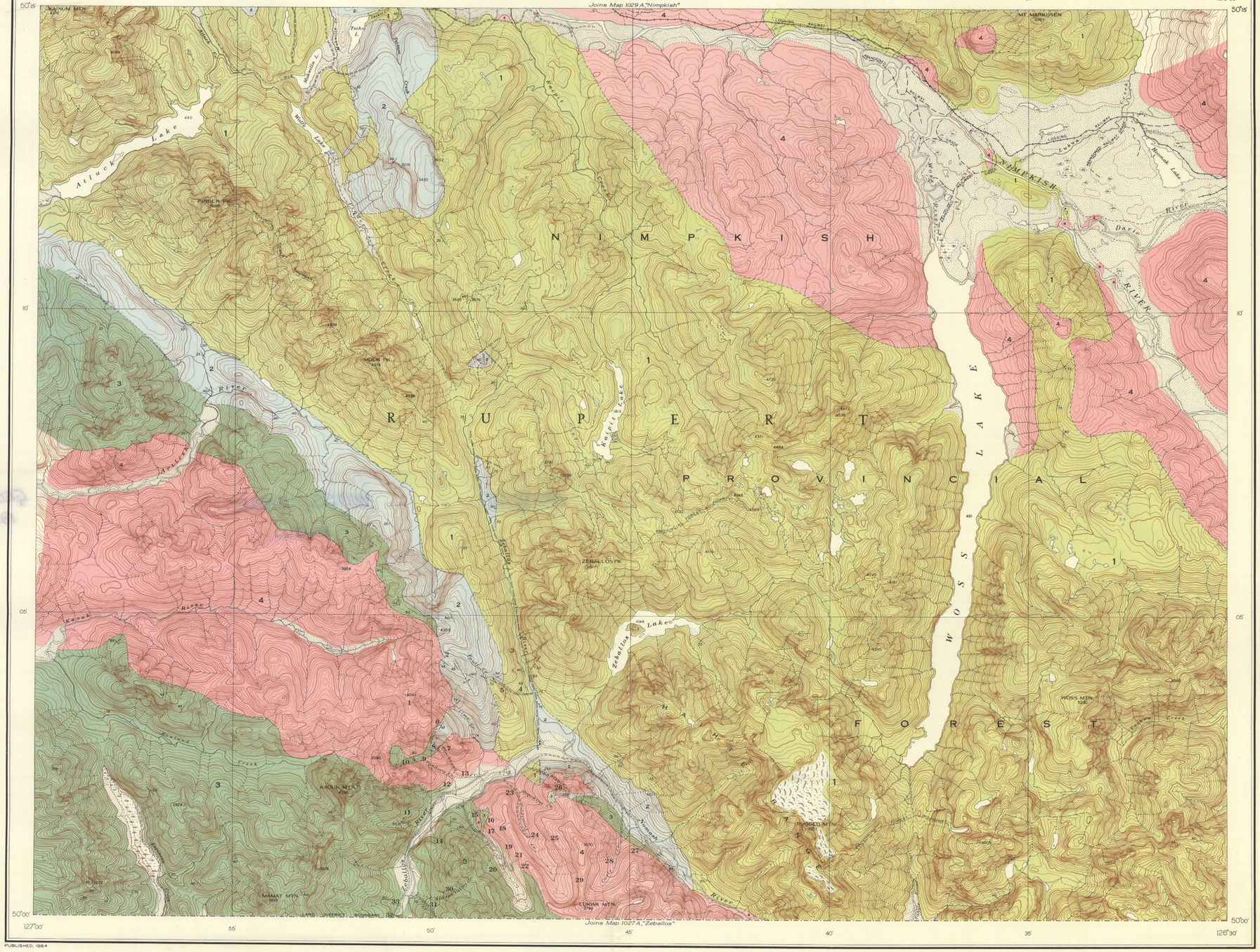
CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

GEOLOGICAL SERIES

SHEET 92 $\frac{L}{2}$



LEGEND

JURASSIC AND/OR CRETACEOUS
UPPER JURASSIC AND/OR LOWER CRETACEOUS
COAST INTRUSIONS

4 — *Quartz monzonite, granodiorite, quartz diorite, diorite, gabbro; minor aplite and micropegmatite*

TRIASSIC AND (?) JURASSIC
UPPER TRIASSIC AND (?) LATER
BONANZA GROUP

3 — *Andesitic lavas, agglomerates, tuffs, and breccias; basaltic, trachytic, and dacitic lavas; minor intercalated limestone; 400 to 500 feet composed of thin-bedded argillite, tuffaceous argillite, impure limestone, and quartzite at base; numerous thin, intercalated andesitic lavas and associated pyroclastic rocks*

TRIASSIC
UPPER TRIASSIC

2 — *QUATSINO FORMATION: crystalline limestone; minor volcanic rocks*

UPPER TRIASSIC AND (?) EARLIER
KARMUTSEN GROUP

1 — *Basaltic and andesitic lavas, agglomerates, breccias, and tuffs; minor intercalated limestone*

MESOZOIC

Heavily drift-covered area
Bedding (horizontal, inclined, vertical)
Fault (arrow indicates direction of dip)
Shear zone
Glacial striæ
Anticlinal axis
Mining property — 2

INDEX TO MINING PROPERTIES

32	Answer (gold)	12	Maquinna (gold)
6	Barnacle (Gold)	27	Monitor (gold)
29	Big Star (gold)	20	Mount Zeballos (gold)
11	Boden (gold)	3	North Fork Exploration (gold)
22	Britannia (gold)	9	Omega (gold)
26	Central Zeballos (gold)	13	Pandora (gold)
24	C.D. (Rey Oro) (gold)	10	Peerless (gold)
2	Churchill (iron, copper, lead, zinc)	16	Prident (gold)
7	Cordova (gold)	15	Privateer (gold)
8	Ford Magnetite (iron)	30	Prosperity (gold)
23	Gold Creek (gold)	25	Rimy (gold)
31	Gold Gate (gold)	21	Spud Valley (gold)
5	Gold Spring (gold)	33	Tagore (gold)
28	Homeward (gold)	14	Van Isle (gold)
18	I.X.L. (gold)	17	White Star (gold)
4	King Midas (gold)	19	Zeballos (Pacific) (gold)
1	Lucky Strike (gold)		

Geology mainly by H.C. Gunning, 1931, 1932
Descriptive notes by J.W. Hoadley, 1952

Cartography by the Geological Cartography Division, 1953

Road
Logging road
Trail
Building
Logging railway
Abandoned railway grade
Provincial forest boundary
Glacier
Intermittent stream
Marsh
Shoal, sand or gravel
Contours (interval 100 feet)
Height in feet above mean sea-level 2924

Base-map compiled and drawn by the Surveys and Mapping Branch, from air photographs taken by the Royal Canadian Air Force, and from surveys by the Department of Lands and Forests, British Columbia

Air photographs covering this map-area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario

Approximate magnetic declination, 24°19' East

PUBLISHED, 1954

MAP 1028A

WOSS LAKE

VANCOUVER ISLAND
BRITISH COLUMBIA

Scale: One Inch to One Mile = $\frac{1}{63,360}$
Miles

DESCRIPTIVE NOTES

The map-area occupies part of the rugged, mountainous region of north-central Vancouver Island. Except in the small area of the Zeballos mining camp, there are no roads, and existing trails are much overgrown. The rugged, highly mountainous nature of the terrain, combined with the dense forest cover, make travel below timber-line, at an elevation of about 4,000 feet, very arduous.

The Karmutsen group (1) consists of a great thickness of basaltic and andesitic lava flows, agglomerates, breccias, and tuffs, with minor intercalated sedimentary strata. With the exception of the tuffs, the volcanic rocks are generally massive and dark green or black, and are characteristically amygdaloidal. In some places pillowed lavas are common. Much of the group has undergone regional metamorphism: where the rocks are well removed from intrusive bodies, the principal changes have been due to induration, some recrystallization, chloritization, and epidotization, but in the immediate vicinity of intrusions the processes of dynamic and thermal metamorphism have resulted in complete obliteration of most of the original textures.

The Karmutsen group is conformably overlain by the Quatsino formation (2), which consists of crystalline limestone intercalated with thin volcanic flows. Its apparent stratigraphic thickness, where exposed in the relatively undisturbed area along Artlish River, varies from about 2,000 to 5,000 feet. Its true thickness may, however, be considerably less, although no definite evidence of overthickening by faulting or folding was noted in that particular region. The limestone is fine to coarsely crystalline, and varies in colour from pure white to black. Towards the base, it tends to be exceedingly fine grained, and grey and brownish or buff types are characteristic. Midway of the formation the predominant colours are white and grey, but towards the top they change to dark grey or black, due to the presence of more or less carbonaceous matter. In places where the limestone has been cut by Coast intrusions it has been much altered, and in part has been converted to a variety of contact metamorphic silicate minerals. Some of these metamorphic zones contain varying amounts of magnetite and of copper, lead, and zinc sulphides. Elsewhere little alteration was noted beyond simple recrystallization.

The Quatsino formation is conformably overlain by rocks of the Bonanza group (3). The lower 400 to 500 feet of the group consists of thin-bedded argillite, tuffaceous argillite, impure limestone, quartzite, and numerous, thin, intercalated andesitic lava flows. Above this lower, predominantly sedimentary part, the rocks of the group consist of a great thickness of andesitic lavas, agglomerates, tuffs, and breccias, with lesser amounts of basaltic, trachytic, and dacitic lavas and minor intercalated lenses of limestone. The top of the group has nowhere been recognized either in this or nearby map-areas. In general, the rocks are much altered by induration and regional metamorphism so that original textures are largely obliterated.

Primary structure within this conformable series of volcanic and sedimentary rocks (1-3), which in earlier accounts have been generally referred to the widespread Vancouver group, have been largely preserved, and over large parts of the area the strata occupy a seemingly simple monocline striking northwest and dipping at moderate angles, generally not more than 45 degrees to the southwest. In the vicinity of large bodies of Coast intrusions, however, the rocks are commonly greatly contorted and are intersected by faults of varying magnitude. This condition is illustrated along Nomash River, and over most of the area contiguous to the lower reaches of Zeballos River, in all of which places very steep to vertical to overturned dips and, less commonly, abrupt, radical changes in strike, are prevalent. In addition, the regional monoclinal structure is complicated by a tightly folded syncline whose axis approximately parallels, and lies close to, the north fork of Zeballos River and continues northward along the valley of Pinder Creek towards Nimpkish Lake. The structure is in many places partly isoclinal, and the beds may be overturned either to the west or to the east. As a result, narrow remnants of Quatsino limestone are preserved, along the north fork, in the underlying Karmutsen volcanic rock. The folding was accompanied, or followed, by faulting. The most pronounced fault trends a little west of north along the north fork of the Zeballos and, where observed, dips vertically or steeply east. It forms the western boundary of the infolded masses of limestone, and the east side of the fault has moved down, and possibly northward, relative to the west side.

No well-preserved diagnostic fossils have been found in the map-area, but in the Zeballos map-area, to the south, fossils of Upper Triassic age were found in a small lens of argillite intercalated with volcanic rocks near the top of the Karmutsen group. Also, in Nimpkish map-area, to the north, diagnostic fossils, including *Monotis subcircularis*, were found in the sedimentary part of the Bonanza group, thus establishing the age of this part of the group as late Upper Triassic. It would, therefore, seem probable that much, if not all, of the entire series of pre-batholithic sedimentary and volcanic rocks in this and adjoining map-areas is Upper Triassic in age.

The Coast intrusions (4) provide a variety of rock types, the commonest being quartz monzonite, granodiorite, and quartz diorite. A pronounced northwest trend of the masses may be noted, and for the most part they exhibit intrusive contacts. Basic border phases containing a high percentage of included material are common except where the intruded rocks are Quatsino limestone.

The Coast intrusions are cut by diabase and lamprophyre dykes, which follow prominent joint fractures in the granitic rocks.

Almost all of the known mineral deposits of the area are confined to what is known as the Zeballos mining camp, which comprises an area about 5 miles square in the extreme south-central part of the map-area. Excellent access to the major properties of the camp is provided by a good gravel road from the town of Zeballos, situated 4 miles to the south at the mouth of Zeballos River.

The mineral deposits of the camp are of two main types: (a) narrow, high-grade, lode-gold vein deposits, and (b) contact metamorphic, iron and copper-lead-zinc deposits. The former are considered to be genetically related to the intrusion of the Zeballos batholith, and occur in fractures and shear zones within that body, and within the surrounding volcanic and sedimentary rocks of the Bonanza group. The contact metamorphic deposits are likewise genetically related to the intrusion of the Zeballos batholith, and occur as replacement deposits in the rocks of the Quatsino formation and those of the lower sedimentary part of the Bonanza group, where these formations have been intruded by the batholithic rocks.

Interest in the lode-gold deposits of the area commenced about 1934 and rapidly increased, so that by 1938 several properties were being prepared for production, with many others in various stages of development, and the name Zeballos had become a familiar word throughout the mining fraternity. Activity continued at a high level until about 1942 when all the mines were forced to close due to a labour shortage. Subsequently, one mine, the Privateer, reopened, but was forced to close again in 1948. During the short, active life of the camp, thirteen mines produced a total of 267,811 ounces of gold. Of this amount all except a few thousand ounces came from five mines, of which the Privateer was by far the largest producer, with a total of 154,381 ounces. At present, activity in the district is restricted to exploration of two contact metamorphic magnetite deposits.

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