UNITED STATES DEPARTMENT OF THE INTERIOR

U.S GEOLOGICAL SURVEY

CRIB-UTAH: METAL AND NONMETAL RESOURCE INFORMATION AVAILABLE IN THE U.S. GEOLOGICAL SURVEY COMPUTERIZED RESOURCE INFORMATION BANK

BY

Edwin W. Tooker and George Wong

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This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature

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INTRODUCTION

The U.S. Geological Survey's revised and expanded computerized resource information file for the state of Utah is available for public use through the aegis of the Office of Information Systems Programs, University of Oklahoma, and the General Electric World-Wide MARK III Computer Network. The file, which is part of a national file of resource data, currently consists of more than 3,500 records containing location, geologic, and resource information about metal and some nonmetal deposits or commodity occurrences in the state. These records are stored in the U.S. Geological Survey's Computerized Resource Information Bank (CRIB), which will be revised in a continuing program of verification, documentation, revision, and addition of new information.

The retrival programs available for use with CRIB make possible highly selective rapid searches of this file. The information can be reproduced as a complete record or specified parts of a record, as tabulations, and as map plots for selected fields of interest. Procedures for public access and use of this file can be obtained from the Director of Information Systems Programs, University of Oklahoma, P.O. Box 3030, Norman, Oklahoma 73070.

CRIB-UTAH provides a source of existing resource information from a number of specialized internal Geological Survey files (see U.S. Geol. Survey, 1979) and publicly available literature sources. The file represents a comprehensive central source of documented or verified nonconfidential geologic and resource information about metal and nonmetal mineral localities for the state of Utah. The file excludes organic fuels, most industrial

minerals (i.e., clays and saline evaporate minerals), and construction materials (i.e., sand, gravel, and cement rock). Complementary files are available for those resource materials specifically excluded.

A compilation of data such as this relies on the cooperation and assistance of many persons. We are pleased to acknowledge some whose contributions in the completion of this file have been substantial: Maureen G. Johnson, Jocelyn A. Peterson, and Donald F. Huber guided us through the computer input-output phases; Donald T. McMillan, Director, and Hellmut H. Doelling, Economic Geologist, of the Utah Geological and Mineralogical Survey were most cooperative in discussing the methodology of resource files and in exchanges of data; Gail McCoy, William J. Moore, Richard A. Armin, Hal T. Morris, Roscoe M. Smith, and Thomes A. Steven contributed information from the Tooele, Delta, and Richfield $1^{o}x2^{o}$ quadrangle projects of the Conterminous United States Mineral Assessment Program (CUSMAP); William J. Hassler made available the Utah files of the U.S. Geological Survey exploration loan programs (OME and DMEA); and Terry W. Offield contributed computerized information on energy materials in Utah from the National Uranium Resource Evaluation (NURE) program. To the many others unnamed, we also tender our sincere thanks.

PURPOSE AND CONTENT OF THE CRIB-UTAH FILE

The file was constructed primarily for use by the U.S. Geological Survey to help meet its specific national resource responsibilities; it complements several other files prepared for regional, local, or other uses. CRIB-UTAH is one of several files currently being compiled by the U.S. Geological Survey for the conterminous United States. It is intended to be a working tool in meeting advisory responsibilities for assessing the known and potential locatable mineral resources of the nation (U.S. Geol. Survey, 1975). The file

will also be available for use in geologic mapping, mineral commodity, and metallogenesis research. Emphasis is therefore on those metallic and nonmetallic commodities that are of broad national or international interest, rather than on those equally important materials that are generally abundant but are of more local (statewide) economic significance, i.e., common nonmetals (sodium and potassium), industrial minerals (brick clay, limestone for flux, or gemstones), and construction materials (sand, gravel, and cement rock). The CRIB-UTAH file emphasizes geologic information of resource occurrence; thus the geologic availability of the resource material is a prime consideration. While no appraisal of currently economic resources is made, all available production data are included.

OTHER AVAILABLE RESOURCE DATA

Complementary data file sources for the organic fuels, industrial (metallic and nonmetallic) minerals, and construction materials are also available. Information about organic fuel materials are located in several files described in U.S. Geological Survey Circular 817 (1979). Some of these data are also included in the CRIB files of the Utah Geological and Mineralogical Survey (U.G.M.S.), 606 Black Hawk Way, Salt Lake City, Utah, 84108. The U.G.M.S. file also contains geologic information about the occurrence and estimates of the resource potential of the common nonmetal, industrial minerals, and construction materials. Information about the economic factors of resource production of metallic and nonmetallic materials may be found also in the Minerals Availability System (MAS) file prepared by the U.S. Bureau of Mines (1974), and available through the U.S. Bureau of Mines, Western Field Operations Center, E. 315 Montgomery Avenue, Spokane, Wash., 99107.

DESCRIPTION OF THE CRIB-UTAH FILE

Currently the CRIB-UTAH file contains 3,552 entries similar to the example shown as table 1, but CRIB is a dynamic file and is constantly being corrected, updated, and added to as new information is made available. The file is an inventory of metal and nonmetal occurrence localities and consists of records that include the name, location, geologic setting, commodity information, deposit development information, production, resource potential, when available, and significant literature citations. The file uses the GIPSY program, an English-based computer language format by which new data and new records can be added easily, old data corrected and revised, and superfluous or duplicate records deleted (Keefer and Calkins, 1977). Information about a metal or nonmetal commodity, its location by district, county, longitude and latitude, Universal Transverse Mercator (UTM) or Township and Range can be retrieved by means of interactive access, batch computer text, tabular printout, or map plots.

The file contains geologic and resource information about historical mineral deposits (those now worked out), currently economic and productive deposits, and subeconomic occurrence localities that may contain potentially usable metallic or nonmetallic resource materials. As such, this file contains more than an inventory of past and present productive deposits.

Output retrieval from the CRIB-UTAH file may be in the form of batch computer text similar to that shown in table 1, tabular printout, as shown in table 2, or map plots at varying scales and projections, such as those in figures 2A through S. In addition, there are statistical programs available, and retrieval can be made also by interactive access programs.

Table 1.--Typical CRIB-UTAH file entry

```
CRIB MINERAL RESOURCES FILE 12

                                        RECORD IDENTIFICATION
                                          RECORD NO.............  DC12525
                                          COUNTRY/ORGANIZATION.  USGS
                                          FILE LINK ID..........  CONSV
                                          MAP CODE NO. OF REC..

                                        REPORTER
                                          DATE:  74 06
                                          UPDATE(S): 79 01
                                          BY:  WONG, GEORGE; TOOKER, ED

NAME AND LOCATION
  DEPOSIT NAME.................  CHIEF MINE
  SYNONYM NAME.................  CHIEF CONSOLIDATED

  MINING DISTRICT/AREA/SUBDIST.  TINTIC DISTRICT
  SUBDISTRICT..................  MAIN TINTIC

  COUNTRY CODE.................  US
  COUNTRY NAME:
   UNITED STATES

  STATE CODE.............  49
  STATE NAME:
   UTAH

  COUNTY.................  JUAB

  QUAD SCALE          QUAD NO OR NAME
   1: 24000            EUREKA, 1954

  LATITUDE            LONGITUDE
   39-57-03N           112-07-01W

   ALTITUDE.. 6577 FT

  UTM NORTHING        UTM EASTING         UTM ZONE NO
   4422691.            404594.             +12

  TWP.....  010S
  RANGE....  002W
  SECTION..  18
  MERIDIAN.  SL

  POSITION FROM NEAREST PROMINENT LOCALITY:  SOUTH-CENTRAL EDGE OF EUREKA
    TOWNSITE

  LOCATION COMMENTS: LOCATION IS OF NO. 1 SHAFT


COMMODITY INFORMATION
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Table 1.--Typical CRIB-UTAH file entry--Continued

```
  COMMODITIES PRESENT: AG  PB  ZN  CU  AU  MN  CD

  SIGNIFICANCE:
              MAJOR PRODUCTS.. AG  PB  ZN
              MINOR PRODUCTS.. CU  AU
              COPRODUCTS......
              BYPRODUCTS...... CD
              POTENTIAL.......
              OCCURRENCE...... MN

  ORE MATERIALS (MINERALS,ROCKS,ETC.):
    GALENA, SPHALERITE, ARGENTITE, NATIVE SILVER, NATIVE GOLD, WURTZITE,
    CERARGYRITE, CERUSSITE, PLUMBOJAROSITE, ENARGITE,
    TETRAHEDRITE-TENNANTITE, PROUSTITE

  ANALYTICAL DATA(GENERAL)
    1910 - 56 AVE:  0.1 OZ AU, 15.5 OZ AG, 0.3 % CU, 6 % PB, 2.3 % ZN


EXPLORATION AND DEVELOPMENT
  STATUS OF EXPLOR. OR DEV.  4
                             PROPERTY IS INACTIVE

  EXPLOR. AND DEVELOP. COMMENTS:
    1980-UNDER EXPLORATION BY ASARCO


DESCRIPTION OF DEPOSIT

  DEPOSIT TYPES:
    REPLACEMENT
  FORM/SHAPE OF DEPOSIT: POD, PIPELIKE, AND VEIN DEPOSITS ALL IRREGULARLY
    INTERCONNECTED.

  SIZE/DIRECTIONAL DATA
    SIZE OF DEPOSIT.....  MED-LARGE
  COMMENTS(DESCRIPTION OF DEPOSIT):
    GRANITE CLAIMS PIPE(75 FEET IN DIAMETER AND 800 FEET THICK): THIS IS ONE
    EXAMPLE OF THE MANY ORE BODIES IN THE MINE.

DESCRIPTION OF WORKINGS
     UNDERGROUND

  DESCRIP. OF UNDERGRND WORKINGS
     LENGTH OF WORKINGS.............. 120       MI

  DESCRIP. OF OPEN WORKINGS (SURFACE OR UNDERGRND)

  COMMENTS(DESCRIP. OF WORKINGS):
    THE LENGTH OF WORKINGS INCLUDES ADJACENT MINES.  THE MINE IS DEVELOPED BY
    TWO SURFACE SHAFTS, FOUR UNDERGROUND WINZES WITH DRIFTS AND CROSSCUTS.
    NO. 1 SHAFT IS 1,850 FEET DEEP WITH NINE LEVELS.  NO. 2 SHAFT IS 1,800
    FEET DEEP; IT IS USE FOR VENTILATION AND ESCAPE.  THE LOWEST LEVEL IS AT
    3,050 FEET BELOW THE SURFACE.
```

Table 1.--Typical CRIB-UTAH file entry--Continued

```
PRODUCTION
      YES


 ANNUAL PRODUCTION (ORE AND COMMODITIES)


 CUMULATIVE PRODUCTION (ORE,COMMOD.,CONC.,OVERBUR.)

   ITEM          ACC  AMOUNT  THOUS.UNITS YEAR  GRADE,REMARKS
  8  ORE         ACC 3451.780 TONS        1909 - 1956
  9  AG          ACC 52098.12 OZ          1909 - 56
  10 PB          ACC 410540.1 LB          1909 - 56
  11 ZN          ACC 165711.8 LB          1909 - 56
  12 CU          ACC 10878.11 LB          1909 - 56
  13 AU          ACC 0200.496 OZ          1909 - 56

PRODUCTION YEARS.......  1909-1956

SOURCE OF INFORMATION (PRODUCTION).. UTAH GEOL SOC GUIDEBOOK # 12

PRODUCTION COMMENTS....  $48,770,940 (NET FROM THE SMELTER AT PREVAILING
  PRICES)

GEOLOGY AND MINERALOGY

  AGE OF HOST ROCKS.............  EORD-LMISS
  HOST ROCK TYPES...............  OPOHONGA LIMESTONE TO DESERET LIMESTONE
    FORMATIONS

  AGE OF ASSOC. IGNEOUS ROCKS..  OLIGO
  IGNEOUS ROCK TYPES............  (30-32 M.Y.) PACKARD QUARTZ LATITE; SILVER
    CITY MONZONITE PORPHYRY AND RELATED PLUTONS

  PERTINENT MINERALOGY.........  GANGUE OF BRECCIATED, VUGGY, BARITIC
    JASPEROID

  IMPORTANT ORE CONTROL/LOCUS..  NORTHEAST TRENDING STRIKE-SLIP FAULTS.

  GEOLOGICAL DESCRIPTIVE NOTES.  2 ORE ZONES

  LOCAL GEOLOGY

    SIGNIFICANT LOCAL STRUCTURES:
      THE MINE IS ON THE WEST LIMB AND IN THE TROUGH OF THE TINTIC SYNCLINE.
      BEDS IN THE LIMB ARE STEEP TO OVERTURNED.  EAST BECK FAULT(N 60 E,
      STEEP NW); MILLIONAIRE ROW FAULT(N 60 E, IRREGULAR N); INTERMEDIATE
      FAULT(N 77 E, 75 S); LEADVILLE REVERSE FAULT(N 75 E, STEEP SE);
      BULKHEAD FAULT(N 75 W, 65-85 SW).

    SIGNIFICANT ALTERATION:
      OXIDATION TO THE 1800 FT LEVEL; LIMESTONES WERE DOLOMITIZED, PYRITIZED,
      AND JASPEROIDIZED PRIOR TO ORE DEPOSITION.
```

Table 1.--Typical CRIB-UTAH file entry--Continued

GEOLOGICAL PROCESSES OF CONCENTRATION OR ENRICHMENT:
ASCENDING HYDROTHERMAL ORE FLUIDS.

GENERAL REFERENCES

1) COOK, DR, 1957 , GEOL OF E TINTIC MTNS AND ORE DEP OF TINTIC MINING DIST: UTAH GEOL SOC GUIDEBOOK # 12 , PL 3 , P. 80 - 93
2) USBM MIN. RES. 1923-1933
3) LINDGREN, W AND LOUGHLIN, GF, 1919 , GEOL AND ORE DEP OF TINTIC MINING DIST: USGS PROF PAPER 107 , P. 205 - 207
4) MORRIS, H.T., 1968, THE MAIN TINTIC MINING DISTRICT, UTAH: IN ORE DEPOSITS OF THE U. S., 1933-1967, AIME GRATON-SALES VOLUME 2, P. 1043-1073.

SOURCES OF CRIB INFORMATION

The CRIB-UTAH file brings together in verified form several overlapping sources of data from individual resource programs within the Geologic and Conservation Divisions of the U.S. Geological Survey, as well as data from other public and private sources. The Conservation Division has had special responsibility for the assessment and management of leasable minerals on federal lands; the Geologic Division has maintained special expertise for the assessment and measurement of the geologic availability for the major metal and nonmetal commodities, and has responsibility for locatable minerals on all lands. The Geologic Division has also managed the U.S. Geological Survey mineral exploration loan programs (OME-DMEA) and has been involved in the National Uranium Resource Evaluation (NURE), the Forest Service Regional Area Resource Evaluation (RARE II), a mapping program to assess resource potential in the Richfield, Tooele, and Delta $1^{o}x2^{o}$ quadrangles, as part of the Conterminous United States Mineral Assessment Program (CUSMAP). Programs such as the Circumpacific Resource Study, the National Atlas, the Wilderness Resource Assessment programs, and the metallogenic map program of the Geologic Division are a few of the important continuing sources of information for the CRIB-UTAH file.

A major outside source of data for this file is the Utah Geological and Mineralogic Survey (UGMS), which has also developed a file for use in the resource appraisal of leasable and other minerals for the U.S. Bureau of Land Management (BLM), to assist them in management of leasable minerals on federal lands in Utah. The extensive published literature on the mineral resources of Utah also is an important additional source of data on Utah mineral resources.

LEVELS OF COVERAGE AND ACCURACY

The CRIB-UTAH file is a level-one compilation (U.S. Geol. Survey, 1975) or an inventory of known and available resource information based essentially on a search of existing files and of the literature. Each entry has been verified as to location by longitude and latitude and UTM coordinates, references to the literature have been authenticated, and the geologic information in the file has been expanded where possible. Even so, the records vary in the amount of detail, quality, and consistency--in large part because of similar variations in the original data, the different intensity and the specializations of the individual contributors, the particular program emphasis of the contributor, and differences in an individual's capabilities for making such observations. We have made no on-site investigations in individual deposits, mines, or prospects, and no assessments or estimates of resource potential have been added by the compilers of the present file to those of the original contributors. Should the depth of information currently in the files be insufficient for the users' purposes, appropriate references cited should be consulted. The extent and distribution of mineral deposits and occurrence localities in the file are summarized in the following table. Table 2 shows the total number of records, and the distribution of major commodity groups by county and geologic provinces in Utah.

SUMMARY MAPS OF METAL AND NONMETAL LOCALITIES

The series of maps that follow afford a visual estimate of the content of individual metal and nonmetal commodity localities documented in the CRIB-UTAH file, as detailed in table 2. The index map, figure 1, shows the approximate boundaries of the main geologic regions in Utah--the Great Basin, the Northern Rocky Mountains, and the Colorado Plateau--, the boundaries of individual counties, and the $1^{o}x2^{o}$ quadrangle basemaps in the state. Figures 2A through

Table 2.--Distribution of CRIB-UTAH localities for some metal and nonmetal commodities in counties and geologic provinces of Utah

Counties	Geologic province[1]	Number of records	Base metals (Cu, Pb, Zn)	Ferrous metals (Fe, Mn, V, Ti, Mo)	Precious metals (Au, Ag, P+gp)	Energy metals (U-Th, Li)	Nonmetals (F, P, Al)	Miscellaneous metals (W, Sn, Be, Nb/Ta, Hg, Co/Ni, Cr)
Beaver	BR	200	123	47	73	28	36	34
Box Elder	BR	89	49	8	39	1	1	10
Cache	RM	25	11	4	6	0	1	0
Carbon	CP	105	0	0	0	0	0	0
Daggett	RM	10	2	4	2	3	1	0
Davis	BR	15	3	0	2	0	0	1
Duchesne	CP and RM	53	3	5	0	6	6	0
Emery	CP	483	34	109	1	279	0	4
Garfield	CP	157	22	22	9	146	0	3
Grand	CP	371	32	147	25	236	5	2
Iron	BR and CP	162	11	73	42	5	1	3
Juab	BR	260	149	50	124	37	49	32
Kane	CP	15	0	7	1	12	0	2
Millard	BR	64	17	16	10	2	1	19
Morgan	BR and RM	9	5	2	5	1	2	0
Piute	BR and CP	90	19	13	26	45	32	5
Rich	RM	11	1	2	0	0	9	0
Salt Lake	BR and RM	267	194	17	157	2	2	11
San Juan	B	480	107	245	6	427	0	0
Sampete	BR and CP	5	2	2	2	1	0	0
Sevier	BR and CP	36	3	6	5	19	10	0
Summit	RM	26	19	6	20	1	4	0
Tooele	BR	331	231	59	203	3	20	34
Uintah	CP and RM	36	7	10	7	16	4	0
Utah	BR and RM	138	82	22	58	0	2	2
Wasatch	RM	17	10	5	6	0	0	0
Washington	BR and CP	65	14	22	19	29	2	1
Wayne	CP	8	5	1	0	6	1	1
Weber	BR	4	1	1	1	0	2	0
	Total	3,552						

[1]BR = Basin and Range
CP = Colorado Plateau
RM = Rocky Mountain

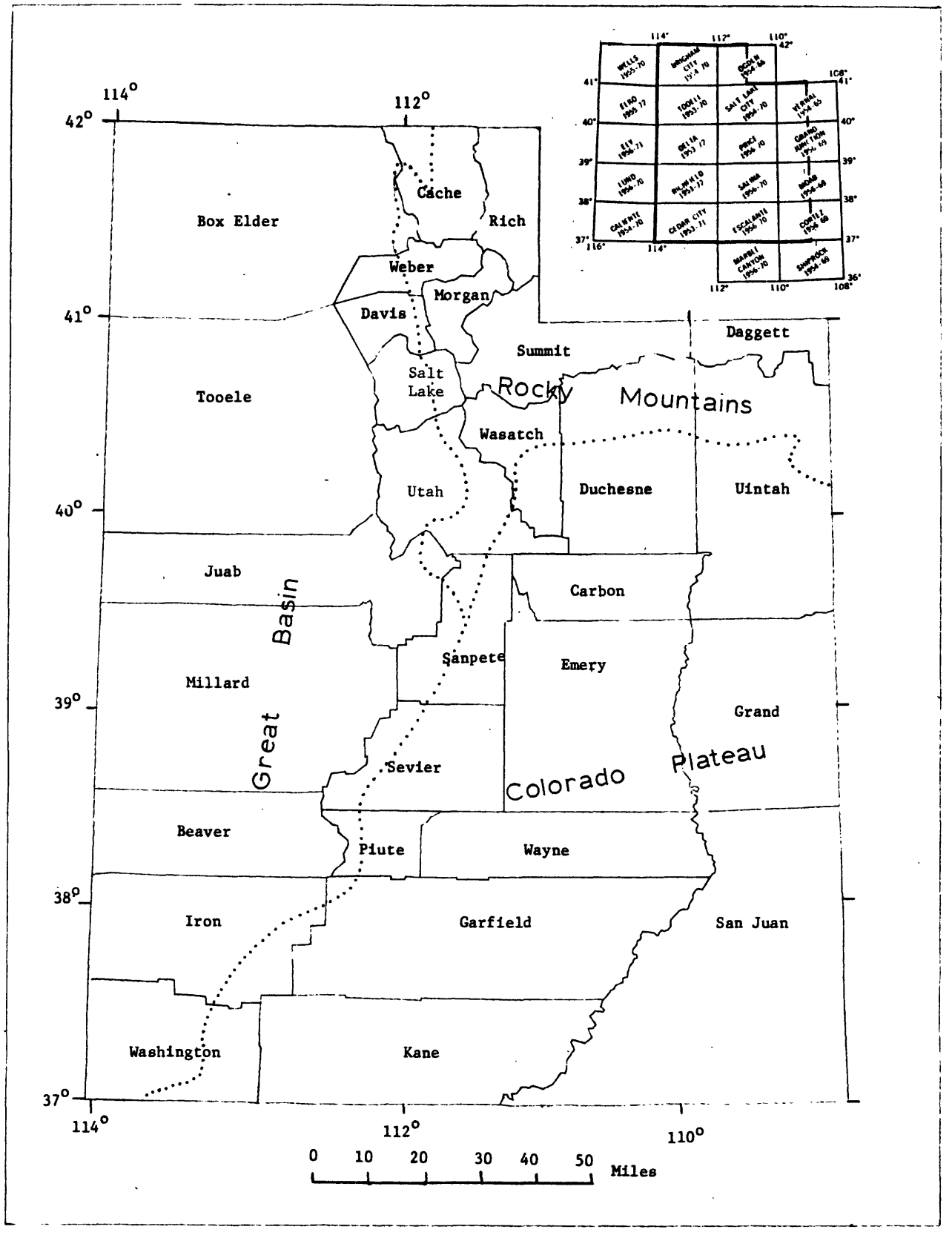

Figure 1. Index map showing the counties in the state of Utah, the $1^{\circ} \times 2^{\circ}$ (1:250,000) topographic quadrangle maps therein, and the three main geologic regions of the state (Great Basin, Rocky Mountains, and Colorado Plateaus).

S chronicle the distribution of individual commodities beginning with the base metals (copper, lead, zinc), the precious metals (gold and silver), the ferroalloy minerals (iron, manganese, titanium, molybdenum, and vanadium), the energy metals (uranium, thorium, and lithium), and ending with a number of other important but less abundant materials--beryllium, phosphorus, mercury, tungsten, fluorine (as fluorite), barium (as barite) and the rare earths (monazite), arsenic, bismuth, cadmium, antimony, selenium, and tellurium. Not all locality points in the file may be resolved individually at the reduced scale shown, but local areas of interest can be resolved in computer plots at a more detailed scale.

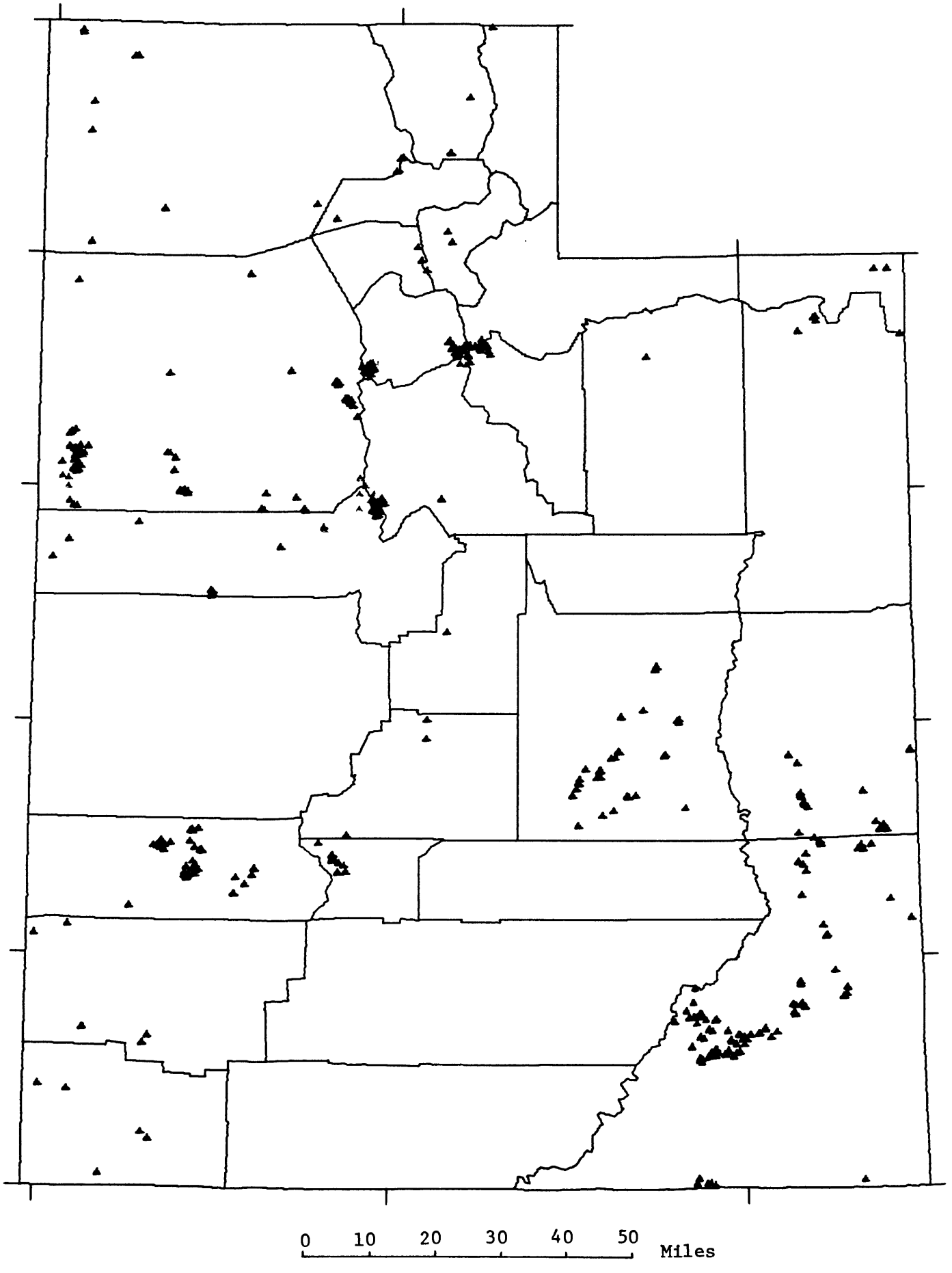

Figure 24.--Copper in Utah.

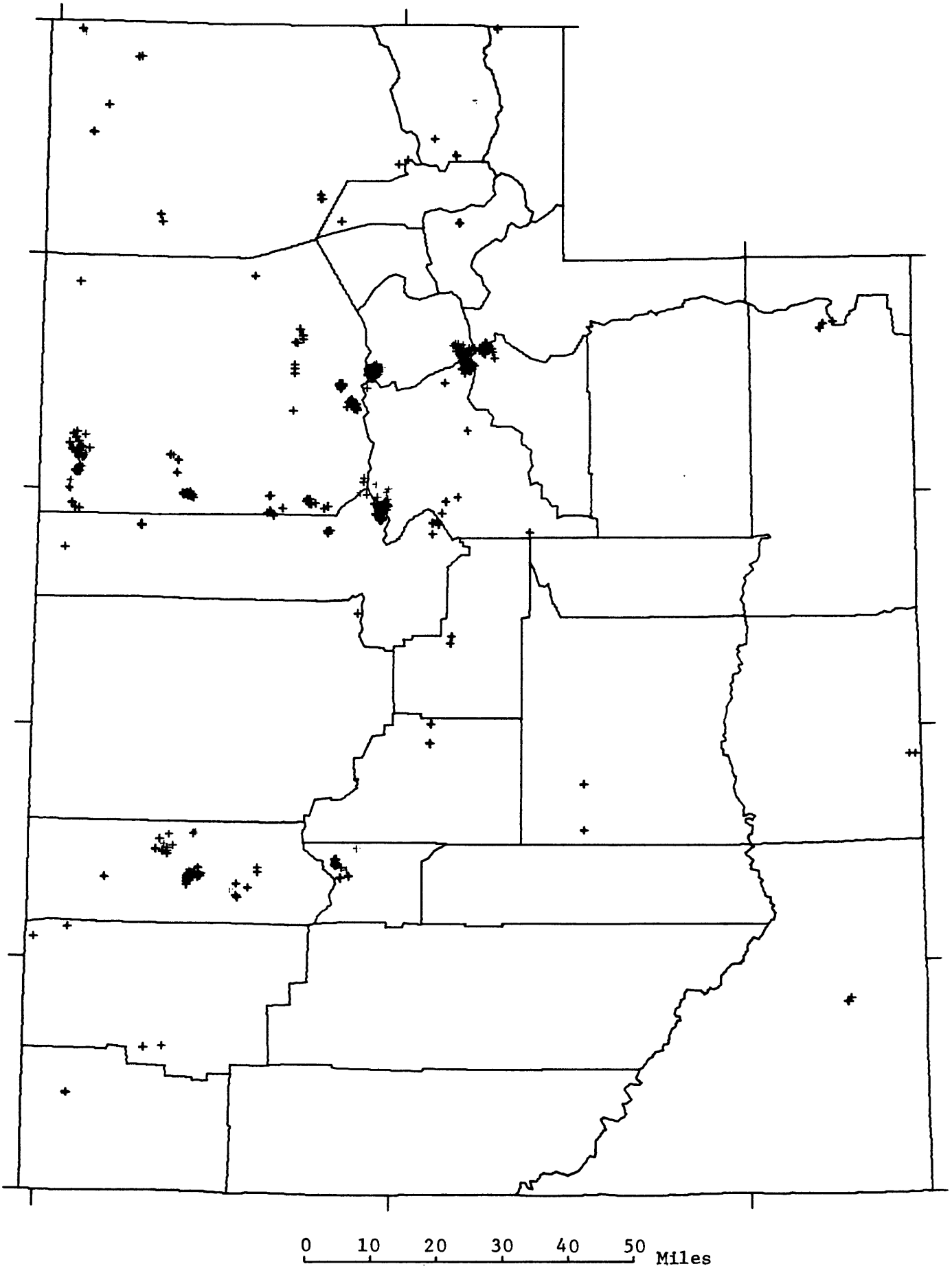

Figure 2*B*.--Lead in Utah.

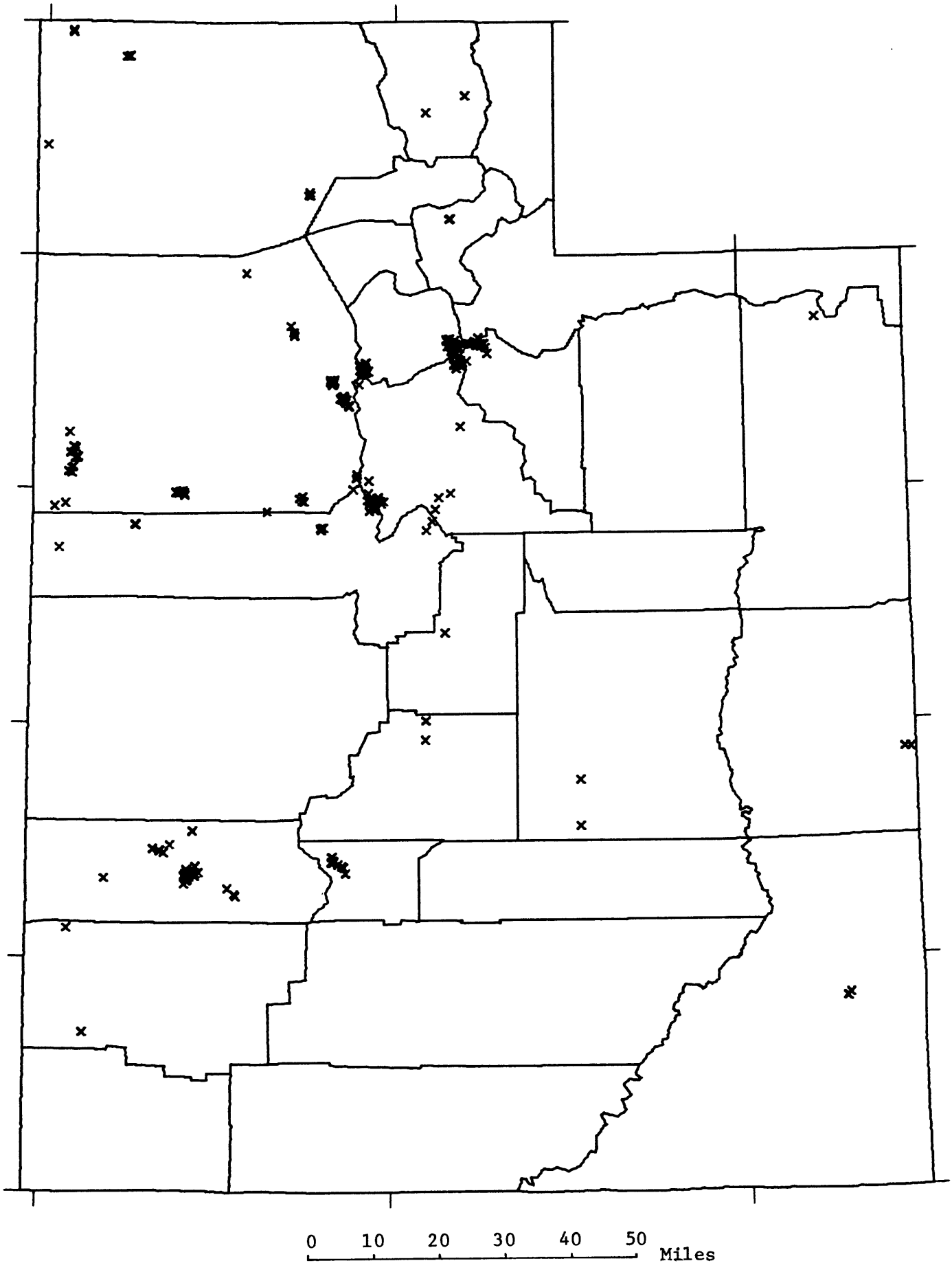

Figure 2C.--Zinc in Utah.

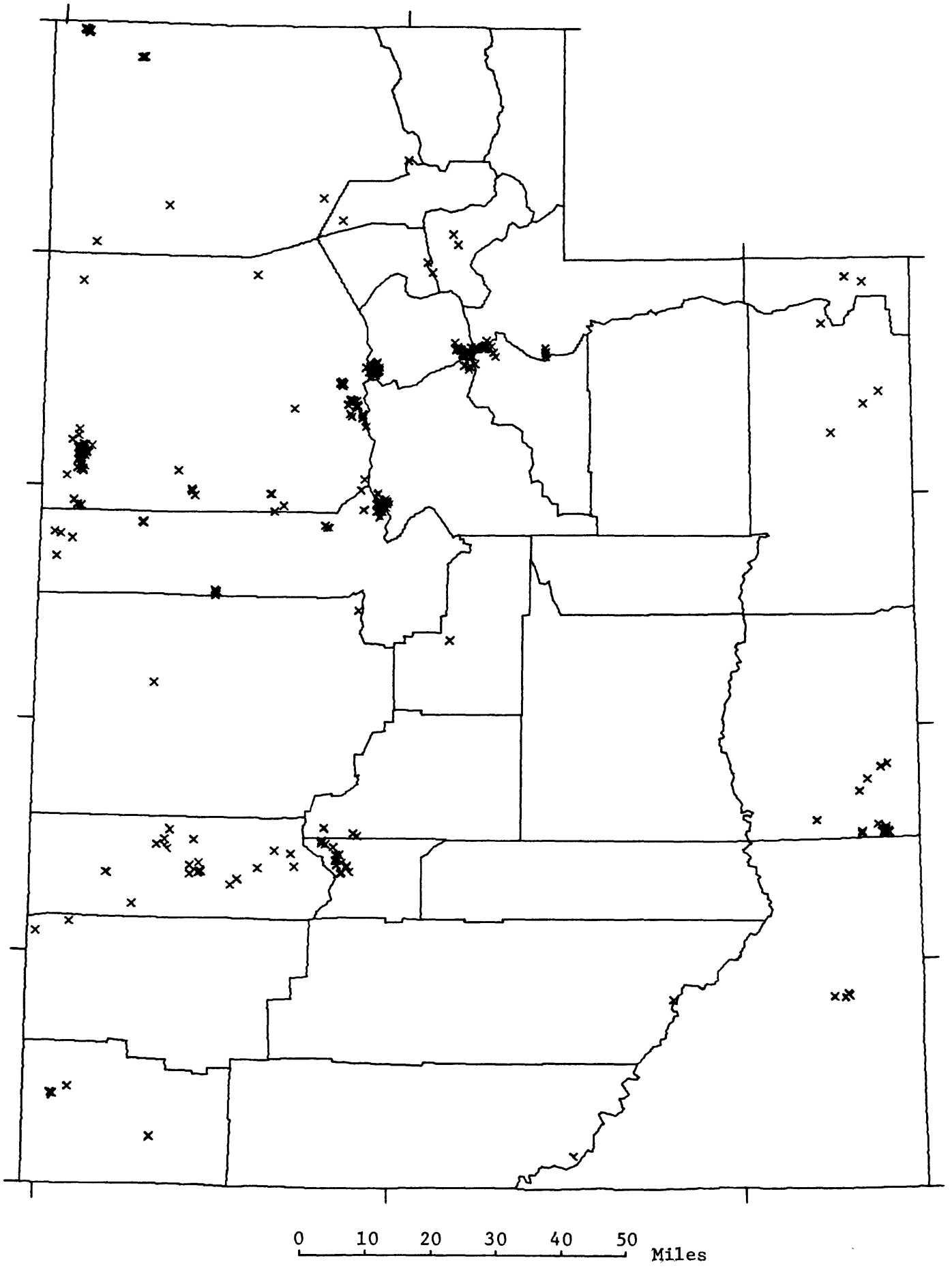

Figure 2*D*.--Gold in Utah.

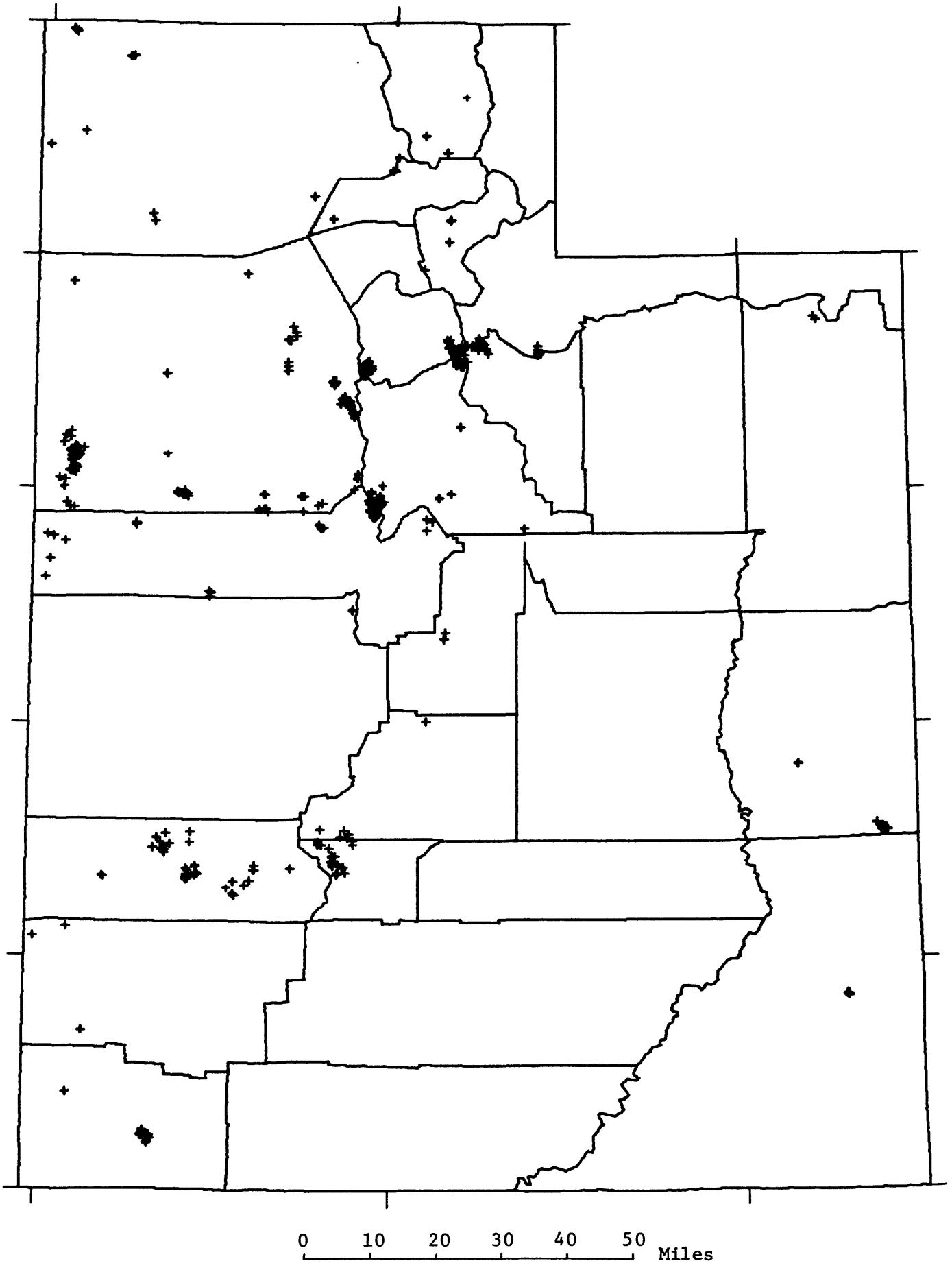

Figure 2*E*.--Silver in Utah.

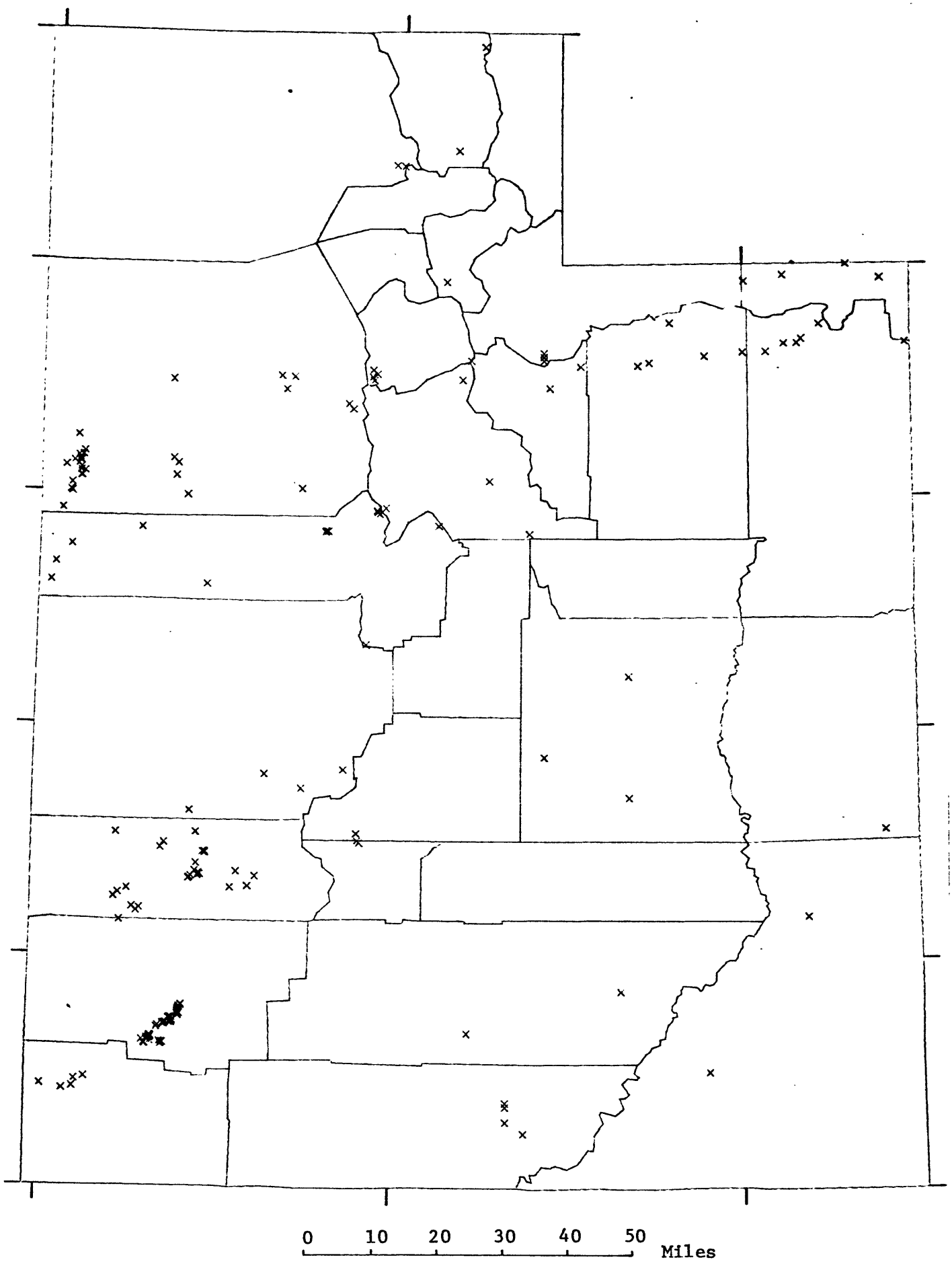

Figure 2F.--Iron in Utah.

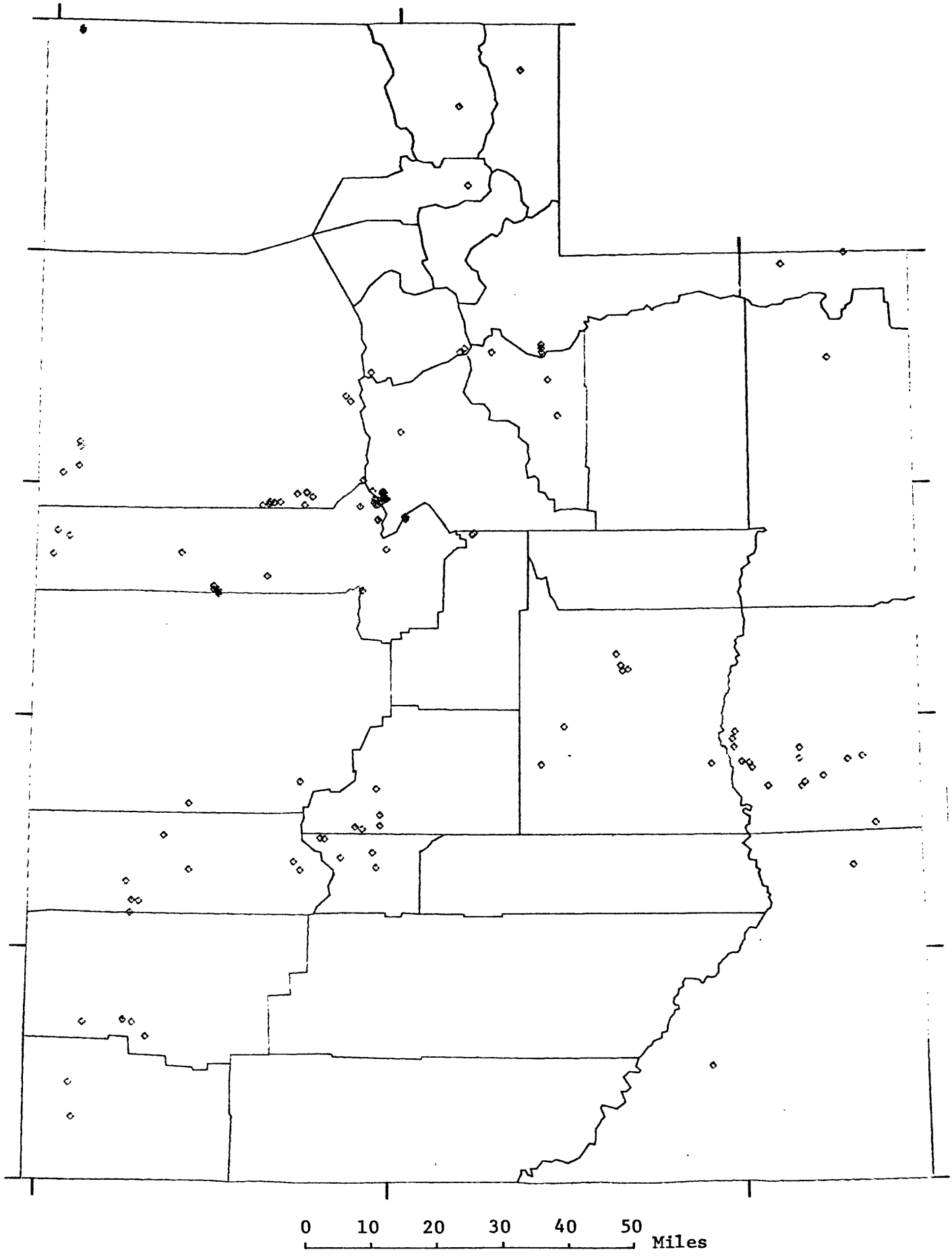

Figure 2*G*.--Manganese in Utah.

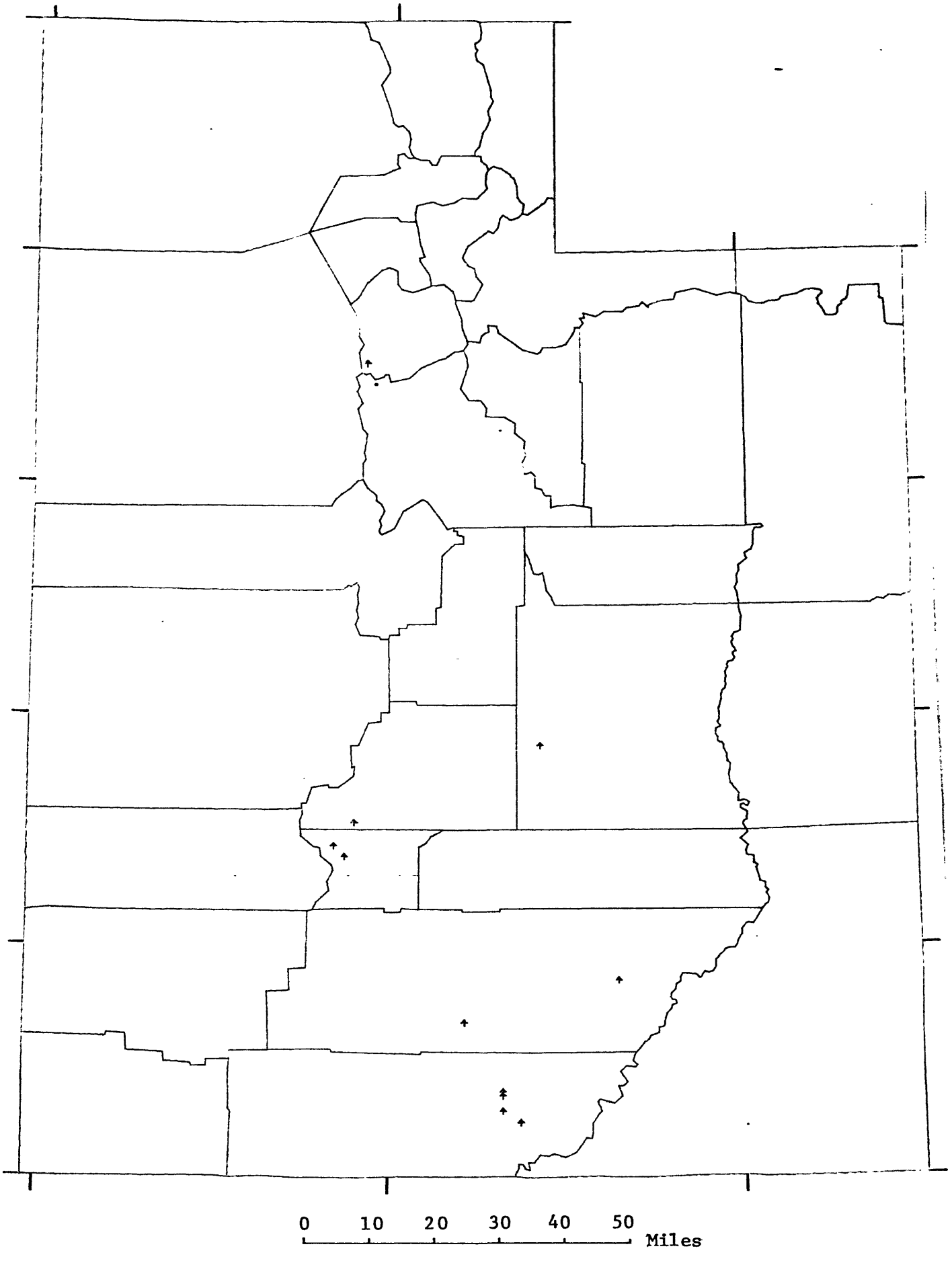

Figure 2*H*.--Titanium in Utah.

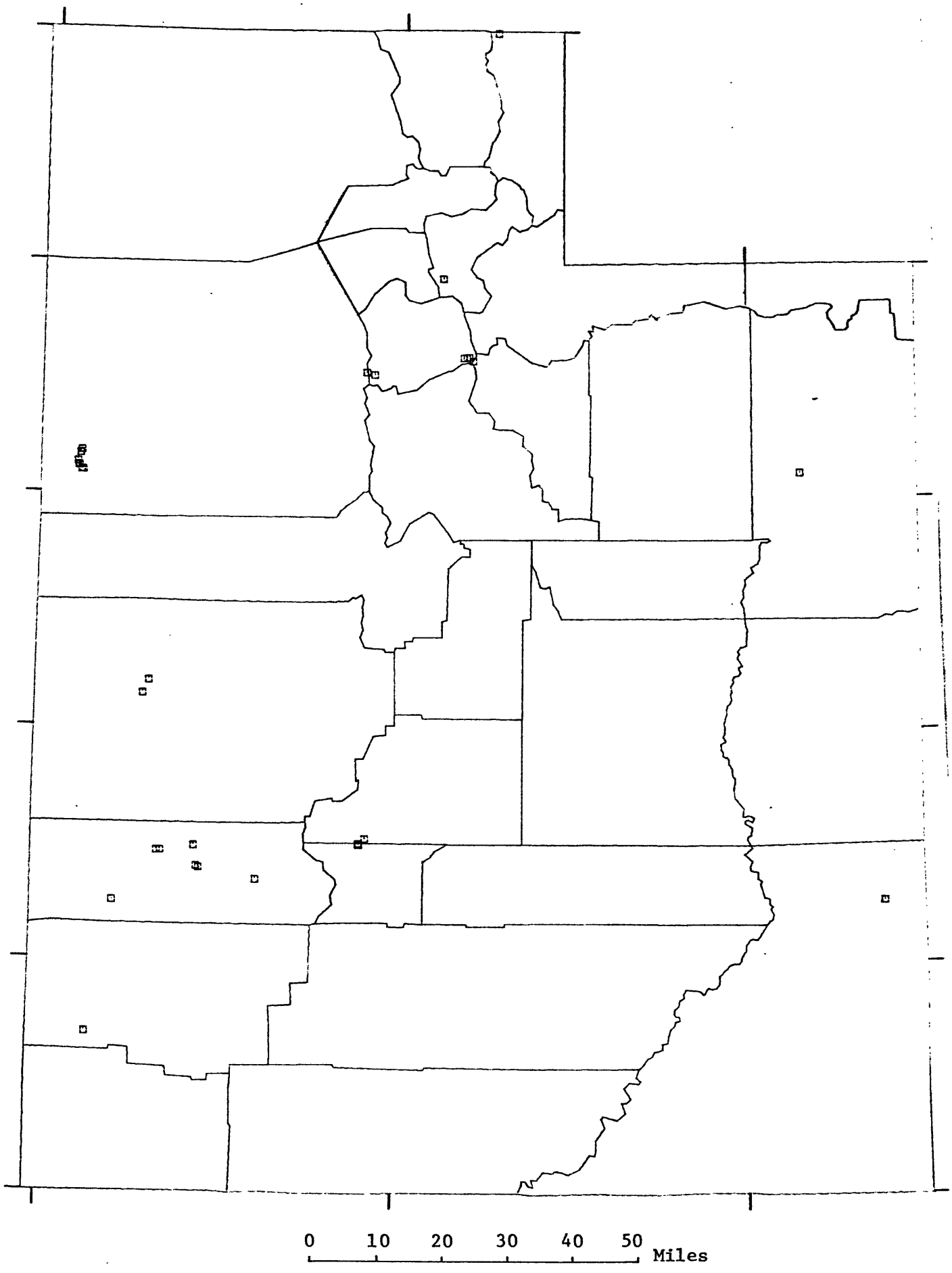

Figure 21.--Molybdenum in Utah.

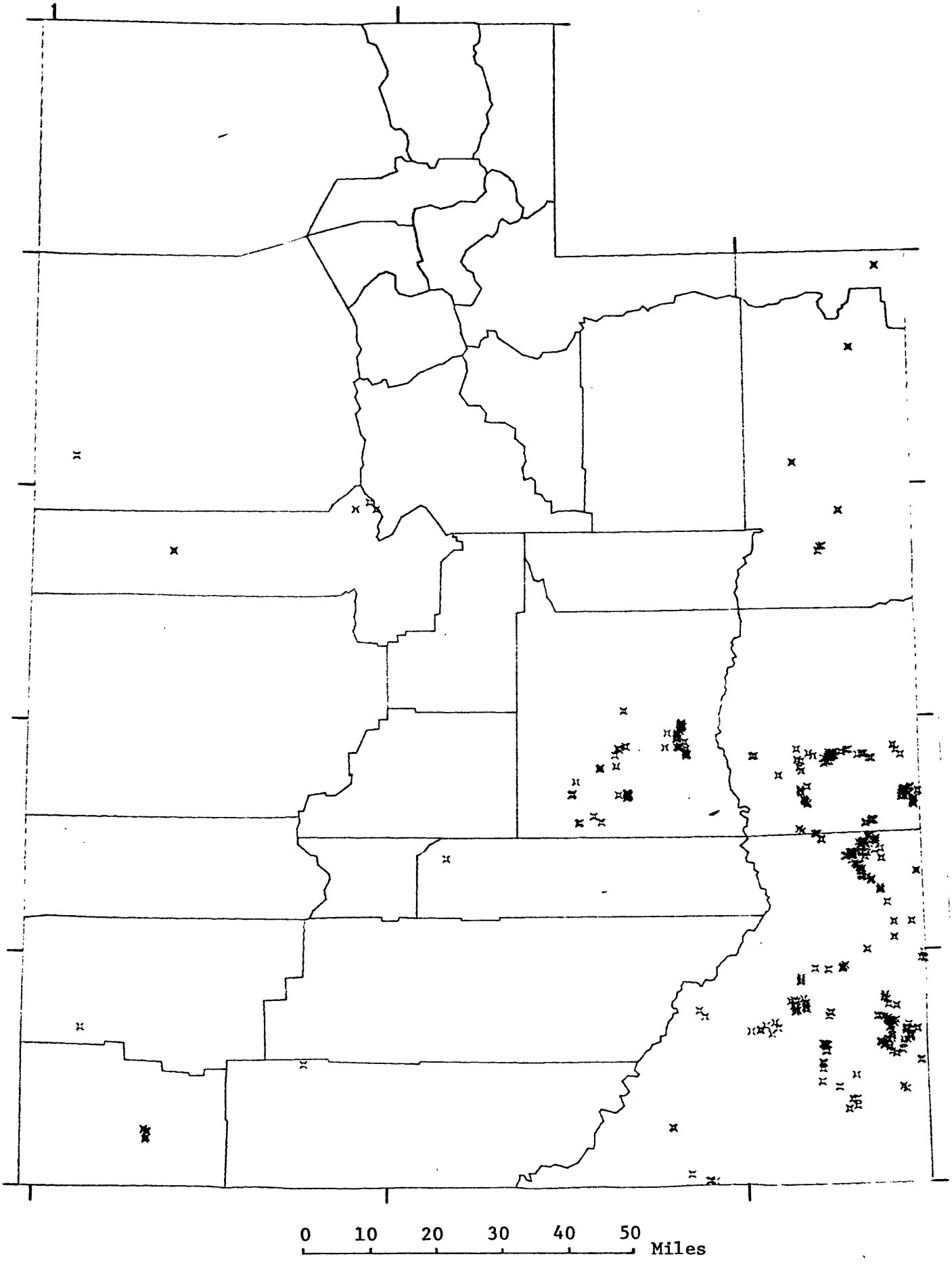

Figure 2J.--Vanadium in Utah.

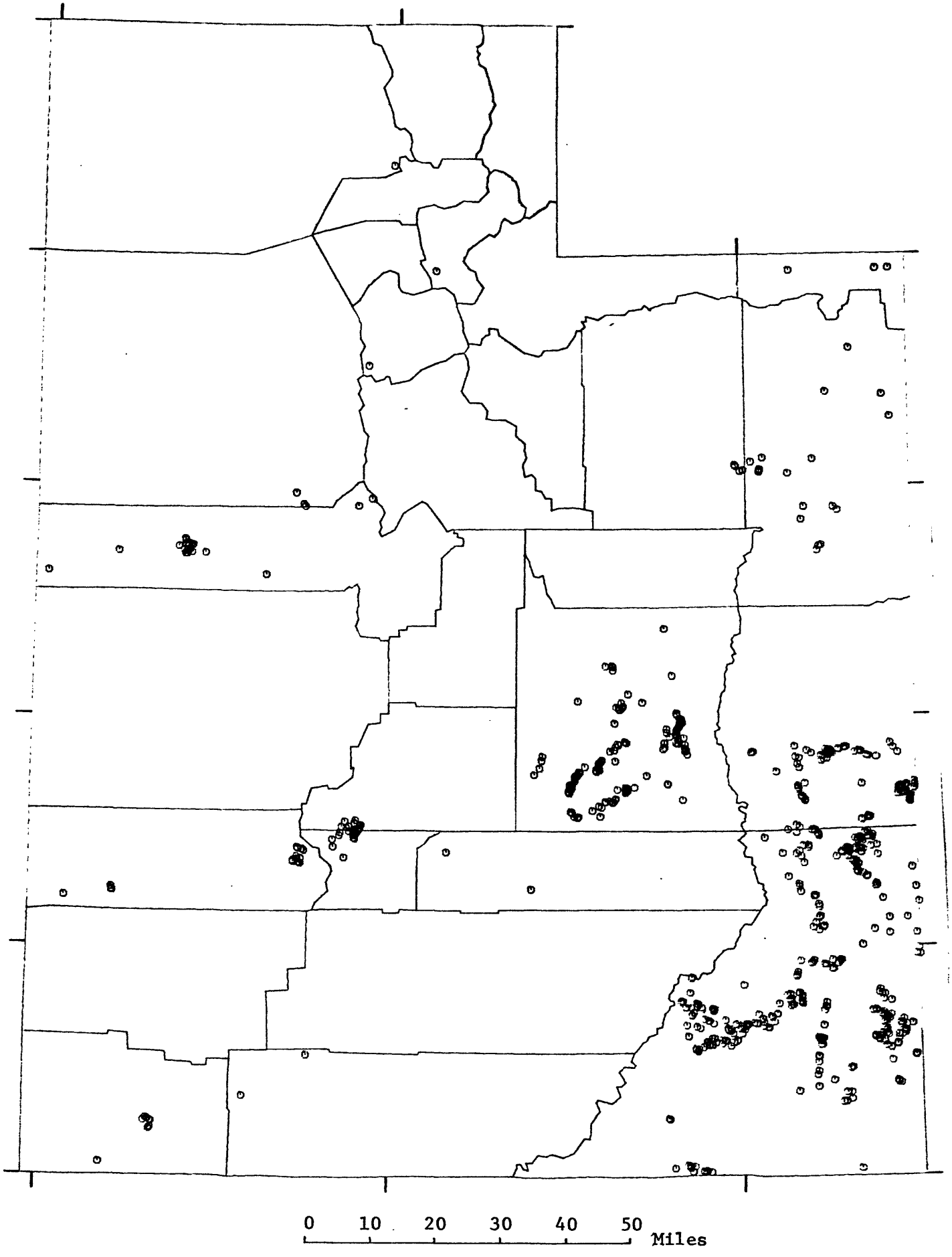

Figure 2K.--Uranium in Utah.

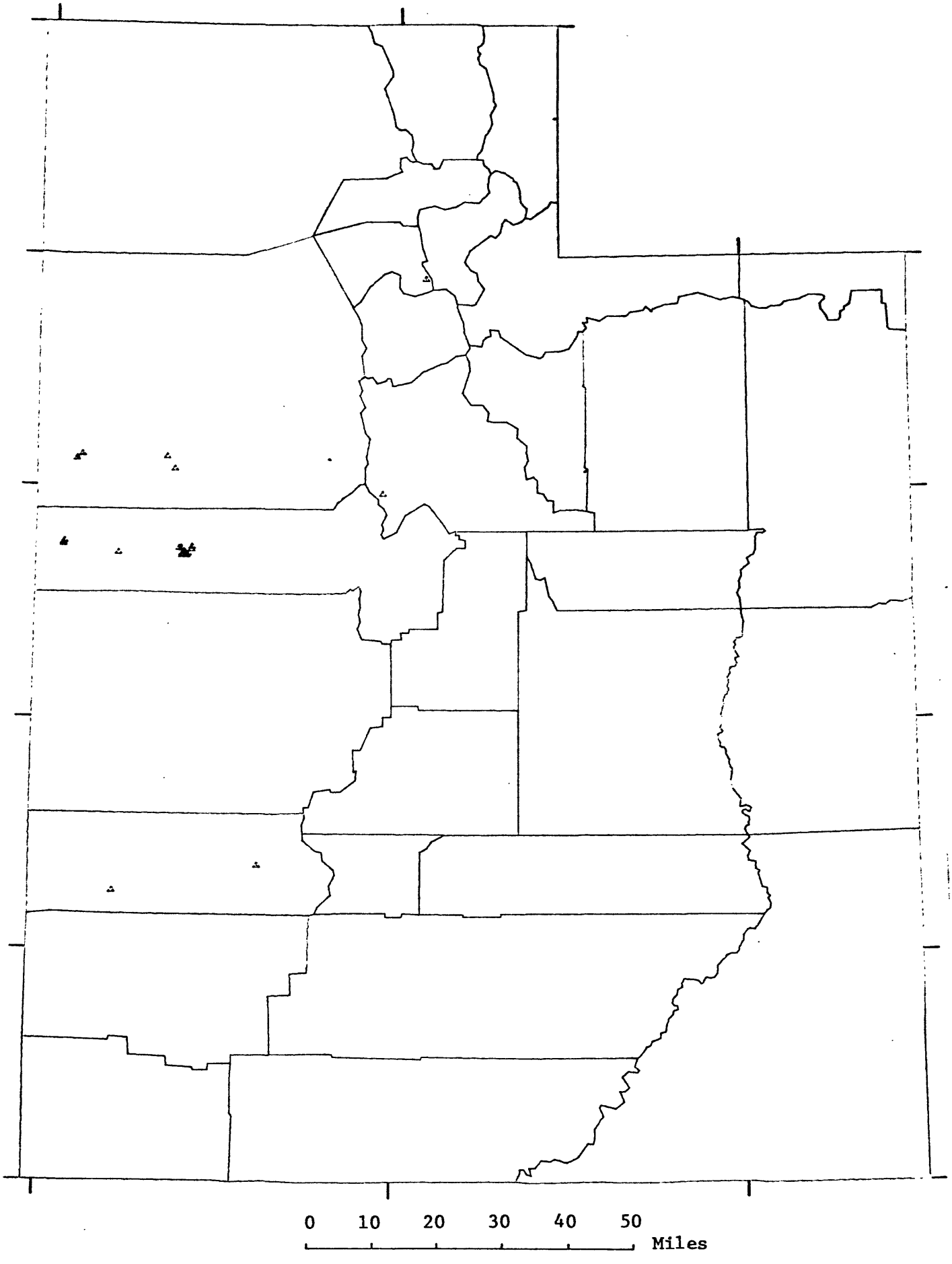

Figure 2L.--Beryllium in Utah.

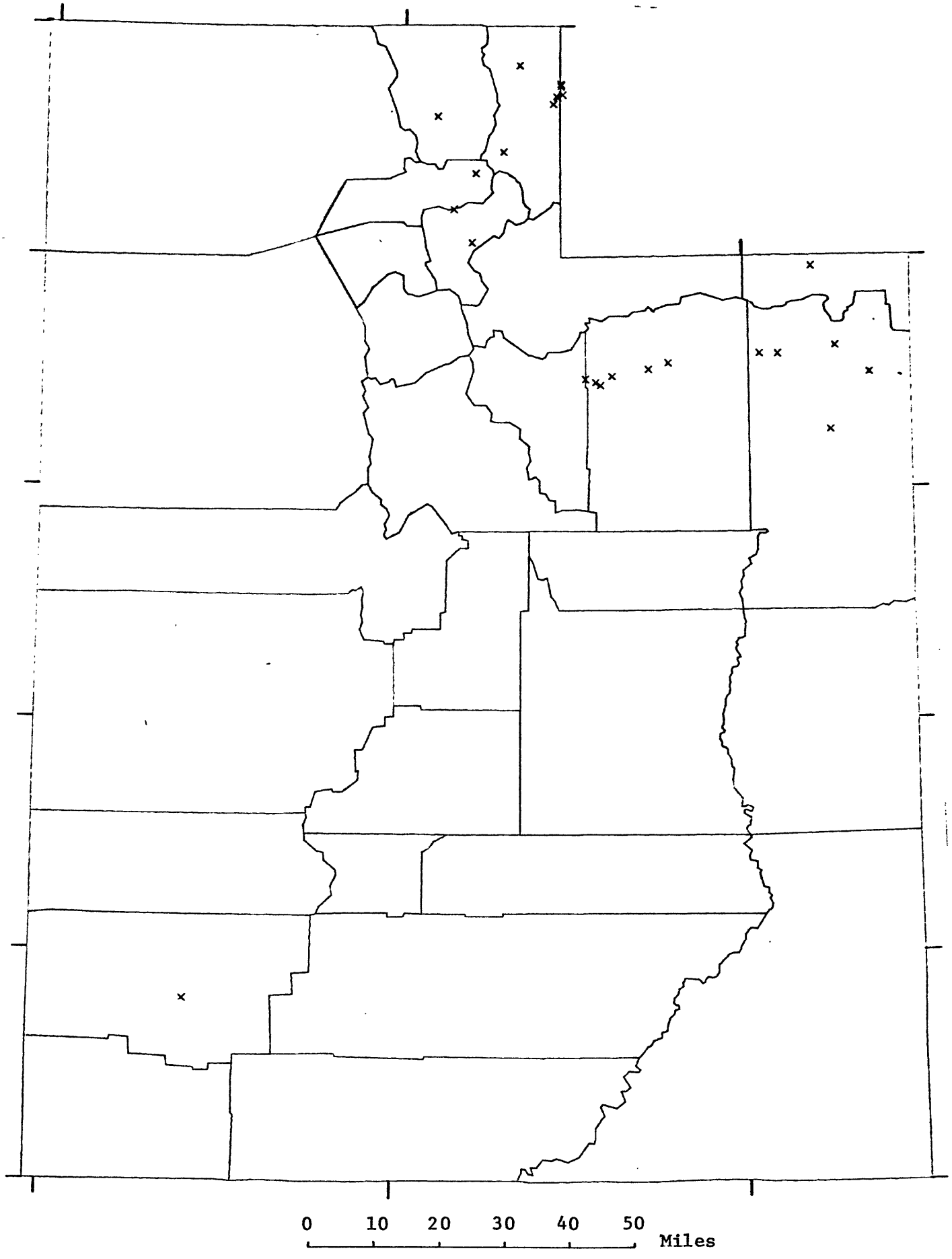

Figure 2*M*.--Phosphorus in Utah.

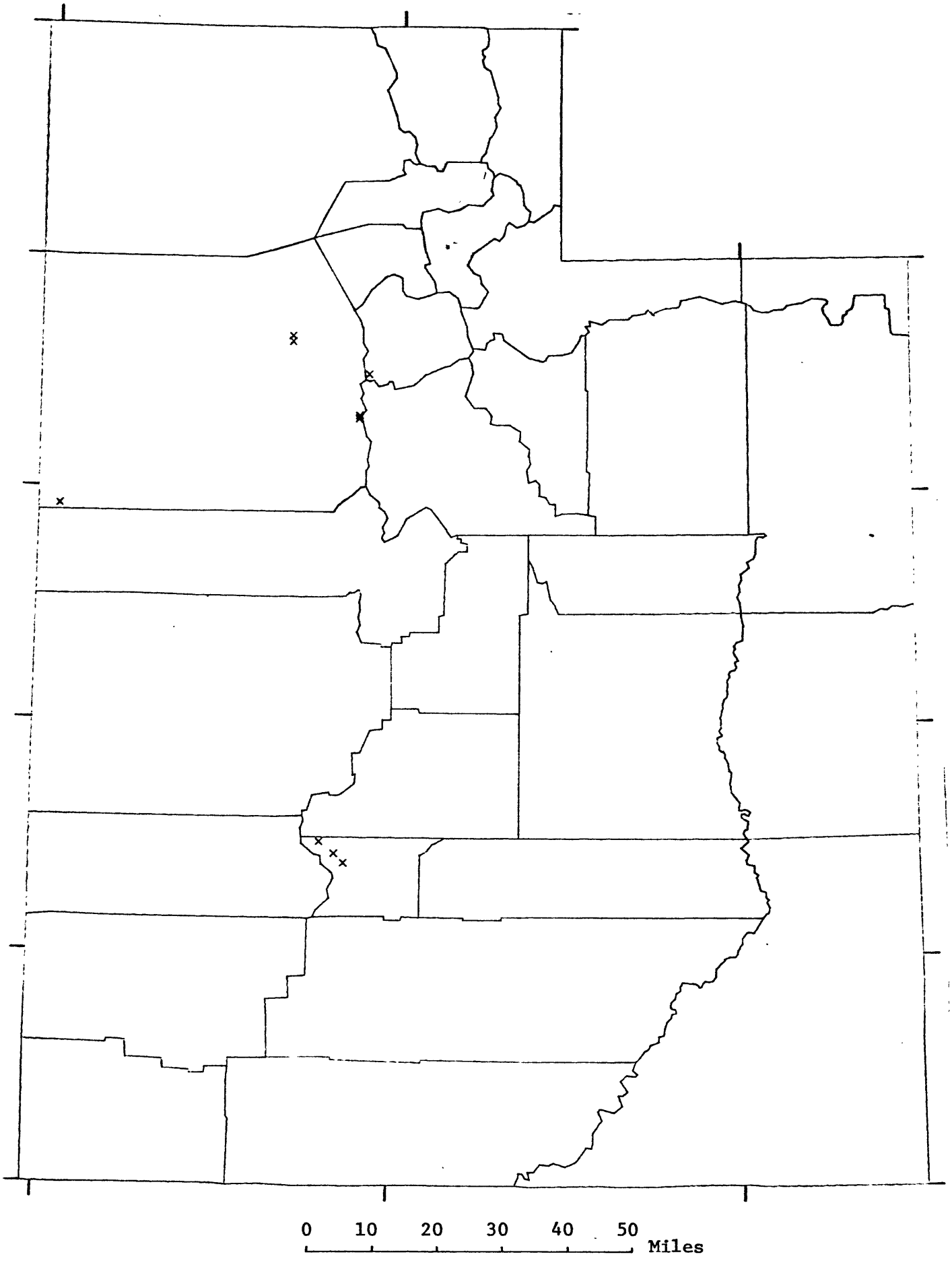

Figure 2*N*.--Mercury in Utah.

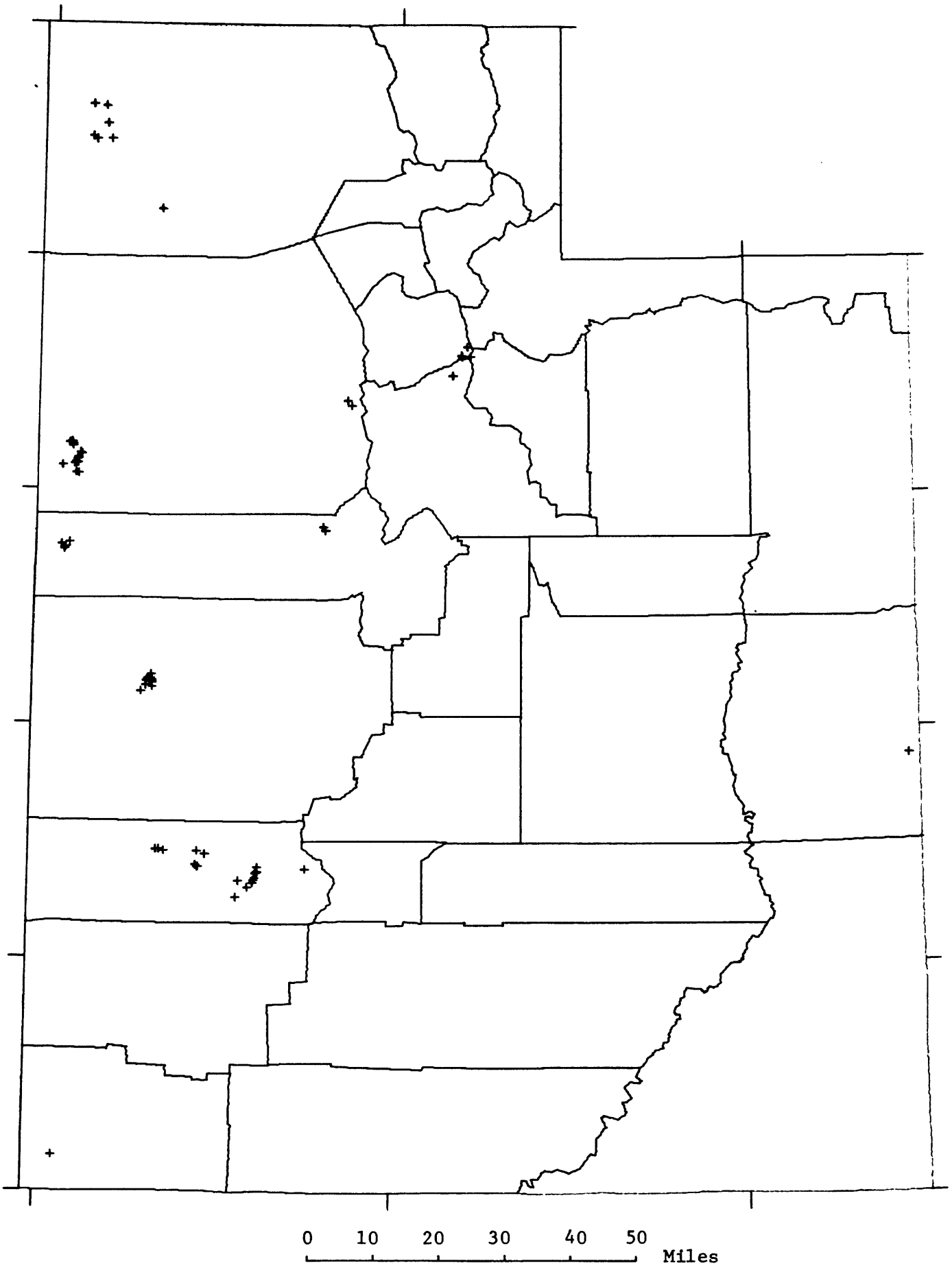

Figure 20.--Tungsten in Utah.

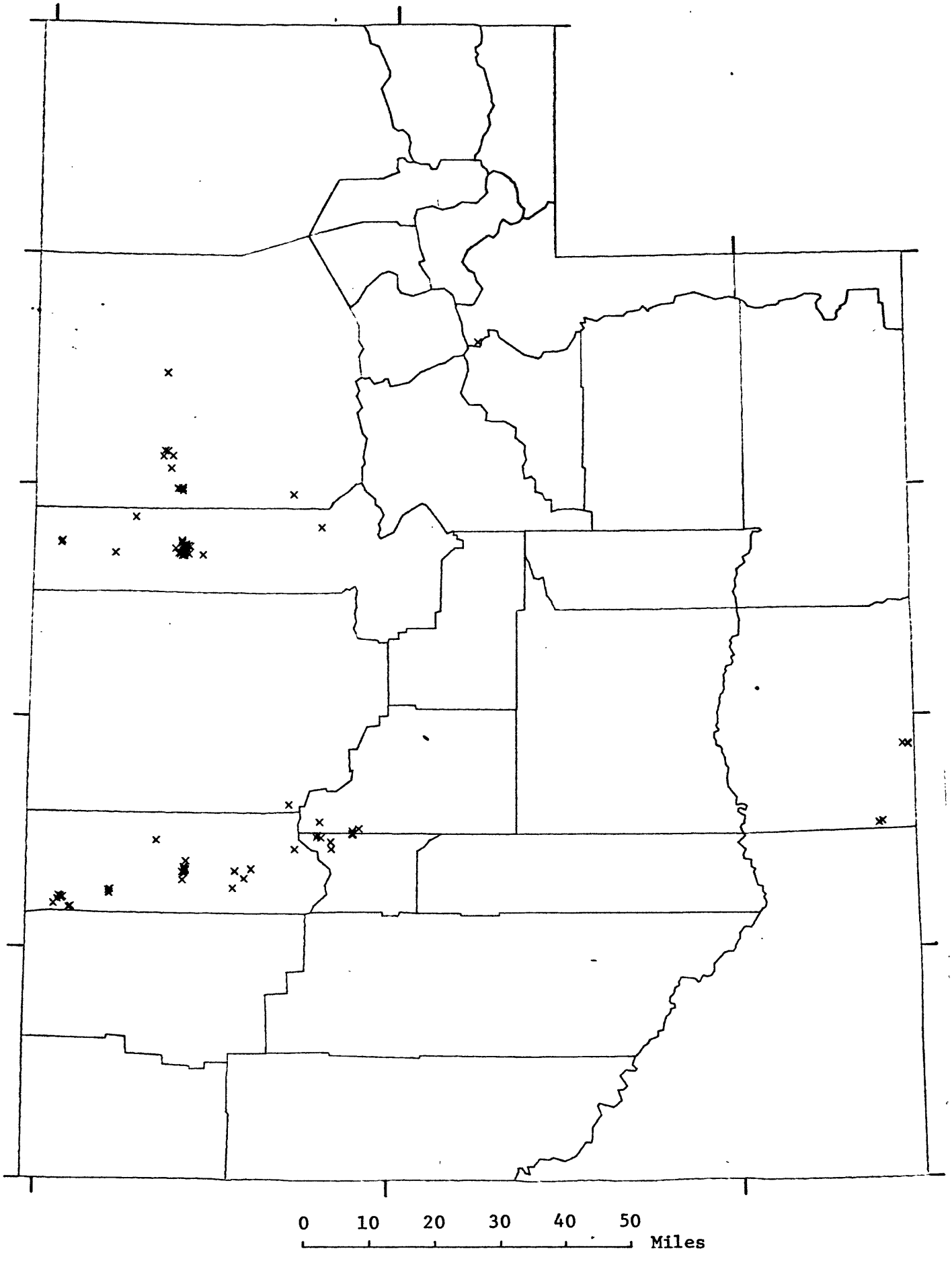

Figure 2*P*.--Fluorite in Utah.

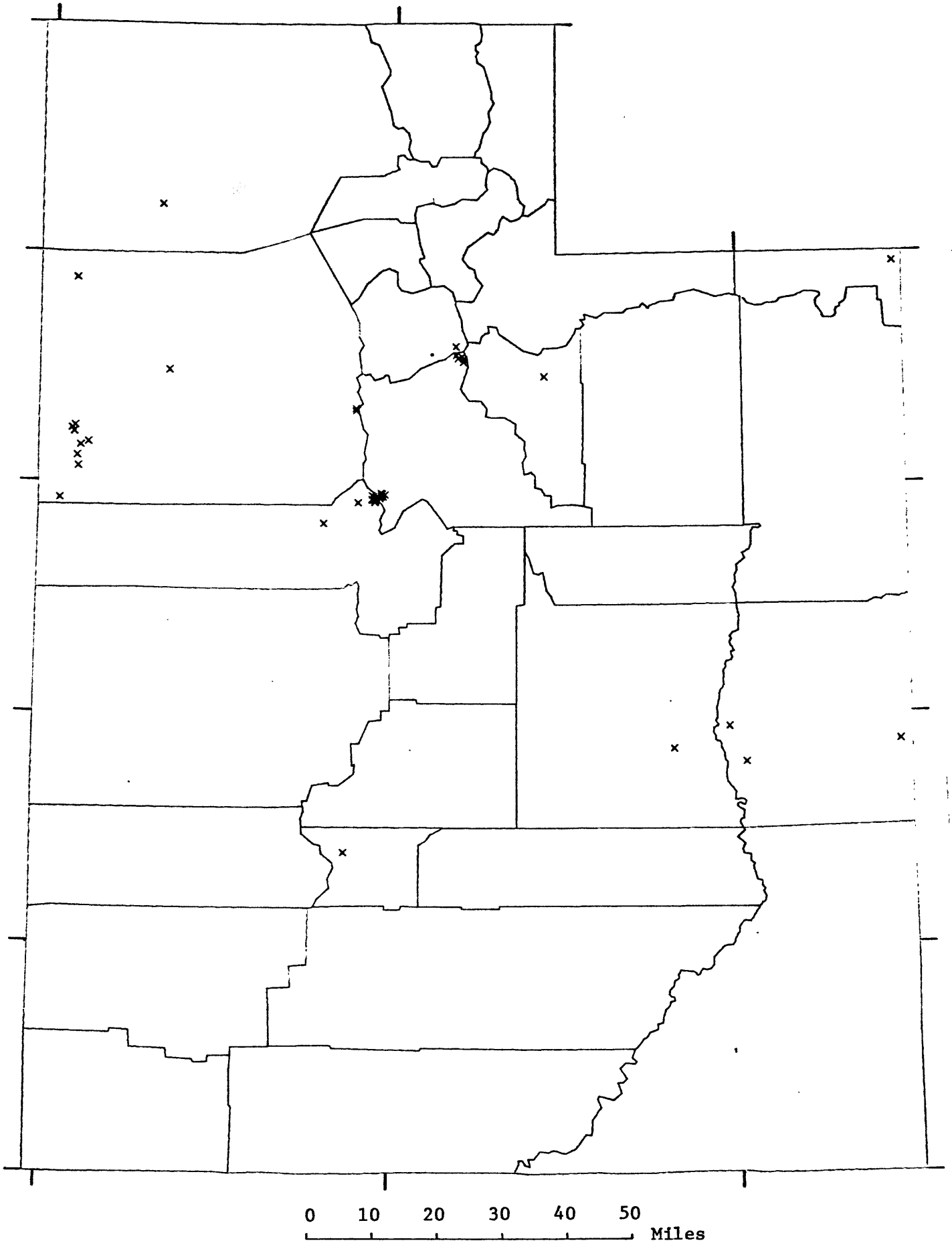

Figure 2Q.--Barite in Utah.

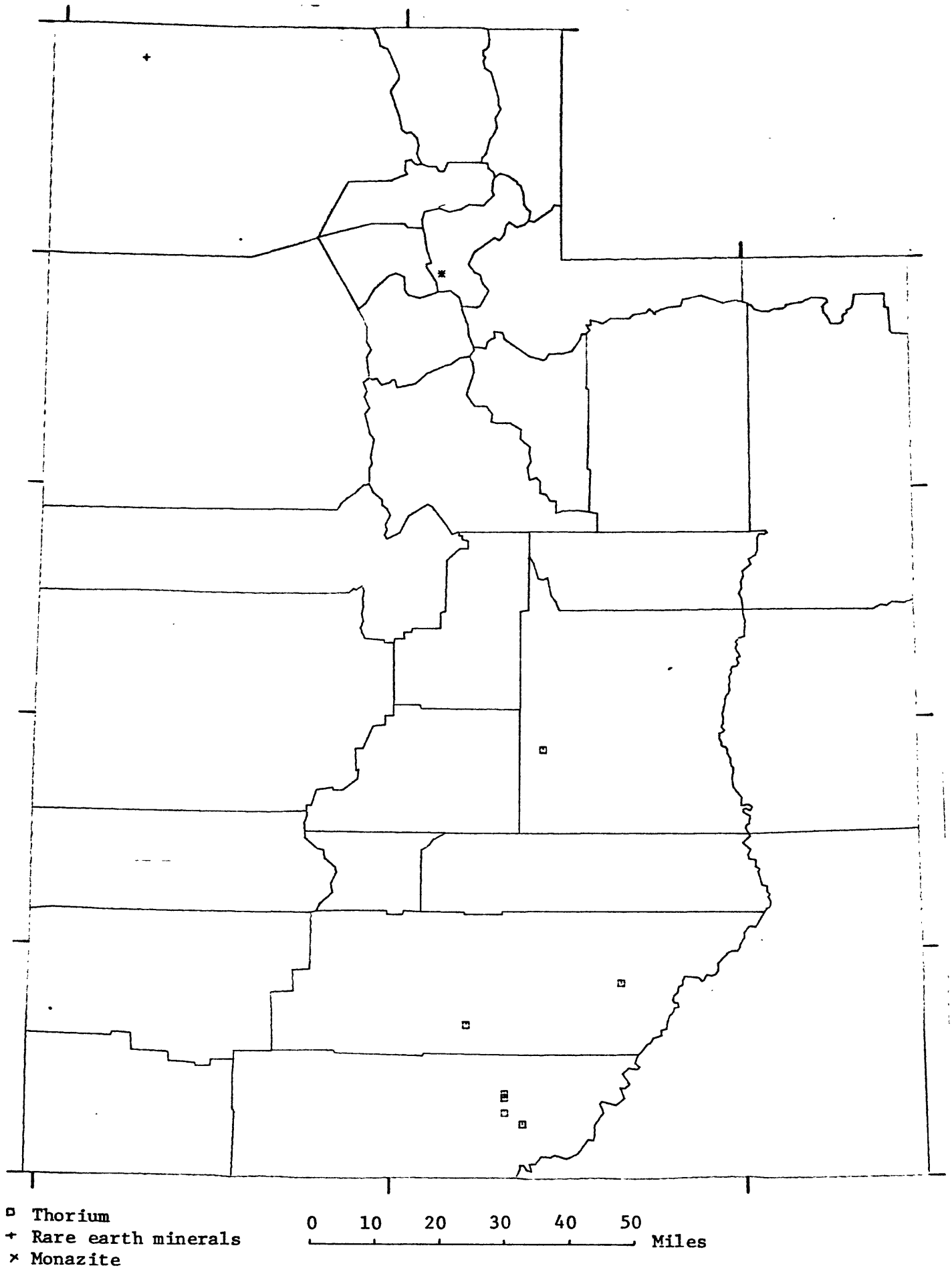

Figure 2*R*.--Thorium and rare earth minerals.

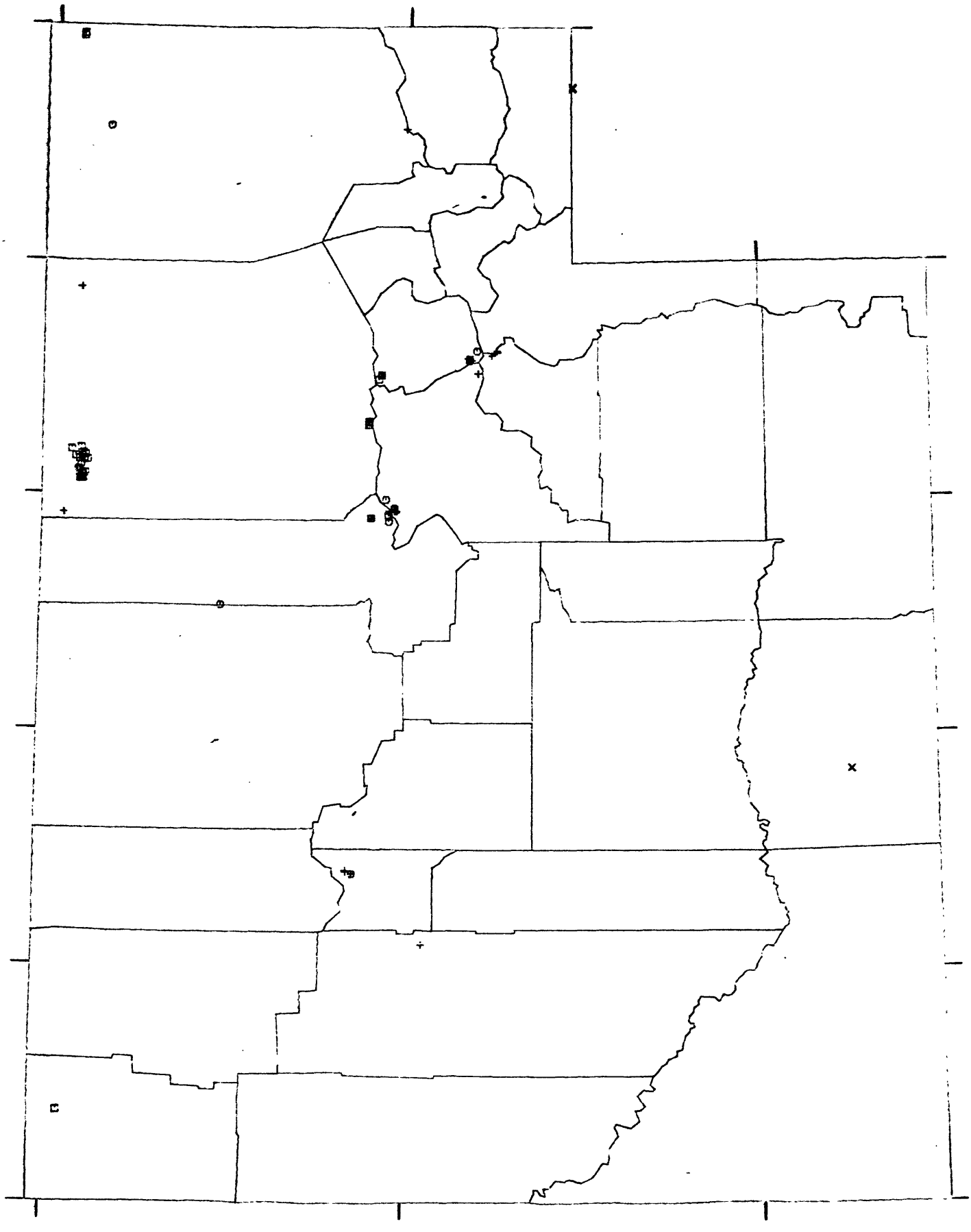

Figure 2*S*.--As, Bi, Cd, Sb, Se, Te in Utah.

REFERENCES CITED

Keefer, E. K., and Calkins, J. A., 1977, Description of individual data and codes in CRIB: U.S. Geological Survey Circular 775B, 32 p.

U.S. Bureau of Mines, 1974, The Bureau of Mines minerals availability system and resource classification manual: U.S. Bureau of Mines Information Circular 8654, 199 p.

U.S. Geological Survey, 1975, Mineral resource perspective: U.S. Geological Survey Professional Paper 940, 24 p.

_____1979, Scientific and technical, spatial and bibliographic data bases of the U.S. Geological Survey: U.S. Geological Survey Circular 817.