CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH

BUREAU OF GEOLOGY AND TOPOGRAPHY

GEOLOGICAL SURVEY

LEGEND

CENOZOIC

MODERN

16 — *Recent alluvium and glacial deposits*

TERTIARY

EOCENE AND OLIGOCENE

15 — *Shale, sandstone, conglomerate; coal seams*

14 — *Basalt, andesite; some dacite and rhyolite; tuff, etc.*

13 — *Talus debris, shale, sandstone, conglomerate, tuffaceous beds; thin coaly seams*

12 — *Granite, syenite*

MESOZOIC

JURASSIC AND/OR LATER

OKANAGAN INTRUSIVES

10 — *Granite granodiorite*

9 — *Augite syenite and other alkali-rich granitic rocks*

8 — *Mainly diorite and quartz diorite*

7 — *Pyroxenite, hornblendite, peridotite, serpentine*

11 — *Okanagan intrusives not subdivided, mainly granodiorite*

TRIASSIC (?)

5 — *Limestone*

TRIASSIC

4 — *Andesite, basalt and related intrusives*

6 — *Amphibolitic and dioritic rocks, hornfels; patches of altered sedimentary rocks*

3 — *Chert, argillite, limestone, tuffaceous sediments; 3a, limestone*

PALAEOZOIC

PERMIAN

2 — *Limestone*

CARBONIFEROUS (?)

1 — *Siliceous and micaceous schists; argillite, quartzite, conglomerate, limestone; amphibolitic and chloritic schists, andesitic lava and tuff; basic intrusive bodies*

SHUSWAP COMPLEX

21 — *Biotite granite and granodiorite, mainly massive*

20 — *Hornblende and hornblende-biotite granodiorite, and quartz diorite, massive and gneissic*

19 — *Undivided Shuswap; mainly granite-gneiss, granodiorite-gneiss, pegmatite*

18 — *Banded gneiss (paragneiss) amphibolitic and micaceous schists*

17 — *Sheared and gneissic granodiorite and diorite*

Areas with many Tertiary dykes

Geological boundary (defined, assumed)

Glacial striæ

Road well travelled

Road not well travelled

Trail

Abandoned railway

School

Post Office

Wharf

Land District boundary

Indian Reserve boundary

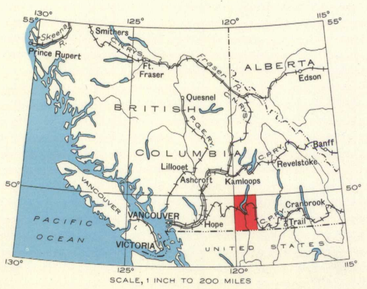
Intermittent lake and stream

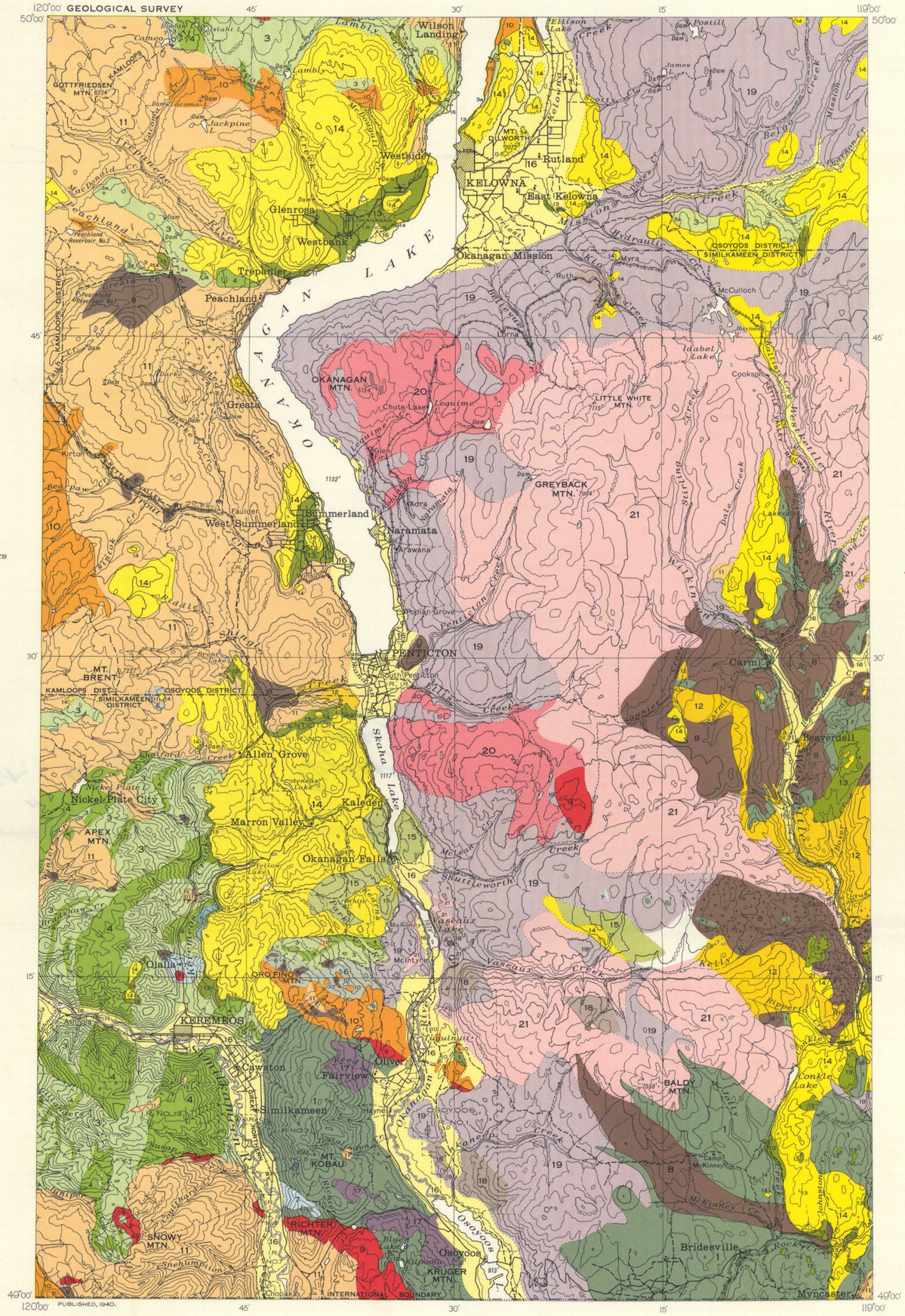
Contours (interval 500 feet)

Height in feet above Mean sea-level

Geology by C. E. Cairnes, 1936, and from published and unpublished maps by the Geological Survey. For Mineral Localities, see Map 539A, "Kettle River, West Half."

Base-map prepared by the Topographical Survey, 1936, from maps supplied by the British Columbia Department of Lands. Cartography by the Drafting and Reproducing Division, 1939.





MAP 538A

KETTLE RIVER

(WEST HALF)

SIMILKAMEEN AND OSOYOOS DISTRICTS

BRITISH COLUMBIA

Scale, ~~253,440~~ or 1 Inch to 4 Miles

Miles 4 0 4 8 12

Approximate magnetic declination, 25° East.

PHYSICAL FEATURES

Much of the area lies within the Interior Plateaux and is characterized by broad, rolling uplands steeply and deeply dissected by the main valleys and their principal tributaries. West of Similkameen river and for some miles north of this stream the more rugged mountains of the Okanagan range merge with the Plateaux region. West of Okanagan valley precipitation is, in most parts, small; forest growth is light and southern slopes commonly quite open. East of this valley precipitation is relatively heavy and much of the area is thickly timbered and difficultly accessible. The main valley bottoms are thickly floored with drift which forms conspicuous terraces and, more locally, alluvial fans and deltas. A coalescence of fans from either side of Okanagan lake at Penticton has separated the waters of Okanagan and Skaha lakes which formerly were one. Rock formations are best exposed along the steep valley walls and the summits of the higher ridges and peaks. Much of the uplands, however, are drift-covered and this has afforded a considerable handicap to prospecting.

GENERAL GEOLOGY

What are thought to be the oldest rocks in the area form a group (1) of intimately associated, much altered sediments and volcanic rocks. The sediments are in considerable part siliceous and micaceous schists and for the most part appear originally to have been argillaceous. The volcanic rocks are in part amphibolitic and chloritic schists. Originally they seem mainly to have been andesitic lavas. With them are grouped related intrusive bodies and others, mainly of basic and ultrabasic rocks, which may be considerably younger. As developed in the southwest this group of rocks is separated by faults from fossiliferous strata of Permian and Triassic age but appears to dip beneath these measures and therefore is classed tentatively as Carboniferous.

A body of limestone (2), bounded by faults, and situated near Keremeos, carries Permian fossils.

The Triassic sedimentary strata (3) in the southwest have yielded fossils and their age is definitely established. Chert is abundant; much of the wide band of sediments striking north across the Similkameen valley west of Keremeos for instance, is composed of blue-black, massive chert. The so-called Triassic sedimentary strata occurring in the north closely resemble the Triassic measures of the southern areas but as yet no fossils have been found in them. They include some volcanic rocks (greenstones).

The Triassic volcanic rocks (4) are mainly dark green, massive, andesite and basalt, but included with them are minor intrusive bodies. The age of the southern occurrences is indicated by their association with fossiliferous Triassic sediments. The northern developments of so-called Triassic volcanic rocks closely resemble those of the south but like the sediments with which they are associated their age is not definitely determinable.

North of Keremeos a band of limestone (5) overlies Triassic volcanic rocks. No fossils have yet been found in the limestone but it is probably of Triassic age.

The assemblage of principally metamorphic rocks (6) consists mainly of dark green, crystalline amphibolitic types. On Oro Fino mountain these are associated with dioritic intrusives from which they may be difficultly distinguishable. The assemblage is of composite origin. Its principal area borders Mesozoic sediments and contains inclusions of them whereas the associated dioritic rocks are presumably Okanagan Intrusives.

The Okanagan Intrusives (7) to (11) are a group of allied rocks ranging from light-coloured silicious granites to dark pyroxenites, peridotites, etc. The main types differ in age and in most cases more acidic bodies are younger than and cut neighboring more basic bodies. The rocks for the most part are coarse-grained. They contain biotite and hornblende; pyroxene is rare except in the alkali-rich types which characteristically form bodies of varying textures and compositions.

The intrusives (12) classed as Tertiary vary from quartzose granite to syenite and are mainly coarse-grained and pink to reddish. Biotite is the characteristic dark constituent. The rocks commonly exhibit minute cavities. They are accompanied by many dykes of similar compositions and textures. In Shingle Creek valley what appears to be a sill-like apophysis or near surface flow, directly connected with a stock-like intrusive mass, both underlies and is overlain by basal Tertiary sediments.

The oldest Tertiary sediments (13) consist partly of angular talus debris and partly of water lain clastics. So far as known these sediments are of late Eocene age. They are overlain by volcanic rocks, mainly lavas (14) that in the vicinity of White lake have an estimated thickness of 4,500 feet. The flows vary from massive to highly vesicular, are grey, green and reddish, and are mainly andesite and basalt. In the area between Olalla and Skaha lake these lavas are overlain by younger Tertiary sediments (15) constituting two groups of which the lower is the thicker and contains important coal beds. The sediments consist of water-lain, coarse to fine-grained clastics that in places are unconsolidated. Otherwise they are distinguished from the oldest Tertiary sediments by an abundant detritus from underlying Tertiary volcanic and sedimentary rocks. The two upper groups of sediments are separated by an intervening group of volcanic rocks (14) that are chiefly andesitic lavas and pyroclastic beds. Elsewhere in the area it has not been possible to distinguish more than two groups of Tertiary sediments and in most parts the uppermost Tertiary rocks consist of widespread, mostly dark green, basaltic lavas some of which may be of Modern age. Dykes related to the Tertiary volcanic rocks are common; they are chiefly dark grey and green and andesitic to basaltic.

The members of the Shuswap Complex (17) to (21) are believed to represent the products of various stages in a process of granitization that affected sedimentary and volcanic formations and intrusive igneous bodies. The process is believed to have been in action during the period of intrusion of the Okanagan Intrusives. The various bodies of member (17) are in their less altered parts much like the diorite and quartz diorite (8) of the Okanagan Intrusives but for the most part they more closely resemble the gneissic rocks of member (19) and it seems probable they have been affected by the processes which gave rise to the rocks of the Shuswap Complex. Member (18) consists of gneisses and crystalline schists and less altered strata derived mainly from sedimentary rocks which presumably include representatives of Mesozoic and pre-Mesozoic formations. Member (19) consists mainly of granite-gneiss, granodiorite-gneiss, and abundant pegmatitic intrusives. The gneisses grade into crystalline schists like those composing member (18) and into granitic rocks like those of members (20) and (21). Member (21) consists mainly of grey, massive or gneissic, quartz-rich, in places pegmatitic granite and granodiorite; the rocks composing member (20) contain less quartz and more dark-coloured constituents.

STRUCTURAL GEOLOGY

The Tertiary sediments (13) and (15) dip at comparatively low angles and for the most part occur in basin-shaped structures. The Tertiary volcanic rocks (14) mainly lie in broad, open folds trending northerly. The Tertiary strata are intersected by many nearly vertical faults striking in various directions but in most cases northerly and with the downthrow in most instances on the east side. One prominent, east-west fault, west of Vaseaux lake is exposed for several miles and brings Mesozoic strata on the south into contact with Tertiary volcanic rocks on the north.

The Okanagan Intrusives (7) to (11) are intersected by many faults and shear zones striking in all directions.

The Palaeozoic (1) and (2) and Triassic (3) to (5) strata are extensively faulted and for the most part are steeply inclined. The general structural trend is northerly but east-west folds are common and in many places the strike of the beds parallels the swinging courses of the edges of nearby intrusive masses. In places the faults definitely predate the Okanagan Intrusives.

Okanagan valley probably marks a zone of faulting following a zig-zag course striking northwesterly and northeasterly and raising the complex of Shuswap rocks on the east to the level of the less altered strata on the west. The Shuswap rocks (17) to (21) are intersected by numerous nearly vertical faults most of which strike north and in many cases are marked by canyon-like gulches. The foliation and banding of the gneissic rocks in general dips away from the granitic bodies and forms broad basin-like and dome-shaped structures, but in places the structures are of the nature of compressed folds.

NOTE: The area contains a variety of mineral deposits and many scattered mines and prospects. These are listed and their positions are indicated on Map 539A, (Mineral Localities), "Kettle River, Similkameen and Osoyoos Districts, British Columbia".

PUBLISHED, 1940.