DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-992
WHITEBREAD AND OTHERS - GEOCHEMICAL
DISTRIBUTION, DUN GLEN QUAD., NEV.

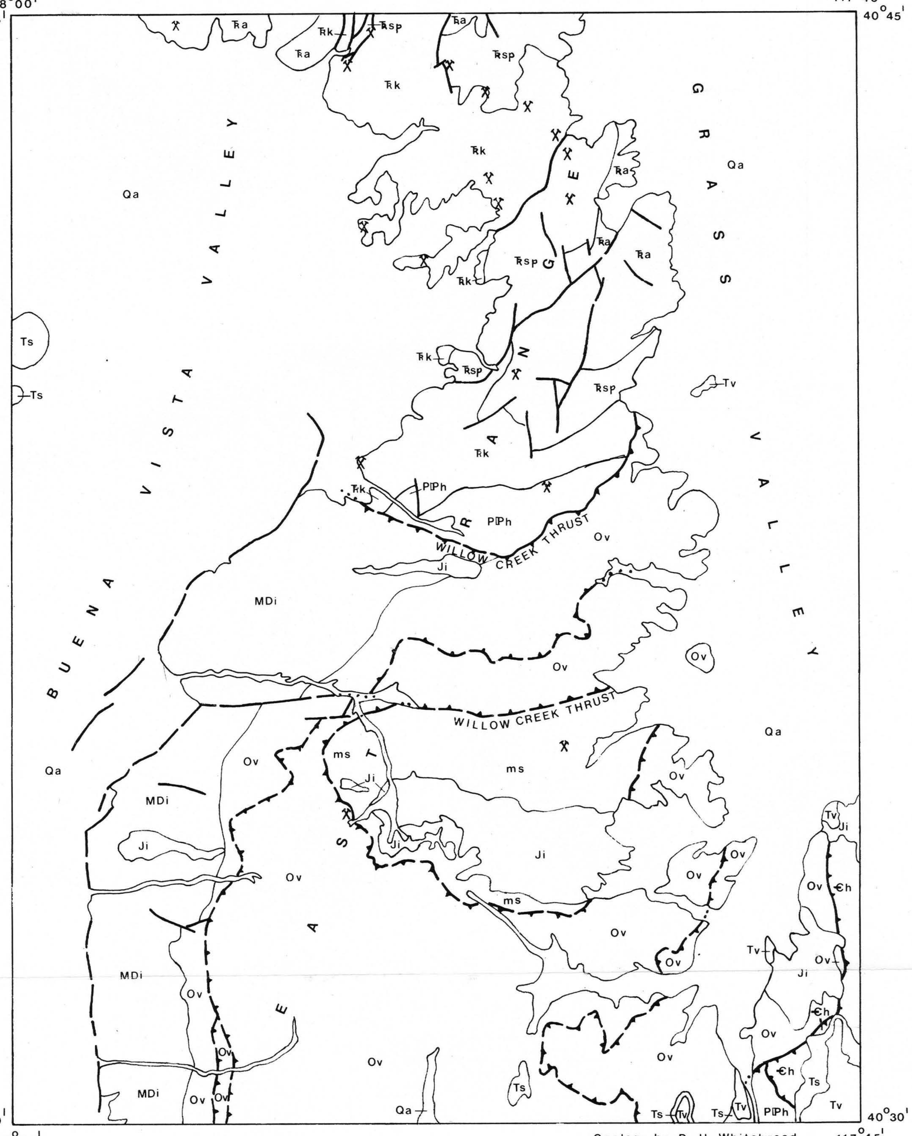


Figure 1. Generalized geologic map of the Dun Glen quadrangle, Pershing County, Nev.

EXPLANATION

Qa	ALLUVIUM (Quaternary)
Tv	VOLCANIC ROCKS (Tertiary)
Ts	SEDIMENTARY ROCKS (Tertiary)
Ji	GRANITIC INTRUSIVE ROCKS (Jurassic)
₮a	AULD LANG SYNE GROUP (Triassic)--Agrillite, siltstone, quartzite, limestone, and dolomite
₮sp	STAR PEAK GROUP (Triassic)--Limestone, dolomite, and minor conglomerate and argillite
₮k	KOIPATO GROUP (Triassic)--Rhyolitic tuffs, flows, and breccias
ms	METASEDIMENTARY ROCKS OF UNDETERMINED AGE
PPh	HAVALLAH SEQUENCE OF SILBERLING AND ROBERTS (1962) (Permian, Pennsylvanian, and Mississippian)--Argillite, quartzite, chert, greenstone, and limestone
MDi	INSKIP FORMATION (Mississippian? and Devonian?)--Phyllite, wacke, quartzite, conglomerate, metavolcanic rocks, and limestone
Ov	VALMY FORMATION (Ordovician)--Argillite, chert, greenstone, quartzite, and minor limestone
Єh	HARMONY FORMATION (Cambrian)--Feldspathic and micaceous quartzite, argillite, and minor limestone

Contact

Fault--Dashed where approximately located

Thrust fault--Dashed where approximately located; dotted where concealed

Mine

DISCUSSION

The nine geochemical maps show the distribution and abundance of gold, silver, mercury, arsenic, antimony, copper, lead, zinc, and molybdenum in 144 veins and 45 limonite fracture fillings in the Dun Glen quadrangle, Pershing County, Nev. Samples were collected to determine the distribution and abundance of metals and to outline those areas most favorable for exploration. The samples represent the most highly mineralized rock seen at each locality.

The values for 30 elements were determined by semiquantitative spectrographic analyses by E. F. Cooley, W. D. Crim, G. W. Day, R. T. Hopkins, R. E. Mays, J. M. Motooka, J. H. Reynolds, and D. F. Siems. Determinations of gold, silver, mercury, copper, lead, and zinc by atomic absorption methods and of arsenic and antimony by colorimetric methods were by R. N. Babcock, C. A. Curtis, M. S. Erickson, J. R. Hassemer, S. I. Hoffman, R. W. Leinz, J. F. Lomons, H. D. McBride, R. L. Miller, R. M. O'Leary, M. S. Rickard, L. A. Vinnola, and A. W. Wells.

All the samples were analyzed for gold and silver by atomic absorption, and spectrographic analyses were obtained for 155 samples. During periods in which mobile field laboratories of the U.S. Geological Survey were operating in north-central Nevada, determination of mercury, arsenic, and antimony by atomic absorption and colorimetric methods also was made on 132 of the samples, and determination of copper, lead, and zinc by atomic absorption was made on 74 samples. Lower limits of determination by the spectrographic method are: As, 200 ppm; Cu, 5 ppm; No, 5 ppm; Pb, 10 ppm; Sb, 100 ppm; and Zn, 200 ppm. Lower limits of determination by atomic absorption or colorimetric methods are: Au, 0.02 ppm; Ag, 0.2 ppm; Hg, 0.01 ppm; As, 10 ppm; Cu, 5 ppm; Pb, 5 ppm; Sb, 1 ppm; and Zn, 5 ppm. Because the lower limits of determination for arsenic, antimony, and zinc are significantly higher in samples analyzed by spectrographic methods, a symbol is used on the geochemical maps of these elements to denote those samples analyzed only spectrographically that contain less than detectable amounts.

Median values of the elements in figures 2-10 are: Au, 0.05 ppm; Ag, 1 ppm; Hg, 0.5 ppm; As, 50 ppm; Sb, 10 ppm; Cu, 50 ppm; Pb, 30 ppm; Zn, 50 ppm; and Mo, <5 ppm. These values determined from samples of veins and fractures undoubtedly are considerably higher than background values of the adjacent unmineralized country rock. Median values of other elements in the veins and fractures are: Fe, 3 percent; Mg, 0.2 percent; Ti, 0.1 percent; Mn, 300 ppm; B, 10 ppm; Ba, 300 ppm; Cr, 15 ppm; Ni, 10 ppm; Sc, 7 ppm; V, 70 ppm; Y, 15 ppm; and Zr, 70 ppm. The median values for Be, Bi, Cd, Co, La, Nb, Sn, Sr, and W are less than the lower limits of detection by spectrographic methods.

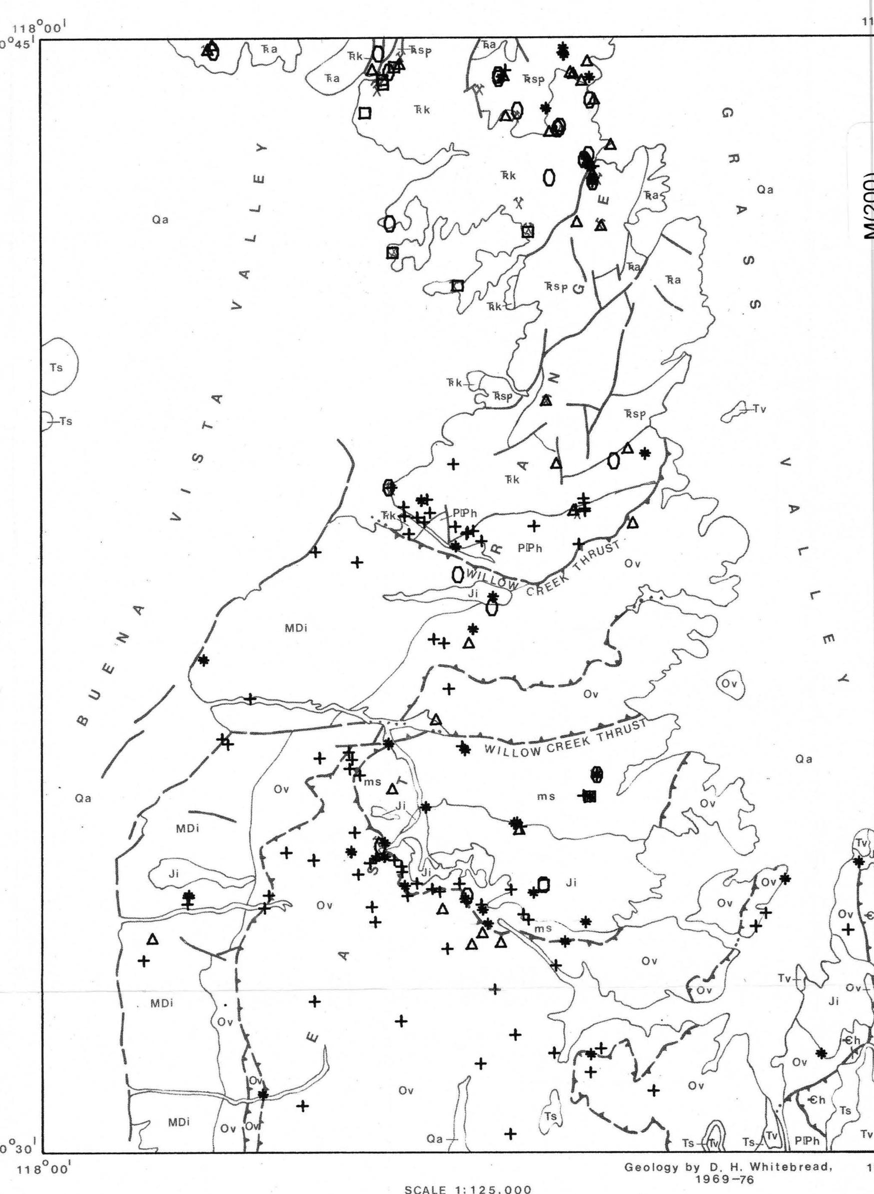
Spearman's rank correlation method was used to indicate the relative strength of association of the various elements with gold and silver. In the veins, lead, zinc, antimony, silver, arsenic, and mercury show the highest positive correlation with gold, and antimony, lead, copper, zinc, mercury, and gold have the highest correlation with silver. In the fractures, silver, mercury, iron, antimony, arsenic, and lead show the highest positive correlation with gold, and mercury, gold, lead, manganese, and magnesium have the highest correlation with silver. Apparent high positive correlation coefficients between tungsten and silver in veins and between lanthanum and both gold and silver in fractures cannot be considered significant because they are based on relatively few samples.

The geology of the Dun Glen quadrangle has been mapped by Whitebread (1978), and the reader is referred to his map for a more detailed version of the geology. Gold and silver mines in the Sierra mining district in the north half of the quadrangle are mostly in quartz veins in the Koipato and Star Peak Groups of Triassic age. The geochemical maps show that the greatest concentration of high values of metals in veins and fractures is in these units. Sampling of additional small veins in the Koipato Group undoubtedly would identify other occurrences of gold and silver. Although most of these veins cannot be mined economically, they were probably the source of much of the placer gold recovered in several canyons. Many of the samples containing anomalous values in the south half of the quadrangle are from around the perimeters of several granitic intrusive bodies or are from near the Willow Creek thrust. Small quartz and calcite veins in the Paleozoic rocks in the upper plate of the thrust are the main source of the placer gold in that area. Many samples near the southern trace of the Willow Creek thrust contain arsenic in amounts greater than median values, and zinc in above-median values occurs in numerous samples in rocks of the upper plate in the southern part of the area. Nearly all eight samples that contain detectable tungsten are from the Star Peak Group in the northernmost part of the quadrangle.

REFERENCES

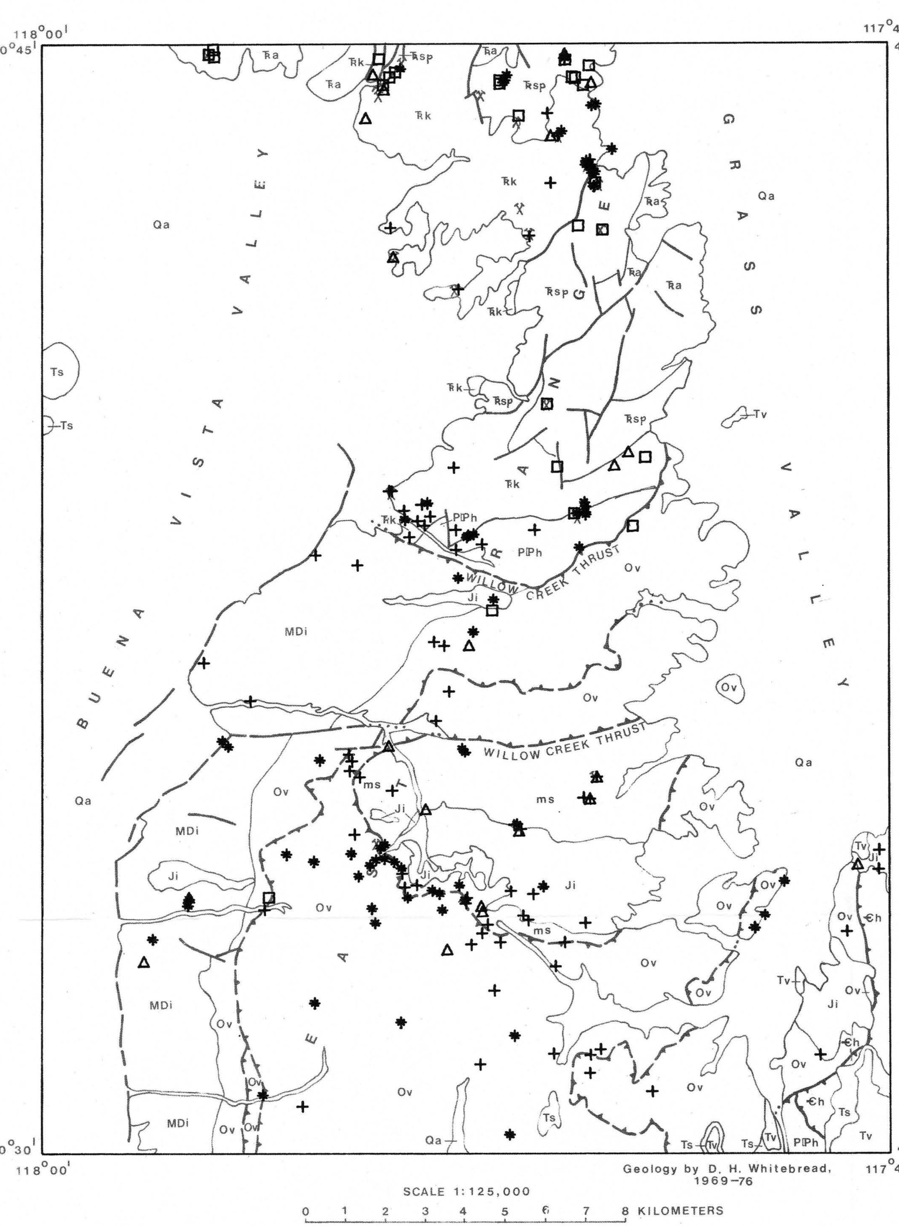
Silberling, N. J., and Roberts, R. J., 1962, Pre-Tertiary stratigraphy and structure of northwestern Nevada: Geol. Soc. America Spec. Paper 72, 58 p.

Whitebread, Donald H., 1978, Preliminary geologic map of the Dun Glen quadrangle, Pershing County, Nevada: U.S. Geol. Survey Open-file Map 78-407.



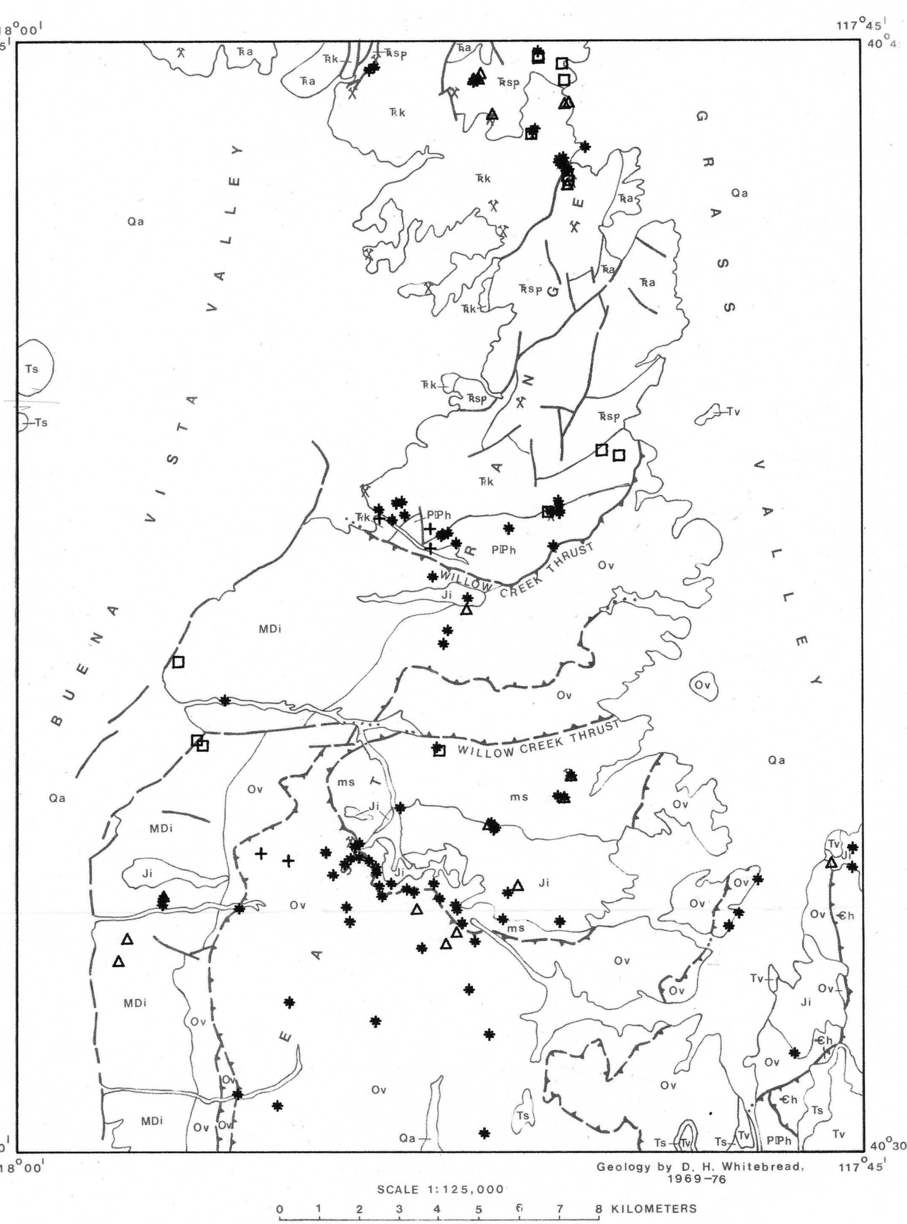
Gold, in parts per million
<0.02 0.02-0.1 0.15-1 1.5-10 >10

Figure 2. Distribution of gold in 189 samples from veins and fractures.



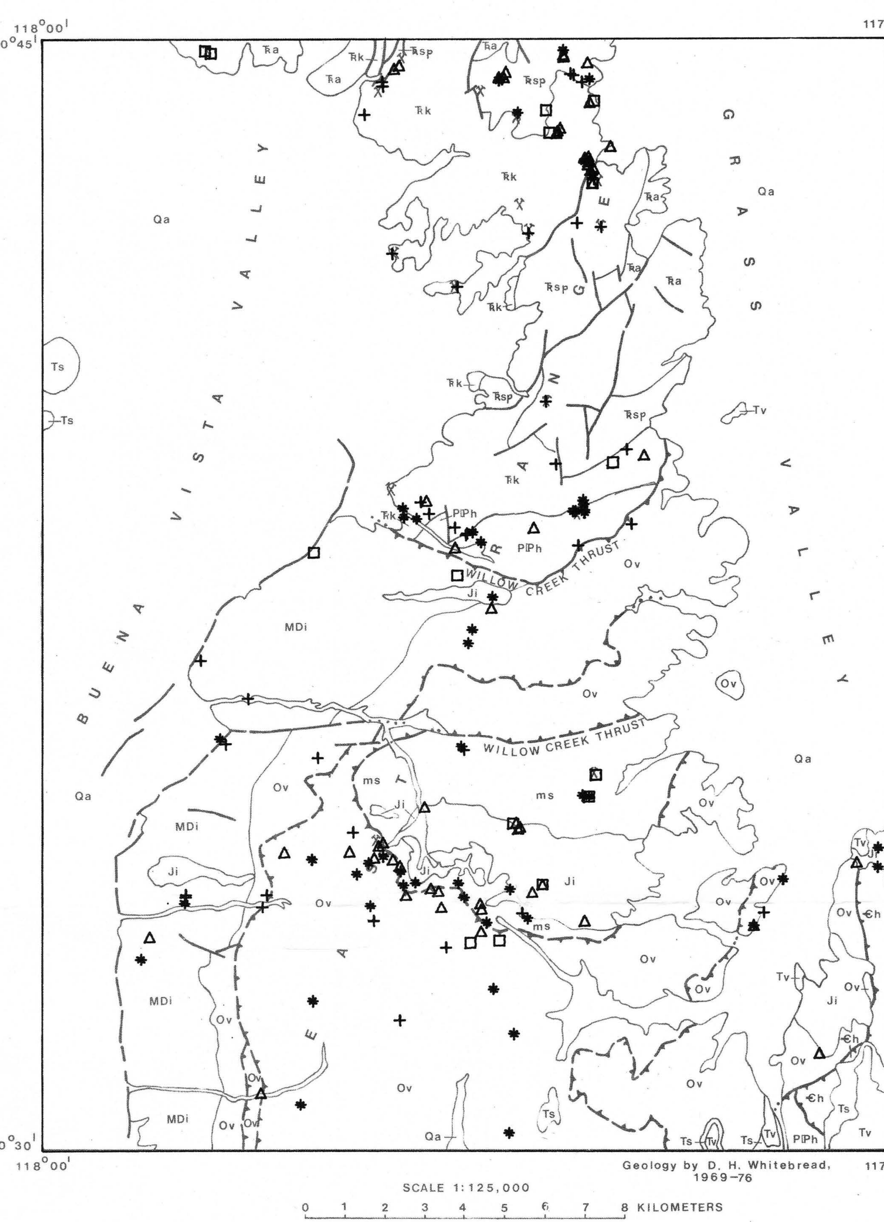
Silver, in parts per million
<0.5 0.5-3 5-100 >100

Figure 3. Distribution of silver in 189 samples from veins and fractures.



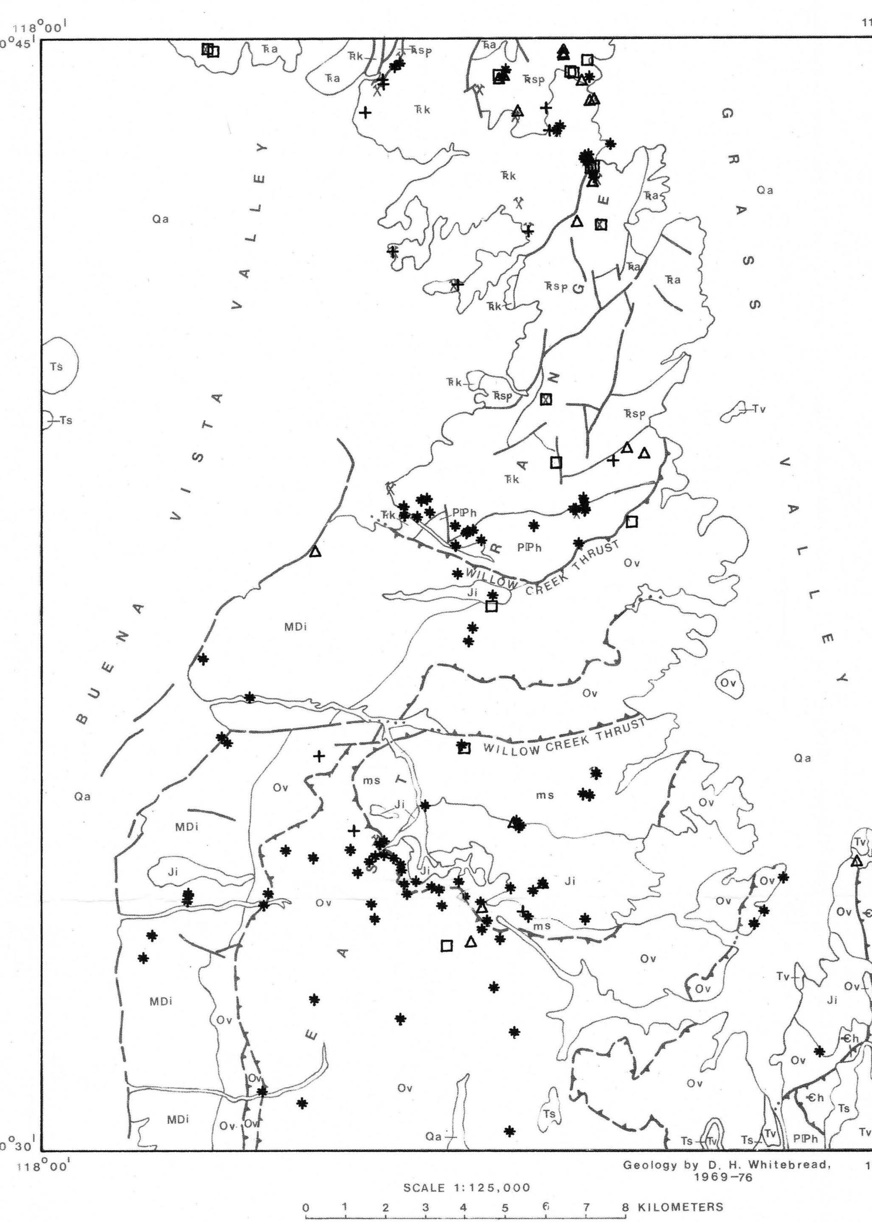
Mercury, in parts per million
<0.02-0.1 0.15-1 1.5-10 >10

Figure 4. Distribution of mercury in 132 samples from veins and fractures.



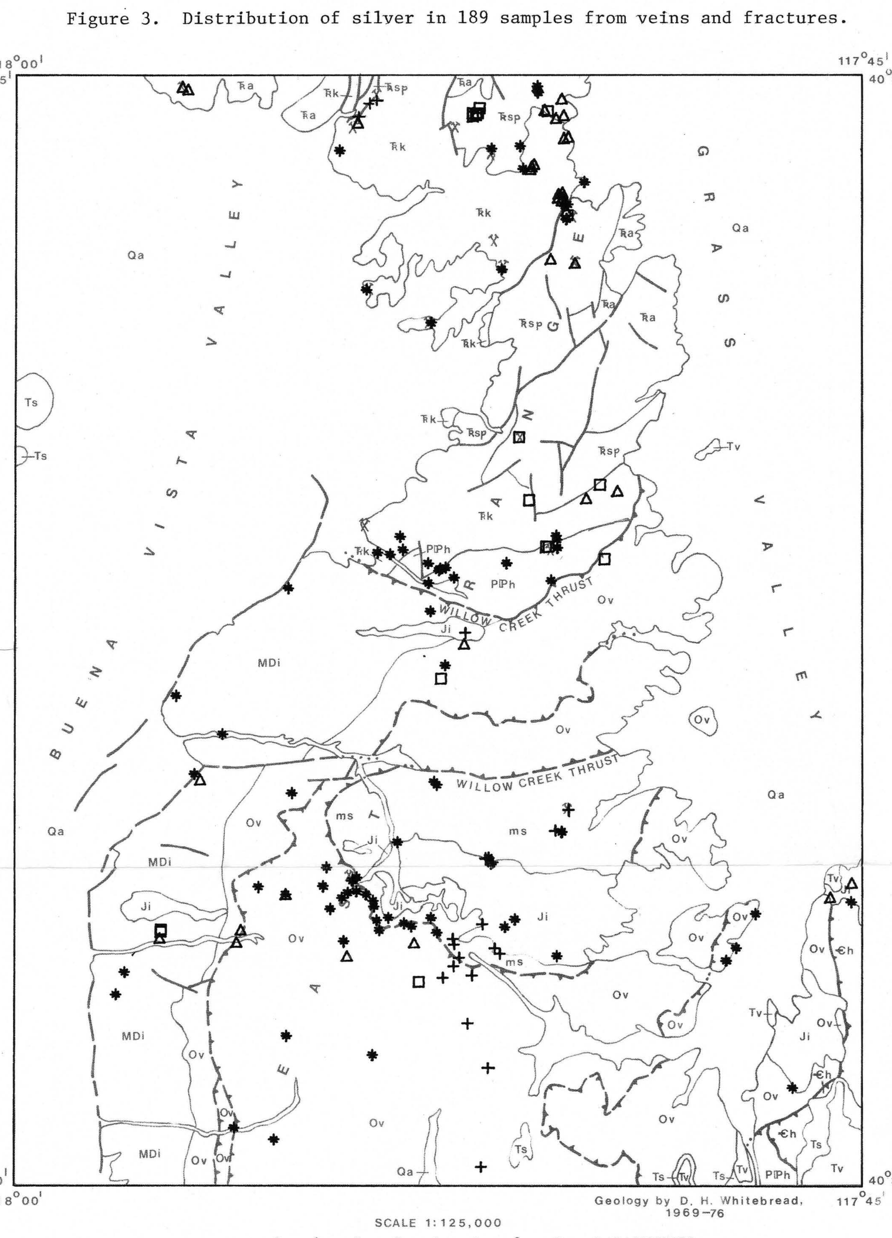
Arsenic, in parts per million
<200 10-50 70-200 >200

Figure 5. Distribution of arsenic in 155 samples from veins and fractures.



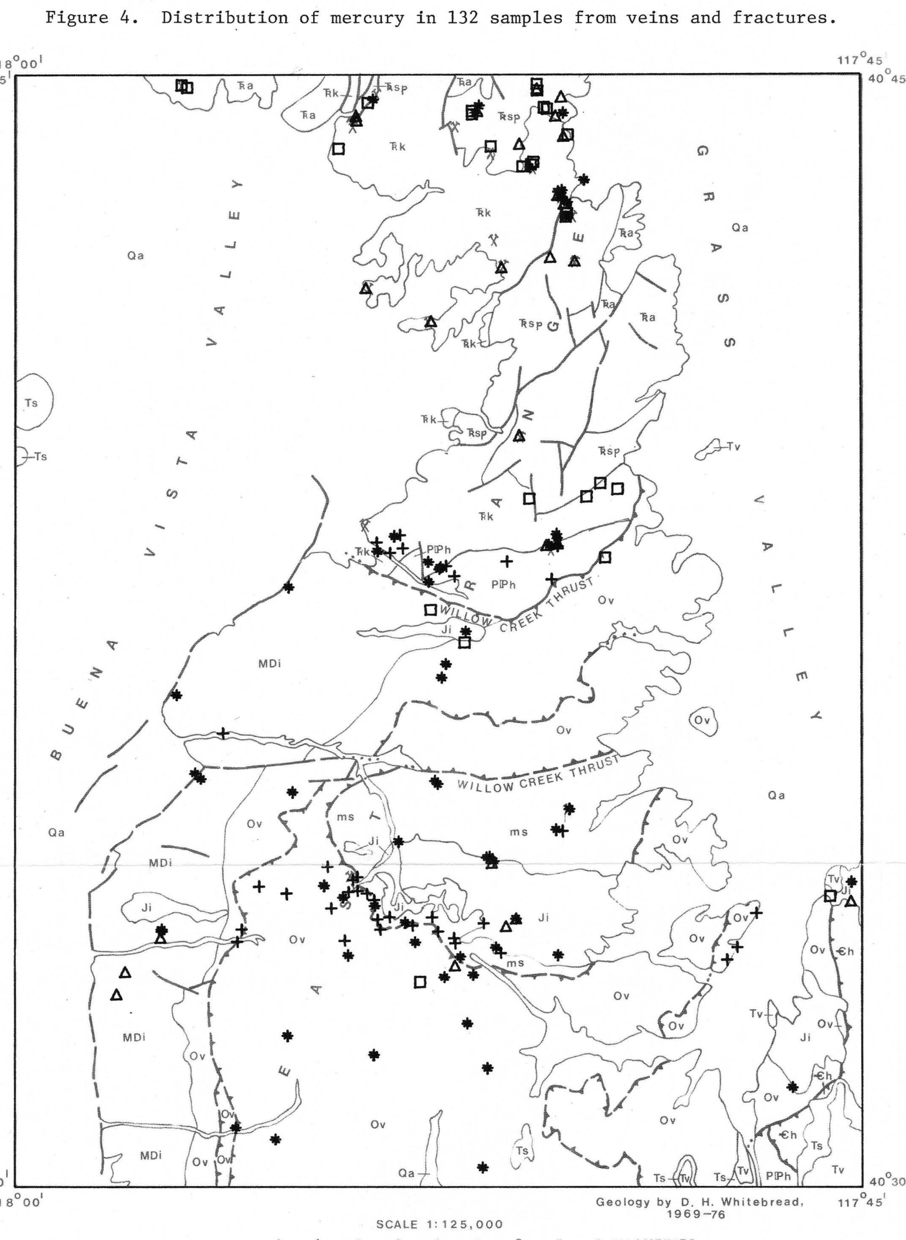
Antimony, in parts per million
<100 1-30 50-200 >200

Figure 6. Distribution of antimony in 155 samples from veins and fractures.



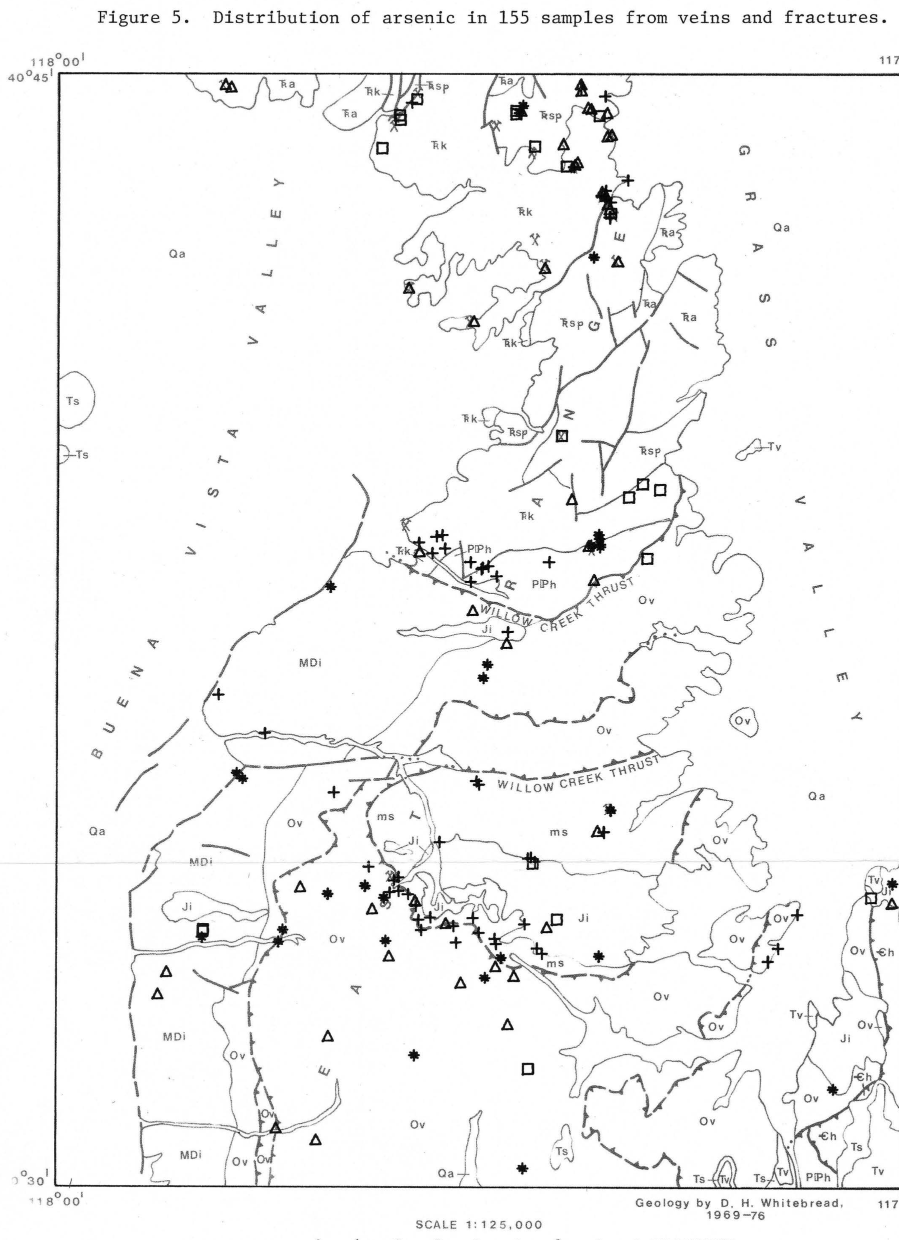
Copper, in parts per million
<5-30 50-200 300-1500 >1500

Figure 7. Distribution of copper in 155 samples from veins and fractures.



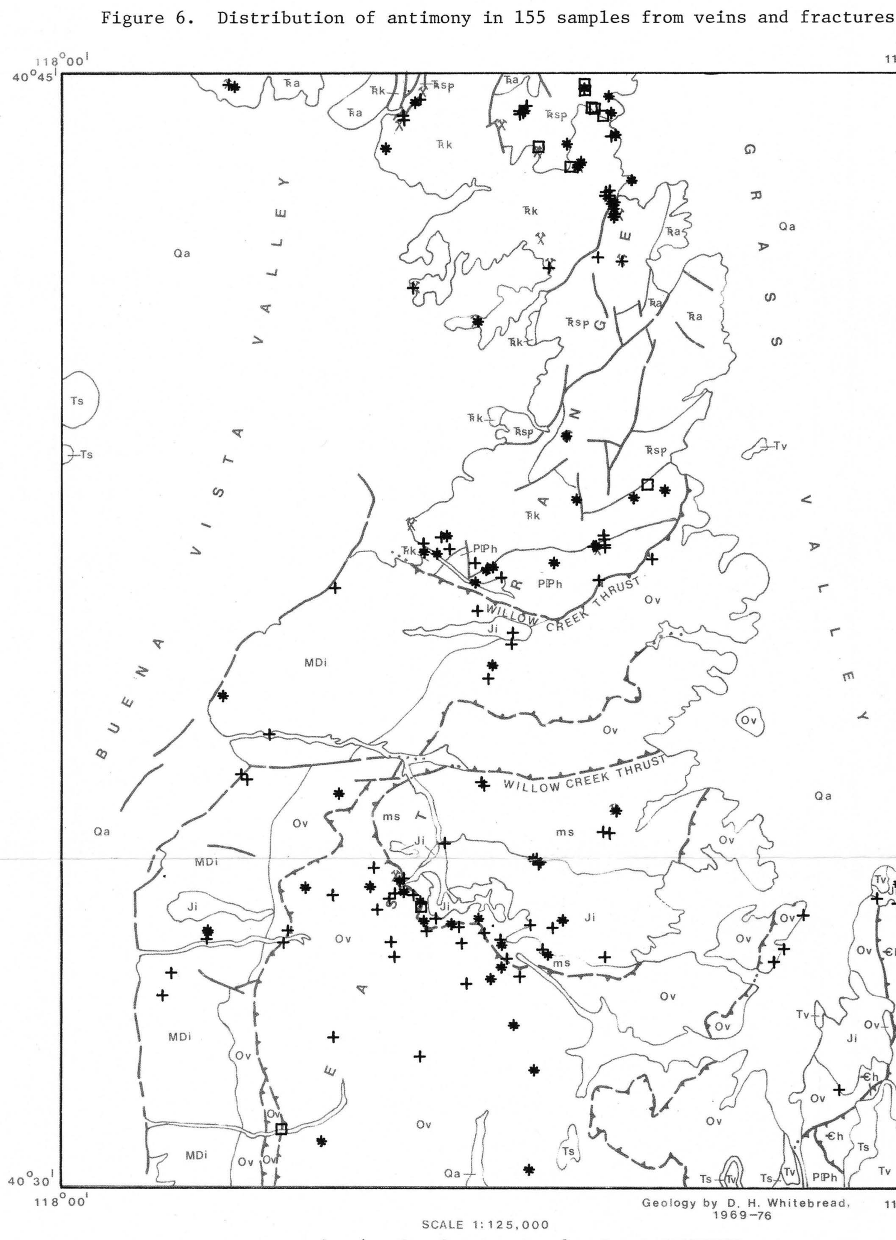
Lead, in parts per million
<10 10-50 70-1000 >1000

Figure 8. Distribution of lead in 155 samples from veins and fractures.



Zinc, in parts per million
<200 5-70 100-1000 >1000

Figure 9. Distribution of zinc in 155 samples from veins and fractures.



Molybdenum, in parts per million
<5 5-30 >30

Figure 10. Distribution of molybdenum in 155 samples from veins and fractures.

Quadrangle location

MAPS SHOWING GEOCHEMICAL DISTRIBUTION OF ELEMENTS IN VEINS AND FRACTURES IN THE DUN GLEN QUADRANGLE, PERSHING COUNTY, NEVADA

BY

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1978

Interior--Geological Survey, Reston, Va.--1978
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