CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

GEOLOGICAL SERIES

SHEET 92 I (West Half)

LEGEND

CENOZOIC

TERTIARY

MIOCENE OR EARLIER

KAMLOOPS GROUP (23,24)

24 — *Basalt, andesite, and rhyolite; associated tuffs and breccias*

23 — *COLDWATER BEDS (?): sandstone, shale, and conglomerate; coal*

EOCENE

22 — *Conglomerate, breccia, arkose, and shale; basaltic lava and breccia (relations to Kamloops group unknown)*

CRETACEOUS OR TERTIARY

21 — *Conglomerate, sandstone, and shale*

MESOZOIC

CRETACEOUS

LOWER CRETACEOUS

KINGSVALE GROUP

19, 20 — 19. *Arkose, conglomerate, shale, and greywacke*
20. *Basalt and andesite; agglomerate, tuff, and breccia*

SPENCES BRIDGE GROUP

18 — *Andesite, dacite, basalt, and rhyolite; tuff, breccia, and agglomerate; conglomerate, sandstone, greywacke, and arkose*

JACKASS MOUNTAIN GROUP

15, 16, 17 — 15. *DIVISION A: greywacke, argillite, and siltstone; arkose and conglomerate*
16. *DIVISION B: conglomerate, greywacke, and argillite*
17. *DIVISION C: greywacke, argillite, conglomerate; arkose*

LILLOOET GROUP

14 — *Argillite, volcanic conglomerate, and tuffaceous sandstone*

BREW GROUP

13 — *Argillite, quartzite, and conglomerate*

JURASSIC

MIDDLE AND UPPER JURASSIC

12 — *Shale, conglomerate, and sandstone*

TRIASSIC

UPPER TRIASSIC

NICOLA GROUP

11 — *Basalt and andesite; tuff and agglomerate; limestone, quartzite, argillite, greywacke, and arkose*

TRIASSIC OR EARLIER

8–10 — 8. *Phyllite, quartzite, limestone; greenstone; schist*
9. *Argillite, slate, phyllite, quartzite, greywacke, chert, limestone; greenstone; schist*
10. *Phyllite, argillite, conglomerate, greywacke. May be in part of late Mesozoic age*

7 — *Schist and gneiss*

PALÆOZOIC

PERMIAN AND(?) EARLIER

CACHE CREEK GROUP

5, 6 — 5. *Greenstone; chert, argillite, minor limestone and quartzite; chlorite and quartz-mica schist*
6. *MARBLE CANYON FORMATION: limestone*

INTRUSIVE ROCKS

CRETACEOUS OR LATER

LOWER CRETACEOUS OR LATER

4 — *Quartz diorite, albite syenite*

CRETACEOUS

LOWER CRETACEOUS

3 — *Granodiorite*

JURASSIC OR CRETACEOUS

LOWER CRETACEOUS OR EARLIER

2 — *MOUNT LYTTON BATHOLITH: granodiorite, quartz diorite, and diorite*

JURASSIC

LOWER JURASSIC

1 — *GUICHON CREEK BATHOLITH: granite, granodiorite, quartz diorite, diorite*

COAST INTRUSIONS

JURASSIC (?)

A — *Hornblende diorite and related rocks*

B — *Serpentinized ultrabasic rocks*

Heavily drift-covered area

Bedding (horizontal, inclined, vertical, overturned)

Schistosity (inclined, vertical)

Foliation (inclined, vertical)

Glacial striæ (direction of ice-movement known, direction unknown)

Fault

Fossil locality Ⓕ

Mining property 23•

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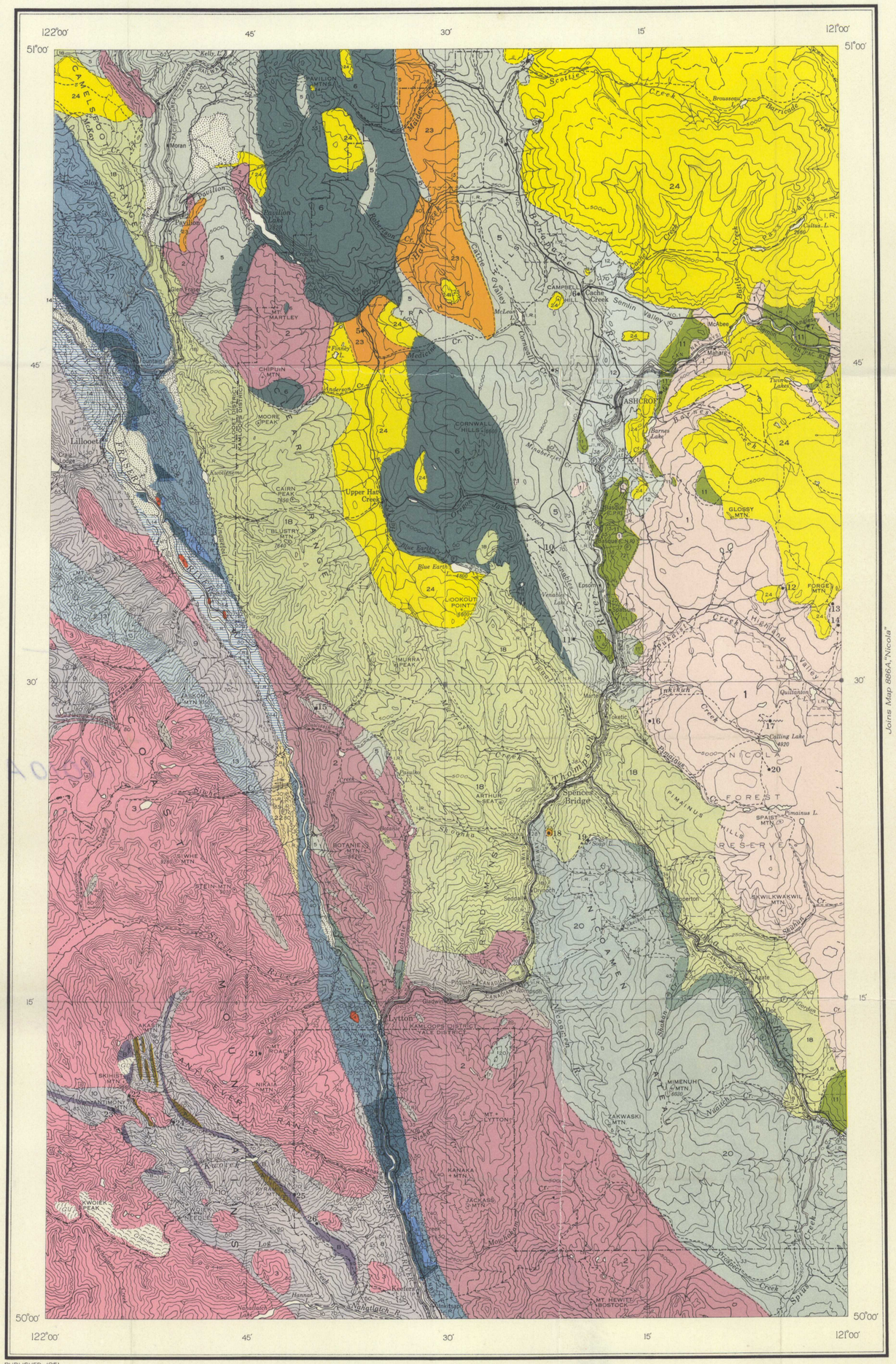
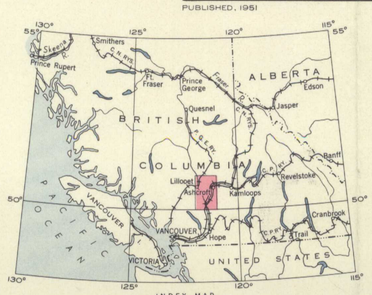
Geology by S.Duffell and K.C.McTaggart, 1945-46, and K.C.McTaggart, 1947

Cartography by the Geological Mapping Division, 1951



PUBLISHED, 1951



MAP 1010A

ASHCROFT

KAMLOOPS, LILLOOET AND YALE DISTRICTS
BRITISH COLUMBIA

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

Miles 4 3 2 1 0 4 8 12

Approximate magnetic declination, 24°15' East

REFERENCE

Main highway with route number NO. 3
Other roads
Trail
Church
Post Office P.O.
Land District boundary
Forest Reserve boundary
Indian Reserve boundary
Intermittent stream
Glacier
Contours (interval 500 feet)
Contours (position approximate)
Height in feet above mean sea-level 6030

Base-map compiled by the Bureau of Geology and Topography from surveys and from information supplied by the Department of Lands and Forests, British Columbia.

DESCRIPTIVE NOTES

West of Fraser River, the map-area occupies part of the Coast Mountains of British Columbia, and the high ridges southeast of Lytton mark the northern extremity of the Cascade Mountains. Elsewhere the area forms part of the Interior Plateau, and its vegetation and climate are largely characteristic of the 'dry belt' of this region.

The Cache Creek group (5, 6) constitutes a thick succession of mainly chert, argillite, altered volcanic rocks, and crystalline limestone, much of which is deformed and largely altered to talc, chlorite, and sericite schists. The distinctive crystalline limestone of Marble Canyon and Pavilion Mountains is mapped separately as the Marble Canyon formation (6).

Lenses and patches of metamorphosed rocks (7) within the Coast intrusions consist in part of chlorite, hornblende, and quartz-mica schists, and in part of granitic gneiss. Some parts of the large area of these rocks on Scarped Mountains are identifiable as Cache Creek (5), but other lenses may include strata of Mesozoic age.

Unfossiliferous, metamorphosed rock groups of uncertain identity (8-10), west of Fraser River, probably comprise strata of both Palæozoic and Mesozoic age. One group of mainly micaceous and graphitic phyllite (8) is probably of late Palæozoic age, but may include younger formations. Another varied assemblage of sedimentary and volcanic rocks (9), at least 7,500 and probably 10,000 feet thick, is probably in part Cache Creek. Still another group, comprising many thousands of feet of grey to black phyllite, grey argillite, conglomerate, and greywacke (10), extends southeast into Hope map-area, where it appears to include rocks of the Upper Jurassic (?) or Lower Cretaceous Ladner group. It also affords points of resemblance with the Lower Cretaceous Brew group (13).

Nicola group rocks (11) consist mainly of medium-grained, basaltic and andesitic lavas, largely altered to greenstones, greenish grey tuff, and agglomerate. Argillite, chert, greywacke, and limestone, associated with volcanic rocks near Basque, have yielded marine fossils of Upper Triassic age. The group has been metamorphosed by the Guichon Creek batholith (1) and occurs as small roof pendants within, or as relatively small bodies along, the border of the batholith.

Conglomerates, shales, and sandstones of Jurassic age (12) occupy a narrow synclinal belt near Ashcroft. The sandstones, commonly arkosic, and the conglomerates are greenish grey. The black shales, commonly carbonaceous, have yielded ammonites of Middle and Upper Jurassic age. East of Basque, conglomerate at the base of the succession rests unconformably on granitic rocks (1).

The Brew group (13) consists mainly of banded argillite, impure quartzite, and boulder conglomerate, and contains marine fossils of early Lower Cretaceous age.

The Lillooet group (14) and the Jackass Mountain group (15-17) form a belt of folded and deformed Lower Cretaceous sedimentary rocks along Fraser River, and are in faulted contact with all adjacent rock groups.

The Spences Bridge group (18), consisting of about 5,000 feet of varicoloured volcanic rocks, mainly lavas, and minor continental sediments, has yielded fossil plant remains of mid-Lower Cretaceous age. The lavas are generally much decomposed, and are commonly traversed by thin stringers of pink and white calcite. The group is gently folded, much of it lying horizontally or nearly so.

Sedimentary rocks (19) and volcanic rocks (20) of the Kingsvale group unconformably overlie the Spences Bridge group along Nicola River. The light-coloured sedimentary strata at the base of the group reach a thickness of 800 to 1,000 feet on Shakan Creek, but may be missing elsewhere. Fossil plant remains collected from them are of late Lower Cretaceous age. Small areas of sedimentary rocks on Botanie Creek and Fraser River near Stein River were mapped with the Kingsvale group on the basis of fossil evidence. The volcanic rocks, which constitute the bulk of the group, are largely of andesitic and basaltic composition and flows are commonly amygdaloidal.

Evidence obtained in Nicola map-area to the east suggests that certain local accumulations of conglomerate and sandstone (21) may be either of Cretaceous or Tertiary age. The conglomerate contains boulders and pebbles of Cache Creek and Nicola group rocks as well as of granite.

A succession of sedimentary and volcanic rocks (22) 4,500 feet thick has yielded fossil leaves of Eocene age. Coarse conglomerates in the exposed sections contain easily recognized boulders of Lower Cretaceous rocks (13-17). These Eocene strata form one of the many fault blocks along Fraser River, and the steep dips and close folds are mainly the result of fault movements.

Most of the Kamloops group consists of volcanic rocks (24), but with them are included several small areas of Tertiary sedimentary beds (23), which at upper Hat Creek and south of Spences Bridge are coal bearing. The sedimentary strata are probably the equivalent of the Coldwater beds of the adjoining Nicola map-area. The volcanic rocks exhibit a wide range of colours; they are mainly dark, dense, fine-grained basalts, but include thick beds of agglomerate, minor breccia, and tuff. Thin beds of argillaceous material yielded poorly preserved leaves of Tertiary age.

All of the map-area was covered by ice during Pleistocene time except perhaps some of the higher peaks of the Coast Mountains. Pleistocene and Recent drift mantles most of the plateau region. White silt deposits are prominent along Thompson River east of Spences Bridge. Alluvial fans, and ice-contact and glacial outwash deposits are common, and the major valleys are lined with marginal terraces of sand, gravel, and clay.

Batholithic rocks of the Coast intrusions consist mainly of granite, granodiorite, quartz-diorite, and diorite. The Guichon Creek batholith (1) intrudes Upper Triassic rocks (11) and is overlain by Middle and Upper Jurassic rocks (12). The Mount Lytton batholith (2) is overlain by lavas of the Spences Bridge and Kingsvale groups (18-20) and may be of early Lower Cretaceous age, but is probably more nearly contemporaneous with the Guichon Creek mass. The widespread granodiorite (3) of the Coast Mountains is believed to be of mid-Lower Cretaceous age.

Elongate bodies of ultrabasic rocks (B), with which are associated bodies of hornblende diorite and related rocks (A), are exposed in the Coast Mountains. The rocks of the main serpentine belt in the southwest corner of the map-area are, apparently, about in line with those of the serpentine belt to the southeast in Hope map-area, and are probably of Cretaceous age. Small undifferentiated bodies of serpentine associated with Cache Creek rocks along Bonaparte River carry significant chromite deposits.

Several minor intrusions (4) cut rocks of the Fraser River Lower Cretaceous belt (14-17).

The belt of Lower Cretaceous rocks along Fraser River may be regarded as a series of fault blocks or slices involved in a major zone of faulting along which rocks to the west have been relatively elevated. From the south border of the map-area to Cinquefoil Creek the Cretaceous rocks appear to occupy a graben. Farther north, rocks to the west of the Cretaceous belt appear to be elevated, and those to the east relatively depressed, with respect to the Lower Cretaceous rocks.

Albitization and, to a lesser extent, prehnitization are features of many of the rocks in and adjacent to the Fraser River Cretaceous belt. The abundant albite of some of the intrusive rocks is a product of metasomatism, a process that is believed also to have affected the older bedded rocks (14) of the Cretaceous belt; the albite of the younger formations is probably of detrital origin.

The map-area contains a variety of metallic and industrial mineral deposits, several of which have been productive. Placer gold has been mined on all major streams, but only in small amount since early years of the present century. Stibnite is found in irregular quartz veinlets along a fault zone in granodiorite near the headwaters of Stein River. Plutonic rocks of the Guichon Creek batholith are host to copper deposits near Highland Valley, and contain hematite deposits in shear zones near Toketic. The copper minerals occur in veins and shattered zones associated with tourmaline and hematite, and the wall-rocks are commonly highly sericitized. The greatest production came from the O.K. mine, which during the period of its activity mined and concentrated 10,000 tons of ore containing 3.6 per cent copper. The Maggie mine on Bonaparte River was prospected underground as a copper deposit. Fifty tons of selected ore yielded 2 ounces of silver a ton, 8 per cent copper, and low assays in lead and zinc. Chromite occurs in ultrabasic rocks along Bonaparte River, the principal discoveries having been made on Scottie Creek and the creek south of it. Gold and silver have been reported from quartz veins in the schist, argillites, and batholithic rocks in the southwest corner of the map-area. The Big Slide (Grange) mine has produced gold, copper, and silver from narrow quartz veins in diorite. Considerable exploration work has been done at the Martel property on narrow lenticular quartz veins in Cache Creek rocks that contain molybdenum and gold. Narrow quartz veins carrying sphalerite, galena, and chalcopyrite occur in Triassic rocks east of Ashcroft.

Coal has been mined with limited success from the deposit at upper Hat Creek. Occurrences of gypsum, jade, vesuvianite, magnesium sulphate, and sodium carbonate have been recorded, and some magnesium sulphate has been produced from the deposit at Basque. Much of the Marble Canyon formation is composed of very pure limestone.