

STATE OF WASHINGTON

DEPARTMENT OF NATURAL RESOURCES

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DIVISION OF GEOLOGY AND EARTH RESOURCES

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**GEOLOGIC MAP GM-28**

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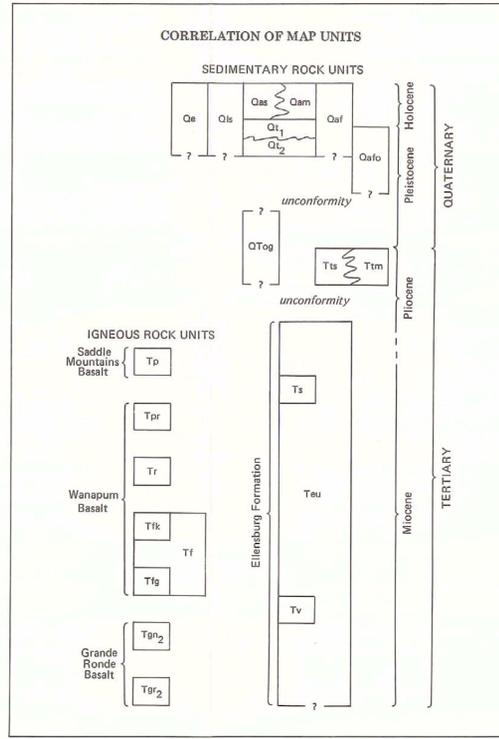
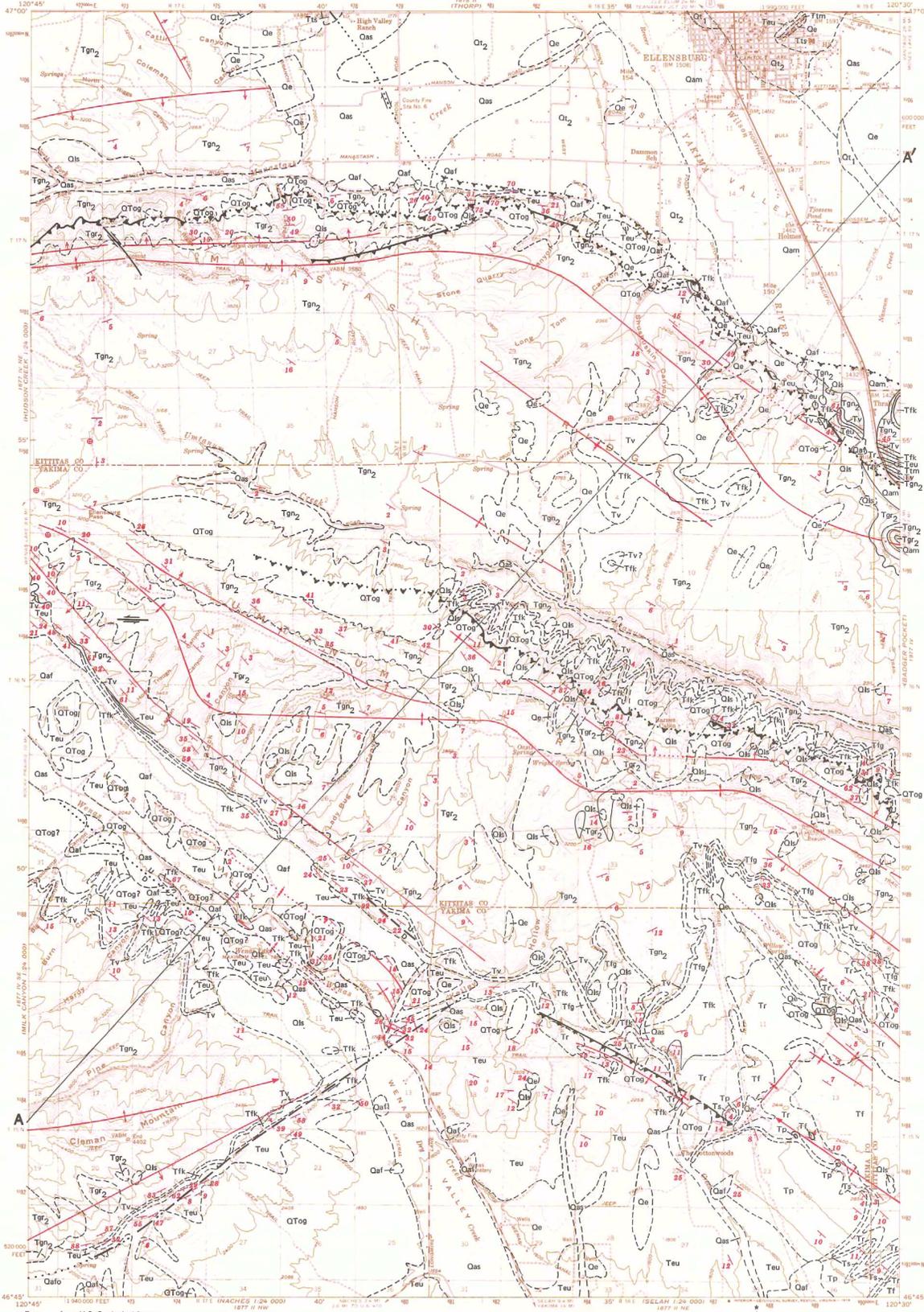
**GEOLOGIC MAP OF THE  
ELLENSBURG QUADRANGLE, WASHINGTON**

By

**R. D. BENTLEY AND NEWELL P. CAMPBELL**

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**ALLUVIUM, sidestream facies** — Stream deposits of silt, sand, and gravel dominantly of basaltic composition; largely confined to valley bottoms; may include local lacustrine, paludal, and eolian deposits in depressions deposited by tributaries of the Yakima River (sidestream facies of Wait, 1979)

**ALLUVIUM, mainstream facies** — Stream deposits of silt, sand, and gravel of mixed lithologies; largely confined to valley bottoms; may include local lacustrine, paludal, and eolian deposits in depressions; deposited directly by the Yakima River (mainstream facies of Wait, 1979)

**TERRACE DEPOSITS** — Stream deposits of silt, sand, and gravel of diverse composition; largely confined to the Yakima River drainage system; poorly indurated and moderately to slightly weathered clasts; divided into Q<sub>2</sub>, middle level, and into Q<sub>1</sub>, lower level

**ALLUVIAL FAN DEPOSITS** — Sand and gravel of diverse composition with basalt clasts dominant in larger sizes; cone shaped with little or no caliche development; surface relatively undivided

**LANDSLIDE DEPOSITS** — Clay, silt, sand, and gravel; unstratified and poorly sorted; surface often hummocky; deposited by rotational-translational slides and flows

**EOLIAN DEPOSITS** — Silt and fine sand; pale orange to brown; locally contains multiple caliche and tephra beds; includes the Palouse Formation and all younger loess

**OLDER ALLUVIAL FAN DEPOSITS** — Sand and gravel; semiconsolidated fanglomerate; primarily basalt clasts cemented by iron-stained clays; surface of fans frequently dissected and capped by well-developed caliche

**OLDER GRAVEL REMNANTS** — Coarse sand and gravel; alluvial fan and terrace remnants; dominantly basalt clasts; slightly to moderately weathered with local fine sand and silt lenses; associated with steep slopes of anticlinal ridges of the Yakima fold belt; age uncertain but may be in part correlative with Thorp Gravel

**THORP GRAVEL** — Coarse sand and gravel; moderately to highly weathered and poorly indurated stream terrace deposits related to the Yakima River drainage; locally divided into mainstem facies of mixed lithologies (Tm); and into basalt-dominant sidestream facies (T<sub>s</sub>); base of unit commonly unconformable near ridges and conformable in basins with underlying Ellensburg units

**ELLENSBURG FORMATION UNDIFFERENTIATED** — Gravel, sand, silt, and clay — white to light reddish-brown; weakly to moderately indurated fluvial and lahatic deposits; dominated by pumiceous dacitic, andesitic, and basaltic clasts; grades downward into thin units of fluvial sand and clay, locally pebbly sand, with mixed volcanic clasts and locally hydraulic units; base defined as the top of the lowermost flow of the Columbia River Basalt Group, but the unit includes all conformably underlying sediments of similar lithology beyond the lowermost Columbia River basalt flow pinchout; top of unit defined as below Thorp Gravel or other Pliocene(?) Pleistocene units; to the east intertongues with flows of the Yakima Basalt Subgroup

**Selah Member of Schmincke (1967)** — Clay, silt, sand, and gravel; white to light reddish brown; weakly to moderately indurated fluvial and lahatic deposits; dominated by dacitic, andesitic, and pumiceous clasts; stratigraphic position defined by overlying Pomona Member of the Saddle Mountains Basalt and next basalt stratigraphically below

**Vantage Member** — Clay, silt, and coarse sand; white to tan; weakly to moderately indurated fluvial deposits; dominated by dacitic and andesitic grains and local pumiceous clasts; stratigraphic position defined by overlying Wanapum Basalt and underlying Grande Ronde Basalt; similar thin volcanoclastic layers occur between other basalt flows

**FRENCHMAN SPRINGS MEMBER UNDIFFERENTIATED** — Fresh exposures are gray to black; gray to reddish-brown on weathered surfaces; medium- to coarse-grained; highly to very sparsely plagioclase-phyrlic flows of Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity (Rietman, 1966); thin sedimentary interbeds common; one to three flows in map area; lower flows commonly pillowed at base

**Flow of Kelley Hollow, Frenchman Springs Member** — Fresh exposures are gray-black; weathers to reddish-gray; fine- to medium-grained; phyrlic with abundant plagioclase phenocrysts and glomerocrysts up to 2 cm; phenocryst abundance highly variable from 1 to 100 glomerocrysts per square meter surface area; thin entablature and well-developed colonnade with 0.5-1.5 m diameter columns; Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity

**Ginkgo flows, Frenchman Springs Member** — Fresh exposures are gray-black; weathers to reddish-gray; fine- to medium-grained; phyrlic with abundant plagioclase phenocrysts and glomerocrysts up to 2 cm; 100 to 200 glomerocrysts per square meter surface area; thin entablature and well-developed colonnade with 0.5-1.5 m diameter columns and pillowed base; Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity; laboratory results indicate a south excursion inclination with normal polarity (Sheriff and Bentley, in press); one to two flows in the map area

**GRANDE RONDE BASALT**

**Unnamed basalt flows, nonporphyritic to very sparsely plagioclase-phyrlic, generally fine-grained and petrographically nondistinct; chemical composition varies within a broad field named Grande Ronde chemical type (formerly called Yakima chemical type by Wright and others, 1973); divided into two chemical types — high MgO and low MgO (Swanson and others, 1979); also divided into magnetostratigraphic units on the basis of dominant magnetic polarity**

**Flows of normal magnetic polarity — N<sub>2</sub> of Swanson and others (1979) —**  
 Upper part of unit contains four or five flows of high MgO Grande Ronde chemical type (Swanson and others, 1979); this unit is the Sentinel Bluffs sequence of Meyers and others (1979); fresh exposures are gray-black; weathers reddish-brown and gray; flows are commonly moderately microphyric with 1 to 3 mm long, equant plagioclase phenocrysts in a fine- to medium-grained basalt; many flows are multiterried flows; four flows form this unit in the map area; the lowest flow is the McCoy chemical subtype (Long and others, 1980)  
 Lower part of the N<sub>2</sub> contains flows of low MgO Grande Ronde chemical type. Two to four flows are fine-grained, dense, black, aphyric basalt with thick, massive, black, hackly entablatures over colonnades. Sedimentary interbeds are common at the top and bottom of this unit, but invasive relations (Byerly and Swanson, 1979) obscure their continuity and none are shown on the map. The upper flow in this unit is the Umtanum flow (Umtanum chemical subtype of Myers and others, 1979)

**Flows of reversed magnetic polarity — R<sub>2</sub> of Swanson and others (1979) —**  
 Fresh exposures are gray-black; weathers reddish-gray; fine- to medium-grained; aphyric but some flows have locally scattered plagioclase phenocrysts to 1 cm; poorly developed entablature with hackly jointing and brick-bat jointing; poorly developed colonnades with 0.5 m diameter columns; low MgO Grande Ronde chemical type (Swanson and others, 1979); reversed magnetic polarity; 10 to 13 flows or flow units in the map area; contains several sedimentary interbeds, not shown on map. Many flows have amygdulites of white secondary minerals



**COLUMBIA RIVER BASALT GROUP**

**YAKIMA BASALT SUBGROUP**

**SADDLE MOUNTAINS BASALT**

**Pomona flow, Pomona Member** — Fresh surfaces are gray to blue black, weathers gray, fine-grained; abundance to slightly phyrlic with abundant white to colorless plagioclase microphenocrysts, sparse plagioclase glomerocrysts; sparse olivine phenocrysts; invasive contacts common into pumice of Ellensburg Formation; well-developed entablature with fanning columns; Pomona chemical type (Wright and others, 1973); reversed magnetic polarity (Rietman, 1966; Choiniere and Swanson, 1979); K-Ar age about 12 m.y. (McKee and others, 1977); single flow in map area. This flow is the Wenas basalt of Smith (1903)

**WANAPUM BASALT**

**Priest Rapids flow, Priest Rapids Member** — Fresh exposures are gray-black; weathers rusty brown; medium- to coarse-grained; aphyric, with rare plagioclase phenocrysts; diktytaxitic; well-developed colonnade with 0.5-1.5 m diameter columns; Rosalia chemical type (Swanson and others, 1979); reversed magnetic polarity; age approximately 13.6 m.y.; one flow in map area

**Rosa flow, Rosa Member** — Fresh exposures are gray black; weathers reddish-brown; fine- to medium-grained, with plagioclase phenocrysts and glomerocrysts generally 0.5-1.0 cm; phenocrysts commonly a few hundred per square meter surface area; well-developed colonnade with up to 1 m diameter columns; locally diktytaxitic; Frenchman Springs chemical type (Wright and others, 1973); normal magnetic polarity; laboratory results indicate transitional after demagnetization (Rietman, 1966); resembles plagioclase-phyrlic flows of Frenchman Springs Member, but phenocrysts generally more abundant, and smaller in average size; one flow in map area

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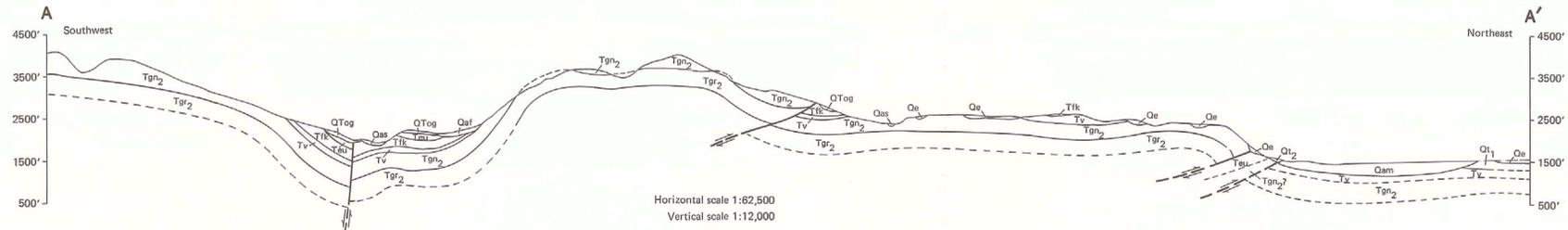
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