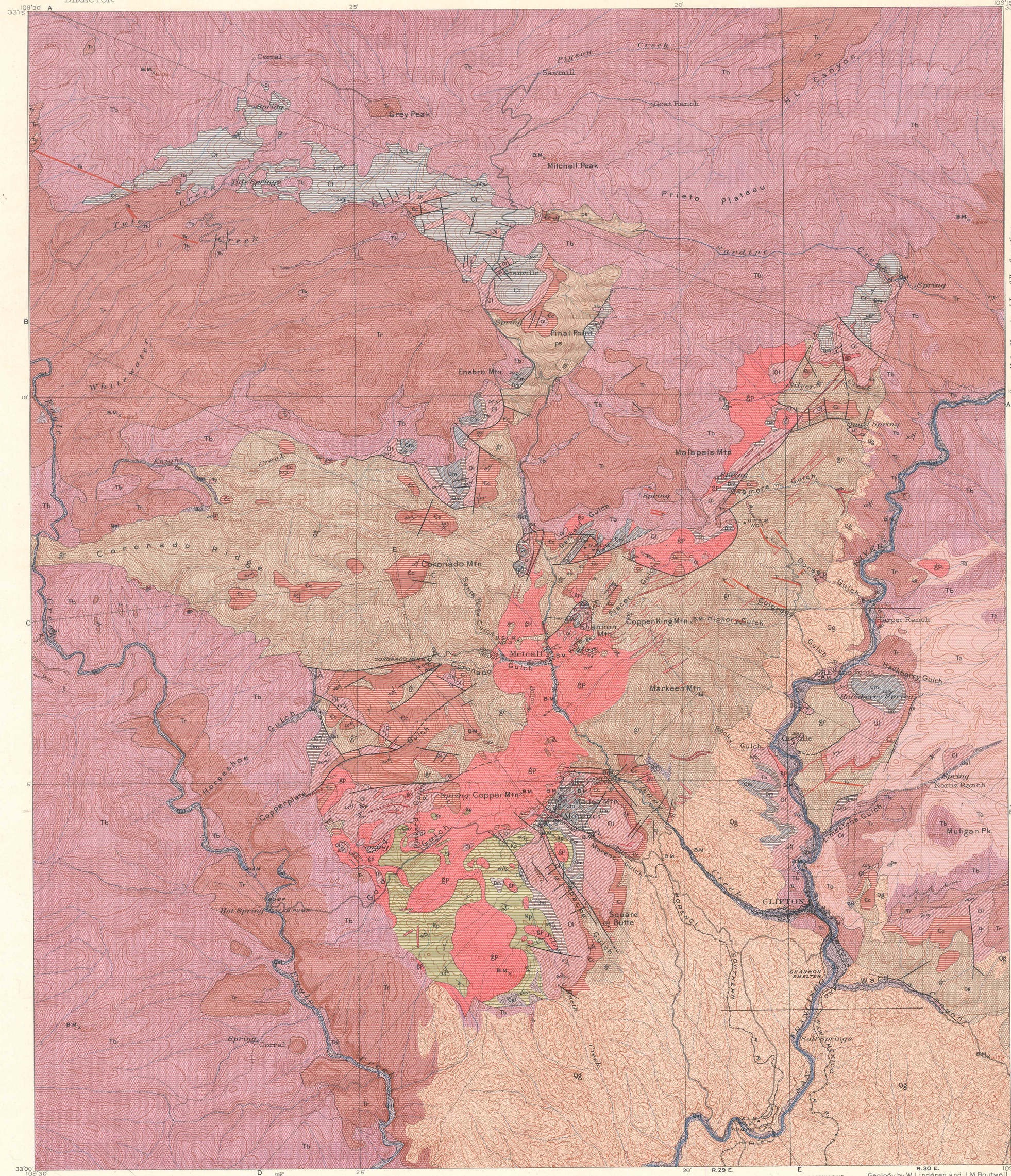
U.S. GEOLOGICAL SURVEY
CHARLES D. WALCOTT
DIRECTOR

AREAL GEOLOGY

ARIZONA
(GRAHAM COUNTY)
CLIFTON QUADRANGLE



LEGEND

SEDIMENTARY ROCKS

(Areas of subaqueous deposits are shown by patterns of parallel lines; subaerial deposits by patterns of dots and circles; metamorphism is indicated by features combined with the line patterns)

Qal — **Alluvium**
(sand and gravel along present valleys, and local talus accumulations)

Qg — **Gila conglomerate**
(thick fluviatile deposits of irregularly bedded conglomerate and sand, locally consolidated)

Kp — **Pinkard formation**
(alternating brown sandstone and black shale, hardened and metamorphosed near porphyry contacts)

Ct — **Tule Spring limestone**
(heavy-bedded bluish-gray limestone in northern part of quadrangle; contains Mississippian and Pennsylvanian fossils)

Cm — **Modoc limestone**
(heavy-bedded gray limestone, sometimes magnesian, in lower part; contains Mississippian fossils)

Dm — **Morenci formation**
(black clay shale with argillaceous limestone locally in lower part)

Ol — **Longfellow formation**
(heavy-bedded brown limestone, shaly and siliceous in lower part, usually cherty and sometimes magnesian)

Cc — **Coronado quartzite**
(brown and red quartzitic sandstone, usually with basal conglomerate)

ps — **Pinal schist**
(sericite-quartz-schist containing small masses of amphibolite)

Benton group — Modoc, Morenci, and Longfellow formations locally metamorphosed near porphyry contacts — Metamorphic

QUATERNARY — CRETACEOUS — CARBONIFEROUS — DEVONIAN ? — ORDOVICIAN — CAMBRIAN ? — PRE-CAMBRIAN

IGNEOUS ROCKS

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

Ta — **Andesite**
(surface flows and dikes, representing two epochs of eruption)

Tb — **Basalt**
(thick, dark-colored surface flows, rarely tuffaceous; represents two epochs of eruption)

Tr — **Rhyolite**
(thick, light-colored surface flows with much tuff and breccia; represents three epochs of eruption)

Tr Tb Ta — **Dikes of rhyolite, basalt, and andesite**

gP db — **Granite-porphyry, quartz-monzonite-porphyry, and diorite-porphyry**
(with transition phases; occur in dikes, stocks, and laccoliths; also dikes of diabase, db)

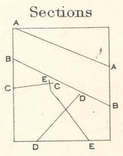
gr — **Granite**
(intrusive masses in Pinal schist)

TERTIARY — LATE CRETACEOUS OR EARLY TERTIARY — PRE-CAMBRIAN

Known faults

Concealed faults
(covered by younger deposits)

Sections



E. M. Douglas, Geographer in charge.
Triangulation and topography by Jeremiah Ahern.
Surveyed in 1900-1901.

Geology by W. Lindgren and J. M. Boutwell.
Surveyed in 1902.

APPROXIMATE MEAN DECLINATION 1901.
TRUE NORTH
MAGNETIC NORTH
12½°

Scale 1/62500

1 ½ 0 1 2 3 4 Miles

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 100 feet.
Datum is mean sea level.

Edition of Oct. 1905.

Boutwell
Lindgren

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	

R. 29 E. R. 30 E.
T. 4 S.