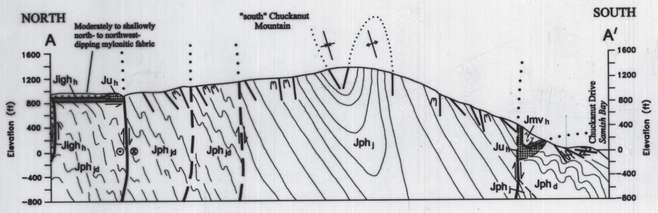
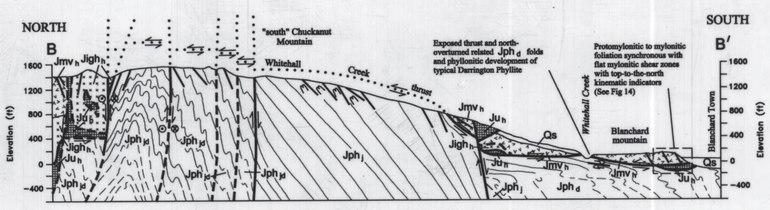
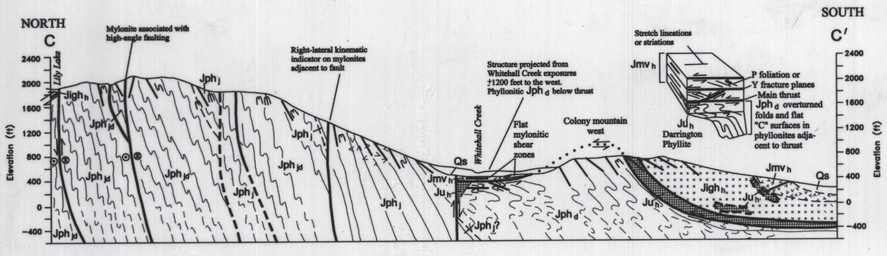
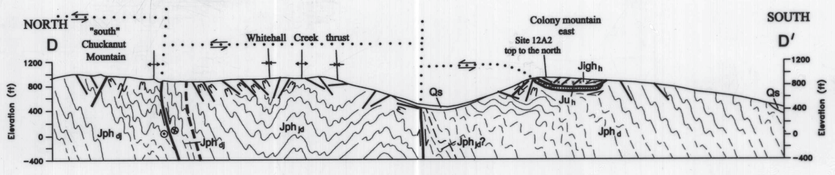
WASHINGTON DIVISION OF GEOLOGY AND EARTH RESOURCES
Raymond Lasmanis, State Geologist
PLATE 3
OPEN FILE REPORT 98-5
GEOLOGIC MAP AND INTERPRETED GEOLOGIC HISTORY OF THE BOW AND ALGER 7.5-MINUTE QUADRANGLES, WESTERN SKAGIT COUNTY, WASHINGTON

Diagrammatic Cross Sections









Structural Explanation for Cross-sections A-A′, B-B′, C-C′, and D-D′

Contacts

Contact; dashed where inferred

Folds

Minor overturned asymmetric (S- and Z-shaped) shallowly east- or west-trending folds of mostly phyllonitized Darrington Phyllite directly under the Whitehall Creek thrust; vergence sense not implied

Minor upright shallowly east- or west-trending small-scale M-, Z-, or S-shaped (undivided) F2 or "F3" folds of the same generation as L2 or L3 microfolds (crenulations); see figure 12 for a discussion of "F3" folds

Major upright "F3" synform

Major upright "F3" antiform

Foliations

Dip of foliation (non-apparent); some data projected from off section. (Except directly under the Whitehall Creek thrust, the S1 foliation in the Easton Metamorphic Suite is syn-metamorphic and predates mylonitization near the Whitehall Creek thrust; foliation in the Helena-Haystack melange is late- to post-metamorphic and protomylonitic to mylonitic.)

Trace of the S1 cleavage in the Darrington Phyllite and semischist of Mount Josephine; dashed where inferred. (F2 and "F3" parasitic fold style of S1 cleavage is generalized; mylonitized fabric directly under the Whitehall Creek thrust is subparallel to the thrust and is locally shown schematically.)

S2 axial plane orientation of asymmetric F2 folds; vergence sense not implied

S2 axial plane orientation of M-shaped F2 folds

Faults

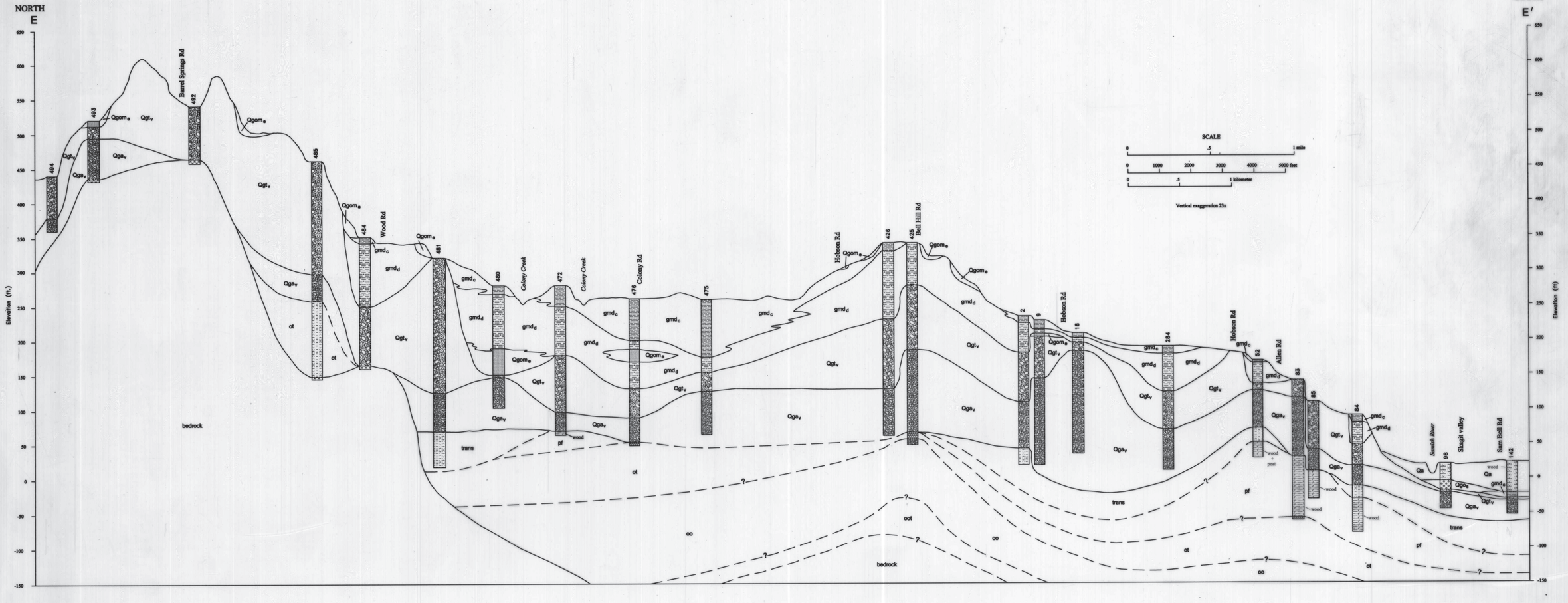
Dip-slip fault; arrows indicate relative motion

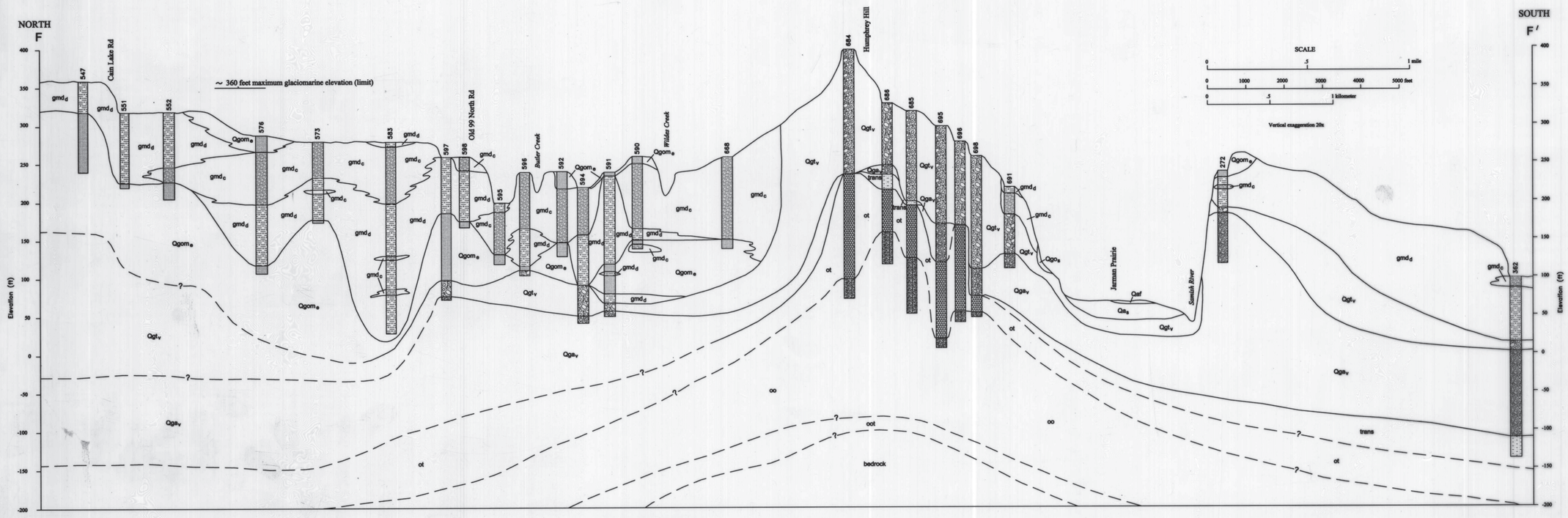
Strike-slip fault; circled dot indicates relative motion toward the viewer

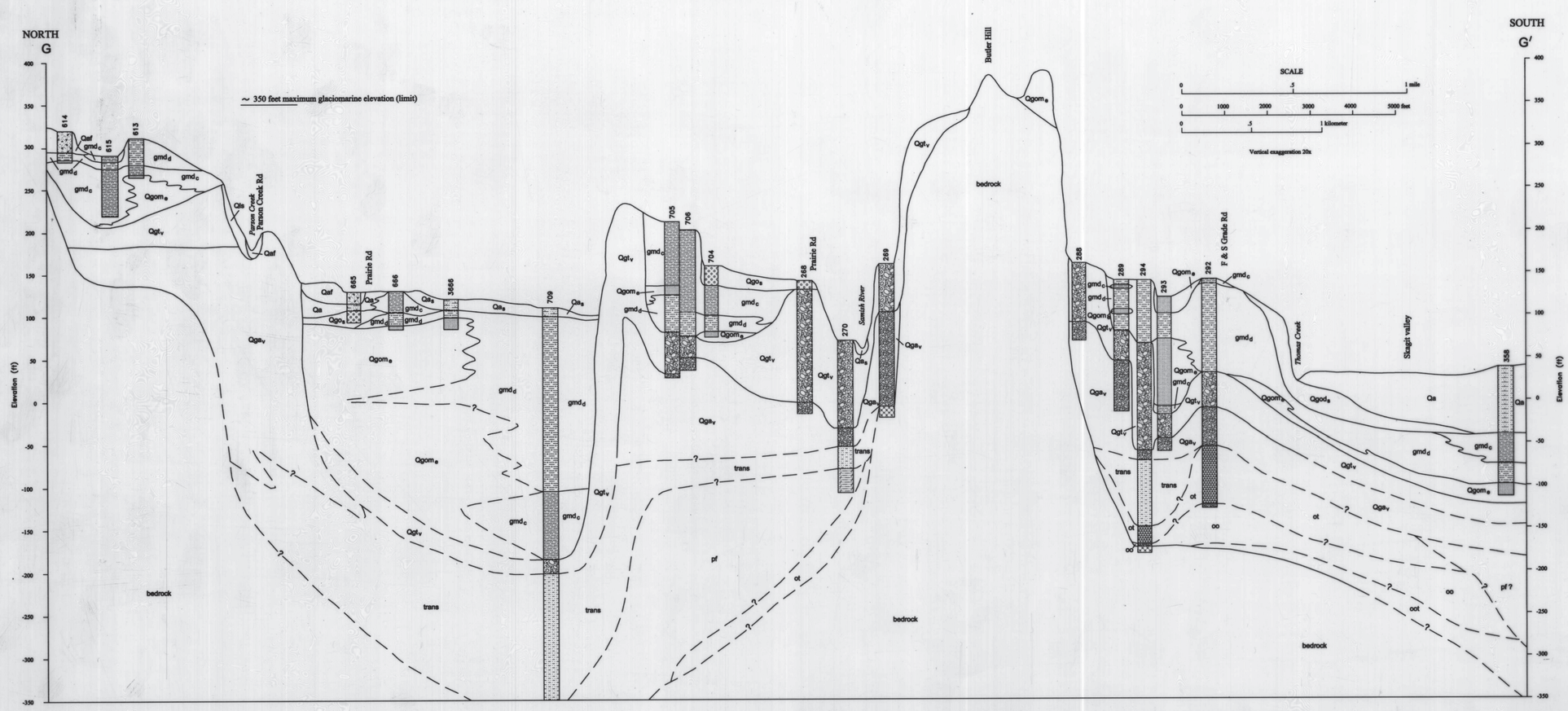
High-angle faults; those showing both symbols above display kinematic and (or) map-pattern evidence for both dip- and strike-slip motion.

Whitehall Creek thrust fault (informal name); dashed where inferred; dots show projection above present erosional level

SCALE
0 .5 1 mile
0 1000 2000 3000 4000 5000 feet
0 .5 1 kilometer
No vertical exaggeration







Explanation of symbols for cross sections E-E′, F-F′, and G-G′.

Vertical numbers above water-well and geotechnical boring strip logs provide reference number (this study)

Unit symbols beginning with Q (for example, Qgo_s) are described on Plate 2. See Appendix 3 for further descriptions of the informally designated subsurface geologic units such as "trans".

Unit $Qgom_e$ sub-units

gmd_c — Fine sediment, mostly soft to very soft clay, silty clay and clayey silt with rare or no gravel (dropstones) and lesser sand and silt interbeds

gmd_d — Diamicton, mostly composed of soft to very soft silty, sandy clay with scattered gravel

Subsurface units (not observed in surface exposures in the study area)

trans — Transitional beds; fine sediment (generally silt and clay) similar to the "transitional beds" that Pessl and others (1989) observed in outcrops directly south of the study area (Appendix 2); represent early Vashon Stade and (or) late Olympia nonglacial sediments

pf — Pre-Fraser interglacial sediment; dominantly fine sediment (generally silt and clay) commonly containing wood and peat with lesser gravelly sand and gravelly clay; underlies units Qga_v or trans; correlated with the Olympia nonglacial sediments of Armstrong and others (1965) and Easterbrook (1969)

ot — Older till; pre-Fraser glacial diamicton representing till and (or) glaciomarine clayey gravel diamicts; tentatively correlated with the Possession Drift of Easterbrook and others (1967) and Easterbrook (1994)

oo — Older outwash; pre-Fraser glacial or nonglacial sediments mostly composed of sand and gravel with lesser clay or silt interbeds; tentatively correlated with outwash deposits of the Possession Drift of Easterbrook and others (1967) and Easterbrook (1994); alternatively, may be correlated with fluvial nonglacial deposits of the Whidbey Formation of Easterbrook (1994)

oot — Older older till; rarely penetrated pre-Fraser probably glacial sediments mostly composed of diamicton and gravel; possible correlations include lower Possession Drift of Easterbrook and others (1967), fluvial nonglacial deposits of the Whidbey Formation, or (assuming unit oo is intraglacial deposits) the Double Bluff drift as described by Easterbrook (1994).

WASHINGTON STATE DEPARTMENT OF Natural Resources
Jennifer M. Belcher - Commissioner of Public Lands

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