GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

SHEET 115P

LEGEND

CENOZOIC

QUATERNARY
POST-GLACIAL
20 — Stream deposits, alluvium

TERTIARY AND LATER
PLIOCENE (?) AND LATER
19 — Stream deposits, alluvium; 19a, "White Channel gravel"

SELKIRK GROUP
18 — Basalt, andesite

TERTIARY
LATE TERTIARY
17 — 17a, rhyolite, trachyte; 17b, granite and syenite porphyries, trachyte

EOCENE (?) OR LATER
CARMACKS GROUP
16 — Andesite, rhyolite, trachyte, dacite

EOCENE (?)
15 — Conglomerate, arkose, sandstone, silt, clay

21 — Surficial deposits undivided

MESOZOIC

JURASSIC AND/OR CRETACEOUS
COAST INTRUSIONS (13, 14)
14 — Granite, granodiorite, quartz monzonite
13 — Syenite, monzonite
12 — Gabbro, peridotite, serpentine, diorite

CARBONIFEROUS (?) TO (?) CRETACEOUS
11 — Andesite, trachyte
10 — 10a, conglomerate, chert, tuff, slate; 10b, phyllite, quartzite; 10c, quartzite, chert, phyllite, limestone

PALÆOZOIC

ORDOVICIAN (?) OR LATER
9 — Quartzite, slate, sandstone, conglomerate; 9a, conglomerate
8 — Limestone, slate, phyllite, quartzite

ORDOVICIAN (?) OR EARLIER
6 7 — 7. Varicoloured slate; 6. Quartzite, slate, phyllite, limestone

KLONDIKE GROUP
5 — Schist, orthogneiss

PROTEROZOIC

YUKON GROUP (1-4)
4 — Schist, quartzite, phyllite, limestone
3 — Schist, quartzite, limestone
2 — Quartzite, schist
1 — Paragneiss, quartzite, schist, phyllite, limestone

Geological boundary (approximate, assumed)
Limestone of various ages
Bedding, tops known (inclined, overturned)
Bedding, tops unknown (horizontal, inclined, vertical)
Schistosity, foliation (inclined, vertical)
Fault (defined, approximate, assumed)
Anticline
Glacial striæ
Drumlin (direction of ice movement known)
Limit of last glacial advance (defined, approximate)

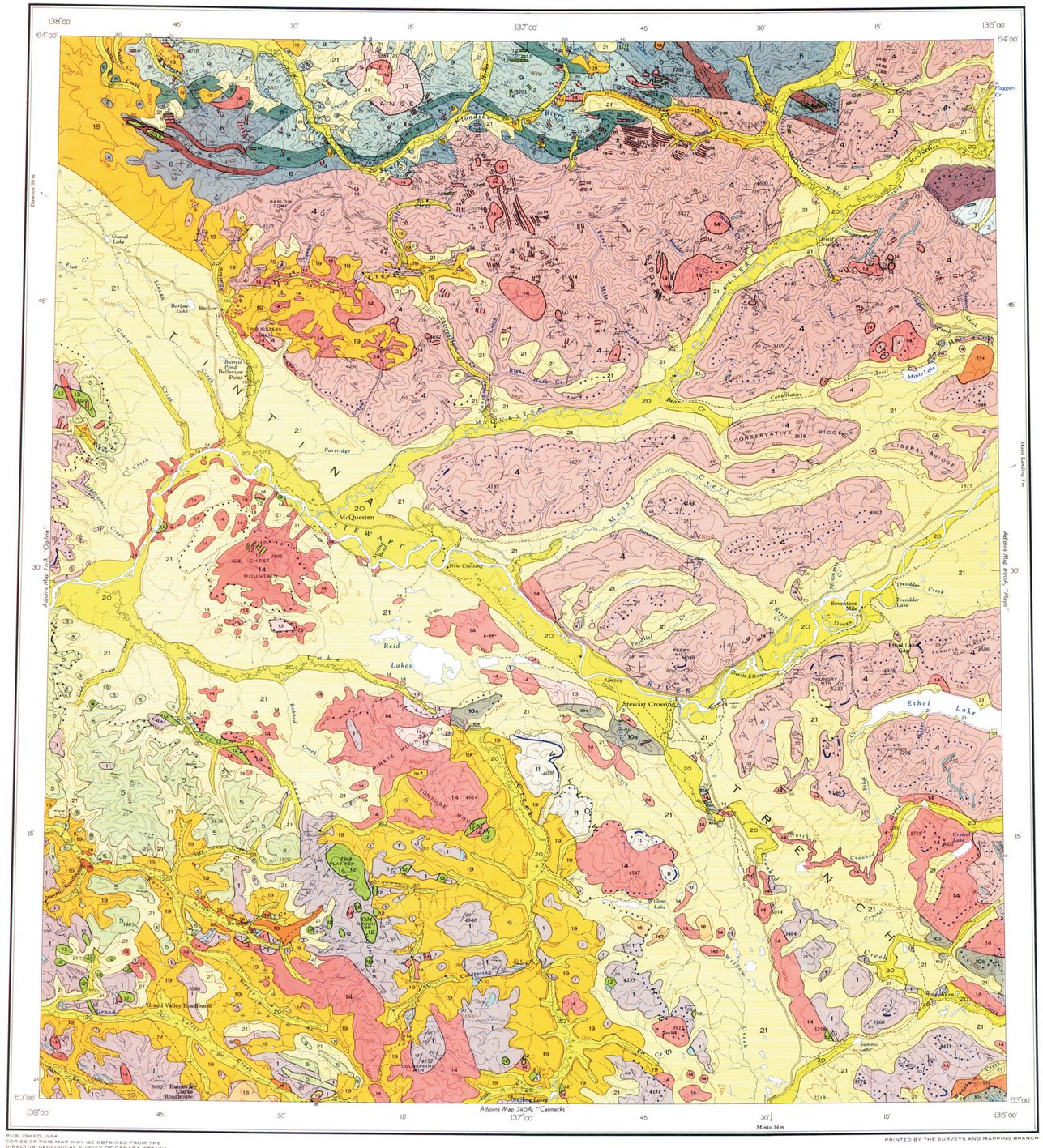
Geology by H. S. Bostock, 1926-1929

Cartography by the Geological Survey of Canada, 1963

Main road
Winter road or cart track
Trail or portage
Bridge
Horizontal control point — 3334
Warm spring, temperature indicated — 76°
Intermittent stream
Marsh
Contours (interval 500 feet) — 2500

Base-map compiled and drawn by the Surveys and Mapping Branch

Mean magnetic declination, 33°00' East, decreasing 3.9' annually. Readings vary from 31°42' in the SW corner to 33°38' in the NE corner of the map area



PUBLISHED, 1964
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MAP 1143A

GEOLOGY

McQUESTEN

YUKON TERRITORY

Scale: One Inch to Four Miles = 1/253,440

Miles: 4 2 0 4 8 12

DESCRIPTIVE NOTES

The map-area is reached by road from Whitehorse, Dawson, or Mayo. Small craft may be used on Stewart River, formerly navigated by steamboats in summer, and on McQuesten River. Roads along Haggart, Minto, and Highet Creeks connect with Mayo. The trails follow the best routes, but the condition of the trails varies greatly and roadhouses are in ruin. The airstrips are in disuse. Helicopters may be landed in valleys and on ridges but below 4,000 feet timber clothes the hills.

Tintina Trench is a zone of intense fracturing, faulting, and shearing, the geology on either side being notably dissimilar.

Units 1 to 4, the Yukon Group, contain metamorphic rocks of sedimentary, volcanic, and unknown origin and of Precambrian or uncertain age.

Unit 1 consists of hornblende, quartz, feldspar, and mica paragneisses, interbedded with micaceous quartzite, quartz-mica schist and limestone. In the southwest, gneiss predominates, whereas east of White Mountains, the rocks are dominantly thinly bedded, fine-grained, dark quartzite interbedded with mica and graphitic schists. In a few places this quartzite contains quartz pebbles. In general, the degree of metamorphism in unit 1 is more intense to the southwest, and in all of it is more intense than in the units of the Yukon Group northeast of Tintina Trench.

Unit 2 is characterized by grey, massive, blocky fracturing quartzite interbedded with schist. It is overlain by unit 3 characterized by mica and graphitic schists, with minor quartzite and limestone. This is in turn overlain by unit 4, characterized by mica schist and micaceous quartzite in beds less than a foot thick. Much of it is very uniform, the beds alternating with gradational contacts for great thicknesses. Many of the rocks of unit 4 are brown and contain rounded sand grains and quartz pebbles 1/8 to 1/4 inch, rarely 1 inch long. Between Moose and Bear Creeks, thinly bedded, grey quartzite with thin interbeds of mica schist forms much of this unit. Massive lenses of light grey to white, coarsely crystalline limestone occur in units 1, 3, and 4.

The rocks of unit 5 are mainly massive, quartz-mica schists but include areas of orthogneiss containing, in addition to quartz and mica, feldspar, hornblende, and chlorite. North of Silt Creek, green hornblende gneiss and amphibolite occur. The contacts of unit 5 cut across the bedding and structures of unit 1 which they apparently intrude. Unit 5 is similar to, and continuous with areas of, the Klondike Group to the west.

Quartzite and sandstone form most of unit 6 but some slate and phyllite are present everywhere, particularly to the west. The arenaceous rocks are in beds up to 3 feet thick, composed of rounded, light grey or white, quartz pebbles, 1/16 to 1/2 inch long in a dark matrix. Many are speckled with iron sulphide. Near the middle of the unit is one or perhaps two layers of varicoloured slates and phyllite (7). Above them slate and phyllite are more common and the quartzite is dark grey, finer grained and in places cherty. The limestone in unit 6 is grey and finer grained than that in the Yukon Group.

Unit 8 consists of thin-bedded, in places massive, limestone interbedded with dark grey to light-coloured beds consisting of various proportions of limy, siliceous, and argillaceous material with a fine texture and a slaty cleavage, and some phyllite. The lithologically similar beds northeast of Lost Horses Creek may be unit 8 repeated structurally, or possibly they may be stratigraphically higher, calcareous beds.

Unit 9 comprises a large thickness of grey, cherty quartzite and grey and black slate. Interbedded with these are coarse, pebbly quartzites, with glassy quartz pebbles and fine-grained, dark sandstone and greywacke. Fine, current ripple marks and crossbedding are common features. On Lost Horses Creek, massive beds of conglomerate, with stones mainly of pebble size but up to 2 inches long, occur in this unit. To the northeast these are followed by dark grey and black slates. The highest beds are believed to be those around lower Glacier Creek and north of Gates Creek, where light-coloured massive chert and cherty quartzite, slate, brown shale, and sandstone occur. North of Gates Creek, these rocks are in fault contact with a conglomerate (9a) composed mainly of rounded pebbles and stones of varicoloured chert up to 4 inches long. The age of units 6 to 9 is based on fossils collected about 2 miles northwest of Burton Creek from rocks similar to those of unit 9. These fossils are believed to be of late Palaeozoic or possibly Ordovician age.

A decrease in the degree of metamorphism in rocks above unit 4 is generally a distinguishing feature, but the lack of recognizable marker beds and complex faulting and overturning, in places necessitated the arbitrary drawing of boundaries between units 4 to 9. The relationships of the units to each other is uncertain but unconformities may be present between units 4 and 6 and between units 6 and 8.

Unit 10 is the northwestward continuation of rocks referred to as "Triassic or Earlier" in Mayo map-area and Carboniferous (?) to Cretaceous (?) in Glenlyon map-area. Unit 10c is continuous with similar rocks in two groups in Glenlyon map-area, one referred to as "Mississippian and/or Later", and the other as "Mississippian". Unit 11 resembles rocks in Glenlyon map-area grouped with rocks resembling unit 10c. Unit 11, believed to overlie unit 10, is composed of greenish grey, porphyritic andesite flows, breccias, and agglomerates with some cream and pink porphyritic trachyte flows. These rocks resemble the "Jurassic or Later" volcanics of Carmacks map-area and some in the Carboniferous (?) to Cretaceous (?) unit of Glenlyon map-area.

The rocks of unit 12 form small irregular bodies and dykes of various compositions, including in addition to those listed in the legend, hornblende-rich diorite, hornblendite, diabase, and intermediate types. They intrude rocks of the Yukon Group.

The Coast Intrusions comprise a wide range of intrusive rocks ranging from moderately alkaline and mafic (13) to felsic and acidic (14) types. Some bodies of unit 13 are intruded by rocks of unit 14 but, in places, the contacts are gradational. Rocks of both units are intrusive into those of unit 10c, and unit 14 has contributed boulders to unit 15. The age of units 13 and 14 therefore conforms in a general way with that of the Coast Intrusions elsewhere. In the southeast, near Grand Valley Creek, however, some crushed and foliated bodies mapped as unit 14 resemble unit 5 and may be older. It is possible also that some bodies of unit 12 are early, mafic or ultramafic phases of the Coast Intrusions.

Syenite Range is formed of a composite stock with a core of granite (14) grading outward to a rim of coarse, porphyritic syenite (13), 80 per cent of which consists of large, tabular, Carlsbad-twinned albite phenocrysts. The groundmass contains hornblende, biotite, two feldspars and a little quartz. Accessory minerals include titanite, allanite, and an unusual abundance of tourmaline. Towards the centre of the stock the proportion of groundmass to phenocrysts increases, and in the granitic core the feldspar phenocrysts are stubby but scarce.

Sills and dykes of unit 14, though mainly granite and granodiorite, include quartz monzonite, quartz diorite, and near the Syenite Range, syenite.

Along Tintina Trench, northeast and southwest of it, and around North Crooked Creek, most of unit 14 is composed of coarse, light grey granite, commonly containing abundant phenocrysts of large Carlsbad-twinned feldspar. Some parts of the larger bodies near Tonsure Mountain are foliated, showing gneissic and rarely schistose structures. In this neighbourhood also, bodies rich in hornblende with white feldspar occur in unit 14. Some of the bodies of unit 13, north, south, and southwest of Lake Creek, are coarse and porphyritic, others are uniform and medium grained. The feldspar is mainly pink, and the biotite and hornblende content varies greatly. Locally much pegmatitic material is present. Much of the syenite west of Airstrip Creek is foliated, crushed, and altered.

Unit 15 consists of loosely consolidated, well-stratified, clastic rocks comprising more than 200 feet of strata. Most of the beds are 6 to 18 inches thick. They include relatively clean beds of coarse pebbles, sand and silt, but most grade from well-sorted silt and sand in the upper part of each bed to coarse sand and ½-inch pebbles in the lower part. Some coarser beds are arkose and contain feldspar pebbles up to an inch long. Some beds of fine-grained material contain granite boulders up to 2 feet long, lying isolated or in groups. Unit 15 occupies a similar structural and topographic position in Tintina Trench as the upper Eocene coal measures to the northwest, and may be a part of them.

Unit 16 is composed of brown and grey andesite, and other, lighter-coloured volcanic flows and breccias. In places, these rocks are tilted, and truncated by the upland surface. They are similar to, and in part continuous with, the Carmacks group in the map-area to the south where they overlie sediments tentatively correlated with unit 15.

Lavas of unit 17a in Minto Creek valley lie apparently undisturbed, and the creek, in deepening its valley, has cut through them. Somewhat similar but coarser-textured rocks (17b) are both intrusive and extrusive. These lavas too lie in a valley and are partly cut through by streams. The porphyries of this unit are medium to coarse grained, with a granitic, but commonly drusy texture. The rocks of both units 17a and 17b have been overridden by the last glacial advances.

Unit 18 consists of lava flows occurring in valleys, covering, and in places covered by, gravels of unit 19. Some flows have been partly dissected by streams; others, which have rough, partly ropy, cavernous surfaces, are not covered by soil. These rocks are typical of, and in part continuous with, areas of the Selkirk group in Carmacks map-area.

The surficial deposits range in age from pre-Pleistocene, to the present. The "White Channel gravels" (19a) are the oldest. They are more than 100 feet thick and lie on granite (14) and are overlain with a sharp, horizontal contact by brown gravels (19b). Unit 19a is mainly composed of well-rounded, slightly polished stones of the toughest of the local rocks, white vein-quartz and quartzite with some foreign black and grey chert. Schist and other dark, originally ferruginous rocks have been leached of their iron content. Though most of the stones are 3 inches or less in length, a few are as long as 10 inches. They are unsorted but their longer dimensions are horizontal. Unit 19a except for the foreign chert, is typical of the White Channel gravels of the Klondike.

A mantle of brown or rusty overburden (19) composed of gravel and alluvium is widespread in the north and southwest. It consists of rounded pebbles and cobbles, largely of tough foreign rocks such as chert, quartzite, diorite and greenstones, but includes a few local types. These materials form, in places, modified terraces where they are as much as 200 feet thick. North of Barrett Pond, the surface material is a gravelly soil with large, angular, local and foreign rocks and rounded and wind-facetted stones. It resembles a till. At Belleview Point, about 75 feet of these gravels is exposed overlying and containing materials of unit 15. At this locality they are well sorted and largely lacking in grains smaller than ¼ inch long. Most of the coarser-textured rocks crumble when disturbed. Brown gravel of this unit lies on the west slope of the hill north of Stevens Roadhouse, at elevations up to 3,000 feet; it contains foreign boulders as large as 5 x 3 x 2 feet of chert and conglomerate. The conglomerate is composed of chert and quartzite stones in a siliceous cement.

Northwest of Coldspring Mountain, very coarse, rounded stones in well-sorted deposits with open interstices, and weathered to light grey lie on the east of the passes up to 3,500 feet. West of upper Lake Creek, thick masses of brown, gravelly overburden, also included in unit 19, disrupt the normal drainage pattern. A few giant, foreign boulders, only movable by ice, occur as high as 3,300 feet in this locality.

Great masses of unit 19 lie in Tintina Trench. To the northwest they are continuous with the late Tertiary, Flat Creek gravels of the Klondike. Near Belleview Point they are overlain by fresh, grey till (21), which suggests a middle or early Pleistocene age for them.

Fresh, light grey overburden, mainly stream deposits and till, (21) is widespread below and southwest of the limit of the last major glacial advance. Included with it are areas of units 19 and 20. In the banks of Stewart River, above Seventeen Mile, a gently undulating sheet of till, 10 to 20 feet thick, lies for several miles between two sets of gravels. A similar section occurs on lower Lake Creek, and the till at Belleview Point is like that in these sections. The till has a silty to clay-like body with scattered stones, commonly as long as 6 inches, and rarely striated boulders. The gravels, both above and below the till, and the till itself, are fresh, except that on Lake Creek, diorite stones in the till and in the gravel under it were seen to be crumbling. Throughout these, and in numerous other exposures of the gravels, the stones are well rounded and their surfaces are coarsely ground. The gravels vary in coarseness and are mingled with sand and silt. They exhibit the typical sorting and bedding of rapid-stream deposits. These materials are believed to be the debris and outwash deposits of the last major glacial advance of the Pleistocene Epoch.

At the head of the east fork of Gates Creek, above 3,000 feet elevation, and in the Glacier Creek drainage, great, rotten boulders, mainly of the distinctive rocks of Syenite Range lie on slopes of brown till-like material. Masses of similar overburden divert the tributaries of Glacier Creek from their former direct courses to the Little South Klondike River. Moraines composed of fresher but brown-weathered material from the Syenite Range, including solid boulders, extend down from the cirques to the Little South Klondike Valley. Their topographic forms are modified and end moraines are lacking. These phenomena record an earlier and extensive advance of glaciers from the Syenite Range at least to Gates Creek and a later advance that reached the Little South Klondike Valley. The weathering and modification of the moraines suggests that both advances antedate that of the fresh light grey till and gravel of the Stewart Valley.

Unstratified silt, probably loess, commonly a foot or more thick but more than 50 feet thick on the north side of Barrett Pond, mantles much of the lower levels of the main valleys.

A distinct soil profile, 3 to 18 inches thick, red at the top, grading downward through lighter red to ochre and thence to light grey speckled with light carbonate, is apparent in the main valleys. In places, a few inches to a foot or more of dark grey-brown soil lies on top of the profile. A sprinkling of white dust on the surface, believed to be volcanic ash, was noted in south-eastern parts of the map-area.

The first prospecting and mining in the map-area was in 1885 when fine gold was found on the bars of Stewart River below the mouth of McQuesten River. Subsequently fine gold was found at many localities along both these rivers. Coarse gold was discovered on numerous creeks both in the map-area and to the eastward. The fine gold occurs along the rivers where they have eroded glacial debris brought by the ice from areas containing gold-bearing creeks. Some interest in lode prospecting developed after the discovery of silver-lead ore on Keno Hill to the east in 1919.

Rocks and structure throughout the map-area are more or less favourable for prospecting. The part north of Bear Creek, McQuesten River, and Tintina Trench contains most of the lode and placer mineral discoveries in the map-area, including those carrying gold, silver, lead, zinc, antimony, tungsten, tin, copper, barite, and monazite. The discoveries generally lie near a small granitic stock (14). In this section, glaciation and tilting of the surface have lead to many intricate changes in the drainage. In some creeks the placer concentrations in their earlier channels have been washed away, redistributed, or buried by new streams so that careful study of these changes is warranted in placer prospecting. In addition to gold, tungsten has been produced from placer deposits a few miles east of the map-area and deposits of these or other heavy minerals may also be present in the map-area. The vein prospects contain stibnite, arsenopyrite, chalcopyrite, galena, sphalerite, and pyrrhotite with which some gold and silver are commonly associated. Skarn, containing scheelite and chalcopyrite, yielding some gold, was found near Castnor Creek.