



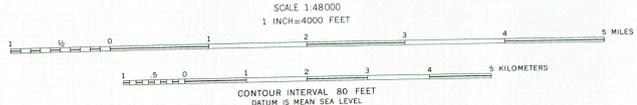
EXPLANATION

Qal	Sand and gravel on valley floors	Qr	Rubble stream deposits
Qc	Landslide deposits Soil covered		
Qts	Sand and gravel on stream terraces		
Qtb	Basalt Dark-green and gray lava flows, 0 to 1000 ft thick. Caps mesas	Qv	Lava and volcanic bombs Contains brightly colored altered rocks in an ancient volcanic crater
Tdp	Intrusive igneous rocks Tdp, diatle porphyry Ta, porphyritic andesite Ts, tephrohyre Relative ages unknown. Form ledges and cliffs. Thin dikes and sills shown as single red line		
Tpc	Poison Canyon Formation Coarse-grained yellow sandstone and conglomerate, washed from moun- tains to west by streams; 0 to 1500 ft thick. Forms ledges. Lower part intertongued with upper part of Raton Formation	Trk	Raton Formation Basin deposits. Fine-grained yellow and gray sandstone deposited by streams; dark-colored shale and coal deposited in overflow ponds and swamps. Yellow and gray stream conglomerate at base. 0 to 1300 ft thick
Kv	Vermajo Formation Yellow and gray bench sandstone alternating with coastal-swamp shale and coal. 0 to 170 ft thick		
Kt	Trinidad sandstone Light-gray bench sandstone, 0 to 100 ft thick. Forms cliffs		
Kpn	Pierre Shale and upper part of Niobrara Formation Black marine shale containing many lenses of orange- stained limestone and a few thin layers of orange shale composed of altered volcanic ash. 200 to 250 ft thick		
Knf	Fort Hays Limestone Member of Niobrara Formation Gray marine limestone and thin layers of black shale. 20 to 60 ft thick		
Kcb	Carlile, Greenhorn, and Graneros Formations Black marine shale containing a few beds and lenses of dark-colored limestone in the middle and a few thin layers of orange shale composed of altered volcanic ash. 300 to 300 ft thick		
Kd	Dakota Sandstone Two thick units, one yellow and one light-gray of cross- bedded bench sandstone, separated by dark-colored marine shale. 100 to 300 ft thick. Sandstone forms ledges and cliffs		
Jm	Morrison Formation Red, gray, and brown shale and sandstone, stream loam. Thin beds of sandstone, containing remains of red jasper, at base. 100 ft thick. (Includes Entrada Sandstone at some places)		
Je	Entrada Sandstone Light-gray crossbedded dune sandstone, 40 to 60 ft thick. Forms low ledges and cliffs. (Where impracticable to map separately, combined with Morrison Formation)		
Td	Duckan Group Red, brown, tan, and green shale and fine-grained sand- stone, containing many lenses of gray limestone con- glomerate. Much red sandstone and a little con- glomerate near base. Stream-banded and bedded deposits. 100 to 300 ft thick. (These rocks usually divided into Chalko Formation [100], 100 to 150 ft thick, and Santa Rosa Sandstone, 100 ft thick)		
Ppcc	Sangre de Cristo Formation Red and gray conglomerate and red sandstone, contain- ing a few layers of red shale and gray limestone. Stream and lake deposits. 0 to 5000 ft thick		
pCgr	Coarse-grained pink granodiorite		
pCg	Light-colored gneiss, dark-colored schist, and minor quartzite Intruded by many small bodies of pink granodiorite and by dikes of dark-colored diorite and one dike of coarse-grained diorite porphyry		

Contact between rock units Approximately located	Strike and dip of foliation in meta- morphie and igneous rocks
Fault Approximately located. Dotted where concealed by younger rocks; queried where extension unknown. U, up- thrown side; D, downthrown side	Vertical foliation in metamorphic and igneous rock
Strike and dip of beds of sedi- mentary rock	Vertical shaft
Vertical beds of sedimentary rock	Adit
Horizontal beds of sedimentary rock	Prospect pit
Overturned beds of sedimentary rock	Line of geologic section; plate 5
	Windmill

Topographic mapping by the U.S. Geological Survey
from portions of the Cimarron, Ute Park,
Tooth of Time, and Miami 15-minute
quadrangles, surveyed 1955-56

GEOLOGIC MAP OF THE PHILMONT RANCH REGION, NEW MEXICO



Geology mapped by A. A. Wank and C. B. Read, 1956-58;
revised by G. D. Robinson, W. H. Hays, and
Malcolm McCallum, 1958-59