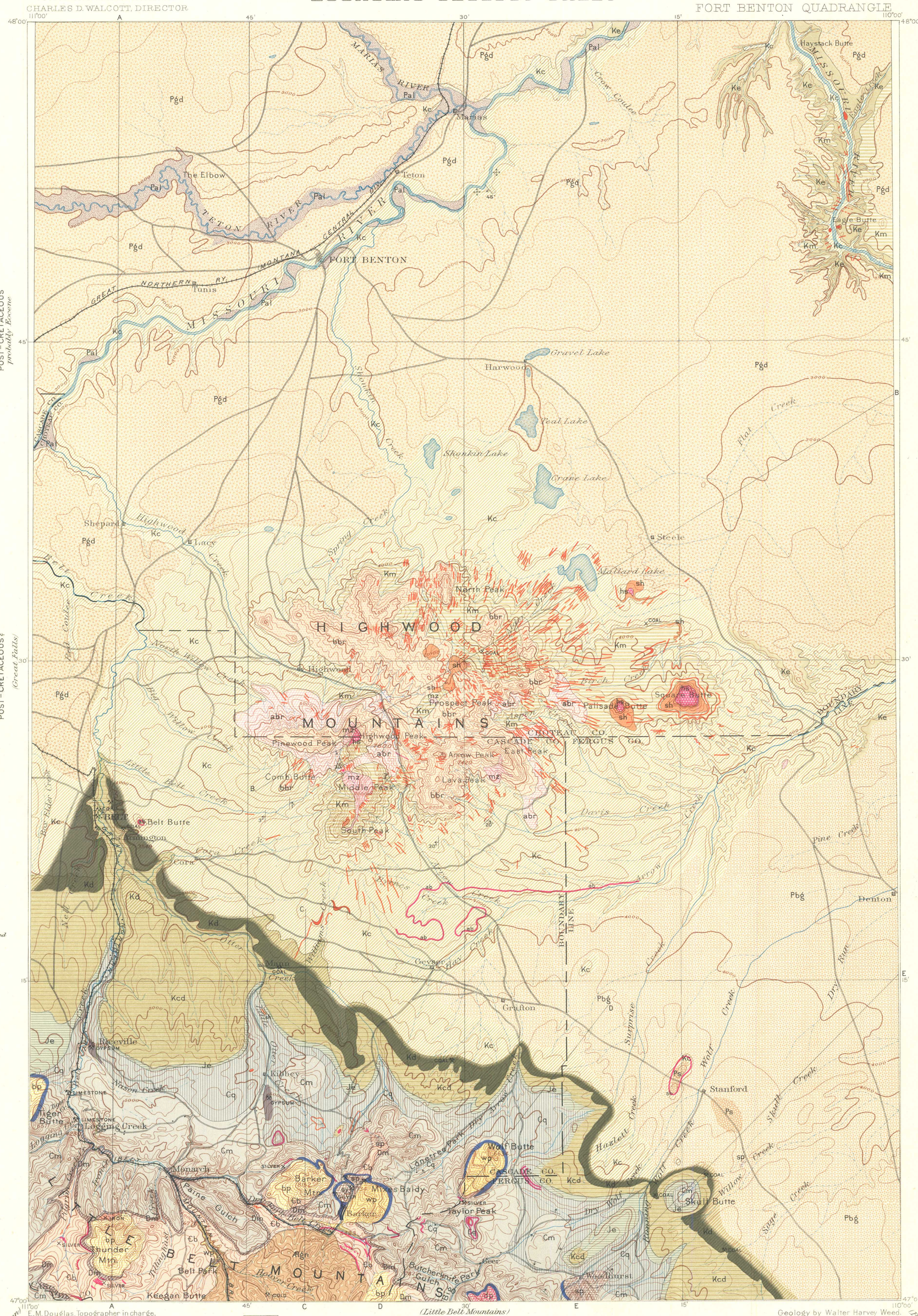
U. S. GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

ECONOMIC GEOLOGY SHEET

MONTANA
FORT BENTON QUADRANGLE



LEGEND
(continued)

IGNEOUS ROCKS

(Areas of Igneous rocks are shown by patterns of triangles and rhombs.)

POST-CRETACEOUS *probably Eocene*

- hs — Highwood syenite *(in part sodalite-syenite)*
- mz — Monzonite *(basic syenite)*
- sh — Shonkinite *(including missourite)*
- Basaltic sheets and dikes *(augite, mica, and analcite basalts in Highwood Mts.; minette in Little Belt Mts.; mica-basalt on Missouri River)*
- bbr — Basaltic breccia, flows, and scoria
- Trachytic dikes and sheets *(trachyte and phonolite porphyries in Highwood Mts.; trachyte, syenite, and rhyolite porphyries in Little Belt Mts.)*
- abr — Andesitic breccia and tuffs

POST-CRETACEOUS? *(Great Falls)*

- sp — Syenite-porphyry
- sy — Syenite
- wp — Wolf porphyry *(granite-porphyry)*
- bp — Barker porphyry *(granite-porphyry)*
- dp — Diorite-porphyry

Sections

20° Dip and strike of stratified rocks
Horizontal stratified rocks
Mines and quarries
Prospects

Known productive formations

- Coal *(Cascade formation, containing coal seam at the top, and formations directly overlying this coal.)*
- Silver *(contact zones favorable for ore deposits)*
- Iron *(contact zone between syenite-porphyry laccolith and shale)*
- Gypsum *(in Quadrant formation)*

LEGEND

SURFICIAL ROCKS

(Areas of Surficial rocks are shown by patterns of dots and circles.)

PLEISTOCENE

- Pal — Alluvium *(stream bottoms)*
- Pbg — Bench gravels
- Pgd — Glacial drift and till
- Ps — Stanford conglomerate *(sand and gravel locally cemented by lime)*

SEDIMENTARY ROCKS

(Areas of Sedimentary rocks are shown by patterns of parallel lines.)

CRETACEOUS

- Km — Montana formation *(clay-shale with sandstone interbedded at the top)*
- Ke — Eagle formation *(white sandstone with lignite seams and clay)*
- Kc, ab — Colorado formation *(black shale at the base, gray shale above, and sandstone interbedded; contains an ash bed, ab)*
- Kd — Dakota formation *(sandstone and interbedded clay-shale)*
- Kcd — Cascade formation *(sandstone and shale with coal seam at the top)*

JURATRIAS

- Je — Ellis formation *(limestone grading upward into sandstone and pebbly sandstone at the base)*

CARBONIFEROUS

- Cq — Quadrant formation *(sandstone, green and red shale, and white limestone)*
- Cm — Madison limestone *(thinly bedded limestone)*

DEVONIAN *and probably Silurian*

- Dm — Monarch formation *(brown and black granular limestone capped by shale)*

CAMBRIAN

- Єb — Barker formation *(limestone and micaceous shale, containing beds of limestone-conglomerate, and quartzite at the base)*

UNCLASSIFIED CRYSTALLINE ROCKS

(Areas of ancient crystalline rocks and metamorphic rocks of unknown origin are shown by patterns of short dashes)

ARCHEAN

- Ærgn — Gneiss and schist

Legend is continued on the left margin.

E.M. Douglas, Topographer in charge.
Triangulation by E.M. Douglas.
Topography by Northern Transcontinental Survey, E.M. Douglas, and R.H. Chapman.
Surveyed in 1883, 87, and 96.

Geology by Walter Harvey Weed.
Assisted by Louis V. Pirsson.
Surveyed in 1894 and 1897.