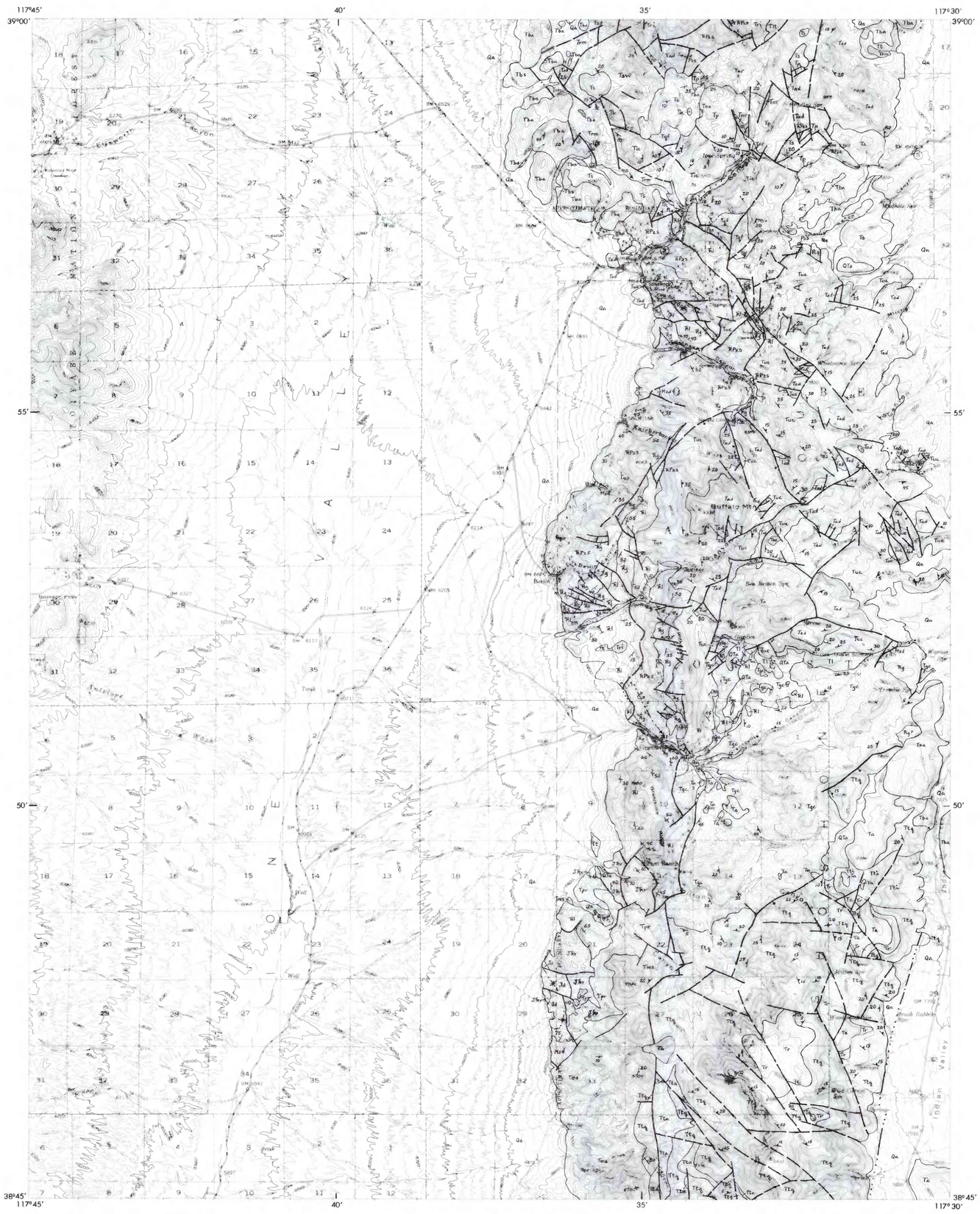
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OPEN FILE REPORT
88-48



Base from U.S. Geological Survey, 1948

Geology mapped by D.H. Whitebread, 1984-85; N.J. Silberling, 1950, 1953, and 1983; G.F. Brem, 1984; and T.D. Andrews, 1984-85

SCALE 1:62 500

1 ½ 0 1 2 3 4 5 MILES

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE LOCATION

INTRODUCTION

The geology of the Shoshone Mountains in the eastern half of the Ione 15-minute quadrangle was mapped during a study of the geology and mineral resources of the Tonopah 1° by 2° quadrangle as part of the Conterminous United States Mineral Assessment Program (CUSMAP). The geology of the pre-Tertiary rocks, mapped earlier by Silberling (1959), was revised and the stratigraphic nomenclature was updated. The Tertiary rocks had been mapped previously by Vitaliano (1963). The geology of the Tertiary rocks exposed along the western edge of the Ione quadrangle is included on a map of the Paradise Range by John (1988). The geology of the Shoshone Mountains immediately north of the Ione quadrangle has been mapped by Bonham (1970), and the geology east and south of the quadrangle has been mapped by G.F. Brem and others (written comm., 1985).

The stratigraphic section of Miocene and Oligocene volcanic and sedimentary rocks in the northern part of the quadrangle differs markedly from that in the central and southern part. The two sections are separated by faults. The irregular boundary between the two sections extends from near the mouth of Ione Canyon eastward across the range to Spanish Ranch Canyon. The tuff of Arc Dome is the only ash-flow tuff that can be correlated with certainty between both sections.

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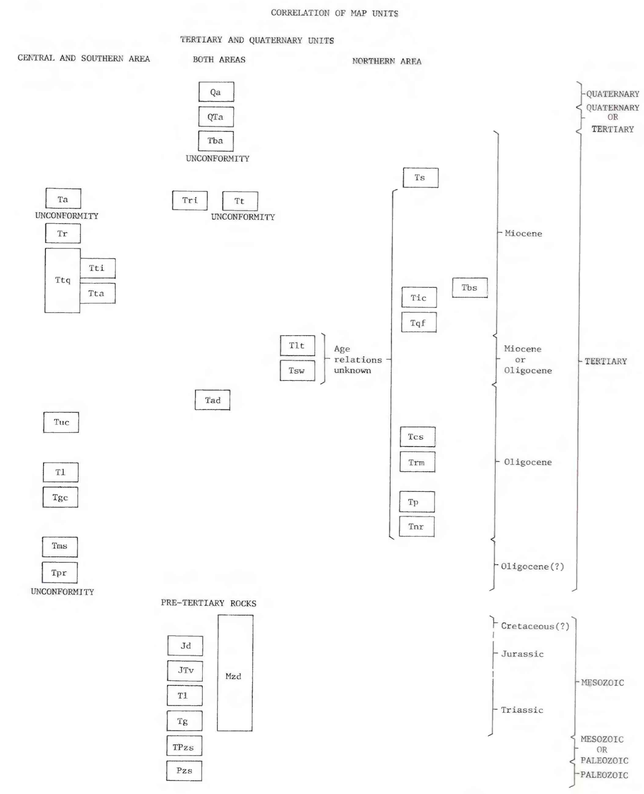
CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qa **Alluvium (Quaternary)**--Consolidated and unconsolidated alluvium. Includes colluvium, talus, alluvial fan deposits, and basin fill

QTa **Older alluvium (Quaternary and Tertiary)**--Remnants of sand and gravel deposits that cap high-level benches and ridges

Tba **Basalt and andesite (Miocene)**--Aphyric to sparsely porphyritic basalt and andesite flows

Ts **Sedimentary rocks (Miocene)**--Tuffaceous sandstone, siltstone, and conglomerate; platy water-laid tuff; and nonwelded tuff. Locally highly silicified

Tri **Rhyolitic intrusive rocks (Miocene)**--Sparsely porphyritic rhyolite, locally flow-banded. Phenocrysts of quartz, K-feldspar, and rare biotite

Tt **White tuff (Miocene)**--White to grayish-pink, moderately crystal-poor to crystal-rich, nonwelded tuff. Phenocrysts of quartz, biotite, and K-feldspar. Locally contains lithic fragments. Correlation of the tuff in the northeastern part of the area with that along the west side of the range is uncertain

Ta **Andesite (Miocene)**--Aphyric to sparsely porphyritic andesite or trachyandesite flows and intrusive rocks. Phenocrysts are hornblende, pyroxene, and plagioclase. K-Ar age 17.1 ± 0.5 Ma in Indian Valley (McKee and John, 1987)

Tr **Rhyolite (Miocene)**--Sparsely porphyritic rhyolite flows. K-Ar age 20.3 ± 0.6 Ma in Toiyabe Range (McKee and John, 1987)

Toiyabe Quartz Latite (Miocene)

Ttq **Ash-flow tuff**--Densely welded, crystal-rich ash-flow tuff containing about 25-40 percent phenocrysts of plagio clase, biotite, K-feldspar, quartz, and minor horn blende. K-Ar ages 21.4 ± 0.7 and 22.9 ± 0.7 Ma in Paradise Range (McKee and John, 1987)

Tti **Quartz latite**--Interpreted to be a plugged vent for ash-flow tuff of the Toiyabe Quartz Latite. K-Ar age is 22.5 ± 0.7 Ma (McKee and John, 1987)

Tta **Andesite**--Sparsely porphyritic andesite flows

Tbs **Tuff of Big Spring (Miocene)**--Rhyolitic ash-flow tuff containing about 20 percent phenocrysts of K-feldspar, quartz, plagioclase, and rare biotite. Pumice-poor and lithic-poor. Named for exposures in Paradise Range (John, 1988)

Tlc **Tuff of Ione Canyon (Miocene)**--Two cooling units of crystal-rich ash-flow tuff containing phenocrysts of plagioclase and lesser quartz, K-feldspar, and biotite. Lower unit contains about 30-40 percent phenocrysts. Upper unit, which contains about 20-30 percent phenocrysts, is commonly platy and contains lithic fragments. White pumice as much as 5 cm long. K-Ar age from vitrophyre at base of upper unit is 22.3 ± 0.7 Ma (McKee and John, 1987)

Tqf **Quartz-felspar tuff (Miocene)**--Crystal-rich ash-flow tuff containing about 35-50 percent phenocrysts of K-feldspar, quartz, sparse plagioclase, and rare biotite. White pumice is 1-3 cm long

Tlt **Lithic tuff (Miocene or Oligocene)**--Light gray, crystal-poor, lithic-rich ash-flow tuff containing about 5-10 percent phenocrysts of plagioclase, quartz, sparse to common K-eldspar, and minor biotite. Age relations with other Tertiary units unknown

Tsw **Tuff of Sand Wash (Miocene or Oligocene)**--Compound cooling unit of poorly to densely welded, moderately crystal poor ash-flow tuff containing about 5-25 percent phenocrysts of plagioclase, K-feldspar, quartz, and locally prominent biotite. Age relations with other Tertiary units unknown

Tad **Tuff of Arc Dome (Oligocene)**--Densely welded, crystal-rich, rhyolitic ash-flow tuff containing 30-50 percent phenocrysts of K-feldspar, plagioclase, quartz, and minor biotite. Characterized by bipyramidal quartz crystals. Pumice locally as long as 10 cm. Dark fiamme in basal part. Rare small lithic fragments. K-Ar age is 24.4 ± 0.5 Ma (Armstrong, 1970)

Tuc **Tuff of Union Canyon (Oligocene)**--Compound cooling unit of crystal-poor, densely welded ash-flow tuff containing about 5-10 percent phenocrysts of K-feldspar, plagioclase, quartz, and minor biotite. Some parts contain 10-20 percent lithic fragments. Upper part contains prominent dark fiamme as long as 30 cm. Probably equivalent in part to the tuff of Gabbs Valley (Ekren and others, 1980), tuffs of Menter Canyon and Green Springs (John, 1988), and may include some tuff of Camel Spring (John, 1988)

Tcs **Tuff of Camel Spring (Oligocene)**--Pale red, crystal-poor, densely welded ash-flow tuff containing about 5-10 percent phenocrysts of K-feldspar and quartz. Named for exposures in Paradise Range (John, 1988)

Trm **Tuff of Return Mine (Oligocene)**--Light gray, poorly welded, moderately crystal-rich lithic tuff containing about 10-25 percent phenocrysts of quartz, K-feldspar, plagioclase, and minor biotite. Named for exposures in Paradise Range (John, 1988)

Tl **Porphyritic latite (Oligocene)**--Coarsely porphyritic latite containing about 40 percent phenocrysts of plagioclase, biotite, pyroxene, and minor hornblende in a fine-grained groundmass

Tgc **Tuff of Grantsville Canyon (Oligocene)**--Light yellowish gray, altered, crystal-rich ash-flow tuff characterized by large embayed quartz phenocrysts. Lithic content 0-15 percent. Contains about 25-40 percent phenocrysts of quartz, K-feldspar, plagioclase, and minor biotite.West of Grantsville Canyon includes some tuffaceous sedimentary rocks at top of unit

Tp **Platy tuff (Oligocene)**--Platy, crystal-rich, moderately welded tuff with prominent pumice 1-3 cm long. Contains 25-35 percent phenocrysts of plagioclase, quartz, K- feldspar, biotite, and accessory sphene. K-Ar age 30.0 ± 0.9 Ma (McKee and John, 1987)

Tnr **Nonwelded rhyolitic tuff (Oligocene)**--Nonwelded to poorly welded, crystal-rich ash-flow or ash-fall tuff containing about 40 percent phenocrysts of K-feldspar, quartz, and minor plagioclase and biotite. Contains sparse lithic fragments. Upper part is water-laid tuff with interbedded volcaniclastic conglomerate and sandstone

Tms **Mission Spring Formation of Vitaliano and Vitaliano (1972) (Oligocene(?)**--Rhyolitic ash-flow tuff and massive to platy rhyolitic flows. Flows locally flow-banded. Tuffs are generally crystal-poor, with phenocrysts of plagioclase, K-feldspar, and minor biotite and quartz. Lithic tuff contains fragments of pre-Tertiary rocks. Commonly propylitized or silicified

Tpr **Porphyritic rhyodacite (Oligocene(?))**--Consists mainly of altered porphyritic rhyodacite to andesite flows. May include some lithic tuff. Equivalent in part to the Third Canyon Formation of Vitaliano and Vitaliano (1972)

Mzd **Diorite (Mesozoic)**--Predominantly quartz diorite, but grades in composition from diorite to granodiorite. Small body between Spanish Canyon and Mission Canyon is quartz monzonite porphyry

Jd **Dunlap Formation (Middle? and Lower Jurassic)**--Mainly sandstone, either white to brown, massive, fine-grained, and quartzose or gray-green and gray-red, volcanogenic, and partly gritty or pebbly; silty, dense, algalaminated dolomite units occur near top and form highest exposed part of section; exposed thickness about 250 m

JTv **Volcano Peak Group of Taylor and others (1983) (Lower Jurassic and uppermost Upper Triassic)**--Calcareous argillite, calcareous siltstone, and silty or sandy limestone, in alternating, repetitious succession; minor limestone and pebble conglomerate near top; locally fossiliferous; marine; thickness about 800 m

Tl **Luning Formation (Upper Triassic)**--In descending order:
Dense, predominantly fine-grained and algal-laminated, intertidal or supertidal dolomite; several meters of massive, shelly, sugary secondary dolomite at top; unit thickness about 300 m
Thick-bedded, partly shelly, lime mudstone with subordinate interstratified argillite; massive, sugary, secondary dolomite intercalated in upper part; represents a carbonate-platform deposit; platform-margin, cross-bedded, crinoidal grainstone 2-3 m thick at base; section incompletely exposed, thickness exceeds 300 m
Calcareous shale having lime mudstone interbeds widely spaced in lower part and increasingly abundant towards top; represents a progradational basinal deposit; thickness about 165 m
Impure limestone interbedded and interlensing with calcareous mudstone; represents a basinal deposit grading downwards into shallow-marine, shelly, impure limestone; thickness about 170 m
Argillite, sandstone, and conglomerate; gray-green (tuffaceous?) argillite at top, grading downward into interbedded argillite and chert sandstone, grit, or conglomerate; massive chert-pebble to -boulder conglomerate at base; thickness 170-200m

Tg **Grantsville Formation (lowest Upper and Middle Triassic)**--
Upper part, massive gray limestone grading downward into impure, brown-weathering, shelly limestone; thickness about 100 m
Lower part, gray-brown silty and sandy argillite overlying massive chert-pebble conglomerate having lenses of sandy argillite; about 10 m of grayish-red, volcanogenic argillite at base; thickness about 120 m

TPzs **Greenstone of Shamrock Canyon (Triassic and (or) upperPaleozoic)**--In descending order:
Meta-andesite breccia and flows with subordinate volcaniclastic conglomerate; thickness exceeds 300 m
Limestone, generally recrystallized, partly bioclastic, locally impure with lenses of volcaniclastic sedimentary rocks; thickness about 60 m
Meta-andesitic volcaniclastic and tuffaceous rocks; progradational turbiditic sequence of gray-green tuffaceous argillite having graded volcanic sandstone interbeds and intercalated units of massive volcanic sandstone and conglomerate; granitoid cobbles conspicuous in conglomerate near top; base not exposed, thickness exceeds 400 m

Pzs **Quartzitic rocks (lower Paleozoic (?))**--Orthoquartzitic sandstone forming massive resistant units several tens of meters thick separated by subordinate argillaceous quartz siltstone and sandstone, some containing chert pebbles; all contacts faulted, structural thickness at least 200 m

Contact

Fault--Dashed where approximately located, dotted where concealed. Bar and bell on downthrown side

Axial trace--first-deformation syncline

Axial trace--second-deformation overturned anticline

Strike and dip of beds

Inclined

Overturned

Strike and dip of cleavage

Inclined

Vertical

Strike and dip of inclined compaction foliation

PRELIMINARY GEOLOGIC MAP OF THE EASTERN HALF OF THE IONE QUADRANGLE, NYE COUNTY, NEVADA

by

Donald H. Whitebread, Norman J. Silberling, Gerald F. Brem, and Terry D. Andrews

1988