STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
DONALD A. HULL, STATE GEOLOGIST

Reconnaissance Geologic Map of the Willamette Pass Area, Oregon

PLATE I

Map prepared by
STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

SCALE 1:62500

EXPLANATION

(Boundaries are approximate; statements are general; descriptions are based on hand specimen identification)

Qgf — Glaciofluvial deposits: Unconsolidated, locally stratified deposits of gravel, silt, cobbles, and boulders up to 5 m in diameter, with lenses of varved silts and clays where glacial deposits predominate. Forms flat-lying to hummocky deposits on floors of stream valleys. Includes undifferentiated alluvial, terminal moraine, and glacial outwash deposits. Approximate equivalent to Qal (alluvium) of Wells and Peck (1961) and Qal (alluvium) of Peck and others (1964)

Qls — Landslide deposits: Unconsolidated blocks of bed rock and debris moved downslope via debris flow and slumping from undercutting by stream action. Material size ranges from silt- and clay-size particles to blocks 250 m in longest dimension. Prominent scarps are normally present at heads of slides.

QTdh — Basalts of High Prairie: Upper Pliocene or Pleistocene (?), medium-gray, diktytaxitic, glomeroporphyritic, olivine-bearing basaltic flows, with euhedral to subhedral plagioclase phenocrysts. Overlies Pliocene to Miocene (?) stream gravels as series of intracanyon flows in canyon of North Fork of Middle Fork of Willamette River north of city of Oakridge. Mapped separately from unit *Tpv* on basis of stratigraphic position. Flat areas tend to be blanketed by thick, brick-red, saprolitic soil. Source is thought to be large shield and composite volcanoes of the High Cascades platform east of the study area. Partially equivalent to Qv (volcanic rocks of the High Cascades) of Callaghan and Buddington (1938), Qb (basalts and andesites) of Wells and Peck (1961), and Qtv (volcanic rocks of the High Cascades . . . undivided) of Peck and others (1964)

Tpv — Pliocene volcanic rocks: Lower to middle Pliocene, medium- to light-gray, diktytaxitic, glomeroporphyritic to aphyric, olivine-bearing basaltic and andesitic flows, with euhedral to subhedral plagioclase phenocrysts. Includes interflow pyroclastic and epiclastic rocks. Caps ridges east of Middle Fork of Willamette River. East of longitude 122°15' W., occurs as dominant rock type and is mantled with glacial moraine and outwash deposits. Major source thought to be large shield and composite volcanoes east of study area. Unit is defined on basis of lithology and stratigraphic position and includes all similar rocks of Pliocene age and possibly some of lower Pleistocene age on the eastern portion of the map area (unit *QTbh* excluded). Partially equivalent to Qv (volcanic rocks of the High Cascades) of Callaghan and Buddington (1938), QTba (basalts and andesites) of Wells and Peck (1961), and QTv (volcanic rocks of the High Cascades . . . undivided) of Peck and others (1964)

Tpd — Pliocene (?) dacitic rocks: Upper Miocene or lower Pliocene (?), medium- to light-gray, diktytaxitic, fine-grained, quartz- and hypersthene-bearing dacitic flows and plugs. Found as limited outcrops directly underlying unit *Tpv*. Partially equivalent to Qv (volcanic rocks of the High Cascades) of Callaghan and Buddington (1938), QTba (basalts and andesites) of Wells and Peck (1961), and QTv (volcanic rocks of the High Cascades . . . undivided) of Peck and others (1964)

Tmv — Miocene volcanic rocks: Miocene basaltic, andesitic, and dacitic lava flows and autobreccias and, to a lesser extent, tuffs, lapilli tuffs, ash flows, mudflows, and debris flows. Dark-gray to black, dense, porphyritic, two-pyroxene andesites with large plagioclase phenocrysts predominate, but aphyric basaltic rocks are also common. Mafic minerals are generally altered to green clay minerals, with degree of alteration increasing toward base of unit. Flow contacts are readily identified in outcrop, and several unconformities are present within unit. Caps ridges west of Hills Creek Reservoir. Limited outcrops underlie unit *Tpv* east of Middle Fork of Willamette River. Unit is defined on basis of lithology, stratigraphic position, and K/Ar dates and includes all similar rocks of Miocene age (units *Tms* and *Tmd* excluded). Partially equivalent to Ta (volcanic rocks of Western Cascades) of Callaghan and Buddington (1938). Approximate time-stratigraphic equivalents of Tmua (andesite and basalt) of Wells and Peck (1961) and Tsa (Sardine Formation andesite) of Peck and others (1964)

Tmd — Miocene dioritic rocks: Middle (?) Miocene, light-gray, aphanitic, equigranular, quartz-bearing diorite; crops out locally in Salt Creek drainage only, intruding flows of upper *Tov* unit. Approximately equivalent to Ti (intrusive igneous rocks) of Callaghan and Buddington (1938) and Tg (granodiorite) of Peck and others (1964)

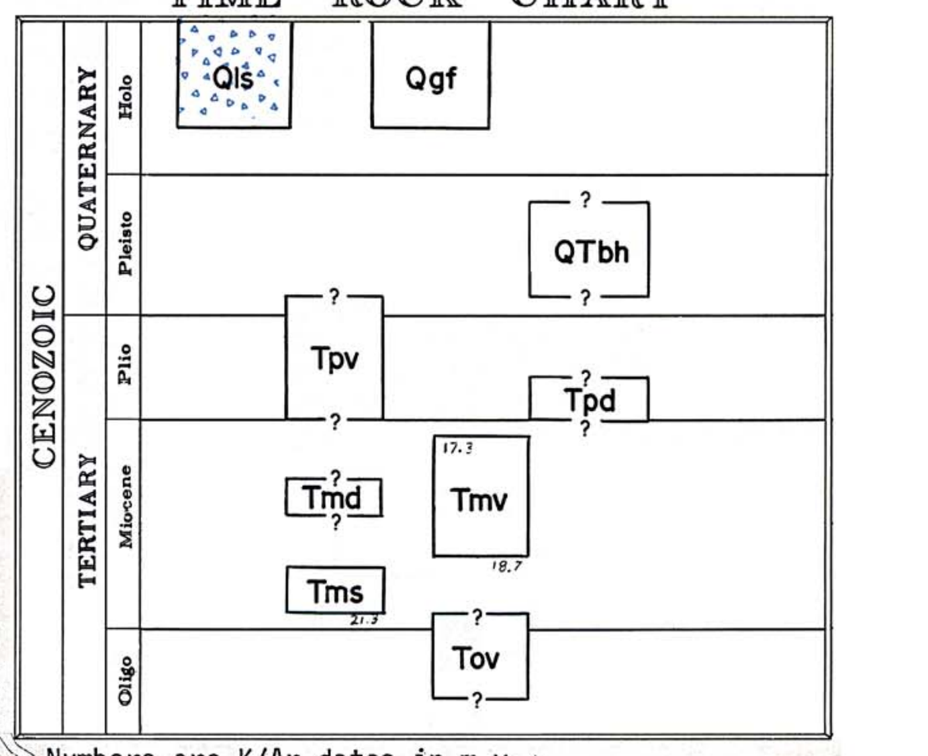
Tms — Miocene silicic rocks: Lower Miocene, light-gray to red, flow-banded, aphyric to porphyritic, sanidine- to quartz-bearing rhyodacitic and dacitic flows and plugs. Occurs as dominant rock type in Eagle Butte and Dead Mountain areas and locally elsewhere throughout entire study area. Unit is defined on basis of lithology, K/Ar dates, and stratigraphic position. Partially equivalent to Ta (volcanic rocks of the Western Cascades) of Callaghan and Buddington (1938), lower part of Tmva (andesite and basalt) and upper part of Tmop (pyroclastic rocks) of Wells and Peck (1961), and upper part of Tlt (Little Butte Volcanic Series tuff) of Peck and others (1964)

Tov — Oligocene (?) volcanic rocks: Oligocene (?) lithic tuffs, lapilli tuffs, rock-fragment-rich laharic tuffs, volcanic breccias, and epiclastic rocks, and, to a lesser extent, black, dense, basaltic and andesitic autobreccias and flows. Pyroclastic rocks are generally highly sheared and massive in outcrop and altered to contain green, greenish-brown, and light-green low-grade metamorphic minerals. Lava flows are generally highly altered, with mafic minerals wholly altered to green and white clay minerals. Margins of flows are obscured in outcrop by numerous shear zones filled with clay, calcite, and green to white quartz and chalcedony. Unit is easily discernible from unit *Tmv* in outcrop on basis of lithology, relative degree of alteration, and shearing. Occurs as dominant rock type throughout western portion of study area. Unit is defined on basis of lithology and stratigraphic position and includes all similar rocks lying below unit *Tmv*. Partially equivalent to Ta (volcanic rocks of the Western Cascades) of Callaghan and Buddington (1938). Approximate time-stratigraphic equivalent to Tmop (pyroclastic rocks) of Wells and Peck (1961) and Tlt (Little Butte Volcanic Series tuffs) of Peck and others (1964)

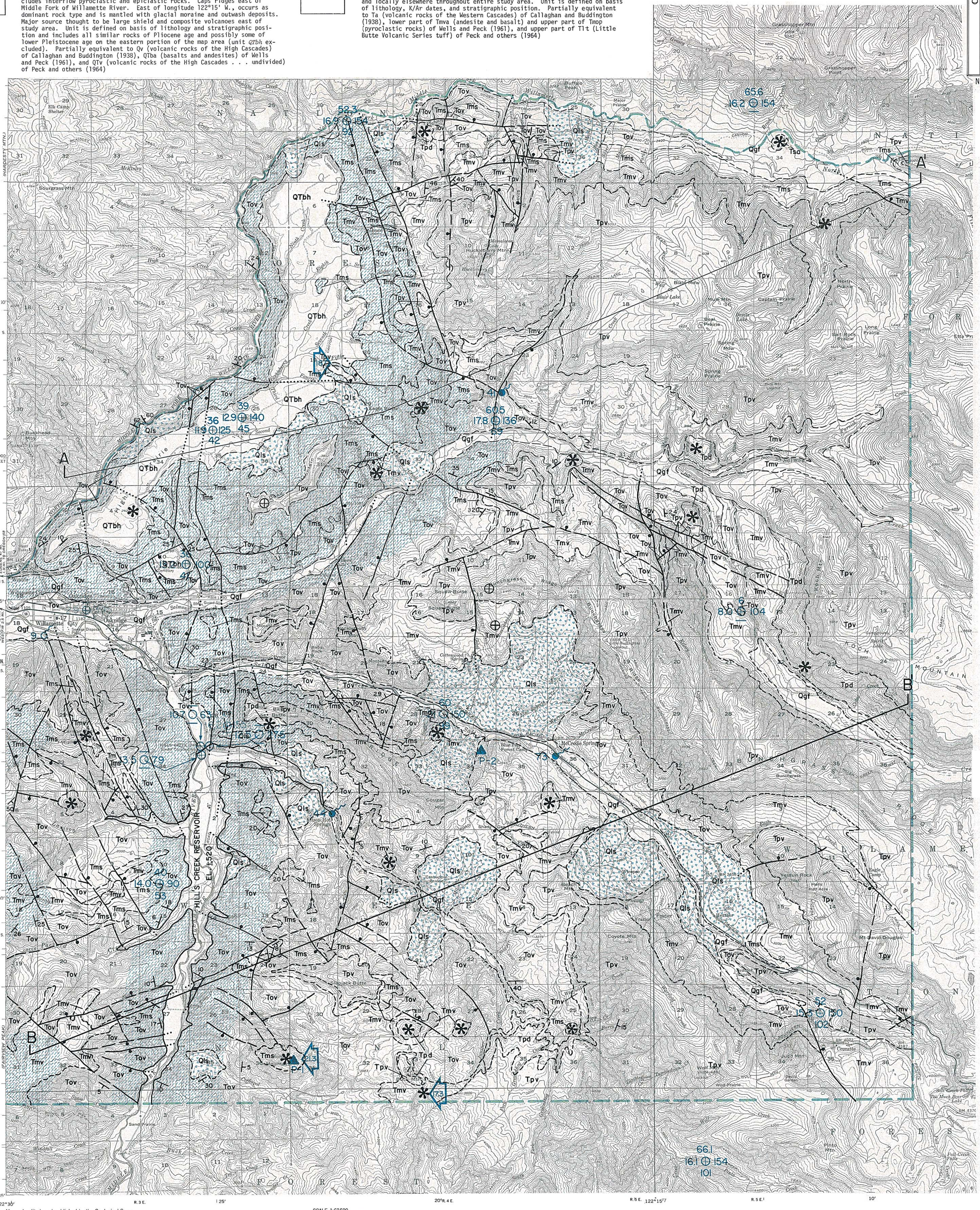
GEOLOGIC SYMBOLS

- Contacts - All contacts for this study are approximately located and based on reconnaissance mapping only
- Normal fault - Solid where exposed, dashed where inferred, dotted where concealed, ball and bar on downdropped side
- Syncline - Dashed where inferred
- Strike and dip of beds
- ⊕ Flat-lying beds
- * Volcanic center - Includes volcanic pipes, necks, plugs, and shield volcanoes
- Areas of general rock alteration - Areas of propylitic to argillic alteration. Alteration suite includes deposits of one or more of the following: quartz, chalcedony, limonite, pyrite, barite, hematite, specularite, pyrrhotite, and clay minerals

TIME ROCK CHART



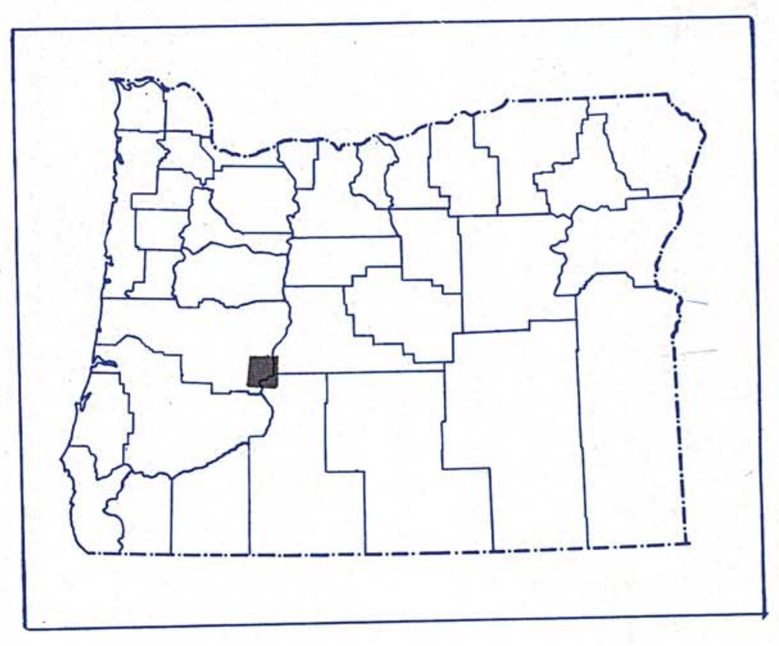
Numbers are K/Ar dates in m.y.



- GRADIENT (°C/Km^{-1})
- DEPTH PROBED
- HOLE LOCATION
- HEAT FLOW (mWm^{-2})
- BOTTOM HOLE TEMP. (°C)

(Example: 80 / 22.1 ⊕ 150 / 83)

- 86 THERMAL SPRING — WATER TEMP. (°C)
- 12 COLD SPRING — WATER TEMP. (°C)
- 79 K/Ar AGE—DATE LOCATION
- P-29 ROCK CHEMISTRY LOCATION WITH TEXT REFERENCE



SECTIONIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

GEOMORPHIC DIVISION OF OREGON (MODIFIED FROM DICKEN 1950)

Mapped, edited, and published by the Geological Survey
Control by USGS, USC&GS, USCE, and State of Oregon
Topography from aerial photographs by multiplex methods
Aerial photographs taken 1954. Field check 1956
Polyconic projection. 1927 North American datum
10,000-foot grid based on Oregon coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 10, shown in blue
Red tint indicates areas in which only landmark buildings are shown
Dashed land lines indicate approximate locations
Unchecked elevations are shown in brown

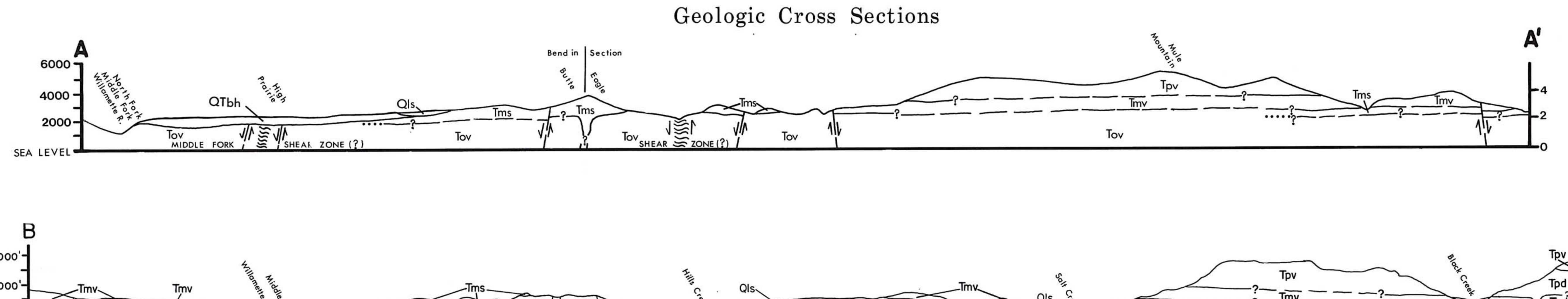
TRUE NORTH / MAGNETIC NORTH 20°
APPROXIMATE MEAN DECLINATION, 1956

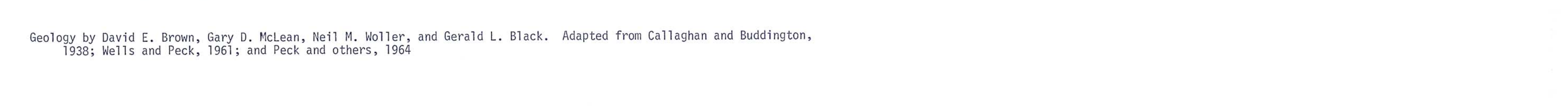
SCALE 1:62500
1 0 1 2 3 4 MILES
3000 0 3000 6000 9000 12000 15000 18000 21000 FEET
1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 80 FEET
DATUM IS MEAN SEA LEVEL

OREGON
QUADRANGLE LOCATION

Geologic Cross Sections





Geology by David E. Brown, Gary D. McLean, Neil M. Woller, and Gerald L. Black. Adapted from Callaghan and Buddington, 1938; Wells and Peck, 1961; and Peck and others, 1964