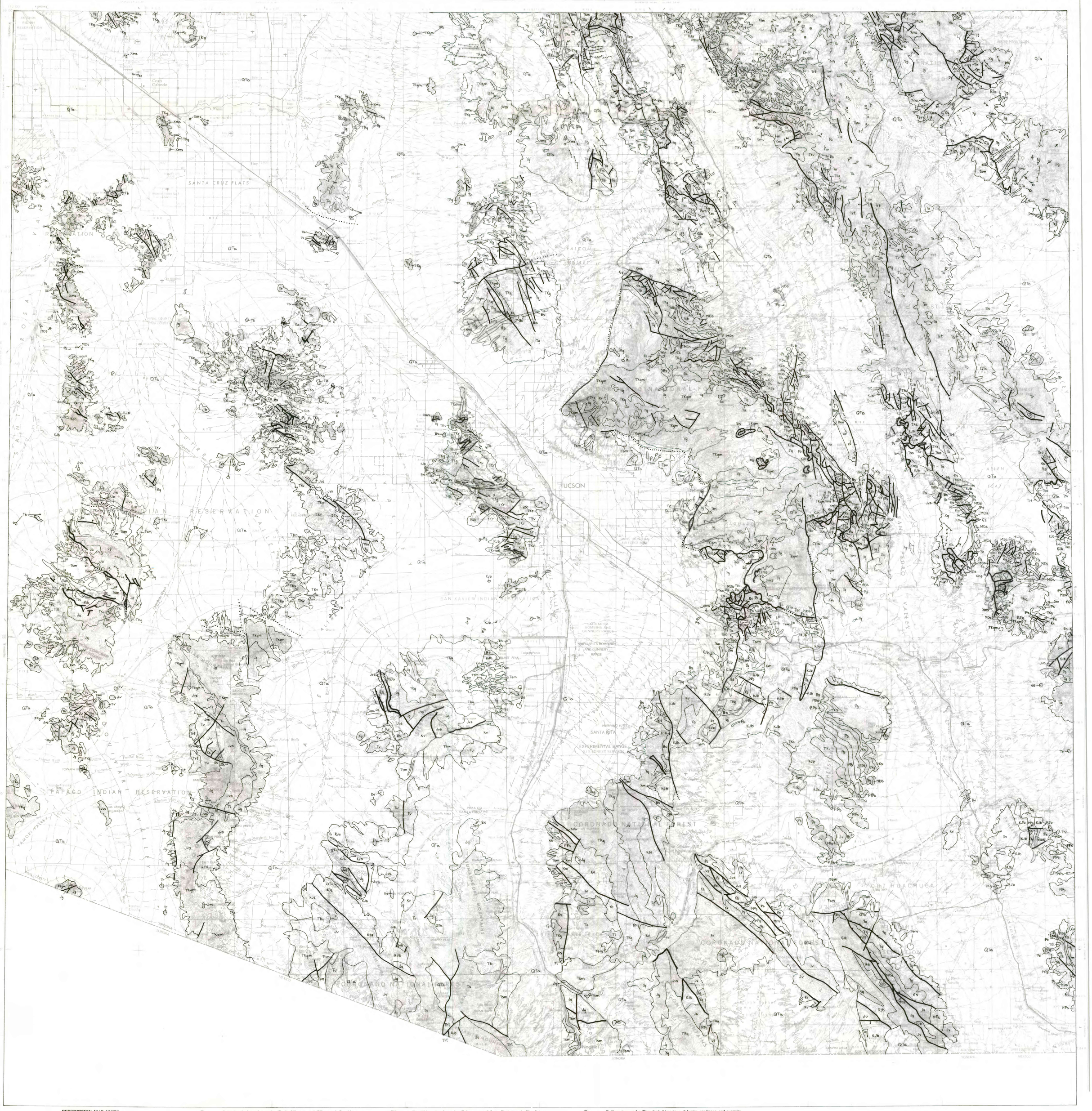
OPEN-FILE REPORT 90-276



DESCRIPTION MAP UNITS

QTa **Alluvium and sedimentary rock (Holocene to Middle Miocene)**--Unconsolidated to well-consolidated and caliche-cemented sand, silt, and gravel and dissected basin-fill deposits of conglomerate, sandstone, and siltstone with minor lacustrine rocks. Includes Quiburis Formation, Ft. Lowell Formation, and parts Rillito Andesite (Brown, 1939) and Nogales and Big Dome Formations

Tsm **Sedimentary rocks (Middle and Early Miocene)**--Conglomerate and sandstone that largely postdate the main pulse of middle Tertiary volcanism and that were deposited during middle Tertiary tectonism. Includes lower part of Rillito Andesite (Brown, 1939), Nogales Formation, San Manuel Formation, Ripsey Wash sequence, Hell Hole Conglomerate, Apsey Conglomerate, and lower part of Big Dome Formation

Tb **Basaltic volcanic rocks (Middle Miocene to Oligocene)**--Generally flat-lying to gently dipping flows of basalt and basaltic andesite, with interbedded sedimentary rocks and tuff

Tsv **Sedimentary, volcaniclastic, and volcanic rocks, undivided (Early Miocene and Oligocene)**--Sedimentary and volcaniclastic rocks interbedded with middle Tertiary volcanic rocks. Includes Cloudburst Formation and eulvalent rocks, and Wymola Conglomerate (Shafiqullah and others, 1976) near Picacho Peak

Tv **Volcanic rocks, undivided (Early Miocene and Oligocene)**--Includes (1) flows of basalt, andesite, and trachyandesite; (2) lava flows, flow breccia, and ash-flow tuff of rhyolitic, latitic, and dacitic composition; (3) potassium-metasomatized volcanic rocks at Picacho Peak; and (4) subordinate, interbedded sedimentary rocks

Tr **Rhyolitic volcanic rocks (Early Miocene and Oligocene)**--Rhyolitic, latitic, and dacitic lava flows and intrusive rocks with volcanic textures. Includes interbeds of pyroclastic and reworked pyroclastic rocks

Trt **Rhyolitic tuff (Early Miocene and Oligocene)**--Rhyolitic, latitic, and dacitic ash-flow tuff with local ash-flow and tuffaceous sedimentary rocks. Includes several members of Galiuro Volcanics and Recortado ash flow (Bikerman, 1967)

Ta **Andesitic volcanic rocks (Early Miocene and Oligocene)**--Andesite, trachyandesite, and dacite lava flows, agglomerate, and interbedded subordinate clastic and pyroclastic rocks. Includes coarsely plagioclase-porphyritic andesite, informally referred to as a "turkey-track" porphyry

Ti **Subvolcanic intrusive rocks (Early Miocene and Oligocene)**--Basaltic to rhyolitic or apilitic dikes, sills, and plugs with a volcanic or fine-grained granitic texture

Tg **Granitoid rocks (Early Miocene and Oligocene)**--Generally medium-grained biotite granodiorite and granite

Tm **Mylonitic rocks (Early Miocene and Oligocene)**--Mylonitic gneiss and schist exposed beneath Catalina and Picacho detachment faults. Formed by Tertiary mylonitization of Proterozoic crystalline rocks and Tertiary granitoid rocks

Tso **Sedimentary rocks (Oligocene and latest Eocene)**--Conglomerate, sandstone, siltstone, and lacustrine rocks deposited prior to main pulse of middle Tertiary volcanism. Includes Whitetail Conglomerate, Pantano Formation, Mineta Formation (Dickson and Shafiqullah, 1989) and Three Links Conglomerate

TKgm **Peraluminous, generally muscovite-bearing granite (Eocene to Late Cretaceous)**--Medium- to coarse-grained peraluminous granite with minor amounts of biotite, muscovite, and garnet. Associated with aplite and pegmatite. Includes Wilderness granite (Keith and others, 1980), Wrong Mountain Granite, granite of Derrio Canyon, Pan Tak Granite, and phases of Tea Cup Granodiorite and Texas Canyon Quartz Monzonite

TKg **Granitoid rocks (Paleocene and Late Cretaceous)**--Generally medium- to fine-grained biotite-hornblende granodiorite, granite, diorite, and local gabbro. Commonly porphyritic and associated with copper mineralization. Includes Ruby Star Granodiorite, Amole Granite (Brown, 1939), Texas Canyon Quartz Monzonite, Leatherwood quartz Diorite (Bromfield, 1952), granodiorite of Chirreon Wash, quartz monzonite of Mineral Butte, granite of Sacaton Peak, Copper Creek Granodiorite, and phases of Tea Cup Granodiorite

TKs **Sedimentary rocks (Paleocene and Late Cretaceous)**--Conglomerate, sandstone, siltstone, and shale, locally of a volcaniclastic nature. Includes Claflin Ranch Formation (Richard and Courtright, 1960) and Cascabel formation

TKi **Intrusive rocks, undivided (Early Tertiary and Late Cretaceous)**--Dikes, sills, and other intrusions of rhyolite to andesite. Includes Amole Latite (Brown, 1939) and porphyritic biotite rhyodacite in Comobabi Mountains

TKv **Volcanic rocks, undivided (Paleocene and Late Cretaceous)**--Andesitic, dacitic, and rhyolitic lava flows, pyroclastic rocks, and local subvolcanic intrusions. Includes Glory Hole Volcanics, Williamson Canyon Volcanics, Mideleho volcanics, Roskruge Volcanics, and numerous units in the Tucson Mountains, such the Tucson Mountain Chaos (Courtright, 1958) and andesite megabreccia blocks hosted in a matrix of rhyolitic ash-flow tuff (Cat Mountain Rhyolite (Brown, 1939))

TKr **Rhyolitic volcanic rocks (Paleocene and Late Cretaceous)**--Rhyolitic to dacitic flows, tuff, volcaniclastic rocks, and subvolcanic intrusions. Include tuff of Confidence Peak, Mount Lord Volcanics, and Cat Mountain Rhyolite (Brown, 1939)

Ks **Sedimentary rocks (Cretaceous)**--Conglomerate, sandstone, and finer grained rocks including American Flag Formation, Pinkard Formation, and rocks of uncertain affinity in southern Winchester Mountains

Kv **Volcanic rocks (Cretaceous)**--Andesite flows and tuffs with intercalated dioritic rocks and conglomerate. Rhyodacitic tuffs and flows locally intensely silicified

Kg **Granitoid rocks (Cretaceous)**--Porphyritic granodiorite stocks

KJb **Bisbee Group and related rocks (Early Late Cretaceous to Late Jurassic)**--Sandstone, siltstone, shale, conglomerate, and limestone. Includes Glance Conglomerate and other units of Bisbee Group, Amole Arkose (Brown, 1939), Sand Wells Formation, and correlative rocks in Roskruge, Silver Bell, and Santa Rosa Mountains

KJs **Sedimentary rocks, undifferentiated (Cretaceous and Jurasic)**--Sandstone, siltstone, and conglomerate in Waterman Mountains. Probably contains rocks equivalent to units KJb and Js

Js **Sedimentary rocks (Jurassic)**--Sandstone, siltstone, conglomerate, and their metamorphic equivalents, including phyllite, quartzite, and schist

Jvs **Volcanic and sedimentary rocks, undivided (Jurassic)**--Rhyolitic flows and tuff, andesitic to trachyandesitic flows and flow breccia, interbedded with mudstone, siltstone, sandstone, and conglomerate. Includes Walnut Gap Volcanics and Sil Nakya and Cocoraque Formations

Jv **Volcanic rocks (Jurassic)**--Rhyolitic, dacitic, and andesitic volcanic flows, flow breccia, and tuff, with local sedimentary rocks

Ja **Andesitic volcanic rocks (Jurassic)**--Andesitic to trachyandesitic flows, flow breccia, tuff, and associated sedimentary rocks

Jg **Granitoid rocks (Jurassic)**--Coarse- to fine-grained granite, granodiorite, quartz syenite, syenodiorite, diorite, and rhyolite, rhyolite porphyry, and aplite intrusions

Jm **Metamorphic rocks (Jurassic)**--Schistose rocks of volcanic, sedimentary, and uncertain origin

Pzs **Sedimentary rocks, undifferentiated (Paleozoic)**--Limestone, dolomite, sandstone, quartzite, siltstone, shale, and conglomerate, commonly metamorphosed to low grade

PPs **Sedimentary rocks (Permian and Pennsylvanian)**--Limestone, dolomite, sandstone, siltstone, and conglomerate of Naco Group

Ps **Sedimentary rocks (Permian)**--Limestone, dolomite, sandstone, and quartzite of upper part of Naco Group. Includes Rainvalley Formation, Concha Limestone, Scherrer Formation, Epitaph Dolomite, and Colina Limestone

IPs **Sedimentary rocks (Pennsylvanian)**--Limestone, dolomite, sandstone, siltstone, and conglomerate of lower part of Naco Group. Includes Earp and Horquilla Formations

MDs **Sedimentary rocks (Mississippian and Devonian)**--Limestone and dolomite with minor shale, siltstone, sandstone, and conglomerate. Includes Black Prince Formation, Escabrosa Limestone, and Martin Formation

Ꞓs **Sedimentary rocks (Cambrian)**--Quartzite, sandstone, shale, conglomerate, limestone, and dolomite. Includes Abrigo Formation and Bolsa Quartzite

Ypzs **Sedimentary rocks, undivided (Paleozoic and Middle Proterozoic)**--Includes Paleozic sedimentary rocks and Proterozoic Apache Group, with local diabase

Ydb **Diabase (Middle Proterozoic)**--Dikes and sills of fine- to coarse-grained diabase and associated rocks

Ya **Apache Group (Middle Proterozoic)**--Quartzite, siltstone, mudstone, limestone, and conglomerate. Includes Troy Quartzite, Mescal Limestone, Dripping Spring Formation, and Pioneer Formation

Yg **Granite (Middle Proterozoic)**--Coarse- to medium-grained granite and granodiorite, commonly with megacrysts of K-feldspar. Includes 1.45 Ga Oracle Granite (Peterson, 1938), Ruin Granite, and Tungsten King Granite. Many outcrops contain dikes of pegmatite, alaskite, and aplite

Xg **Granite (Early Proterozoic)**--Undeformed to foliated, medium-grained granodiorite, granite, and quartz diorite. Includes 1.65 Ga Johnny Lyon Granodiorite and correlative rocks

Xm **Metamorphic rocks, undivided (Early Proterozoic)**--Greenschist to lower-amphibolite-facies metasedimentary, metavolcanic, metahypabyssal, and metaplutonic rocks

Xms **Metasedimentary rocks (Early Proterozoic)**--Schist, phyllite, metasandstone, and quartzite, with some metaconglomerate and metavolcanic rocks

Xmv **Metavolcanic rocks (Early Proterozoic)**--Schist, greenstone, and foliated and metamorphosed rhyolitic, dacitic, and andesitic flows, flow breccia, and tuff

MAP SYMBOLS

Contact

Fault—Bar and ball on downthrown side

Low-angle normal fault—Hachures on upper plate

Detachment fault—Hachures on upper plate

Tectonized (ductile) contact—Teeth on upper plate

Thrust fault—Teeth on upper plate

Dike

Mafic composition

Intermediate composition

Felsic composition

Strike and dip of bedding

Inclined

Horizontal

Strike and dip of foliation or schistosity

Inclined

Horizontal

Base from U.S. Geological Survey
Nogales, 1956 (1969); Tucson, 1956 (1977)

TRUE NORTH
MAGNETIC NORTH
12°
Approximate Mean Declination, 1988

Scale 1:250,000

5 0 5 10 15 20 Statute Miles

5 0 5 10 15 20 25 30 Kilometers

5 0 5 10 15 Nautical Miles

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS

TRANSVERSE MERCATOR PROJECTION

ARIZONA
AREA OF MAP

PLATE 1

GEOLOGIC MAP OF THE TUCSON AND NOGALES QUADRANGLES