OPEN-FILE REPORT O-92-15
PRELIMINARY GEOLOGIC MAP OF THE WRANGLE BUTTE QUADRANGLE
MALHEUR COUNTY, OREGON
1992
BY MARK L. FERNS

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

WRANGLE BUTTE QUADRANGLE
OREGON—MALHEUR CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1971. Field checked 1972

Projection and 10,000-foot grid ticks: Oregon coordinate system, south zone (Lambert conformal conic)
1000-metre Universal Transverse Mercator grid ticks, zone 11, shown in blue. 1927 North American datum

UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS

OREGON DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES

Field work conducted 1991

Funded jointly by the Oregon Department of Geology and Mineral Industries, the Oregon State Lottery, and the U. S. Geological Survey COGEOMAP Program.

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route U. S. Route State Route

WRANGLE BUTTE, OREG.
N4300—W11745/7.5

1972

AMS 2470 III SE—SERIES V892

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PRELIMINARY GEOLOGIC MAP OF THE WRANGLE BUTTE QUADRANGLE MALHEUR COUNTY, OREGON

By M. L. Ferns
Oregon Department of Geology and Mineral Industries

1992

Field work conducted in 1991
Map Scale: 1:24,000

Funding Statement: Funded jointly by the Oregon Department of Geology and Mineral Industries, the Oregon State Lottery, and the U. S. Geological Survey COGEOMAP Program as part of a cooperative effort to map the west half of the 1^{O} by 2^{O} Boise sheet, eastern Oregon.

Wrangle Butte

Late Miocene sediments and tuffs make up unit Tscb, the oldest known unit exposed in the Wrangle Butte quadrangle. The section includes the distal end of the Devine Canyon Tuff, whose 9.2 Ma date corresponds well with the Late Clarendonian - Early Hemphillian age assignment made by C. A. Repenning (unpublished data, 1987) on vertebrate fossils from this unit. The unit extends southward and is considered correlative with the Rome Beds. Nodules of Magadi-type chert (snake agate) at Ryegrass Creek indicate a potential for bedded zeolite and fluorine deposits similar to those found in the Rome Beds.

Much of the quadrangle is covered by olivine basalt flows; including the quartz tholeiites of unit Tbwb and the diktytaxitic, high-alumina flows of unit QTb. The bench east of Chanis Rock is occupied by a single olivine basalt flow (Qbcr) which is locally mantled by fluviatile sands and gravels that contain well-rounded pebbles and cobbles of chert, quartzite, and granitic rock. Presumably the Qbcr flow was erupted during early carving of the present-day Owyhee Canyon. The basalt flows from the Saddle Butte Lava Flow (Qbsb) were erupted later, and flowed down into a more deeply incised canyon.

WRANGLE BUTTE

Qp — Playa lake deposits (Quaternary) Thin accumulations of white tuffaceous silt deposited in ephemeral lake beds. May include small evaporite deposits.

Qc — Colluvial deposits (Quaternary) Slope covering deposits of angular blocks of basalt from unit QTb.

Qls — Landslides (Quaternary) Landslide and skree deposits consisting of basalt from unit Qbcr. Main landslide areas denoted by rotated slump blocks along rim of Owyhee River Canyon.

Qbsb — Basalt of Saddle Butte (Quaternary) Dark grayish-blue diktytaxitic olivine basalt flows with well preserved primary volcanic structures such as tumuli, pahoehoe surfaces, and collapse structures forming the Saddle Butte Lava Field. Flow top features partially mantled by soil and wind-blown silts. Lava field contains several segments of lava tubes southeast of the quadrangle boundary (Ciesiel and Wagner, 1969). Chemically a high alumina basalt (Analyses 1, Table 1, Wrangle Butte quadrangle). Equivalent to unit Qlb of Walker and Repenning (1966). Age based on K/Ar determination of 0.43+0.09 Ma reported by Hart and Mertzman (1982).

Qs — Unconsolidated to semiconsolidated fluvial deposits (Quaternary) Includes sand, gravel, and poorly consolidated tuffaceous siltstones. Gravel clasts are well rounded and include volcanic and plutonic rock, white vein quartz, and highly polished chert and quartzite pebbles, cobbles, and small boulders. Equivalent to unit QTc of Evans (1991) and Qs of Walker and Repenning (1966).

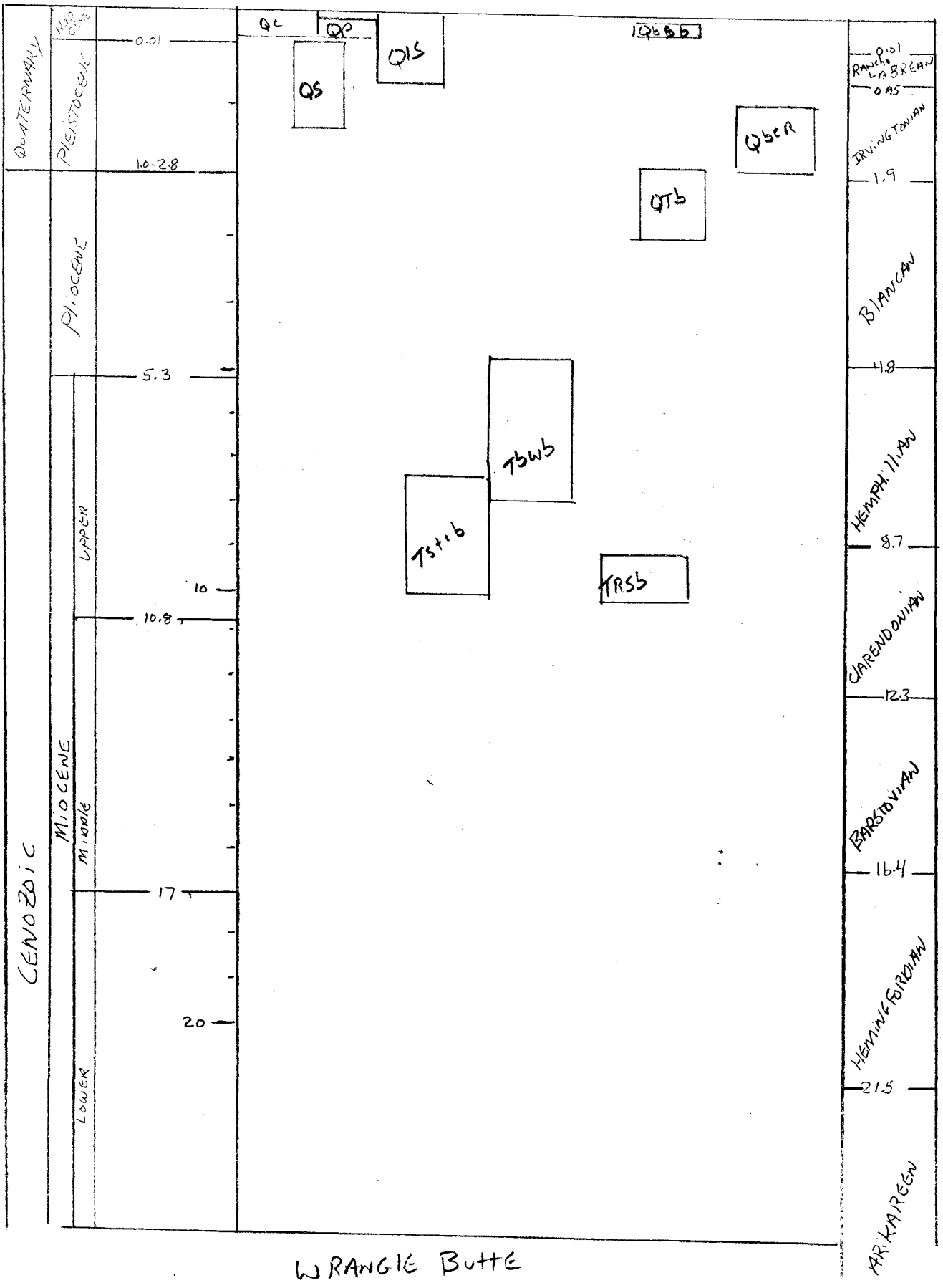
Qbcr — Basalt of Chanis Rock (Pleistocene) A single flow of dark bluish-gray olivine basalt flow mantled by fluviatile sands. Aphyric and holocrystalline, with ophitic clinopyroxene and intragranular olivine crystals in plagioclase lathes. Chemically a high-alumina basalt (Analyses 2, Table 1). Equivalent to unit Qb of Walker and Repenning (1966).

QTb — Olivine basalt (Pliocene?) Gray and grayish-black diktytaxitic olivine basalt flows with well preserved flow tops. Locally heavily mantled by windblown silt. Includes holocrystalline basalts with less than 2% olivine phenocrysts as large as 3mm in diameter in a groundmass of interlocking plagioclase lathes and subophitic clinopyroxene which are chemically high alumina basalts (Analyses 1, Table 1, Mustang Butte quadrangle). Equivalent to unit Qb of Walker (1977).

Tbwb Olivine basalt flows of Wrangle Butte (Pliocene and Late Miocene?) Bluish and grayish-black, olivine basalt flows and interbedded palagonitic breccias. Includes hyalophitic pillow basalts with 2 mm diameter olivine and plagioclase phenocrysts with ophitic and subophitic clinopyroxene. Chemically, includes quartz tholeiites (Sample, Table 1, Wrangle Butte quadrangle). Equivalent to part of unit Tb of Evans (1991) and QTb of Walker (1977).

Tstcb Tuffaceous siltstones, sandstones, and ashflow tuff (Late Miocene) Mainly pale yellowish-white to white, tuffaceous silt- and sandstones. Includes tuffaceous siltstones at Ryegrass Creek which contain nodules of Magadi-type cherts (snake agate). Correlative with the Rome Beds and tentatively assigned a Late Clarendonian - Early Hemphillian age based on vertebrate fossils from east of Ryegrass Creek (C.A.. Repenning, unpub. data, 1987). Unit includes a thin vitric welded tuff in the Sacramento Butte quadrangle to the north which is correlated by Ferns (1992a) with the 9.2 Ma Devine Canyon Tuff (Greene, 1973). Unit has a maximum exposed thickness of 350 feet to east in Chalk Basin (Evans, 1991). Equivalent to unit Ts of Evans (1991) and Walker (1977).

Trsb Grayish-white to pinkish white rhyolite (late Miocene?) Phyric, with about 15% plagioclase and sanidine phenocrysts up to 8 mm in diameter. Spherulitic with devitrified groundmass. Petrographic textures indicate possible ashflow tuff. Chemically a metaluminous rhyolite (Analyses Table 1). May be an areally restricted ashflow erupted from the rhyolite complex at Saddle Butte to the west. Equivalent to part of unit Tsv of Walker (1977).


CENOZOIC
QUATERNARY
PLEISTOCENE
PLIOCENE
MIOCENE
UPPER
MIDDLE
LOWER
0.01
1.0-2.8
5.3
10
10.8
17
20
Qc
QP
QLS
QS
QLSb
Qber
QTb
TSWb
TSTLb
TRSb
Pico
Rancho
La Brea
0.45
IRVINGTONIAN
1.9
BLANCAN
4.8
HEMPHILLIAN
8.7
CLARENDONIAN
12.3
BARSTOVIAN
16.4
HEMINGFORDIAN
21.5
ARIKAREEN
WRANGLE Butte

LAB #	Quadrangle	1/4	1/4	Sec.	T.(S.)	R.(E.)	Lithology	Unit	SIO2	AL203	TIO2	FE203	MNO	CAO	M60	K20	NA20	P205	LOI	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	NB	BA	LI
AZB-109	Wrangle Butte	SW	SW	23	28	40	Olivine basalt	Tbmb	48	14.6	2.21	13.8	0.22	10.3	7.11	0.39	2.36	0.44	0.85	259	41	120	73.4	118.	27	286	28	172	37	841	9.7
AZB-110	Wrangle Butte	NW	NE	5	29	40	Rhyolite	Trsb	74.8	12.6	0.08	1.04	0.05	1.33	0.41	4.54	4.4	0.06	1.08	-10	<5	<5	9.5	55.	248	-10	63	111	38	161	31.1
AZB-120	Wrangle Butte	NE	NW	36	29	40	Olivine basalt	Qbsb	46.6	15.7	0.83	10.4	0.17	13	9.24	0.21	2.36	0.15	1.7	264	39	147	90.8	66.	12	226	21	61	12	131	5.0
AZB-112	Wrangle Bute	SE	SW	24	28	40	Ashflow tuff	Tstcb	76.4	10.3	0.22	2.93	0.08	0.34	0.18	4.35	4.56	0.04	0.77	-10	<5	<5	11.1	220.	141	-10	188	1190	95	132	36.7
AZB-113	Wrangle Butte	SW	SW	31	28	41	Olivine basalt	Qbcr	48.2	16.2	0.98	11.2	0.18	11.5	8.98	0.29	2.48	0.14	0.23	265	44	151	84.5	77.	19	188	28	94	12	232	6.7

Ciesiel, R.F. and Wagner, N.S., 1969, Lava-tube caves in the Saddle Butte area of Malheur County, Oregon: Oregon Department of Geology and Mineral Industries, The Ore Bin, v. 31, no. 8, p. 153-171.

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Hart, W.K. and Mertzman, S.A., 1982, K-Ar ages of basalts from southcentral and southeastern Oregon: Isochron West, vol. 33, p. 23-26.

Walker, G.W., 1977, Geologic map of Oregon east of 121st meridian: U.S. Geological Survey Miscellaneous Investigations Map I-902, scale 1:500,000

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MAP SYMBOLS

Contact -- approximately located

Fault contact -- dashed where approximately located, dotted where concealed. Ball and bar on down throw side

Strike and dip of beds

Location of whole rock sample analyzed in Table 1