin, than support the plan of establishing a new universal language. The proposals of the committee are founded on the process of formation of jargons. Grammatical forms are eliminated, and the order of words determines the meaning of the sentence. The phonetics are to be simple, and the vocabulary based on the vocabulary which is common to the leading Aryan tongues. As Volapük and other universal languages are not formed according to these principles, the committee considers them as not apt to meet the requirements of international intercourse. All this may be true, but it would seem to us that scientists, even if successful in the attempt at forming an artificial language which would be as well adapted for thinking as for writing and speaking, would increase the amount of necessary work instead of diminishing it. Before the era of nationalities, as we may well designate our time, English, German, French, and Spanish were almost exclusively used in scientific publications of any importance. The same feeling that prompted writers to use their own language, however few the men speaking it may be, will prevent the general adoption of a universal language; and when this feeling has subsided, those few European languages will again become the means of scientific intercourse. And how should we make use of the treasures contained in the literature of the past, or in popular writing, without learning these languages? We believe that these difficulties, even aside from that of making a satisfactory language, will prevent the scheme of a universal language being successful.

YUKON EXPEDITION, 1887.

WE noticed several times the progress of the Yukon expedition undertaken by the Canadian Government in 1887. The present number of *Science* is accompanied by a map showing the results of this important expedition. The map is a reduction of a large-scale map published by the Department of the Interior of Canada, a number of corrections being added by Dr. Dawson. The coast-line is founded upon the charts of the Coast Survey. While the greater part of the topography of the interior is the result of last year's expedition, a few older explorations were available for constructing the map. The lower part of the Stikine River was surveyed in 1877 by J. Hunter. The traverse from Telegraph Creek down the Hotalinqua River, to latitude 60° north, was made by the Telegraph Exploration in 1867. Schwatka's maps were used for constructing the lower part of Pelly River, while Chilkat River is founded on Dr. A. Krause's surveys in 1882.

The recent expedition was undertaken in consequence of the necessity of ascertaining the nature and extent of the developments of placer gold-mining, which of late years has attracted an increasing number of miners into that part of the North-west Territories lying between British Columbia and Alaska. We reported in No. 243 of *Science* on the progress of Dr. Dawson's expedition up to the 29th of July. Mr. William Ogilvie had reached the lower part of Pelly River by a different route. He had started from Chilkoot Inlet, and reached the summit of Chilkoot Pass on June 8. On June 27, after considerable difficulty occasioned by stormy weather, the first lake was reached. Mr. Ogilvie experienced considerable difficulty in carrying his instrumental survey across the mountains. He says in his report to Captain Deville, "Beginning from the summit of Chilkoot Pass, we descend almost one-third of a mile to Crater Lake, the fall in that distance being by barometer 367 feet. At four miles and a half from the summit, Mountain Lake, which is about a mile and a half in length, is reached, the fall in this distance being about 575 feet. At this point the first trees on the north-east side of the summit are seen, but they are of no importance, being small and of stunted growth." Lake Lindeman was found to be 1,237 feet below Chilkoot Pass. The party then crossed Lake Bennett and Lake Marsh, and began their descent of the Lewes River. "At 125 miles from salt water, the cañon is reached. At this point the river flows through a fissure in a barrier of basaltic rocks which intersects its course. The cañon proper is about five-eighths of a mile long and about 100 feet wide, with perpendicular walls from 60 to 80 feet high. The current through it is swift and the water rough; but with a fairly large boat, the only risk in running through it would be from contact with the sides, in which case one would be certain to come to grief. The passage through it is made in from three to four minutes. The cañon and its rapids are altogether two miles and three-quarters long. The last rapid, which is three-eighths of a mile in length, is a bad one, and we had to portage every thing round it, and let our boat down with ropes from the shore. This rapid is called by the miners the 'White Horse,' from the fact that nearly all the water is white with foam. Several parties have run through the rapid on rafts, and one or two in boats, but few want to repeat the trip." In proceeding farther down the river, the travellers passed Big Salmon River. Looking up its valley, a distant view was had of many mountain-peaks covered with snow, the presence of which in summer is proof of a considerable altitude. Ogilvie found that the upper part of the river was almost deserted by the miners, who have gone to Forty-Mile Creek, where considerable quantities of gold have been found.

Dr. Dawson, who had reached the Pelly River by way of the Stikine and Frances Lakes, describes the latter part of his journey as follows: "Our Indians, who had for a long time been very uneasy because of their distance from the coast and the unknown character of the country into which they had been taken, were now paid off, and, to their great delight, allowed to turn back. As a dangerous rapid was reported to exist on the upper part of the Pelly, it was decided to construct a canvas canoe in preference to building a boat, which it might prove impossible to portage past the rapid. Having completed the canoe, we descended the Pelly, making a portage of half a mile past Hoole's Rapid, and reached the confluence of the Lewes branch of the Pelly on the 11th of August. We had now reached the line of route which is used by the miners, and expected to find at the mouth of the Lewes a memorandum from Mr. Ogilvie, from whom we had separated in May. As we could not find any such memorandum, and as Mr. Ogilvie had not been seen on the lower river by a party of miners whom we met here on their way up the Lewes, we were forced to conclude that he had not yet reached this point. The same party informed us that few miners were during the summer on the Stewart River, where most of the work had been carried on in 1886, but that in consequence of the discovery of 'coarse' gold on Forty-Mile Creek, about 120 miles farther down the river, all had gone there, and that Harper's trading-post, where I had hoped to be able to get an additional supply of provisions should we fail to connect with Mr. Ogilvie, had also been moved from the mouth of the Stewart to Forty-Mile Creek. From the place where we now were, we still had a journey of over 400 miles to the coast, with the swift waters of the Lewes to contend against for most of the distance. If, therefore, it should have become necessary to go down stream 220 miles to Forty-Mile Creek for provisions, so much would have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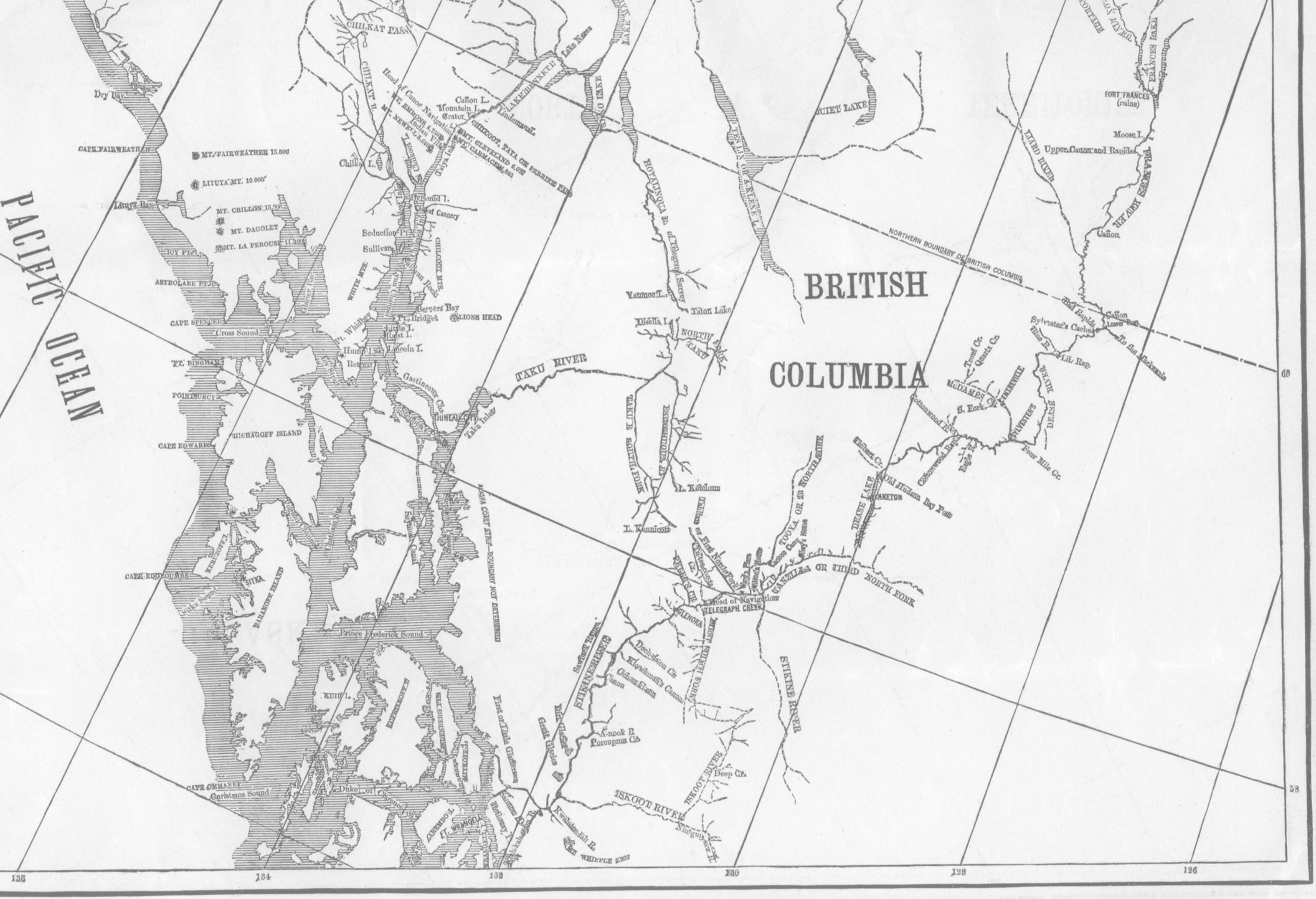
NORTH WEST TERRITORIES
ALASKA
MACMILLAN RIVER
KALZAS LAKE
GAUCHES LAKES
BEAVER RIVER
REID LAKES
STEWART RIVER
Ft. Campbell
Rapids
Rapids
GLENLYON
Big Salmon R. (D'Abbadie R.)
TES-ZIN-TOO OR
Limestone Hill 500 to 600'
LAKE LABARGE
Little Salmon R. (Daly R.)
Eagle's Nest
Five Fingers (Miners)
Rink Rapids (Schwatka)
Nordenskiold R.
LEWES RIVER
Indian Vill.
FT. SELKIRK (ruins)
PELLY RIVER
UPPER RAMPARTS
WHITE RIVER
AYONIES R.
INDIAN CAMP
FORCIER R.
DEER R.
FT. RELIANCE
Forty Mile
FORTY MILE CR.
CONE HILL R.
BOUNDARY BUTTE
BELLE ISLE
John's Village
INTERNATIONAL BOUNDARY
TANANAH RIVER
MT. ST. ELIAS 19,500'
MT. COOK 16,000'
MT. VANCOUVER 13,100'
ALTSEK RIVER


64
62
60
NORTH WEST TERRITORIES
BRITISH COLUMBIA
PACIFIC OCEAN
PELLY LAKES
FRANCES LAKE
FINLAYSON LAKE
FINLAYSON RIVER
CAMPBELL'S PORTAGE
FORT FRANCES (ruins)
Moose L.
FRANCES RIVER
Cañon
Upper Cañon and Rapids
LIARD RIVER
Hoole's R.
Hoole's Rapids
Sylvester's Cache
Bad Rapids
To the Mackenzie
NORTHERN BOUNDARY OF BRITISH COLUMBIA
MACMILLAN RIVER
Rapids
GLEN LYON
Big Salmon R. (D'Abbadie R.)
Little Salmon R. (Daly R.)
Eagle's Nest
Five Fingers (Miners)
Rink Rapids (Schwatka)
Nordenskiold R.
LEWES RIVER
FT. SELKIRK (ruins)
TES-ZIN-TOO OR NEWBERRY RIVER (SCHWATKA)
HOOTALINQUA RIVER
Limestone Hills 500 to 600'
LAKE LABARGE
White Horse Rapids (Head of Steamboat Navigation)
LEWES RIVER
LAKE MARSH
TAGISH LAKE
TAKU ARM
TES LIN OR A-KLENE L.
HOTALINQUA R. of Telegraph Survey
Lake Nares
Lake Bennett
Lake Lindeman
Cañon L.
Mountain L.
Crater L.
Head of Canoe Navigation
CHILKOOT, TAYA OR PERRIER PASS
MT. CLEVELAND 6,000
MT. CARMACK 6,840
Taiya Inlet
MT. EMMONS
MT. NEWBERRY
Indian Village
CHILKOOT MTS.
LIONS HEAD
Berners Bay
CHILKAT PASS
CHILKAT R.
Chilkat L.
Chilkoot L.
Seduction Pt.
Sullivan I.
Lynn Channel
WHITE MTS.
Eagle R.
Gastineau Cha.
Lincoln I.
Shelter I.
Pt. Retreat
Icy Strait
Cross Sound
CAPE SPENCER
ASTROLABE PT.
ICY PT.
PT. BINGHAM
POINT CROSS
MT. FAIRWEATHER 15,500'
LITUYA MT. 10,000'
MT. CRILLON 15,900'
MT. DAGOLET
MT. LA PEROUSE 11,300'
Lituya Bay
CAPE FAIRWEATHER
Dry Bay
ALTSEK RIVER
MT. COOK 16,000'
MT. VANCOUVER 13,100'
MT. ST. ELIAS 19,500'
OCEAN CAPE
WHITE RIVER
TANANAH RIVER
TAKU RIVER
TAKU
Atlin L.
Tahco Lake
NORTH FORK TAKU
Quartz Cr.
Thibert Cr.
McDAME'S CR.
Cottonwood
Dease L.



Map of the Upper Yukon River.

(SCALE 1 : 3,000,000.)

SCIENCE, April 20, 1888. No. 272.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NORTH WEST TERRITORIES
ALASKA
MACMILLAN RIVER
KAIZAS LAKE
GAUCHES LAKES
BEAVER RIVER
REID LAKES
STEWART RIVER
of Campbell
Rapids
Rapids
GLENLYON
Little Salmon R. (Day R.)
Big Salmon R. (D'Abbadie R.)
TES-ZIN-TOO OR
HOOT
Limestone Hills 500 to 600'
LAKE LABARGE
Eagle's Nest
Five Fingers (Miners)
Rink Rapids (Schwatka)
Nordenskiold R.
LEWES RIVER
FT. SELKIRK (ruins)
Indian Vil.
PELLY RIVER
UPPER RAMPARTS
WHITE RIVER
INDIAN CAMP
AYONIES R.
FORCIER R.
DEER R.
FT. RELIANCE
Forty Mile
FORTY MILE CR.
CONE HILL R.
BELLE ISLE
John's Village
BOUNDARY BUTTE
INTERNATIONAL BOUNDARY.
TANANAH RIVER
MT. ST. ELIAS 19,500'
MT. COOK 16,000'
MT. VANCOUVER 13,100'
ALTSEK RIVER
PT. MANBY
Icy B.

NORTH WEST
TERRITORIES
BRITISH
COLUMBIA
PACIFIC OCEAN
PELLY LAKE
FRANCES LAKE
FINLAYSON LAKE
FINLAYSON RIVER
CAMPBELL'S PORTAGE
FORT FRANCES (ruins)
Moose L.
FRANCES RIVER
Cañon
Upper Cañon and Rapids
LIARD RIVER
Hoole's R.
Hoole's Rapids
Cañon
Lower Post
To the Mackenzie
Bad Rapids
Sylvester's Cache
Blue R.
Lil. Rap
DEASE RIVER
SYLVESTER'S
CENTREVILLE
McDAMES CR.
Trout Cr.
Quartz Cr.
S. Fork
Cottonwood
NORTHERN BOUNDARY OF BRITISH COLUMBIA
MACMILLAN RIVER
GLENLYON
Rapids
PELZAS LAKE
Rapids
LEWES RIVER
FT. SELKIRK (ruins)
Rink Rapids (Schwatka)
Five Fingers (Miners)
Nordenskiold R.
Eagle's Nest
Little Salmon R. (Daly R.)
Big Salmon R. (D'Abbadie R.)
TESLIN LAKE
TES-LIN OR A-KLENE L.
TES-ZIN-TOO OR NEWBERRY RIVER (SCHWATKA)
HOOTALINQUA RIVER
Limestone Hills 500 to 600'
LAKE LABARGE
White Horse Rapids (Head of Steamboat Navigation)
LAKE MARSH
LEWES RIVER
HOTALINQUA R. of Telegraph Survey
Vazonee L.
Disella L.
Teslin Lake
NORTH FORK
TAKU
TAKU
TAKU RIVER
TAGISH LAKE
Lake Nares
LAKE BENNETT
Lindeman L.
CHILKOOT, TAYA OR PERRIER PASS
MT. CLEVELAND 6,070
MT. CARMACK 5,840
Cañon L.
Mountain L.
Crater L.
Taiya Inlet
Head of Canoe Navigation
MT. EMMONS 4,750
Indian Village
MT. NEWELL 5,640
Chilkoot L.
Chilkat Inlet
Pyramid I.
Chilkat Cannery
Chilkoot Inlet
CHILCOOT MTS.
Sullivan Rock
Berners Bay
LIONS HEAD
Pt. Bridget
Little I.
Ralston I.
Lincoln I.
Gastineaux Cha
JUNEAU CITY
Inlet
Seduction Pt.
Sullivan I.
Lynn Channel
WHITE MTS.
Pt. Whidbey
Hump I.
Retreat
Icy Strait
Glacier Bay
Cross Sound
CHILKAT PASS
CHILKAT R.
Chilkat L.
WHITE RIVER
NANAH RIVER
ALTSEK RIVER
MT. FAIRWEATHER 15,500
LITUYA MT. 10,000'
MT. CRILLON 15,900
MT. DAGOLET
MT. LA PEROUSE 11,300
Lituya Bay
JOY PT.
ASTROLABE PT.
CAPE SPENCER
PT. BINGHAM
POINT CURCY
CAPE FAIRWEATHER
Dry Bay
MT. COOK 16,000'
MT. VANCOUVER 13,100'
MT. ST. ELIAS 19,500'
OCEAN CAPE
PT. MANBY
Icy Bay
60
58

SCIENCE, April 20, 1888.

Map of the Upper Yukon River.

(SCALE 1 : 3.000.000.)

been added to our up-stream journey that it would become doubtful whether we should be able to afford time for geological work on the Lewes, and reach the coast before the smaller lakes near the mountains were frozen over. I therefore decided to set about the building of another boat, suitable for the ascent of the Lewes, and on the second day after we had begun work Mr. Ogilvie very opportunely appeared. After having completed our boat and obtained Mr. Ogilvie's preliminary report and survey sheets, together with the necessary provisions, we began the ascent of the Lewes, from the head waters of which we crossed the mountains by the Chilkoot Pass, and reached the coast at the head of Lynn Canal on the 20th of September. I am happy to be able to add that the entire expedition was carried out without any serious accident or loss, notwithstanding the difficult nature of the country, and that, though circumstantial reports were heard in the spring, of trouble between the miners and Indians on the Yukon, these proved to be entirely groundless."

Mr. Ogilvie proceeded down the Pelly River, and is now wintering in the vicinity of Belle Isle. It was proposed to make astronomical observations corresponding to those of Mr. Ogilvie near the point of intersection of the Yukon and 141st meridian at two places, — Kamloops and Ottawa. Unfortunately the corresponding observations could not be carried out, and the value of Mr. Ogilvie's astronomical work is therefore problematical. This spring he will start for the mouth of the Mackenzie by way of the Porcupine River and Fort Macpherson, and ascend the Mackenzie to Fort Chipewayan, connecting with his own survey of the Peace and Athabasca Rivers.

THE GEOLOGICAL OBSERVATIONS OF THE YUKON EXPEDITION, 1887.

THE routes to be followed by the expedition were selected with the purpose of obtaining as much information of a geographical, geological, and general character as possible of the great tract of country included in the extreme northern part of British Columbia, and to the north of the 60th parallel (which forms the boundary-line of that province), between the Rocky Mountains proper on the east, and the borders of Alaska on the west. The greater part of this vast region is drained by several large tributaries of the Yukon River, but these interlock to the south with tributaries of the Stikine and with branches of the Liard, a feeder of the Mackenzie.

The results obtained will form the subject of a detailed report of the Geological Survey of Canada, but for the preparation of this some time is yet required; and Mr. Ogilvie of the Dominion Lands Branch, and Mr. McConnell of the Geological Survey, are still in the field for the purpose of continuing surveys and explorations next summer. Meanwhile the following notes, bearing particularly on the principal geological features of scientific importance, may prove of interest.

In 1879 a geological traverse was made by the writer, of the entire width of the Cordillera region, by the line of the Skeena and Peace Rivers (*Report of Progress of the Geological Survey of Canada*, 1879–80); but this had, so far, remained the most northern line of geological examination across the wide mountain-belt of the west coast of the continent. The work of the past summer included a similar traverse of the same belt by the Stikine, Dease, and Liard Rivers, at a minimum distance of two hundred miles north of the last, and extended by the last-named river completely through the Rocky Mountains, to the great valley of the Mackenzie. The latter part of the traverse was, however, undertaken by Mr. McConnell, and his observations are not yet available.

To the north of this cross-section the exploration extended in the Yukon basin to the mouth of the Lewes River, near the 63d parallel. The actual line of travel and survey followed the Liard from its junction with the Dease northward to its sources, crossed the height of land to the Pelly near its head waters, followed that river down to the mouth of the Lewes, ascended the Lewes southward to its head, and finally, traversing the coast mountains by the Chilkoot Pass, reached the head of Lynn Channel.

The entire region thus examined may be described as mountainous in general character, though comprising also wide areas of hilly or rolling country, and many important flat-bottomed river-valleys. It declines as a whole gradually to the north-westward from heights of 2,730 feet at the Stikine-Dease watershed, and 3,150 feet at the height of land between the Liard and Pelly, to 1,550 feet at the confluence of the Lewes and Pelly. The close-set mountains forming the coast ranges on one hand, and on the other the serried peaks at the base of which Frances, Finlayson, and Pelly Lakes lie, and which represent the western tier of the Rocky Mountains, are here the principal mountain axes. A third important intermediate range, which it is proposed to name the Cassiar Range, is, however, cut through by the Dease River immediately to the east of Dease Lake. This appears to be continuous in a north-westward direction to the Pelly, after reaching which it assumes a more westward course, and with decreasing altitude follows parallel to the river, which it eventually crosses, near the mouth of the Lewes, in the form of low ranges of hills. The trend of the subsidiary and less continuous ranges to the west of the Rocky Mountains proper, as well as the prevailing strike of the rocks, partake in a similar general change in direction, wheeling westward in the north in approximate conformity with the outline of the Pacific coast.

The rocks throughout the entire region above outlined present close analogies to those already investigated in the southern portions of British Columbia, thus confirming previous statements with respect to the great general similarity, in a north-westerly and south-easterly direction, of the peculiar geological features of the Cordillera belt. The coast mountains where crossed by the Stikine, and again still farther north in the line of the Chilkoot Pass, consist for the most part of granitoid rocks, which are generally rich in hornblende and triclinic felspars. With these are occasionally included belts of crystalline schists, micaceous or hornblendic, the rocks as a whole resembling those of which details are given in my last report on Vancouver Island (*Annual Report of the Geological Survey*, 1886). It may be said, in fact, that the composition and structure of the coast ranges is practically identical wherever they have been examined, from the Fraser River to the head of Lynn Channel, — a length of nearly nine hundred miles.

To the east of these ranges, the country to and including the Rocky Mountains proper is chiefly characterized by the occurrence and wide distribution of paleozoic rocks, which often closely resemble those provisionally named the Câche Creek Series in southern British Columbia. They include limestones, quartzites, argillites, slates, and schists, with a notable proportion of agglomerates and other materials of volcanic origin, and are all pretty thoroughly altered and hardened and considerably flexed. Near Dease Lake, and again on the Pelly almost on the same line of strike, important beds of serpentine occur, and the associated rocks in these and many other places are preponderantly schistose and slaty, running through a number of varieties, but closely resembling the schistose and slaty rocks of Cariboo, and other gold-bearing districts to the south, and here also yielding gold.

These paleozoic rocks are interrupted by granitic areas, which generally rise in the form of ridges or mountain elevations, and were in some places observed to be flanked by more or less considerable occurrences of crystalline schists, which appear to be more highly altered portions of the paleozoic. The most important of these inland granitic ranges is that previously referred to as the Cassiar Range. Granitic mountains also, however, occur in the range to the east of Frances Lake, and elsewhere.

Fossils are by no means abundant in the paleozoic rocks; but a small collection of graptolites was obtained on the Dease, which has been submitted to Professor Lapworth, and by him pronounced to be of middle ordovician age, six species being recognized. This is, no doubt, the farthest north-western occurrence of a graptolitic fauna so far noted on the continent. Carboniferous fossils, notably *Fusulina* and *Loftusia Columbiana*, were obtained from limestones in the Liard basin, and again on Tahko or Tagish Lake near the head of the Lewes River. It is probable, however, that rocks ranging from the Cambrian to the top of the paleozoic, and possibly also including the triassic (Vancouver or Nicola Series), may be embraced in this great preponderantly paleozoic area.

Strata which are probably of cretaceous age occur on the Stikine in limited basins immediately to the east of the coast mountains; and rocks holding middle or lower cretaceous marine fossils have a considerable development on the Lewes, where they are associated