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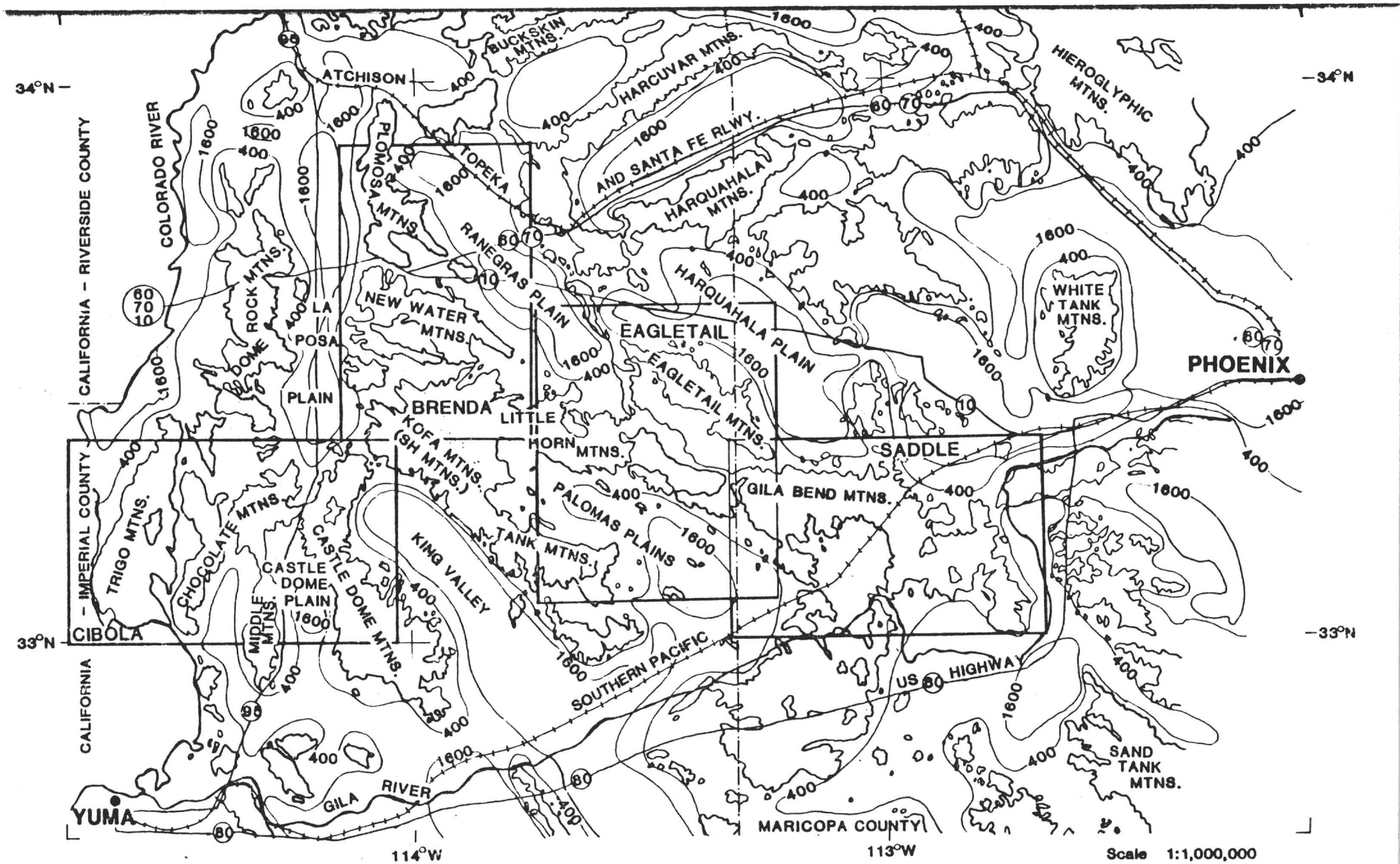

Figure 1. LOCATION OF THE CIBOLA, BRENDA, EAGLE TAIL AND SADDLE SUB-AREAS OF THE KOFA GRA. Surface physiography and depth to basement contours in feet, after Oppenheimer and Sumner (1981).

La Paz Cty - rept. by Geoexplorers for BLM in AZ Bur Mines Lib

Maricopa Cty

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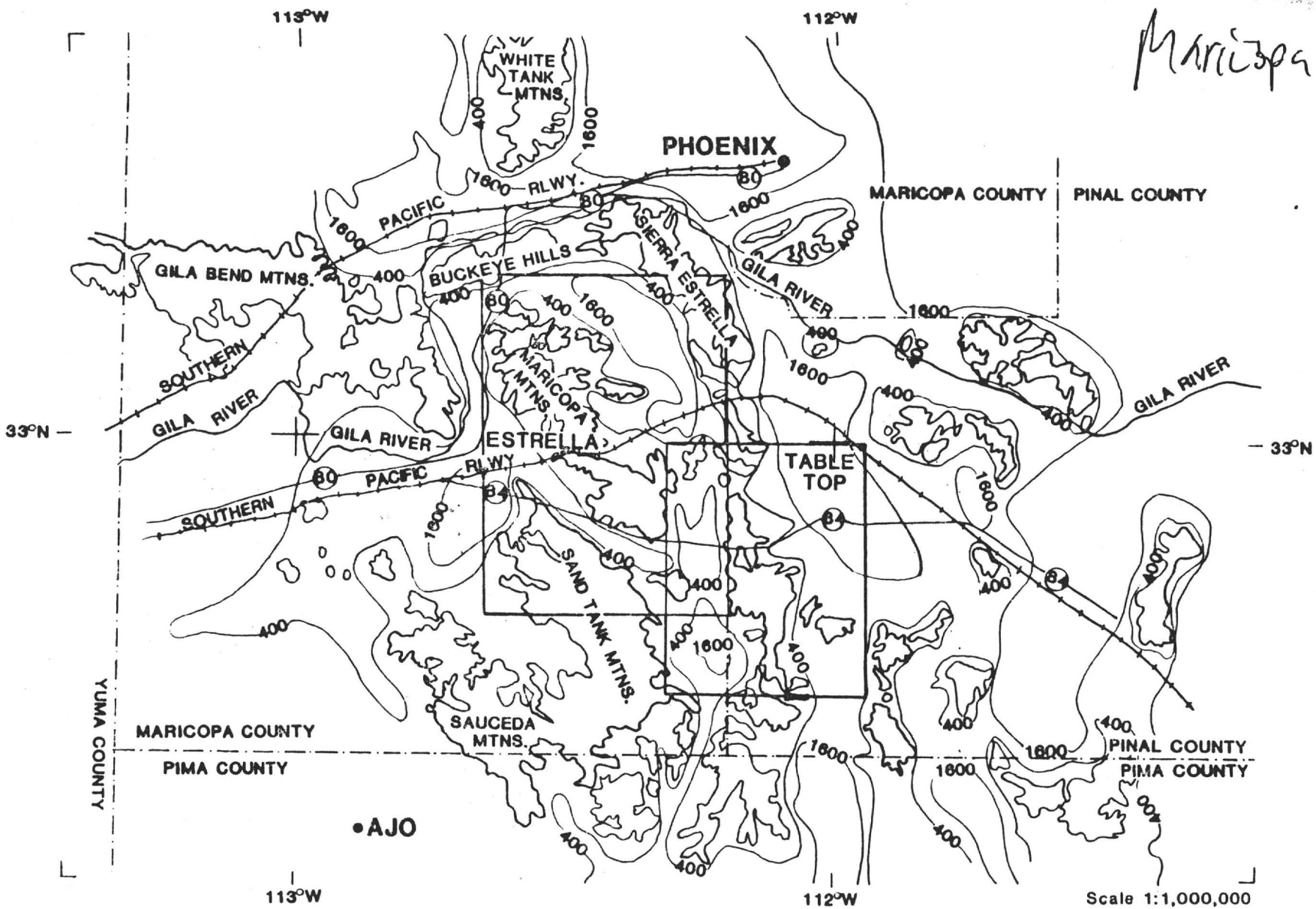

Figure 1. LOCATION OF THE ESTRELLA AND TABLE TOP SUB-AREAS OF THE MARICOPA GRA. Surface physiography and depth to basement contours in feet, after Oppenheimer and Sumner (1981).

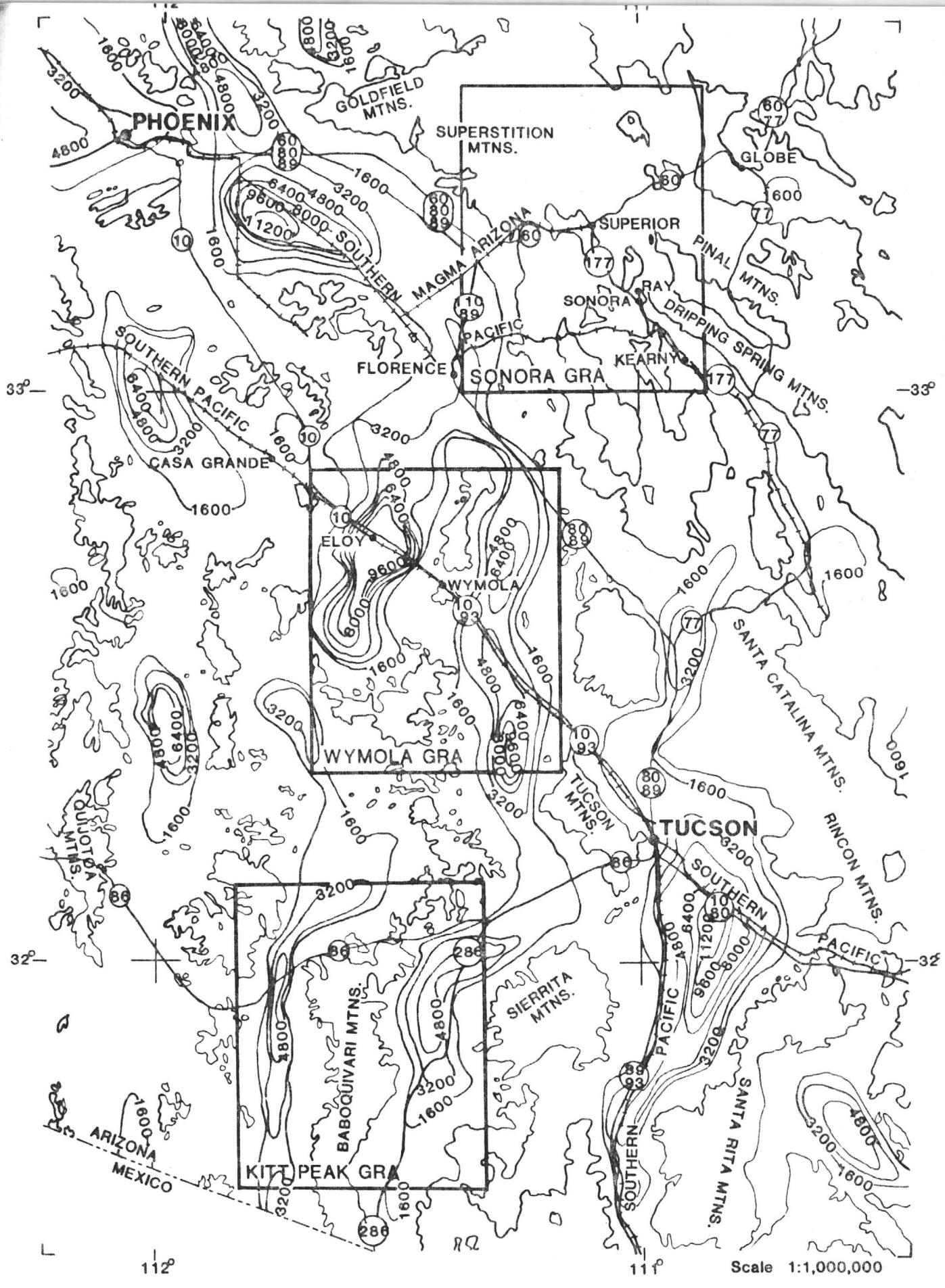

FIG. 1. **PHYSIOGRAPHIC MAP OF SOUTH-CENTRAL ARIZONA SHOWING LOCATION OF SONORA, WYMOLA AND KITT PEAK AREAS. Depth to bedrock contours, interval = 1600 ft., from Oppenheimer and Sumner (1980).**

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Maricopa Cty

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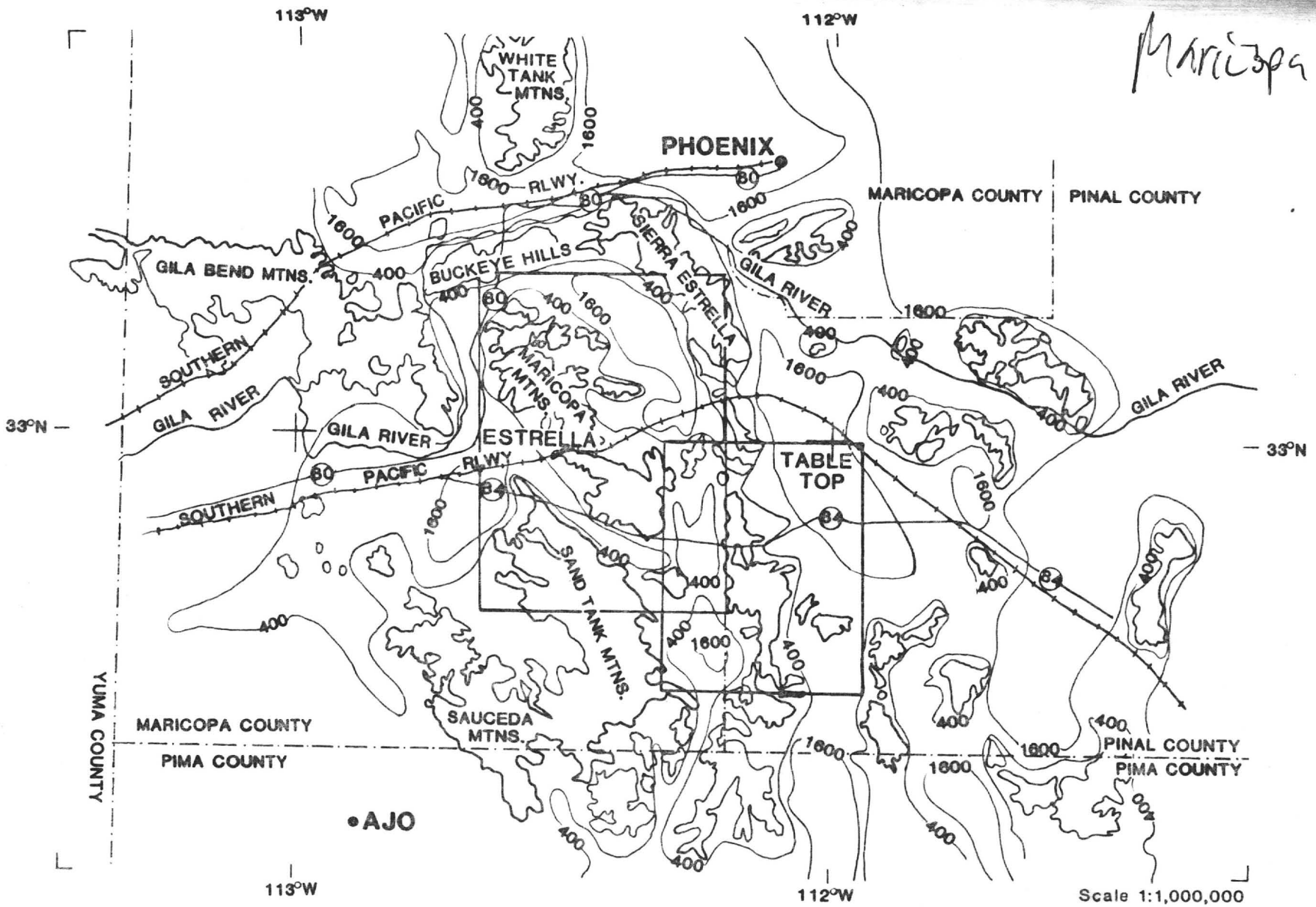

Figure 1. LOCATION OF THE ESTRELLA AND TABLE TOP SUB-AREAS OF THE MARICOPA GRA.
Surface physiography and depth to basement contours in feet, after Oppenheimer and Sumner (1981).

reflections, which are overprinted on Precambrian and Mesozoic structures and crustal layering in the region. The identity of the reflections as being produced by the variably developed mylonitic fabric on a compositionally layered crust can be made primarily by correlation to exposed mylonitic rocks and drill core into the reflective packages. The pattern of mylonitic reflectivity occupies much of the middle crust of the region and extends downward in some places to the sharply defined Moho. The mylonitic rocks are not simply localized as the downward extent of exposed detachment faults. The packages of mylonitic reflections are regionally extensive across the core complex corridor of Arizona and California, including areas around the Black, Chemehuevi, Whipple, Buckskin, Harcuvar, Harquahala, Picacho, Rincon, and Pinaleno Mtns. They also extend to the west of the exposed windows of middle-crustal mylonitic rocks. Seismic lines west of the Old Woman Mtns. and near the So. Chocolate Mtns. suggest that the middle-crustal mylonitic rocks may continue for distances of at least 100-200 km to the west of the core complexes in California and several 100's of kms west of the Arizona complexes, indicating that the mylonitic rocks do not simply root to the northeast beneath the Colorado Plateau. Rather, a widespread zone of Tertiary reworking of the crust by distributed shear appears present. The regionally subhorizontal character of the reflections at mid-crustal level suggests that individual detachment faults probably descend to a mid-crustal zone of accommodation, rather than cutting through the entire crust. Many of the exposed mylonitic rocks are inclined WRT this accommodation zone, indicating that the regionally extensive mylonitic shear zone was disrupted after its initial formation and portions rotated to the surface during continued simple shear within the middle and lower crust. The three-dimensional interaction of such a regional zone of distributed simple shear is attractive to explain the progressive development of the overall detachment terrane on a crustal scale.

SUPERIMPOSED DOMINO-STYLE NORMAL FAULTS IN A TERTIARY BIMODAL VOLCANIC COMPLEX, WICKENBURG MOUNTAINS AND VICINITY, CENTRAL ARIZONA

№ 143031

FRYXELL, J. E., STIMAC, J. A., and REYNOLDS, S. J., Arizona Bureau of Geology, 845 N. Park Ave., Tucson, AZ 85719

The Wickenburg Mountains, located along the boundary between the Basin and Range and Transition Zone Provinces, contain a suite of early to middle Miocene, high-potassium calc-alkaline volcanic rocks that overlie Proterozoic and Late Cretaceous crystalline rocks. Volcanism was strongly bimodal throughout its duration, with basaltic and rhyolitic to dacitic compositions comprising at least 90% of the volcanic rocks. Early volcanism was dominated by eruption of basaltic and phenocryst-poor rhyolitic lava flows and related rhyolitic lithic-rich tuffs. These rocks are overlain by a sequence of phenocryst-rich dacitic lavas and tuffs. Uppermost dacite flows are interbedded with debris flows, basalt flows, megabreccias, and fluvial clastic rocks that are synchronous with major extensional faulting.

The volcanic rocks are tilted 50°-70° ENE. The volcanic section and underlying Proterozoic rocks are repeated on two sets of NNW-striking imbricate normal faults. One set dips 40°-50° SW, and cuts the other, which is subhorizontal. Bedding-to-fault angles average 90° for the younger set, 60° for the older set, and both sets are consistent throughout the map area. The consistency of bedding attitudes, bedding-to-fault angles, and fault orientations indicates that these faults are planar, not listric. These relationships suggest the following sequence of events. Faulting began early during volcanic activity, although most extension followed the bulk of volcanic activity; faults initiated with NNW strikes and 60°SW dips. As extension progressed, the faults and fault blocks moved through about 30° of rotation. Then, a second set of faults formed, at a similar initial orientation as the first set, and moved through 20°-30° of rotation before extension ceased. Preliminary extension estimates of 130% and 150% are obtained, based on palinspastic reconstruction and on fault rotation, respectively.

CONTRASTING ^{40}AR/^{39}AR THERMOCHRONOLOGY OF MINERALS FROM LOWER PLATE ROCKS OF THE BUCKSKIN-BULLARD-EAGLE EYE DETACHMENT FAULT SYSTEM, WEST-CENTRAL ARIZONA

№ 143040

FRYXELL, J. E., USGS Flagstaff, AZ 86001; RICHARD, S. M., Geology Dept., UCSB, Santa Barbara, CA 93106; SUTTER, J. F., USGS Reston, VA 22092; LUCCHITTA, I., USGS Flagstaff, AZ 86001

Subhorizontal mylonitic fabrics with a N60E lineation overprint Precambrian to Tertiary(?) rocks through most of the Buckskin Mountains (BM), but only in the northeast end of the Harquahala Mountains (HM). Both ranges occupy the lower plate of the Buckskin-Bullard-Eagle Eye detachment fault system. Biotite and K-feldspar from the BM yield ^{40}Ar/^{39}Ar age spectra that record early Miocene cooling to argon closure temperature (<300°C) throughout the range, and middle Miocene reheating (<200°C) only in the northeastern BM. Amphibole age spectra in the northeastern BM indicate initial cooling to argon closure temperatures (~500°C) in the Paleocene and minor argon loss in the Miocene. Together these data suggest that (1) the detachment system was active in the Miocene, (2) the mylonitic fabric probably was developed at temperatures not greatly exceeding 300°C, and (3) the middle Miocene reheating probably was caused by circulating hydrothermal fluids during movement on the detachment. In the central and southwestern HM, age spectra of minerals, including K-feldspar, record late Cretaceous to early Tertiary cooling to argon closure temperatures. However, in the northeasternmost HM, where mylonitic fabrics are present, biotite and K-feldspar age spectra show Miocene cooling to argon closure temperature, without reheating, very similar to the southwestern BM. We propose that, in the BM, the detachment denuded a large area of thermally deep crust due to a large amount of slip on the detachment itself, with a relatively small amount of the total extension occurring within the upper plate. In contrast, total extension in the HM was accommodated by greater amounts of extension within the upper plate, therefore less displacement on the Eagle Eye detachment, thus exposing less thermally deep crust.

GEOLOGY AND MINERALIZATION AT THE MILAGROS GOLD DEPOSIT, MANZANO MOUNTAINS, CENTRAL NEW MEXICO

№ 136653

FULP, M.S., Santa Fe Pacific Mining, Inc., Box 27019, Albuquerque, NM 87125; WOODWARD, L.A., Department of Geology, University of New Mexico, Albuquerque, NM 87131

The Milagros gold deposit is a lenticular vein emplaced in a northeast-trending shear zone in the Precambrian Hell Canyon greenstone sequence which is about 4,500 feet thick and consists of metatholeiite with subordinant metasediments and metadacite. The greenstone is underlain by at least 1,900 feet of metasediments, is locally overlain by 2,000 feet of metamorphosed rhyodacite crystal-rich tuff, and is intruded by metadiorite.

Native gold occurs in sintery quartz and brecciated iron-rich metachert with minor copper carbonates, iron oxides, and native copper in exposed workings. Sulfides occur in dumps and a few workings, suggesting their presence at depth. The deposit was last mined in the 1970's when an open-pit, heap-leach operation yielded 2,348 ounces of gold and 3,333 ounces of silver. Vein material assayed 0.023 to 0.145 ounce of gold and 0.13 to 1.23 ounces of silver per ton. Production from the nearby Star shaft was about 0.5 ounce of gold per ton and 9-28% copper in the early 1900's. Gold-copper mineralization occurs intermittently along the shear zone for approximately 2,500 feet south of the Milagros and Star mines.

We interpret the gold-copper deposits of the Hell Canyon area as syngenetic, exhalative deposits that were remobilized during deformation and metamorphism in Precambrian time. Additional remobilization may have occurred during hot-spring activity related to late Cenozoic opening of the Rio Grande rift. There is potential for additional gold-copper massive sulfide deposits in the Hell Canyon greenstone.

PROTEROZOIC TUNGSTEN MINERALIZATION IN THE SOUTHERN SANGRE DE CRISTO MOUNTAINS, NEW MEXICO

№ 136691

FULP, Michael S., Santa Fe Pacific Mining, Inc., Box 27019, Albuquerque, New Mexico 87125

Proterozoic (1650-1720 m.y.) tungsten mineralization occurs in a variety of geologic settings in the southern Sangre de Cristo Mountains, New Mexico, including stratabound calc-silicate horizons and sheared sulfide deposits and discordant quartz veins and pods, pegmatites, and fracture coatings. Scheelite is the most common tungsten-bearing mineral although wolframite occurs locally.

Tungsten mineralization is abundant in the metamorphosed volcano-sedimentary terrane of the Glorieta Baldy area where recent exploration has discovered 45 outcropping scheelite occurrences. One of these, the Blacklite prospect in Dalton Canyon, is a stratabound calc-silicate horizon; all others are discordant. In the Pecos greenstone belt, minor scheelite is associated with sheared volcanogenic sulfide deposits at Jones Hill and the Pecos mine. A quartz-copper oxide-wolframite vein occurs in Ortega Quartzite east of Copper Hill in the Picuris Range. Pegmatites in the Rociada, Elk Mountain, and Hermit Peak areas carry minor amounts of tungsten. In addition to these documented occurrences, stream sediment tungsten anomalies occur along the Santa Fe River, Bear Creek, Rio de Las Trampas, and Macho Canyon drainages.

Stratabound tungsten in the southern Sangre de Cristo Mountains is interpreted as volcanogenic-exhalative in origin. Similar occurrences in Precambrian terrane of the Rocky Mountains are small and subeconomic; however, the common association of scheelite with stratabound gold deposits suggests that tungsten could be used as an exploration tool for Precambrian gold deposits.

TECTONIC FABRIC MAP OF THE OCEAN BASINS FROM SEASAT ALTIMETRY DATA

№ 136992

GAHAGAN, Lisa; Institute for Geophysics, Univ. of Texas, 8701 Mopac Blvd, Austin, Texas, 78759-8345

Identifying and locating bathymetric features, such as fracture zones in the ocean basins, are important steps in the process of developing accurate plate reconstruction models. After the tidal and wave effects are removed, the sea surface is a good approximation of the geoid and, as such, reflects the changes in bathymetry beneath it. In 1978, NASA launched the SEASAT satellite, which spent three months acquiring information on certain oceanic parameters. The satellite collected more than four million data points along tracks with equatorial spacings of 165 km. The satellite used radar to measure the distance between itself and the sea surface. Ground-tracking lasers located the position of the satellite in its orbit, permitting the calculation of the distance between the satellite and a reference ellipsoid around the earth. The distance between the satellite and the sea surface was subtracted from the distance between the satellite and the reference ellipsoid, with the remainder being the variation in height of the sea surface. The footprint of the satellite was 6.6 km in area which negated the effects of waves. Repeat orbits of the satellite averaged out the tidal effects. By using the digital SEASAT altimetry data, it is possible to identify bathymetric features and tectonic flow lines on the ocean floor.

Maricopa Cty Az
GSA Ann Mtg

The dominant sets of microfractures are transverse or longitudinal with respect to the northeast-trending folds of the region. Other sets show consistent relationships with bedding orientations, faulting, or the location of overturned fold limbs. Brittle deformation and the development of microfractures occurred partly during folding, but largely following it. Microfractures cut pre-folding stylolites as well as pre- and syn-folding plastic deformational features. The earliest formed microfractures are consistent with the strain geometry of buckle folds with outer arc layer-parallel extension and inner arc layer-parallel shortening. Many microfractures formed on northwest limbs as they were rotated to overturned and underwent down-dip extension. Faults which propagated through fold limbs late in the folding history were accompanied by profuse microfracturing. The youngest microfractures post-date folding and maintain a constant orientation normal to the fold axis regardless of bedding orientation. Veins filled with unfractured quartz and recrystallization in highly strained zones completed the deformational history of the area.

SEALEVEL CONTROL ON PALEOLATITUDE LIMITS OF MESOZOIC-CENOZOIC PLATFORM CARBONATE DEPOSITION | № 133198

OPDYKE, Bradley N. and WILKINSON, Bruce H., Department of geological Sciences, The University of Michigan, Ann Arbor, MI 48109-1063

Global mass-age data on Mesozoic-Cenozoic limestones indicate relatively invariant rates of carbonate accumulation, steadily declining deposition on continental platforms, and gradually increasing rates in deep ocean basins. Reduced shallow water carbonate deposition must be reflected as lower vertical accumulation rate, decreased latitudinal distribution, and/or more restricted low-latitude shelf area related to lower sealevel. In order to evaluate effects of changing continental freeboard on platform carbonate accumulation rate, the paleolatitudinal extent of shallow water limestone was compiled at 20 million year time intervals from the late Jurassic to present. Paleogeographic data from the eastern Atlantic, Tethian, and western Atlantic continental margins all document a roughly 20° southern migration of the limit of platform carbonate deposition that also exhibits a significant positive correlation with decreasing global sealevel. Similarly, calcite compensation depth also exhibits significant positive correlation with sealevel over the same time interval.

Collectively, limestone distributions record changing patterns of carbonate deposition and saturation state in response to changing eustasy. Greater latitudinal extent of carbonate platforms during high sealevel is balanced by a decrease in carbonate production over deep water and subsequent shoaling of the calcite compensation depth. Whereas the distribution of cratonic carbonate records greater latitudinal extent of supersaturated surface water during continental flooding, a paucity of abiotic aragonite suggests lower degrees of supersaturation. Shallow water carbonates record an inverse relation between latitudinal gradients of carbonate saturation and eustasy, with more abrupt poleward decreases during periods of continental emergence.

MAGNETIC STRATIGRAPHY OF THE UPPER PALEOZIC | № 138746

OPDYKE, Neil, D., Geology Dept., 1112 Turlington Hall University of Florida, Gainesville, FL 32611

It has long been known that Permo-Pennsylvania time is dominated by a reversed field for approximately 60 m.y. The use of this reversed superchron for intercontinental correslation has not progressed rapidly because of the following:1) the difficulty of determining the time of remanent acquisition, 2) wide spread problems of remagnetization in both redbeds and limestone, 3) hiatuses in the stratigraphic record, 4) the unknown morphology of the field prior to and following the Permo Carboniferous reversed superchron. Paleomagnetic results from the Minturn fm of Colorado and the Amadem fm of Wyoming will be presented to illustrate ways of determining the timing of remanent acquistion. Results have recently been obtained from the Maringouin fm of New Brunswick from more than 140 samples distributed through 300 meters of section. The high temperature directions of magnetization pass reversal and fold test indicating that the characteristic direction is Pre Permian in age. A distinctive reversal pattern was obtained with four normal and four reversed magnetozones. The top of the Maringouin fm and the bottom of the Shepody fm is reversly magnetized. The pole position obtained from this study is in agreement with paleopole position obtained from the Mauch Chunk fm of Pennsylvania.

GEOLOGY, METALLOGENESIS, AND ISOTOPE GEOCHEMISTRY IN THE SUNFLOWER MINING DISTRICT, MARICOPA CO., ARIZONA | № 143088

ORR, Richard L., and EASTOE, Chris J., Dept. of Geosciences, University of Arizona, Tucson, AZ 85721; CONWAY, Clay, M., U.S. Geological Survey, Flagstaff, AZ 86001

Ore deposits of the Sunflower mining district occur in the Early Proterozoic Alder Formation, a thick sequence of felsic and mafic volcanic rocks, greywacke and slate, that has been metamorphosed, tightly folded, and sheared. During eruption of pillow basalt, a thick exhalative unit of bedded and brecciated dolomite and jasper was deposited, and the basalts were carbonate-altered. Stratabound massive pyrite-arsenopyrite at the Story mine was deposited prior to regional deformation. Arsenical Ag-Au-Pb vein deposits occur within faults and shear zones in and near post-deformational intrusive rhyolite sheets. Cinnabar deposits, also post-deformational, occur as veins and disseminations within shear zones in and near the pre-deformational Early Proterozoic Pine Mountain Porphyry intrusive sheet. Metal ratios in the massive sulfide deposits and Ag-Au-Pb veins are similar, indicating a close genetic association. Enrichment in As, Sb, B, Bi, and Hg suggests a genetic affinity to 1700 Ma silicic magmatism, as in other deposits in the Tonto Basin-Mazatzal Mountains region. Hg is enriched in both the Ag-Au-Pb veins and in the cinnabar veins, the relationship between which is unclear. $\delta^{34}S$ values of pyrite from all deposit types show a narrow range (2.1 to 4.9‰), suggesting a common sulfur source and hydrothermal fluids dominated by reduced S-species. Cinnabar (-12.9 to +2.8‰) formed in rocks containing earlier pyrite (2.4 to 4.9‰) suggesting that S in the cinnabar was derived from pyrite by oxidized fluid in a distinct hydrothermal event. Carbonate $\delta^{13}C$ values include: exhalative: -4.5 to 0.3‰, alteration: -7.3 to -2.5‰ limestones: -0.1 to 0.8‰, cinnabar veins: -1.3‰. Carbonate $\delta^{18}O$ values (9.5 to 21.4‰, SMOW) suggest subsequent interaction with meteoric waters.

PROTEROZOIC CRUSTAL EVOLUTION OF THE LOWER COLORADO RIVER REGION: REAR-ARC OROGENESIS TO ANOROGENIC CRUSTAL REMOBILIZATION | № 143843

ORRELL, Suzanne E., ANDERSON, J. Lawford, Dept. Geol. Sci., Univ. of So. Calif., Los Angeles, CA 90089; WOODEN, Joseph, L., U.S. Geol. Survey, Menlo Park, CA 94025.
WRIGHT, James E., Stanford Univ., Stanford, CA 94305

Granulite to high amphibolite Proterozoic orogenic metamorphism of the lower Colorado River region of southern Nevada, western Arizona, and adjacent California was accompanied by multiple intrusion of synorogenic to late orogenic bimodal suites of tholeiitic gabbro (amphibolite) and crustal-derived, potassic granitic magmas. The latter, dated at 1.64 to 1.71 Ga (U/Pb, zircon) range from magnetite-series metaluminous to ilmenite-series peraluminous suites and contain none of the calc-alkaline intermediate (mantle-derived?) members characteristic of the same orogen exposed to east in central Arizona. The low pressure, high grade of attendant granulite metamorphism (ca 650-750°C at 3.5±0.5 kb) records imposed geothermal gradients in excess of 50°C/km, implying an unusually high heat flow for the region. Following a magmatic hiatus in excess of 200 Ma, renewal magmatism was "anorogenic" but similarly bimodal including voluminous suites of 1.4 Ga, crustal-derived potassic granites, all metaluminous in this region, and swarms of tholeiitic to marginally alkalic diabase of uncertain Proterozoic age.

The high heat flow of the Proterozoic orogenic metamorphism, bimodal character of attendant plutonism, and lack of intermediate igneous suites are indicative of a rear-arc setting relative to synorogenic metamorphism and magmatism exposed to the east in central Arizona. The similarity to later "anorogenic" igneous activity underscores a repetition of the same magma-generation conditions, specifically one of vapor-absent crustal melting in response to mantle-derived underplating of a thinned lower crust.

NEW INSIGHTS INTO THE TECTONIC EVOLUTION OF MEXICO | № 142822

ORTEGA-GUTIERREZ, F., Instituto de Geología, UNAM, Delegación Coyoacan 04510, México, D. F.

Recent developments in plate tectonic theory as applied to México have introduced new concepts into the tectonic evolution of this country. In fact, classic models describing it as an integral part of North América, have stoically resisted the enchanting appeal of the terrane concept that considers 80% of México suspicious of allochthoneity with respect to North América. Nevertheless, known geology at the surface, subsurface and xenolith studies from volcanoes that sampled the deep interior of the Mexican pre-Mesozoic crust provide evidence that Grenvillian rocks extend continuously in the eastern half of México. This crust, however, is not flanked to the east by Appalachian crust similar to that of North América but by enigmatic, calk-alkalic plutons and sedimentary rocks of mainly late Paleozoic-Triassic age.

This fact, contrasted to the apparent continuity (albeit somewhat displaced by Mesozoic left-lateral translations) of the Mexican Grenvillian belt, define a paradox which, if considered in the geological frame of southern México, Where a 180°-rotated version of the Grenville-Appalachian crust is present, it becomes so complex that its solution would be admittedly facilitaded by tectonic models that involve Paleozoic-Mesozoic accretion of far-travelled continental and oceanic fragments against the southern margin of North America and the reverse process (continental truncation), that has been active throughout the Cenozoic.

In the absence of detailed geologic mapping and complementary geochemical, paleontologic, paleomagnetic, isotopic and geophysical studies over this vast territory, the where, when and how these processes if ever ocurred, will have to wait until critical data of such kind become available. These questions are challenging the initiative and imagination of geoscientists working today in Mexico.

Maricopa City Az

1987 GSA

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(602) 937-0587 - unlisted

- Stella Cousins, live in mobile home,

- husband passed away 2 years ago

- lots of partners - 3 people now own it.

- ~~Grand Ave~~. - Castle Hot Springs Road

[Call before noon]

- 1000 Ac.
- 44 claims - unpatented, clear title

Kennecott had it once - core holes

- Ag, Cu

Picture rock

- flour gold

+15 claims (won in suit)

Mill on on side (mica)

- $150,000 cash =

- Castle Mines - about 3 miles up dirt rd. from turn off

near the resort

THE MINING RECORD

SINCE 1889

THE VOICE OF THE MINING INDUSTRY

VOL. 97, NO. 10 WEDNESDAY, MARCH 6, 1985, DENVER, COLORADO 80206 *$24 per year, 50 cents per copy*

Submittals

~~Commonwealth Mine - Pence~~, AZ

~~Castle Dome Prospect~~ - Jim Wilson (Tim Wood) - Yuma

Lloyd Nuttall - Carefree Prospect near Phoenix
(602) 282-4263

~~Vera Cruz Mine~~ - B&B

~~Berber Minerals~~ sub.

From: WSD
To: GAP
Concern: Arizona Borate Program

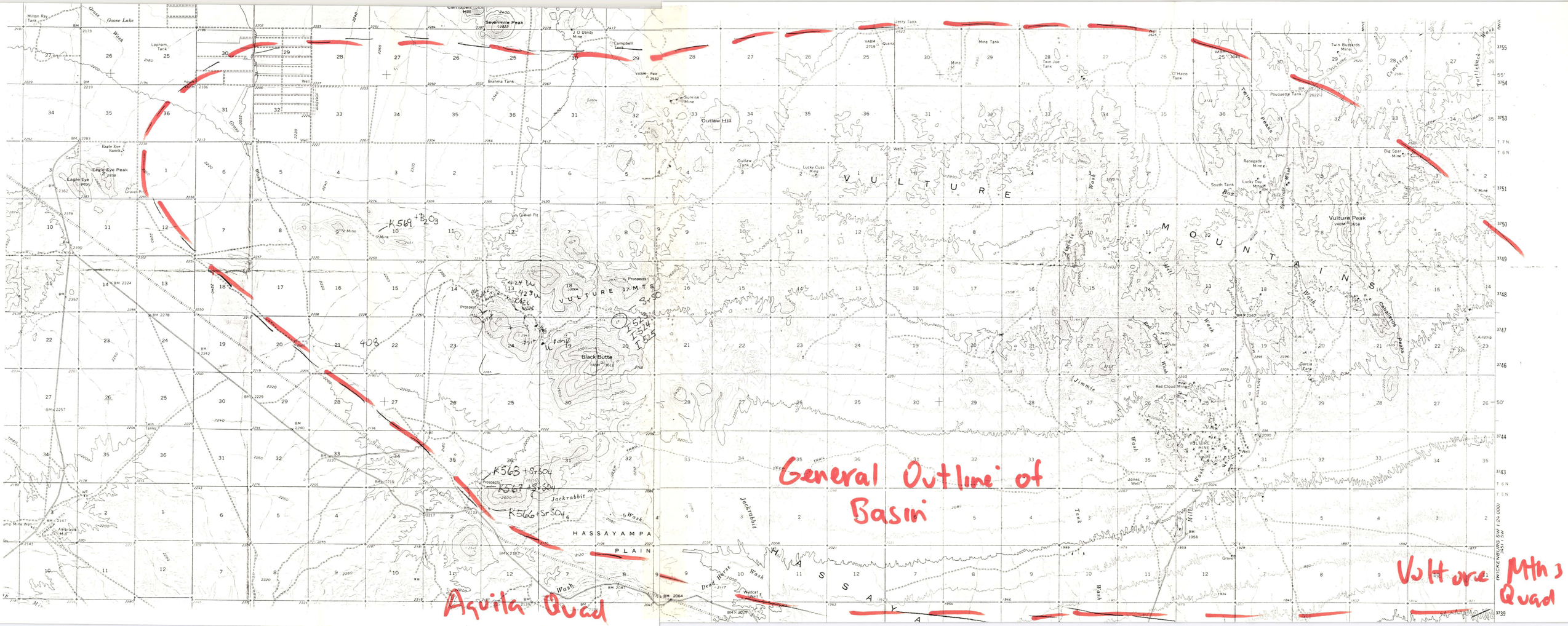
The purpose of this initial reconnaissance of the Pliocene sediments of western Arizona was to determine if the potential exists in this area for borate ore deposits. While these valuable deposits have been exploited in California and Nevada, very little exploration in age-equivalent rocks has occurred in Arizona.

The "Black Butte Basin" south of Aquila, Arizona, in the western Vulture Mountains was chosen for our initial work due to the presence of a bedded celestite deposit and numerous uranium occurrences in associated fine-grained sediments -- both elements are highly enriched in known borate producing areas, particularly in the old Calico borate mining area.

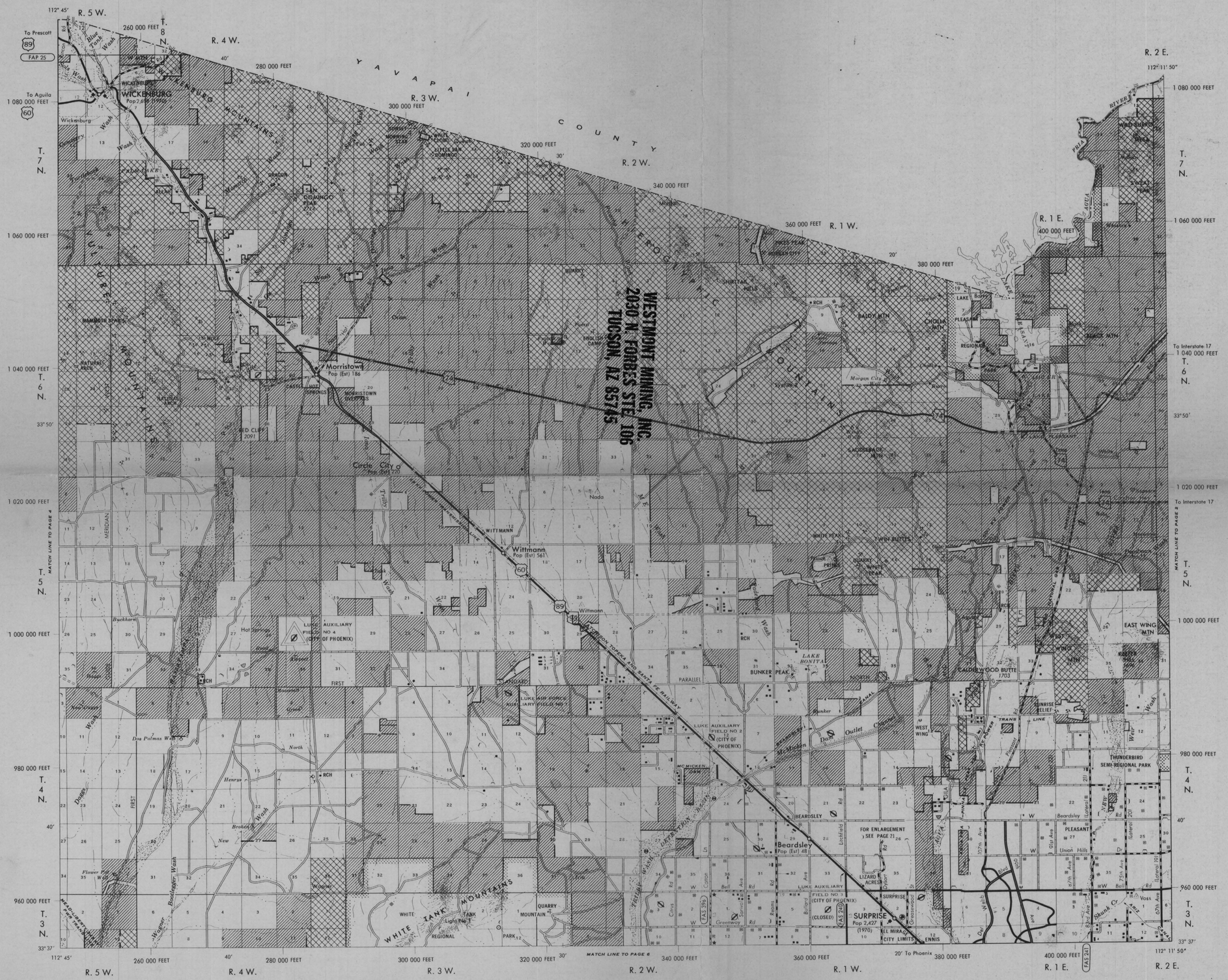
Seven samples were taken from a variety of rock types within the basin and analysed for B_2O_3 and $SrSO_4$. While most samples contained less than 30 ppm B_2O_3, one sample (a uraniferous tuffaceous mudstone) contained greater than 50,000 ppm B_2O_3. $SrSO_4$ ranges from 1,000 ppm to 80,000 ppm in these samples.

The stratigraphy and geologic relationship of the rock types here are similar to those in known districts. Fine-grained shaley sediments and tuffaceous mudstones are intercalcated with mafic flows; they are locally intruded by mafic to felsic plugs. Some Sr-Mn mineralization appears to have occurred during "Black Butte Basin" time and is probably hot spring related.

Our sampling and reconnaissance has covered only the very western-most portion of this basin. I assume it is related temporally to those sediments found further east in the Vulture Mountains. However, our preliminary work suggests that some follow-up be preformed to more fully define this basin and test a thicker section of potentially borate-bearing strata. Certainly, the possibility of discovering a new borate district within the western United States warrants a careful study.


General Outline of Basin
Aquila Quad
Vulture Mtns Quad
VULTURE MOUNTAINS
HASSAYAMPA PLAIN
Black Butte
Vulture Peak
Outlaw Hill
Eagle Eye Peak
Sevenmile Peak
K569 + B2O3
K568 + SrSO4
K567 + SrSO4
K566 + SrSO4
I523
I524
I525
408

Client I.D.	Lab #	Atomic Absorption or Emission			
		Au (ppm)	Ag (ppm)	B (ppm)	Sr (ppm)
I-521	56	<.01	.3		
I-522	57	3.65	.9		
I-523	58			32	37500
I-524	59			<10	46210
I-525	60			<10	48990



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COUNTY MARICOPA

SHEET 3

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ARIZONA BUREAU OF MINES
J. D. FORRESTER, DIRECTOR

GEOLOGIC MAP OF MARICOPA COUNTY, ARIZONA

PREPARED BY THE
ARIZONA BUREAU OF MINES
UNIVERSITY OF ARIZONA
TUCSON, ARIZONA

BY
Eldred D. Wilson, Richard T. Moore, and H. Wesley Peirce with additional data from maps by L. A. Heindl and D. W. Peterson, U. S. Geological Survey.
Base materials furnished by U. S. Geological Survey.

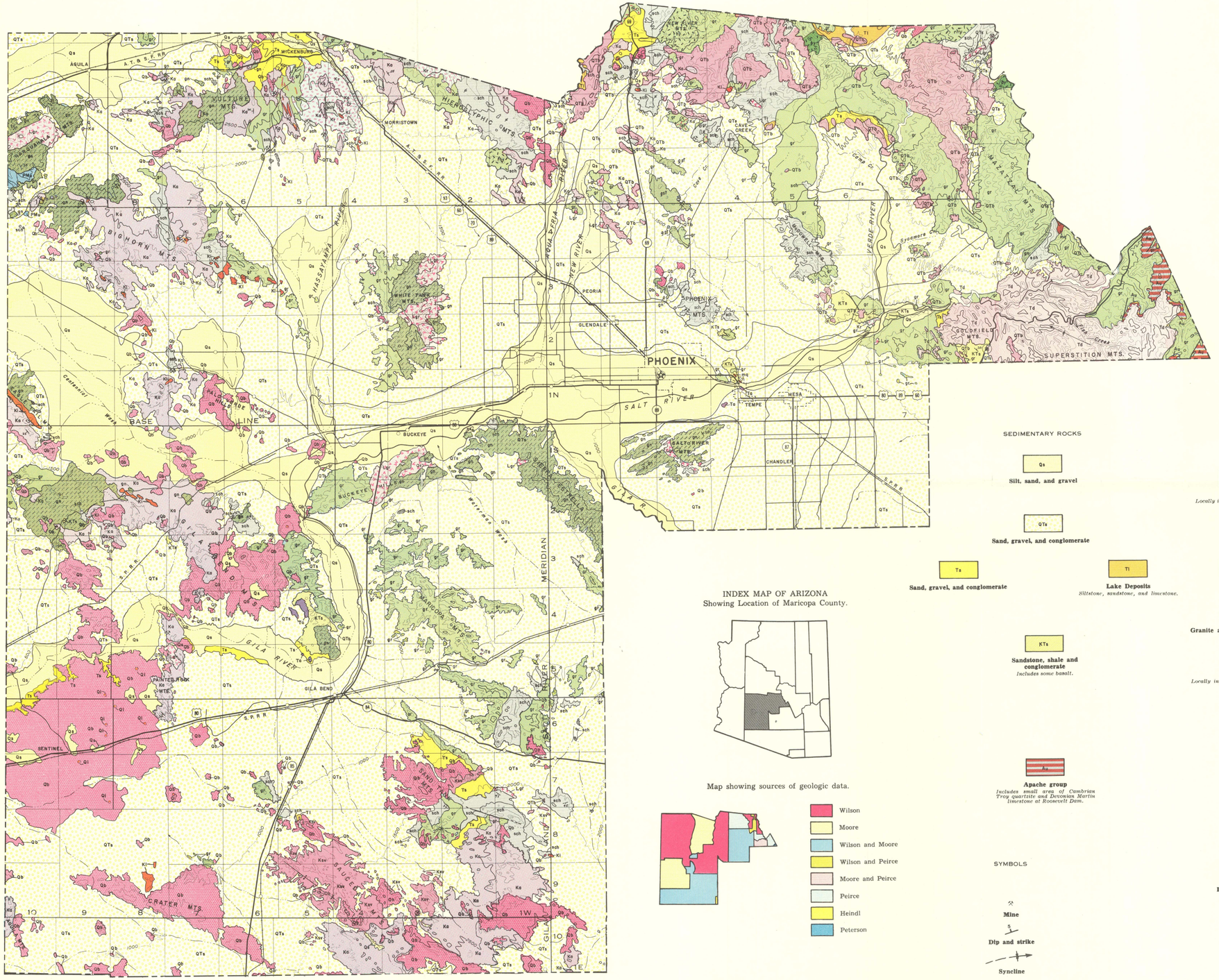
Scale $\frac{1}{375,000}$

10 0 10 20 30 Miles

10 0 10 20 30 Kilometers

Contour interval 500 feet
datum is mean sea level

1957



INDEX MAP OF ARIZONA
Showing Location of Maricopa County.

Map showing sources of geologic data.

- Wilson
- Moore
- Wilson and Moore
- Wilson and Peirce
- Moore and Peirce
- Peirce
- Heindl
- Peterson

EXPLANATION

SEDIMENTARY ROCKS

- Qs — Silt, sand, and gravel
- QTs — Sand, gravel, and conglomerate
- Ts — Sand, gravel, and conglomerate
- Tl — Lake Deposits — *Siltstone, sandstone, and limestone.*
- KTs — Sandstone, shale and conglomerate — *Includes some basalt.*
- Au — Apache group — *Includes small area of Cambrian Troy quartzite and Devonian Martin limestone at Roosevelt Dam.*

IGNEOUS ROCKS

- Qb — Basalt — *Locally includes tuff and gravel.*
- Ql — Dikes and plugs — *Mainly basaltic in composition.*
- QTb — Basalt — *Locally includes tuff and gravel.*
- Ta — Andesite
- Td — Dacite — *Includes dacite tuff and agglomerate.*
- Lgr — Granite and related crystalline rocks
- Ki — Dikes and plugs — *Rhyolitic to andesitic in composition.*
- Ka — Andesite — *Locally includes tuff and agglomerate.*
- Kr — Rhyolite
- Ksv — Sauceda volcanics — *Includes rhyolite, latite, and andesite. Locally contains volcanic glass.*
- gr — Granite and related crystalline rocks
- pl — Diorite porphyry
- py — Pyroxenite
- rhy — Red Rock rhyolite

METAMORPHIC ROCKS

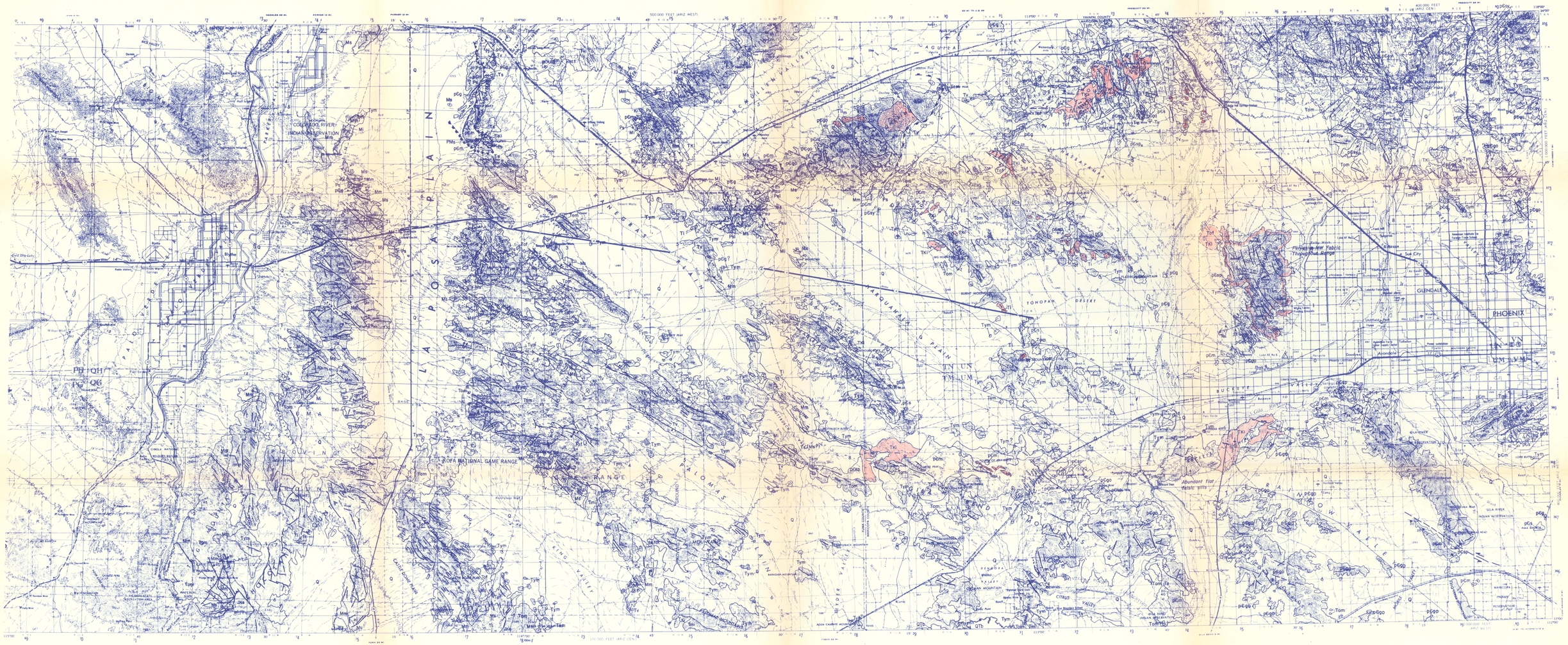
- PMu — Shale, quartzite, and limestone
- mq — Mazatzal quartzite
- sch — Schist — *Locally includes diorite, rhyolite, and greenstone.*
- gst — Greenstone — *Predominantly altered volcanics.*
- gn — Granite gneiss

QUATERNARY
TERTIARY
LARAMIDE
CRETACEOUS
PALEOZOIC AND MESOZOIC UNDIVIDED
YOUNGER PRECAMBRIAN
OLDER PRECAMBRIAN

SYMBOLS

- Mine
- Dip and strike
- Syncline
- Anticline

200.2.7.22



LA POSA PLAIN
COLORADO RIVER INDIAN RESERVATION
KOFA NATIONAL GAME RANGE
PALOMAS PLAIN
TONOPAH DESERT
GLENDALE
PHOENIX
Abundant flat felsic sills

overall area of metamorphosed and iron-rich rocks extends north from Metcalf about a mile, where it is cut off by a fault; the area is about 0.5 mile wide (41).

The Modoc limestone of Shannon Mountain is about 130 feet thick and has been highly metamorphosed with the development of magnetite and limonite. The resulting iron-rich rock includes garnet, quartz, some calcite, and is stained by malachite and azurite. Assays of samples by the Shannon Copper Co. are compiled in table 15 (41, pp. 313, 314).

Miscellaneous

Gold placer-mining operations in the Morenci district indicate the presence of abundant magnetite, and some hematite and ilmenite in alluvium of the area (17, pp. 1180-1181).

TABLE 15. - Analyses of Shannon Mountain iron, Greenlee County, Ariz. (41, pp. 310-314)

Sample	Chemical analyses, percent									Remarks
	Fe	Mn	Cu	Zn	S	SiO_2	MgO	CaO	Al_2O_3	
1.....	43.2	7.6	1.9	14.5	None	5.2	None	Trace	21.8	Above lime quarry.
2.....	17.4	1.0	6.5	20.4	do	28.4	do	do	17.7	Do.
3.....	25.9	2.9	1.7	17.8	do	20.4	do	do	10.8	Do.
4.....	50.9	1.0	1.2	2.2	do	9.3	do	do	4.5	Above Brown tunnel.
5.....	49.46	2.92	2.88	-	do	5.02	-	-	1.68	Do.
6.....	37.30	-	1.20	2.60	do	21.30	-	2.65	11.50	Cave near Mitchell tunnel.

Maricopa County

Precambrian Taconite-Like Iron Formations, Maricopa and Yavapai Counties

Introduction

Magnetite and some hematite were noted in low-grade taconite, semitaconite, and Jaspilite-like iron formations traced interruptedly more than 70 miles through Maricopa and Yavapai Counties (fig. 19) as part of the Precambrian, Yavapai schist or series. Geographically, the observable iron formations center around Cleator-Crown King. They extend south into the Hieroglyphic Mountains in T 6 N, Rs 1 and 2 W, and north beyond Lynx Creek into Tps 16 and 17 N, Rs 1 and 2 W, Gila and Salt River meridian and baseline.

The Yavapai series consists of metamorphosed volcanic and sedimentary rocks, including diorite, rhyolite, greenstone, quartzite, phyllite, argillite, graywacke, mica schist, hornblende schist, and amphibolites.

The iron occurrences investigated varied from jaspilite beds to predominantly taconite-like formations. The area, approximately 35 miles wide and 70 miles long (fig. 19), was too great for comprehemsive evaluation without

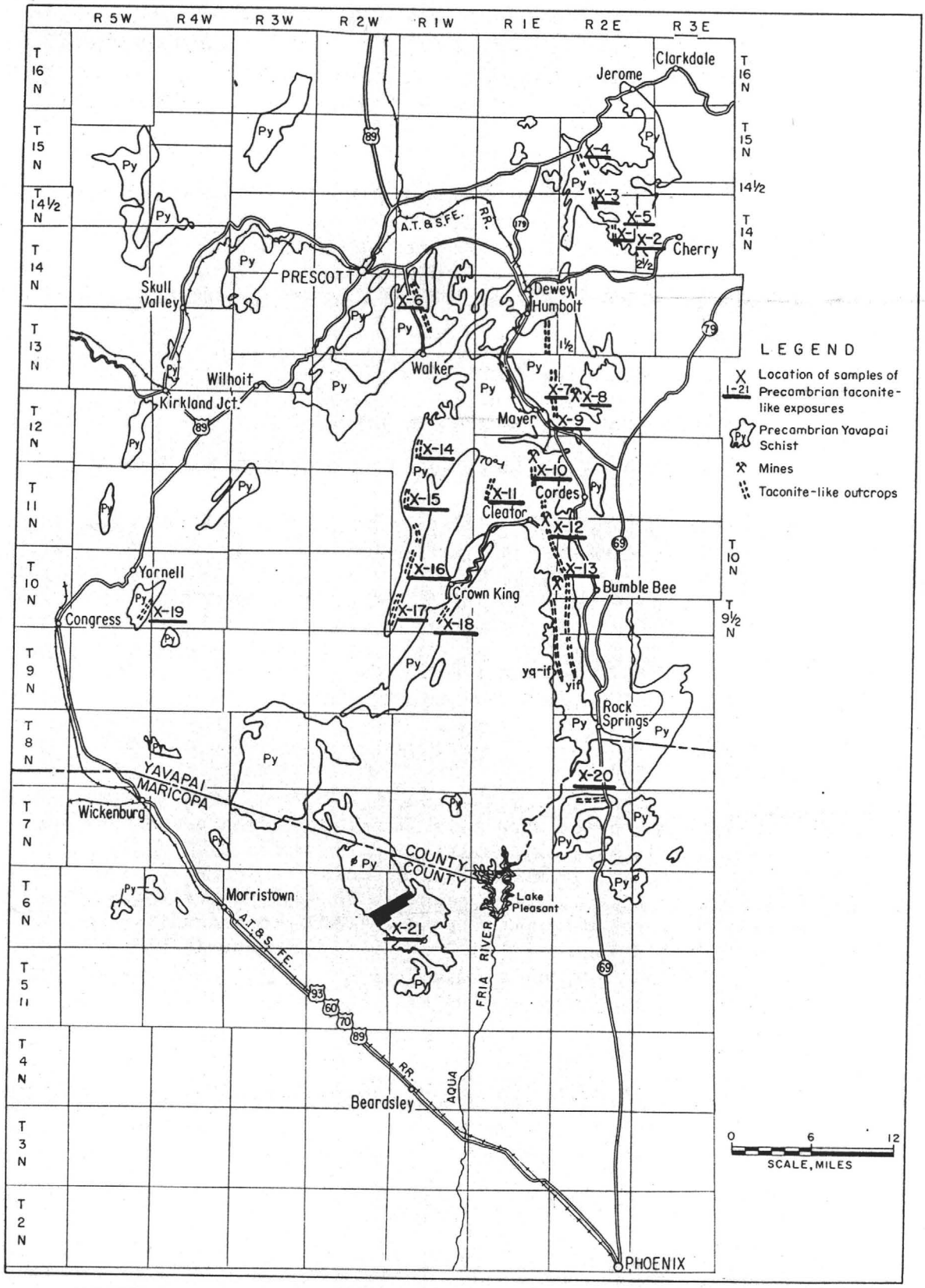


FIGURE 19. - Taconite-Like Iron Formations, Maricopa and Yavapai Counties, Ariz.

geologic investigation, correlation, and basic exploration. However, several outcrop areas were given a cursory examination to develop information as to their extent and continuity and were character sampled to form an idea of their potential mineral content. The areas investigated (X-1 through X-21) are located on figures 1 and 19 and are in Maricopa and Yavapai Counties. Table 16 is a compilation of the Bureau of Mines analyses of widely separated character samples, indicating the quality.

The hundred million tons (20) Pikes Peak deposit (X-21, fig. 19) in the Hieroglyphic Mountains north of Beardsley and the extensive Big Boulder taconite (X-20, fig. 19) south of Rock River are reported in Maricopa County. Other taconite- and jaspilite-like iron formations are reported in Yavapai County.

The taconite- and jaspilite-like iron locations (X-1 through X-21, fig. 19) correspond to locations 83, 88, 81, 102, 82, 95, 96, 89, 86, 85, 90, 94, 92, 91, 84, 97, 79, 101, 100, 48, and 50, on figure 1.

Big Boulder and Iron Ridge Hematite-Magnetite Taconite

A large low-grade taconite and semitaconite-like iron formation (48, fig. 1; X-20, fig. 19) was located as the Big Boulder and Iron Ridge group of 19 claims and 3 placers (1954-56) by D. Gordon, O. E. Elwood, W. E. Bruce, and M. Garcia, and others, in secs 3, 4, and 5, T 7 N, R 2 E, in the Tip Top mining district. In 1962 they were the property of Otto E. Elwert, Long Beach, Calif. The iron deposit (X-20, fig. 19) is reached by traveling 5.5 miles south from Rock Springs on Arizona Highway 69 to a point 0.5 mile beyond milepost 237 or 4.5 miles north from New River, then 0.4 mile northwest along the Bard and Little Grand Canyon ranch roads. The first glistening black outcrops (fig. 20) can be seen in the drywash just west of the road. There has been no production from the property.

Hematite-martite-magnetite with some limonite, goethite, and pyrolusite-hausmannite, and a little apatite, pyrite, and ilmenite, occur as a large low-grade siliceous and taconite-like deposit in schist and greenstone of the Yavapai series. The iron-formation appears as an approximately vertical structure, traceable westward by outcrop and float from Arizona Highway 69 about 3 miles (fig. 20) toward the similar Pikes Peak deposit about 14 air miles southwest. The taconite has a well developed slaty cleavage, shattering into plates one-quarter inch or more thick.

The iron formation has a distinct laminated and banded structure with alternate bands of fine-grained iron and manganese oxides sandwiched between parallel bands of dark-colored, more or less barren quartz. The iron oxide bands range in thickness from less than 1/8 inch to several feet. The higher grade siliceous iron formation crops out as a more resistant ridge (fig. 20).

TABLE 16. - Analyses of taconite and jaspilite-like iron formations, Yavapai and Maricopa Counties, Ariz.

Location		Name and county	Chemical analyses, percent						Remarks
	Fig. 19		Fe	Mn	SiO_2	TiO_2	P	S	
[illegible]	X-1	Black Gold, Yavapai.	33.5, 33.6.	4.5, 3.4.	28.5, 35.1	-	-	-	Magnetite-hematite jaspilite; two samples.
[illegible]	X-2	Cash Reserve, Yavapai.	36.2	2.9	37.4	0.3	0.21	0.12	Magnetite-hematite jaspilite; spectrographic analysis indicated presence of Co, Ni, Cu and V.
[illegible]	X-3	Big Buck, Three Points group, Yavapai.	37.1 to 37.4	2.9 to 3.0	25.2 to 25.5	.22 to .32	.02	.04 to .07	Hematite-magnetite jaspilite; also contains some Pb, Zn, and a trace of Cu; three samples.
[illegible]	X-4	Yaeger (Vojnich), Yavapai.	26.9, 34.6.	1.1, .9.	53.0, 36.6.	.4 -	.15, .30.	.11 -	Hematite jasper-jaspilite; some magnetite and ilmenite; two samples.
[illegible]	X-5	Black Chief (Warrior), Yavapai.	37.2	4.1	32.6	.3	.42	.09	Magnetite-hematite jaspilite; spectrographic analysis indicated presence of Co, Ni, and Cu.
[illegible]	X-6	Lynx Creek, Yavapai.	36.2	1.9	52.0	.3	.10	.08	Magnetite taconite. Spectrographic analysis indicated presence of Co, Cu, Ni, V, and Zr.
[illegible]	X-7	Mayer-Stoddard, Yavapai.	27.2	1.4	51.0	.2	.10	.09	Magnetite-hematite taconite.
[illegible]	X-9	Blue Bell Siding, Yavapai.	27.3 to 35.6	1.9 to 1.8	39.0	.2 to .3	.17	.10	Magnetite-hematite taconite; two samples. Spectrographic analyses indicated presence of Co, Ni, Cu, V, and Zr.
[illegible]	X-10	Blue Bell mine, Yavapai.	29.0	.9	52.4	.6	.10	.11	Magnetite-hematite taconite. Spectrographic analysis indicated presence of Co, Ni, Cu, V, and Zr.
90	X-11	De Soto mine, Yavapai.	28.3	.9	-	.2	-	-	Magnetite-hematite taconite.
94	X-12	Los Felice (Townsend Butte), Yavapai.	29.1 to 38.88	1.3 to 10.91	35.0 to 51.2	.2 to .3	.2 to .3	.1 to .25	Magnetite-hematite iron formation. Maxima-minima of 11 samples. Spectrographic analysis indicated presence of Co, Ni, Cu, and V.
91	X-14	Goodwin, Yavapai.	20.8	.7	50.6	.6	.12	.17	Magnetite-hematite taconite.
84	X-15	Blind Indian-Arrastra Creek-Longfellow Ridge, Yavapai.	34.0	.1	39.0	.3	.1	.1	Do.
97	X-16	Pine Creek, Yavapai.	33.8	.1	38.2	.3	.11	.08	Magnetite taconite. Spectrographic analysis indicated presence of Co, Ni, Cu, V, and Zr.
100	X-19	Stanton, Yavapai.	20.6, 30.6.	1.8, 2.9.	59.2, 43.8.	.2, .4.	.11, .27.	.10, .08.	Magnetite-hematite taconite; two samples. Spectrographic analysis indicated presence of Co, Ni, Cu, and V.
48	X-20	Big Boulder-Iron Ridge, Maricopa.	24.6 to 33.1	1.04 to 2.5	31.8 to 51.8	.15 to .4	.12 to .194	.10 to .12	Magnetite-hematite taconite. Maxima-minima of 4 samples. Spectrographic and other analyses indicated presence of Co, Ni, Cu, V, As, Pb, and Zn.
50	X-21	Hieroglyphic Mts. (Pikes Peak), Maricopa.	29.74	2.81	37.6	-	.126	.04	Magnetite-hematite taconite; average 165 surface samples.
		do.	31.2	2.8	36.4	-	.13	.05	Average of more than 200 samples; 1/3 surface, 2/3 underground.
		do.	28.7	1.9	-	.1	-	-	Character sample, 1961. Spectrographic analysis indicated presence of Co, Ni, Cu, and V.

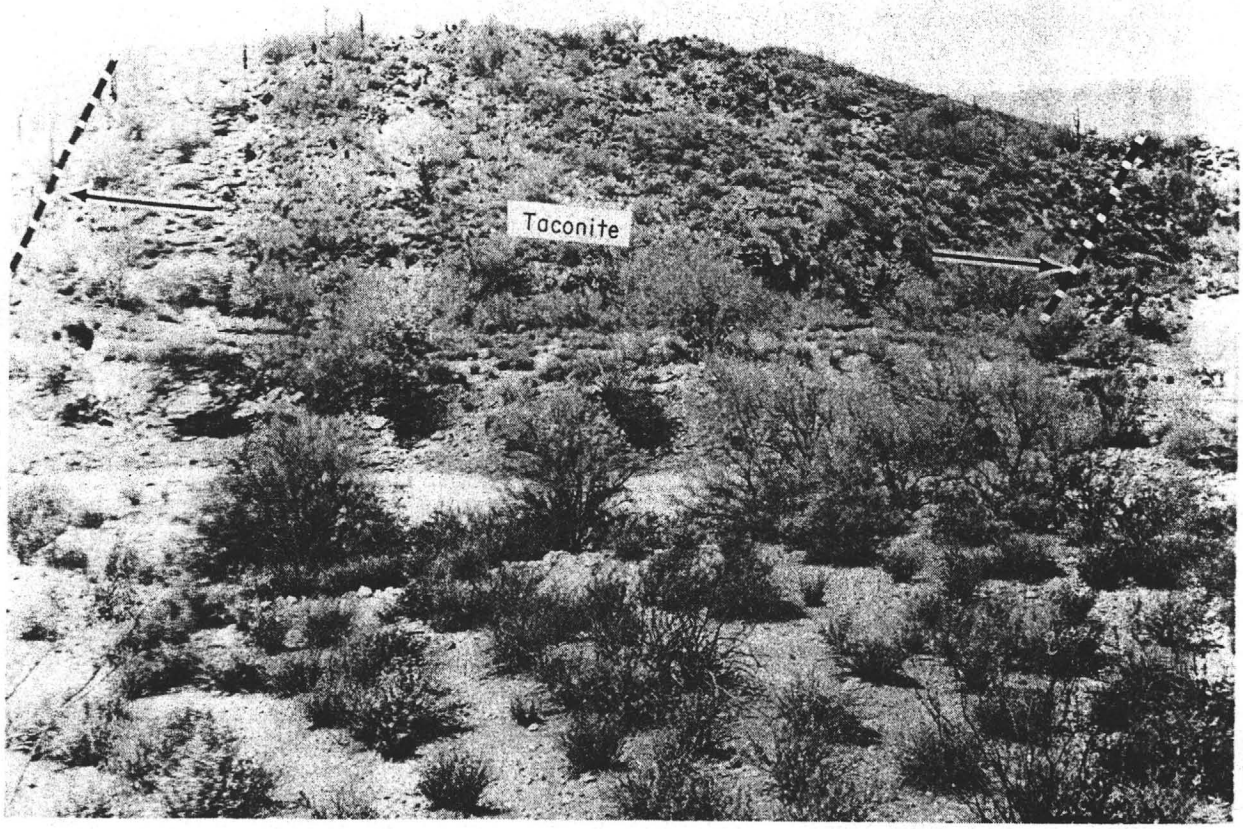


FIGURE 20. - Big Boulder-Iron Ridge Hematite-Magnetite Taconite, Sec 3, T 7 N, R 2 E, Maricopa County, Ariz.

From reconnaissance only, the east end of the deposit is inferred to be 200 to 500 feet wide. The Big Boulder group of claims extend along the westerly strike about 2 miles, following a hogback structure (fig. 20) as much as 200 feet above a drywash. The west end of the iron formation appears divided, with the north limb about 350 feet wide and the south limb about 150 feet wide. Beyond the outcrops and under volcanics and alluvium overburden a heavy float zone indicates further extensions of 4 or more miles.

Results of character sampling are compiled in table 17. The mineral content of samples 2 and 3 were calculated as 24 and 20 percent magnetite, 11 and 18 percent hematite, and 0.05 percent ilmenite, respectively.

This iron formation, including schist and greenstone, is part of a great exposure of the Yavapai series traceable intermittently for many miles in Maricopa and Yavapai Counties.

This outcropping iron formation and its possible extensions, when considered with the similar Pikes Peak occurrence 14 air miles southwest, and others (fig. 19) is a large potential source of low-grade iron.

TABLE 17. - Results of character sampling, Big Boulder-Iron Ridge taconite iron formation, Maricopa County, Ariz.

Sample	Chemical analyses, percent									Source
	Fe	Mn	TiO_2	P	S	SiO_2	CaO	Al_2O_3	MgO	
1[1]....	33.1	1.04	0.15	0.194	-	33.78	0.32	8.48	0.58	Courtesy E. W. Fredell, P. E. consultant Webb & Knapp, Inc., Mar. 20, 1961; P. L. Rupard, Sr., representing the owner. (Analysis by U.S. Steel, Geneva, Utah, Apr. 12, 1954.)
2[2]....	25.4	2.5	.2	.14	0.11	51.8	-	-	-	Grab character sample; sec 3, T 7 N, R 2 E; Bureau of Mines Mar. 23, 1961.
3[2]....	26.6	1.9	.2	.12	.12	50.8	-	-	-	Do.
4.....	24.6	2.5	.4	.18	.10	36.2	-	-	-	Grab sample; Bureau of Mines, Sept. 14, 1961.
5.....	25.5	2.3	.26	.15	.11	46.3	-	-	-	Metallurgical chip sample composite; Bureau of Mines, 1961.

[1] Sample 1 also contained 0.01 percent As and Cu, 0.02 percent Ni, and 0.04 percent Pb and Zn.

[2] Spectrographic analysis of composite of samples 2-3 indicated presence of 1-10 percent manganese; 0.01-0.1 percent Co, Cu, Ni; and 0.001-0.01 percent V.

Hieroglyphic Mountains (Pikes Peak) Hematite-Magnetite Taconite-Semitaconite

A large low-grade taconite and semitaconite-like iron formation (50, fig. 1, X-21, fig. 19) on the south slope of the Hieroglyphic Mountains in the Pikes Peak mining district of north-central Maricopa County was known before 1906. The deposit is covered by 72 mining claims known as the Iron Age, Pig Iron, and Bessemer groups in parts of secs 8, 17, 18, 19, T 6 N, R 1 W, and secs 13, 23, 24, 25, T 6 N, R 2 W. The property (fig. 21) is reached by driving 2.6 miles northwest from Beardsley to the entrance of the Costello T T ranches, then 13 miles north to the southwestern end of the deposit. The nearest contact by railroad is Wittman, about 7.5 miles southeast on the Atchison, Topeka & Santa Fe Railroad. Altitudes range from 2,100 feet in the deeper drywashes to 2,800 feet at the highest peak.

The Pikes Peak deposit (X-21, fig. 19; fig. 22) was investigated by Kaiser Steel Corp. in 1942-43, and by the Bureau of Mines (20) during 1942. There was no further activity as of 1961.

Hematite-martite-magnetite with some limonite; goethite and pyrolusite-hausmannite; and a little pyrite, apatite, and ilmenite occur as a large low-grade siliceous and taconite-like deposit in schist and greenstone of the Yavapai series. The deposit includes many parallel and overlapping bands and lenses (fig. 21) within an outcrop area as much as 2,000 feet wide and 18,000 feet long, exposed through a topographic relief of 50 to 400 feet. Within this area are 10 large bodies and many more of lesser extent (fig. 21). Outcrops of the larger occurrences range from about 400 feet to more than 5,000 feet in length and from 50 to 300 feet in width. The iron formation has a distinct laminated and banded structure (fig. 22) with alternate bands of fine-grained iron and manganese oxides sandwiched between

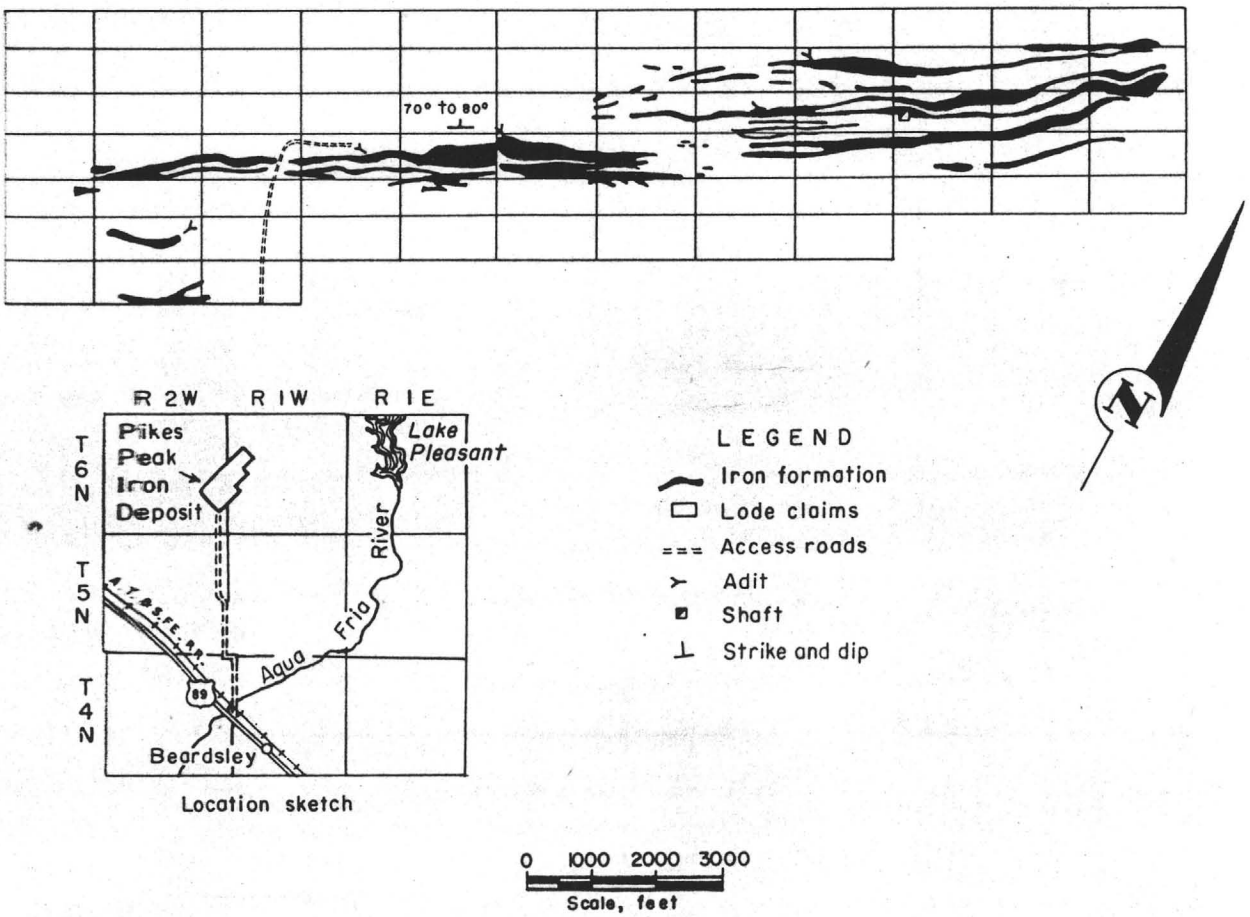


FIGURE 21. - Pikes Peak Taconite Deposit, T 6 N, Rs 1 and 2 W, Maricopa County, Ariz.

parallel bands of dark-colored, more or less barren quartz. The iron oxide bands vary in thickness from less than 1/8 inch to several feet. The higher grade siliceous iron formation crops out as more resistant hogbacks (fig. 23) that strike N 60° E, and dip 70° to 80° NW, concordant with regional schistocity. Many of the bodies of iron have no distinct walls but grade outward into leaner material. Depth is established to be more than 400 feet by topographic relief, one core drill hole, and observations at similar deposits.

In the part explored, hematite-martite, and magnetite are the principal iron minerals. Magnetite, only partly replaced by hematite, makes much of the iron formation magnetic. Magnetite particles appear so small (1- to 20-microns) and uniformly distributed that practically all of the crushed ore will contain more or less magnetite. Much of the magnetite occurs also in clusters one-quarter inch or larger in diameter that also include martite-hematite. Associated with the iron minerals are minor amounts of manganese as pyrolusite and hausmannite and a little titania as ilmenite. Gangue is mainly fine-grained quartz with a little apatite, pyrite, feldspar, and mica.

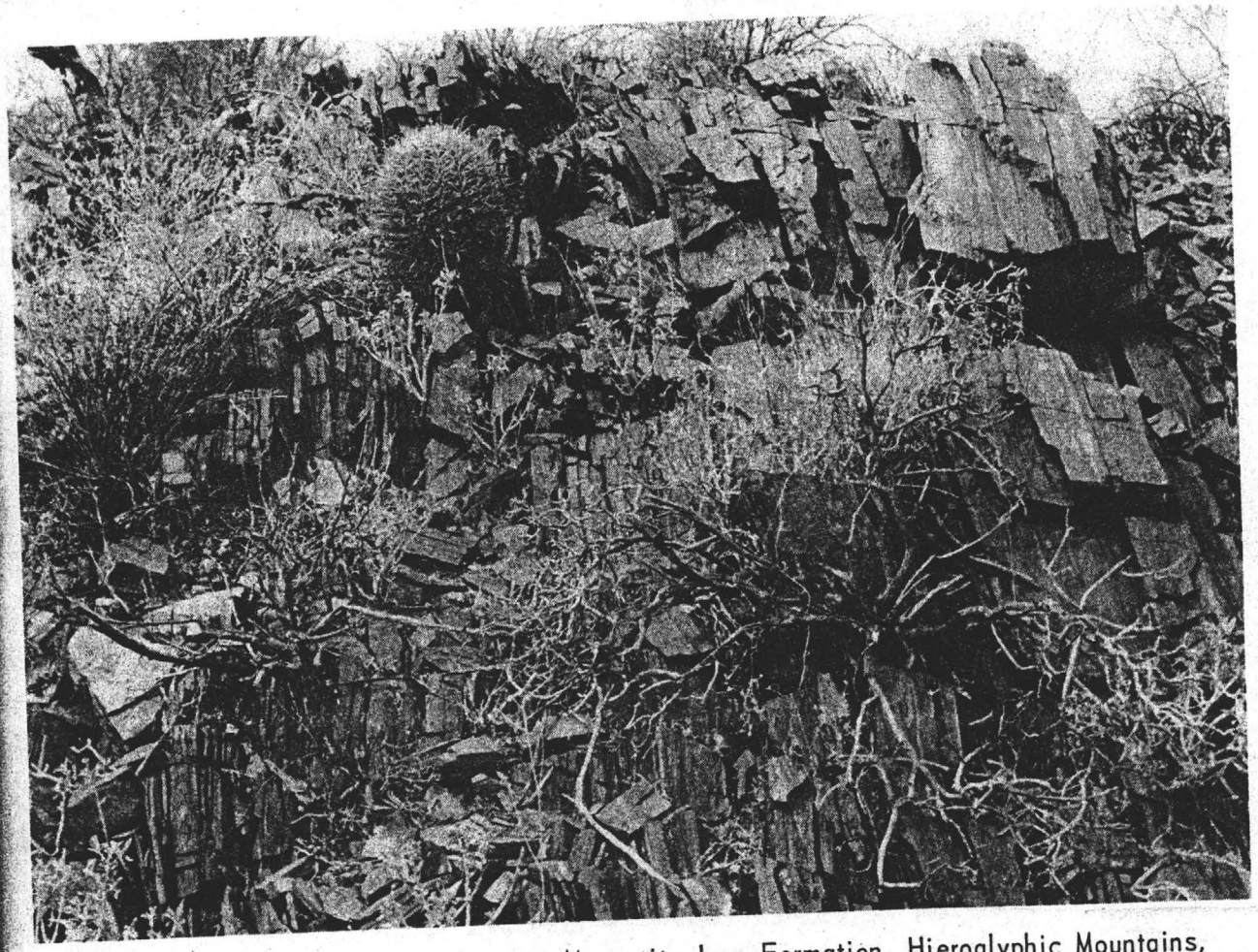


FIGURE 22. - Taconite-Like Hematite-Magnetite Iron Formation, Hieroglyphic Mountains, T 6 N, Rs 1 and 2 W, Maricopa County, Ariz. Note banded, laminated structure.

The average of 165 samples (20) taken in 35 trenches across outcrops averaged 29.74 percent iron, 2.81 percent manganese, and 0.126 percent phosphorus. The average of more than 200 samples (1/3 surface and 2/3 underground) used in Bureau metallurgical investigations (table 16) contained 31.2 percent iron, 2.8 percent manganese, 36.4 percent silica, 4.1 percent alumina, 1.1 percent lime, 0.13 percent phosphorus, and 0.05 percent sulfur.

Results of underground sampling (20) by Kaiser Steel Corp. to a depth of 100 feet on the Pig Iron No. 9 claim averaged 30 percent iron and 2.8 percent manganese. Underground channel samples on the Bessemer No. 5 claim averaged 34.3 percent iron and 2.6 percent manganese.

An out crop character sample taken by the Bureau in 1961 contained 28.7 percent iron, 0.1 percent titania, 0.13 percent phosphorus, 0.05 percent sulfur, 46.5 percent silica, and 1.9 percent manganese; a spectrographic analysis of this sample indicated the presence of 0.01 to 0.1 percent cobalt, nickel, titanium, and copper and 0.001 to 0.01 percent vanadium. The mineral content of the sample was calculated to be 21 percent hematite, 20 percent magnetite, and 0.5 percent ilmenite.

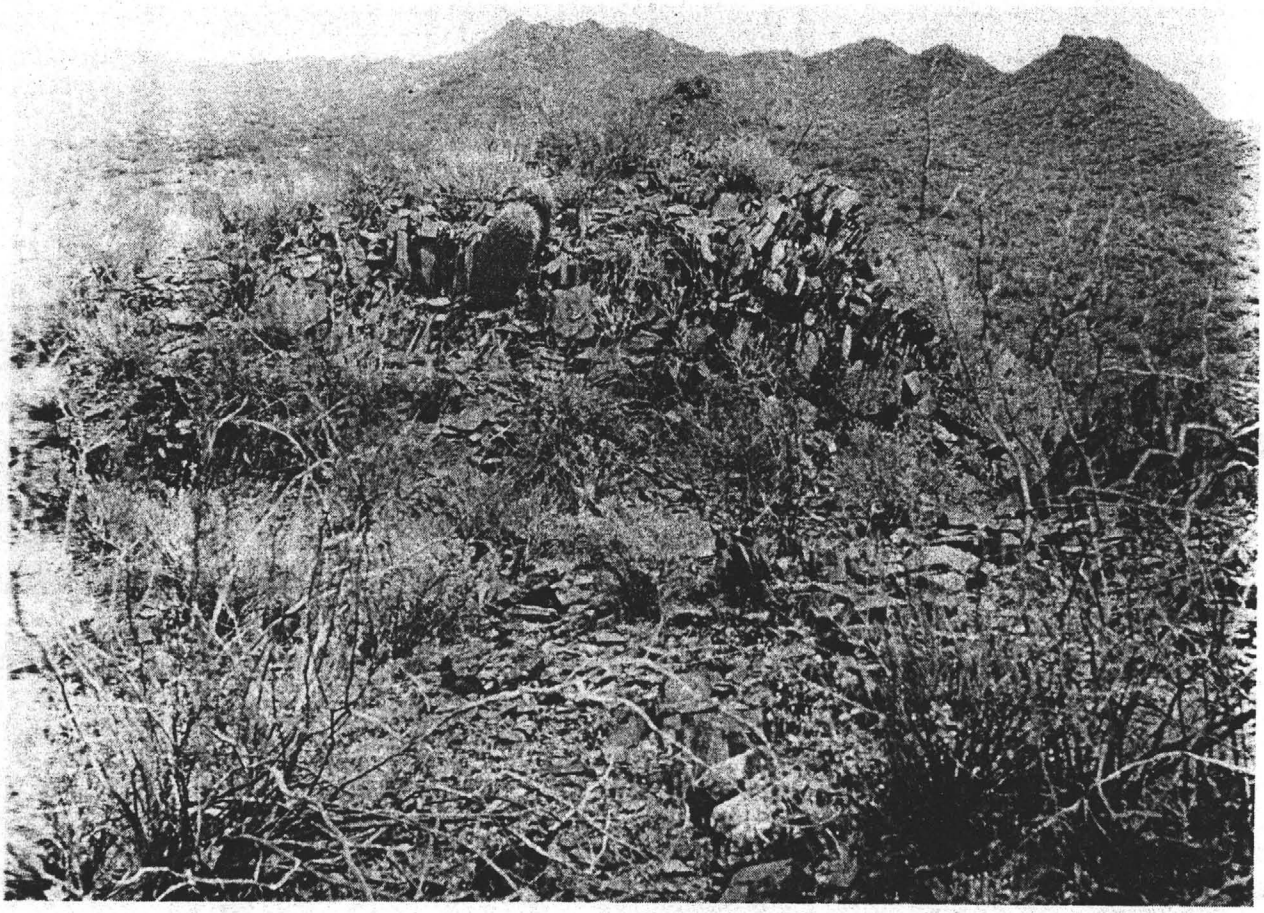


FIGURE 23. - Hogback Structure Assumed by Siliceous Iron Formation Rising Above Leaner and Less Siliceous Schist and Greenstone of the Precambrian Yavapai Series, Pikes Peak Deposit, T 6 N, Rs 1 and 2 W, Maricopa County, Ariz.

Approximate determinations indicate that 1/3 or more of the ore may prove magnetic. Octahedra of martite with centers of magnetite suggest that magnetite was the original source of iron in the deposit.

Reserves (20) in the Hieroglyphic Mountains area inferred to a depth of 400 feet were estimated as 100 million long tons averaging about 31 percent iron, 2.8 percent manganese, 36.4 percent silica, 4.1 percent alumina, 1.1 percent lime, 0.1 percent phosphorus, and 0.05 percent sulfur.

When considering the potential of this occurrence with possible extensions exemplified by the Big Boulder deposit 14 air miles northeast, low-grade iron reserves in the Hieroglyphic Mountains area may greatly exceed the 100 million tons inferred.

Big Horn District (Fred Brown) Magnetitic Alluvium

Approximately 6,000 acres of alluvial plain have been located by Fred R. Brown of Picacho as a large magnetite placer deposit in the Big Horn Mountains area (49, fig. 1) and mining district. The alluvial area comprises parts of secs 9, 10, 14, 15, 16, 17, 19, 20, 21, 22, 23, 27, 28, 29, 30, and 32, T 4 N, R 9 W, Gila and Salt River meridian and baseline. The magnetite placer area starts about 17 miles south of Aguila, just east of the Aguila-Tonopah road.

Titaniferous magnetite occurs in alluvium and stream gravels reportedly ranging in thickness from a few feet to more than 100 feet. The magnetite with minor amounts of ilmenite makes up 3 to 7 percent of the alluvium; parts of the deposit contain as much as 10 percent magnetite.

Beneficiation tests made by lessees in 1961, including screening and magnetic separation, yielded concentrates containing 65 to 69 percent iron and 0.3 to 0.8 percent titania. The area has been prospected by scattered pits 10 to 15 feet deep.

Bilge Pump, New Year, Toro Hematite, Goethite Turgite

Hematite, goethite, and turgite occur as scattered clusters and color prominent northeast-trending quartzite ledges and crinkle folded jasper about 0.2 mile north of the Bards-Little Grand Canyon Ranch road (51, fig. 1) on the Toro, Bilge Pump, and New Year's limonite groups of claims located in 1956-59 by T. Collins, M. W. Rollins, and others. The deposits are in secs 32 and 33, T 8 N, R 2 E, north of the Big Boulder magnetite taconite deposit. The quartzite-jasper beds are about 50 feet thick and can be traced for almost 2 miles. Dips range from 50° N to vertical.

Gold placer-mining operations in the Wickenburg district indicate the presence of abundant magnetite and some hematite, ilmenite, and zircon in alluvium of the area (17, pp. 1180-1181).

Phoenix Mountains Magnetite

Thin layers of magnetite and some hematite (52, fig. 1) occur parallel to the bedding planes in Precambrian quartzite beds in the Phoenix Mountains, about 11 miles north of Phoenix. The occurrence is not of commercial significance (38, p. 45).

White Tank Mountains (Luck Lode) Titaniferous Magnetite

Titaniferous magnetite-hematite (53, fig. 1) was reported in Precambrian and pegmatitic quartz mica schist during 1955. The occurrence is in the SW¼ T 3 N, R 3 W, along the west flank of the White Tank Mountains, about 12 miles north of Buckeye. During 1954 Luck Lode Mining Co. of Avondale and Buckeye located 22 claims covering the deposit.

Ilmenite and some sphene occur as intergrowths with magnetite in grains 65-mesh to about ½ inch in size and as segregations several inches in diameter.

Sporadic chalcopyrite was noted also. The occurrence extends northwest more than a mile, dipping from 30° to 50° northeast. Numerous small, narrow bodies of diabase intrusive occur within the schist.

Three widely separated bulk samples taken by the Bureau in 1955 contained 5.6 percent iron and 0.76 to 1.18 percent titania. A sink-float concentrate contained 61.7 percent iron and 8.7 percent titania.

Mohave County

Alamo Crossing Hematite

Specularite (54, fig. 1) was reported by J. M. Breedon and H. L. Richardson in 1943. The deposits are irregular replacements in thin-bedded Paleozoic limestone in T 11 N, R 13 W, about 2½ miles west of Alamo Crossing and are similar in origin to those at Swansea and New Planet in Yuma County. The hematite occurrence is poorly defined and is believed small.

Grand Wash Cliffs Hematite

Hematite, partly cupreous, has been reported (63) as replacements in carboniferous limestone near the summit of Grand Wash Cliffs (55, fig. 1), approximately in the N½ T 26 N, Rs 13 and 14 W, about 6 miles east of the Music Mountain mine and 18 miles north of Hackberry (63, p. 144).

Hualapai and Yucca Magnetitic Alluvium

Magnet Mining Corp., Melvin Jones, president of Congress, Ariz., reported extensive magnetitic alluvial deposits in the Hualapai district near Kingman (56, fig. 1) and the Yucca district (57, fig. 1) near Yucca. Preliminary tests indicated about 7 percent magnetite in their Hualapai holdings and about 4 percent magnetite in their Yucca placer holdings.

Navajo County, Fort Apache Indian Reservation Hematite

Introduction

Hematite crops out abundantly in the rugged mesa-canyon terrain (fig. 24) along the Canyon Creek drainage (58, 59, 60, 61, 62, 63, fig. 1) in the northwest part of the Fort Apache Indian Reservation and the southwest corner of Navajo County, Tps 8, 9, and 10 N, Rs 15½ and 16 E. In 1961 the area was part of a larger tract under lease and being explored by The Colorado Fuel and Iron Corp. The area included the more prominent Apache, Chediski, and Split Rock occurrences and numerous other outcroppings and favorable zones. This area is now accessible from Young by truck and jeep roads and is reached by driving 4.4 miles north from Young post office to the junction of the Payson-Heber roads, east and northeast for 12 miles towards Red Lake and the Reservation boundary fence, then east and south for several miles on both sides of Canyon Creek canyon to the various exploration sites.