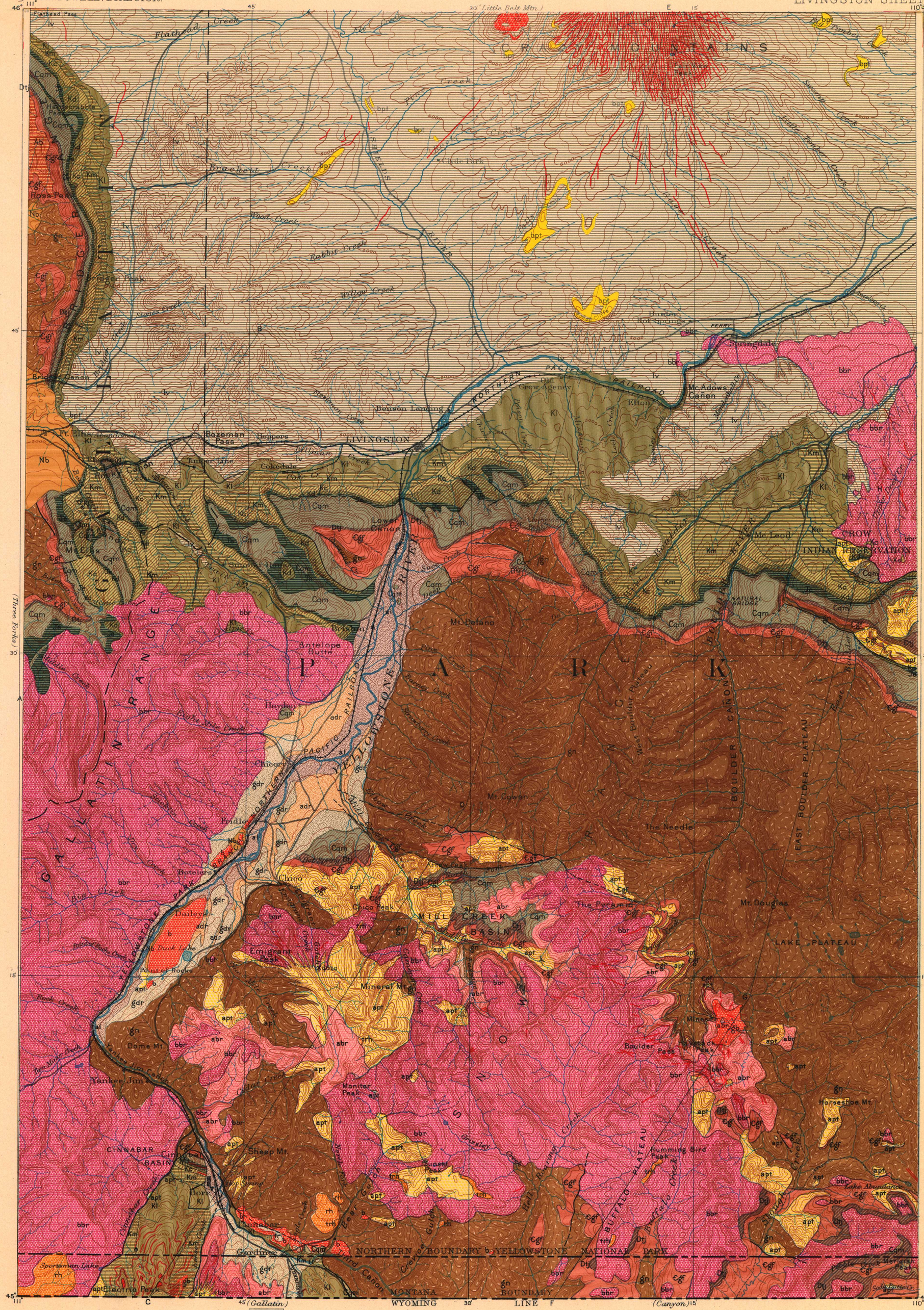
U.S. GEOLOGICAL SURVEY.
J.W. POWELL, DIRECTOR.

AREAL GEOLOGY

MONTANA
LIVINGSTON SHEET



Henry Gannett, Chief Topographer.
A.H. Thompson, Geographer in charge.
Triangulation by E.M. Douglas and J.H. Renshawe.
Topography by { Northern Transcontinental Survey. Frank Tweedy and W.H. Leffingwell.
Surveyed in 1886-7.

N.T.S
Tweedy

Scale $\frac{1}{250,000}$
0 2 4 6 8 10 12 Miles
Contour Interval 200 feet
Edition of July 1893.

Arnold Hague, Geologist in Charge.
Geology by Joseph Paxson Iddings and Walter Harvey Weed.
Surveyed in 1890-1.

LEGEND

SUPERFICIAL

- tr — Travertine (Hot-Spring deposit. Lime)
- al — Alluvium (Brick clays)
- adr — Assorted glacial drift
- gdr — Glacial drift

PLEISTOCENE

SEDIMENTARY

- Nb — Bozeman lakebeds (conglomerates and clays. Brick clays-Polishing materials)
- lv — Livingston formation (including probable Fort Union beds. Lower part conglomerates, sandstones and tuffs largely of andesitic materials. Upper part sandstones and clays. Lignites and Building stone)

NEOCENE

- Kl — Laramie formation (Sandstones and clays, containing from 3 to 6 workable coal seams-Building stone)
- Km — Montana formation (Fox Hills sandstone. Pierre shales)
- Kc — Colorado formation (Niobrara limestone and shales. Benton shales)
- Kd — Dakota formation (conglomerate, shales and quartzite)

CRETACEOUS

- Je — Ellis formation (Arenaceous limestone. Myacites limestone and quartzites)

JURA-?

- Cqm — Quadrant quartzite. Madison limestone

CARBONIFEROUS

- Dtj — Three Forks shale. Jefferson limestone (possibly including Silurian at base)

DEVONIAN

- Ꞓgf — Gallatin limestone and shales. Flathead quartzite and shale.

CAMBRIAN

- Ab — Belt Beds (conglomerates sandstones and arenaceous limestones)

ALGONKIAN

IGNEOUS

- b — Basalt
- rh — Rhyolite
- Dikes and sheets (of various rocks)
- apt — Acid porphyrite, andesite and dacite
- bpt — Basic porphyrite and andesite
- th — Theralite
- gb — Gabbro and diorite
- trh — Trachytic rhyolite
- bbr — Basic andesitic breccia and flows
- abr — Acid andesitic breccia and flows

CRYSTALLINE

- gn — Granite, gneiss and schist

ARCHEAN