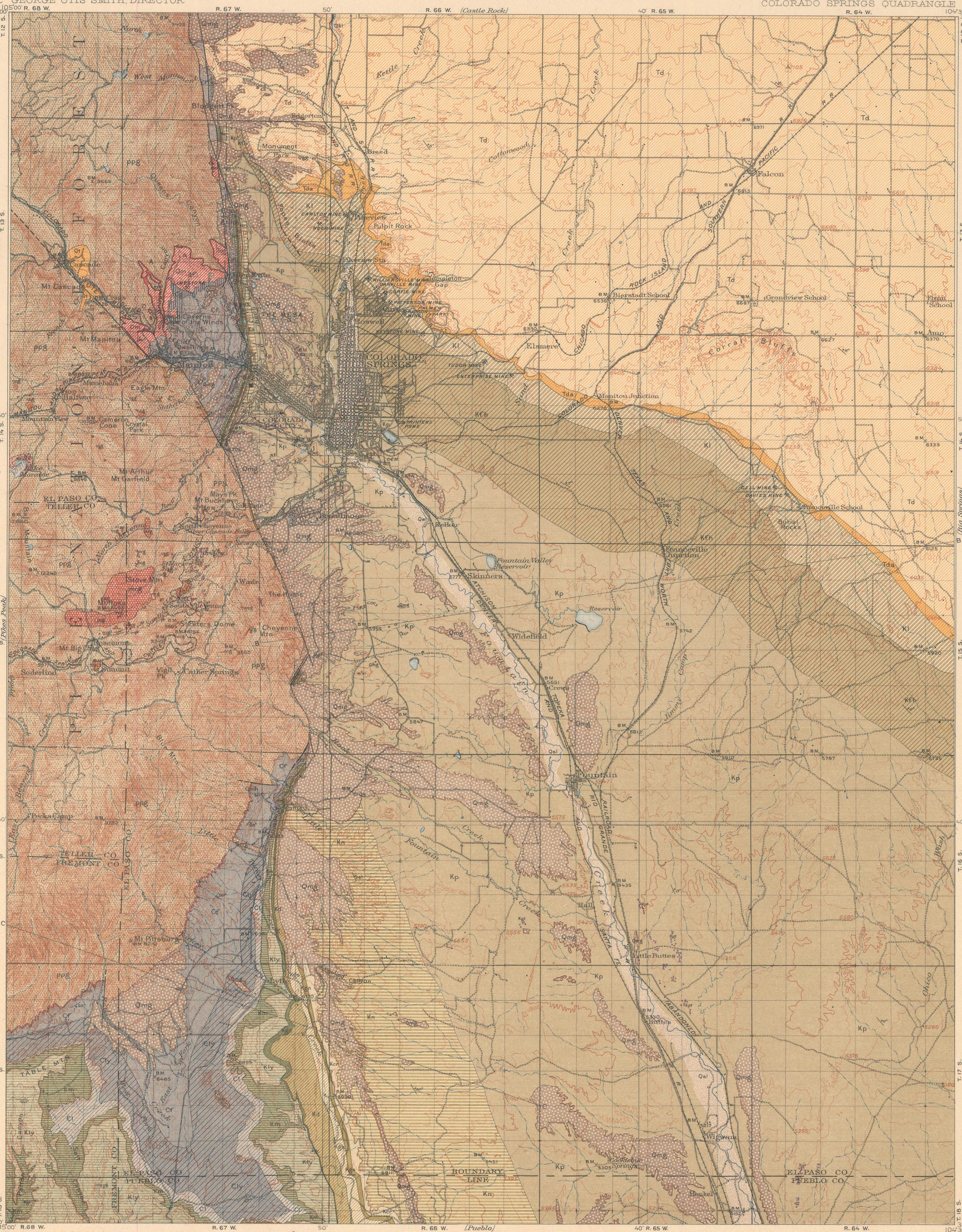
U.S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

AREAL GEOLOGY

COLORADO
COLORADO SPRINGS QUADRANGLE



LEGEND
(continued)

IGNEOUS ROCKS
(Areas of igneous rocks are shown by patterns of triangles and rhombs)

- **sy** — Syenitic dikes *(dense, black, aphanitic rock)*
- **pt** — Pegmatite dikes *(coarse feldspar, quartz, and numerous accessory minerals)*
- **mrg** — Mount Rosa granite *(fine-grained, gray amphibole granite in masses, dikes, and sheets)*
- **ccg** — Cripple Creek granite *(pink biotite granite and fine-grained micaceous dikes)*
- **PPg** — Pikes Peak granite *(coarse pink biotite granite)*

PRE-CAMBRIAN

Faults

Concealed faults *(covered by younger deposits)*

20° Strike and dip of stratified rocks

Coal mines and limestone quarries

Economic note: *Workable coal beds occur in the Laramie formation; the Niobrara formation is suitable for the manufacture of cement; building stone can be obtained from the Dakota and Sawatch sandstones and from the various granites; lime from Manitou limestone and Niobrara formation; gypsum from Lykins formation; clay for brick from the Pierre shale; and sand and gravel from the mesa gravels. Minerals used as semi-precious stones or of value to collectors, including microcline (amazon stone), topaz, smoky quartz, and phenacite, occur in the Pikes Peak granite in Crystal Park and vicinity southwest of Manitou and near St. Peters Dome.*

LEGEND

SEDIMENTARY ROCKS
(Areas of subaqueous deposits are shown by patterns of parallel lines, subaerial deposits by patterns of dots and circles)

QUATERNARY

- **Qal / Qt** — Alluvium and talus *(only larger areas shown)*
- **Qtg** — Terraced stream gravels
- **Qmg** — Mesa gravels *(wash from the mountain slopes; in part equivalent to Nussbaum formation)*
- **Qgd** — Glacial drift *(chiefly terminal moraines of local valley glaciers)*

TERTIARY

- **sd** — Sandstone dikes in Pikes Peak granite *(along or closely associated with fault planes)*
- **Td / Tda** — Dawson arkose *(conglomerate, sandstone, and shale, with andesitic sandstone member; Tda, at the base)*

UNCONFORMITY

CRETACEOUS

- **Kl** — Laramie formation *(white quartz sandstone, black clay shale, and coal beds)*
- **Kfh** — Fox Hills sandstone *(friable greenish and brownish quartz sandstone)*
- **Kp / Kpt** — Pierre shale *(dark clay shale containing limestone concretions, some of which form hills called "Tepee Buttes," Kpt)*
- **Kn** — Niobrara formation *(lower part bluish-gray limestone, mapped in some areas as Timpas limestone, and upper part bluish-black calcareous shale, mapped in some areas as Apishapa shale)*
- **Kcr** — Carlile shale *(black clay shale with thin, yellow sandstone at top)*
- **Kgn** — Greenhorn limestone *(light bluish-gray limestone with thin calcareous shale partings)*
- **Kgs** — Graneros shale *(dark-gray clay shale)*
- **Kd** — Dakota sandstone *(light-colored cross-bedded quartz sandstone)*

UNCONFORMITY

- **Kgc / Kly** — Purgatoire formation *(Lytle sandstone member, Kly, sandstone with interculated grit and shale; Glencairn shale member, Kgc, dark shale with a little sandstone)*

JURASSIC OR CRETACEOUS

- **Km** — Morrison formation *(green to maroon shale with some sandstone and thin limestone)*

UNCONFORMITY

CARBONIFEROUS

- **Cl** — Lykins formation *(thin-bedded red sandstone and shale, with gypsum at top)*
- **Cly** — Lyons sandstone *(brick-red and white sandstone)*
- **Cf / Cg** — Fountain formation with Glen Eyrie shale member *(arkose, conglomerate, sandstone, shale, and Glen Eyrie shale member, Cg, composed of sandy shale and sandstone)*

UNCONFORMITY

ORDOVICIAN

- **Om / Omh** — Manitou limestone *(red to gray limestone; a few feet of overlying Harding sandstone included in the southwestern part of quadrangle as Omh)*

CAMBRIAN

- **Ꞓs** — Sawatch sandstone *(white quartzose to reddish calcareous sandstone)*

Legend is continued on the left margin.

E. M. Douglas and E. C. Barnard, Geographers in charge.
Topography by R. T. Evans and H. R. Elliott.
Control by Coast and Geodetic Survey.
Surveyed in 1906-1907.

TRUE NORTH
MAGNETIC NORTH
14½°
APPROXIMATE MEAN DECLINATION 1907.

Scale $\frac{1}{125000}$
1 ½ 0 1 2 3 4 5 Miles
1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 100 feet.
Datum is mean sea level.
Edition of April 1915.

DIAGRAM OF TOWNSHIP.

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

DIAGRAM OF QUARANGLES.
MANITOU
COLORADO SPRINGS

Geology by George I. Finlay.
Surveyed in 1906-1912.