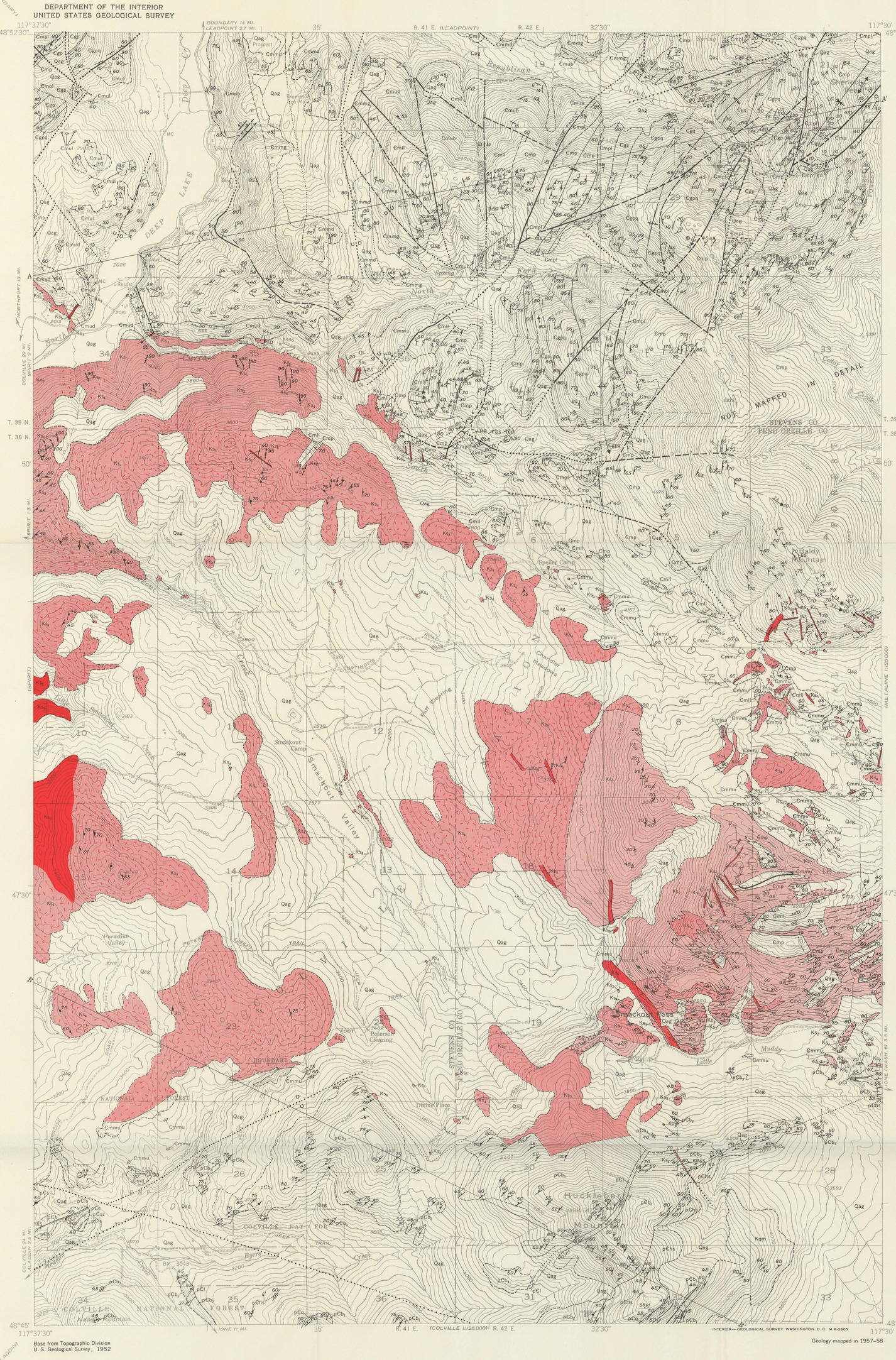
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MINERAL INVESTIGATIONS
FIELD STUDIES MAP MF-237



Base from Topographic Division
U. S. Geological Survey, 1952

Geology mapped in 1957–58

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C. M R-2605

EXPLANATION

QUATERNARY

Qag — Alluvial and glaciofluvial deposits
Includes Recent valley fills and alluvial fan deposits of gravel and sand and Pleistocene gravel, sand, silt, and clay of glaciofluvial origin

CRETACEOUS (?)

Ks — Spirit pluton
An intrusive mass consisting of the following separable units, arranged numerically:
- Ks_6 *(youngest), small dikes and lenses of white and pink aplite and quartz-microcline-muscovite pegmatite.*
- Ks_4, *fine- to medium-grained light-gray granite and quartz monzonite.*
- Ks_3, *coarse-grained light-gray quartz monzonite (merging into granodiorite) containing large euhedral pink orthoclase crystals.*
- Ks_2, *coarse-grained light-gray granodiorite merging into quartz monzonite.*
- Ks_1, *medium-grained medium- to dark-gray biotite-hornblende-quartz diorite.*
- Ks_1 *(oldest), coarse-grained greenish-black hornblende gabbro*

Kqm — Quartz monzonite of Kaniksu batholith
Consists of the muscovite facies of Park and Cannon (1943), a coarse-grained light-gray gneissic quartz-monzonite composed of microcline, plagioclase, quartz, muscovite, biotite, and accessory garnet. Streaked with a coarser pegmatitic phase

ORDOVICIAN

Ol — Ledbetter slate
Gray to black slate and phyllite. Contains poorly preserved graptolites. Locally thermally metamorphosed to a chiastolite slate

CAMBRIAN

Metaline formation

Cmud, Cmul, Cmub — Upper member
Cmud, *medium-bedded light-gray dolomite overlain conformably by the Ledbetter slate.*
Cmul, *thin-bedded fine-grained dark-gray to black limestone and intraformational dolomite breccia.*
Cmub, *thin-bedded medium- to fine-grained dark-gray dolomite interlayered with intraformational dolomite breccia.*
The middle unit, Cmul, *probably equivalent, at least in part, to the shale, limestone, and dolomite unit shown as Cambrian (?) in Area 1 of Leadpoint quadrangle (Yates and Robertson, 1958).*
The lower unit, Cmub, *is shown on that map as the upper member of the Metaline formation*

Cmmg, Cmmd, Cmmu — Middle member
Three stratigraphic units and a metamorphic unit of interminate stratigraphic postion:
Cmmg, *the upper and lower units, massive light-gray dolomite.*
Cmmd, *the middle unit, medium-bedded dolomite with alternating light- and dark-gray layers.*
Cmmu, *a coarse-grained light-gray to white dolomite marble representing thermally metamorphosed dolomite of indeterminate position within the middle member of the Metaline formation*

Cmll — Lower member
Fine-grained indistinctly bedded dark-gray limestone with interbeds of limy phyllite in the lower part of the unit

Maiden phyllite

Cmp — Phyllite and schist
Gray to greenish-gray quartz-muscovite-chlorite phyllites that grade southward towards the Spirit pluton through quartz-biotite-muscovite schists and quartz-biotite-andalusite schists into quartz-biotite-sillimanite schists. Contains some limy phyllite and a few thin limestone units, ls

Cmpl — Limestone
Medium-bedded medium-grained white to light-gray limestone

Gypsy quartzite

Cgp — Phyllite and phyllitic quartzite
Gray to greenish-gray phyllite containing thin phyllitic quartzite layers and lenses. Included under Maiden phyllite on Leadpoint quadrangle (Yates and Robertson, 1958)

Cgpq — Quartzite and phyllitic quartzite
Thin-bedded medium-grained dark-gray to greenish-gray quartzite containing interbeds of phyllitic quartzite. Northwest of Deep Lake, unit contains a thin limestone layer, ls, *at top. This unit included under Maiden phyllite on Leadpoint quadrangle (Yates and Robertson, 1958)*

Cgq — Quartzite
Thick- to thin-bedded medium- to coarse-grained white to light-gray vitreous quartzite

PRECAMBRIAN (?)

ROCKS SOUTH OF THE SPIRIT PLUTON (EXCEPT THOSE SHOWN TO RIGHT)

The age sequence indicated below assumes that the section is not overturned

pCb_3, pCl, pCb_2, pChs, pCq, pCb_1

Schist, limestone, quartzite, and hornblende schist
- pCb_3, *quartz-biotite-andalusite schist containing thin layers of impure quartzite and limestone near its upper limit.*
- pCl, *a thinly laminated light-gray siliceous limestone.*
- pCb_2, *thin-bedded quartz-biotite schist containing sparse andalusite.*
- pChs, *thin bedded dark greenish-black hornblende-plagioclase schist.*
- pCq, *massive to medium-bedded white quartzite.*
- pCb_1, *quartz-biotite schist containing a few thin limestone beds*

ROCKS IN SW¼ SEC. 27, T. 38 N., R. 41 E.

This rock assemblage is separated from that shown to the left by faults of unknown displacement. The relative ages of the two assemblages are unknown. The age sequence within this assemblage assumes that the section is not overturned

pCs, pCls, pCs, pCqz, pCls

Schist, limestone, and quartzite
- pCs, *medium-bedded fine-grained quartz-biotite-andalusite schist.*
- pCls, *medium-bedded light-gray limestone.*
- pCqz, *medium-bedded coarse-grained white to gray quartzite*

Contact
Dashed where approximately located, dotted where concealed

Indefinite contact

Fault, showing dip
Dashed where approximately located, dotted where concealed. U, *upthrown side;* D, *downthrown side*

Doubtful or probable fault

Anticline
Showing crest and direction of plunge of fold

Syncline
Showing trough of fold

Plunge of minor anticline

Plunge of fold axes

Horizontal fold axes

Strike and dip of beds

Strike and dip of overturned beds

Strike of vertical beds

Horizontal beds

Strike and dip of compositional layering and foliation

Strike and dip of foliation

Strike of vertical foliation

Strike and dip of cleavage

Strike and dip of joints

Strike of vertical joints

Strike and dip of lenticular inclusions in plutonic rocks

Strike of vertical lenticular inclusions in plutonic rocks

Dike, showing dip

Vertical dike

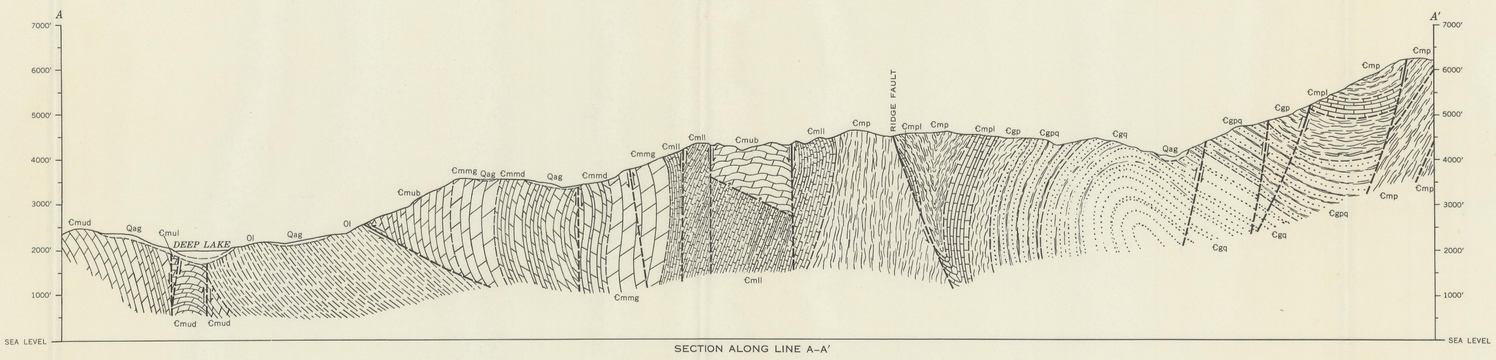
Compositional streaking, showing dip

Vertical compositional streaking

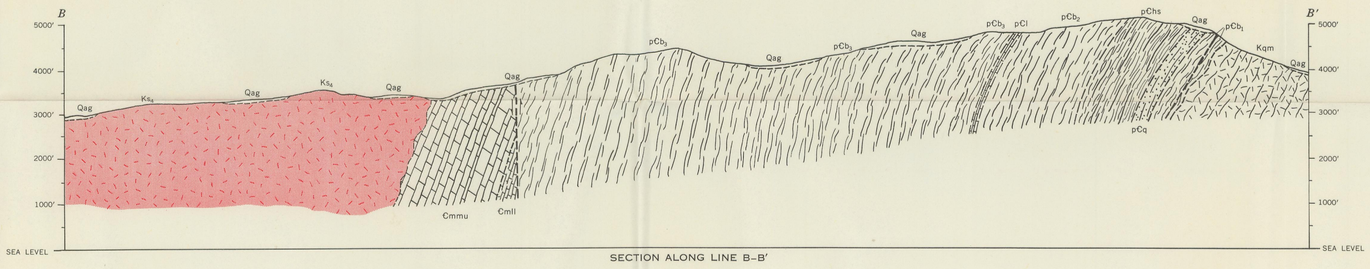
REFERENCES CITED

Park, C. F., Jr., and Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U. S. Geol. Survey Prof. Paper 202.
Yates, R. G., and Robertson, J. F., 1958, Preliminary geologic map of the Leadpoint quadrangle, Stevens County, Washington: U. S. Geol. Survey Field Studies Map MF-137.

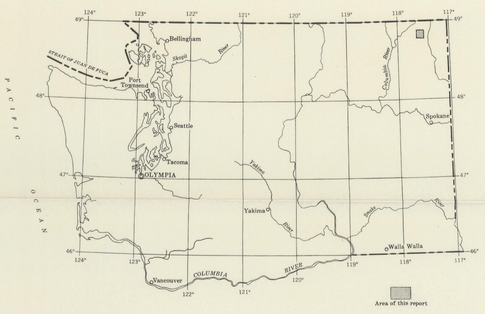
APPROXIMATE MEAN DECLINATION, 1960



SECTION ALONG LINE A–A'



SECTION ALONG LINE B–B'



INDEX MAP OF WASHINGTON

PRELIMINARY GEOLOGIC MAP OF THE DEEP LAKE QUADRANGLE, STEVENS AND PEND OREILLE COUNTIES, WASHINGTON

By
R. G. Yates and A. E. Ford

SCALE 1:24 000

1 ½ 0 1 MILE

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

1960

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For sale by U. S. Geological Survey, price 50 cents