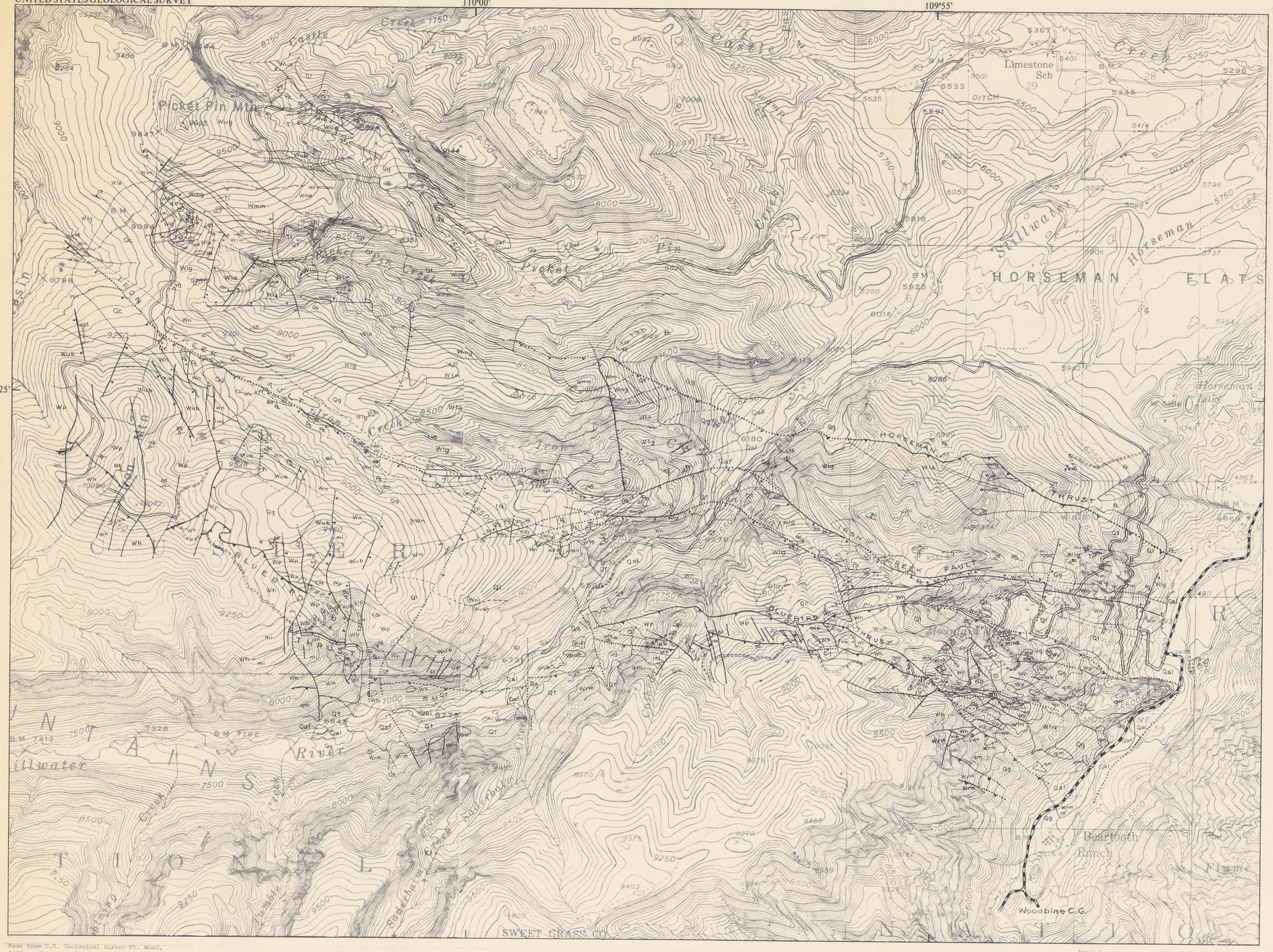
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT
79-656



Base from U.S. Geological Survey Mt. Wood, 1939, and Mt. Douglas, 1940, 1:62,500

SCALE 1:24 000
1 0 1 2 3 MILES
1 0 1 2 3 KILOMETERS
CONTOUR INTERVAL 20 FEET

PRELIMINARY GEOLOGIC MAP OF THE PICKET PIN TO MOUNTAIN VIEW SECTOR OF THE STILLWATER COMPLEX, STILLWATER COUNTY, MONTANA

By
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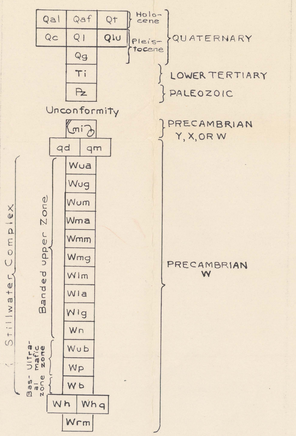
1979

CORRELATION OF MAP UNITS



Banded upper zone mapped in 1978; includes Wn-Wub contact. Ultramafic and basal zones and metamorphic rocks generalized from Page, Norman J., and Nockleberg, W. J., 1974, Geologic map of the Stillwater Complex, Montana: U.S. Geological Survey Miscellaneous Investigations Map I-797, sheets 2, 3. Ties to Carlson, Robert R., and Segerstrom, Kenneth, 1978, Preliminary geologic map of the East Boulder sector of the Stillwater Complex, Sweet Grass County, Montana: U.S. Geological Survey Open-file Report 78-704.

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE)--Chiefly silt, sand, and gravel. Shown only in the valleys of the Stillwater River and the West Fork

Qaf ALLUVIAL FAN DEPOSITS (HOLOCENE)--Sand, gravel, and boulders at the mouths of gulches tributary to the Stillwater River, West Fork, and Picket Pin Creek

Qt TALUS DEPOSITS (HOLOCENE)--Accumulations of angular blocks of debris derived from nearby bedrock outcrops on steep walls of the valleys of West Fork and Picket Pin Creek

Qc COLLUVIUM (PLEISTOCENE)--Slope-wash deposits

Ql LANDSLIDE DEPOSITS (PLEISTOCENE)--Two types identified

Unbroken--As a large block of rock which has slid with little apparent disruption, but with the formation of pressure ridges normal to direction of flow. An unbroken landslide on the left side of West Fork valley is 3 km long, as much as 1.6 km wide, and has a difference of elevation of 740 m from head to toe

Broken--An unstratified heterogeneous mixtures of soil, glacial debris, and angular rock fragments. Two major landslides on the left side of the main Stillwater River valley have unbroken cores and broken edges. Where landslides have concealed the contact between the ultramafic and banded upper zones, the symbols for the concealed units are in parentheses

Qls LANDSLIDE DEPOSIT (PLEISTOCENE)--Broken landslide composed of debris from the ultramafic zone of the Stillwater Complex which has slid over the banded upper zone

Qg GLACIAL DEPOSITS (PLEISTOCENE)--Mostly till. In Iron Creek valley includes a large swamp deposit. Where drilling has shown that limestone, shale, or sandstone bedrock underlie the till, the symbol (Pz) (in parentheses) is shown; where Stillwater rocks directly underlie the till, the appropriate symbol is shown in parentheses

Ti INTRUSIVE PORPHYRY (TERTIARY)--Andesite porphyry composed of very small (<1 mm) phenocrysts of plagioclase, biotite, and hornblende in an aphanite groundmass

Pz SEDIMENTARY ROCKS (PALEOZOIC)--Limestone and minor shale and sandstone

mi MAFIC INTRUSIVE ROCKS (PRECAMBRIAN Y, X, OR W)--Dikes and possibly sills of basaltic composition

qd QUARTZ DIORITE (PRECAMBRIAN W)--A small cupola and several apophyses that intrude the banded upper zone of the Stillwater Complex about 1.3 km south of Picket Pin Mountain

qm QUARTZ MONZONITE (PRECAMBRIAN W)--A large stock and its apophyses that intrude the lower part of the Stillwater Complex as well as metamorphic rocks

RANDED UPPER ZONE OF THE STILLWATER COMPLEX (PRECAMBRIAN W)--Total thickness ~4,000 m (west of area of this map) to ~1,300 m (east and of mapped area)

Wua Upper anorthosite member--Largely plagioclase cumulate. Postcumulus pyroxene occurs locally. Thickness 0 to ~200 m

Wug Upper gabbro member--Principally plagioclase-clinopyroxene-orthopyroxene cumulate. A prominent plagioclase cumulate, present 100-200 m above the base, is well exposed along the road which traverses a cirque 1 km east of Picket Pin Mountain. Thickness 0 to ~300 m

Upper mixed member--Plagioclase-olivine cumulate with sparse interlayers of olivine cumulate and plagioclase cumulate. A plagioclase orthopyroxene cumulate 2-3 m thick is present along the base. Thickness 0 to ~85 m

Wma Middle anorthosite member--Plagioclase cumulate with minor postcumulus pyroxene. Clinopyroxene oikocrysts occur locally. Thickness 0 to ~360 m

Wmm Middle mixed member--Alternating plagioclase cumulate and plagioclase-olivine cumulate, apparently forming three cycles. Thickness 0 to ~400 m

Wmg Middle gabbro member--Plagioclase-two pyroxene cumulate and plagioclase-olivine cumulate. Locally present, as on the eastern part of the ridge between Picket Pin Creek and Iron Creek, is four-phase rock: plagioclase-orthopyroxene-clinopyroxene-olivine cumulate. Near and to the west of Picket Pin Mountain, a distinctive feature of the member is augen-like segregations of plagioclase cumulate elongated parallel to regional foliation. Thickness 0 to ~150 m

Wlm Lower mixed member--Plagioclase-olivine cumulate with interbeds of plagioclase cumulate. Thickness 0 to ~120 m

Wla Lower anorthosite member--Plagioclase cumulate with 5-25 percent postcumulus clinopyroxene. Oikocrysts of clinopyroxene occur throughout the member. Thickness 0 to ~480 m

Wlg Lower gabbro member--Chiefly plagioclase-two pyroxene cumulate, generally with clinopyroxene more abundant than orthopyroxene, but locally with more ortho than clino. Near the middle of member a few meters of plagioclase-olivine cumulate and olivine cumulate overlain by plagioclase cumulate are exposed along the road to Mountain View mine. In the upper part of the member plagioclase cumulate is abundant; there, "inch-scale" layered rocks, defined mostly by flattened oikocrysts of clinopyroxene occur. Thickness 0 to ~550 m

Wn Norite member--Divisable into three mappable units but not done so here because of space limitations at 1:24,000 scale, and because of structural complications due to faulting parallel to layering. Upper unit consists mostly of plagioclase-orthopyroxene cumulate which is transitional to plagioclase-two pyroxene cumulate near the top. Upper unit ~250 m. Middle unit consists of a thick sequence of plagioclase-two pyroxene cumulate overlain by interbedded plagioclase-orthopyroxene cumulate; plagioclase-olivine cumulate (including pegmatoid olivine cumulate), and plagioclase cumulate. The pegmatoid olivine cumulate and immediately overlying plagioclase cumulate contain sulfides, chiefly pyrrhotite and pentlandite, and include minerals of palladium and platinum. Middle unit ~100 m. Lower unit consists of plagioclase-orthopyroxene cumulate with prominent interbeds of plagioclase cumulate and minor intercalations of plagioclase-two pyroxene cumulate. Lower unit ~400 m thick

ULTRAMAFIC ZONE OF THE STILLWATER COMPLEX (PRECAMBRIAN W)--Distinguished from banded upper zone by absence of cumulus plagioclase. Total thickness ~1,350 m

Wub Bronzitite member--Upper orthopyroxene (bronzite) cumulate of ultramafic zone. Thickness ~350 m

Wp Peridotite member--Consists of cyclic units of olivine cumulate, olivine-orthopyroxene cumulate, and orthopyroxene cumulate; thin chromite cumulates are present. Crosscutting dunite and harzburgite occur locally. Thickness ~1,000 m

Wb BASAL ZONE OF THE STILLWATER COMPLEX (PRECAMBRIAN W) --Basal norite and basal orthopyroxene cumulate with post-cumulus plagioclase. Thickness ~170 m

Wh HORNFELS (PRECAMBRIAN W)--Includes metaquartzite and iron-formation

Whq Mixed hornfels and quartz monzonite

Wrm REGIONALLY METAMORPHOSED ROCKS (PRECAMBRIAN W)--Granitic gneiss, biotite schist, amphibolitic gneiss, and biotite gneiss

EXPLANATION

- CONTACT -- Dashed where concealed
- 20 STRIKE AND DIP OF SEDIMENTARY BEDS
- STRIKE OF VERTICAL SEDIMENTARY BEDS
- 60 STRIKE AND DIP OF CUMULATE LAYERS
- 60 STRIKE AND DIP OF OVERTURNED CUMULATE LAYERS
- STRIKE OF VERTICAL CUMULATE LAYERS
- HIGH-ANGLE FAULT--Dotted where concealed; ball and bar on downthrown side of some faults
- THRUST FAULT--Dotted where concealed; sawteeth on upper plate
- ADIT
- QUARRY
- PAVED HIGHWAY
- GRAVEL ROAD
- PRIMITIVE ROAD