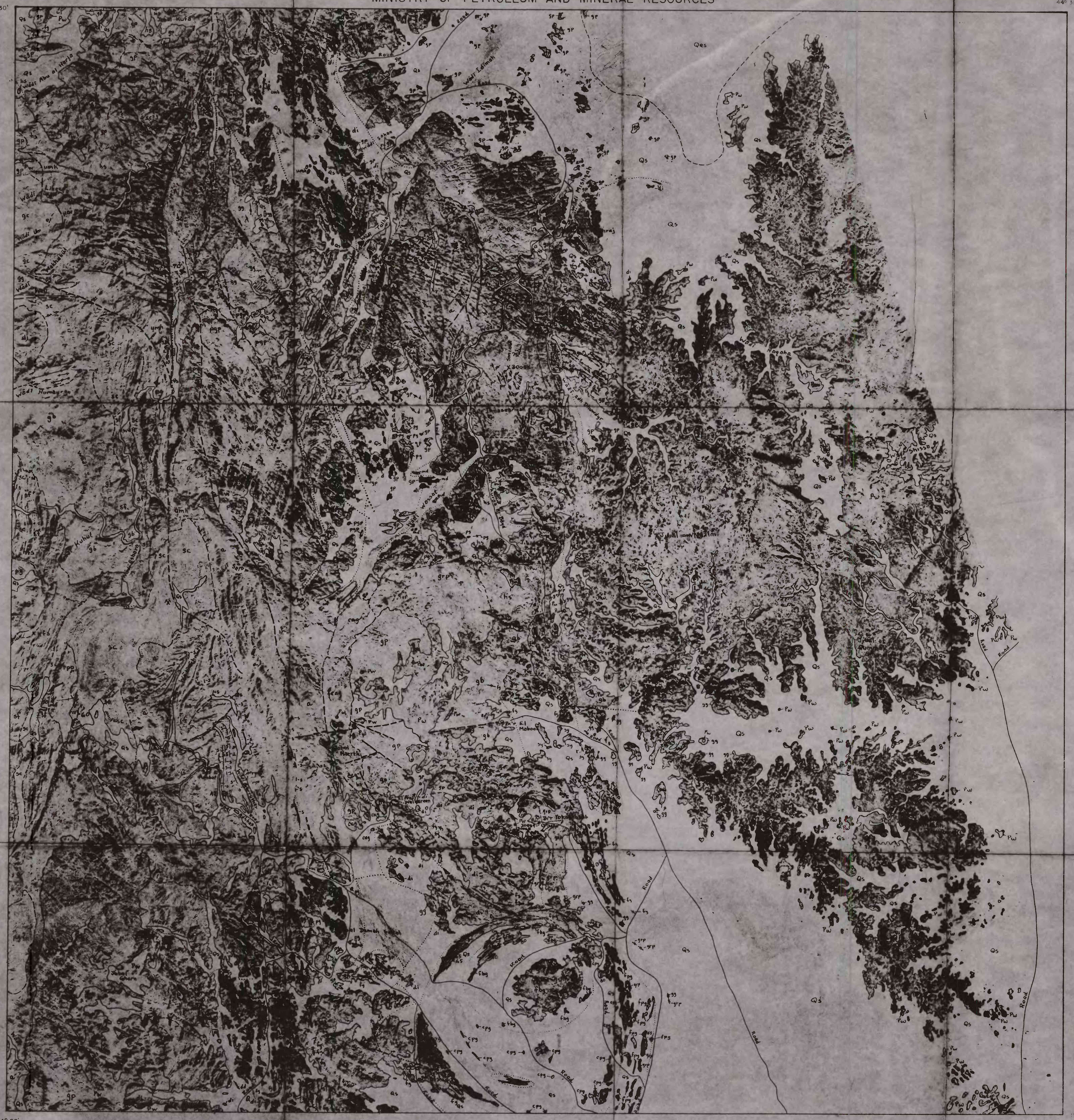
U.S. GEOLOGICAL SURVEY

KINGDOM OF SAUDI ARABIA
MINISTRY OF PETROLEUM AND MINERAL RESOURCES

70-248

44° 00' 18° 30' 44° 30'



18° 00' 44° 00' 44° 30' 18° 00'

AERIAL PHOTOGRAPHY 1955 AND CONTROLLED MOSAIC 1956
AERO SERVICE CORP., PHOTOGRAMMETRIC ENGINEERS
PHILADELPHIA 20, PENNSYLVANIA, U. S. A.

10 000 0 10 000 20 000 30 000 40 000 FEET

2 0 2 4 6 8 10 KILOMETERS

SCALE 1:100,000

Geology mapped by W. C. Overstreet in parts of November 1964, May and October 1965, and February to March 1966; and by D. L. Rossman from February to May 1967. Geology in extreme western part of area modified from Brown and Jackson, 1959.

[redacted]

RECONNAISSANCE GEOLOGIC MAP OF THE WĀDĪ WASSAT QUADRANGLE, KINGDOM OF SAUDI ARABIA

by

William C. Overstreet and Darwin L. Rossman

1969

EXPLANATION

QUATERNARY

Qes

Aeolian sand

Qs

Alluvial and aeolian sand poorly Sorted alluvial sand along wadi floors; aeolian sand in northeastern and southwestern part of area

TERTIARY AND QUATERNARY

s

Gossan

Buff, brown, maroon, and red gossan (s) of scoriaceous to delicately banded, pluverent to hard and brittle mixtures of hematite, limonite, goethite, jasper, chalcedony, kaolinite, and gypsum; relicts of leached argillite, andesite, diorite, granite, and rhyolite, developed on pyrite-bearing, fine-grained sedimentary rocks of andesitic composition

PERMIAN OR OLDER

Pw

Wajid Sandstone

Reddish brown, yellow, tan, and white crossbedded sandstone, limonite-and hematite-cemented layers and concentrations, thin conglomerate and clay lenses, locally overlies saprolite

PRECAMBRIAN AND CAMBRIAN

Peralkalic Magma Series

p

Syenite porphyry dikes

Light to dark gray dikes of syenite porphyry, trachyte, latite, and dacite with dark gray fine-grained matrix; phenocrysts of white to pink feldspar; locally biotite swarm

pr

Pyroxene rhyolite dikes

Light to dark, gray to red pyroxene rhyolite dikes; commonly strike N. 20° W. to N. 30° W. in swarms; pyroxene may be absent in individual dikes or replaced by biotite pseudomorphs

da d

Dacite, diabase, and basalt dikes

Gray to dark gray, medium- to-fine-grained dacite and dacite porphyry dikes (da) with biotite; phenocrysts of orthoclase and oligoclase; dark gray to black, fine-grained diabase dikes with chilled margins and ophitic texture (d), locally includes dark, fine-grained dikes of basalt, some may be geologically young.

fg q

Felsite and porphyritic granite dikes; quartz veins

Gray to red felsite dikes grading into granite porphyry, quartz porphyry, graphic granite, and pegmatite (fg); dikes are penecontemporaneous with quartz porphyry (qp); massive white quartz veins (q)

pg cpg sy fpg fbg qp grp

Aegirine-bearing granite, porphyritic pyroxene granite pyroxene granite, syenite, biotite granite, quartz porphyry, and granite porphyry

Mostly massive, but locally with promary flow banding, pink to red, aegirine-bearing granite (pg), locally pyritic; coarse-grained generally porphyritic pyroxene granite (cpg) that grades locally into coarse-grained quartz syenite and syenite (sy); fine-grained pyroxene granite (fpg); fine- to medium-grained, quartz-rich biotite granite (fbg); massive, medium-grained, quartz porphyry (qp) which grades into dike swarms and masses of granite porphyry (grp)

g

Granite, pegmatite, and felsite dikes

Massive, pink to white dikes of biotite granite, pegmatite, and felsite; epidote common on joints; differentiate from biotite granite (gp); the granite dikes may be in part contemporaneous and in part older than rhyolite, r

r

Rhyolite

Light to dark gray, buff, pink, and red rhyolite (r); weathers white to buff; as north-trending dikes and intrusive masses, or as isolated plugs; dikes contain sparse phenocrysts of quartz and spessartite, rare biotite; pyrite present in dikes, as much as 12 percent of rock; epidote common on joints

gp pgp

Biotite granite

Massive, pink to red, medium-grained biotite granite (gp), in plutons and dikes; porphyritic phases (pgp)

di gb dd

Diorite and gabbro

Massive, dark gray to black diorite (di) and biotite diorite; grades locally into gabbro (ab); mainly as plutons and small masses, locally has satellitic swarms of diorite and andesite porphyry dikes (dd)

PRECAMBRIAN

gg gc

Granite gneiss

Coarse-grained, locally porphyritic, light gray to gray, rarely reddish, biotite granite gneiss and hornblende-biotite granite gneiss (gg); granite gneiss complexly intruded by or intermixed with gabbro, diorite, and amphibolite (gc)

a md cag hs umh sc m rpa sf hfs

Andesite, microdiorite, hornblende schist, sericite-chlorite schist, marble, rhyolite, slate and felsite

Gray, yellowish gray, green, and dark green, massive to poorly bedded, locally badly fractured and/or cleaved andesite, andesite porphyry, porphyry, microdiorite, agglomerate, and andesitic tuff with interbedded conglomerate, graywacke, laminated argillite, pyritiferous sediment, marble, and calcareous graywacke (a); in places the grain-size of the andesite and andesite porphyry coarsens and the rock becomes microdiorite and biotite diorite (md), the increase in grain size may partly be caused by contact metamorphism of intrusive granite, commonly this microdiorite and diorite is mixed with greenstone, and hornblende schist (umh); complex intermixtures of rocks in the andesite unit and intrusive granite (cag) are in the southwestern part of the quadrangle; andesite unit (a) is variably but generally little metamorphosed, bleached along western contacts of gossan north of Wadi Wassat; andesite unit (a) grades along and across strike into two more strongly metamorphosed units shown as hornblende schist (hs) and sericite-chlorite schist (sc); hornblende schist unit consists of dark green hornblende schist, actinolite schist, chlorite schist, greenstone, and schistose diorite formed by dynamothermal and contact metamorphism of dominantly mafic components of andesite unit (a); sericite-chlorite schist unit (sc) consists of gray-green sericite schist, graphitic sericite schist, and sericite-chlorite schist formed by dynamothermal and contact metamorphism of dominantly felsic or argillaceous components of andesite unit (a); lenticles of marble (m) common in sericite-chlorite schist unit; rhyolite, rhyolite porphyry, and rhyolite agglomerate (rpa) in intrusive and extrusive masses, commonly with slate and felsite (sf), locally and quite variably sheared to sericite schist which encloses tectonic slices of massive rhyolite porphyry; dark hornfels (hfs) developed locally from bedded volcanic and sedimentary rocks at intrusive contact of pyroxene granite; at west side of Jabal 'Alijah the hornfels attains upper amphibolite facies.

SYMBOLS

Dashed where approximately located or inferred, dotted where concealed

Contact

Fault

50 — Strike and dip of bed

60 — Strike and dip of foliation

Strike of vertical foliation

60 60 — Strike and dip of foliation and plunge of lineation

10 — Strike of vertical foliation and plunge of lineation

10 — Strike and dip of primary flow banding

Strike of vertical flow banding

30 30 — Strike and dip of primary flow banding and plunge of lineation

70 — Strike and dip of fracture cleavage

Strike of vertical fracture minor cleavage

10 — Strike and plunge of minor fold axes

m — Marble: Isolated outcrop of marble

Lineament from aerial photographs: Prominent lineament not checked on ground; may be dikes, bedding, foliation, joints, or faults

Dikes, undivided, mainly andesite, rhyolite, and granite

Well — Well: Where abandoned, marked dry well

Road — Unpaved road

Diamond drill hole: W1, W2...W9, holes in gossan at Wadi Wassat; A1, A2, A3, A4, holes in gossan at Bi'r Adhbat

Ancient working: Abandoned mine or prospect

Ruins: Ruins of ancient buildings or tumuli