

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
BERT L. COLE, Commissioner of Public Lands
RALPH A. BESWICK, Supervisor

DIVISION OF GEOLOGY AND EARTH RESOURCES
VAUGHN E. LIVINGSTON, JR., State Geologist

GEOLOGIC MAP GM-23

GEOLOGIC MAP OF THE
MARBLEMOUNT QUADRANGLE, WASHINGTON

By

PETER MISCH

Prepared in cooperation with
UNITED STATES GEOLOGICAL SURVEY



1979

For sale by Department of Natural Resources, Olympia, Washington
Price \$4.00



QUATERNARY DEPOSITS

- Talus
- Neoglacial moraines; in places continuous with talus (Qt) upslope
- Landslides
- Quaternary deposits, undifferentiated

TERTIARY (PLUS LATEST CRETACEOUS) STRATA

- Conglomerate-horrelts on Mount Despair; presumably post-Chuckanut and related to Tertiary Hannegean Volcanics
- Chuckanut Formation, latest Cretaceous and Paleocene; continental arkoses with polymict conglomerates and minor shales (molasse)

TERTIARY INTRUSIVE ROCKS

- Granitoid rocks of Chilliwack Composite Batholith, Eocene through Miocene; quartz diorites and granodiorites, minor diorites and quartz monzonites; Td, locally differentiated dikes in the batholith

BELOW SHUKSAN THRUST

- Chilliwack Group, late Paleozoic
- Where subdivided:
 - Metadacite (porphyroid)
 - Metabasic greenstones
 - Metavolcanic rocks general
 - Chert
 - Slate to phyllite, in part with metagraywackes

SHUKSAN METAMORPHIC SUITE

- Shuksan Greenschist, metabasaltic; actinolitic greenschists with intercalations of blueschists
- Darrington Phyllite; quartz phyllites, albite in part, commonly graphitic

PRE-TERTIARY ROCKS

- Metamorphosed Supracrustal Rocks
Cascade River Schist *s. str.*
- Low-grade schists (greenschist facies): phyllitic schists, highly quartzose in part, graphitic in places; albite phyllites, leucogreenschists, some greenschists, actinolitic in parts of biotite zone
- Thick leucogreenschist derived from graywacke unit
- Conglomeratic beds within lgs
- Various phyllitic schists
- Greenschist
- Medium-grade Cascade River Schist (narrow belt of albite-epidote amphibolite facies at western boundary, main part in oligoclase to sodic andesine-epidote amphibolite facies); micaschists (s) ranging from highly quartzose to fairly basic; amphibolites (a); minor bands of marble, calc-silicate rocks, gurbenschiefer, etc.

SKAGIT METAMORPHIC SUITE

- Cascade River Schist and associated intrusive rocks
- Metagabbro, low-grade
- Talc schist, low- and medium-grade
- Forsterite-bearing metaperidotites; with omphacite at low-grade, with talc at medium-grade
- Alma Creek Leucotrochilite, very weakly gneissose, incidentally adjusted to regional metamorphic facies, intruded at end of Skagit metamorphic cycle
- Haystack Creek Leucotrochilite Orthogneiss; intruded during late stage of Skagit metamorphic cycle
- Marble Creek Trondhjemite Orthogneiss with quartz diorite (to locally dioritic) and granodiorite varieties; intruded prior to or at early stage of Skagit metamorphic cycle
- Quartz dioritic orthogneisses in injection zone north of main body of Marble Creek pluton
- Injection gneiss northeast of Little Devil Peak
- Orthogneiss not subdivided, mostly trondhjemite and quartz dioritic (to locally dioritic)
- Marblemount Meta Quartz Diorite, gneissose to massive, intruded prior to Skagit cycle (x220, zircon age); low-grade
- Metatrandhjemite associated with Marblemount; leucocratic, gneissose, low-grade

SKAGIT GNEISS

- Predominantly leucocratic gneisses, not subdivided; mainly of quartz dioritic and trondhjemite overall compositions, locally dioritic, etc.
- Skagit Gneiss *s. str.* in large part is migmatitic and commonly banded, with subordinate to minor remnants of biotite schists, amphibolites, etc.; it also contains concordant bodies of orthogneisses (quartz-dioritic, subordinately dioritic, on minor scales granodioritic, etc.)
- Pegmatite concentration in leucocratic Skagit Gneiss
- Zones rich in biotite schist(s) and/or amphibolite(s) within Skagit Gneiss, incidentally to moderately migmatized and commonly banded (bdg-banded gneiss); with minor layers of calc-silicate rocks, quartzitic schist, etc.
- Moderately strongly migmatized banded gneiss locally differentiated

CONTACTS AND STRUCTURAL SYMBOLS

- contacts; dashed where approximately located; queried where inferred; dotted where concealed
- sheared-off (detached) contacts, pre-Tertiary
- other contacts modified by pre-Tertiary faulting
- thrust fault, Cretaceous
- high-angle faults, Tertiary; U and D designate upthrow and downthrow; arrows indicate strike-slip displacement
- large fractures and fracture zones with no or little displacement; Tertiary; intruded in places by dikes (andesite, etc.) locally noted as Td
- strike and dip of beds
- vertical beds
- strike and dip of foliation, schistosity (cleavage in some Chilliwack Group rocks)
- vertical foliation or schistosity
- general trend of foliation
- cleavage where parallel to bedding (shown in Chilliwack Group rocks only)
- bearing and plunge of lineation
- bearing and plunge of minor folds
- axial trend and plunge of anticlines and synclines (stratigraphically verified)
- axial trend and plunge of antiforms and synforms
- vergence (horizontal component of yielding) of folds
- important outcrops too small to map at map scale

Base from U.S. Geological Survey 1:62,500, 1953 10,000-foot grid based on Washington coordinate system, north zone



SCALE 1:48,000

CONTOUR INTERVAL 80 FEET WITH SUPPLEMENTARY CONTOURS AT 40-FOOT INTERVALS DATUM IS MEAN SEA LEVEL



Geologic mapping, 1949-1967, including reconnaissance and detailed mapping. Area between Boulder Creek and Cascade River after Bryant, 1959.

GEOLOGIC MAP OF THE MARBLEMOUNT QUADRANGLE, WASHINGTON

By
Peter Misch
1979