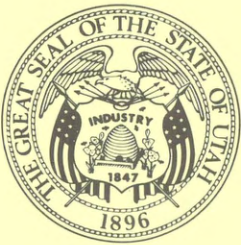

UTAH GEOLOGICAL AND MINERALOGICAL SURVEY
affiliated with
THE COLLEGE OF MINES AND MINERAL INDUSTRIES
University of Utah, Salt Lake City, Utah

MINERALS
OF
UTAH

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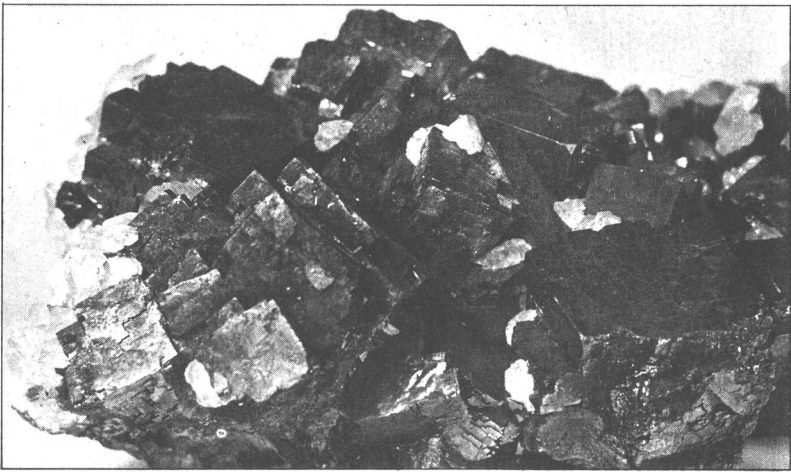
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MINERALS OF UTAH

by Kenneth C. Bullock



Galena and calcite cluster.

*Utah Geological and Mineralogical Survey
affiliated with
The College of Mines and Mineral Industries
University of Utah, Salt Lake City, Utah*

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MINERALS OF UTAH

by *Kenneth C. Bullock*¹

INTRODUCTION

There has long been widespread interest by mineralogists and geologists in the minerals of the State. This interest is increasing both because of renewed activity in old mining camps and because of Utahns and tourists who seek relaxation and adventure out-of-doors. Evidence of this interest is the organization of many rock and mineral societies.

"Minerals and Mineral Localities of Utah" (Bullock, Smouse and Robinson, 1960) was my first publication to document the minerals of Utah. The present volume is the result of complete revision of the earlier edition. Mineral listings have been increased from 401 to 627², in order to include all minerals which have been recognized in Utah through 1965. A few hydrocarbons and a few rock terms such as obsidian have been included, but coal, petroleum, and natural gas are not listed. Minor occurrences of many minerals have been omitted, and only a few rock-forming mineral occurrences are included. The main helium and carbon dioxide occurrences are listed,

In Chapter I mining districts are listed alphabetically both for each county and for the State. The numbers refer to locations on plate 1 (p. 11).

Chapter II is devoted to county listings of mining districts, mines, and mineral localities, with the minerals found at each mine or locality. Most mining districts and mineral localities in the county lists are large enough to warrant further subdivision into mines and specific mineral localities. Minerals which are characteristic of the entire locality are listed as occurring in the locality as a whole, along with those for which the specific area (mine, for instance) is not known. Other minerals, however, that occur in a particular part of a larger district or locality, are listed only under the area specified.

Chapter III consists of an alphabetical listing of 627 minerals found in Utah including a brief description of each mineral, followed by a listing of the occurrences of each mineral in the State.

Following the Bibliography is an Appendix consisting of the results of a computer analysis which was made by the author after completion of the study which forms most of Bulletin 76.

Thanks and appreciation are extended to De Forrest Smouse and Gerald B. Robinson, Jr., co-compilers of first edition, and to Howard V. Hamilton and J. D. Stephens who brought to my attention some minerals not listed in the earlier edition.

1. Professor of Geology, Brigham Young University, Provo, Utah.

2. At press time, announcement was made of the discovery of two minerals in Beaver County new to Utah. Dr. James D. Stephens of Western Mining Divisions Research, Kennecott Copper Corp., had identified ettringite, $\text{Ca}_6\text{Al}_2(\text{SO}_4)_3(\text{OH})_{12} \cdot 26\text{H}_2\text{O}$, from the open pit of the Old Hickery mine in the Rocky Range northwest of Milford. Dr. James A. Whelan of the College of Mines and Mineral Industries, University of Utah, has reported taking libethenite, $\text{Cu}_2(\text{PO}_4)(\text{OH})$, from the Atlas mine in the Star Range, southwest of Milford.

At the same time, Dr. Hamed El Shatoury, in his doctoral dissertation, reported monimolite $[(\text{Pb}, \text{Ca})_3\text{Sb}_2\text{O}_8?]$ from the United States mine in the Gold Hill district of Tooele County. Monimolite, previously reported from Park City by Boutwell, occurs at Gold Hill in scorodite that has developed after arsenopyrite.

CHAPTER I

MINING DISTRICTS OF COUNTIES AND THE STATE OF UTAH

COUNTY LISTINGS

BEAVER COUNTY

Antelope District (Mineral Range).
Beaver Lake District (Beaver Lake Mountains).
Bradshaw District (Mineral Range).
Fortuna District (Tushar Mountains).
Gordon District (Tushar Mountains).
Granite and North Granite Districts (Mineral Range).
Indian Peak District (Needle Range).
Lincoln District (Mineral Range).
McGarry District (Mineral Range).
Newton District (Tushar Mountains).
Pine Grove District (Wah Wah Mountains).
Pruess (Newhouse) District (San Francisco Mountains).
Rocky District (Rocky Range).
San Francisco (Frisco) District (San Francisco Mountains).
Star and North Star Districts (Star Range).
Sterling District (Red Buttes).
Sulphur District (Wah Wah Mountains).
Washington District (Needle Range).

BOX ELDER COUNTY

Ashbrook District (Grouse Creek Mountains).
Box Elder District (Wasatch Mountains).
Crater Island District (Crater Island).
Lucin District (Pilot Range).
Newfoundland District (Newfoundland Mountains).
Park Valley District (Raft River Mountains).
Promontory District (Promontory Mountains).
Rosebud District (Grouse Creek Mountains).
Sierra Madre District (Wasatch Mountains).

Willard District (Wasatch Mountains).

CACHE COUNTY

Paradise District (Bear River Range).
Richmond District (Bear River Range).

CARBON COUNTY

Tidewell and Rideout District (West Tavaputs Plateau).

DAGGETT COUNTY

No Organized Mining Districts.

DAVIS COUNTY

Farmington District (Wasatch Mountains).

DUCHESNE COUNTY

Castle Peak District (Uinta Basin).

EMERY COUNTY

Cedar Mountain District (Cedar Mountain).
Emery (Lost Springs) District (Red Plateau).
Green River District (S.W. Green River).
San Rafael District (San Rafael Swell).

GARFIELD COUNTY

Colorado River District (Colorado River).
Coyote Creek (Antimony) District (Escalante Mountains).
Little Rockies District (Henry Mountains).
North Wash District (Henry Mountains).
Trachyte District (Henry Mountains).

GRAND COUNTY

La Sal District (North Mountain,
La Sal Mountains).
Little Grand District (S.E. Green
River).
Miners Basin District (North
Mountain, La Sal Mountains).
Polar Mesa District (Polar Mesa).
Richardson District (Waring Creek).
Thompsons District (S.E. Thompsons
Wilson Mesa (Wheeler Desert)
District (Wilson Mesa).
Yellow Cat District (W. part of
Thompsons District).

IRON COUNTY

Escalante District (Mt. Escalante).
Gold Springs District (Hamlin Valley).
Iron Springs District (Iron and Granit
Mountains, Three Peaks).
Pinto Iron (Silver Belt) District
(Pinto).
Stateline District (Hamlin Valley).

JUAB COUNTY

Deseret (Desert Mountain) District
(Desert Mountain).
Detroit (Drum, Joy) District (Drum
Mountains).
Fish Springs District (Fish Springs
Mountains).
Juab District (Wasatch Mountains).
Mona District (Long Ridge).
Mt. Nebo (Timmons) District
(Wasatch Mountains).
North Tintic District (East Tintic and
Boulter Mountains).
Spring Creek District (Deep Creek
Mountains).
Tintic District (East Tintic
Mountains).
Trout Creek (Johnson Peak) District
(Deep Creek Mountains).
West Tintic District (West
Tintic Mountains).

KANE COUNTY

Colorado River District (Colorado
River).

MILLARD COUNTY

Detroit (Drum, Joy) District (Drum
Mountains).

Gordon District (Pavant Mountains).
Leamington (Oak City) District
(Canyon Mountains).
Saw Back District (W. of Sevier Lake).

MORGAN COUNTY

Argenta District (Wasatch Mountains).
Hardscrabble (Mill Creek) District
(Wasatch Mountains).
Morgan District (Wasatch Mountains).

PIUTE COUNTY

Gold Mountain (Kimberly) District
(Deer Creek, Tushar Mountains).
Marysvale District (Marysvale
Uranium Area).
Mt. Baldy District (Cottonwood Creek,
Tushar Mountains).
Ohio District (Bullion Canyon, Tushar
Mountains).

RICH COUNTY

Swan Creek (Garden City) District
(Bear River Range).

SALT LAKE COUNTY

Big Cottonwood District (Wasatch
Mountains).
Bingham (West Mountain) District
(Oquirrh Mountains).
Hot Springs (Adams) District
(Wasatch Mountains).
Little Cottonwood (Alta) District
(Wasatch Mountains).
Lower Placer District (Oquirrh
Mountains).
Smelter District (Oquirrh Mountains).

SAN JUAN COUNTY

Big Indian District (Big Indian Wash-
Lisbon Valley Area).
Cottonwood Canyon District (N. of
Bluff).
Monticello (Blue Mountain) District
(Abajo Mountains).
Monument Valley (Monumental)
District (Monument Valley).
Paradox Valley District (Paradox
Valley).
Red Canyon District (Red Canyon).
White Canyon District (White
Canyon).

SANPETE COUNTY

No Organized Mining Districts.

SEVIER COUNTY

Henry District (Antelope Range).
Salina Creek District (Salina
Creek).

SUMMIT COUNTY

Marble (Silver Creek) District
(Wasatch Mountains).
Park City (Uinta) District
(Wasatch Mountains).

TOOELE COUNTY

Bingham (West Mountain) District
(Oquirrh Mountains).
Blue Bell District (Sheeprock
Mountains).
Columbia District (N.E. Sheeprock
Mountains).
Dugway District (Dugway Range).
East Erickson District (W. Sheeprock
Mountains).
Erickson (Black Crook) District
(Simpson Mountains).
Free Coinage District (Stansbury
Mountains).
Gold Hill (Clifton) District (Deep
Creek Mountains).
Granite Mountain District (Granite
Mountain).
Grantsville (Third Term) District
(Stansbury Mountains).
Greeley District (Topliff Hill).
Lakeside District (Lakeside
Mountains).
Mercur (Camp Floyd) District
(Oquirrh Mountains).
North Tintic (Boulter, Caledonia,
Oasis) District (Boulter
Mountains).
Ophir District (S.W. Oquirrh
Mountains).
Osceola District (Thorpe Hills).
Rush Valley (Stockton) District (W.
Oquirrh Mountains).
Silver Island (Silver Islet) District
(Silver Island Mountains).
Tooele District (W. Oquirrh
Mountains).
Willow Springs District (Deep Creek
Mountains).

UINTAH COUNTY

Brush Creek District (Uinta
Mountains).
Carbonate District (Uinta Mountains).
Green River District (Cub Creek).
Uteland Knoll District (Ouray).

UTAH COUNTY

Alpine District (Wasatch
Mountains).
American Fork District (Wasatch
Mountains).
East Tintic District (East Tintic
Mountains).
Lehi District (Lake Mountain).
North Tintic (Caledonia, Oasis) District
(East Tintic Mountains).
Payson District (Wasatch Mountains).
Provo District (Wasatch Mountains).
Santaquin District (Wasatch
Mountains).
Silver Lake District (Wasatch
Mountains).
Spanish Fork District (Wasatch
Mountains).
Utah District (Long Ridge).

WASATCH COUNTY

Blue Ledge District (Bald Mountain).
Elkhorn District (E. Keetley).
Rhodes Plateau (Woodland) District
(Uinta Mountains).
Snake Creek (Howland, White Pine)
District (Wasatch Mountains).

WASHINGTON COUNTY

Bull Valley District (Bull Valley).
Santa Clara District (Santa Clara).
Silver Reef (Harrisburg) District
(Leeds).
Tutsagubet District (Beaver Dam
Mountains).

WAYNE COUNTY

Miners Mountain District (Miners
Mountain).

WEBER COUNTY

Fremont Island District (Fremont
Island).
Sierra Madre District (Wasatch
Mountains).
Weber (Junction) District
(Wasatch Mountains).

MINING DISTRICTS OF UTAH

<u>NUMBER</u> ^{1/}	<u>NAME OF DISTRICT</u>	<u>COUNTY</u>
	Adams (See Hot Springs)	
1.	Alpine	Utah
	Alta (See Little Cottonwood)	
2.	American Fork.....	Utah
3.	Antelope	Beaver
	Antimony (See Coyote Creek)	
4.	Argenta	Morgan
5.	Ashbrook	Box Elder
6.	Beaver Lake	Beaver
7.	Big Cottonwood	Salt Lake
8.	Big Indian	San Juan
9.	Bingham	Salt Lake, Tooele
	Black Crook (See Erickson)	
10.	Blue Bell	Tooele
11.	Blue Ledge	Wasatch
	Blue Mountain (See Monticello)	
	Boulter (See North Tintic)	
12.	Box Elder	Box Elder
13.	Bradshaw.....	Beaver
14.	Brush Creek	Uintah
15.	Bull Valley	Washington
	Caledonia (See North Tintic)	
	Camp Floyd (See Mercur)	
16.	Carbonate	Uintah
17.	Castle Peak	Duchesne
18.	Cedar Mountain	Emery
	Clifton (See Gold Hill)	
19.	Colorado River	Garfield, Kane
20.	Columbia.....	Tooele
21.	Cottonwood Canyon.....	San Juan
22.	Coyote Creek	Garfield
23.	Crater Island	Box Elder
24.	Deseret	Juab
	Desert Mountain (See Deseret)	
25.	Detroit	Juab, Millard
	Drum (See Detroit)	
26.	Dugway	Tooele
27.	Elkhorn	Wasatch
28.	Emery	Emery
29.	East Erickson.....	Tooele
30.	East Tintic	Utah
31.	Erickson	Tooele
32.	Escalante	Iron
33.	Farmington	Davis
34.	Fish Springs	Juab
35.	Fortuna	Beaver
36.	Free Coinage	Tooele
37.	Fremont Island	Weber

1. Numbers refer to locations on plate 1 (p. 11).

<u>NUMBER</u>	<u>NAME OF DISTRICT</u>	<u>COUNTY</u>
	Frisco (See San Francisco)	
	Garden City (See Swan Creek)	
38.	Gold Hill.....	Tooele
39.	Gold Mountain.....	Piute
40.	Gold Springs.....	Iron
41.	Gordon	Beaver, Millard
42.	Granite	Beaver
43.	Granite Mountain	Tooele
44.	Grantsville	Tooele
45.	Greeley	Tooele
46.	Green River.....	Emery
47.	Green River.....	Uintah
48.	Hardscrabble	Morgan
	Harrisburg (See Silver Reef)	
49.	Henry.....	Sevier
50.	Hot Springs.....	Salt Lake
	Howland (See Snake Creek)	
51.	Indian Peak	Beaver
52.	Iron Springs	Iron
	Johnson Peak (See Trout Creek)	
	Joy (See Detroit)	
53.	Juab	Juab
	Junction (See Weber)	
	Kimberly (See Gold Mountain)	
54.	Lakeside	Tooele
55.	La Sal	Grand
56.	Leamington.....	Millard
57.	Lehi	Utah
58.	Lincoln	Beaver
59.	Little Cottonwood	Salt Lake
60.	Little Grande	Grand
61.	Little Rockies.....	Garfield
	Lost Springs (See Emery)	
62.	Lower Placer	Salt Lake
63.	Lucin	Box Elder
64.	Marysvale	Piute
65.	McGarry	Beaver
66.	Marble	Summit
67.	Mercur.....	Tooele
	Mill Creek (See Hardscrabble)	
68.	Miners Basin	Grand
69.	Miners Mountain	Wayne
70.	Mona	Juab
71.	Monticello	San Juan
72.	Monument Valley	San Juan
	Monumental (See Monument Valley)	
73.	Morgan	Morgan
74.	Mt. Baldy	Piute
75.	Mt. Nebo	Juab
76.	Newfoundland.....	Box Elder
	Newhouse (See Pruess)	
77.	Newton	Beaver
	North Granite (See Granite)	
	North Star (See Star)	

<u>NUMBER</u>	<u>NAME OF DISTRICT</u>	<u>COUNTY</u>
78.	North Tintic	Juab, Tooele, Utah
79.	North Wash.....	Garfield
	Oasis (See North Tintic)	
	Oak City (See Leamington)	
80.	Ohio.....	Piute
81.	Ophir	Tooele
82.	Osceola.....	Tooele
83.	Paradise	Cache
84.	Paradox Valley	San Juan
85.	Park City	Summit
86.	Park Valley	Box Elder
87.	Payson.....	Utah
88.	Pine Grove	Beaver
89.	Pinto Iron	Iron
90.	Polar Mesa	Grand
91.	Promontory	Box Elder
92.	Provo	Utah
93.	Pruess	Beaver
94.	Red Canyon.....	San Juan
95.	Richardson	Grand
96.	Richmond.....	Cache
97.	Rhodes Plateau.....	Wasatch
98.	Rocky.....	Beaver
99.	Rosebud.....	Box Elder
100.	Rush Valley.....	Tooele
101.	Salina Creek.....	Sevier
102.	San Francisco	Beaver
103.	San Rafael.....	Emery
104.	Santa Clara.....	Washington
105.	Santaquin	Utah
106.	Saw Back.....	Millard
107.	Sierra Madre	Box Elder, Weber
	Silver Belt (See Pinto Iron)	
	Silver Creek (See Marble)	
108.	Silver Island.....	Tooele
	Silver Islet (See Silver Island)	
109.	Silver Lake	Utah
110.	Silver Reef	Washington
111.	Smelter	Salt Lake
112.	Snake Creek	Wasatch
113.	Spanish Fork	Utah
114.	Spring Creek.....	Juab
115.	Star	Beaver
116.	Stateline	Iron
117.	Sterling.....	Beaver
	Stockton (See Rush Valley)	
118.	Sulphur	Beaver
119.	Swan Creek.....	Rich
	Third Term (See Grantsville)	
120.	Thompsons	Grand
121.	Tidewell and Rideout.....	Carbon
	Timmons (See Mt. Nebo)	
122.	Tintic.....	Juab
123.	Tooele	Tooele

<u>NUMBER</u>	<u>NAME OF DISTRICT</u>	<u>COUNTY</u>
124.	Trachyte	Garfield
125.	Trout Creek.....	Juab
126.	Tutsagubet	Washington
	Uinta (See Park City)	
127.	Utah.....	Utah
128.	Uteland Knoll.....	Uintah
129.	Washington.....	Beaver
130.	Weber.....	Weber
	West Mountain (See Bingham)	
131.	West Tintic	Juab
	Wheeler Desert (See Wilson Mesa)	
132.	White Canyon	San Juan
	White Pine (See Snake Creek)	
133.	Willard	Box Elder
134.	Willow Springs	Tooele
135.	Wilson Mesa	Grand
	Woodland (See Rhodes Plateau)	
136.	Yellow Cat	Grand

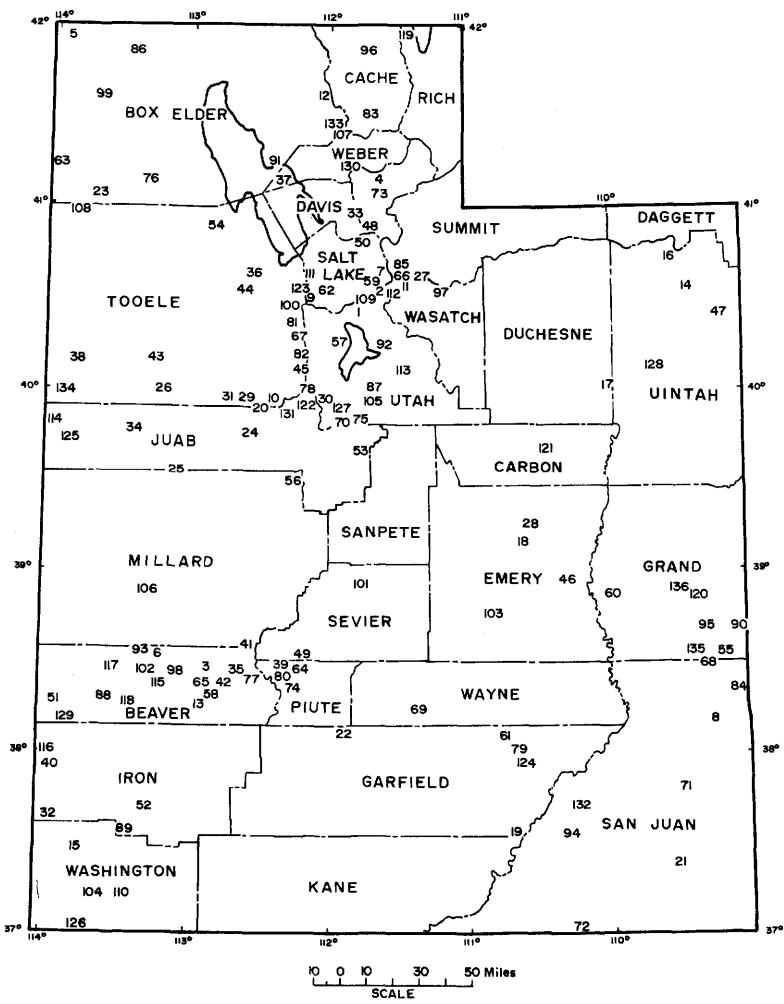


Figure 1. Mining Districts of Utah (see page 7).

CHAPTER II

MINERAL LOCALITIES LISTED BY COUNTY

Beaver County

ANTELOPE DISTRICT (Mineral Range)
barite, calcite, galena, magnetite,
malachite.

BEAVER (near) - hyalite.

BEAVER LAKE DISTRICT (Beaver Lake
Mountains) - andalusite, barite, dia-
spore, plancheite.

Bat Ridge - calcite, garnet, magnetite.
Beaver Copper, Copper Mountain
mines - azurite, malachite.

Beaver-Harrison, OK mines - azurite,
bornite, chalcocite, chalcopyrite,
chrysocolla, copper, covellite, cup-
rite, jasper, limonite, malachite,
molybdenite, powellite, pyrite.

Galena mine - galena.

Iron Mountain Pass deposits - hema-
tite.

Skylark mine - azurite, calcite, chal-
copyrite, chrysocolla, copper, cup-
rite, diopside, garnet, hematite,
malachite, magnetite, muscovite,
pyrite.

West Spring - brucite, clinohumite,
ludwigite, szaibelyite.

BLUE MOUNTAINS.

Black Jack (Skougard) claims - pyro-
lusite, rhodochrosite.

Susie Q (Iron Lily) claims - calcite
pyrolusite, rhodochrosite.

T. 29 S., R. 12 W. - hematite, mag-
netite.

BLUE VALLEY - black agate with blue
bands.

BRADSHAW DISTRICT (Mineral Range)
amethyst, clinozoisite, tourmaline,
tremolite, wollastonite.

Cave mine - anglesite, aragonite,
argentite, aurichalcite, cerussite,
chalcopyrite, cuprite, galena, gold,
limonite, magnetite, malachite, py-
rite, sphalerite, sulfur.

Hecla mine - argentite, chalcopyrite,
galena, gold, pyrite.

Jolly Boy mine - gold, limonite.

Nip and Tuck mine - argentite, chal-
copyrite, galena, gold, pyrite.

2 R's group - epidote, fluorite, garnet,
idocrase, malachite, scheelite, ser-
pentine.

ENGLISH SPRINGS (Wah Wah Moun-
tains) - hematite, limonite.

FORTUNA DISTRICT (Tushar Moun-
tains).

Rocky Hollow - gold, limonite, pyrite.

FRISCO DISTRICT (See SAN FRANCISCO
DISTRICT).

GORDON DISTRICT.

Sulphurdale - epsomite, marcasite,
pyrite, sulfur.

GRANITE and NORTH GRANITE DIS-
TRICTS (Mineral Range).

Beaver View mine - argentite, cerus-
site, chrysocolla, galena, gold,
smithsonite, sphalerite.

Big Pass (Pass Canyon) group - argen-
tojarosite, aurichalcite, barite, cal-
cite, cerussite, epidote, fluorite,
galena, garnet, gold, idocrase, jaro-
site, limonite, malachite, molybde-
nite, pyrite, scheelite, tremolite,
wollastonite.

Bismuth (Major) mine - amphibole,
bismuthinite, fluorite, idocrase,
molybdenite, pyrite, scheelite.

Burnt Hollow group - epidote, galena,

hematite, limonite, magnetite, scheelite.

Contact group - barite, bornite, chalcopryrite, epidote, fluorite, garnet, gold, hematite, molybdenite, scheelite.

Garnet group - almandite, epidote, fluorite, gold, malachite, scheelite. King-of-the-Hills group - hematite, malachite, scheelite.

Major Fault group - scheelite.

Miller mine - apatite, beryl, helvite, thulite, topaz.

Molly group - epidote, garnet, pyrite, scheelite.

Oak group - epidote, garnet, idocrase, scheelite.

Oak Basin group - epidote, garnet, idocrase, scheelite.

Rattler group - calcite, epidote, garnet, idocrase, scheelite.

Scheelite group - beryl, epidote, garnet, scheelite.

Sunrise property - thorium, rare earths.

Ward group - epidote, garnet, idocrase, scheelite.

INDIAN PEAK DISTRICT (Needle Range)
argentite, cerussite, fluorite, galena. Blue Bell, Cougar Spar, Dugout, JB, Nooday, Lost Sheep, Utah mines - calcite, fluorite, quartz. Steelville, Spor properties - pyrolusite.

LINCOLN DISTRICT (Mineral Range). Creole mine - amethyst, anglesite, azurite, bornite, calcite, cerussite, chalcopryrite, chrysocolla, clinzoisite, copper pitch, epidote, fluorite, galena, garnet, hematite, idocrase, limonite, magnetite, malachite, opal, pyrite, quartz, tourmaline, tremolite, scheelite, wollastonite. Rattler Iron claim - limonite, magnetite.

Lincoln (Rawlins) mine - anglesite, argentite, chalcopryrite, chrysocolla, galena, hematite, limonite, magnetite, malachite, pyrite, smithsonite, sphalerite.

MCGARRY DISTRICT (Mineral Range)
barite, calcite, galena, magnetite, malachite.

MILFORD (near) - opal.

MOONEY SPRINGS - topaz.

NEW HOUSE DISTRICT (See PRUESS DISTRICT).

NEWTON DISTRICT (Tushar Mountains).

Black Rock (Shotwell) deposit - pyrolusite.

Indian Creek - autunite, fluorite, galena, gold, pyrite, tobernite.

Louise claims - huebnerite, quartz.

North Creek (head) - wolframite.

Rob Roy mine - gold, pyrite, quartz.

Sheep Rock mine - alunite, amethyst, argentite, calcite, cerargyrite, fluorite, limonite, pyrite, sericite, tellurium mineralization.

Sniffer and Mystery claims - autunite, fluorite, metatorbernite, tobernite, uranophane.

NORTH GRANITE DISTRICT (See GRANITE DISTRICT).

NORTH STAR DISTRICT (See STAR DISTRICT).

PINE GROVE DISTRICT (Wah Wah Mountains) - anglesite, cerussite, galena, pyrite, pyrolusite.

Central Wah Wah Iron deposits - limonite.

Emma prospect - hematite, limonite.

Iron Duke (Iron Gloery, Ruby Iron) prospects - hematite, limonite.

Iron Queen (Mooney, Wilson, Last Chance) prospects - hematite, limonite.

King Iron prospect - hematite, limonite.

Monarch (Staats) mine - autunite, calcite, fluorite, quartz, uranophane.

PRUESS (NEWHOUSE) DISTRICT (San Francisco Mountains).

Blackbird group, Cactus mine - anhydrite, azurite, barite, chalcopryrite, cosalite, goethite, limonite, magnetite, malachite, molybdenite, pyrite, quartz, sanidine, selenite, serpentine, siderite, stilbite, tetrahedrite, tourmaline, wollastonite.

Cactus Gulch - chalcopyrite, garnet, limonite, quartz, rutile, tourmaline.
Copper Gulch - garnet, tourmaline.
Gold Reef mine - barite, cerussite, galena, gold, pyrite.
Indian Queen mine - galena.

ROCK CORRAL (E. of) - albite, orthoclase, prase, smoky quartz.

ROCKY DISTRICT (Rocky Range).

Adelia mine - magnetite, wulfenite.
Copper Ranch mine - azurite, garnet, magnetite, malachite, muscovite, scheelite.
Little Rocky prospect - huntite.
Old Hickory mine - apatite, bornite, chalcopyrite, diopside, garnet, magnetite, magnesite, pyrite, scheelite, thaumasite.
SilverShield Mining and Milling Company mine - magnesite.

SAN FRANCISCO (FRISCO) DISTRICT (San Francisco Mountains) - apatite, augite, biotite, chlorite, chrysolite, goethite, hornblende, ilmenite, magnesite, manganite, pyrolusite, quartz, rare earths, rhodochrosite, rutile, thorium mineralization, titanite, zircon.

Beaver Carbonate mine - chalcopyrite, galena, pyrite, sphalerite.
Cupric mine - chalcopyrite, diopside, fluorite, galena, garnet, pyrite, scheelite, sphalerite, wollastonite.
Frisco Contact mine - epsomite.
Golden Reef mine - gold, selenium mineralization.
Horn Silver mine - alunite, anglesite, argentite, azurite, barite, beaverite, bindheimite, brochantite, calamine, calcite, cerargyrite, cerussite, chalcantite, chalcedony, chalcocite, chalcopyrite, chrysocolla, cosalite, covellite, dufrenoyite, galena, goslarite, gypsum, jamesonite, jarosite, kaolinite, linarite, malachite, melanconite, opal, plumbojarosite, proustite, pyrargyrite, pyrite, scorodite, smithsonite, stibnite, sulfur, wollastonite, wulfenite, wurtzite, zircon.
Imperial mine - chalcopyrite, copper, cuprite, galena, hematite, magnetite, malachite.

King David mine - galena, pyrite.
Michigan group - chalcopyrite, galena, gold, pyrite.
Peacock Copper group - galena, sphalerite.
Washington mine - chalcopyrite, galena, pyrite, sphalerite.

STAR and NORTH STAR DISTRICTS (Star Range) - aurichalcite, bismutite, cerargyrite, molybdenite, scorodite, rhodochrosite, saponite.

Brown Thrush, Cabin, Fluorine Ledge, Lucky Boy nos. 1-2, Manassa, Monte Cristo, Quartzite, North Virginia Extension, Virginia nos. 1-5 claims - fluorite, quartz.

Cedar-Talisman, Hoosier Boy mines - anglesite, azurite, calamine, cerussite, galena, malachite, smithsonite, troostite, willemite.

Commonwealth, Kemple, Progressive, St. Mary's mines - azurite, bismuthinite, bismutite, calcite, cerussite, chalcopyrite, garnet, limonite, malachite, pyrite.

Copper King mine - azurite, garnet, magnetite, malachite, scheelite.

Dotson mine - azurite, cerussite, galena, malachite.

Estelle, Mowitza, Vicksburg mines - cerussite, galena.

Harrington-Hickory, Rebel, White Rock mines - anglesite, azurite, cerussite, chalcopyrite, corkite, galena, limonite, malachite, pyrite, silver, sphalerite, tetrahedrite, vanadinite, wulfenite.

Hub mine - anglesite, cerussite, chalcopyrite, chlorite, fluorite, galena, magnetite, muscovite, plumbojarosite, pyrite, serpentine, sphalerite.

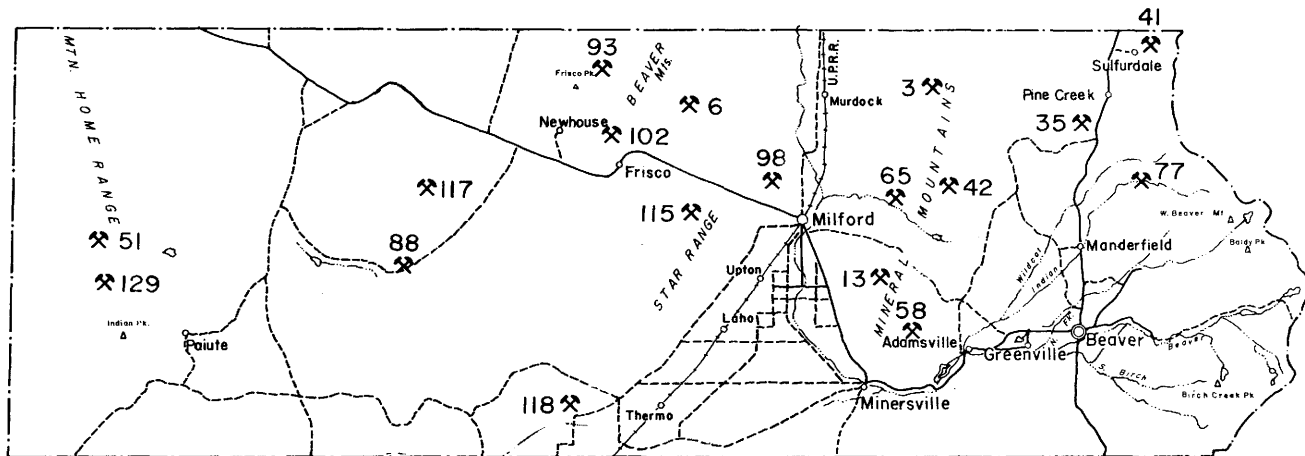
Lady Bryan mine - chalcopyrite, epidote, fluorite, hedenbergite, magnetite, muscovite, pyrite, pyroxene, tremolite.

Little May Lilly mine - scheelite.

Mammoth mine - cerussite, limonite.

Moscow mine - amphibole, anglesite, cerussite, chalcopyrite, fluorite, galena, greenockite, hedenbergite, jarosite, plumbojarosite, pyrite, rhodochrosite, sericite, smithsonite, sphalerite.

Red Warrior mine - anglesite, azurite, cerussite, chalcopyrite, galena,



MINERAL DEPOSITS of BEAVER COUNTY

Mining Districts

- 51 - Indian Peak
- 129 - Washington
- 117 - Sterling
- 88 - Pine Grove
- 118 - Sulphur
- 93 - Pruess

- 6 - Beaver Lake
- 102 - San Francisco
- 98 - Rocky
- 115 - Star & North Star
- 3 - Antelope
- 65 - McGarry

- 42 - Granite & North Granite
- 13 - Bradshaw
- 58 - Lincoln
- 77 - Newton
- 35 - Fortuna
- 41 - Gordon

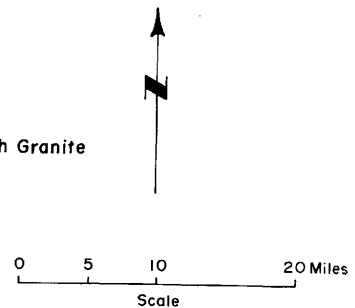


Figure 2.

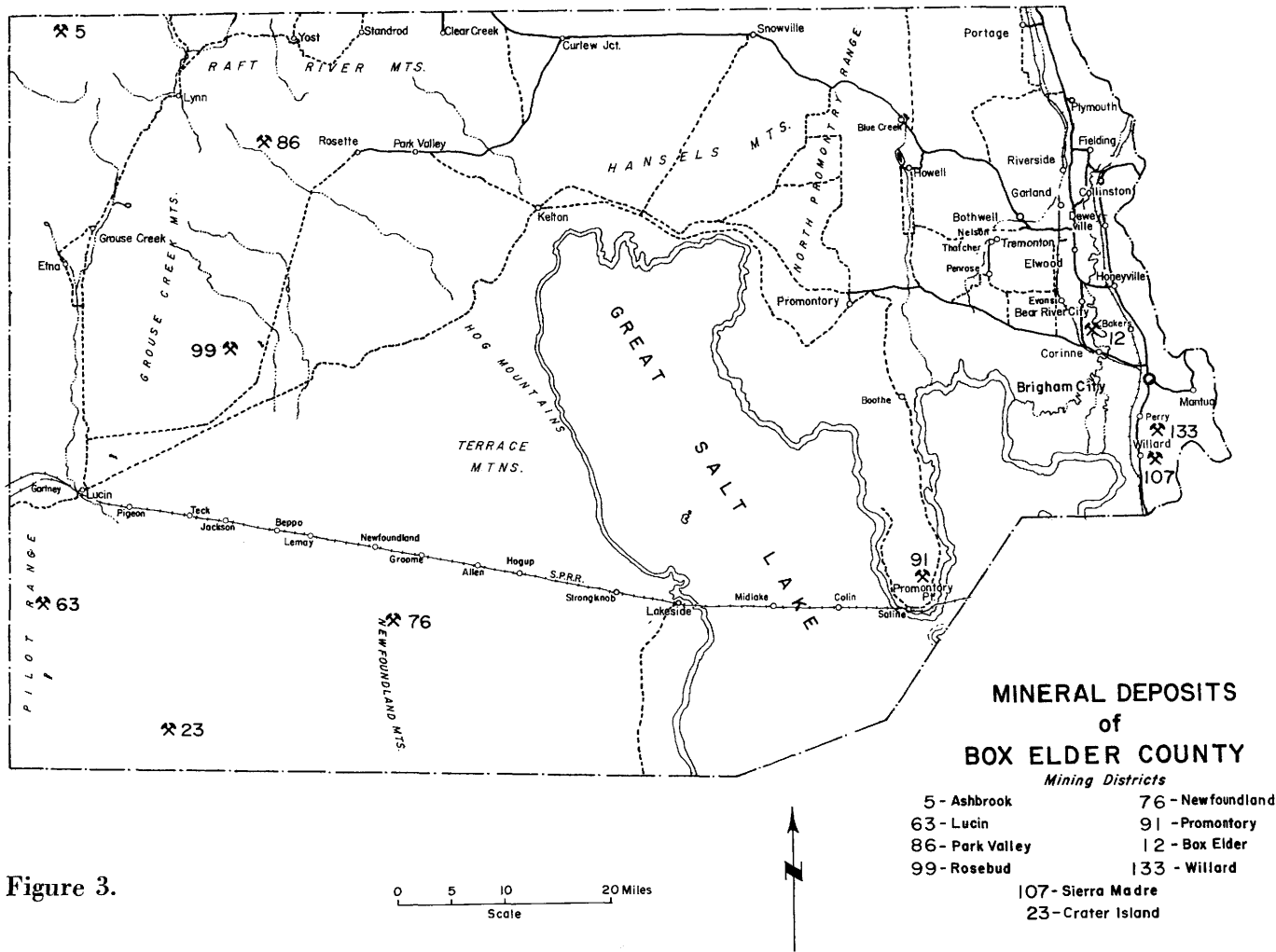


Figure 3.

**MINERAL DEPOSITS
of
BOX ELDER COUNTY**
Mining Districts

- | | |
|------------------|--------------------|
| 5 - Ashbrook | 76 - Newfoundland |
| 63 - Lucin | 91 - Promontory |
| 86 - Park Valley | 12 - Box Elder |
| 99 - Rosebud | 133 - Willard |
| | 107 - Sierra Madre |
| | 23 - Crater Island |

jarosite, limonite, malachite, plumbogjarosite, pyrite, smithsonite, sphalerite.

Wild Bill mine - anglesite, azurite, cerussite, chalcopyrite, chrysocolla, corkite, diopside, fluorite, galena, garnet, jarosite, magnetite, malachite, pyrite, specularite, sphalerite.

STERLING DISTRICT (Red Buttes) - no minerals reported.

SULPHUR DISTRICT (Wah Wah Mountains) - sulfur.

WAH WAH VALLEY - sulfur.

WASHINGTON DISTRICT (Needle Range)
Orizaba Consolidated mine, Lucero claim - yellow andradite.

WHITE MOUNTAIN - alunite.
Grampian Hill - magnesite, tremolite.

Box Elder County

ASHBROOK DISTRICT (Grouse Creek Mountains) - diaspore.

Bovine mine - scheelite.
Vipont mine - anglesite, argentite, argyrodite, arsenopyrite, azurite, cerargyrite, cerussite, chalcocite, chalcopyrite, copper, covellite, cuprite, galena, gold, hematite, limonite, malachite, orpiment, pearceite, pyrrargyrite, pyrite, quartz, realgar, rhodochrosite, sericite, silver, sphalerite, tennantite.

BIRD ISLAND - guano.

BOX ELDER DISTRICT (Wasatch Mountains) - calcite, cerussite, galena.

CRATER ISLAND DISTRICT (Crater Island).

Copper Blossom mine - bornite, calcite, chalcopyrite, chrysocolla.

DRY LAKE MINE (E. Brigham City) - stibnite.

GREAT SALT LAKE (shores) - aragonite,

bloedite, glauberite, halite, mirabilite, thenardite.

GROUSE CREEK RANGE - epidote, stolzite.

Birch, Southern Conley, Western Grouse Creeks - kyanite.

Lone Pine, Magnitude, Rocky Pass mines - scheelite.

GUNNISON ISLAND - guano.

LUCIN DISTRICT (Pilot Range).

Copper Mountain mine - alunite, anglesite, azurite, barite, cerussite, chrysocolla, copper, cuprite, galena, goethite, gold, halloysite, kaolinite, malachite, melaconite.

Cunepah (Montello) tunnel - cerussite, galena, limonite, smithsonite.
Empire mine - bismutite, variscite, wulfenite.

Jeff-Doran mine - azurite, limonite, malachite.

Judson mine - cerussite.

Parkdale mine - chrysocolla.

Tecoma Hill mines - alunite, anglesite, cerussite, chalcopyrite, galena, goethite, gold, halloysite, hemimorphite, hematite, kaolinite, limonite, plumbogjarosite, pyrite, sericite, silver, smithsonite, sphalerite, wulfenite.

Tri-State Minerals claim - barite.

NEWFOUNDLAND DISTRICT (Newfoundland Mountains) - anglesite, bismuthinite, cerussite, galena.

Copper Ridge - azurite, bornite, chalcopyrite, chrysocolla, limonite, malachite, pyrite.

Desert Peak, Pack Rat Canyon - scheelite.

NORTH SHORE of GREAT SALT LAKE asphalt, pyrite in shale and slate.

PARK VALLEY DISTRICT (Raft River Mountains).

Century, Susannah mines - arsenopyrite, chalcopyrite, galena, gold, monazite, pyrite, sphalerite.

PROMONTORY DISTRICT (Promontory Mountains).

Big Pine mining properties - cerussite.

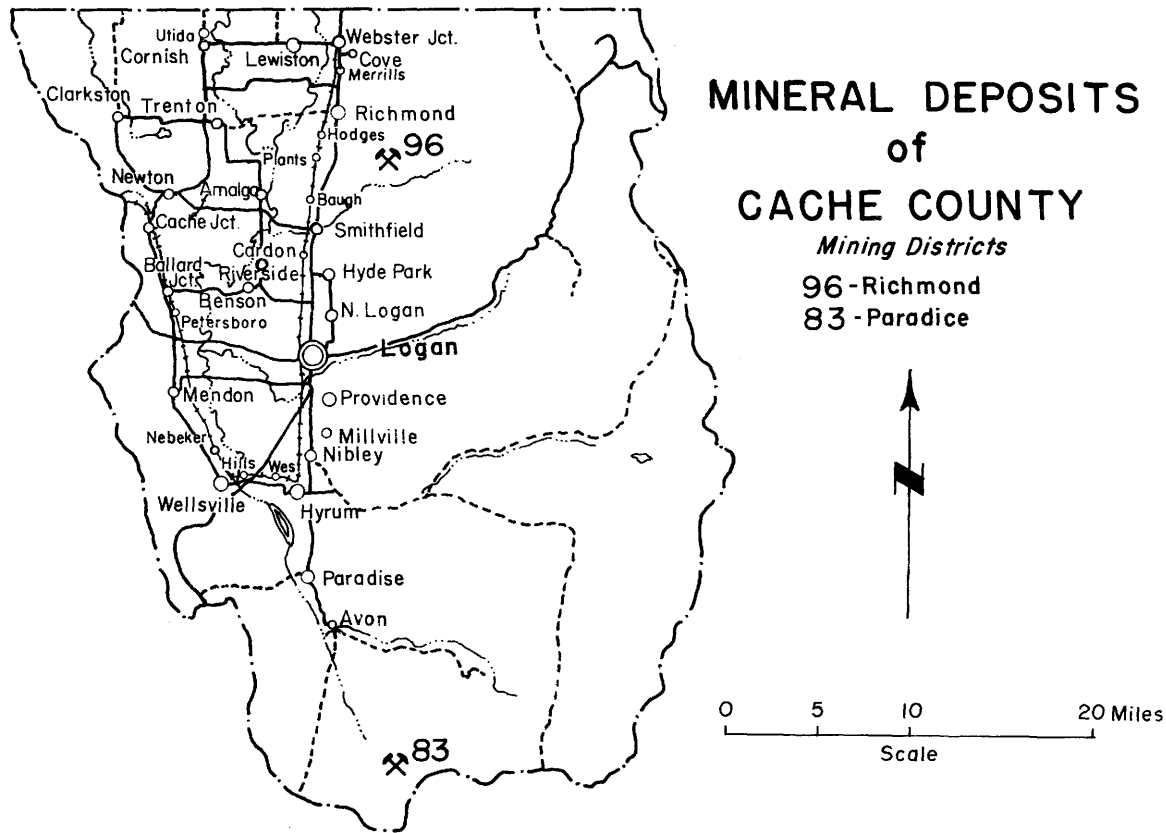


Figure 4.

Lakeview, Lead Hill, North Side, Volunteer mines - bornite, calamine, cerussite, chalcopyrite; gold, gypsum, limonite, malachite, pyrite, smithsonite.

Promontory Point - obsidian, variscite.
Sunshine mining properties - cerussite.

ROSEBUD DISTRICT (Grouse Creek Mountains) - barite, cerussite, chlorite, epidote, garnet, muscovite, quartz.

A & W, Magnitude mines - galena, scheelite, vanadinite, wulfenite.

Mogul mine - galena, gold.

Red Buttes - chalcopyrite, gold, pyrite.

ROZEL POINT - asphalt.

SALINE STATION (near) - smithsonite.

SIERRA MADRE DISTRICT (Wasatch Mountains) - See Weber County.

SNOWVILLE (near) - variscite.

UTAHLITE HILL (5 mi. N.W. Lucin) - lucinite, metavariscite, variscite.

WILLARD DISTRICT (Wasatch Mountains) - bindheimite, cyrtolite, stibnite.

Consolidated group, Louise Consolidated mine, Silver Queen claim - galena.

Gold Standard mine - hematite, limonite.

Mormon Girl claim - azurite, magnetite, malachite, muscovite.

Ogden Boil makers claim - azurite, bindheimite, galena, malachite, tetrahedrite.

Overland claim - azurite, chalcopyrite, gold, malachite, pyrite, tetrahedrite.

Twin Pine claim - magnetite.

Cache County

HYRUM AREA (Blacksmith Fork).

Lucky Star claim - galena, malachite, silver.

Moon claim - gold, hematite, smithsonite.

Pig Hole Hollow - pyrolusite.

Tip Top claim - cerussite, galena, silver, smithsonite.

LA PLATA AREA (Davenport Creek).

La Plata, Sunrise claims - galena.

Sundown claim - malachite.

Yellow Jacket claim - cerussite, silver.

LOGAN AREA (Logan Canyon) - chalcotrichite, galena.

PARADISE DISTRICT (East Fork Little Bear River) - anglesite, azurite, cerussite, galena, malachite.

Mineral Point - hematite, siderite, specularite.

RICHMOND DISTRICT (Bear River Range) - galena, malachite.

SMITHFIELD AREA - cerussite, kaolinite, smithsonite.

Carbon County

COAL (COLD) CREEK (20 mi. N. Price) - carnotite.

FARNHAM DOME - carbon dioxide.

GORDON CREEK - carbon dioxide.

PRICE (S.W.) - calcite.

SUNNYSIDE (5 mi. N.) - asphalt.

TIDEWELL and RIDEOUT DISTRICT (West Tavaputs Plateau).

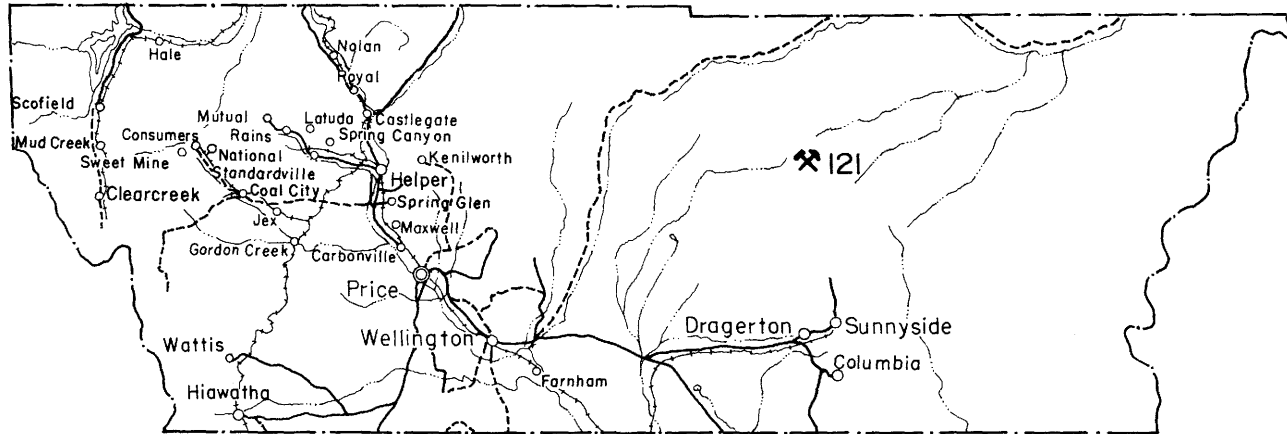
Winter Quarters mine - copalite.

WHITMORE CANYON - ozocerite.

Daggett County

BIRCH CREEK DEPOSIT - limonite.

DAGGETT CHIEF PROPERTY - pyrolusite.



MINERAL DEPOSITS
of
CARBON COUNTY
Mining Districts
121-Tidwell 8
Rideout

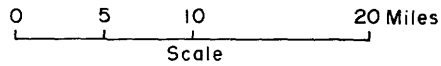


Figure 5.

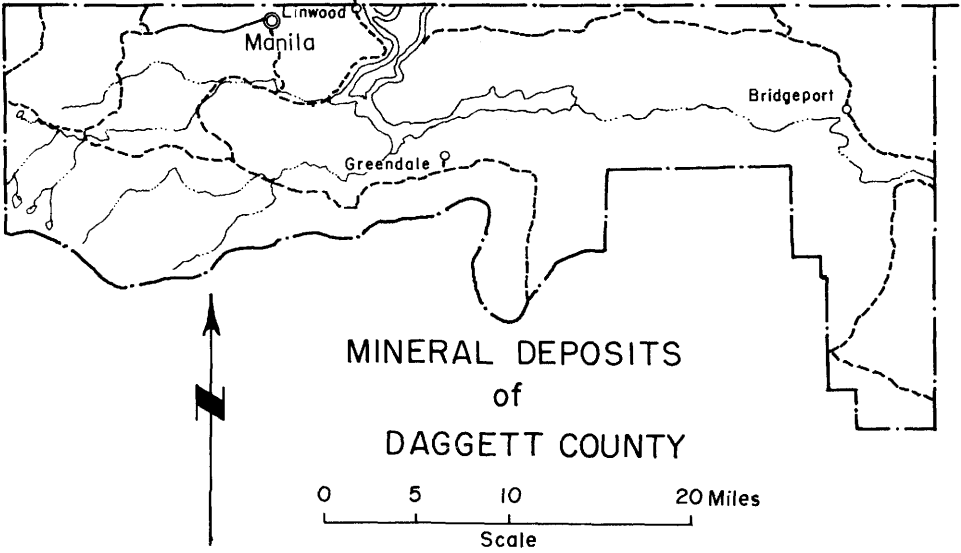


Figure 6.

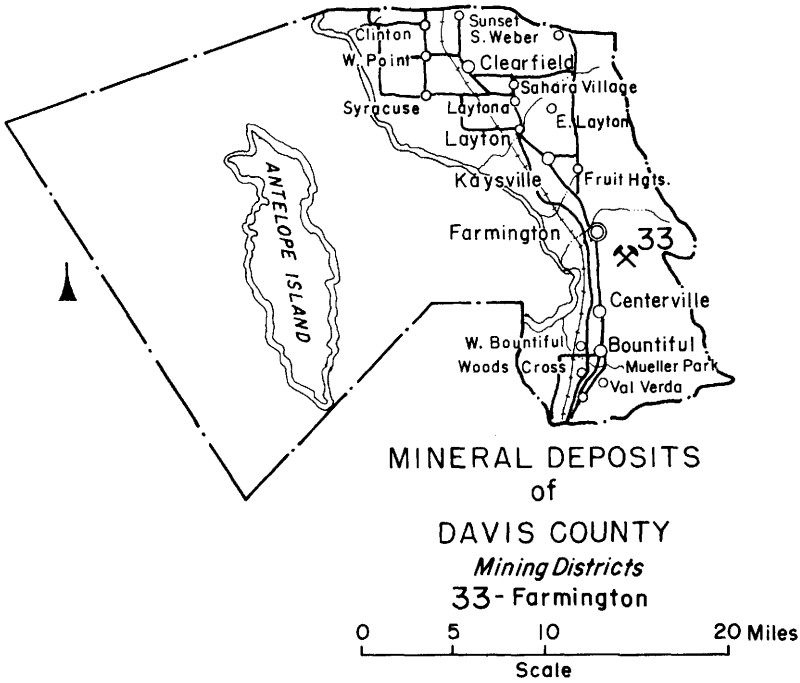


Figure 7.

RED CREEK (Browns Park).

Yellow Canary uranium deposit - azurite, bornite, brochantite, carnotite, chalcocite, chalcopyrite, gold, hematite, hyalite, malachite, tyuyamunite, volborthite.

RED CREEK COMPLEX (Uinta Mountains) - almandite, anthophyllite, apatite, beryl, hematite, hornblende, hyanite, muscovite, staurolite.

SPRING CREEK DEPOSIT - limonite, pyrolusite.

UINTA MOUNTAINS (N.E. flank) - glauconite in Cambrian Ladore Fm. collophane, carbonate apatite, fluorapatite, francolite, phosphorite in Permian Meade Peak phosphate shale.

Davis County

ANTELOPE ISLAND (Great Salt Lake) almandite, azurite, biotite, chalcopyrite, chlorite, chrysocolla, epidote, grossularite, hornblende, hematite, limonite, magnetite, malachite, microcline, oligoclase, quartz, sulfur, vermiculite, zoisite.

BEAR CANYON - tremolite.

FARMINGTON DISTRICT (Wasatch Mountains).
Morning Star group - azurite, chalcopyrite, cuprite, gold, malachite, pyrite.

Parrish Canyon - anglesite, azurite, bornite, chalcocite, chalcopyrite, gold, limonite, malachite, pyrite, specularite.

GREAT SALT LAKE (shores) - aragonite, bloedite, glauberite, halite, mirabilite, thenardite.

LUCKY BOY and UTAH-PIOCHE MINES scheelite.

WANDERING JEW MINE - azurite, galena, malachite.

Duchesne County

ANTELOPE CANYON - wurtzilite.

AVINTAGUIN CANYON - wurtzilite.

CARTER OIL COMPANY WELLS - acmite, analcite, leucospentite, nahcolite, magnesioriebeckite, reedmergerite, searesite, shortite.

CASTLE PEAK DISTRICT (Uinta Basin) gilsonite.

DUCHESNE (S.W.) - albertite.

DUCHESNE IRON PROSPECT - hematite, red ochre.

GREEN RIVER FORMATION - acmite, analcite, anhydrite, bassanite, burbankite, collophane, crocidolite, eitelite, fluorapatite, loughlinite, magnesioriebeckite, nahcolite, northupite, pyrite, reedmergerite, riebeckite, searlesite, shortite, thermnatrite, trona.

INDIAN CANYON - sepiolite, wurtzilite.

LAKE FORK - anhydrite, gypsum.

MOON LAKE IRON DEPOSIT - hematite, red ochre.

MYTON (S.) - gilsonite.

RAT HOLE CANYON - wurtzilite.

RED CREEK - wurtzilite.

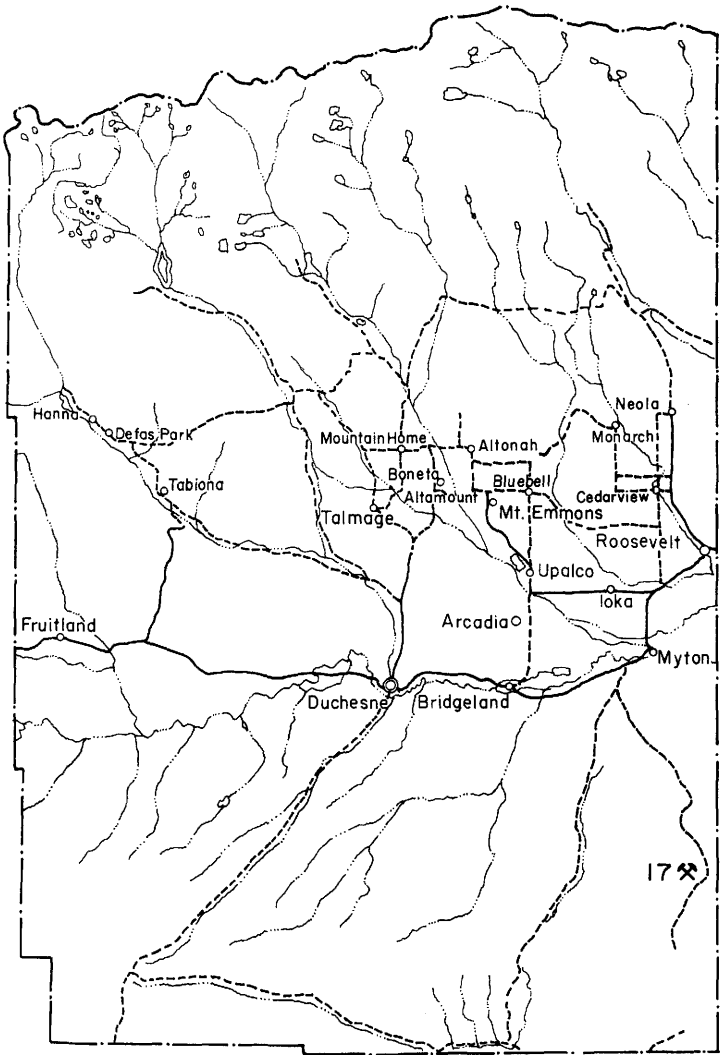
RED LEDGE and HILLTOP IRON CLAIMS hematite, red ochre.

ROCK CREEK - gypsum, malachite.

SINCLAIR MORTENSON WELL - acmite, analcite, eitelite, leucospentite, magnesioriebeckite, nahcolite, reedmergerite, searlesite, shortite.

TABBY CREEK - tabbyite.

UINTA MOUNTAINS (S. flank) - carbonate apatite, collophane, fluorapatite,



MINERAL DEPOSITS
of
DUCHEсне COUNTY
Mining Districts

17 - Castle Peak

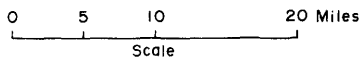


Figure 8.

francolite, phosphorite in the Permian Meade Peak phosphate shale.

Emery County

BARIUM INCORPORATED MINE - barite.

BLACK DRAGON CANYON - sulfur.

BOW KNOT AREA.

Sevastopol, Riggs claims - schroeckingerite.

CASTLE DALE (E.) - agate, azurite, chalcedony, epsomite, jasper, malachite, silicified bone and wood.

CASTLE VALLEY - agate, azurite, chalcedony, chert, epsomite, jasper, malachite, silicified bone and wood.

CEDAR MOUNTAIN DISTRICT (Cedar Mountain) - agate, anhydrite, chalcedony, jasper, gypsum, pyrolusite, psilomelane, silicified bone and wood, sulfur, wad.

EMERY (near) - brookite, cassiterite, dumortierite, ilmenite, monazite, zircon in Ferron Sandstone Member of Mancos Shale.

EMERY (LOST SPRINGS) DISTRICT (Red Plateau) - galena, gold, malachite, silver.

FULLERS BOTTOM - anhydrite, gypsum.

GREEN RIVER DISTRICT (10-12 mi. S.W. of town of Green River).

Crabapple claim - schroeckingerite, uraninite.

Denise no. 1 mine - bassetite, coffinite.

Mineral Ten claim - metatorbernite, phosphuranylite, torbernite.

Sodaroll claim - zippeite.

Ventura claims - torbernite, uraninite.

Yellow Queen claims - carnotite, torbernite, uraninite.

GREEN RIVER.

18 mi. W. of town of Green River - carnotite, tyuyamunite.

30 mi. S.W. - agate, chalcedony, fibroferrite, jasper, silicified bone and wood.

50 mi. S. - carnotite, celestite.

HORN SILVER GULCH - anhydrite, gypsum.

LAST CHANCE DESERT - agate, chalcedony, jasper.

LOST SPRINGS DISTRICT - (See EMERY DISTRICT).

MEXICAN BEND - sulfur.

MUDDY RIVER.

Snow deposit - manganite, psilomelane, pyrolusite.

PHILLIPS HUNTINGTON NO. 1 WELL brookite, cassiterite, dumortierite, as detrital grains in the Ferron Sandstone.

ROCHESTER (near) - pyrolusite.

SAN RAFAEL DISTRICT (San Rafael Swell) - agatized wood, amethyst, chalcedony, galena, gypsum, jasper. Camp Bird no. 13 mine - carnotite, uraninite.

Calf Mesa:

Dalton group - autunite.

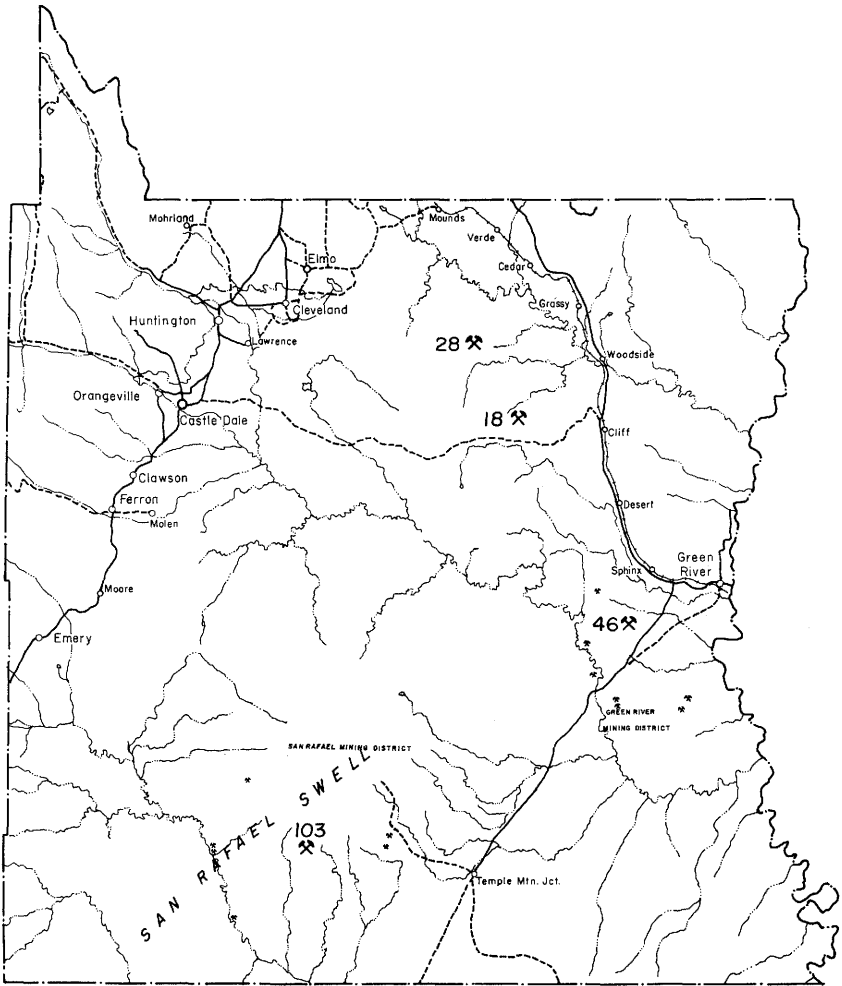
Dexter group - alunogen, butlerite, chalcantite, chalcopyrite, copiapite, coquimbite, fibroferrite, diadochite, goldichite, halotrichite, melanterite, parabautilerite, roemerite, metazeunerite, pitchblende, sulfur, voltaite, zeunerite, zippeite.

Calyx mine - coffinite, corvusite, montroseite, pitchblende, thucolite.

Copper Globe deposit - anglesite, azurite, cerussite, galena, malachite, torbernite.

Delta (Hidden Splendor) mine - bayleyite, becquerelite, boltwoodite, brochantite, fourmarierite, gummite, gypsum, illite, kaolinite, phosphuranylite, rutherfordine, schoepite, uraninite, vandendriesscheite.

Flat Top Mesa - carnotite, chrome



MINERAL DEPOSITS

of

EMERY COUNTY

Mining Districts

28 - Emery

46 - Green River

103 - San Rafael

18 - Cedar Mountain

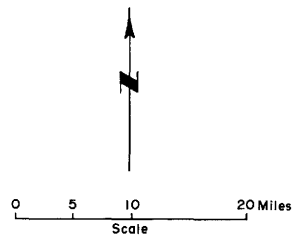


Figure 9.

mica-clay, gypsum, hewettite, metatorbernite, rauvite, torbernite, uvanite.

Green Vein Mesa:

Consolidated mine - becquerelite, metazeunerite, schoepite, zippeite.
Green Vein no. 5 mine - metazeunerite.

Original Green Vein mine - metazeunerite.

Lone Tree group - autunite.

Lucky Strike no. 2 mine - becquerelite, bieberite, cobaltocalcite, fourmarierite, galena, pitchblende, pyrite.

Maybe mine - bornite, pyrite, pitchblende.

Marshbank Canyon - uraninite.

Pay Day mine - boltwoodite, metazeunerite, uraninite.

Table Mountain - carnotite.

Temple Mountain - ankerite, chrome mica-clay, carnotite, dolomite, fernandinite, hewettite, hummerite, metatorbernite, pitchblende, roscoelite, rauvite, thucolite, torbernite, tyuyamunite, uraninite, uvanite, zippeite.

Fuemrol no. 2 mine - abernathyite, arsenic, bassetite, jarosite, metazeunerite, orpiment, pitticite, pyrite, realgar, sphalerite, scorodite.

North Temple Mountain, Eagle's Nest prospect - chrome mica-clay.

Rex no. 2 mine - corvusite, hewettite, montroseite, paramontroseite, pitchblende, uraninite.

South Temple Mountain - chrome mica-clay.

Temple Mountain mine - corvusite, rauvite, uvanite.

Wild Horse claims, Dripping Springs - autunite, phosphuranylite.

Temple Rock, and South Temple Wash - autunite, carnotite, corvusite, hewettite, metahewettite, metatorbernite, rauvite, tyuyamunite, uvanite.

Vanura claims - coffinite, uraninite.

West Little Horse Mesa - carnotite.

Wild Horse Canyon - carnotite.

SAN RAFAEL RIVER (2 mi. S. of bridge) - agate, anhydrite, carnotite, chalcodony, gypsum, jasper, selenite, sulfur.

Tidwell Ranch - alabaster, carnotite.

SAUCER BASIN - pyrolusite.

SOUTHERN PART OF COUNTY - cryolite, gold.

WOODSIDE (5 mi. S.) - agate, chalcodony, jasper, silicified bone and wood.

WOODSIDE DOME - helium.

Garfield County

ANTIMONY DISTRICT (See COYOTE CREEK DISTRICT).

BOULDER MOUNTAIN.

Pleasant Creek - pyrolusite.

CANNONVILLE - bentonite, wheel-erite.

CIRCLE CLIFFS - silicified wood.

Acme mine - autunite, azurite, gypsum, malachite, pyrite, torbernite.

Black Widow mine - autunite, azurite, carnotite, gypsum, torbernite, uraninite, uranophane.

Blue Goose mine - azurite, autunite, gypsum, malachite, torbernite.

Horse Head mine - autunite, carnotite, torbernite, uraninite, uranophane.

Lone B mine - carnotite, pyrite.

Rocky Mountain mine - autunite, chalcocopyrite, arsenopyrite, chrysocolla, gypsum, pyrite, torbernite.

Steam Boat mine - azurite, autunite, gypsum, torbernite.

Stud Horse mine - chalcocopyrite, pyrite.

COLORADO RIVER DISTRICT (Colorado River) - gold, magnetite.

COYOTE - ptilolite, amygdaloidal fillings in basalt.

COYOTE CREEK (ANTIMONY) DISTRICT (Escalante Mountains).

Hampton mine - alunogen, epsomite, gypsum, orpiment, realgar, senarmonite, stibnite, stibiconite, valentinite.

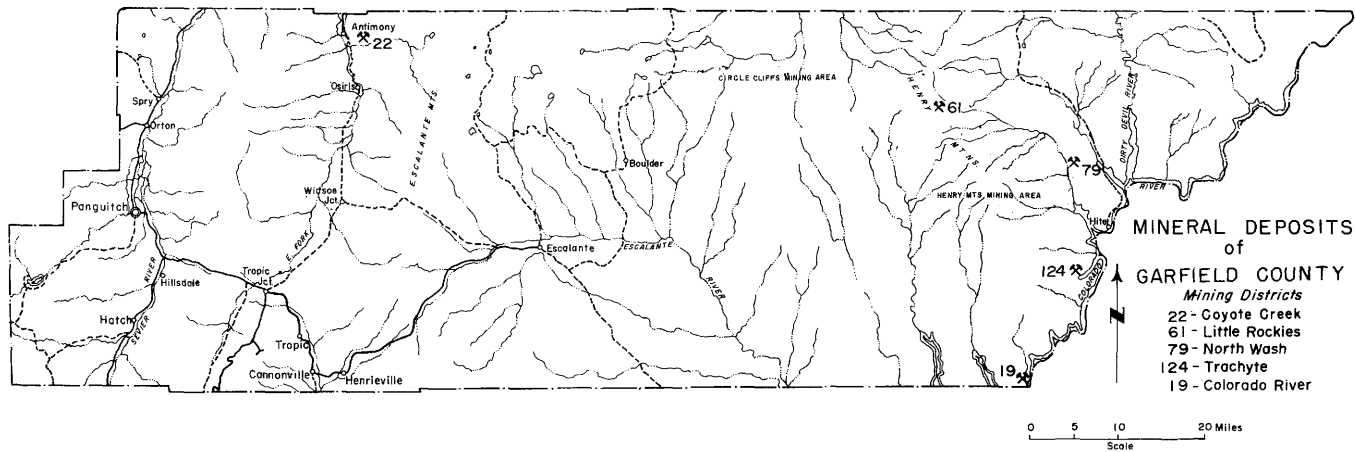


Figure 10.

ESCALANTE (near) - agate, ilmenite, monazite, silicified bone and wood, zircon.

HENRIEVILLE - bentonite.

HENRY MOUNTAINS - bornite, beta-uranotile, jet, johannite, uranophane, vanoxite, zippeite.

Bromide, Oro mines - azurite, chalcopryrite, epidote, gold, ilmenite, laumontite, magnetite, pyrite, specularite.

Crescent Creek - bentonite, carnotite, metaheawettite, pascoite, tyuyamunite.

Cuprum claim - azurite, gold, magnetite, malachite.

Starlight claims - tyuyamunite.

Southwestern Flanks - ilmenite, monazite, zircon.

HITE - gold, platinum in placers.

HUTCH PASTURE - pyrolusite, wad.

LITTLE ROCKIES DISTRICT (Henry Mountains).

Del Monte group - carnotite, vanoxite. Ekker mine, Shooting Canyon - carnotite, vanoxite.

MAMMOTH CREEK (S. Hatch) - onyx (green travertine).

NORTH WASH DISTRICT (Henry Mountains).

S.Y. Guthrie group - carnotite, vanoxite.

V.C.A. deposits - carnotite.

OAK CREEK PROSPECT (17 mi. N.F. Boulder) - pitchblende, torbernite.

PANGUITCH (N.W.) - pyrolusite.

SPOTTED DOG CLAIM - torbernite.

TABLE CLIFF PLATEAU.

Fullmer prospect - pyrolusite.

TRACHYTE DISTRICT (Henry Mountains).

Blitz nos. 1-7, June Bell nos. 1-4, Minnie Pearl nos. 1-2, Straight Creek, Trachyte nos. 1-2, V.C.A. claims - carnotite, vanoxite.

Trachyte Creek - carnotite, tyuyamunite.

TROPIC - bentonite.

TUSHAR RANGE.

Hawkins claims - pyrolusite.

WATER POCKET CANYON - anhydrite, gypsum.

Grand County

AGATE SWITCH - agate, amethyst, chalcedony, red jasper casts of fossils, satin spar, travertine.

BALD MESA - placer gold, pyrolusite.

BEAVER MESA.

Corvusite nos. 1-3 mines - carnotite, coffinite, rauvite.

BLUE SPAR PROPERTY (near Colorado-Utah border) - fluorite.

CANE CREEK - anhydrite, carnallite, gypsum, halite, polyhalite, sylvite.

CISCO (near) - agate, agatized clams, chalcedony, calcite (onyx marble), silicified bone and wood, opalized wood.

7 mi. S. - agate.

Trader Smith's claims - schroëckerite.

COLORADO RIVER AREA - chromite, gold in placers.

COURTHOUSE WASH - barite, calcite, limonite, pyrolusite.

CRESCENT JUNCTION - carnallite, sylvite.

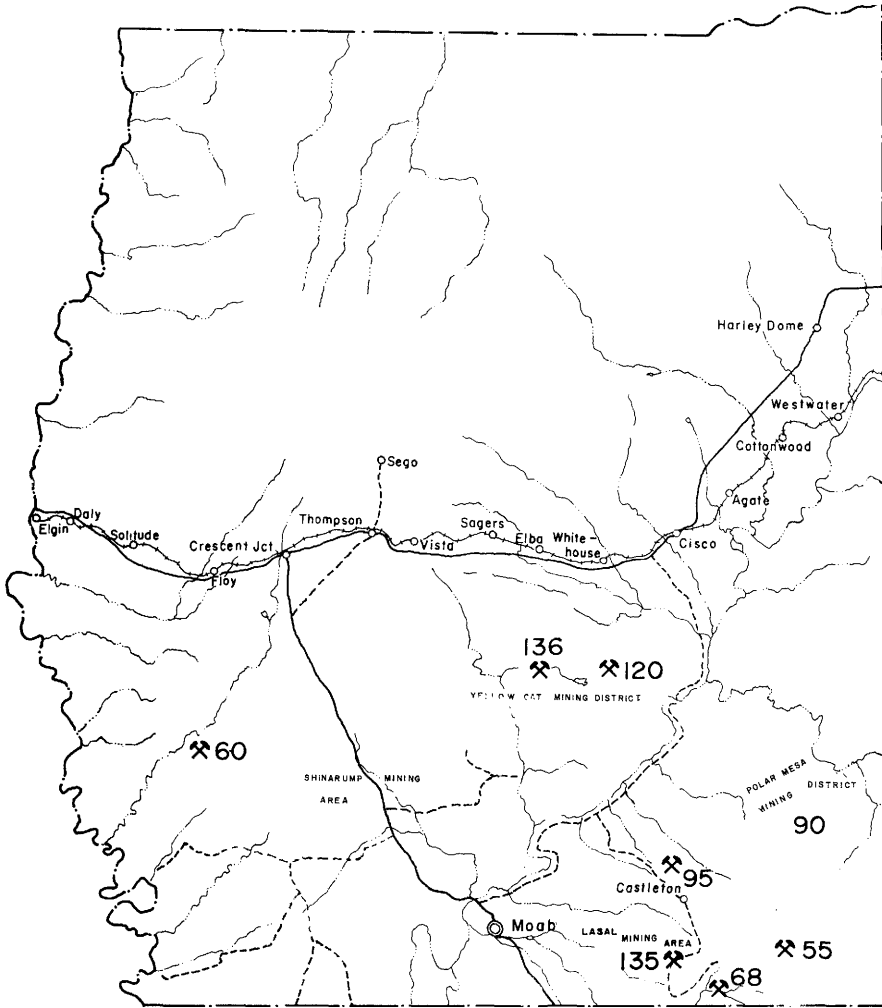
FISHER VALLEY - anhydrite, gypsum.

GREEN RIVER - chromite in placers.

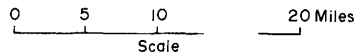
GREEN RIVER CROSSING (D. and R.G. Railroad) - aluminite.

GYPSUM HILLS - anhydrite, gypsum.

HARLEY DOME - carbon dioxide, helium.



MINERAL DEPOSITS
of
GRAND COUNTY
Mining Districts



- | | |
|-------------------|------------------|
| 135 - Wilson Mesa | 55 - La Sal |
| 60 - Little Grand | 90 - Polar Mesa |
| 95 - Richardson | 136 - Yellow Cat |
| 68 - Miners Basin | 120 - Thompsons |

Figure 11.

HOOSIER MINE (near Brendel) - azurite, bornite, malachite, pyrite.

LA SAL DISTRICT (E. slopes of North Mountain, La Sal Mountains).

Bornite mine - azurite, bornite, malachite, pyrite.

Jack claim - carnotite, corvusite, hewettite, ilsemannite.

McCoy mine - azurite, bornite, chalcopryrite, malachite.

LA SAL MOUNTAINS (North Mountain) actinolite, aegirite, augite, biotite, hedenbergite, oligoclase.

LITTLE GRAND DISTRICT (S. E. Green River).

Black Bird claim - pyrolusite.

Colorado Fuel and Iron Company mine barite, calcite, pyrolusite.

Desert Rock (Mongol) claim - pyrolusite.

Dry Lake Wash - pyrolusite.

Duma Point - pyrolusite.

Needles - barite, calcite, manganite, pyrolusite, rhodochrosite.

Salt Wash group - celestite, chert, manganite, pyrolusite.

Tenmile Wash - barite, calcite, psilomelane, pyrolusite.

White Wash deposits - pyrolusite.

LITTLE VALLEY - limonite, pyrolusite.

MCCARTHY WELL - anhydrite.

MILL CREEK (N. Moab) - carnotite.

MINERS BASIN DISTRICT (W. slopes of North Mountain, La Sal Mountains).

Dewey mine - actinolite, calcite, chalcedony, chrysocolla, chalcopryrite, fluorite, hedenbergite, hematite, malachite, limonite, quartz.

Dillon mine - gold, pyrite.

High Ore mine - azurite, calcite, chalcopryrite, chrysocolla, chalcedony, fluorite, goethite, hematite, limonite, malachite, quartz.

McCormick mine - calcite, malachite, siderite.

M.I.F. mine - actinolite, gold, hedenbergite, pyrite.

Moab no. 1 mine - azurite, chalcopryrite, malachite, pyrite.

Placer Creek - gold.

Skylark mine - chalcopryrite, chrysocolla, limonite, pyrite.

Tornado deposit - gold, pyrite.

West Slope mine - carnotite.

MOAB (5 mi. N.) - agate, chalcedony, silicified bone and wood.

MOAB VALLEY - anhydrite, calciovolborthite, carnotite, gypsum.

MULESHOE WASH - pyrolusite.

ONION CREEK (La Sal Mountains) anhydrite, chevkinite in volcanic ash, gypsum.

PACK CREEK (La Sal Mountains) - autunite, carnotite, cuprodescloizite, metahewettite, tyuyamunite.

PARADOX BASIN - anhydrite, carnallite, gypsum, halite, polyhalite, sylvite.

POISON SPRING CANYON - meta-autunite.

POLAR MESA DISTRICT (Polar Mesa) fervanite, gypsum, hewettite.

Elva M., Imp, Polar nos. 2-3, Rim Rock no. 2 claims - carnotite.

PR SPRINGS - asphalt.

RICHARDSON DISTRICT (Waring Creek) azurite, calciovolborthite, carnotite, galena, saponite, tyuyamunite, volborthite.

RYAN CREEK SCHEELITE PROSPECT - barite, fluorite, galena, scheelite, sphalerite.

SALT VALLEY AREA - anhydrite, azurite, carnallite, gold, gypsum, halite, limonite, malachite, polyhalite, psilomelane, pyrolusite, sylvite.

SEGER STATION - carnotite.

SEVEN MILE ANTICLINE - anhydrite, carnallite, gypsum, halite, polyhalite, sylvite.

SEVEN MILE CANYON.

Shinarump nos. 1-3 claims - becquerelite, boltwoodite, bornite, carnotite, chalcocite, chalcopyrite, lithiophorite, pitchblende, pyrite, schroekingerite, uranite, zippeite.

SQUAW PEAK - pyrolusite.

THOMPSONS AREA - agate, anhydrite, dinosaur bone, carnotite, gypsum, jasper, metaheawettite, metarossite, rossite, roscoelite, selenite, tyuyamunite, vanoxite.

THOMPSONS DISTRICT (S.E. Thompsons).

Black Ape mine - liebigite, pascoite. Cactus Rat mines - barnesite, carnotite, hewettite, metaheawettite, phosphuranylite, rauvite, rossite, roscoelite, steigerite, tyuyamunite, vanoxite.

Cobalt no. 2 mine - phosphuranylite. Flat Top no. 1 claim - carnotite.

Juniper mine - corvusite, montroseite, melanovanadite, paramontroseite, uraninite.

McCoy group - schroekingerite.

Parco no. 23 mine - andersonite, corvusite, grantsite, metatyuyamunite, metarossite, montroseite, rossite, roscoelite, schroekingerite, selenium, tyuyamunite, uraninite, uranite, vanoxite, zippeite.

Red Vanadium group - carnotite.

Skinny no. 1 mine - andersonite.

Thom claim - autunite, meta-autunite.

WHEELER DESERT DISTRICT (See WILSON MESA DISTRICT).

WHITE HOUSE - pyrolusite.

WILSON MESA (WHEELER DESERT) DISTRICT (Wilson Mesa) - bentonite, gold, pyrolusite, sherwoodite.

YELLOW CAT DISTRICT (W. part of Thompsons District).

Eli Malichs Lucky Day claim - pitchblende.

L.A. Sutherland Sock claim - pitchblende.

Uvanco (Yellow Jacket) mine - carnotite.

Yellow Cat group - metaheawettite, schroekingerite, tyuyamunite.

Iron County

ANTELOPE RANGE.

Black Jack (Gregory), Lucky Joe, Taylor claims - pyrolusite.

Newcastle area - chalcedony geodes.

CEDAR BREAKS - agate.

CEDARCANYON - anhydrite, carnotite, gypsum, selenite.

CEDAR MOUNTAIN.

Black Hawk, Joe Louis claims - pyrolusite.

CIMA (MARIETTA, STRATTON) MINE cinnabar, opal, sulfur.

ESCALANTE DISTRICT (Mt. Escalante).

Clove prospect - pyrolusite.

Escalante mine - annabergite, descloizite, fluorite, pyromorphite.

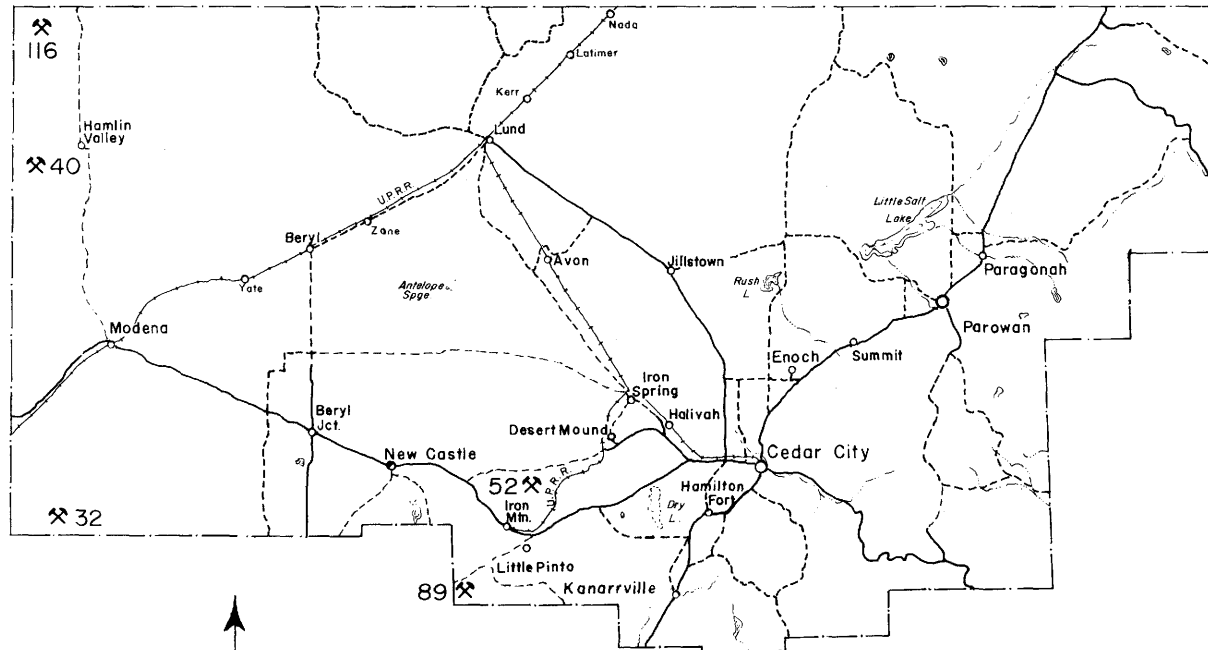
GOLD SPRINGS DISTRICT (Hamlin Valley).

Homestake mine - adularia, cerargyrite, fluorite, garnet, gold, mercury, quartz, selenium and tellurium mineralization.

IRON SPRINGS DISTRICT (Iron Mountain, Granite Mountain, Three Peaks).

Granite Mountain (Ore bodies: Armstrong, Constitution, Desert Mound, Iron Springs Arch, King, Little Jim, Little Mormon, Lindsay Hill, Lindsay South, Milner Pit, Pioche Pit, Section 3, Section 9, Short Line, Short Line Extension, Thompson, Vermillion Pit, Walker) - actinolite, albite, amethyst, azurite, apatite, barite, chalcedony, cinnabar, diopside, galena, hematite, lodestone, magnetite, limonite, malachite, mimetite, pyrite, siderite.

Iron Mountain (Ore bodies: A and B, Black Hawk, Black Magnetic, Blowout Hill, Burke no. 2, Burke no. 3, Chesapeake, Comstock, Crystal, Cyclone, Deer, Duluth, Duncan, Excelsior,



MINERAL DEPOSITS of IRON COUNTY

- Mining Districts*
- 116 - Stateline
 - 40 - Gold Springs
 - 52 - Iron Springs
 - 89 - Pinto Iron
 - 32 - Escalante

Figure 12.

Homestake, Last Chance, Milner Hill, Mountain Lion, Pinto, Pot Metals, Queen of the West, Sparta, The Last Chance, Tip Top, Wall Street - actinolite, albite, amethyst, azurite, apatite, barite, chalcedony, cinnabar, diopside, galena, hematite, lodestone, magnetite, limonite, malachite, mimetite, pyrite, siderite.
Blowout Hill - metastrengite, rockbridgeite.
Three Peaks (Ore bodies: April Fool, Ashton, Blackbird, Great Western, Irene, Jeanette, Jones, Marshall, McGarry, War Eagle) - apatite, hematite, lodestone, magnetite.

KANARRAVILLE - anhydrite, autunite, gypsum.

LUND - sulfur, N. end of Escalante Valley.

MODENA PROPERTY - pyrolusite, rhodochrosite.

PARAGONAH - analcite, in andesite flows.
Iron Peak - andesine, augite, biotite, chlorite, damourite, magnetite.

PAROWAN (near) - niter.

PINTO IRON (SILVER BELT) DISTRICT (Pinto) - hematite, magnetite.

SAND SPRINGS - gold.

SILVER BELT DISTRICT (See PINTO IRON DISTRICT).

STATELINE DISTRICT (Hamlin Valley) argentite, bog ore, cerargyrite, ferromolybdenite, gold, mercury, pyrite, selenium mineralization, sylvanite.

Juab County

ABRAHAM HOT SPRINGS - psilomelane.

DESERET (DESERT MOUNTAIN) DISTRICT (Desert Mountain).
Miller mine - cerussite, galena, quartz with liquid inclusions.

Rockwell shaft - barite, chalcopryrite, chrysocolla, malachite.

DESERT MOUNTAIN DISTRICT (See DESERET DISTRICT).

DETROIT (DRUM, JOY) DISTRICT (Drum Mountains) (See also MILLARD COUNTY) - agate, jarosite, jasper.

Black Boy group (Staats and Pratt mines) - psilomelane, pyrolusite, rhodochrosite.

Charm, Copperhead, E.P.H., Ibex mines - azurite, bismutite, cerargyrite, chalcedony, chalcopryrite, cuprite, galena, gold, jasper, hematite, malachite, pyrite, pyrolusite.

DRUM DISTRICT (See DETROIT DISTRICT).

DUGWAY RANGE - beryl, bixbyite, chalcedony, fluorite, garnet, topaz.

EAST TINTIC DISTRICT (See under UTAH COUNTY).

EAST TINTIC MOUNTAINS - phosphorite in basal Deseret Limestone.

FISH SPRINGS DISTRICT (Fish Springs Mountains).

Carnation, Emma, Galena, Utah mines anglesite, cerargyrite, cerussite, chalcopryrite, covellite, fluorite, galena, limonite, magnesite, plumbojarosite, pyrite, sphalerite.
Garrick mine - barite.

GOSHUTE INDIAN RESERVATION beryl, muscovite, orthoclase, quartz.

HONEYCOMB HILLS - autunite, bertrandite, fluorite, meta-uranocircite, sklodowskite, soddyite, spodumene, uraninite, uranophane, uranospinite.

IBAPAH MOUNTAINS.

Fifteenmile Canyon - beryl (gem quality aquamarine).

INDIAN CREEK - autunite, fluorite.

JERICO - agate, chalcedony, jasper, labradorite.

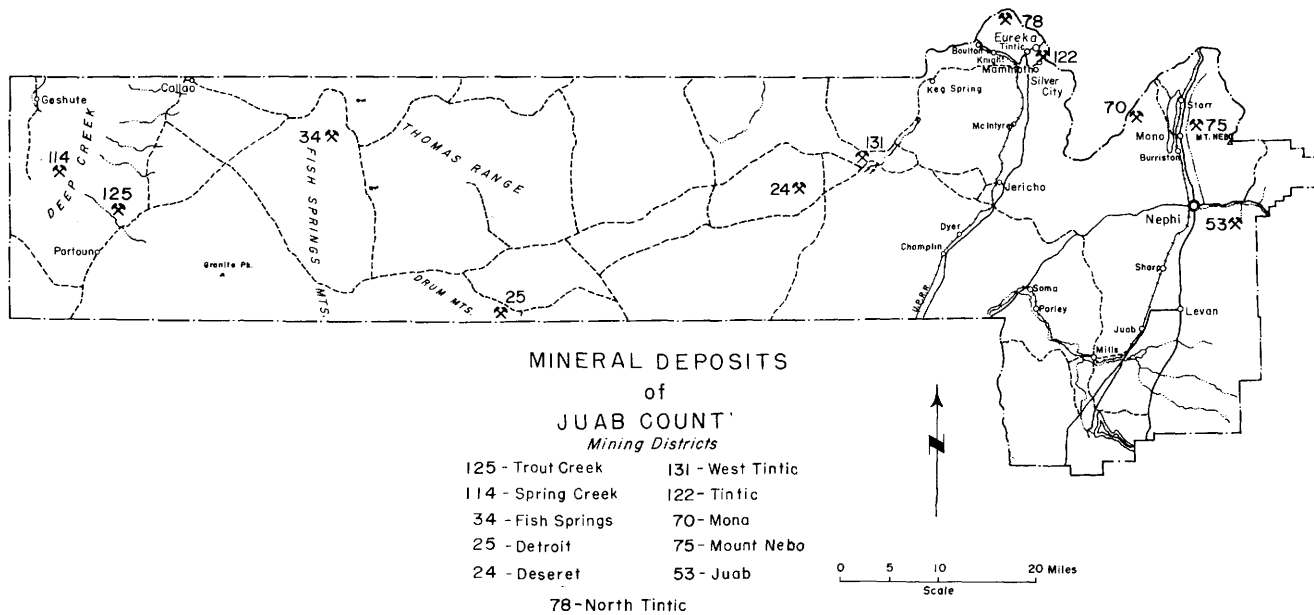


Figure 13.

JOHNSON PEAK DISTRICT (See TROUT CREEK DISTRICT).

JOY DISTRICT (See DETROIT DISTRICT).

JUAB DISTRICT (Wasatch Mountains) cerussite, galena.

KEG (MCDOWELL) MOUNTAINS - agate, labradorite, obsidian.

MONA DISTRICT (Long Ridge) - anhydrite, cerussite, galena, gypsum.

MT. NEBO (TIMMONS) DISTRICT (Wasatch Mountains).

Ajaxto no. 2 prospect - galena, sphalerite.

Big Nebo mine - argentite, cerussite, galena.

Black Ledge claims - chalcedony, pyrolusite.

Blackett Tunnel - argentite, galena.

Eva (Privateer) mine - argentite, barite, calcite, calamine, cerussite, cuprite, dolomite, galena, smithsonite, sphalerite.

Freddie Lode - argentite, barite, calamine, cerussite, galena, smithsonite, sphalerite.

Highland mine - calcite, galena, sphalerite.

Santaquin Chief mine - cerussite, galena, sphalerite.

Santaquin King mine - cerussite, galena.

Syndicate (Bullock) Tunnel - cerussite, galena.

NORTH TINTIC DISTRICT (Boulter Mountains) (See also under Tooele and Utah Counties).

Tintic Prince mine - galena, jasper, pyrite.

SAN PITCH MOUNTAINS.

Black Jack (Kendall-Duvall) claims agate, braunite, chalcedony, quartz, psilomelane.

Chicken Creek, Levan, Nephi, Salt Creek - anhydrite, gypsum, halite.

Orme property - calcite, opal, psilomelane, pyrolusite.

SPRING CREEK DISTRICT (W. side Deep Creek Mountains).

Queen of Sheba mine - albite, azurite, beryl, biotite, galena, garnet, limonite, muscovite, orthoclase, pyromorphite, quartz, tourmaline.

THOMAS RANGE - agate, bertrandite, beryl, chalcedony, fluorite, garnet, opal, pseudobrookite, quartz, specularite, topaz.

Autunite no. 8 claim - calcite, fluorite, opal, quartz, sanidine, weeksite.

Buena no. 1 claim - fluorite, opal.

Good Will, Yellow Chief groups - beta-uranophane, fluorite, schroeking-erite, uranophane, weeksite.

SPOR MOUNTAIN - bertrandite, fluorite, morganite.

Bell Hill mine - camotite, chalcedony, chalcopryite, fluorite, hematite, magnetite, montmorillonite, pyrite, quartz.

Blowout mine - carnotite, fluorite, montmorillonite, quartz.

Blue Queen prospect - fluorite.

Claybank, Blue Chalk, Hogsback, Northend, Rainbow, Roadside claims bertrandite, calcite, chalcedony, fluorite, gel-bertrandite, montmorillonite.

Dell no. 1 mine - fluorite, quartz.

Dell no. 5 mine - carnotite, fluorite, montmorillonite, quartz.

Eagle Rock prospect - calcite, carnotite, fluorite, malachite, montmorillonite.

Evening Star prospect - fluorite, sanidine, quartz.

Floride mine - carnotite, fluorite, hematite, limonite.

Floride no. 5 mine - fluorite, montmorillonite.

Fluorine Queen mine - carnotite, chalcedony, fluorite, montmorillonite, pyrolusite.

Fluorine Queen no. 4 prospect - carnotite, fluorite, montmorillonite.

Green Crystal mine - chalcedony, fluorite.

Harrisite mine - calcite, carnotite, fluorite, montmorillonite.

Hilltop mine - carnotite, fluorite, quartz.

Lost Sheep mine - carnotite, chalcodony, fluorite, quartz.

Lost Soul prospect - fluorite.

Lucky Louie mine - carnotite, chalcodony, fluorite.

Nonella prospect - fluorite, opal, quartz.

Oversight mine - calcite, fluorite, quartz.

Rainbow no. 2 prospect - fluorite.

Thursday mine - calcite, fluorite.

TOPAZ MOUNTAIN - almandite, beryl, bixbyite, calcite, carnelian, carnotite, chalcodony, fluorite, garnet, hematite, morganite, hyalite, pseudobrookite, quartz, sanidine, schroekingerite, specularite, spessarite, topaz, uranophane, weeksite.

TIMMONS DISTRICT (See MT. NEBO DISTRICT).

TINTIC DISTRICT (East Tintic Mountains) - arseniosiderite, arduinite, atacamite, cotunnite, pyrolusite, tennantite, siderotil, sicklerite, spangolite, zoisite.

Ajax mine - borickite, chalcophyllite, enargite, mixite, tyrolite.

American Eagle mine - conichalcite, chenevixite, erinite.

Beck Tunnel mine - cerussite, galena, jasper.

Black Dragon mine - galena, limonite, pyrite.

Black Jack Empire mine - gold, limonite, silver, pyrolusite, wad.

Boss Tweed mine - azurite, barite, bismite, bismuth, bismutite, brochantite, calamine, cuprite, malachite, mixite.

Brooklyn mine - crandallite.

Bullion Beck mine - anglesite, aurichalcite, azurite, calamine, cerargyrite, cerussite, gold, galena, marcasite, pearceite, silver, smithsonite, sphalerite.

Carissa mine - aurichalcite, azurite, barite, bismuth, bismutite, brochantite, calcite, chrysocolla, conichalcite, copper, cuprite, enargite, garnet, letsomite, malachite, mixite, olivenite, pitticite, scorodite, utahite.

Centennial Eureka mine - azurite, barite, cerargyrite, chalcocite, chalcopyrite, conichalcite, copper, cornwallite, cuprite, enargite, erinite, galena, gold, malachite, metazeunerite, silver, zeunerite.

Chief Consolidated mine - cerargyrite, cerussite, enargite, galena, huntite on 1800 level, jasper, proustite, pyrrargyrite, pyrite, silver, smithsonite, sphalerite.

Colorado mine - calamine, cerussite, galena, geocronite, smithsonite, sphalerite.

Dragon mine - chrysocolla, galena, halloysite, limonite.

Eagle and Blue Bell mine - anglesite, bismite, bismutite, bismoclite, cerargyrite, cerussite, daubreeite, enargite, galena, jarosite, jasper, smithsonite.

Emerald mine - bismuth, calcite, hematite, limonite, psilomelane, wad.

Eureka Hill mine - anglesite, barite, brochantite, carphosiderite, cerussite, enargite, galena, gold, leadhillite, minetite, phosgenite, pyromorphite, sphalerite.

Gemini mine - anglesite, aurichalcite, azurite, calamine, cerargyrite, cerussite, galena, heulandite, hydrozincite, jasper, malachite, marcasite, pearceite, silver, smithsonite.

Godiva mine - anglesite, cerargyrite, cerussite, galena, minium, smithsonite.

Gold Chain mine - barite, conichalcite, enargite, malachite, olivenite, pharmacosiderite, tyrolite.

Grand Central mine - barite, cerargyrite, chalcocite, chalcopyrite, connellite, covellite, enargite, galena, jasper, limonite, silver.

Homestake and Shoebridge mines - enargite, galena.

Humbug mine - anglesite, cerussite, galena, stephanite.

Iron mine - cerargyrite, hematite, limonite.

Iron Blossom mine - adamite, aragonite, aurichalite, azurite, barite, calcite, covellite, enargite, galena, jasper, malachite, pyrite, sphalerite.

Lower Mammoth mine - enargite, galena, pyrite, smithsonite, sphalerite, tetrahedrite.

New Bullion mine - smithsonite.

Mammoth mine - argentite, arsenobismite, barite, bismuthinite, borickite, brochantite, cerargyrite, cerussite, chalcophyllite, clinoclase, enargite, erinite, famatinite, galena, gold, gypsum, lettsomite, olivenite, pharmacosiderite, pyromorphite, silver, tyrolite.

May Day mine - aurichalcite, calamine, galena, gold, hydrozincite, smithsonite.

Mintintic mine - zunyite.

Ophonga mine - barite, enargite, olivenite.

Packard Peak - halloysite.

Scotia mine - bindheimite, jamesonite.

Sioux mine - azurite, dolomite, enargite, galena, malachite, quartz.

Sunbeam mine - anglesite, cerussite, limonite, malachite, pyrite.

Swansea mine - anglesite, arsenopyrite, barite, cerussite, enargite, galena, melaconite, melanterite, pyrite, silver, sphalerite, tenorite.

Uncle Sam mine - aurichalcite, smithsonite.

Victoria mine - ankerite, bismutite, calamine, enargite, galena, gold, jasper, manganite.

White Cloud mine - pyrolusite, wad.

Yankee mine - aurichalcite, smithsonite.

TROUT CREEK (JOHNSON PEAK) DISTRICT (E. side Deep Creek Mountains) - fluorite, gold, pyrrhotite, sphalerite.

Apex mine - beryl, quartz, scheelite.

Bacon mine - andalusite, scheelite.

Trout Creek mine - scheelite.

WEST TINTIC DISTRICT (West Tintic Mountains) - arsenopyrite, bismuthinite, enstatite, galena, idocrase, magnetite, molybdenite, pyrite, scheelite, sphene, talc, tremolite, wollastonite.

88 mine - anglesite, barite, cerussite, chrysocolla, fluorite, galena.

Iron King mine - andradite, clinzoisite, epidote, grossularite, magnetite, pyrite, scheelite, specularite.

Lockheed Iron property - chalcopyrite, epidote, hematite, magnetite, malachite, pyrite.

1903 mine - barite, calamine, cerussite, chalcopyrite, chrysocolla, fluorite, galena, limonite, malachite, pyrite, sphalerite.

Pyramid mine - barite, galena, limonite, malachite.

Scotia (Old Scotia) mine - anglesite, arsenopyrite, azurite, barite, bindheimite, cerussite, chalcopyrite, chrysocolla, conicalcrite, galena, gold, hematite, jamesonite, limonite, linarite, malachite, olivenite, pharmacosiderite, pyrite, scorodite, sphalerite.

Tintic Western (Desert Tungsten) mine actinolite, andradite, azurite, calcite, chalcopyrite, chlorite, chrysocolla, clinzoisite, epidote, grossularite, limonite, magnetite, malachite, pyrite, quartz, scheelite, specularite, stibnite.

War Eagle claims - anglesite, aurichalcite, barite, bindheimite, calcite, cerussite, chalcodony, chalcopyrite, chrysocolla, galena, gold, hematite, limonite, malachite, pyrite, specularite, wad.

Kane County

ALUM HILLS - alunite.

BULLOCH CLAIMS - autunite, carnotite, torbernite, tyuyamunite.

CANNONVILLE - anhydrite, gypsum.

COLORADO RIVER DISTRICT - placer gold, magnetite.

GLENDALE - anhydrite, gypsum.

JOHNSON CREEK - anhydrite, gypsum.

KAIBAB FAULT (W. side) - allophane, ammoniojarosite, ammonia alum.

KAIPAROWITS PLATEAU (S. part) - ilmenite, monazite, zircon.

KANAB (near) - silicified wood.

KANAB CREEK - anhydrite, gypsum.

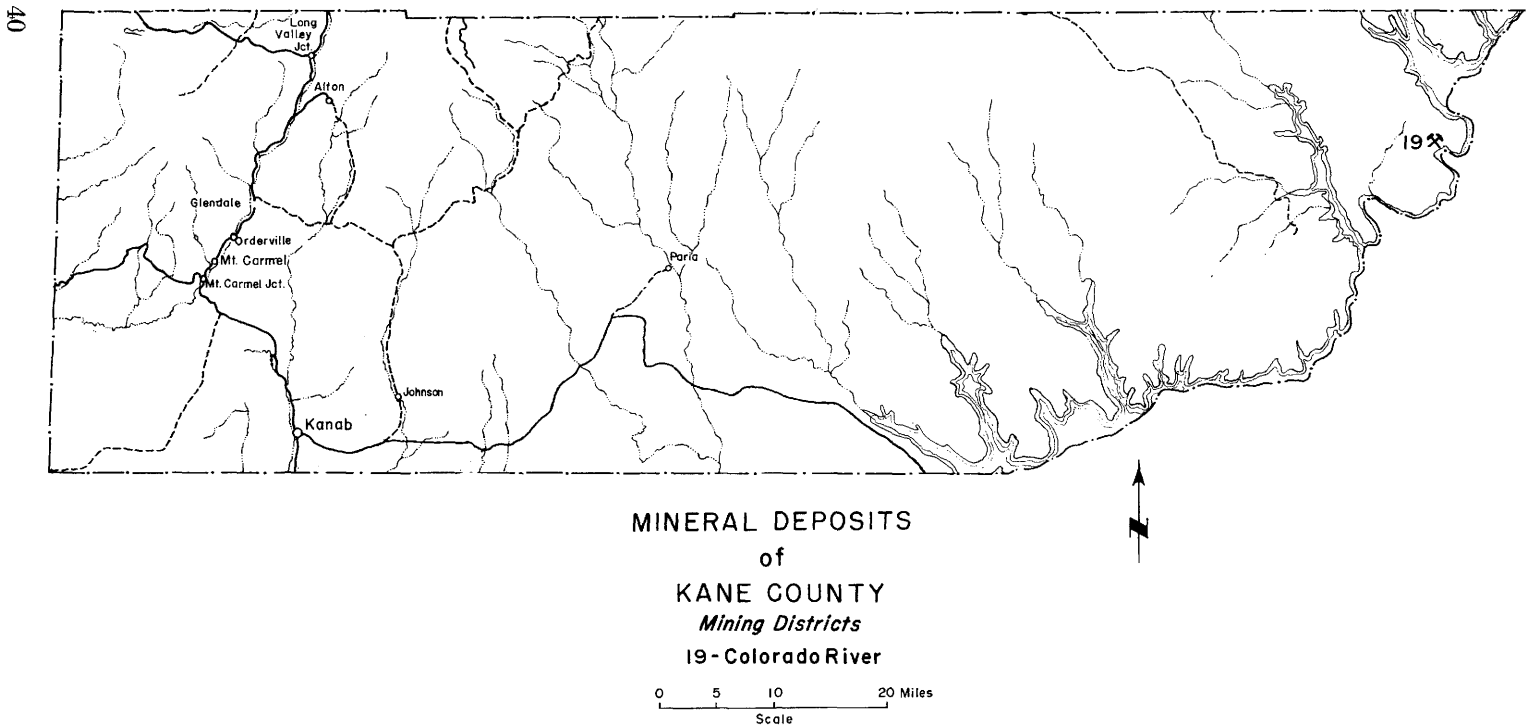


Figure 14.

KIMBALL VALLEY - anhydrite, gypsum.

KITCHEN CÓRRAL CANYON - barite, calcite, chalcedony, limonite, pyro-lusite.

ORDERVILLE - agate, anhydrite, cal-cite geodes, gypsum, silicified wood.

PARIA (PAHREAH) (9 mi. S.) - alumin-ite, autunite, anhydrite, carnotite, gypsum, uranospinite.

PARIA (PAHREAH) MINING COMPANY - azurite, cuprite, malachite.

VIRGIN RIVER - torbernite.

Millard County

ANTELOPE SPRINGS - limonite, pyrite altered to limonite.

BLACK ROCK (5 mi. N.) - red and black obsidian; flowering or snowflake obsi-dian.

CLEAR LAKE RAILROAD STATION - straw yellow labradorite in weathered ande-site.

CRICKET MOUNTAINS - dolomite.

DETROIT (DRUM, JOY) DISTRICT (Little Drum Mountains) (See also Juab County).

Almond, Blue Bell, Major Drum mines - azurite, bismutite, cuprite, chalce-dony, chalcopyrite, malachite, pyrite, pyrolusite, rhodochrosite, wad.

Black Diamond, Guy (Black Jack), Last Chance, Martha, Silica Plug mines - jasper, manganite, pyrolusite, wad.

DRUM DISTRICT (See DETROIT DIS-TRICT).

FILLMORE (near) - anhydrite, gypsite, gypsum, niter.

GORDON DISTRICT (Pavant Mountains). Black, Philadelphia, Sulphur King mines - gypsum, sulfur.

Cove Creek - gypsum, hematite, mar-casite, pyrite, sulfur.

Excelsior, Mariposa, New York, Prince Albert, Queen Victoria mines gypsum, hematite, sulfur.

Rain Bow mine - fluorite.

Victor Conqueror mine - marcasite, pyrite, sulfur.

HOUSE RANGE.

Amasa Valley - albite, biotite, diop-side, garnet, gold, idocrase, molyb-denite, pyrite, scheelite, tourmaline, tremolite, wollastonite.

Horseshoe, Mt. Baldy, New Klondike, Pine Peak, Pinke Peak, South, South Pit, Sidesprings mines - diopside, gar-net, idocrase, scheelite.

Notch Peak (intrusive and contact) albite, biotite, diopside, garnet, gold, idocrase, microcline, molyb-denite, oligoclase, orthoclase, py-rite, scheelite, tremolite, wollaston-ite.

Painter Springs - garnet, idocrase, microcline, orthoclase, muscovite, pyrite, scheelite.

Rainbow mine - diopside, fluorite, garnet, idocrase, scheelite.

JOYDISTRICT (See DETROIT DISTRICT).

KANOSH (near) - anhydrite, gypsite, gypsum.

LEAMINGTON (OAK CITY) DISTRICT (Canyon Range).

Arbroath mine - anglesite, cerussite, galena.

Fool Creek Canyon - azurite, limonite, malachite.

Leamington Mining Company - angle-site, cerussite, galena.

Wood Canyon - galena, sphalerite.

Yellowstone mine - anglesite, aragon-ite, cerussite, galena, gold.

OAK CITY DISTRICT (See LEAMINGTON DISTRICT).

SAW BACK DISTRICT (W. of Sevier Lake) - chalcopyrite, galena, garnet, molybdenite.

SEVIER LAKE (S. end) - corundum in angular masses in alluvium.

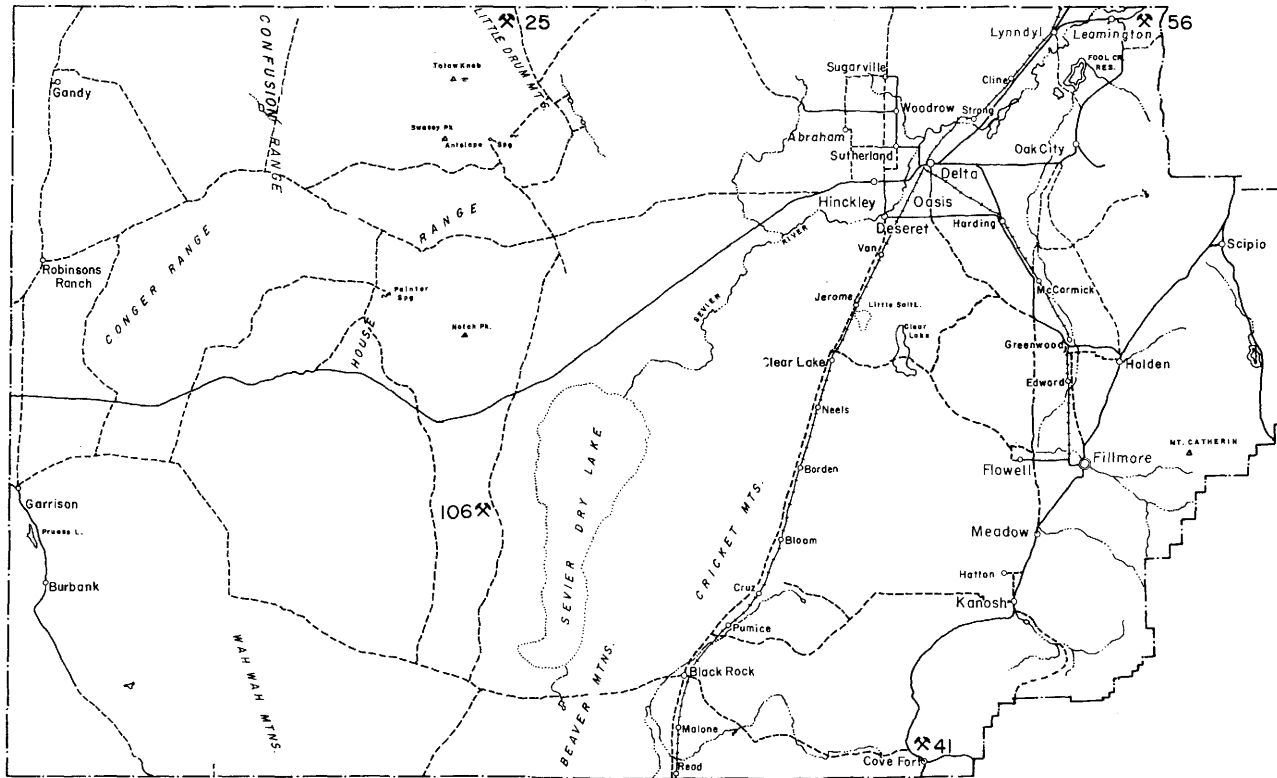
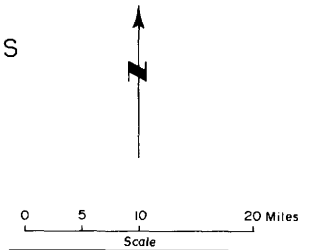


Figure 15.

MINERAL DEPOSITS
of
MILLARD COUNTY
Mining Districts
56-Leamington
25-Detroit
106-Saw Back
41-Cove Fork



SOUTH PAVANT RANGE.

Cove Fort (N.E.) - fluorite, sulfur.
Dog Valley - chalcedony, fluorite.

TABERNAACLE MOUNTAIN - guano.

TWIN PEAKS - andesine, apatite, augite, biotite, magnetite, martite.
Black Diamond Iron prospect - hematite, magnetite, martite.

WHITE MOUNTAIN - red and black obsidian, black obsidian.

Morgan County

ARGENTA DISTRICT (Wasatch Mountains).

Carbonate Hill, Carbonate Gem mines - anglesite, barite, cerussite, galena, jarosite, limonite, pyrite, smithsonite.

ARTHUR FORK - biotite, monazite, molybdenite, uraninite, xenotime.

HARDSCRABBLE (MILL CREEK) DISTRICT (Wasatch Mountains).

Norway group - hematite, limonite.

MILL CREEK DISTRICT (See Hardscrabble District).

MORGAN DISTRICT (Wasatch Mountains).

Chicago-Utah, Iron King, Morgan Consolidated, Red Eagle mines - azurite, gold, malachite, marcasite, pyrite.

Morgan Crescent mine - azurite, chalcocopyrite, chrysocolla, copper, cuprite, gold, malachite, tenorite.

ROUND VALLEY.

Copper Mountain mine - azurite, malachite.

STRAWBERRY MINE (near Gateway) - gold, silver.

Piute County

ANTELOPE RANGE - limonite, pyrolusite, torbernite.

CIRCLEVILLE MOUNTAIN - stellerite.

DRY CANYON - pyrolusite.

GOLD MOUNTAIN (KIMBERLY) DISTRICT (Deer Creek, Tushar Mountains) alunite, barite, garnet, gypsum.

Annie Laurie mine - argentite, cerargyrite, galena, gold, limonite, pyrite, sphalerite.

Sevier mine - adularia, argentite, amethyst, azurite, cerargyrite, gold, limonite, pyrite.

KIMBERLY DISTRICT (See GOLD MOUNTAIN DISTRICT).

MARYSVALE DISTRICT (Marysville Uranium Area) - adularia, allophane, alum, alunite, albite, biotite, calcite, cobaltomeneite, clinocllore, chlorite, cristobalite, dickite, halite, halloysite, manganocalcite, montmorillonite, nontronite, obsidian.

Alum King mine - potash alum.

Al-Kee-Mee prospect - alunite, natroalunite.

Big Chief, Big Star, Manning Creek, Mary's Lamb, Marysville Peak, Pittsburg, White Hills, North Star, Winkelman mines - alunite.

Blackbird, Blue Miami Moon no. 1 mines - pyrolusite.

Buddy mine - autunite, jordisite, lithiophorite, pitchblende.

Bullion Monarch (Farmer John) mine - autunite, barite, fluorite, ilsemannite, jadisite, johannite, lithiophorite, metatorbernite, schroekinggerite, torbernite, pitchblende, uraninite, uranophane, uranopillite, zippeite.

Copper Butte mine - autunite, torbernite, uranophane.

Copper Cap mine - jarosite.

East Slope no. 2 prospect - alunite, autunite, hematite, metatorbernite, schroekinggerite, uranophane.

Freedom Lease, V.C.A. mine - autunite, pitchblende.

Freedom no. 1 mine - autunite, fluorite, ilsemannite, jarosite, jordisite, lithiophorite, pitchblende, torbernite, schroekinggerite, umohoite.

Freedom no. 2 mine - autunite, beta-uranotile, fluellite, fluorite, gearksutite, ilsemannite, jordisite, lithio-

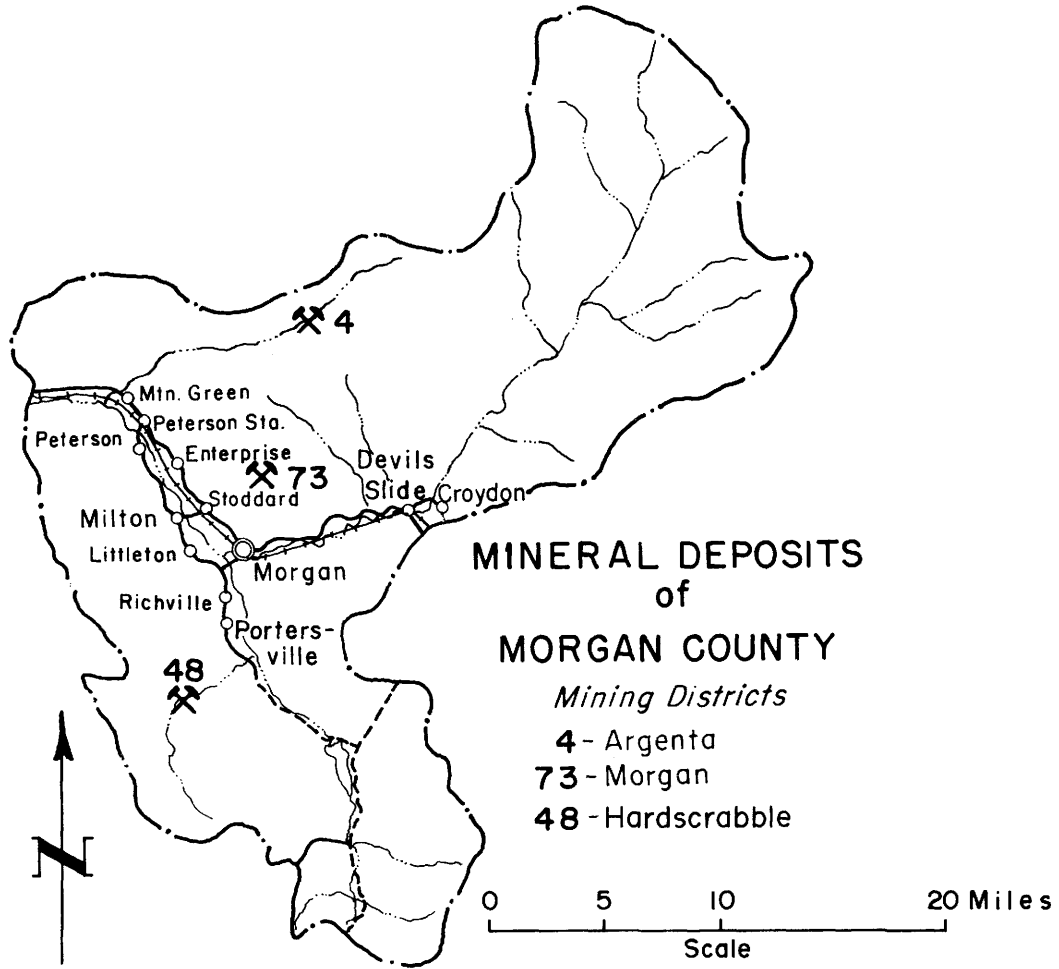
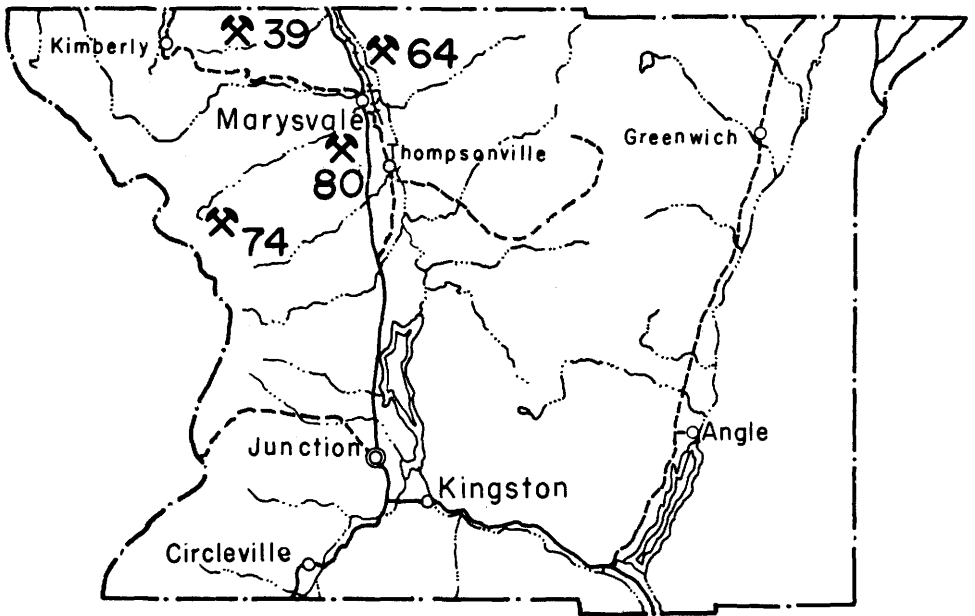


Figure 16.



MINERAL DEPOSITS

of

PIUTE COUNTY

Mining Districts

39- Gold Mount

80- Ohio

74- Mt. Baldy

64- Marysville



0 5 10 20 Miles

Scale

Figure 17.

phorite, meta-autunite, metatorbernite, phosphuranylite, sabugalite, schroekingerite, sklodowskite, torbernite, umohoite, uraninite, uranophane, zeuermite, zippeite.

J. & L. alunite mine - alunite, hyalite, opal, phosphuranylite.

LaVita prospect - fluorite, goethite, hematite, metatorbernite, meta-autunite, molybdenite, pyrite, rauvite, tyuyamunite.

Papsy's Hope prospect - meta-autunite, uranophane.

Prospector no. 1 mine - autunite, fluellite, fluorite, ilsemannite, jordisite, johannite, lithiophorite, pitchblende, torbernite, schroekingerite, uraninite, uranophane, uranoplite, zippeite.

Prospector no. 3 mine - autunite, lithiophorite, pitchblende, torbernite, schroekingerite.

Quicksilver mine - amethyst, argentine, cinnabar, ilsemannite, metacinnabar, mordenite, quartz, selenite, tiemannite.

Silica Hills - alunite, celadonite, chabazite, goethite, jarosite, opal, natrolite, thomsonite.

White Horse deposit - alunite, kaolinite.

Yellow Jacket mine - alunite, jarosite.

MOUNT BALDY DISTRICT (Cottonwood Creek, Tushar Mountains).

Bradburn, Close In, Mineral Products, L and N, Sunshine mines - alunite.

Clyde mine - chalcopyrite, malachite, pyrite, sphalerite, tetrahedrite, wurtzite.

Crystal mine - alunite, galena.

Deer Trail mine - anatase, anglesite, cerussite, fluorite, galena, gold, jarosite, limonite, leuchtenbergite, malachite, manganocalcite, octahedrite, pitchblende, plumbojarosite, pyrite, pyrolusite, quartz, specularite, sphalerite, zircon.

Green Eyed Monster mine - limonite, pyrite.

Lucky Boy mine - barite, cinnabar, onofrite, tellurium mineralization, tiemannite.

Pluto mine - argentite, cerargyrite,

cerussite, galena, gold, tellurium mineralization, wulfenite.

MOUNT BELKNAP - pyrolusite.

OHIO DISTRICT (Bullion Canyon, Tushar Mountains).

Bully Boy and Webster mines - azurite, barite, cerussite, chalcopyrite, fluorite, galena, gold, hydrozincite, limonite, pyrite, pyrolusite, quartz, selenium mineralization, sphalerite, sylvanite, tetrahedrite, wulfenite.

Cascade mine - azurite, cerussite, chalcopyrite, galena, gold, malachite, pyrite, tetrahedrite, sphalerite.

Copper Belt, Iris, Shamrock mines - azurite, cerussite, chalcopyrite, galena, malachite, pyrite, tetrahedrite.

Dalton mine - azurite, cerussite, gold, malachite, pyrite, rhodochrosite, tellurium mineralization, tetrahedrite.

Gilbert claims - pyrolusite.

Wedge mine - adularia, azurite, gold, malachite.

SEVIER CANYON - alunite, anhydrite, gypsum, limonite.

TUSHAR RANGE.

Dillon mine - rhodochrosite.

Rich County

BEAR RIVER RANGE.

Lakeview claims - calcite, jasper, pyrolusite, rhodochrosite.

CRAWFORD MOUNTAINS - phosphorite, tyuyamunite.

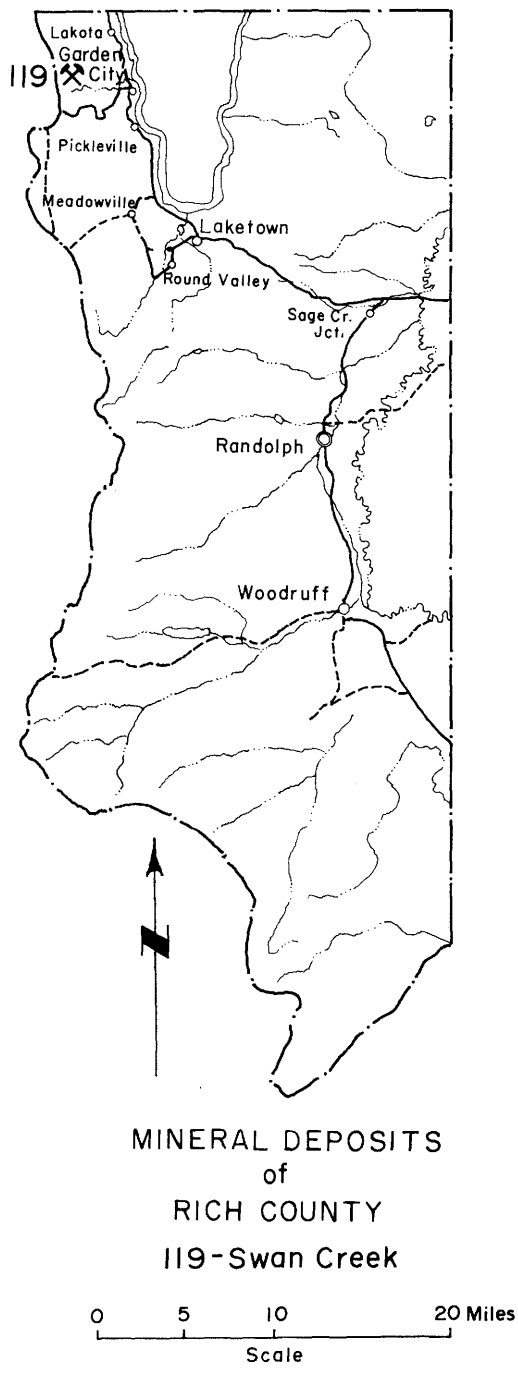
GARDEN CITY DISTRICT (See SWAN CREEK DISTRICT).

LAKETOWN CANYON - phosphorite.

SWAN CREEK (GARDEN CITY) DISTRICT (Bear River Range).

Victoria prospect - azurite, barite, cerussite, galena, tennantite, wulfenite.

WOODRUFF CREEK - phosphorite.



MINERAL DEPOSITS
 of
 RICH COUNTY
 119-Swan Creek

Figure 18.

Salt Lake County

ADAMS DISTRICT (See HOT SPRINGS DISTRICT).

ALTA DISTRICT (See LITTLE COTTONWOOD DISTRICT).

ALTA STOCK - allanite, hypersthene.

ALUM POINT - apjohnite, bushmanite, pickeringite.

BIG COTTONWOOD CANYON (near mouth) - large orthoclase crystals.

BIG COTTONWOOD DISTRICT (Wasatch Mountains) - actinolite, andradite, anglesite, asbestos, barite, dufrenoyite, orthoclase.

Alta Tunnel and Transportation Company mine - cerussite, galena, malachite, smithsonite.

American Metals mine - galena, pyrite, quartz, sphalerite.

Carbonate mine - argentite, aurichalcite, cerussite, galena, limonite, malachite, pyrolusite, smithsonite.
Cardiff mine - cerussite, covellite, galena, limonite, malachite, plumbogjarosite, pyrite, pyrolusite, rhodochrosite, smithsonite, sphalerite, tetrahedrite.

Confidence mine - anorthite.

Copper King mine - cuprite, molybdenite.

Kennebec mine - cerussite, galena.

Great Western mine - ludwigite.

Kentucky - Utah mine - chalcopyrite, magnetite, pyrite.

Lulu mine - chalcopyrite, galena, siderite.

Maxfield mine - alaskaite, anorthite, dyscrasite, galena, pyrite, sphalerite, tetrahedrite, wollastonite.

Mountain Lake mine - bornite, brucite, chalcocite, chalcopyrite, diopside, epidote, forsterite, garnet, hydromagnesite, magnesioludwigite, magnetite, malachite, muscovite, periclase, scheelite, szaibelyite, xanthophyllite.

Mountain View mine - ludwigite.

New State mine - gold.

Prince of Wales mine - cerussite, galena.

Steamboat mine - chalcocite, forsterite.

Tar Baby mine - galena.

Woodlawn mine - cerussite, galena, malachite, pyrolusite, wulfenite.

BINGHAM (WEST MOUNTAIN) DISTRICT (Oquirrh Mountains) - actinolite, bismuth, bismutite, boumonite, calcite, garnet, linarite, magnetite, massicot, mercury, pyrolusite, pyrrhotite, rutile, seligmannite, siderotil, tennantite.

Bingham Copper (Kennecott, Utah Copper) Pit - allophane, apophyllite, bornite, chalcantinite, chalcopyrite, chlorite, digenite, enargite, foshagite, gold, gyrolite, kaolinite, illite, malachite, molybdenite, nontronite, okenite, palladium, platinum, pyrite, quartz, sericite, selenium mineralization, stilbite, tellurium mineralization, thauamasite, thomsonite, tobermorite, turquoise, vivianite, wavelite.

Boston Consolidated, Burning Moscow, Last Chance, Nast mines - cerussite, chalcocite, chalcopyrite, galena, gold, pyrite, sphalerite.

Broad Gauge mine - cerussite, chalcantinite, gold, hematite, pyrite.

Brooklyn, Yosemite mines - cerussite, chalcopyrite, galena, gold, pyrite, sphalerite.

Butterfield mine - azurite, cerussite, chalcopyrite, galena, gold, malachite, pyrite, rhodochrosite, sphalerite.

Butterfield Canyon - orpiment, realgar.
Caledonia, Montezuma, Red Wing mines - cerussite, galena, gold, pyrite.
Colorado mine - chalcopyrite, galena, pyrite.

Columbia mine - azurite, chalcocite, malachite, pyrite.

Commercial mine - azurite, chalcocite, chalcopyrite, copper, enargite, gold, malachite, pyrite, tellurium mineralization.

Conger, Fortune mine - chalcocite, chalcopyrite, galena, pyrite.

Copper Center Tunnel - bornite, chalcopyrite, pyrite.

Dalton, Lark group - azurite, cerussite, chalcopyrite, galena, gold,

pyrite, silver, sphalerite.
Eagle Bird lode - arsenopyrite, barite, galena, rhodochrosite, sphalerite.
Eighty Nine mine - tetrahedrite.
Frisco mine - chalcopyrite, galena, pyrite, sphalerite.
Galena, Old Jordan mines - anglesite, azurite, bornite, cerussite, chalcantinite, chalcocite, chalcopyrite, cuprite, enargite, galena, gold, goslarite, limonite, malachite, opal, pisanite, pyrite, quartz, sphalerite, tenorite, tetrahedrite, silver.
Highland Boy, Yampa mines - azurite, bornite, calaverite, chalcantinite, chalcocite, chalcopyrite, copper, covellite, cuprite, enargite, galena, leverierite, limonite, malachite, marcasite, pyrite, racewinite, siderite, specularite, sphalerite.
Jersey Blue mine - cerussite, galena.
Lucky Boy mine - barite, luckite, melanterite, mallardite, rhodochrosite.
Midland mine - azurite, cerussite, galena, malachite, marcasite.
Minnie mine - chalcocite, pyrite.
Neptune mine - galena, pyrite, silver, sphalerite.
Northern Chief lode - covellite.
Old Telegraph mine - azurite, cerussite, chalcocite, chalcopyrite, galena, gold, malachite.
Parnell mine - gold.
Petro mine - cerussite, galena.
Phoenix mine - chalcocite, galena, pyrite.
Queen lode - argentite, galena.
Queen mine - argentite, barite, chalcopyrite, galena, rhodochrosite, sphalerite.
Silver Shield mine - chalcopyrite, galena, freibergite, tetrahedrite.
Tiewaukee mine - azurite, binnite, galena, malachite, pyargyrite, pyrite, silver, sphalerite.
U.S. and Lark mine - azurite, cerussite, chalcopyrite, galena, gold, malachite, montmorillonite, pyrite, quartz, silver, sphalerite, talc.
Winnamuck, Dixon mines - cerargyrite, chalcocite, chalcopyrite, cubanite, dufrenoyite, galena, gold, goslarite, pyrite, pyargyrite, rhodochrosite, sphalerite, tetrahedrite.
York mine - azurite, chalcopyrite, galena, malachite.

CAMP WILLIAMS

Evans lime quarry - calcite, pyrolusite.

DRY CANYON - phosphorite

GREAT SALT LAKE (shores) - aragonite, bloedite, glauberite, gypsum, halite, mirabilite, thenardite.

HOT SPRINGS (ADAMS) DISTRICT (Wasatch Mountains) - cerussite, galena.

LAKE BONNEVILLE SHORELINE - thino-lite as cement of gravels.

LITTLE COTTONWOOD (ALTA) DISTRICT (Wasatch Mountains) - allanite, chabazite, ferrimolybdate, heulandite, mesolite, prehnite, orthoclase, stilbite, periclase, zoisite.

Albion mine - argentite, barite, bornonite, cerussite, chalcopyrite, galena, pyrite.

Alta mine - actinolite, biotite, diopside, forsterite, garnet, tremolite, vesuvianite.

Alta Consolidated mine - cerussite, chalcopyrite, limonite, magnetite, pyrite, wulfenite.

Alta - Gladstone vein no. 5 - molybdenite, pyrite.

Bay State mine - stibnite.

Cabin mine - cerussite, galena, limonite, plumbojarosite.

Centennial Alta mine - beaverite, enargite, tyrolite, wulfenite.

City Rocks mine - wulfenite.

Columbus Consolidated and Wasatch Drainage Tunnel mine - galena, pyrite, sphalerite, tetrahedrite.

Columbus-Rexal mine - bornite, chalcopyrite, enargite, galena, pyrite, siderite, tetrahedrite.

Dwyer claims - cerussite, chalcopyrite, galena, gold, pyrite, smithsonite, sphalerite.

Emma mine - argentite, anglesite, azurite, cerussite, calamine, chrysocolla, cervantite, galena, limonite, malachite, massicot, pyrite, pyrolusite, siderite, smithsonite, stephanite, sphalerite, stolzite, tetrahedrite, tungstenite, wulfenite, wolframite.

Flagstaff mine - barite, cerussite, galena, limonite, plumbojarosite, wulfenite.

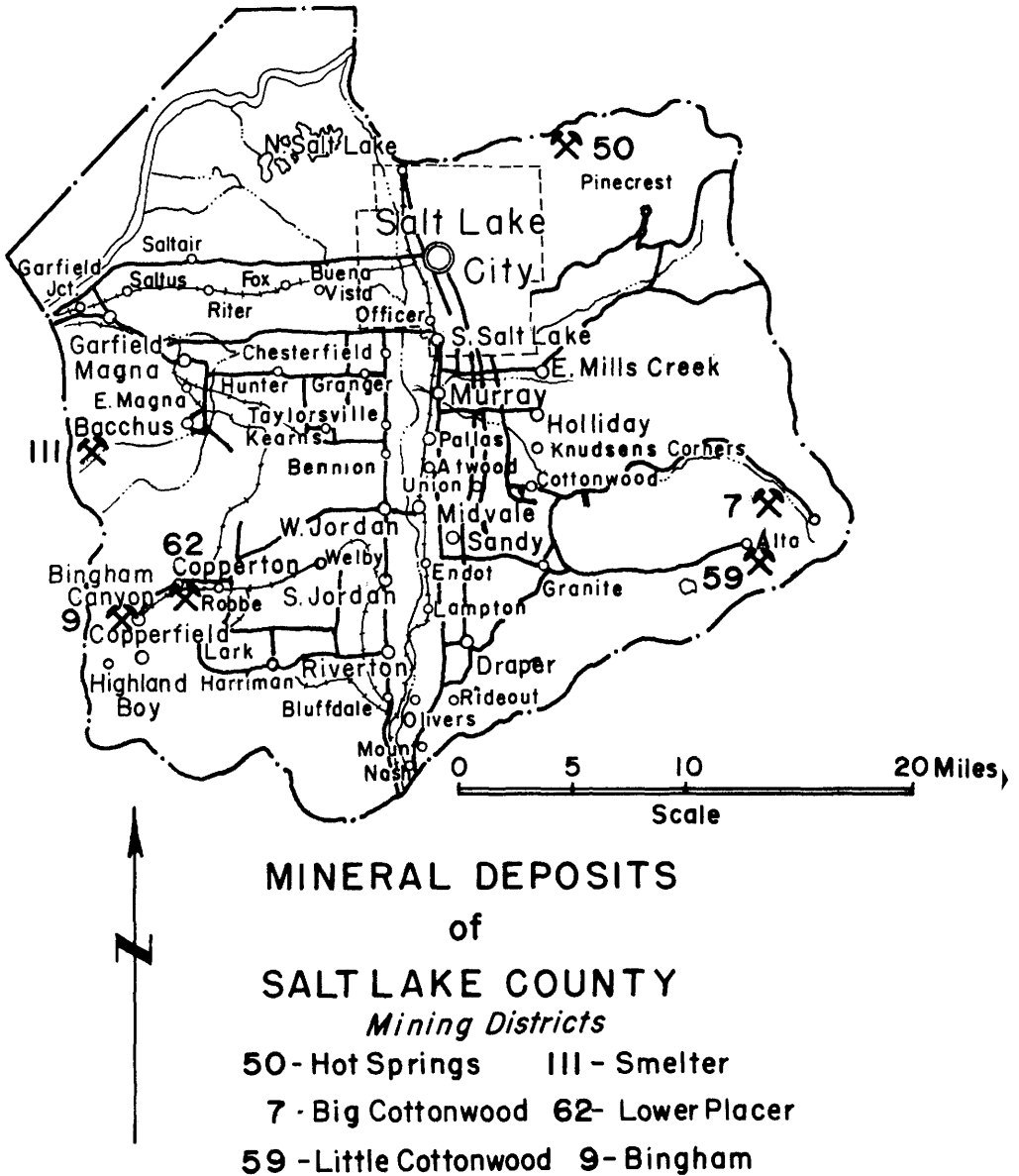


Figure 19.

Grizzly mine - linarite.

Little Emma mine - anglesite, calamine, cerussite, cervantite, chrysocolla, galena, malachite, pyrite, pyrolusite, sphalerite, stephanite, tungstenite, wulfenite.

Michigan-Utah (Continental Alta) mine - anglesite, cerussite, galena, limonite, ludwigite, magnetite, pyrolusite, rhodochrosite, wulfenite.

Native Copper mine - chalcocopyrite, copper.

Oxford, Geneva mines - caledonite, chalcocopyrite, dufernoysite.

Patsey Marley mine - epidote.

Peruvian Consolidated mine - galena, pyrite, tetrahedrite.

South Hecla mine - (includes Dwyer and Sells Tunnels) - aikinite, bismite, bismuth, bismuthinite, bornite, chalcocopyrite, enargite, galena, garnet, ludwigite, magnetite, plumbojarosite, pyrite, scheelite, smithsonite, sphalerite, tetrahedrite, wollastonite.

Superior mine - chalcocopyrite, galena, pyrite, sphalerite, tetrahedrite.

Third Chance mine - molybdenite.

West Toledo mine - cerussite.

LITTLE COTTONWOOD STOCK (Wasatch Mountains) - apatite, allanite, biotite, hornblende, magnetite, microcline, molybdenite, orthoclase, plagioclase, pyrite, quartz, sphene, sericite, scheelite, zircon.

LOWER PLACER DISTRICT (Oquirrh Mountains) - gold.

S MELTER DISTRICT (Oquirrh Mountains) - limonite, malachite.

WEST MOUNTAIN DISTRICT (See BINGHAM DISTRICT).

San Juan County

ABE DAY'S VANADIUM CLAIM - carnotite.

BIG INDIAN DISTRICT (Big Indian Wash-Lisbon Valley Area).

Big Buck mine - becquerelite, coffinite, doloresite, montroseite, uraninite, vanadium hydromica.

Big Indian Copper mine - azurite, chalcocite, chalcocopyrite, covellite, cuprite, malachite, pyrite.

Cal uranium mine - coffinite, carnotite, doloresite, montroseite, paramontroseite, uraninite, vanadium hydromica.

Homestake mine - coffinite, doloresite, montroseite, paramontroseite, uraninite, vanadium hydromica.

La Sal mine - coffinite, doloresite, montroseite, uraninite, vanadium hydromica.

Mi Vida (Utex) mine - bayleyite, carnotite, chalcocite, coffinite, clausenthalite, doloresite, fluorite, galena, greenochite, liebigite, montroseite, paramontroseite, pascoite, sphalerite, tyuyamunite, pitchblende, uraninite, vanoxite, vanadium hydromica.

Radon mine - carnotite, coffinite, doloresite, montroseite, tyuyamunite, uraninite, vanadium hydromica, wheelite.

Rattlesnake mine - carnotite, coffinite, doloresite, montroseite, uraninite, vanadium hydromica.

BLUFF - placer gold in sands of San Juan River.

BLUE JAY MINE - boltwoodite.

BLUE MOUNTAIN DISTRICT (See MONTICELLO DISTRICT).

BROWNS HOLE AREA - carnotite.

BULL CANYON - carnotite.

"C" GROUP CLAIMS - rutherfordine.

CANE SPRINGS PASS,
Bridger Jack Flat - carnotite.

CANE WASH.

Atomic King no. 2 mine - andersonite.

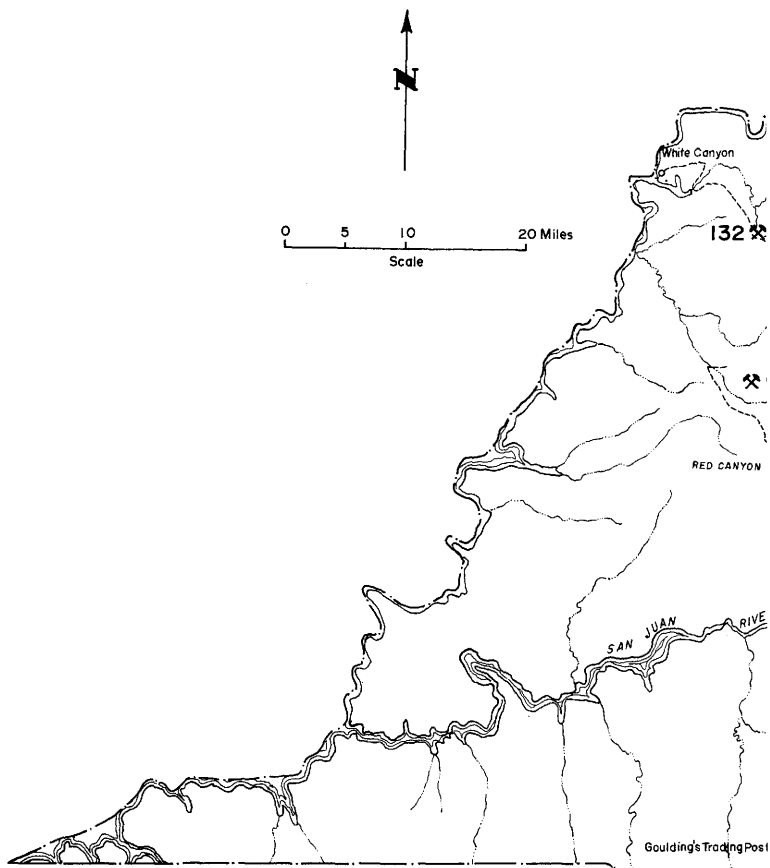
CHESS RIDGE - carnotite.

CHINLE WASH - pyrope.

MINERAL DEPOSITS
of
SAN JUAN COUNTY

Mining Districts

- | | |
|---------------------|---------------------------|
| 71 - Monticello | 94 - Red Canyon |
| 72 - Monument | 8 - Big Indian |
| 132 - White Canyon | 21 - Cottonwood
Canyon |
| 84 - Paradox Valley | |



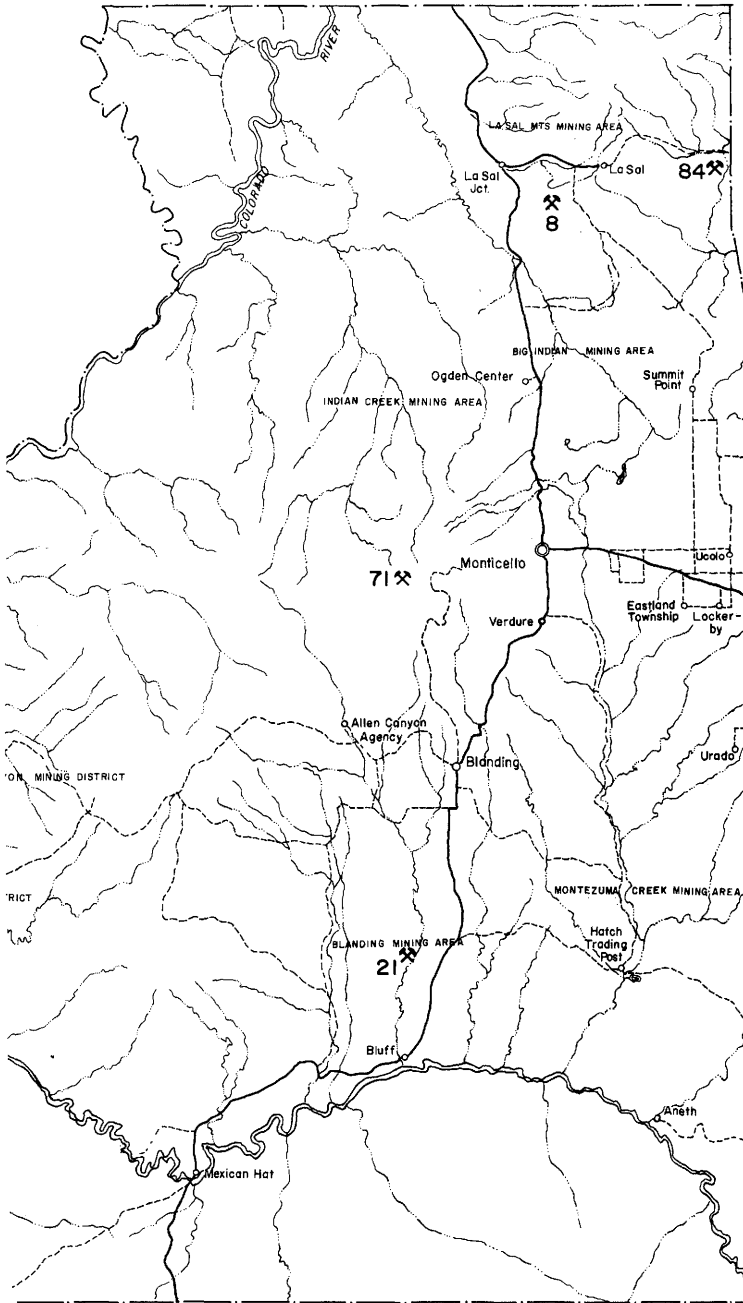


Figure 20.

COLORADO RIVER - chromite, gold in placers.

COMB RIDGE (near) - pyrope in volcanic vents.

COTTONWOOD CANYON DISTRICT.
Basin, Big Hole, Birthday Shale, Blue Bird, East Bank, Found no. 2, Hang-over nos. 1-2, Lost, Ridge nos. 1-2 claims - carnotite.

DRY VALLEY - carnotite.

EAST CANYON - carnotite, tyuyamunite.

ELK RIDGE.
Coral claim - bayleyite, carnotite, swartzite.

GOLDEN QUEEN MINE - gold.

GYPSUM CREEK - anhydrite, gypsum.

INDIAN CREEK - carnotite.

JULIA CLAIMS - boltwoodite.

LA SAL MOUNTAINS - amethyst, azurite, bomite, carnotite, chalcocite, chrysocolla, covellite, limonite, malachite, manganite, molybdenite, torbernite.
Middle Mountain, Brumley Ridge aegirite, apatite, augite, magnetite, noselite, orthoclase, sodalite, sphene.
Point Lookout Placer - gold.

LISBON VALLEY - tyuyamunite.
Climax nos. 1-2 claims - azurite, carnotite, cuprite, malachite.
Lisbon Copper mine - azurite, cuprite, malachite.

MOAB VALLEY - anhydrite, carnallite, gypsum, halite, polyhalite, sylvite.

MONTEZUMA CANYON - carnotite.

MONTICELLO (BLUE MOUNTAIN) DISTRICT (Abajo Mountains) - anhydrite, carnotite, gypsum.
Alma mine - pyrite.
Blue Bird, Danish Girl, Gold Queen mines - chalcocopyrite, galena, gold,

pyrite, sphalerite.
Brushy Basin, Spring Creek - metarosite.

Copper Queen mine - azurite, bornite, chalcocite, chalcopyrite, chrysocolla, covellite, malachite, pyrite.

Dream mine - chalcocopyrite, galena, gold, limonite, pyrite, sphalerite.
Duckett mine - calcite, gold, limonite, pyrite.

Harts Draw, Lakes claim, Robertson Pasture, Shay Mountain, Shay Road, Sunshine mining claim properties metatyuyamunite.

Log Cabin claim - gold.
Tuffy Copper mine - azurite, chalcocite, malachite, pyrolusite.

MONUMENT VALLEY (MONUMENTAL) DISTRICT (Monument Valley).

Holiday Mesa - uraninite.
Mitten no. 1 mine - corvusite, navajosite, tyuyamunite, uraninite.

Oljeta mine - autunite, azurite, malachite, tyuyamunite, uraninite, uranophane.

Skyline mine - autunite, azurite, malachite, metatorbernite, torbernite, tyuyamunite, uraninite, uranophane.

Whirlwind mine - azurite, chalcocite, calciovolborthite, malachite, tyuyamunite, uranophane.

MONUMENTAL DISTRICT (See MONUMENT VALLEY DISTRICT).

MOSES ROCK - pyrope in dike rocks.

MULE EAR - pyrope in alluvium.

NAVAJO RESERVATION - carnotite, pyrope.

PARADOX BASIN - anhydrite, gypsum.

PARADOX VALLEY DISTRICT (Paradox Valley) - carnallite, kieserite, sylvite.
Grey Dawn mine - carnotite, coffinite, beta-uranotil, gummitite, hewettite, metatorbernite, phosphuranylite, roscoelite, torbernite, uraninite, uranophane.

Vanadium Queen mine - coffinite, montroseite, paramontroseite, melanoivanadate, selenium, simplotite, uraninite.

PETE NO. 6 CLAIM - boltwoodite.

PINTADO CANYON - pintadoite.

RED CANYON DISTRICT (Red Canyon) carnotite, chalcocite, covellite, malachite.

Frey no. 4 mine - becquerelite, cuprosklodowskite, johannite, jordisite, ilsemannite, schoepite, uraninite.

Jerry group - boltwoodite.

Markey no. 3 mine - alunite, chalcanthite, chalcopyrite, metatorbernite, metazeunerite, pyrite, torbernite, uraninite.

Posey mine - becquerelite, brochanite, cuprosklodowskite, johannite, phosphuranylite, pitchblende, schoepite, torbernite, uraninite, uranophane, zippeite.

SAN JUAN RIVER - anhydrite, chalcopyrite, copper, gold, gypsum, malachite.

SPANISH VALLEY ANTICLINE - carnotite.

WHITE CANYON DISTRICT (White Canyon).

Four Aces mine - azurite, carnotite, malachite.

Gonaway-North Point claims - phosphuranylite.

Happy Jack mine - allophane, antlerite, azurite, barite, becquerelite, bieberite, bornite, boltwoodite, brochantite, carnotite, chalcanthite, chalcedony, chalcocite, chalcopyrite, covellite, erythrite, galena, gersdorffite, goethite, greenochite, gypsum, hematite, hydromica, ilsemannite, jarosite, johannite, magnetite, malachite, marcasite, metatorbernite, metazeunerite, microcline, phosphuranylite, pitchblende, psilomelane, pyrite, quartz, sabugalite, schoepite, sepiolite, siderotil, smaltite, sphalerite, sulfur, torbernite, tourmaline, uraninite, uranopilite, uranophane, zippeite.

Hideout mine - bayleyite, becquerelite, carnotite, johannite, phosphuranylite, pitchblende, schoepite,

schroeckingerite, torbernite, uraninite, uranophane, zippeite.

Jomac mine - azurite, chalcanthite, chalcopyrite, hematite, jarosite, malachite, metazeunerite, pyrite.

Notch mine - uraninite.

White Canyon no. 1 mine - carnotite, uraninite, voglite.

White Fawn, Yellow Circle claims carnotite.

W.N. mine (Deer Flats) - alunite, boothite, chalcanthite, chalcopyrite, metatorbernite, metazeunerite, pyrite, torbernite.

Sanpete County

DRY CANYON (N. of) - galena, marcasite, pyrite, sphalerite, strontianite.

EPHRAIM (near) - limonite pseudomorphs after pyrite.

FAIRVIEW (near) - beidellite.

GUNNISON (S.E.) - anhydrite, gypsum, halite.

MANTI (near) - epsomite.

MAYFIELD (S.W.) - anhydrite, gypsum.

MT. PLEASANT (8 mi. N.W.) - jasper, pyrolusite.

R.A.J. PROSPECT - autunite, torbernite.

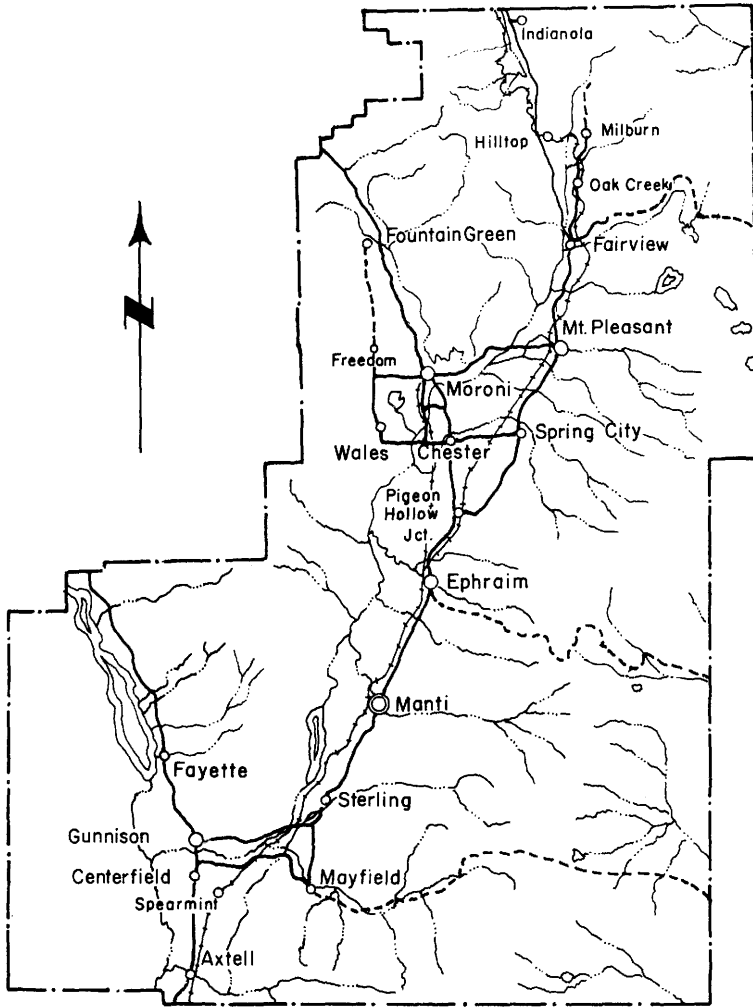
TWELVE MILE CANYON - anhydrite, gypsum, halite.

Sevier County

AURORA - bentonite, fuller's earth.

FISH LAKE - opal.

GLENWOOD (N.E.) - anhydrite, chalcedony geodes, gypsum, halite, selenite.



MINERAL DEPOSITS
of
SANPETE COUNTY

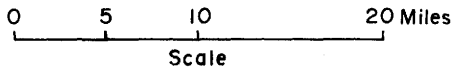
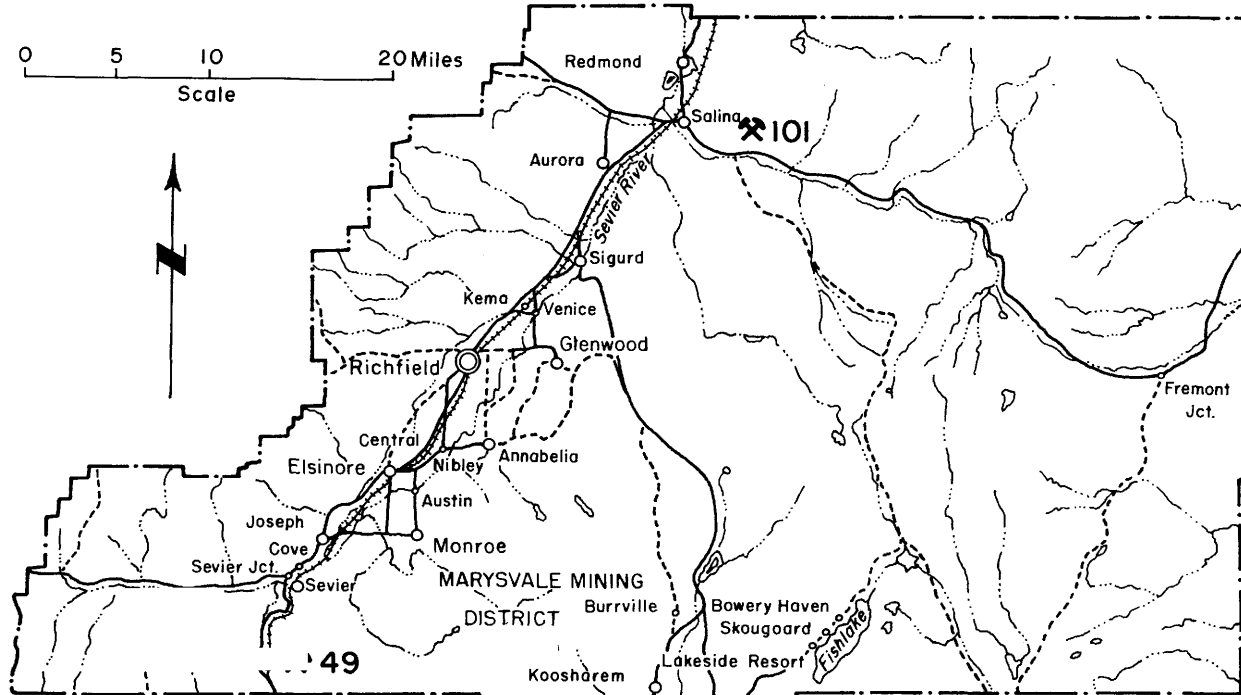


Figure 21.



**MINERAL DEPOSITS
of
SEVIER COUNTY**

MINING DIST.

49 - Henry

101 - Salina Creek

Figure 22.

HENRY DISTRICT (Antelope Range).

Georgia, Jumbo, Yellow Hornet properties - pyrolusite.

Iron Peaks property - hematite, limonite, magnetite, pyrolusite, thorium mineralization.

Krotke Iron (Iron Cap) mine - hematite, limonite, pyrolusite, thorium mineralization.

Noonday claims - pyrolusite.

Trinity prospect (Monzonite Hill) apatite, albite, antigorite, andradite, calcite, chalcantinite, chalcopyrite, chalcedony, diopside, epidote, grossularite, gypsum, galena, hematite, illite, kaolinite, microcline, muscovite, montmorillonite, magnetite, orthoclase, phlogophite, pyrolusite, penninite, prochlorite, quartz, rutile, serpentine, scapolite, specularite, tremolite, wollastonite.

PINE CANYON (S. of Koosharem).

Black Hawk claims - corundum, variety sapphire, hercynite.

REDMOND - bentonite, halite.

ROCK CANDY MOUNTAIN - alunite, illite, jarosite, limonite, montmorillonite, pyrite, selenite.

SALINA CREEK DISTRICT (Salina Creek).

Ball mine - azurite, chalcocite, chalcopyrite, galena, malachite, sphalerite.

Lead Hill mine - azurite, celestite, cerussite, chalcocite, galena, malachite, pyrite, sphalerite.

SEVIER CANYON - azurite, copalite, malachite.

SEVIER PLATEAU.

Black Beauty claims (Forshea Mountain) - pyrolusite, wad.

SIGURD - anhydrite, gypsum, halite, selenite.

Summit County

BEAVER CANYON - psilomelane, pyrolusite.

BONANZA FLAT - grossularite.

COALVILLE (near) - manganite, psilomelane, pyrolusite, sulfur.

FRANSON CANYON - phosphorite.

MARBLE (SILVERCREEK) DISTRICT - galena, pyrite.

PARK CITY (UINTA) DISTRICT (Wasatch Mountains) - barite, calcite, chabazite, chalcantinite, chlorite, epidote, goslarite, magnetite, massicot, mimetite, phosphorite, spinel, thau-masite.

American Flag mine - galena, tetrahedrite.

California mine - galena, jamesonite, pyrite, sphalerite.

Comstock mine - anglesite, cerussite, galena, malachite, pyrite, sphalerite.

Creole mine - cerussite, galena.

Daly mine - anglesite, azurite, bornite, cerargyrite, cerussite, chalcocite, chalcopyrite, chrysocolla, galena, malachite, montmorillonite, pyrite, pyrolusite, rhodochrosite, rhodonite, serpentine, sphalerite, tetrahedrite.

Daly-Judge mine - alisonite, azurite, balydonite, bourmonite, chrysocolla, cuprite, gold, malachite, pyrite, quartz, sericite, sphalerite, tetrahedrite.

Daly West mine - argentite, azurite, bourmonite, galena, malachite, quartz, pyrite, sphalerite, tetrahedrite, zinkenite.

J.A.C. Tunnel - chalcopyrite, pyrite.

Jupiter mine - azurite, cerussite, galena, malachite, garnet, quartz, specularite.

Kearns-Keith mine - chalcopyrite, galena, pyrite, quartz, sphalerite.

Little Bell mine - anglesite, cerussite, chrysocolla, cuprite, galena.

Nail Driver mine - anglesite, cerussite, galena, limonite, malachite, pyrolusite.

New York mine - azurite, cerussite, galena, gold, pyrite.

Ontario mine - anglesite, azurite, bornite, cerargyrite, cerussite, chalcocite, chalcopyrite, chrysocolla, galena, malachite, montmorillonite,

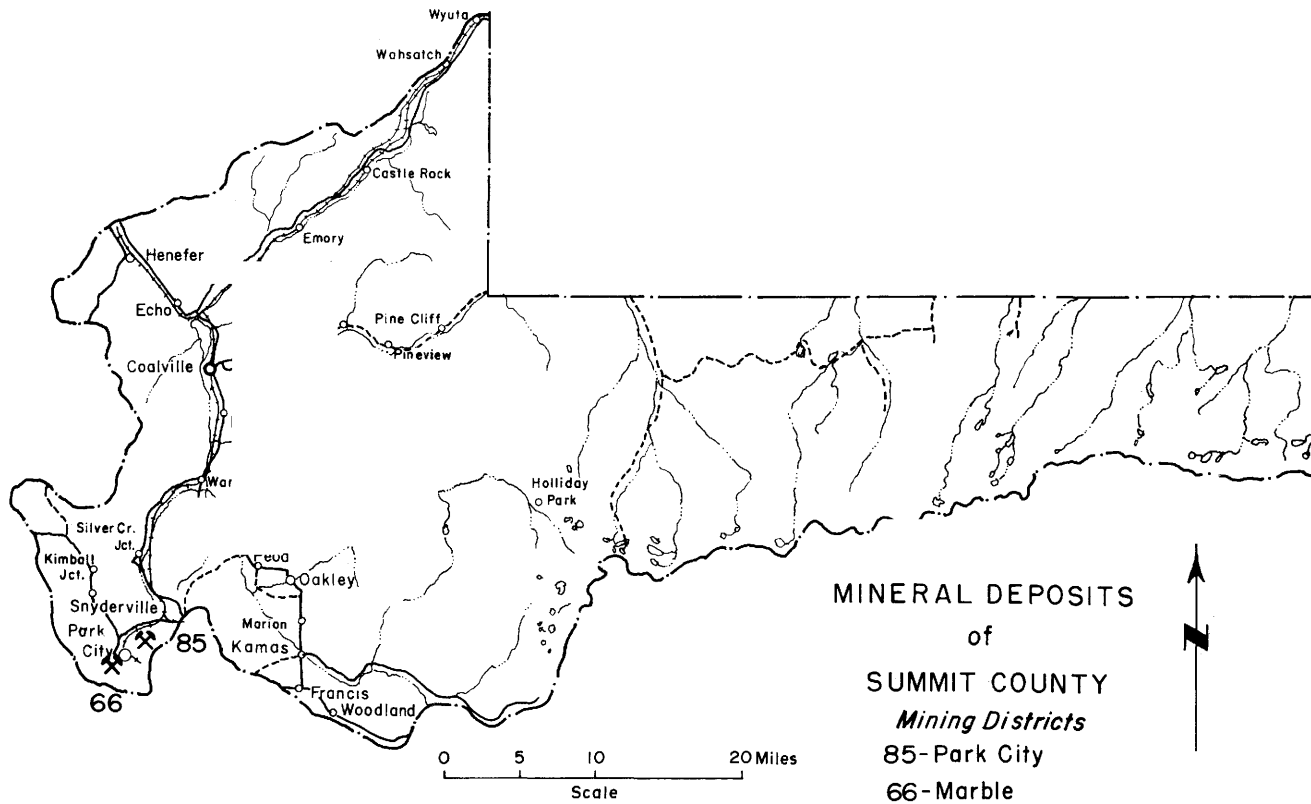


Figure 23.

pyrite, pyrolusite, rhodochrosite, rhodonite, serpentine, sphalerite, tetrahedrite.

Ontario Tunnel - magnesioferrite.

Park-Bingham Tunnel - halloysite.

Park City Consolidated mine - boulangerite, calaverite, covellite, mangano-dolomite, pyrrargyrite.

Quincy mine - hemimorphite.

Scottish Chief mine - anglesite, cerargyrite, cerussite, chalcopyrite, chrysocolla, galena, malachite, silver, pyromorphite.

Silver King (Coalition), Woodside mines - anglesite, azurite, bindheimite, bourmonite, brochantite, cerussite, chalcopyrite, chrysocolla, fluorite, galena, gold, limonite, linarite, malachite, metastibnite, olivenite, pyrite, pyrolusite, quartz, sericite, sphalerite, stibnite, tetrahedrite.

Silver King Consolidated mine - azurite, galena, malachite, quartz, sericite, tetrahedrite, wulfenite.

Wabash property - chalcopyrite, gypsum, pyrite.

SILVER CREEK DISTRICT (See MARBLE DISTRICT).

UINTA DISTRICT (See PARK CITY DISTRICT).

Tooele County

BINGHAM (WEST MOUNTAIN) DISTRICT (Oquirrh Mountains). (See also under Salt Lake County).

May Flower mine - boulangerite, galena, pyrite, sphalerite.

BLACK CROOK DISTRICT (See ERICKSON DISTRICT).

BLUEBELL DISTRICT (Sheeprock Mountains).

Bennion Canyon mine - galena, pyrite, quartz, sphalerite.

Black Hawk mine - cerussite, galena, silver.

Bogan mine - bismuthinite, galena, hematite, limonite, pyrolusite.

Hidden Splendor mine - galena.

Little Valley mine - pyrite.

Morgan mine - barite, cerussite, galena, pyrite, pyrolusite.

The Iron mine - halloysite, hematite, jasper, limonite.

BOULTER DISTRICT (See NORTH TINTIC DISTRICT).

CALEDONIA DISTRICT (See NORTH TINTIC DISTRICT).

CAMP FLOYD DISTRICT (See MERCUR DISTRICT).

CEDAR MOUNTAINS - calcite (onyx marble).

CLIFTON DISTRICT (See GOLD HILL DISTRICT).

COLUMBIA DISTRICT (N.E. Sheeprock Mountains).

Benmore, Sharp mines - cerussite, fluorite, galena, limonite, pyrite, pyrolusite, quartz, sphalerite, silver, wad.

Iron Hope prospect - quartz, specularite.

Sultana mine - galena, gold, limonite, pyrite, quartz, silver.

DEEP CREEK MOUNTAINS - agate, andalusite, cerussite, chalc edony, galena.

Probert mine - barite, cinnabar, stibnite.

DEEP CREEK VALLEY - natron.

DUGWAY DISTRICT (Dugway Range) agate, amethyst, apatite, beryl, bixbyite, chalc edony, garnet, rosasite, topaz.

Belcher claim - azurite, chrysocolla, malachite, melaconite, tenorite.

Bertha claim - cerussite, chalc anthite, chalcocite, chalcopyrite, chlorite, covellite, galena, gypsum, hematite, hydromica, hemimorphite, limonite, pyrite, smithsonite, sphalerite, tenantite, tetrahedrite.

Black Dragon claim - chrysocolla, cuprite, hematite, limonite, malachite.

MINERAL DEPOSITS of TOOELE COUNTY

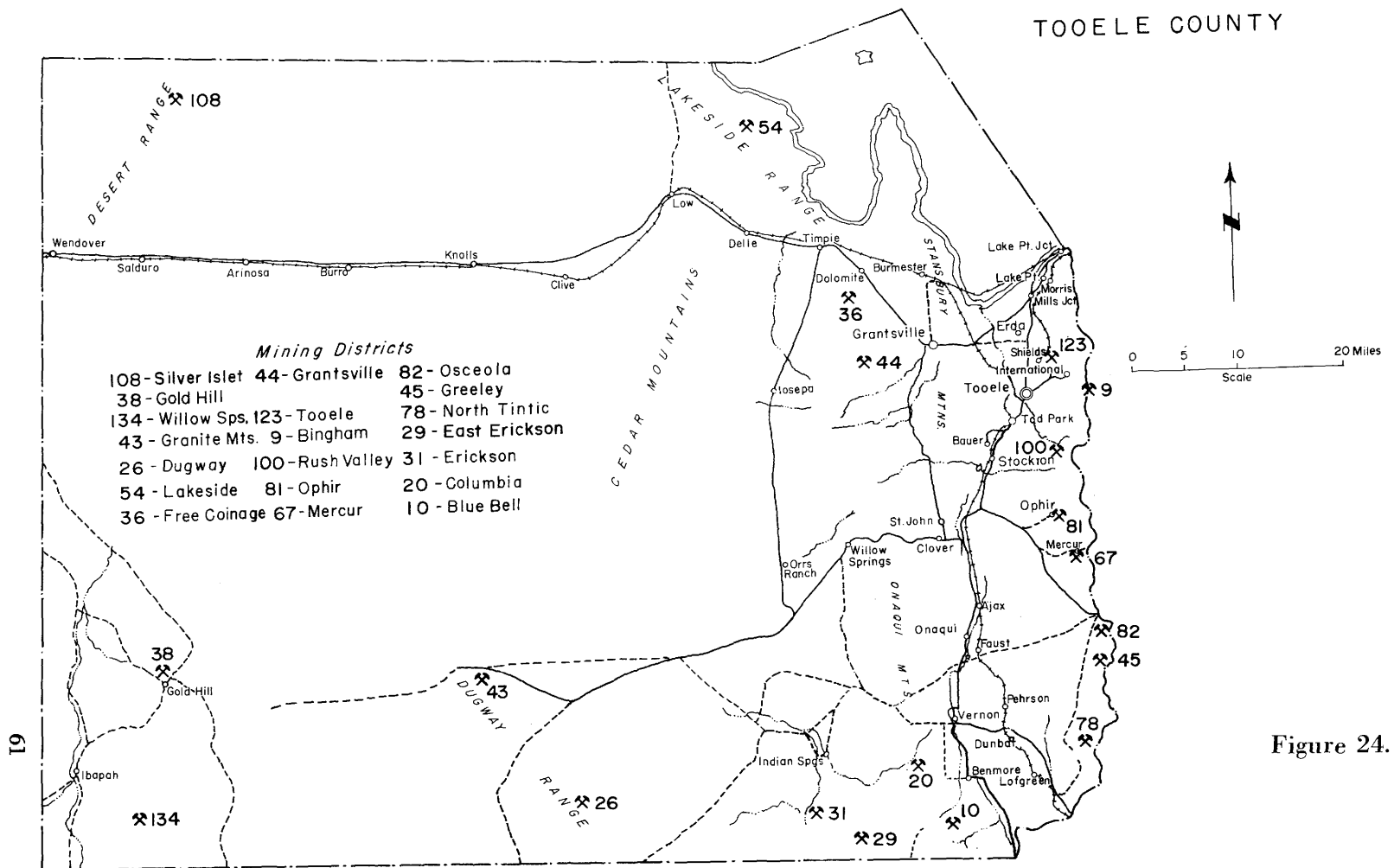


Figure 24.

Black Maria claim - azurite, chrysocolla, fluorite, malachite.

Boston claim - cerussite, siderite, wulfenite.

Bryan claim - anglesite, calcite, cerussite, chlorite, chrysocolla, fluorite, galena, hematite, hemimorphite, hydrozincite, limonite, smithsonite, sphalerite.

Buckhorn mine - barite, cerargyrite, cerussite, copper, cuprite, fluorite, galena, magnetite, prosopite, silver, sphalerite, wulfenite.

Bullion Canyon (head) - aragonite, fluorite, galena, hemimorphite, pyrite, siderite, wulfenite.

Confidence property - azurite, barite, calcite, cerussite, chrysocolla, fluorite, hematite, jarosite, limonite, malachite.

Eureka claim - fluorite.

Four Metals mines - barite, cerargyrite, cerussite, chalcantite, chlorite, copper, cuprite, fluorite, galena, gold, gypsum, hematite, hydrozincite, jarosite, limonite, pyrite, silver, smithsonite, sphalerite, wulfenite.

Francis property - barite, cerussite, galena, smithsonite, sphalerite.

Golconda property - fluorite.

Great Eastern, Nautilus, Pride of the West claims - barite, covellite, fluorite, siderite.

Juno claim - barite, smithsonite.

Kellys Hole - azurite, barite, calcite, cerussite, chalcantite, chalcopryrite, chrysocolla, cuprite, fluorite, galena, gypsum, hematite, jarosite, limonite, malachite, melaconite, pyrite, sphalerite, tenorite.

Lauris claim - barite, cerussite, fluorite, galena, hematite, limonite.

Metal States (Cannon) mine - azurite, chalcantite, chrysocolla, gypsum, limonite, malachite, melaconite, pyrite, tenorite.

Morrell shaft - hydrozincite.

New Park claim - chalcopryrite.

Rainbow claim - fluorite.

Rattler property - fluorite, quartz.

Raymond-Bald Eagle property - azurite, cerussite, galena, hematite, hemimorphite, limonite, malachite, smithsonite.

Surplus Claim - chalcopryrite, gypsum, melaconite, pyrite, sphalerite, ten-

orite.

Yellow Jacket property - cerussite, limonite.

DUTCH MOUNTAIN - augite, azurite, cerussite, fluorite, galena, malachite.

EAST ERICKSON DISTRICT (W. Sheeprock Mountains).

Copper Jack mine - chalcopryrite, chrysocolla, fluorite, limonite, malachite, pyrolusite, pyrite, turquoise.

Dutch Peak (Park-Utah) mine - galena, pyrite.

Ekker Canyon prospect - biotite, quartz, wolframite.

Green's Ridge - chlorite, limonite, magnetite, pyrite, scheelite.

Hard-to-beat-canyon - beryl, chalcopryrite, fluorite, pyrite, topaz, samarskite, uraninite.

Indianapolis mine - galena, gold, pyrite, quartz, sphalerite, specularite.

Jessel Bezzel mine - azurite, chrysocolla, malachite, turquoise.

Sheeprock Canyon - beryl, chalcopryrite, fluorite, pyrite, scheelite, samarskite, uraninite.

Silver King mine - biotite, chalcopryrite, fluorite, pyrite, pyrolusite, quartz, samarskite, specularite, uraninite.

Silver Shield (Flying Dutchman) mine - chalcopryrite, chrysocolla, fluorite, limonite, malachite, pyrite, pyrolusite, turquoise.

South Pine Canyon - biotite, huebnerite, magnetite, monazite.

Tintic-Delaware (Free Coinage) mine - galena, hematite, pyrite, specularite, sphalerite.

ERICKSON (BLACK CROOK) DISTRICT (Simpson Mountains).

Black Jack, Black Rock, Blain, Deer Trail (Black Cap), Indian Boy, May Farmer mines - cerussite, fluorite, galena, pyrite, pyrolusite, sphalerite.

Good Hope mine - cerussite, fluorite, galena.

Happy Jack mine - cerussite.

Highland Lassie no. 1 mine - chalcopryrite, chrysocolla, limonite, malachite.

Huber-Rydalch mine - manganite, pyrolusite, psilomelane, wad.

Indian Chief mine - cerussite, galena.

Last Hope no. 3 mine - chalcopyrite, galena.

OK mine - cerargyrite, tetrahedrite.

Queen Mary claims - pyrolusite, wad.

Silver Reef mine - cerargyrite, chalcopyrite, limonite, pyrite, tetrahedrite.

Utonia claim - galena, pyrite, rhodonite, rhodochrosite, sphalerite.

FAIRFIELD QUADRANGLE - tridymite in volcanic rocks.

FREE COINAGE DISTRICT (Stansbury Mountains) - cerussite, galena, gold, pyrite.

GOLD HILL (CLIFTON) DISTRICT (Deep Creek Mountains) - agate, allanite, axinite, dolomite, erubescite, enstatite, ferromolybdenite, indium mineralization, hueberrnite, scandium mineralization, rutile.

Alvarado mine - bornite, calcite, chalcantinite, chalcedony, chalcocite, chalcopyrite, diopside, galena, garnet, gold, graphite, jarosite, limonite, magnetite, malachite, oligoclase, opal, pyrite, siderite, siderite, spadaite, vesuvianite, wollastonite, zoisite.
B. Estell mine - scheelite.

Bonanza mine - arsenopyrite, cerussite, galena, scorodite, sphalerite.

Bonnemort claim - calcite, chalcocite, chalcopyrite, diopside, wollastonite, zoisite.

Boston mine - arsenopyrite, cerussite, limonite, plumbojarosite, scorodite.

Cane Springs mine - andalusite, bornite, chalcocite, chalcopyrite, covellite, diopside, garnet, molybdenite, pyrite, spadaite, vesuvianite, wollastonite, zoisite.

Calaveras mine - amphibole, azurite, chalcedony, chalcopyrite, chrysocolla, garnet, humite, malachite, pyrite, specularite, tourmaline.

Cash Boy mine - anglesite, arsenopyrite, cerussite, galena, pyrite, sphalerite, wulfenite.

Centennial and Enterprise mines - amphibole, apatite, chalcocite, chalco-

pyrite, diopside, jefferisite, magnetite, malachite, scheelite, tourmaline.

Christmas Mining Company mine - barite, galena, tetrahedrite.

Climax mine - arsenopyrite, galena, pyrite, sphalerite.

Copper Bloom mine - apatite, azurite, bismuth, bismuthinite, bismutite, beidellite, chalcedony, chalcocite, chalcopyrite, copper pitch, covellite, cuprotungstite, gold, jarosite, malachite, pyrite, scheelite, tetrahedrite, tourmaline.

Copper Hill mine - azurite, malachite.

Copperopolis mine - azurite, bornite, chalcocite, chalcopyrite, diopside, garnet, malachite, scheelite.

Copper Queen-Midland Mining Company mine - arsenopyrite, azurite, chalcopyrite, galena, jarosite, malachite, plumbojarosite, pyrite, siderite, sphalerite.

Cyclone mine - aikinite, arsenopyrite, chalcantinite, chalcopyrite, galena, jarosite, plumbojarosite, pyrite, wulfenite.

Doctor mine - apatite, bismuth, bornite, chalcopyrite, epidote, garnet, magnetite, malachite, pyrite, scapolite, scheelite, tourmaline.

E. H. B. mine - scheelite.

Enterprise mine - scheelite.

Evans claim - tetrahedrite.

Fraction Lode mine - epidote, garnet, quartz, scheelite.

Frankie mine - bornite, chalcopyrite, chrysocolla, clinzoisite, copper pitch, diopside, epidote, garnet, humite, malachite, pyrite, scheelite, titanite, tourmaline, wollastonite.

Garrison Monster mine - barite, calamine, cerussite, galena, malachite, plumbojarosite, smithsonite.

Gold Belt claim - galena.

Gold Bond mine - biotite, chrysocolla, copper pitch, danburite, diopside, epidote, fluorite, hematite, malachite, quartz, scapolite, specularite, sphalerite, tourmaline.

Gold Hill (U.S.) mine - adamite, aikinite, anglesite, arsenopyrite, austinite, azurite, beudantite, carminite, cerussite, chalcocite, chalcopyrite, chenevixite, chlorite, chrysocolla, clinoclase, conchalcite, cornwallite,

cuproadamite, ferrisymplectite, galena, gypsum, jamesonite, jarosite, malachite, mimetite, nontronite, olivenite, opal, pyrite, pyrrotite, scorodite, siderite, sphalerite, stibnite, tennantite, tyrolite, wollastonite.

Gold Hill (Western Utah) mine - adamite, arsenosiderite, beaudanite, conicalcrite, natrojarosite, pharmacosiderite.

Gold Hill Standard mine - anglesite, arsenopyrite, galena, plumbojarosite, scorodite, wulfenite.

Kena claim - cuprotungstite, wolframite.

Lucy L. mine - bismuth, bismuthinite, bismutite, calaverite, chalcopyrite, copper pitch, epidote, garnet, gold, malachite, scheelite, tremolite.

Ida Lull mine - azurite, bornite, chalcopyrite, covellite, diopside, garnet, malachite, scheelite.

Mascot mine - arsenopyrite, cerussite, scheelite, scorodite.

Midas mine - bornite, gold, siderite, vesuvianite.

Midland prospect - siderite.

Minnehaha mine - arsenopyrite, azurite, chrysocolla, malachite.

Monoco mine - anglesite, azurite, cerussite, copper pitch, chrysocolla, galena, malachite, opal, plumbojarosite.

Monte Del Rey mine - arsenopyrite, cerussite, scorodite.

Napoleon mine - chrysocolla, malachite.

New Baltimore mine - anglesite, arsenopyrite, azurite, cerussite, desclozite, galena, malachite, mimetite, plumbojarosite, pyrite.

Ozark mine - arsenopyrite, azurite, malachite, scorodite.

Pole Star Copper Company mine - azurite, chalcedony, conicalcrite, cuprite, cuprotungstite, ferberite, malachite, olivenite, pyrite, scheelite, tetrahedrite, tourmaline, wolframite.

Rea mine - azurite, calcite, malachite, tetrahedrite.

Reaper mine - actinolite, albite, amphibole, anatase, orthoclase, barite, biotite, chalcopyrite, covellite, epidote, gold, galena, hematite, hornblende, ilmenite, kaolinite, leucocoxene, molybdenite, serpentine, te-

trahedrite, tourmaline, zircon.

Red Jacket mine - anglesite, cerussite, galena, mimetite, plumbojarosite, pyrite, wulfenite.

Rodenhouse Wash - adularia, bertrandite, quartz.

Rube mine - anglesite, boulangerite, calcite, chalcopyrite, cerussite, chlorite, galena, gold, jarosite, molybdenite, plumbojarosite, pyromorphite, sphalerite, scapolite, spadaite, talc, zoisite.

Shay claim - plumbojarosite, wulfenite.

Silver and Gold Mining Company mine - arsenopyrite, cerussite, galena, limonite, pyrite, scorodite, sphalerite.

Silver King mine - anglesite, azurite, cerussite, chalcocite, chrysocolla, malachite, plumbojarosite, wollastonite.

Spotted Fawn mine - anglesite, cerussite, galena.

Star Dust mine - quartz, scheelite.

Success mine - arsenopyrite, galena, jarosite, plumbojarosite, pyrite, quartz, sphalerite, tennantite.

Unadine mine - arsenopyrite, azurite, chrysocolla, galena, limonite, magnetite, malachite, nontronite, opal, scorodite, spinel, tetrahedrite.

U. S. mine - arsenopyrite, aikinite, cerussite, chalcopyrite, cobaltite, jamesonite, jarosite, pyrite, pyrrotite, sphalerite, scorodite, stibnite.

Victory no. 1 mine - apatite, azurite, chalcocite, chalcopyrite, chrysocolla, malachite, pyrite, quartz, tetrahedrite, tourmaline.

Wilson Consolidated mine - bismuth, bismite, bismuthinite, bismutite, orthoclase, scheelite, stolzite.

Yellow Hammer mine - actinolite, albite, apatite, azurite, chalcopyrite, copper pitch, gold, malachite, molybdenite, muscovite, orthoclase, powellite, scheelite, tourmaline.

GRANITE MOUNTAIN DISTRICT (Granite Mountain) - albite, apatite, beryl, garnet, kaolinite, microcline, muscovite, orthoclase, plagioclase, samarskite, tourmaline, zircon.

Desert, El Dorado, Mountain Queen mines - azurite, chalcopyrite, fluor-

ite, galena, gold, hematite, limonite, malachite, pyrite, quartz.

GRANTSVILLE (THIRD TERM) DISTRICT (Stansbury Mountains) - cerussite, chalcopyrite, galena, malachite, pyrite.

Timpie Valley, Ruby Crystal mine cinnabar, metacinnabar.

GREAT SALT LAKE (shores) - aragonite, bloedite, glauberite, gypsum, halite, mirabilite, thenardite.

GREAT SALT FLATS - halite, sylvite.

GREELEY DISTRICT (Topliff Hill) - cerussite, malachite, pyrite.

IBAPAH MOUNTAINS - barite, beryl (aquamarine variety), cinnabar.

JOHNSON PASS - calcite (onyx), galena.

KNOLLS - gypsite.

LAKESIDE DISTRICT (Lakeside Mountains) - anglesite, cerargyrite, cerussite, galena.

MERCUR (CAMP FLOYD) DISTRICT (Oquirrh Mountains) - aragonite, barite, lorandite, pharmacosiderite, psilomelane, quartz, rutile, scorodite, sulvanite, talc, tourmaline.

Brickyard mine - melanterite, orpiment, realgar, sulfur.

Consolidated Mercur, Daisy (Norma), La Cigale mines - gold, jasper.

Geyser - Marion mine - arsenopyrite, calcite, cerargyrite, gold, jasper.

Golden Gate mine - arsenopyrite, calcite, cinnabar, gold, orpiment, realgar, stibnite, tellurium mineralization, variscite.

Hillside mine - cinnabar, orpiment, sulfur.

Mercur mine - calcite, cinnabar, orpiment, realgar, selenite, variscite, zircon.

Mineral Hill mine - azurite, cerussite, chalcopyrite, galena, limonite, malachite, pyrite.

Sacramento mine - cinnabar, gold, jasper, orpiment, realgar, sulfur.

Sparrowhawk mine - cinnabar, jarosite, stibnite, variscite.

Sunshine mine - cinnabar, orpiment, sulfur.

NORTH TINTIC (BOULTER, CALEDONIA, OASIS) DISTRICT (Boulter Mountains) (See also under Juab and Utah Counties).

New Bullion mine - anglesite, cerussite, galena, hemimorphite, pyrite, smithsonite, sphalerite.

Scranton mines - anglesite, aurichalcite, cerussite, galena, hemimorphite, hydrozincite, pyrite, pyromorphite, quartz, smithsonite, sphalerite.

OASIS DISTRICT (See NORTH TINTIC DISTRICT).

OPHIR DISTRICT (Oquirrh Mountains).

DRY CANYON AREA - apatite, barite, brochantite, calcite, chalcotrichite, chrysocolla, gold, quartz.

Brooklyn mine - azurite, cerussite, malachite, silver, smithsonite.

Deseret mine - paligorskite.

Kearsarge mine - aurichalcite, azurite, covellite, chalcopyrite, galena, hesite, jarosite, limonite, malachite, plumbojarosite, smithsonite.

Mono mine - azurite, cerargyrite, cerussite, chalcopyrite, copper, galena, jarosite, limonite, malachite, pyrite, silver, sphalerite, stephanite.

Queen of the Hills mine - azurite, cerussite, galena, limonite, malachite, tetrahedrite.

Surprise mine - argentite, chalcopyrite, galena, gold.

FOOTHILL AREA.

Lakes of Killarney mine - cerargyrite, jasper, malachite.

LION HILL AREA - pyrolusite, sericite, stibiconite, utahite.

Buffalo mine - argentojarosite, aurichalcite, barite, cerussite, cerargyrite, chalcopyrite, fluorite, galena, gold, jarosite, jasper, limonite, malachite, pyrite, plumbojarosite, wad.

Chloride Point - argentojarosite, aurichalcite, barite, cerussite, cerargyrite, jasper, jarosite, limonite, malachite, plumbojarosite, pyrite, smithsonite, stibiconite, stibnite.

Douglas, Lion, Zella mines - barite, calcite, cerussite, cerargyrite, jasper, jarosite, plumbojarosite.

East Side, Empire, Iron, Monarch, Northern Light, Woodruff mines - cerussite, cerargyrite, gold, jarosite, plumbojarosite, wad.

Three Metals mine - cerussite, cerargyrite.

OPHIR HILL AREA - barite, tetrahedrite.

Admiral Dewey prospect - cerussite, galena, gypsum, jarosite, limonite.

Chicago mine - azurite, cerussite, limonite, malachite.

Cliff mine - aurichalcite, azurite, andradite, cerussite, chalcopryrite, diopside, epidote, galena, garnet, jarosite, limonite, malachite, plumbojarosite, pyrite, pyrolusite, smithsonite, sphalerite, talc, tremolite.

Hidden Treasure mine - actinolite, andradite, apatite, aurichalcite, azurite, beaverite, calamine, cerargyrite, cerussite, cuprite, diopside, epidote, galena, hedenbergite, hydrozincite, limonite, malachite, plumbojarosite, pyrite, smithsonite, sphalerite, topaz, wad, wollastonite.

Jim Fisk mine - argentite, cerargyrite, cerussite, proustite, pyrargyrite, silver.

Ophir Hill Consolidated, Ophir Coalition (Montana) mines - andradite, albite, argentite, apatite, anhydrite, bismuth, calcite, chalcantite, chalcocite, chalcopryrite, chlorite, clinozoisite, dolomite, diopside, epidote, fluorite, galena, grossularite, melanterite, phlogopite, psilomelane, pyrite, pyrolusite, pyrhotite, quartz, sanidine, scheelite, sericite, siderite, sphalerite, tennantite, titanite, tremolite, wad, wolframite, wurtzite, zircon.

Sacramento mine - argentite, aurichalcite, azurite, calamine, cerargyrite, cerussite, chalcopryrite, cuprite, galena, hydrozincite, limonite, malachite, plumbojarosite, pyrite, smithsonite, sphalerite, wad, wollastonite.

OQUIRRH MOUNTAINS

Tickville Gulch - hypersthene.

S. part - olivine.

OSCEOLA DISTRICT (Thorpe Hills) - cerussite, galena, pyrite.

OVERLAND CANYON - bismuthinite.

PINE CANYON - vesuvianite.

RUSH VALLEY (STOCKTON) DISTRICT (Oquirrh Mountains) - iddingsite, natrolite, phillipsite.

Argent mine - cerussite, galena, jarosite, limonite, plumbojarosite, pyrite.

Ben Harrison mine - arsenopyrite, cerussite, chalcopryrite, galena, gypsum, jarosite, limonite, malachite, plumbojarosite, pyrite, sphalerite.

Calumet mine - cerussite, chalcopryrite, galena, jarosite, limonite, malachite, pyrite, sphalerite, sulfur, zoisite.

Galena King mine - cerussite, chalcopryrite, galena, jarosite, limonite, malachite, plumbojarosite, pyrite, sphalerite.

Honerine mine - anglesite, apophyllite, aragonite, arsenopyrite, aurichalcite, beudantite, cerussite, chalcopryrite, clinozoisite, diopside, epidote, fluorite, galena, gold, jarosite, limonite, malachite, mimetite, nontronite, plumbojarosite, pyrite, pyromorphite, sepiolite, serpentine, smithsonite, sphalerite, tetrahedrite, wad, wollastonite.

Mescatine mine - cerargyrite, cerussite, galena, jarosite, limonite, plumbojarosite, sphalerite, pyrite.

Muerbrook mine - anglesite, cerussite, chalcopryrite, galena, gypsum, jarosite, limonite, malachite, melanterite, plumbojarosite, pyrite, sphalerite.

Salvation-Hercules mine - cerargyrite, cerussite, chalcopryrite, galena, jarosite, limonite, malachite, plumbojarosite, pyrite.

Settlement Canyon - analcite, actinolite, grossularite, pyrhotite, thompsonite.

Soldier Creek - epidemine, grossularite, hematite, wollastonite.

Southport mine - cerussite, malachite.
Tip Top mine - chalcopryrite, galena, pyrite, sphalerite.

SALDURO - bischofite, carnallite, halite, kainite, kieserite, polyhalite, sylvite.

SHEEP RIDGE (east of) - nepheline in basalts and sills.

SILVER ISLAND (SILVER ISLET) DISTRICT (Silver Island Mountains).
Carrie Mack property - azurite, barite, bindheimite, cerussite, galena, jame-sonite, malachite, pyrite.

SILVER ISLET DISTRICT (See SILVER ISLAND DISTRICT).

STANSBURY MOUNTAINS.
Amatrice Hill - variscite.
Grantsville (near) - calcite (onyx).
Mack Canyon - labradorite, olivine.
Muskrat Canyon - labradorite, olivine.
North Willow Canyon - augite, biotite, labradorite.
Salt Mountain - labradorite, olivine.

STOCKTON DISTRICT (See RUSH VALLEY DISTRICT).

THIRD TERM DISTRICT (See GRANTSVILLE DISTRICT).

TOOELE DISTRICT (Oquirrh Mountains) cerussite, galena, malachite, pyrite.

WENDOVER - bischofite, carnallite, halite, kainite, kieserite, polyhalite, sylvite.

WEST MOUNTAIN DISTRICT (See BINGHAM DISTRICT).

WILD CAT MOUNTAINS.
Silver Queen (Wild Cat) mine - barite, chalcopryrite, fluorite, gold, pyrite, silver, prosopite.

WILLOW SPRINGS DISTRICT (Deep Creek Mountains) - azurite, cerussite, galena, chalcopryrite, malachite.

Uintah County

ARGYLE CREEK - argulite.

ASHLEY CREEK - carnotite.

Woodside Iron prospect - hematite.

ASPHALT RIDGE - asphalt.

ASPHALT WASH - gilsonite.

BASSETT MINE - galena.

BLACK DRAGON MINE - gilsonite.

BONANZA MINE - gilsonite, petroleum in gilsonite vein.

BROWNS PARK AREA - azurite, bornite, chalcocite, hematite, malachite, pyrite.

Red Creek - tyuyamunite.

BRUSH CREEK - collophane, carbonate apatite, fluorapatite, francolite, phosphorite, rare earths.

BRUSH CREEK DISTRICT (Uinta Mountains).

Little Alta mine - azurite, cerargyrite, malachite, smithsonite.

BULLIONVILLE - azurite, malachite.

CARBONATE DISTRICT (Uinta Mountains).

Dyer mine - azurite, bornite, chalcocite, hematite, malachite, pyrite.

Jessie Ewing mine, Red Creek, Willow Creek - azurite, malachite.

Pope Iron mine - hematite.

EVACUATION CREEK - asphalt.

FORT DUCHESNE - gilsonite.

FRANDSON CANYON - collophane, carbonate apatite, fluorapatite, francolite, phosphorite, rare earths.

GREEN RIVER DISTRICT.

Cub Creek - placer chromite, gold.

HELLS HOLE CANYON - analcite, apophyllite.

JENSON - monazite in placer sands.

Bonnie Bell claims - autunite.

LITTLE BRUSH CREEK - collophane, carbonate apatite, fluorapatite, francolite, phosphorite, rare earths.

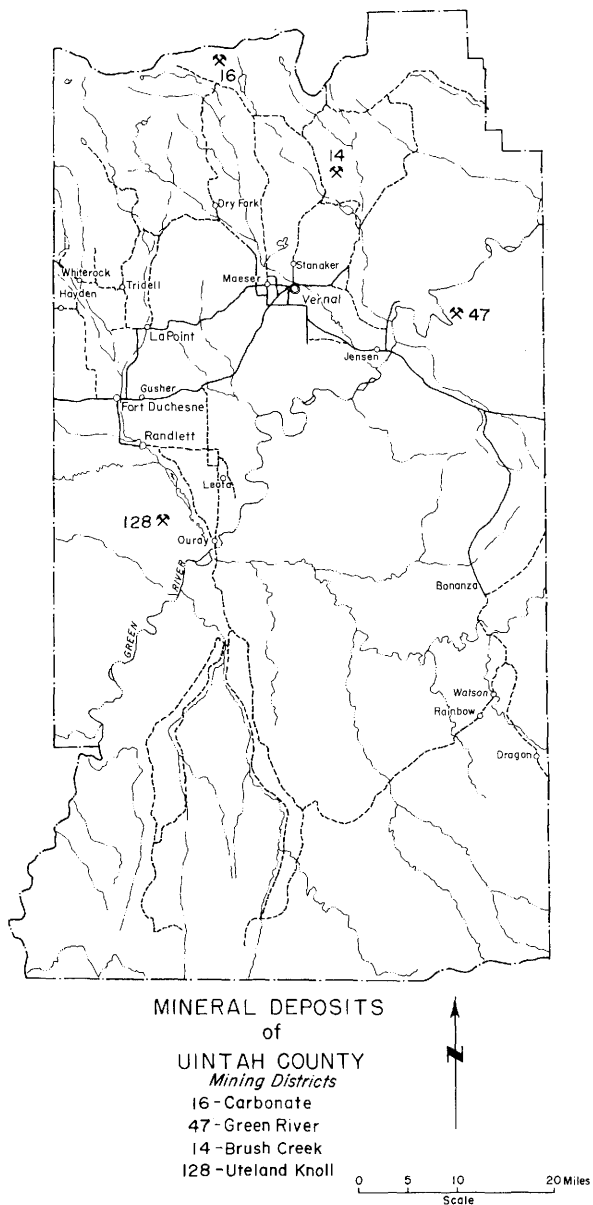


Figure 25.

LITTLE SPLIT MOUNTAIN - azurite, chalcocite, gold, malachite.

PR SPRINGS - asphalt.

RAINBOW MINE - gilsonite.

ROCK CREEK - collophane, carbonate apatite, fluoroapatite, francolite, phosphorite, rare earths.

SILVER KING MINE - cerussite.

SNOW CLAIMS - autunite, torbernite.

SPLIT MOUNTAIN - glauconite, in Curtis Formation.

STEINAKER DRAW - gypsum.

SUN OIL COMPANY SOUTH OURAY WELL - barytocalcite, burbankite, calcite, dolomite, garrelsite, elpidite, leucosphenite, nahcolite, neighborite, shortite, searlesite, pyrite, wurtzite.

UTELAND KNOLL DISTRICT (Ouray). azurite, chalcocite, gypsum, halotrichite, ilsemannite, malachite, molybdenite, pyrite.

VERNAL (N.) - glauconite in Curtis Formation.

WHITE RIVER CANYON - analcite, apophyllite.

WHITEROCKS CANYON - asphalt, gypsum.

Utah County

ALPINE (2 mi. W.) - jasper.

ALPINE DISTRICT (Wasatch Mountains) orthoclase, quartz.

Alpine-Galena property - argentite, cerussite, galena.

Lucky Chance mine - galena, pyrite.

AMERICAN FORK DISTRICT (Wasatch Mountains) - molybdenite, monticellite, smithsonite, tetradymite.

Bay State mine - galena, kermesite, sphalerite.

Bog mine - barite, galena, quartz pyrite, sphalerite, tetrahedrite.

Dutchman (Wild Dutchman) mine - barite, cerussite, chalcopyrite, galena, limonite, pyrite, sphalerite.

Lake Solitude - spinel.

Mary Ellen, Live Yankee mines - chalcopyrite, galena, jamesonite, pyrite.

Miller mine - argentite, azurite, cerussite, galena, limonite, malachite, plumbojarosite, wad, wulfenite.

Pacific mine - barite, galena, pyrite, sphalerite, tetrahedrite.

Pittsburgh mine - cerussite, galena, limonite, plumbojarosite, sericite.

Silver Dipper mine - galena, pyrite, sphalerite, tetrahedrite.

Water Fall vein - galena, pyrite, sphalerite, tetrahedrite.

Yankee mine - barite, chalcopyrite, gold, galena, jamesonite, pyrite, sphalerite, tetrahedrite.

CALEDONIA DISTRICT (See NORTH TINTIC DISTRICT).

CEDAR VALLEY - kaolinite, pyrophyllite in Manning Canyon Shale.

CLAY CANYON (Oquirrh Mountains) bedellite, dehrnite, deltalite, dennisonite, davidsonite, englishite, gordonite, lehiite, lewistonite, millisite, montgomeryite, overite, pseudowavellite, sterrettite, variscite, wardite.

COLTON

Higgins, James Peak (Brown Bear), Kyune Canyon, Midnight, Miller, Pleasant Valley, Thomas Ranch, Town mines - albertite, ingramite, nigrite, ozocerite.

EAST TINTIC DISTRICT (East Tintic Mountains) - altaite, albite, allophane, alunite, anatase, beidellite, bismuthinite, bornite, calcite, chalcocite, clinocllore, dolomite, delesite, endellite, freibergite, gibbsite, gearsutite, hydromica, halloysite,

jamesonite, leucoxene, leuchtenbergite, miargyrite, montmorillonite, nontronite, pargasite, potash alum, rutile, sericite, sylvanite, tetradymite, zoisite.

Apex Standard mine - enargite, galena, gold, pyrolusite, sphalerite, tetrahedrite.

Black Jack (Winberg), White Cloud claims - pyrolusite.

Burgin mine - anglesite, antlerite, argentite, argentojarosite, barite, brochantite, cerussite, chalcophanite, dickite, galena, gold, hetaerolite, jasper, jarosite, kaolinite, lanarkite, limonite, marcasite, massicot, melanterite, mimetite, minium, pyrite, pyrolusite, quartz, rhodochrosite, siderite (manganoan), sphalerite, silver, szomolnokite, tetrahedrite.

Eureka Bullion mine - enargite, galena, gold, sphalerite, tetrahedrite.

Eureka Lily mine - barite, chalcopyrite, enargite, galena, gold, pyrite, sphalerite, tetrahedrite.

Eureka Standard mine - barite, enargite, galena, gold, kaolinite, hessite, petzite, pyrite, sphalerite, tetrahedrite.

Iron King mine - gold, hematite, limonite, pyrolusite.

North Lily mine - anglesite, barite, cerussite, cubanite, enargite, galena, gold, greenockite, luzonite, pyrite, plumbojarosite, smithsonite, sphalerite, tetrahedrite, wurtzite.

Tintic Standard mine - argentojarosite, anglesite, azurite, barite, cerussite, chalcopyrite, enargite, galena, gold, halotrichite, hematite, jarosite, kornelite, limonite, luzonite, malachite, pearceite, polybasite, psilomelane, pyrite, pyrolusite, rhodochrosite, siderite, sphalerite, szomolnokite, tetrahedrite, tenticite, wad.

FOX HILLS (S. end Lake Mountain) - endellite, halloysite, kaolinite, olive in basalts.

GILLULY (8 mi. N.W.) - asphalt.

JORDAN NARROWS, OREM, SARATOGA, SOLDIERS PASS QUADRANGLES - kaolinite, pyrophyllite in the Manning Canyon Shale.

LAKE BONNEVILLE SHORELINE - thin-olite as a cement in gravels.

LEHI DISTRICT (Lake Mountain).

Manning Canyon Shale - kaolinite, pyrophyllite.

PELICAN POINT AREA.

Canyon, Foothill and Hilltop, Pelican and Utah Valley veins - aragonite, calcite.

Hutchings claim - limonite pseudomorphs after pyrite.

Philippine, Potter claims - calcite, (onyx).

PFEIFFER CANYON AREA - calcite (onyx).

Blue Rock claim - pyrolusite.

WEST SLOPE AREA.

Wildcat mine - cryptomelane, wad.

LITTLE COTTONWOOD STOCK - apatite, allanite, biotite, hornblende, magnetite, microcline, plagioclase, orthoclase, quartz, sphene, zircon.

NORTH TINTIC (CALEDONIA, OASIS) DISTRICT (East Tintic Mountains) (See also under Juab and Tooele Counties). Blowhole Hill property - cerussite, galena.

Fields group (Fremont Canyon) - jasper, pyrolusite.

Lehi-Tintic, Tintic Empire, Tintic Paymaster mines - anglesite, cerussite, galena, jasper, pyrite.

North Tintic claims - pyrolusite.

Oxen mine, Tip Top tunnel - psilomelane, pyrolusite, wad.

Selma mine - anglesite, cerussite, limonite, hematite, pyrite.

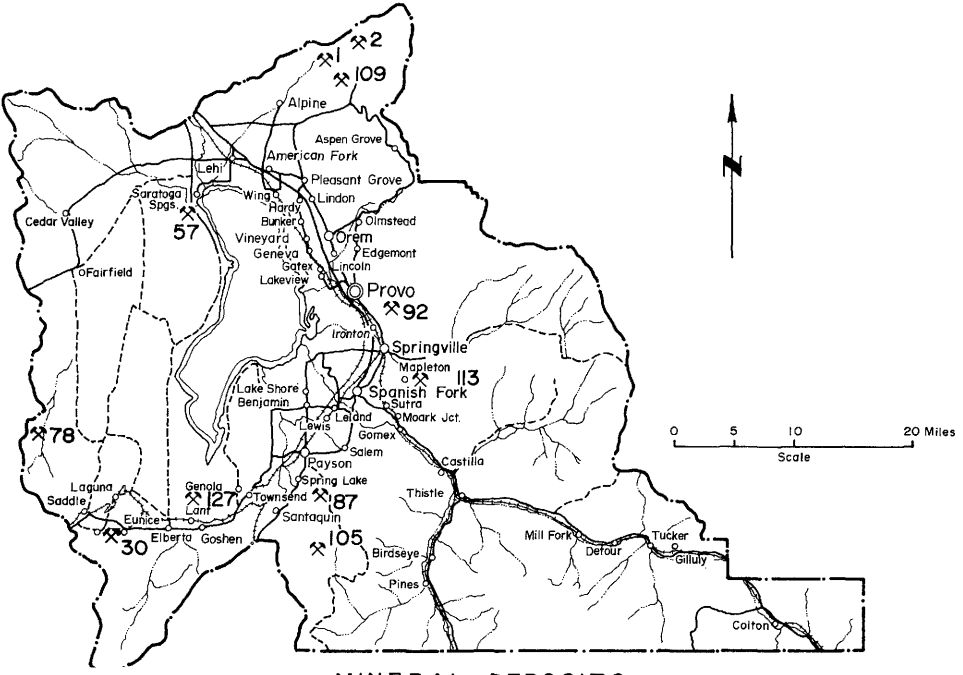
OASIS DISTRICT (See NORTH TINTIC DISTRICT).

PAYSON DISTRICT (Wasatch Mountains).

Nelson mine - galena, gold, limonite, pyrite.

Syndicate mine - barite, cerussite, galena, limonite, smithsonite, sphalerite.

PROVO DISTRICT (Wasatch Mountains).



MINERAL DEPOSITS
of
UTAH COUNTY
Mining Districts

- 1- Alpine
- 2- American Fork
- 109- Silver Lake
- 57- Lehi
- 78- North Tintic
- 30- East Tintic
- 127- Utah
- 87- Payson
- 105- Santaquin
- 92- Provo
- 113- Spanish Fork

Figure 26.

Monarch (Buckley) mine - argentite, calcite, cerussite, dolomite, galena, hematite, limonite, pyrite.

SANTAQUIN DISTRICT (Wasatch Mountains).

Black Balsam vein - calcite, chalcopryrite, fluorite, malachite, pyrite.

Blue Eagle prospect - calcite, cerussite, vanadinite.

Copper Bullion prospect - chalcopryrite, malachite, specularite, pyrite.

Sally Ann prospect - chalcopryrite, cuprite, malachite.

Santaquin Central tunnel - chalcopryrite, pyrite, specularite.

Union Chief mine - barite, calcite, cerussite, cerargyrite, galena, hematite, limonite, sulfur.

SILVER LAKE DISTRICT (Wasatch Mountains).

Deer Creek - brucite, coerdierite, garnet, gold, graphite, hematite, magnetite, molybdenite, olivine, prehnite, periclase, psilomelane, quartz, scheelite, siderite, sphene, wollastonite.

Mayday Extension claim - scheelite.

Milkmaid mine - actinolite, anglesite, andradite, argentite, barite, bornite, cerussite, chalcopryrite, epidote, galena, gold, grossularite, pyrite, scheelite, tetrahedrite, zircon.

Ontario mine - actinolite, anglesite, argentite, barite, cerussite, chalcopryrite, galena, gold, pyrite, sphalerite, tetrahedrite.

Silver Creek - andradite, brucite, coerdierite, epidote, grossularite, graphite, hematite, magnetite, olivine, periclase, quartz, siderite, zircon.

SPANISH FORK CANYON.

Diamond Fork - sulfur.

Little Diamond Fork - phosphorite.

SPANISH FORK DISTRICT (Wasatch Mountains).

Dream (Relief) mine - no production of metals.

THISTLE JUNCTION - geodes containing asphalt.

UTAH DISTRICT (Long Ridge).

Alpha, Emerald, Lucky Boy, Queen of the West, Spalding, Trotter mines gypsum, hematite, jasper, limonite, pyrolusite, psilomelane, wad.

WELLS CANYON (S. Oquirrh Mountains) - calcite, eardleyite, quartz, smithsonite.

Wasatch County

BLUE LEDGE DISTRICT (Bald Mountain).

Glencoe, McHenry, Valeo mines - cerussite, galena, gold, pyromorphite, sphalerite.

Mayflower mine - bornite, chalcopryrite, galena, gold, pyrite, rhodochrosite, sphalerite, siderite, silver.

Ontario tunnel - magnesioferrite.

BONANZA FLAT - calcite, garnet, muscovite.

CLAYTON PEAK - chabazite, spinel, vesuvianite.

ELKHORN DISTRICT (Wasatch Mountains).

Crawford property - cerussite, galena, gold, tetrahedrite.

Nelson, Queen properties - cerussite, galena, gold, tetrahedrite.

HOWLAND DISTRICT (See SNAKE CREEK DISTRICT).

KEETLEY AREA - alunite, dickite, halloysite, kaolinite, montmorillonite.

MIDWAY (N.) - phosphorite.

RHODES PLATEAU (WOODLAND) DISTRICT (Uinta Mountains).

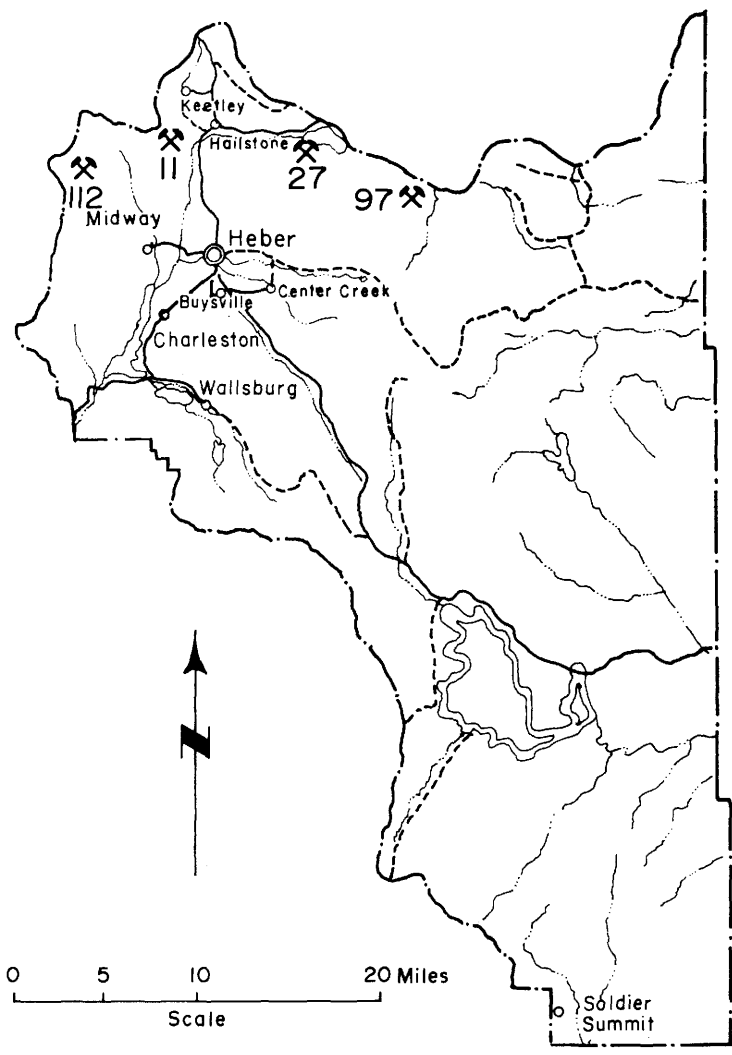
East Star no. 1, Gray Hawk properties - pyrolusite.

Ferry Iron deposit - hematite, magnetite, red ocher, specularite.

SNAKE CREEK (HOWLAND, WHITE PINE) DISTRICT (Wasatch Mountains) - grossularite, penninite, phlogopite, muscovite.

Revelator mine - cerussite, galena, pyromorphite, sphalerite.

West Quincy mine - cerussite, galena, gold, sphalerite.



MINERAL DEPOSITS
of
WASATCH COUNTY
Mining Districts
112 - Snake Creek
11 - Blue Ledge
27 - Elkhorn
97 - Rhodes Plateau

Figure 27.

SOLDIER SUMMIT.

Culmer Brothers, Soldier Summit, U.S. mines - albertite, ingramite, nigrite, ozocerite.

STRAWBERRY AREA - barite, along Charleston Thrust Fault.

UINTA MOUNTAINS (S.W. flank) - carbonate apatite, collophane, fluorapatite, francolite, phosphorite.

WHITE PINE DISTRICT (See SNAKE CREEK DISTRICT).

WOODLAND DISTRICT (See RHODES PLATEAU DISTRICT).

Washington County

BEAVER DAM MOUNTAINS - realgar, scheelite.

BEAVER DAM WASH - agate, silicified wood.

BULL VALLEY DISTRICT (Bull Valley) calcite, gold.

Bucky claim - hematite.

Big Mountain claims - hematite, magnetite.

Emma claims - hematite, magnetite.

Enterprise claims - hematite.

Iron Rod claims - hematite.

Pilot claims - hematite, magnetite, orpiment, realgar, stibnite.

Redtop claims - magnetite.

Soft Iron claims - hematite, red ocher.

CASTLE CLIFF (near) - agate, silicified wood.

CENTRAL (near) - chalcedony in basalt flows.

DRY CANYON - aurichalcite.

ENTERPRISE (near) - birnessite.

GUNLOCK (W.) - stibnite in silicified limestone.

HARRISBURG DISTRICT (See SILVER REEF DISTRICT).

HURRICANE CLIFFS - autunite.

MINERAL MOUNTAIN.

Beauty Knoll claims - alunite, halloysite, kaolinite.

Emma claims - azurite, chrysocolla, malachite, magnetite.

SANTA CLARA DISTRICT (Santa Clara) autunite, carnotite, silicified wood. Black Beauty no. 1 claim - celestite, gypsum, pyrolusite.

SILVER REEF (HARRISBURG) DISTRICT (Leeds) - aguilarite, bornite, calcite, chalcopryrite, cuprite, gypsum, jasper, kaolinite, montmorillonite, muscovite, pyrite, quartz, selenium mineralization, tenorite.

B Reef mine - volborthite.

Barbee and Walker mine - chalcocite, silver.

Buckeye mine - autunite, carnotite, malachite.

Butte Reef mine - carnotite.

California mine - argentite, cerargyrite.

Cobb mine - chalcocite, embolite.

Doyle shaft - carnotite.

Duffin, Toquerville mines - autunite, chalcocite.

East Reef mine - autunite, carnotite, malachite.

Emily Jane mine - chalcocite, malachite.

Last Chance mine - chalcocite.

Leeds mine - argentite, azurite, cerargyrite.

Maud claim - malachite.

Newton mine - azurite.

Requa mine - argentite, azurite, cerargyrite, malachite.

Savage mine - argentite, cerargyrite.

Thompsons mine - chalcocite, silver.

Tecumseh Hill - cerargyrite, chalcocite, volborthite.

Wells pit - volborthite.

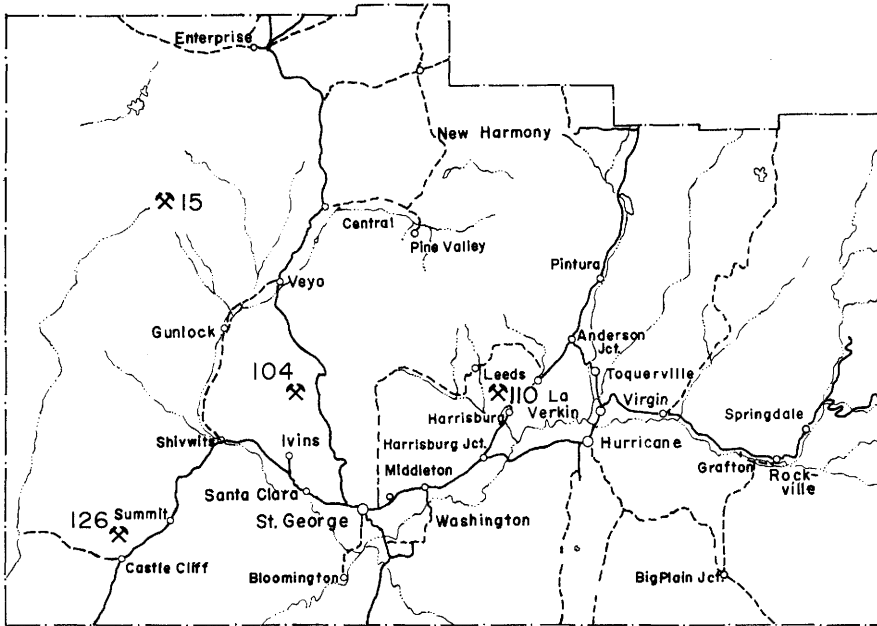
ST. GEORGE (S.) - gypsum.

TOQUERVILLE - gypsum.

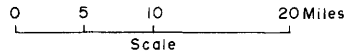
Wallace claims - pyrolusite.

TUTSAGUBET DISTRICT (Beaver Dam Mountains).

Apex (Dixie) mine - adamite, aurichalcite, azurite, cerussite, copper,



MINERAL DEPOSITS
of
WASHINGTON COUNTY
Mining Districts



15 - Bull Valley
110 - Silver Reef

104 - Santa Clara
126 - Tutsagubet

Figure 28.

cuprite, hydrozincite, jarosite, limonite, malachite, plumbojarosite, rosasite, smithsonite.
Paymaster mine - cerussite, jarosite, malachite, plumbojarosite.

VIRGIN ANTICLINE (N. end) - autunite.

VIRGIN RIVER - gypsum, halite.

Wayne County

CAINEVILLE.

Basal Entrada Formation - huge selenite crystals.

T. 27 S., R. 9 E. - anatase, monazite, staurolite, rutile, tourmaline, zircon in Ferron Sandstone.

CAPITOL REEF MONUMENT - carnotite, sideronatrite, torbernite.

CAPITOL WASH - azurite, asphalt, malachite, uranocher.

CAPITOL WASH to SHEETS GULCH - azurite, malachite, metatorbernite.

CHIMNEY ROCK to TANTLUS FLAT - alunite, brochantite, chalcalthite, metatorbernite.

COLEMAN CANYON to OAK CREEK - carnotite, jarosite, metarossite, metatorbernite, schroekingite.

FREMONT RIVER.

South Wash - huge selenite crystals.

FRUITA (S.E. in Grand Wash).

Oyler mine - alunite, becquerelite, carnotite, chalcalthite, chalcopryrite, gypsum, johannite, lepidrocrite, metatorbernite, pitchblende, pyrite, schoepite, sklodowskite, torbernite, zippeite.

SPRING GULCH - pyrolusite.

FRUITA to HANKSVILLE - agate, chert, silicified wood.

GRAND WASH to CAPITOL WASH - alunite, asphalt, jarosite, malachite, metatorbernite, zippeite.

HANKSVILLE (N.) - carnotite.

HENRY MOUNTAINS.

Mt. Ellen (N. end) - carnotite.

Coaly basin (N.W. flank Mt. Ellen) - jet.

LAST CHANCE GULCH - anhydrite, gypsum.

MINERS MOUNTAIN DISTRICT (Miners Mountain) - chalcopryrite, galena, pyrite.

Old Faithful, Wonder Copper no. 1 mines - azurite, limonite, malachite.

MUDDY RIVER - anhydrite, carnotite, gypsum.

NOTON BENCH - carnotite.

POISEN SPRINGS - carnotite.

RABBIT VALLEY.

Old Dixon prospect - carnotite, jarosite, limonite, silicified wood.

TORREY (near) - agate, jasper, metazeunerite, silicified bone and wood.
T.R. Lode no. 1 mine - azurite, limonite, malachite.

UPHEAVAL DOME - carnotite.

WATERPOCKET FOLD - carnotite.

Weber County

COLD WATER CANYON - azurite, barite, fluorite, gold, malachite.

FREMONT ISLAND DISTRICT (Fremont Island) - chalcopryrite, galena, gold, pyrite, silver.

HUNTSVILLE (10 mi. E.) - pyrolusite.

JUNCTION DISTRICT (See WEBER DISTRICT).

OGDEN - fluorite, above "W" on mountain.

OGDEN CANYON - garnet, hornblende, limonite, phosphorite, uraninite.

SIERRA MADRE DISTRICT (Wasatch Mountains) - epidote, garnet, hematite, molybdenite, quartz.

Eldorado property - anglesite, bornite, calcite, cerussite, fluorite, galena, malachite.

King Solomon vein - chalcopyrite, gold, malachite, pyrite.

Napoleon-Maghera group - biotite, chalcopyrite, hornblende, pyrite.

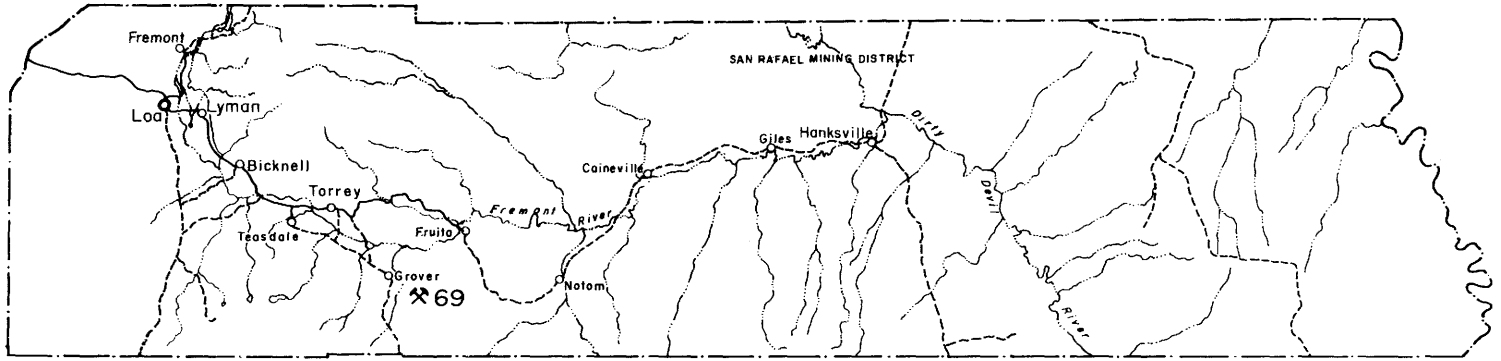
STRONGS CANYON - garnet.

WEBER (JUNCTION) DISTRICT (Wasatch Mountains) - hematite, magnetite.

New Azurite claim - azurite, galena, malachite.

Payday claims - psilomelane, pyrolusite.

Standard Mining Company mine - galena, malachite.



MINERAL DEPOSITS
of
WAYNE COUNTY

69-Miners Mountain

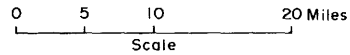


Figure 29.

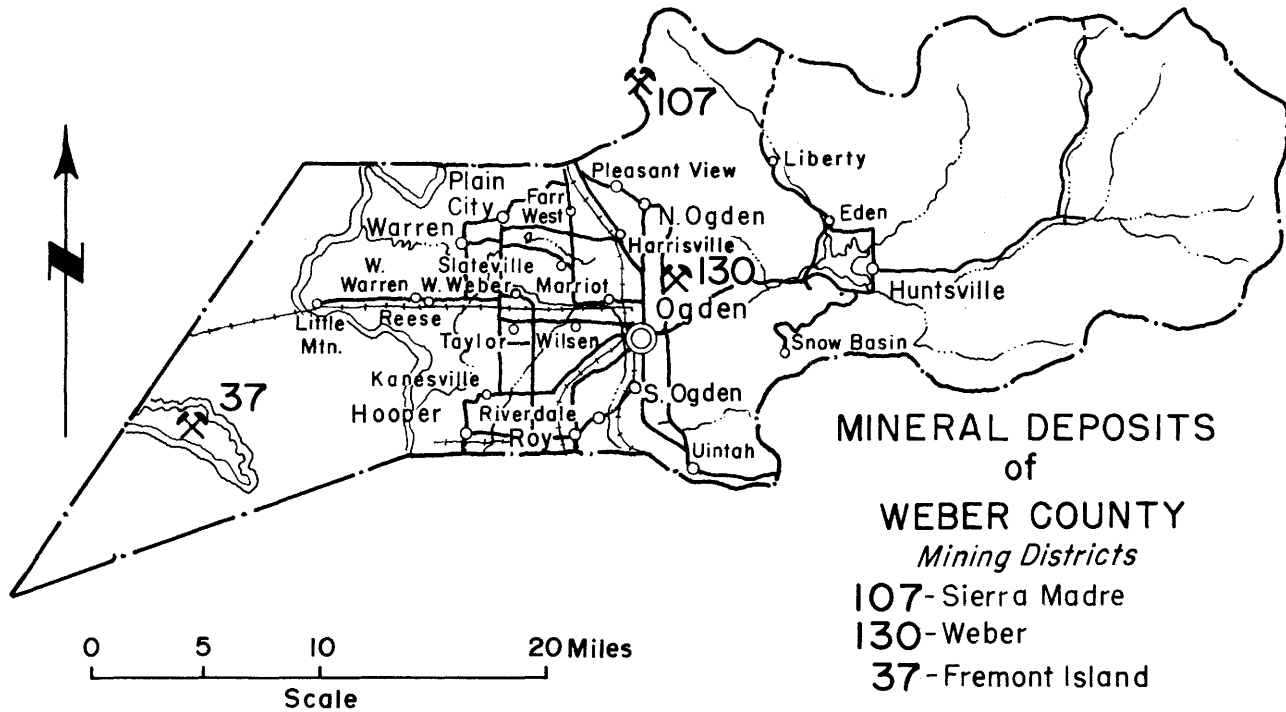


Figure 30.

CHAPTER III

MINERALS OF UTAH

ABERNATHYITE

Hydrous potassium uranium arsenate, $K(UO_2)(AsO_4) \cdot 4H_2O$. Tetragonal. Crystals tabular, occur singly or in groups. H. 2-3. G. 3.7. $\frac{1}{2}$ Color yellow. Transparent. Luster vitreous. Fluoresces to moderately yellow-green color. Streak pale yellow. Occurs as crystalline coating, lining fractures in sandstone.

Emery County San Rafael district: Temple Mountain, Fuemrol no. 2 mine.

ACMITE* $\frac{2}{2}$

Sodium iron silicate, $NaFeSi_2O_6$. Monoclinic. Crystals long prismatic, vertically striated. H. 6-6.5. G. 3.5. Cleavage distinct. Brittle. Color brownish, reddish brown, green. Luster vitreous. Found from cores and cuttings from the Green River Formation, Duchesne County Carter Oil Company wells; Green River Formation; Sinclair Mortenson well.

ACTINOLITE

Calcium-magnesium-iron amphibole, $Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$. Monoclinic. Crystals short or long bladed, columnar or fibrous, granular massive. H. 5-6. G. 3-3.2. Cleavage pris-

1. G. = specific gravity; H. = hardness.

2. Some minerals are starred (*), indicating that the Utah mineral occurrence is characterized by mineral grains and/or crystals that are typically tiny to microscopic in size.

matic at angle of 56 degrees. Color bright green and grayish green. Commonly found in crystalline schists. Beaver County Granite district: Bismuth mine; Star district: Moscow mine. Grand County La Sal Mountains (North Mountain); Miners Basin district: Dewey, M.I.F. mines.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Juab County West Tintic district: Tintic Western mine.

Salt Lake County Big Cottonwood district; Bingham district; Little Cottonwood district: Alta mine.

Tooele County Gold Hill district: Reaper, Yellow Hammer mines; Ophir district: Ophir Hill area- Hidden Treasure mine; Rush Valley district: Settlement Canyon.

Utah County Silver Lake district: Milkmaid, Ontario mines.

ADAMITE

A basic arsenate of zinc, $Zn_2(OH)_2(AsO_4)$. Orthorhombic. Occurs in small crystals, often grouped in crusts and granular aggregations. H. 3.5. G. 4.3. Cleavage good. Color honey-yellow, violet, rose-red, green, colorless. Luster vitreous. Brittle. A rare secondary mineral in oxidized ore zones containing primary zinc and arsenic materials.

Juab County Tintic district: Iron Blossom mine.

Tooele County Gold Hill district: Gold Hill (Western Utah) mine.

Washington County Tutsagubet district: Apex (Dixie) mine.

ADULARIA (See ORTHOCLASE)

AEGERITE (See WURTZILITE)

AEGIRINE (See AEGIRITE)

AEGIRITE

Sodium iron silicate, $\text{NaFe}(\text{Si}_2\text{O}_6)$. Monoclinic. Slender crystals with steep terminations. Often in fibrous aggregates. H. 6-6.5. G. 3.5. Comparatively rare rock-forming mineral in igneous rocks.

Grand County La Sal Mountains: North Mountain.

San Juan County La Sal Mountains: Middle Mountain, Brumley Ridge.

AEONITE (See WURTZILITE)

AGATE

(See CRYPTOCRYSTALLINE QUARTZ)

AGUILARITE

A silver sulfide and selenide, Ag_4SeS . Isometric. Skeleton dodecahedrons, often elongated, also massive. Cleavage none. Fracture hackly. Sectile. H. 2.5. G. 7.6 Luster metallic, brilliant. Color iron black. Opaque. Washington County Silver Reef district.

AIKINITE

A lead, copper, bismuth sulfide, Pb-CuBiS_3 . Orthorhombic. Acicular crystals, basal striations. Cleavage poor. H. 2-2.5. G. 6-7. Fracture uneven. Luster metallic. Color blackish lead-gray; tarnishes brown or copper red, sometimes with a yellowish green coating. Streak grayish black. Opaque. Salt Lake County Little Cottonwood district: South Hecla mine.

Tooele County Gold Hill district: Gold Hill (U.S.), U.S. mines.

ALABASTER (See GYPSUM)

ALASKAITE*

A lead, silver, copper bismuth sulfide, $\text{Pb}(\text{Ag,Cu})_2\text{Bi}_4\text{S}_8$. Massive, compact, or with foliated structure. Indistinct cleavage. Brittle. H. 2.6. G. 6.8.

Luster metallic. Color light lead-gray, may tarnish bronze. Streak gray. Opaque.

Salt Lake County Big Cottonwood district: Maxfield mine.

ALBERTITE

An asphaltic pyrobitumen. Occurs in veins and fillings in the Green River Formation.

Duchesne County near Duchesne. Utah County Colton: Higgins, James Peak (Brown Bear), Kyune Canyon, Midnight, Miller, Pleasant Valley, Thomas Ranch, Town mines.

Wasatch County Soldier Summit: Culmer Brothers, Soldier Summit, U. S. mines.

ALBITE

Sodium, aluminum silicate, $\text{NaAlSi}_3\text{O}_8$. Triclinic. Crystals tabular and elongated, polysynthetic twinning. H. 6. G. 2.6. Cleavage good, two directions. Brittle. Luster vitreous. Color white, gray.

Beaver County East of Rock Corral. Iron County Iron Springs district:

Granite Mountain, Iron Mountain.

Juab County Spring Creek district: Queen of Sheba mine.

Millard County House Range: Amasa Valley, Notch Peak intrusive.

Piute County Marysvale district. Sevier County Henry district: Trinity prospect.

Tooele County Gold Hill district: Reaper, Yellow Hammer mines; Granite Mountain district; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Utah County East Tintic district.

ALISONITE (See GALENA)

ALLANITE

Complex silicate, $\text{X}_2\text{Y}_3\text{O}(\text{SiO}_4)_3(\text{Si}_2\text{O}_7)(\text{OH})$. X = Ca, Ce, La, Na; Y = Al, Fe, Mn, Be, Mg. Monoclinic. Commonly massive and in imbedded grains. H. 5.5-6. G. 3.5-4.2. Luster sub-metallic to pitchy. Color brown to

pitch-black. Often coated with yellow-brown alteration product.

Salt Lake County Alta stock; Little Cottonwood district; Little Cottonwood stock.

Tooele County Gold Hill district.

Utah County Little Cottonwood stock.

ALLOPHANE

Hydrous aluminum silicate, $\text{Al}_2\text{SiO}_5 \cdot n\text{H}_2\text{O}$. Amorphous. In incrustations, sometimes stalactitic. H. 3. G. 1.8. Brittle. Fracture imperfectly conchoidal. Luster vitreous to subresinous. Color pale sky-blue, green, brown, colorless. Translucent.

Kane County Kaibab fault, west side.

Piute County Marysvale district.

Salt Lake County Bingham district; Bingham Copper pit.

San Juan County White Canyon district; Happy Jack mine.

Utah County East Tintic district.

ALMANDINE (See SPINEL)

ALMANDITE (See GARNET)

ALTAITE

Lead telluride, PbTe . Isometric. Atomic structure like galena. Rarely in crystals, usually massive with cubic cleavage. H. 3. G. 8.1. Color tin-white, with yellowish tinge tarnishing to bronze-yellow.

Utah County East Tintic district.

ALUMINITE

Hydrous basic aluminum sulfate, $\text{Al}_2(\text{SO}_4)(\text{OH})_4 \cdot 7\text{H}_2\text{O}$. May be monoclinic or orthorhombic. Occurs as reniform or nodular masses, composed of tiny needles or fibers. Fracture earthy. Friable. H. 1-2. G. 1.7. Luster dull, earthy. Color white. Opaque. Occurs as concretionary deposits in clays and marls.

Grand County Green River, Crossing of the D. and R. G. Railroad.

Kane County Alum Hills; Paria, 9 miles south.

Piute County Marysvale district.

ALUNITE

Hydrous aluminum potassium sulfate, $\text{KAl}_3(\text{SO}_4)_2(\text{OH})_6$. Hexagonal. In rhombohedrons, resembling cubes. Massive, with fibrous or granular texture. H. 3.5-4. G. 2.6-2.9. Cleavage distinct basal. Fracture uneven. Luster vitreous and pearly. Brittle. Color white, pink, gray.

Beaver County Newton district; Sheep Rock mine; San Francisco district; Horn Silver mine; White Mountain.

Box Elder County Lucin district; Copper Mountain, Tecoma Hill mines.

Piute County Gold Mountain district;

Marysvale district; Al-Kee-Mee, Big Chief, Big Star, East Slope no. 2, J.

and L. Alunite, Manning Creek, Mary's Lamb, Marysvale Peak, North Star,

Pittsburg, Silica Hills, White Hills,

White Horse, Yellow Jacket mines;

Mount Baldy district; Bradburn, Close

In, Crystal, Mineral Products, L. and

N., Sunshine mines; Sevier Canyon.

San Juan County Red Canyon district;

Markey no. 3 mine; White Canyon dis-

trict; W. N. mine.

Sevier County Rock Candy Mountain.

Utah County East Tintic district.

Wasatch County Keetley area.

Washington County Mineral Mountain;

Beauty Knoll claims.

Wayne County Chimney Rock to Tant-

lus Flat; Fruita; Oyster mine; Grand

Wash to Capitol Wash.

ALUNOGEN

Hydrous aluminum sulfate, $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$. Monoclinic or triclinic. Usually in delicate fibrous masses, crusts, or in powder form. H. 1.5-2. G. 1.65-1.8. Cleavage perfect. Luster vitreous to silky. Colorless, white, yellowish, or reddish by impurities.

Emery County San Rafael district; Dexter group.

Garfield County Coyote Creek district; Hampton mine.

AMATRICE (See VARISCITE)

AMETHYST (See QUARTZ)

AMMONIA ALUM

Hydrous ammonium aluminum sulfate, $(\text{NH}_4)\text{Al}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$. Isometric. Occurs as fibrous or columnar masses, or as efflorescences. H. 1.5. G. 1.6. Fracture conchoidal. Lustre vitreous, fibrous masses silky. Colorless to white. Taste sweetish and astringent.

Kane County Kaibab fault, west side.

AMMONIOJAROSITE

Basic sulfate of ammonium and ferric iron, $(\text{NH}_4)\text{Fe}_3(\text{SO}_4)_2(\text{OH})_6$. Hexagonal. Occurs as small lumps and irregular flattened nodules, composed of microscopic tabular grains. G. 3.1. Color light yellow. Lustre dull, waxy to earthy.

Kane County Kaibab fault, west side.

AMPHIBOLE (See also ACTINOLITE, HORNBLENDE, TREMOLITE)

Series of complex silicates of magnesium, iron, calcium, and aluminum or various combinations of these elements. Amphibole is a common rock-forming mineral in both igneous and metamorphic rocks.

Tooele County Gold Hill district: Calaveras, Centennial and Enterprise, Reaper mines.

ANALCIME (See ANALCITE)

ANALCITE

Hydrous sodium aluminum silicate, $\text{NaAlSi}_2\text{O}_6 \cdot \text{H}_2\text{O}$. Isometric. Usually forms trapezohedrons, also massive granular, compact. H. 5-5.5. G. 2.2. Cleavage cubic. Fracture subconchoidal. Brittle. Lustre vitreous. Colorless, white; occasionally gray, greenish, yellowish, or reddish. A zeolite.

Duchesne County Carter Oil Company wells; Green River Formation; Sinclair Mortenson well.

Iron County in andesite flows near Paragonah.

Tooele County Rush Valley district:

Settlement Canyon.

Uintah County Hells Hole Canyon; White River Canyon.

ANATASE

Titanium dioxide, TiO_2 . Tetragonal. Commonly pyramidal crystals, also tabular. H. 5.5-6. G. 3.9. Cleavage perfect. Fracture subconchoidal. Brittle. Lustre adamantine. Color various shades of brown, passing into indigo-blue and black; also greenish, blue-green, lilac, gray, and rarely colorless. Streak colorless to pale yellow. Transparent.

Piute County Mount Baldy district: Deer Trail mine.

Tooele County Gold Hill district: Reaper mine.

Utah County East Tintic district.

Wayne County Caineville.

ANDALUSITE

Aluminum silicate, Al_2SiO_5 . Orthorhombic. Usually in coarse prismatic forms, also massive, sometimes radiated and granular. H. 7.5. G. 3.2. Cleavage good. Fracture uneven. Brittle. Lustre vitreous. Color white, reddish, violet, gray, reddish-brown, olive-green. A metamorphic mineral.

Beaver County Beaver Lake district.

Juab County Trout Creek district: Bacon mine.

Tooele County Deep Creek Mountains; Gold Hill district: Cane Springs mine.

ANDERSONITE

Hydrous carbonate of sodium, calcium, uranium, $\text{Na}_2\text{Ca}(\text{UO}_2)(\text{CO}_3)_3 \cdot 6\text{H}_2\text{O}$. Hexagonal. Occurs in clusters of minute pseudo-cubic crystals. G. 2.8. Color bright green. Fluoresces bright green. Soluble in water.

Grand County Thompsons district: Parco no. 23, Skinny no. 1 mines.

San Juan County Cane Wash: Atomic King no. 2 mine.

ANDESINE

A mineral intermediate in the albite-

anorthite series. Triclinic. Crystals tabular and elongated, twinned. H. 6. G. 2.6. Cleavage good. Fracture uneven. Luster vitreous to pearly. Colorless, white, gray. Constituent of many igneous rocks in Utah.

Iron County Paragonah; Iron Peak.

Millard County Twin Peaks.

ANDRADITE (See GARNET)

ANGLESITE

Lead sulfate, $PbSO_4$. Orthorhombic. Crystals prismatic, or tabular. Also massive, granular to compact, nodular, frequently earthy in concentric layers. H. 3. G. 6.4. Cleavage good. Fracture conchoidal. Brittle. Luster adamantine when pure, dull when earthy. Color white, tinged yellow, gray, green, blue. Found in oxidized zone of ore bodies.

Beaver County Bradshaw district: Cave mine; Pine Grove district; San Francisco district: Horn Silver mine; Lincoln district: Creole, Lincoln mines; Star district: Cedar-Talisman, Hoosier Boy, Harrington-Hickory, Hub, Moscow, Rebel, Red Warrior, White Rock, Wild Bill mines.

Box Elder County Ashbrook district: Vipont mine; Lucin district: Copper Mountain, Tecoma Hill mines; Newfoundland district.

Cache County Paradise district.

Davis County Farmington district: Parrish Canyon.

Emery County San Rafael district: Copper Globe mine.

Juab County Fish Springs district: Carnation, Emma, Galena, Utah mines; Tintic district: Bullion Beck, Eagle, Blue Bell, Eureka Hill, Gemini, Godiva, Humbug, Sunbeam, Swansea mines; West Tintic district: 88, Scotia, War Eagle mines.

Millard County Leamington district: Arbroath, Leamington Mining Company, Yellowstone mines.

Morgan County Argenta district: Carbonate Hill, Carbonate Gem mines.

Piute County Mount Baldy district: Deer Trail mine.

Salt Lake County Big Cottonwood

district; Bingham district: Galena, Old Jordan mines; Little Cottonwood district: Emma, Little Emma, Michigan-Utah mines.

Summit County Park City district: Comstock, Daly, Little Bell, Nail Driver, Ontario, Scottish Chief, Silver King, Woodside mines.

Tooele County Dugway district: Bryan claim; Gold Hill district: Cash Boy, Gold Hill (U.S.), Gold Hill Standard, Monoco, New Baltimore, Red Jacket, Rube, Silver King, Spotted Fawn mines; North Tintic district: New Bullion, Sacramento mines; Rush Valley district: Honerine, Muerbrook mines; Lakeside district.

Utah County East Tintic district: Burgin, North Lily, Tintic Standard mines; North Tintic district: Lehi-Tintic, Tintic Empire, Tintic Paymaster, Selma mines; Silver Lake district: Milkmaid, Ontario mines.

Weber County Sierra Madre district: Eldorado property.

ANHYDRITE

Calcium sulfate, $CaSO_4$. Orthorhombic. Crystals not common, usually massive, granular. H. 3-3.5. G. 2.9. Cleavage good. Fracture uneven. Brittle. Luster vitreous to pearly. Color white, gray, bluish, reddish. Transparent to translucent. Occurs in association with gypsum. In southeastern Utah it is found in the Paradox Member of the Hermosa Formation; in east-central Utah it occurs in the Carmel and Summerville Formations; in central Utah in the Arapien Shale; in southwestern Utah it occurs in the Kaibab, Moenkopi, Carmel, and Curtis Formations; in northeastern Utah it occurs in the Thaynes, Green River, and Carmel Formations.

Beaver County Pruess district: Blackbird, Cactus mines.

Duchesne County Green River Formation; Lake Fork.

Emery County Cedar Mountain; Fullers Bottom; Horn Silver Gulch; San Rafael River.

Garfield County Water Pocket Canyon.

Grand County Cane Creek; Fisher Valley; Gypsum Hills; McCarthy well;

Moab Valley; Onion Creek; Paradox basin; Salt Valley; Seven Mine Anticline; Thompsons area.

Iron County Cedar Canyon; Kanarraville.

Juab County Mona district: San Pitch Mountains, Chicken Creek, Levan, Nephi, Salt Creek.

Kane County Cannonville; Glendale; Johnson Creek; Kanab Creek; Kimball Valley; Paria, 9 mi. south.

Millard County Fillmore; Kanosh.

Piute County Sevier Canyon.

San Juan County Gypsum Creek; Moab Valley; Monticello district; Paradox basin; San Juan River.

Sanpete County Gunnison; Mayfield; Twelve Mile Canyon.

Sevier County Glenwood; Sigurd.

Tooele County Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Wayne County Last Chance Gulch; Muddy River.

ANKERITE

Carbonate of calcium, magnesium, iron, $\text{CaCO}_3 \cdot (\text{Mg}, \text{Fe})\text{CO}_3$. Hexagonal. Crystals rhombohedral, also prismatic. Massive, fine to coarse granular, columnar. H. 3.5-4. G. 2.9. Cleavage rhombohedral, perfect. Brittle. Luster vitreous to pearly. Color gray, greenish, yellowish-brown, brown.

Emery County San Rafael district: Temple Mountain.

Juab County Tintic district: Victoria mine.

ANNABERGITE*

A hydrated arsenate of cobalt, nickel, $(\text{Ni}, \text{Co})_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$. Monoclinic. Crystals rare, prismatic to acicular and flattened. Usually occurs as fine crystalline coatings or earthy. H. 1.5-2.5. G. 3. Cleavage good. Flexible. Sectile. Luster weakly adamantine, pearly; also dull, earthy. Color pink, rose, white, gray, apple-green.

Iron County Escalante district: Escalante mine.

ANORTHITE

Calcium aluminum silicate, $\text{CaAl}_2\text{-Si}_2\text{O}_8$. Triclinic. Crystals usually twinned. Cleavage good, two directions. Basal cleavage shows striations. H. 6. G. 2.7. Colorless, white, gray. An end member of the plagioclase series.

Millard County House Range: Notch Peak stock.

Salt Lake County Big Cottonwood district: Confidence, Maxfield mines.

ANORTHOCLASE

Sodium potassium aluminum silicate, $(\text{Na}, \text{K})\text{AlSi}_3\text{O}_8$. Triclinic. Form like that of ordinary feldspars. Twinning as in orthoclase; also polysynthetic twinning. H. 6. G. 2.6. Cleavage good, two directions. Color white, gray. Associated with acidic igneous rocks.

Tooele County Gold Hill district: Reaper mine.

ANTHOPHYLLITE

Basic magnesium silicate, $(\text{Mg}, \text{Fe})_7\text{-}(\text{Si}_8\text{O}_{22})(\text{OH})_2$. An amphibole. Orthorhombic. Cleavage perfect prismatic. H. 5.5-6. G. 2.9-3.2. Luster vitreous. Color brownish gray, yellowish brown, greenish. Translucent.

Daggett County Red Creek Complex.

ANTIGORITE

Basic magnesium silicate, $\text{Mg}_3\text{Si}_2\text{O}_5\text{-}(\text{OH})_4$. A chlorite. Monoclinic. Crystals are tabular, usually six-sided. Commonly foliated or thin scales in aggregates. Cleavage perfect. H. 1-2.5. G. 2.8. Luster pearly to dull. Color green. Occurs in contact metamorphic zones.

Sevier County Henry district: Trinity prospect.

ANTLERITE

Basic sulfate of copper, $\text{Cu}_3(\text{SO}_4)\text{-}(\text{OH})_4$. Orthorhombic. Usually thick

tabular crystals, cross-fiber veinlets, or acicular aggregates. Cleavage perfect. Brittle. H. 3.5. G. 3.9. Luster vitreous. Color emerald green to dark green, light green. Streak pale green. A secondary mineral.

San Juan County White Canyon district: Happy Jack mine.

Utah County East Tintic district: Burgin mine.

APATITE

Calcium phosphate, $\text{Ca}_5(\text{F,Cl,OH})(\text{PO}_4)_3$. Hexagonal. Commonly in crystals of long and short prismatic habit, also tabular. May be massive with structure granular to compact. H. 5. G. 3.2. Cleavage poor. Fracture conchoidal and uneven. Luster vitreous. Color green, white, yellow, gray, red, brown. Transparent and translucent.

Beaver County Granite district: Miller mine; Rocky district: Old Hickory mine; San Francisco district.

Iron County Iron Springs district: Granite Mountain, Iron Mountain, Three Peaks.

Millard County Twin Peaks.

Salt Lake County Little Cottonwood stock.

San Juan County La Sal Mountains: Middle Mountain, Brumley Ridge.

Sevier County Henry district: Trinity prospect.

Tooele County Dugway district; Gold Hill district: Centennial and Enterprise, Copper Bloom, Doctor, Victory no. 1, Yellow Hammer mines; Granite Mountain district; Ophir district: Dry Canyon area; Ophir Hill area - Hidden Treasure, Ophir Hill Consolidated, Ophir Coalition mines.

Utah County Little Cottonwood stock.

APJOHNITE

A hydrated sulfate of aluminum and manganese, $\text{MnAl}_2(\text{SO}_4)_4 \cdot 22 \text{H}_2\text{O}$. Monoclinic. Occurs as masses and crusts, composed of fibrous or acicular crystals. H. 1.5. G. 1.8. Luster silky. Colorless to white, also

tinted rose, pale green, yellow.

Salt Lake County Alum Point.

APOPHYLLITE

Hydrous calcium potassium fluosilicate, $\text{KCa}_4(\text{Si}_4\text{O}_{10})_2\text{F} \cdot 8\text{H}_2\text{O}$. Tetragonal. Usually occurs as crystals. H. 4.5-5. G. 2.4. Cleavage perfect. Luster pearly, vitreous. Colorless, white, gray, may be shades of green, yellow, rose. Transparent to translucent.

Salt Lake County Bingham district: Bingham Copper pit.

Tooele County Rush Valley district: Honerine mine.

Uintah County Hells Hole Canyon; White River Canyon.

AQUAMARINE (See BERYL)

ARAGONITE

Calcium carbonate, CaCO_3 . Orthorhombic. Crystals often acicular. Also in slender prisms, columnar, fibrous, stalactitic, massive, globular. H. 3.5-4. G. 2.9. Cleavage good. Brittle. Luster vitreous. Color white, gray, brown, yellow, green, violet. Transparent to translucent.

Beaver County Bradshaw district.

Box Elder County Great Salt Lake.

Davis County Great Salt Lake.

Juab County Tintic district: Iron Blossom mine.

Millard County Leamington district: Yellowstone mine.

Salt Lake County Great Salt Lake.

Tooele County Great Salt Lake; Mercur district; Rush Valley district: Honerine mine.

Utah County Lehi district: Pelican Point area - Canyon, Foothill and Hilltop, Pelican and Utah Valley veins.

ARDUNITE

A zeolite containing lime and soda. Probably orthorhombic. Occurs in radiation fibrous aggregates. G. 2.3. Color red.

Juab County Tintic district.

ARSENOBISMITE

Chemically hydrated bismuth arsenate, of uncertain formula. Occurs as friable or ocherous microcrystalline masses. Color yellowish brown to yellowish green. G. 5.7.

Juab County Tintic district; Mammoth mine.

ARSENOPYRITE

Iron sulfarsenide, FeAsS . Monoclinic. Crystals prismatic or flattened. Also granular or compact. H. 5.5-6. G. 5.9-6.2. Cleavage fair. Fracture uneven. Brittle. Luster metallic. Color silver white to steel gray. Streak dark gray.

Box Elder County Ashbrook district: Vipont mine; Park Valley district: Century, Susannah mines.

Garfield County Circle Cliffs; Rocky Mountain mine.

Juab County Tintic district: Swansea mine; West Tintic district: Scotia mine.

Salt Lake County Bingham district: Eagle Bird lode.

Tooele County Gold Hill district: Bonanza, Boston, Cash Boy, Climax, Copper Queen-Midland Mining Company, Cyclone, Gold Hill (U. S.), Gold Hill Standard, Mascot, Minnehaha, Monte Del Rey, New Baltimore, Ozark, Silver and Gold Mining Company, Success, Unadine, and U.S. mines; Mercur district: Geyser-Marion, Golden State mines; Rush Valley district: Ben Harrison, Honerine mines.

ASBESTOS (See SERPENTINE)

ASPHALT (See ASPHALTUM)

ASPHALTUM

Mixture of various hydrocarbons. Amorphous. G. 1-1.8. Luster like black pitch. Color brownish black, black. Odor bituminous. Burns with a bright flame.

Box Elder County north shore of Great Salt Lake; Rozel Point.

Carbon County Sunnyside.

Uintah County Asphalt Ridge; Evacuation Creek; PR Springs; Whiterocks Canyon.

Utah County Colton; Gilluly; Thistle Junction.

Wasatch County Soldier Summit.

Wayne County Capitol Wash; Grand Wash to Capitol Wash.

ATACAMITE

Basic chloride of copper, $\text{Cu}_2(\text{OH})_3\text{Cl}$. Orthorhombic. Commonly in slender prismatic crystals, also tabular. Occurs as aggregates, also massive, fibrous, granular to compact. H. 3-3.5. G. 3.7. Color bright green. Luster adamantine to vitreous. Cleavage good. Brittle. Streak apple green. Secondary mineral.

Juab County Tintic district.

AUGITE

Aluminous pyroxene, $(\text{Ca}, \text{Na})(\text{Mg}, \text{Fe}^{++}, \text{Fe}^{+++}, \text{Al})(\text{Si}, \text{Al})_2\text{O}_6$. Monoclinic. Crystals prismatic. Cleavage good, prismatic, nearly right angles. H. 5-6. G. 3.3. Luster vitreous. Color dark green to black.

Beaver County San Francisco district; Star district: Lady Bryan mine.

Grand County La Sal Mountains; North Mountain.

Iron County Paragonah; Iron Mountain.

Millard County Twin Peaks.

San Juan County La Sal Mountains district: Middle Mountain, Brumley Ridge.

Tooele County Dutch Mountain; Stansbury Mountains; North Willow Canyon.

AURICHALCITE

Basic zinc copper carbonate, $(\text{Zn}, \text{Cu})_5(\text{OH})_6(\text{CO}_3)_2$. Orthorhombic. Occurs in drusy incrustations, also tufted, feathery, or plumose forms. Cleavage good. H. 1-2. G. 3.6. Fragile. Luster silky to pearly. Color pale green, greenish blue, sky blue. Transparent.

Beaver County Bradshaw district: Cave mine; Granite district; Big Pass group; Star district.

ARGENTITE

Silver sulfide, Ag_2S . Isometric. Crystals octahedral, also cubic. H. 2-2.5. G. 7.3. Cleavage poor. Very sectile. Luster metallic. Color blackish lead-gray. Streak blackish lead-gray, shining. Opaque.

Beaver County Bradshaw district: Cave, Hecla, Nip and Tuck mines; San Francisco district: Horn Silver mine; Granite district: Beaver View mine; Indian Peak district; Lincoln district: Lincoln mine; Newton district: Sheep Rock mine.

Box Elder County Ashbrook district: Vipont mine.

Iron County State-Line district.

Juab County Mt. Nebo district: Big Nebo, Blackett tunnel, Eva, Freddie Lode mines; Tintic district: Mammoth mine.

Piute County Gold Mountain district: Annie Laurie, Sevier mines; Marysvale district: Quicksilver mine; Mt. Baldy district: Pluto mine.

Salt Lake County Big Cottonwood district: Carbonate mine; Bingham district: Little Cottonwood district: Albion, Emma mines.

Summit County Park City district: Daly West mine.

Tooele County Ophir district: Dry Canyon area - Surprise mine; Ophir Hill area - Jim Fisk, Ophir Hill Consolidated, Ophir Coalition, Sacramento mines.

Utah County Alpine district: Alpine-Galena property; American Fork district: Miller mine; East Tintic district: Burgin mine; Provo district: Monarch mine; Silver Lake district: Milkmaid, Ontario mines.

Washington County Silver Reef district: California, Leeds, Requa, Savage mines.

ARGENTOJAROSITE

Basic sulfate of silver and iron, $\text{AgFe}_3(\text{SO}_4)_2(\text{OH})_6$. Hexagonal. Occurs in minute scales with hexagonal outline as fine grained masses and coatings. G. 3.6. Cleavage basal. Luster brilliant. Color yellow to brown. A

secondary mineral.

Beaver County Granite district: Big Pass group.

Tooele County Ophir district: Lion Hill area - Buffalo mine, Chloride Point.

Utah County East Tintic district: Burgin, Tintic Standard mines.

ARGULITE

An asphalt. Occurs as an asphalt-saturated sandstone.

Uintah County Argyle Creek.

ARGYRODITE*

Silver germanium sulfide, Ag_8GeS_6 . Isometric, perhaps tetrahedral. Occurs as crystals, also massive, compact, or in botryoidal crusts. H. 2.5. G. 6.2. Fracture uneven to conchoidal. Brittle. Luster metallic. Color black with blue to purple tone, steel gray on fresh surface.

Box Elder County Ashbrook district: Vipont mine.

ARSENIC

Native arsenic, As. Hexagonal. Rarely in crystals, generally granular massive, sometimes reticulated, reniform, stalactitic. Cleavage good. Fracture uneven. Brittle. H. 3.5. G. 5.7. Luster nearly metallic. Color and streak tin-white, tarnishing to dark gray.

Emery County San Rafael district: Fuemrol no. 2 mine.

ARSENIOSIDERITE

Hydrated basic arsenate of calcium, iron, $\text{Ca}_3\text{Fe}_4(\text{AsO}_4)_4(\text{OH})_4 \cdot 4\text{H}_2\text{O}$. Tetragonal or hexagonal. In fibrous concretions, also granular. H. 4.5. G. 3.6. Cleavage basal. Luster silky. Color yellowish brown and reddish brown. Streak ocher yellow.

Juab County Tintic district.

Tooele County Gold Hill district: Gold Hill (Western Utah) mine.

Juab County Tintic district: Bullion Beck, Carissa. Gemini. Iron Blossom, May Day, Uncle Sam, Yankee mines; West Tintic district: War Eagle claims. Salt Lake County Big Cottonwood district: Carbonate mine. Tooele County Ophir district: Dry Canyon area - Kearsarge mine; Lion Hill area - Buffalo mine, Chloride Point; Ophir Hill area - Cliff, Hidden Treasure, Sacramento mines; Rush Valley district: Honerine mine; North Tintic district: Scranton mine. Washington County Dry Canyon; Tut-sagubet district: Apex (Dixie) mine.

AUSTINITE

Basic calcium zinc arsenate, $\text{CaZn}(\text{AsO}_4)(\text{OH})$. Orthorhombic. In minute bladed or acicular crystals. Also as radially fibrous crusts and nodules. H. 4-4.5. G. 4.1. Colorless to white, yellowish. Cleavage good. Brittle. Luster subadamantine to silky. Tooele County Gold Hill district: Gold Hill (U.S.) mine.

AUTUNITE

Hydrous calcium uranium phosphate, $\text{Ca}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 10-12\text{H}_2\text{O}$. Tetragonal. In thin tabular, wedge-shaped crystals. Also in foliated and micaceous crusts. H. 2-2.5. G. 3.1. Cleavage good. Luster subadamantine, pearly. Color lemon to sulfur yellow. Streak yellowish. Transparent to translucent.

Beaver County Newton district: Indian Creek, Sniffer and Mystery claims; Pine Grove district: Monarch mine.

Emery County San Rafael district: Calf Mesa, Dalton group, Lone Tree group, South Temple Wash, Wild Horse claims, Dripping Springs.

Garfield County Circle Cliffs: Acme, Black Widow, Blue Goose, Horse Head, Rocky Mountain, Steam Boat mines.

Grand County Pack Creek; Seven Mile Canyon; Thompsons district: Thom claim, Parco no. 23 mine.

Iron County Kanarrville.

Juab County Honeycomb Hills; Indian Creek.

Kane County Bulloch claims; Paria, 9 miles south.

Piute County Marysvale district: Buddy, Bullion Monarch, Copper Butte, East Slope no. 2, Freedom lease, Freedom nos. 1 and 2, Prospector nos. 1 and 3 mines.

San Juan County Monument Valley district: Oljeta, Skyline mines.

Sanpete County R.A.J. prospect.

Utah County Jensen: Bonnie Bell claims; Snow claims.

Washington County Hurricane Cliffs; Santa Clara district; Silver Reef district: Buckeye, Duffin and Toquer-ville, East Reef mines; Virgin anticline.

AXINITE

Hydrous aluminum borosilicate with varying amounts of calcium, manganese, and ferrous iron, $\text{Ca}_2(\text{Fe}, \text{Mn})\text{Al}_2(\text{BO}_3)(\text{Si}_4\text{O}_{12})(\text{OH})$. Triclinic. Frequently in crystals and crystalline aggregates; also massive, lamellar to granular. H. 6.5-7. G. 3.3. Luster vitreous. Color clove-brown, violet, gray, yellow, green. Transparent to translucent.

Tooele County Gold Hill district.

AZURITE

Basic copper carbonate, $\text{Cu}_3(\text{OH})_2(\text{CO}_3)_2$. Monoclinic. Crystals varied and highly modified. Also massive, earthy, and radiating spherical groups. H. 3.5-4. G. 3.8. Cleavage good. Fracture conchoidal. Brittle. Luster vitreous. Color azure blue to Berlin blue.

Beaver County Beaver Lake district: Copper Mountain, Beaver-Harrison, OK, Skylark mines; Lincoln district: Creole mine; Pruess district: Blackbird, Cactus mines; Rocky district: Copper Ranch mine; San Francisco district: Horn Silver mine; Star district: Cedar-Talisman, Hoosier Boy, Commonwealth, Kemple, Progressive, St.

Mary's, Copper King, Dotson, Harrington-Hickory, Rebel, White Rock, Red Warrior, Wild Bill mines.

Box Elder County Ashbrook district: Vipont mine; Lucin district: Copper Mountain, Jeff-Doran mines; New-foundland district: Copper Ridge; Willard district: Mormon Girl, Ogden Boilmakers, Overland claims.

Cache County Paradise district.

Dagget County Red Creek: Yellow Canary uranium deposit.

Davis County Antelope Island; Farmington district: Morning Star group, Parrish Canyon; Wandering Jew mine.

Emery County Castle Dale; Castle Valley; San Rafael district: Dexter group, Copper Globe deposit.

Garfield County Circle Cliffs: Acme, Black Widow, Steam Boat, Blue Goose mines; Henry Mountains: Bromide, Oro mines, Cuprum claim.

Grand County Hoosier mine; La Sal district: Bormite, McCoy mines; Miners Basin district: Moab no. 1, High Ore mines; Richardson district; Salt Valley.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Utah County Detroit district: Charm, Copperhead, E. P. H., Ibex mines; Tintic district: Boss Tweed, Bullion Beck, Carissa, Centennial Eureka, Gemini, Iron Blossom, Sioux mines; Spring Creek district: Queen of Sheba mine; West Tintic district: Scotia, Tintic Western mines.

Kane County Paria Mining Company mine.

Millard County Detroit district: Almond, Blue Bell, Major Drum mines; Leamington district: Fool Creek Canyon.

Morgan County Morgan district: Chicago-Utah, Iron King, Morgan Consolidated, Morgan Crescent, Red Eagle mines; Round Valley: Copper Mountain mine.

Piute County Gold Mountain district: Sevier mine; Ohio district: Bully Boy and Webster, Cascade, Copper Belt, Dalton, Iris, Shamrock, Wedge mines.

Rich County Swan Creek district: Victoria prospect.

Salt Lake County Bingham district:

Butterfield, Columbia, Commercial, Dalton and Lark, Galena, Highland Boy, Midland, Old Jordan, Old Telegraph, Tiewaukee, U.S. and Lark, Yampa, York mines. Little Cottonwood district: Emma mine.

San Juan County Big Indian district: Big Indian Copper mine; Lisbon Valley: Climax nos. 1-2 claims, Lisbon Copper mines; La Sal Mountains; Monticello district: Copper Queen, Tuffy Copper mines; Monument Valley district: Oljeta, Skyline, Whirlwind mines; White Canyon district: Four Aces, Happy Jack, Jomac mines.

Sevier County Salina Creek district: Ball, Lead Hill mines; Sevier Canyon.

Summit County Park City district: Daly, Daly-Judge, Daly West, Jupiter, New York, Silver King, Silver King Consolidated, Woodside mines.

Tooele County Dutch Mountain; Dugway district: Belcher, Black Maria, Confidence, Kellys Hole, Metal States, Raymond-Bald Eagle mines; East Erickson district: Jessel Bezzel mine; Gold Hill district: Calavera, Copper Bloom, Copper Hill, Copperopolis, Copper Queen-Midland Mining Company, Gold Hill (U.S.), Ida Lull, Minnehaha, Monoco, New Baltimore, Ozark, Pole Star Copper Company, Rea, Silver King, Unadine, Victory no. 1, Yellow Hammer mines; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Mercur district: Mineral Hill mine; Ophir district: Dry Canyon area - Brooklyn, Kearsarge, Mono, Queen of the Hills mines; Ophir Hill area - Chicago, Cliff, Hidden Treasure, Sacramento mines; Silver Island district: Carrie Mack property; Willow Springs district.

Utah County Browns Park area: Brush Creek district: Little Altamira; Bullionville; Carbonate district: Dyer, Jessie Ewing mines, Red, Willow Creeks; Little Split Mountain; Uteland Knoll district (Ouray).

Utah County American Fork district: Miller mine; East Tintic district: Tintic Standard mine.

Washington County Mineral Mountain: Emma claims; Silver Reef district: Leeds, Newton, Requa mines; Tutsagubet district: Apex (Dixie) mine.

Wayne County Capitol Wash; Capitol Wash to Sheets Gulch; Miners Mountain district: Old Faithful, Wonder Copper no. 1 mines; Torrey: T. R. Lode no. 1 mine.

Weber County Cold Water Canyon; Weber district: New Azurite claim.

BALYDONITE

Basic hydrous copper lead arsenate, $(\text{Pb,Cu})_3\text{As}_2\text{O}_8 \cdot (\text{Pb,Cu})(\text{OH})_2 \cdot \text{H}_2\text{O}$. Probably monoclinic. In mammillary concretions, fibrous, drusy. H. 4.5. G. 4.4. Color green, yellow green. Luster resinous.

Summit County Park City district: Daly-Judge mine.

BARITE

Barium sulfate, BaSO_4 . Orthorhombic. Crystals commonly tabular, also prismatic. Globular forms, fibrous, lamellar, crested, earthy. H. 3-3.5. G. 4.5. Cleavage good. Fracture uneven. Brittle. Luster vitreous. Color white, or various tinges. Transparent to translucent.

Beaver County Antelope district; Beaver Lake district; Granite district: Big Pass, Contact mines; McGarry district; Pruess district: Blackbird, Cactus, Gold Reef mines; San Francisco district: Horn Silver mine.

Box Elder County Lucin district: Copper Mountain, Tri-State Minerals mines; Rosebud district.

Emery County Barium Incorporated mine.

Grand County Courthouse Wash; Little Grand district: Colorado Fuel and Iron Company mine; Needles; Tenmile Wash; Ryan Creek Scheelite prospect.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Juab County Deseret district: Rockwell shaft; Fish Springs district: Garrick mine; Mount Nebo district: Eva, Freddie mines; Tintic district: Boss Tweed, Carissa, Centennial Eureka, Eureka Hill, Gold Chain, Grand Central, Iron Blossom, Mammoth, Ophongong, Swansea mines; West Tintic district: 88, 1903, Pyramid, Scotia,

War Eagle mines.

Kane County Kitchen Corral Canyon.

Morgan County Argenta district: Carbonate Hill, Carbonate Gem mines.

Plute County Gold Mountain district; Marysville district: Bullion Monarch mine; Mount Baldy district: Lucky Boy mine; Ohio district: Bully Boy and Webster mines.

Rich County Swan Creek district: Victoria prospect.

Salt Lake County Big Cottonwood district; Bingham district: Eagle Bird Lode, Lucky Boy, Queen mines; Little Cottonwood district: Albion, Flagstaff mines.

San Juan County White Canyon district: Happy Jack mine.

Summit County Park City district.

Tooele County Bluebell district: Morgan mine; Deep Creek Mountains: Probert mine; Dugway district: Buckhorn, Confidence, Four Metals, Francis, Great Eastern, Juno, Kellys Hole, Lauris, Nautilus, Pride of the West mines; Gold Hill district: Christmas Mining Company, Garrison Monster, Reaper mines; Ibapah Mountains: Mercur district; Ophir district: Dry Canyon area; Lion Hill area - Buffalo, Chloride Point, Douglas, Lion, Zella mines; Ophir Hill area; Silver Island district: Carrie Mack Property; Wild Cat Mountain: Silver Queen mine. Utah County American Fork district: Bog, Dutchman, Pacific, Yankee mines; East Tintic district: Burgin, Eureka Lily, Eureka Standard, Tintic Standard mines; Payson district: Syndicate mine; Santaquin district: Union Chief mine; Silver Lake district: Milkmaid, Ontario mines.

Wasatch County Strawberry area, along thrust fault.

Weber County Cold Water Canyon.

BARNESITE

Hydrous sodium vanadate, $\text{Na}_2\text{V}_6\text{O}_{16} \cdot 3\text{H}_2\text{O}$. Monoclinic. Consists of microscopic bladed to fibrous crystals, in loose aggregates or in radiating cluster. Color dark red. Luster adamantine. Grains soft and friable. G. 3.2. Occurs in small cavities,

fractures, and fillings in sandstone.
Grand County Thompsons district;
Cactus Rat mine.

BARYTOCALCITE*

Calcium barium carbonate, $\text{CaBa}(\text{CO}_3)_2$. Monoclinic. Usually short to long prismatic crystals. Cleavage perfect. Fracture uneven. Brittle. H. 4. G. 3.6. Luster vitreous. Colorless to white, gray, green, yellow. Occurs in dolomitic shale.
Uintah County Sun Oil Company South Ouray well.

BASSANITE*

Hydrous calcium sulfate, $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$. Pseudomorphs after gypsum, composed of microscopic needles in parallel arrangement. Color white. G. 2.7. Occurs with anhydrite in Green River Formation.
Duchesne County Green River Formation.

BASSETITE

Hydrated iron uranium phosphate, $\text{Fe}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$. Monoclinic. Occurs as plates of flattened crystals. Cleavage perfect. H. 2.5. G. 3.4. Luster vitreous. Color olive green, also yellow, brown. Transparent. Not fluorescent.
Emery County Green River district; Denise no. 1 mine; San Rafael district; Fuenrol no. 2 mine.

BAYLEYITE

Hydrated magnesium uranium carbonate, $\text{Mg}_2(\text{UO}_2)(\text{CO}_3)_3 \cdot 18\text{H}_2\text{O}$. Monoclinic. Occurs as minute, short-prismatic crystals, also in acicular and divergent groups. H. 2-2.5. G. 2. Color sulfur yellow. Luster vitreous.
Emery County San Rafael district; Delta mine.
San Juan County Big Indian district; Mi Vida mine; Elk Ridge; Coral claim; White Canyon district; Hideout mine.

BEAVERITE

Basic sulfate of lead, copper, ferric iron, and aluminum, $\text{Pb}(\text{Cu}, \text{Fe}, \text{Al})_3(\text{SO}_4)_2(\text{OH})_6$. Hexagonal. Friable and earthy masses. G. 4.4. Color canary yellow.
Beaver County San Francisco district; Horn Silver mine.
Salt Lake County Little Cottonwood district; Centennial Alta mine.
Tooele County Ophir district; Ophir Hill area - Hidden Treasure mine.

BECQUERELITE

Hydrated oxide of hexavalent uranium, $2\text{UO}_3 \cdot 3\text{H}_2\text{O}$. Orthorhombic. Crystals tabular and elongated, striated; also massive. H. 2.5. G. 5.2. Cleavage good. Luster adamantine. Color amber to brownish yellow. Streak yellow. Transparent.
Emery County San Rafael district; Delta mine, Green Vein Mesa, Consolidated, Lucky Strike no. 2 mines.
Grand County Seven Mile Canyon.
San Juan County Big Indian district; Big Buck mine; Red Canyon district; Frey no. 4, Posey mines; White Canyon district; Happy Jack, Hideout mines.

BEIDELLITE

Basic magnesium iron aluminum silicate, $(\text{Mg}, \text{Fe}, \text{Al})_2(\text{Al}, \text{Si})_4\text{O}_{10}(\text{OH})_2$. Probably orthorhombic. Occurs in thin crystal plates. H. 1.5. G. 2.6. Cleavage one direction. Luster vitreous to waxy. Color white, red, gray.
Tooele County Gold Hill district; Copper Bloom mine.
Utah County Clay Canyon; East Tintic district.
Sanpete County near Fairview.

BENTONITE (See MONTMORILLONITE)

BERTRANDITE*

Hydrous beryllium silicate, $2\text{Be SiO}_4 \cdot \text{H}_2\text{O}$. Orthorhombic. Occurs in small tabular or prismatic crystals, heart-

shaped twins. Cleavage good. H. 6-7. G. 2.6. Colorless to pale yellow. Luster vitreous. Occurs in association with fluorite in tuffaceous beds replacing dolomite nodules. Grains about one micron in diameter. Juab County Honeycomb Hills; Thomas Range: Spor Mountain - Claybank, Blue Chalk, Hogsback, Northend, Rainbow, Roadside claims. Tooele County Gold Hill district: Rodenhouse Wash.

BERYL

Beryllium aluminum silicate, $\text{Be}_3\text{Al}_2\text{-Si}_6\text{O}_{18}$. Hexagonal. Crystals usually long prismatic, often vertically striated. Also coarse columnar or granular to compact. H. 7.5-8. G. 2.7. Cleavage poor. Fracture conchoidal to uneven. Brittle. Luster vitreous. Color emerald green, pale green to blue, yellow, white. Transparent to translucent. Aquamarine variety found in Ibapah Mountains; bixbite, raspberry red color, found on Topaz Mountain; morganite, pink to rose red, variety found on west side of Spor Mountain.

Beaver County Granite district: Miller, Scheelite group mines.

Daggett County Red Creek Complex. Juab County Goshute Indian Reservation; Ibapah Mountains: Fifteenmile Canyon; Thomas Range: Spor, Topaz Mountains; Trout Creek district: Apex mine; Spring Creek district: Queen of Sheba mine; Dugway Range.

Tooele County Dugway district; East Erickson district: Hard-to-Beat, Sheeprock Canyons; Granite Mountain district; Ibapah Mountains.

BETA-URANOPHANE

(See BETA-URANOTILE)

BETA-URANOTILE

Basic hydrated silicate of calcium and uranium, $\text{Ca}(\text{UO}_2)_2(\text{SiO}_3)_2(\text{OH})_2 \cdot 5\text{H}_2\text{O}$. Monoclinic. Occurs as velvety coatings, fanlike aggregates or needlelike crystals. Cleavage perfect. Fracture conchoidal. Brittle.

H. 2.5-3. G. 3.9. Color usually yellowish green, citron yellow. Luster vitreous, silky. Fluoresces faint green.

Garfield County Henry Mountains. Juab County Thomas Range: Good Will, Yellow Chief mines.

Plute County Marysvale district: Freedom no. 2 mine.

San Juan County Paradox Valley district: Grey Dawn mine.

BEUDANTITE

Basic sulfate-arsenate of lead and ferric iron, $\text{PbFe}_3(\text{AsO}_4)(\text{SO}_4)(\text{OH})_6$. Hexagonal. H. 3.5-4.5. G. 4.2. Color black, dark green, brown. Streak grayish yellow, greenish. Luster vitreous to resinous. Transparent to translucent.

Tooele County Gold Hill district: Gold Hill (U.S.), Gold Hill (Western Utah) mines; Rush Valley district: Honerine mine.

BICKERITE (See AUSTINITE)

BIEBERITE*

Hydrous cobalt sulfate, $\text{CoSO}_4 \cdot 7\text{H}_2\text{O}$. Monoclinic. Occurs as crusts and efflorescences. Cleavage good. Luster vitreous. H. 2. G. 1.9. Color rose-red, flesh red.

Emery County San Rafael district: Lucky Strike no. 2 mine.

San Juan County White Canyon district: Happy Jack mine.

BINDHEIMITE

A pyroantimonate of lead, $\text{Pb}_2\text{Sb}_2\text{O}_6(\text{O},\text{OH})$. Isometric. Occurs as cryptocrystalline masses, dense to earthy, or as incrustations. H. 4-4.5. G. 4.6-5.6. Fracture earthy to conchoidal. Luster resinous, dull or earthy. Color yellow, brown, reddish brown, gray white, greenish. Streak white to yellow. Opaque to translucent.

Beaver County San Francisco district: Horn Silver mine.

Box Elder County Willard district: Ogden Boilmakers claim.

Juab County Tintic district; Scotia mine; West Tintic district; War Eagle claims.

BINNITE (See TENNANTITE)

BIOTITE

Potassium magnesium iron aluminum silicate, essentially $K(Mg,Fe)_3(Al-Si_3O_{10})(OH)_2$. Monoclinic. Crystals tabular or short prismatic. Commonly in irregular foliated masses, also in scales and micaceous aggregates. H. 2.5-3. G. 2.7-3.1. Basal cleavage perfect. Folia flexible and elastic. Luster vitreous, pearly. Color green to black, deep brown. Biotite is a widely-occurring rock-forming mineral.

Beaver County San Francisco district.

Davis County Antelope Island.

Grand County La Sal Mountains (North Mountain).

Iron County Paragonah; Iron Peak.

Juab County Spring Creek district; Queen of Sheba mine.

Millard County House Range; Amasa Valley, Notch Peak intrusive; Twin Peaks.

Morgan County Arthur Fork.

Piute County Marysvale district.

Salt Lake County Little Cottonwood district; Alta mine; Little Cottonwood stock.

Tooele County East Erickson district; Ekker Canyon prospect, Silver King mine, South Pine Canyon; Gold Hill district; Gold Bond, Reaper mines; Stansbury Mountains; North Willow Canyon.

Utah County Little Cottonwood stock.

Weber County Sierra Madre district; Napoleon-Maghera group.

BIRNESSITE

A hydrous manganese oxide, perhaps $(Na,Ca)Mn_7O_{14} \cdot 8H_2O$. Earthy, some grains show facets; rosettes. H. 1.5. G. 2.9. Crystals are nearly opaque. Color dark brown. Occurs as tiny rosettes in cavities in quartz.

Washington County Enterprise.

BISCHOFITE*

Hydrous magnesium chloride, $MgCl_2 \cdot 6H_2O$. Monoclinic. Crystal-line granular, foliated; sometimes fibrous. Fracture conchoidal to uneven. H. 1-2. G. 1.6. Colorless to white. Luster vitreous to dull.

Tooele County Salduro; Wendover.

BISMITE

Bismuth trioxide, Bi_2O_3 . Monoclinic. Massive, compact granular to earthy. H. 4.5. G. 8.6-9.2. Fracture uneven to earthy. Luster subadamantine to dull, earthy. Color grayish green, yellow.

Juab County Tintic district; Boss Tweed, Eagle, Blue Bell mines.

Salt Lake County Little Cottonwood district; South Hecla mine.

Tooele County Gold Hill district; Wilson Consolidated mine.

BISMOCCLITE

Bismuth oxychloride, $BiOCl$. Tetragonal. Occurs only massive, compact, earthy, columnar to platy fibrous. H. 2-2.5. G. 7.7. Cleavage good. Very plastic. Color creamy-white, gray, yellow. Luster greasy to silky, dull to earthy.

Juab County Tintic district; Eagle, Blue Bell mines.

BISMUTH

Native bismuth, Bi. Hexagonal. Crystals rare. Foliated or granular. H. 2.5. G. 9.8. Cleavage good. Sectile. Brittle. Luster metallic. Color and streak silver-white, reddish tint. Opaque.

Juab County Tintic district; Boss Tweed, Emerald mines.

Salt Lake County Bingham district; Little Cottonwood district; South Hecla mine.

Tooele County Gold Hill district; Copper Bloom, Doctor, Lucy L., Wilson Consolidated mines; Ophir district; Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

BISMUTHINITE

Bismuth trisulfide, Bi_2S_3 . Orthorhombic. Usually massive, foliated or fibrous. H. 2. G. 6.8. Cleavage good. Somewhat sectile. Luster metallic. Color and streak lead-gray to tin-white, with a yellow tarnish. Opaque.

Beaver County Bismuth mine; Stardistrict: Commonwealth, Kemple, Progressive, St. Mary's mines.

Box Elder County Newfoundland district.

Juab County Tintic district; Mammoth mine; West Tintic district.

Salt Lake County Little Cottonwood district; South Hecla mine.

Tooele County Blue Bell district; Bogan mine; Gold Hill district; Copper Bloom, Lucy L., Wilson Consolidated mines; Overland Canyon.

Utah County East Tintic district.

BISMUTITE

Bismuth subcarbonate, $(\text{BiO})_2(\text{CO}_3)$. Tetragonal. Fibrous growths, earthy, or pulverulent. H. 2.5-3.5. G. 6.7-7.4. Cleavage good. Luster vitreous. Color white, green, yellow, gray. Streak greenish gray. Transparent in small grains.

Beaver County Stardistrict: Commonwealth, Kemple, Progressive, St. Mary's mines.

Box Elder County Lucin district; Empire mine.

Juab County Detroit district; Charm, Copperhead, E. P. H., Ibex mines; Tintic district; Boss Tweed, Carissa, Eagle and Blue Bell, Victoria mines.

Millard County Detroit district; Almond, Blue Bell, Major Drum mines.

Salt Lake County Bingham district.
Tooele County Gold Hill district; Copper Bloom, Lucy L., Wilson Consolidated mines.

BIXBITE (See BERYL)

BIXBYITE*

Iron manganese oxide, $(\text{Mn,Fe})_2\text{O}_3$. Isometric. Black cubic crystals.

H. 6-6.5. G. 4.9. Cleavage poor. Fracture irregular. Luster metallic to submetallic. Color black. Streak black. Opaque.

Juab County Dugway Range; Thomas Range; Topaz Mountain.

BLOEDITE

Hydrated sulfate of sodium and magnesium, $\text{Na}_2\text{Mg}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$. Monoclinic. Crystals short prismatic. Massive granular or compact. Fracture conchoidal. Brittle. H. 2.5-3. G. 2.3. Colorless. Luster vitreous. Transparent. Taste faint, saline, and bitter.

Box Elder County Great Salt Lake shores.

Davis County Great Salt Lake shores.

Salt Lake County Great Salt Lake shores.

Tooele County Great Salt Lake shores.

BOG ORE (See GOETHITE)

BOLTWOODITE

Hydrous potassium uranium silicate, $\text{K}_2(\text{UO}_2)_2(\text{SiO}_3)_2 \cdot 5\text{H}_2\text{O}$. Orthorhombic; may be monoclinic. Occurs as radiating acicular to fibrous aggregates. H. 3.5. G. 3.6. Cleavage good. Luster pearly to silky. Color yellow. Fluoresces dull green. Encrusts primary uraninite.

Emery County San Rafael district; Delta, Pay Day mines.

Grand County Seven Mile Canyon.

San Juan County Blue Jay mine; Julia claims; Pete no. 6 claim; Red Canyon district; Jerry group; White Canyon district; Happy Jack mine.

BOOTHITE

Hydrous copper sulfate, $\text{CuSO}_4 \cdot 7\text{H}_2\text{O}$. Monoclinic. Usually massive with a crystalline structure, fibrous. Cleavage poor. H. 2-2.5. G. 2.1. Luster vitreous, in fibrous masses silky or pearly. Color pale blue. Secondary mineral.

San Juan County White Canyon district; W.N. mine.

BORICKITE

Hydrous basic calcium iron phosphate, probably $\text{Ca}(\text{Fe}, \text{Al})_4(\text{PO}_4)_2 \cdot (\text{OH})_8 \cdot 7\text{H}_2\text{O}$. Amorphous. Reniform massive, compact. In part opaline. H. 3.5. G. 2.7. Color and streak reddish-brown. Luster weak waxy. Opaque.

Jueb County Tintic district: Ajax, Mammoth mines.

BORNITE

Copper iron sulfide, Cu_5FeS_4 . Isometric. Usually massive, granular or compact. H. 3. G. 5. Cleavage poor. Fracture conchoidal, uneven. Luster metallic. Color copper-red to bronze, with iridescent tarnish. Streak grayish black. Opaque.

Beaver County Beaver Lake district; Granite district: Contact group; Lincoln district: Creole mine; Rocky district: Old Hickory mine.

Box Elder County Crater Island district: Copper Blossom mine; New-foundland district: Copper Ridge; Promontory district: Lakeview mining properties.

Daggett County Red Creek: Yellow Canary uranium deposits.

Davis County Farmington district: Parrish Canyon.

Emery County San Rafael district: Maybe mine.

Garfield County Henry Mountains.

Grand County Hoosier mine; La Sal district: Bornite, McCoy mines; Seven Mile Canyon: Shinarump nos. 1-3 claims.

Salt Lake County Big Cottonwood district: Mountain Lake mine; Bingham district: Bingham Copper pit, Copper Center tunnel, Galena, Old Jordan, Highland Boy, Yampa mines; Little Cottonwood district: Columbus-Rexal, South Hecla mines.

San Juan County La Sal Mountains; Monticello district: Copper Queen mine; White Canyon district: Happy Jack mine.

Summit County Park City district: Daly, Ontario mines.

Tooele County Gold Hill district:

Alvarado, Cane Springs, Copperopolis, Doctor, Frankie, Ida Lull, Midas mines.

Uintah County Browns Park area; Carbonate district: Dyer mine.

Utah County East Tintic district; Silver Lake district: Milkmaid mine.

Wasatch County Blue Ledge district: Mayflower mine.

Washington County Silver Reef district.

Weber County Sierra Madre district: Eldorado property.

BOULANGERITE

Lead antimony sulfide, $\text{Pb}_5\text{Sb}_4\text{S}_{11}$. Monoclinic. In prismatic or tabular crystals. Plumose, fibrous, granular, or compact. H. 2.5-3. G. 5.7-6.3. Cleavage good. Brittle. Luster metallic. Color bluish lead-gray; often yellow spots due to oxidation. Streak brownish gray to brown. Opaque. Summit County Park City district: Park City Consolidated mine.

Tooele County Bingham district: May Flower mine; Gold Hill district: Rube mine.

BOURNONITE

Lead copper sulfantimonite, PbCuSbS_3 . Orthorhombic. Usually short prismatic to tabular crystals. Also massive, granular to compact. H. 2.5-3. G. 5.7-5.9. Cleavage poor. Fracture uneven. Luster metallic, brilliant. Color and streak steel-gray. Opaque.

Salt Lake County Bingham district; Little Cottonwood district: Albion mine.

Summit County Park City district: Daly Judge, Daly West, Silver King, Woodside mines.

BRAUNITE

Essentially an oxide of manganese and silicon, $(\text{Mn}, \text{Si})_2\text{O}_3$. Tetragonal. Pyramidal forms, also granular massive. Cleavage good. Fracture uneven. Brittle. H. 6-6.5. G. 4.8. Luster submetallic. Color dark brownish black to steel-gray. Streak same.

Weakly magnetic. Opaque.
Juab County San Pitch Mountains:
Black Jack (Kendall - Duvall) claims.

BRICKERITE (See AUSTINITE)

BROCHANTITE

Basic copper sulfate, $\text{Cu}_4(\text{SO}_4)(\text{OH})_6$.
Monoclinic. Occurs in groups of
prismatic acicular crystals, drusy
crusts. Also massive, reniform. H.
3.5-4. G. 3.9. Cleavage good.
Fracture uneven. Luster vitreous.
Color emerald green, blackish green.
Streak pale green. Transparent to
translucent.

Beaver County San Francisco district:
Horn Silver mine.

Daggett County Red Creek: Yellow
Canary uranium deposit.

Emery County San Rafael district:
Delta mine.

Juab County Tintic district: Boss
Tweed, Carissa, Eureka Hill, Mam-
moth mines.

San Juan County Red Canyon district:
Posey mine; White Canyon district:
Happy Jack mine.

Summit County Park City district: Sil-
ver King, Woodside mines.

Tooele County Ophir district: Dry
Canyon area.

Utah County East Tintic district:
Burgin mine.

Wayne County Chimney Rock to Tant-
lus Flat.

BRONZITE (See ENSTATITE)

BROOKITE*

Titanium dioxide, TiO_2 . Orthorhom-
bic. Usually tabular and elongated
crystals. Cleavage poor. Fracture
subconchoidal to uneven. Brittle. H.
5.5-6. G. 4.1. Color brown, yellow-
ish brown, reddish brown. Streak un-
colored, or yellowish.

Emery County Emery: Phillips Hunt-
ington no. 1 well.

BRUCITE

Magnesium hydroxide, $\text{Mg}(\text{OH})_2$.
Hexagonal. Crystals usually broad

tabular, also foliated massive, fib-
rous. H. 2.5. G. 2.4. Cleavage
perfect. Folia flexible. Sectile.
Luster pearly, waxy. Color white,
pale green, gray, blue. Streak white.
Transparent.

Beaver County Beaver Lake district.
Salt Lake County Big Cottonwood dis-
trict: Mountain Lake mine.

Utah County Silver Lake district:
Deer, Silver Creeks.

BURBANKITE*

Rare earth carbonate, $\text{Q}_6(\text{CO}_3)_5$. (Q
= Na, Ca, Sr, Ba, rare earths). Hex-
agonal. Color grayish yellow. H.
3.5. G. 3.5. Cleavage good. Effer-
vesces in cold HC.

Duchesne County Green River Forma-
tion.

Uintah County Sun Oil Company South
Ouray well.

BUSHMANITE (See PICKERINGITE)

BUTLERITE

Hydrous basic ferric sulfate, $\text{Fe}(\text{SO}_4)-$
 $(\text{OH}) \cdot 2\text{H}_2\text{O}$. Monoclinic probably.
Usually tabular. Cleavage good. H.
2.5. G. 2.5. Color deep orange.
Streak yellow. Luster vitreous. Oc-
curs with uranium ores.

Emery County San Rafael district:
Calf Mesa, Dexter group.

CALAMINE (See HEMIMORPHITE)

CALAVERITE

Gold ditelluride, AuTe_2 . Monoclinic.
Rarely in small lath-shaped crystals.
Also massive granular. H. 2.5-3.
G. 9. No cleavage. Fracture subcon-
choidal to uneven. Luster metallic.
Color brass-yellow to silver-white.
Streak yellowish to greenish gray.
Opaque. Very brittle.

Salt Lake County Bingham district:
Highland Boy, Yampa mines.

Summit County Park City district:
Park City Consolidated mine.

Tooele County Gold Hill district:
Lucy L. mine.

CALCIOVOLBORTHITE

Basic copper calcium vanadate, $\text{CuCa}(\text{VO}_4)(\text{OH})$. Probably orthorhombic. Occurs in pseudohexagonal scales, rosettes, and fine crystalline granular masses. H. 3.5. G. 3.5. Cleavage good one direction. Luster vitreous to pearly. Color yellow green. Subtranslucent.

Grand County Moab Valley; Richardson district.

San Juan County Monument Valley district: Whirlwind mine.

CALCITE

Calcium carbonate, CaCO_3 . Hexagonal. Rhombohedral and scalenohedral crystals common. Also fibrous, granular, earthy, chalky, stalactitic. H. 3. G. 2.7. Cleavage perfect rhombohedron. Luster vitreous. Color usually white, colorless, may be various shades when impure. Shows double refraction.

Beaver County Antelope district; Beaver Lake district: Rat Ridge, Skylark mines; Blue Mountains: Susie Q claims; Granite district: Big Pass, Rattler groups; Indian Peak district: Blue Bell, Cougar Spar, Dugout, JB, Noonday, Lost Sheep, Utah mines; Lincoln district: Creole mine; McGarry district: Newton district: Sheep Rock mine; Pine Grove district: Monarch mine; San Francisco district: Horn Silver mine; Star district: Commonwealth, Kemple, Progressive, St. Mary's mines.

Box Elder County Box Elder district; Crater Island district: Copper Blossom mine.

Carbon County near Price.

Garfield County Mammoth Creek. Grand County Agare Switch; Cisco; Courthouse Wash; Miners Basin district: Dewey, High Ore, McCormick mines; Little Grand district: Colorado Fuel and Iron Company mine, Needles, Tenmile Wash.

Juab County Mt. Nebo district: Eva, Highland mines; Thomas Range: Autunite no. 8, Claybank, Blue Chalk, Hogsback, Northend, Rainbow, Road-

side, Eagle Rock, Harrisite, Oversight, Thursday mines; Topaz Mountain; Tintic district: Carissa, Emerald, Iron Blossom mines; San Pitch Mountains: Orme property; West Tintic district: Tintic Western, War Eagle claims.

Kane County Kitchen Corral Canyon: Orderville.

Piute County Marysvale district.

Rich County Bear River Range: Lakeview claims.

Salt Lake County Bingham district; Camp Williams: Evans lime quarry.

San Juan County Monticello district: Duckett mine.

Sevier County Henry district: Trinity prospect.

Summit County Park City district.

Tooele County Cedar Mountains; Dugway district: Boston, Confidence mines, Kellys Hole; Gold Hill district: Alvarado, Bonnemort, Rea, Rube mines; Johnson Pass; Mercur district: Geysers-Marion, Golden Gate, Mercur mines; Ophir district: Dry Canyon area; Lion Hill area - Lion, Douglas, Zella mines; Ophir Hill area - Ophir Coalition mine; Stansbury Mountains: Grantsville.

Uintah County Sun Oil Company South Ouray well.

Utah County East Tintic district; Lehi district: Pelican Point area - Canyon, Foothill and Hilltop, Pelican and Utah Valley veins, Philippine, Potter claims; Pfeiffer Canyon area; Provo district: Monarch mine; Santaquin district: Black Balsam, Blue Eagle, Union Chief mines; Wells Canyon.

Wasatch County Bonanza Flat.

Washington County Bull Valley district; Silver Reef district.

Weber County Sierra Madre district: Eldorado property.

CALEDONITE

Basic carbonate-sulfate of lead and copper, $\text{Cu}_2\text{Pb}_5(\text{SO}_4)_3(\text{CO}_3)(\text{OH})_6$. Orthorhombic. In small prismatic crystals as coatings, rarely massive. H. 2.5-3. G. 5.8. Cleavage good. Rather brittle. Luster resinous to vitreous. Color deep green to bluish

green. Streak greenish. Translucent. Salt Lake County Little Cottonwood district; Oxford, Geneva mines.

CARBONATE APATITE*

Hydrous calcium carbonate phosphate, $\text{Ca}_{10}(\text{PO}_4)_6(\text{CO}_3)\cdot\text{H}_2\text{O}$. Hexagonal. Cleavage indistinct. Fracture conchoidal. Brittle. H. 5. G. 3.1. Luster vitreous. Color sea-green, pale blue, brown, colorless. Occurs in Phosphoria Formation.

Daggett County Uintah Mountains. Duchesne County Uintah Mountains. Uintah County Brush Creek; Frandson Canyon; Little Brush Creek; Rock Creek.

Wasatch County Uinta Mountains.

CARBON DIOXIDE

Carbon dioxide, CO_2 . Colorless, odorless gas. Slightly soluble in water. Density 1.53 in dry ice. Utilized in the manufacture of dry ice. Associated with natural gas.

Carbon County Farnham Dome; Gordon Creek.

Grand County Harley Dome.

CARMINITE

Basic lead iron arsenate, $\text{PbFe}_2(\text{AsO}_4)_2(\text{OH})_2$. Orthorhombic. Crystals lath-like, flattened, and elongated. In tufted or satiny aggregates of fine needles, also massive. H. 3.5. G. 4.1. Luster vitreous, pearly. Color carmine-red, reddish-brown. Streak reddish-yellow. Cleavage good. Translucent.

Tooele County Gold Hill district; Gold Hill (U.S.) mine.

CARNALLITE

Hydrous potassium magnesium chloride, $\text{KMgCl}_3\cdot 6\text{H}_2\text{O}$. Orthorhombic. Usually massive, granular. H. 2.5. G. 1.6. No distinct cleavage. Luster greasy. Colorless to white, often reddish. Transparent to translucent. Taste bitter.

Grand County Cane Creek; Crescent

Junction; Paradox basin; Salt Valley; Seven Mile Anticline.

San Juan County Moab Valley; Paradox Valley district.

Tooele County Salduro; Wendover.

CARNELIAN

(See CRYPTOCRYSTALLINE QUARTZ)

CARNOTITE

Hydrous potassium uranium vanadate, $\text{K}_2(\text{UO}_2)_2(\text{VO}_4)_2\cdot 3\text{H}_2\text{O}$. Orthorhombic or monoclinic? Rarely found in crystals. Usually occurs as powder or loosely coherent aggregates, also disseminated. G. 5. Cleavage perfect basal. Luster dull or earthy. Color bright yellow to greenish-yellow. Carbon County Coal Creek.

Daggett County Red Creek; Yellow Canary uranium deposit.

Emery County Green River; Green River district; Yellow Queen mine; San Rafael River; Tidwell Ranch; San Rafael district; Camp Bird no. 13 mine, Flat Top Mesa, Table Mountain, Temple Mountain, Temple Rock, South Temple Wash, West Little Horse Mesa, Wild Horse Canyon.

Garfield County Circle Cliffs; Black Widow, Horse Head, Lone B mines; Henry Mountains; Crescent Creek; Little Rockies district; Del Monte group, Ekker mine; North Wash district; S.Y. Guthrie group, V.C.A. deposits; Trachyte district; Blitz nos. 1-7, June Bell nos. 1-4, Minnie Pearl nos. 1-2 claims, Straight, Trachyte Creeks, Trachyte nos. 1-2, V.C.A. claims.

Grand County Beaver Mesa; Corvusite nos. 1-3 mines; La Sal district; Jack claim; Miners Basin district; West Slope mine; Mill Creek; Moab Valley; Pack Creek; Polar Mesa district; Elva M. and Adjoining, Elva M. and Imp, Polar nos. 2-3, Rim Rock and Rim Rock no. 2 claims; Richardson district; Seger Station; Seven Mile Canyon; Shinarump nos. 1-3 claims; Thompsons area; Thompsons district; Cactus Rat, Flat Top no. 1, Red Vanadium groups; Yellow Cat district; Uvanco mine. Iron County Cedar Canyon.

Juab County Thomas Range: Bell Hill, Blowout, Dell no. 5, Eagle Rock, Floride, Fluorine Queen, Fluorine Queen no. 4, Harrisite, Hilltop, Lost Sheep, Lucky Louie mines; Topaz Mountain. Kane County Bulloch group; south of Paria.

San Juan County Abe Day's vanadium claim; Big Indian district: Cal Uranium, Mi Vida, Radon, Rattlesnake mines; Browns Hole area; Bull Canyon; Cane Springs Pass: Bridger Jack Flat; Chess Ridge; Cottonwood Canyon district: Basin, Big Hole, Birthday Shale, Blue Bird, East Bank, Found no. 2, Hangover nos. 1-2, Ridge nos. 1-2 mines; Dry Valley; East Canyon; Elk Ridge; Coral claim; Indian Creek; La Sal Mountains; Lisbon Valley: Climax nos. 1-2 claims; Montezuma Canyon; Monticello district; Navajo Reservation; Paradox Valley district: Grey Dawn mine; Red Canyon district; Spanish Valley Anticline; White Canyon district: Four Aces, Happy Jack, Hideout, White Canyon no. 1, White Fawn, Yellow Circle mines.

Uintah County Ashley Creek.

Washington County Santa Clara district; Silver Reef district: Buckeye, Butte Reef, Doyle Shaft, East Reef mines.

Wayne County Capitol Reef Monument; Coleman Canyon to Oak Creek; Fruita: Oyler mine; Hanksville; Henry Mountains: Mt. Ellen; Muddy River; Noton Bench; Poisen Springs; Rabbit Valley: Old Dixon prospect; Upheaval Dome; Waterpocket Fold.

CARPHOSIDERITE

Hydrous basic sulfate of ferric iron, $(\text{H}_2\text{O})\text{Fe}_3(\text{SO}_4)_2(\text{OH})_2\text{H}_2\text{O}$. Hexagonal. Earthy or scaly crusts and aggregates, reniform. H. 4-4.5. G. 2.4-2.9. Cleavage doubtful. Luster resinous to dull. Color golden yellow, dark straw-yellow. A gossan constituent.

Juab County Tintic district: Carissa, Eureka Hill mines.

Tooele County Ophir district: Lion Hill area.

CASSITERITE*

Tin dioxide, SnO_2 . Tetragonal. Frequently in elbow-shaped twins; massive granular or reniform shapes. H. 6-7. G. 6.9. Luster adamantine to submetallic. Color usually brown or black. Streak white. Translucent. Occurs as a detrital mineral in Utah. Emery County Emery; Phillips Huntington no. 1 well.

CELADONITE

Iron magnesium potassium silicate, indefinite formula. Earthy or in minute scales. Lamellar or fibrous. Perfect cleavage. Very soft. Color green. Occurs as fillings in amygdules of lava flows.

Piute County Marysvale district: Silica Hills.

CELESTITE

Strontium sulfate, SrSO_4 . Orthorhombic. Crystals tabular or prismatic. Also fibrous, radiated, globular or granular. H. 3.5. G. 3.9. Cleavage good. Luster vitreous to pearly. Colorless to pale blue. Transparent to translucent.

Emery County 50 miles S. of town of Green River.

Grand County Little Grand district: Salt Wash group.

Sevier County Salina Creek district: Lead Hill mine.

Washington County Santa Clara district: Black Beauty no. 1 claim.

CERARGYRITE

Silver chloride, AgCl . Isometric. Crystals usually cubic but rare. Usually massive resembling wax or horn, often in crusts. H. 2-3. G. 5.5. No cleavage. Fracture uneven. Highly sectile and ductile. Luster resinous to adamantine, horn-like. Colorless to pearly-gray when fresh, readily darkens on exposure to light. Transparent to translucent.

Beaver County Newton district: Sheep

Rock mine; San Francisco district: Horn Silver mine; Star district.

Box Elder County Ashbrook district: Vipont mine.

Iron County Gold Springs district: Homestake mine; State Line district.

Juab County Detroit district: Charm, Copperhead, E.P.H., Ibex mines; Fish Springs district: Carnation, Emma, Galena, Utah mines; Tintic district: Bullion Beck, Centennial Eureka, Chief Consolidated, Eagle and Blue Bell, Gemini, Godiva, Grand Central, Iron, Mammoth mines.

Piute County Gold Mountain district: Annie Laurie, Sevier mines; Mt. Baldy district: Pluto mine.

Salt Lake County Bingham district: Dixon, Winnamuck mines.

Summit County Park City district: Daly, Ontario, Scottish Chief mines.

Tooele County Dugway district: Buckhorn, Four Metals mines; Erickson district: OK, Silver Reef mines; Lakeside district; Mercur district: Geysers-Marion mine; Ophir district: Dry Canyon area - Mono mine; Foothill area - Lakes of Killarney mine; Lion Hill area - Buffalo, Chloride Point, East Side, Douglas, Empire, Iron, Lion, Monarch, Northern Light, Three Meadows, Woodruff, Zella mines; Ophir Hill area - Hidden Treasure, Jim Fish, Sacramento mines; Rush Valley district: Mescatine, Salvation-Hercules mines.

Uintah County Brush Creek district: Little Alta mine.

Utah County Santaquin district: Union Chief mine.

Washington County Silver Reef district: California, Leeds, Requa, Savage, Tecumseh Hill mines.

CERUSSITE

Lead carbonate, $PbCO_3$. Orthorhombic. Crystals often tabular and elongated. Often granular massive and compact, earthy. H. 3-3.5. G. 6.5. Cleavage good. Very brittle. Luster adamantine. Colorless to white, gray to black. Streak colorless to white. Transparent to translucent.

Beaver County Bradshaw district:

Cave mine; Granite district: Beaver View, Big Pass mines; Indian Peak district; Lincoln district: Creole mine; Pine Grove district; Pruess district: Gold Reef mine; San Francisco district: Horn Silver mine; Star district: Cedar-Talisman, Hoosier Boy, Commonwealth, Kemple, Progressive, St. Mary's, Dotson, Estelle, Mowitza, Vicksburg, Harrington-Hickory, Rebel, White Rock, Hub, Mammoth, Moscow, Red Warrior, Wild Bill mines.

Box Elder County Ashbrook district: Vipont mine; Box Elder district; Lucin district: Cunepah Tunnel, Copper Mountain, Judson, Tecoma Hill mines; Newfoundland district; Promontory district: Big Pine, Lakeview, Sunshine Mining Properties; Rosebud district. Cache County Hyrum area - Tip Top claim; La Plata area - Yellow Jacket claim; Paradise district; Smithfield area.

Emery County San Rafael district: Copper Globe deposit.

Juab County Deseret district: Miller mine; Fish Springs district: Utah mines; Juab district: Mona district; Mt. Nebo district: Big Nebo, Eva, Freddie, Santaquin Chief, Santaquin King, Syndicate Tunnel mines; Tintic district: Beck Tunnel, Bullion Beck, Chief, Chief Consolidated, Colorado, Eagle and Blue Bell, Eureka Hill, Gemini, Godiva, Humbug, Iron Blossom, Mammoth, Sunbeam, Swansea mines; West Tintic district: 88, 1903, Scotia, War Eagle mines.

Millard County Leamington district: Arbroath, Leamington Mining Company, Yellowstone mines.

Morgan County Argenta district: Carbonate Hill, Carbonate Gem mines.

Piute County Mt. Baldy district: Deer Trail, Pluto mines; Ohio district: Bully Boy and Webster, Cascade, Copper Belt, Dalton, Iris, Shamrock mines. Rich County Swan Creek district: Victoria prospect.

Salt Lake County Big Cottonwood district: Alta Tunnel and Transportation Company, Carbonate, Cardiff Kennebec, Prince of Wales, Woodlawn mines; Bingham district: Boston Consolidated, Burning Moscow, Broad

Gauge, Brooklyn, Butterfield, Caledonia, Dalton and Lark, Galena, Jersey Blue, Last Chance, Midland, Montezuma, Nast, Old Jordan, Old Telegraph, Petro, Red Wing, U.S. and Lark, Yosemite mines; Hot Springs district; Little Cottonwood district: Albion, Alta Consolidated, Cabin, Dwyer, Emma, Flagstaff, Little Emma, Michigan-Utah, West Toledo mines. Sevier County Salina Creek district: Lead Hill mine.

Summit County Park City district: Comstock, Creole, Daly, Jupiter, Little Bell, Nail Driver, New York, Ontario, Scottish Chief, Silver King, Woodside mines.

Tooele County Blue Bell district: Black Hawk, Morgan mines; Columbia district: Benmore, Sharp mines; Deep Creek Mountains; Dutch Mountain; Dugway district: Bertha, Boston, Bryan, Buckhorn, Confidence, Four Metals, Francis, Kellys Hole, Lauris, Raymond - Bald Eagle, Yellow Jacket mines; Erickson district: Black Jack, Black Rock, Blain, Deer Trail, Good Hope, Happy Jack, Indian Boy, Indian Chief, May Farmer mines; Free Coinage district; Gold Hill district: Bonanza, Boston, Cash Boy, Garrison Monster, Gold Hill (U.S.), Mascot, Monoco, Monte Del Rey, New Baltimore, Red Jacket, Rube, Silver and Gold Mining Company, Silver King, Spotted Fawn, U.S. mines; Grantsville district; Greeley district; Lakeside district; Mercur district: Mineral Hill mine; North Tintic district: New Bullion, Scranton mines; Ophir district: Dry Canyon area - Brooklyn, Mono, Queen of the Hills mines; Lion Hill area - Buffalo, Chloride Point, Douglas, Lion, Zella, East Side, Empire, Iron, Monarch, Northern Light, Three Metals, Woodruff mines; Ophir Hill area - Admiral Dewey, Chicago, Cliff, Hidden Treasure, Jim Fisk, Sacramento mines; Osceola district; Rush Valley district: Argent, Ben Harrison, Calumet, Galena, Honerine, Mescatine, Muerbrook, Salvation-Hercules, Southport mines; Silver Island district: Carrie Mack property; Tooele district; Willow Springs district.

Utah County Silver King mine.

Utah County Alpine district: Alpine-Galena property; American Fork district: Dutchman, Miller, Pittsburgh mines; East Tintic district: Burgin, North Lily, Tintic Standard mines; North Tintic district: Blowhole Hill, Lehi-Tintic, Tintic Empire, Tintic Paymaster, Selma mines; Payson district: Syndicate mine; Provo district: Monarch mine; Santaquin district: Blue Eagle, Union Chief mines; Silver Lake district: Milkmaid, Ontario mines. Wasatch County Blue Ledge district: Glencoe, McHenry, Valeo mines; Elkhorn district: Crawford, Nelson and Queen mines; Snake Creek district: Revelator, West Quincy mines.

Washington County Tutsagubet district: Apex, Paymaster mines.

Weber County Sierra Madre district: Eldorado property.

CERVANTITE*

Antimony oxide, formula uncertain, Sb_2O_4 . Orthorhombic? Found in minute acicular crystals. Usually found as a massive fibrous crust or powder. H. 4.5. G. 6.6. Luster greasy, pearly. Color yellow, white to reddish white. Streak light yellow. Transparent.

Salt Lake County Little Cottonwood district: Emma, Little Emma mines.

CHABAZITE

Hydrous calcium-sodium aluminum silicate, $(Ca,Na)_2(Al_2Si_4O_{12}) \cdot 6H_2O$. Hexagonal. Usually in crystals. Cleavage poor. H. 4-5. G. 2.1. Luster vitreous. Color white, yellow, pink, red. Transparent to translucent. Brittle.

Piute County Marysvale district: Silica Hills.

Salt Lake County Little Cottonwood district.

Summit County Park City district.

Wasatch County Clayton Peak.

CHALCANTHITE

Hydrous cupric sulfate, $CuSO_4$. Tri-

clinic. Crystals short prismatic, flattened. Also massive, stalactitic, reniform. H. 2.5. G. 2.2. Cleavage poor. Fracture conchoidal. Luster vitreous. Color berlin blue to sky blue. Streak colorless. Taste metallic and nauseous. Subtransparent to translucent.

Beaver County San Francisco district: Horn Silver mine.

Emery County San Rafael district: Calf Mesa, Dexter group.

Salt Lake County Bingham district: Bingham Copper pit, Broad Gauge, Galena, Old Jordan, Highland Boy, Yampa mines.

San Juan County Red Canyon district: Markey no. 3 mine; White Canyon district: Happy Jack, Jomac, W. N. mines.

Sevier County Henry district: Trinity prospect.

Summit County Park City district.

Tooele County Dugway district: Bertha, Four Metals, Juno, Metal States mines; Gold Hill district: Alvarado, Cyclone mines; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Wayne County Chimney Rock to Tantalus Flat; Fruita: Oyler mine.

CHALCEDONY

(See CRYPTOCRYSTALLINE QUARTZ)

CHALCOCITE

Cuprous sulfide, Cu_2S . Orthorhombic. Short prismatic and tabular crystals. Usually compact massive. H. 2.5. G. 5.5. Cleavage indistinct. Fracture conchoidal. Brittle. Imperfectly sectile. Luster metallic. Color and streak blackish lead-gray. Often tarnished blue or green. Opaque. One of the chief sources of copper.

Beaver County Beaver Lake district: Beaver-Harrison, OK mines; San Francisco district: Horn Silver mine.

Box Elder County Ashbrook district: Vipont mine.

Daggett County Red Creek: Yellow Canary uranium deposit.

Davis County Farmington district: Parrish Canyon.

Grand County Seven Mile Canyon.
Juab County Tintic district: Centennial Eureka, Grand Central mines.
Salt Lake County Big Cottonwood district: Mountain Lake, Steamboat Tunnel mines; Bingham district: Boston Consolidated, Burning Moscow, Columbia, Commercial, Conger, Dixon, Fortune, Galena, Highland Boy, Last Chance, Minnie, Nast, Old Jordan, Old Telegraph, Phoenix, Winnamuck, Yampa mines.

San Juan County Big Indian district: Big Indian Copper, Mi Vida mines; La Sal Mountains; Monticello district: Copper Queen, Tuffy Copper mines; Monument Valley district: Whirlwind mine; Red Canyon district: White Canyon district: Happy Jack mine.
Sevier County Salina district: Ball, Lead Hill mines.

Summit County Park City district: Daly, Ontario mines.

Tooele County Dugway district: Bertha mine; Gold Hill district: Alvarado, Bonnemort, Cane Springs, Centennial and Enterprise, Copper Bloom, Copperopolis, Gold Hill (U.S.), Silver King, Victory no. 1 mines; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.
Uintah County Browns Park area; Carbonate district: Dyer mine; Little Split Mountain; Uteland Knoll district: Ouray.

Utah County East Tintic district:
Washington County Silver Reef district: Barbee and Walker, Cobb, Duffin and Toquerville, Emily Jane, Last Chance, Thompsons, Tecumseh Hill mines.

CHALCOPHANITE

Hydrous oxide of zinc and manganese, $(Zn, Mn, Fe)Mn_2O_5 \cdot 2H_2O$? Hexagonal. Massive, granular, or platy. Minute crystals tabular. Cleavage good. Thin plates flexible. H. 2.5. G. 4. Luster metallic. Color bluish to iron-black. Streak chocolate brown. Transparent on thin edges.

Utah County East Tintic district: Burgin mine.

CHALCOPHYLLITE

Hydrous basic sulfate-arsenate of copper and aluminum, $\text{Cu}_8\text{Al}_2(\text{AsO}_4)_3(\text{SO}_4)_3(\text{OH})_{27} \cdot 33\text{H}_2\text{O}$. Hexagonal. Tabular six-sided crystals. Also foliated masses, and rosette aggregates. H. 2. G. 2.6. Cleavage basal. Luster vitreous, pearly. Color emerald green or grass-green. Streak paler than the color. Transparent to translucent.

Juab County Tintic district: Ajax, Mammoth mines.

CHALCOPYRITE

Copper iron sulfide, CuFeS_2 . Tetragonal. Crystals commonly tetragonal in habit. Also often massive, compact, reniform. H. 3.5-4. G. 4.1. Fracture uneven. Brittle. Luster metallic. Color brass-yellow, often tarnished. Streak greenish black. Opaque. Chief copper ore.

Beaver County Beaver Lake district: Beaver-Harrison, OK, Skylark mines; Bradshaw district: Cave, Hecla, Nip and Tuck mines; Granite district: Contact group; Lincoln district: Creole, Lincoln mines; Pruess district: Blackbird, Cactus mines, Cactus Gulch; Rocky district: Old Hickory mine; San Francisco district: Beaver Carbonate, Cupric, Horn Silver, Imperial, Michigan, Washington mines; Star district: Commonwealth, Harrington-Hickory, Hub, Kemple, Lady Bryan, Moscow, Progressive, Rebel, Red Warrior, St. Mary's, White Rock, Wild Bill mines.

Box Elder County Ashbrook district: Vipont mine; Crater Island district: Copper Blossom mine; Lucin district: Tecoma Hill mines; Newfoundland district: Copper Ridge; Park Valley district: Century, Susannah mines; Promontory district: Lakeview properties; Rosebud district: Red Buttes; Willard district: Overland claim.

Daggett County Red Creek: Yellow Canary uranium deposit.

Davis County Antelope Island; Farmington district: Morning Star group, Parrish Canyon.

Emery County San Rafael district: Dexter group.

Garfield County Circle Cliffs: Rocky Mountain, Stud Horse mines; Henry Mountains: Bromide, Oro mines.

Grand County La Sal district: McCoy mine; Miners Basin district: Dewey, High Ore, Moab no. 1, Skylark mines; Seven Mile Canyon, Shinarump nos. 1-3 claims.

Juab County Deseret district: Rockwell shaft; Detroit district: Charm, Copperhead, E. P. H., Ibex mines; Fish Springs district: Carnation, Emma, Galena, Utah mines; Thomas Range: Bell Hill mine; Tintic district: Centennial Eureka, Grand Central mines; West Tintic district: Lockheed Iron, 1903, Scotia, Tintic Western, War Eagle mines.

Millard County Detroit district: Almond, Blue Bell, Major Drum mines; Saw Back district.

Morgan County Morgan district: Morgan Crescent mine.

Piute County Mt. Baldy district: Clyde mine; Ohio district: Bully Boy and Webster, Cascade, Copper Belt, Iris, Shamrock mines.

Salt Lake County Big Cottonwood district: Kentucky-Utah, Lulu, Mountain Lake mines; Bingham district: Bingham Copper Pit, Boston Consolidated, Brooklyn, Burning Moscow, Butterfield, Colorado, Commercial, Conger, Copper Center Tunnel, Dalton and Lark, Dixon, Fortune, Frisco, Galena, Highland Boy, Last Chance, Nast, Old Jordan, Old Telegraph, Queen, Silver Shield, U.S. and Lark, Winnamuck, York, Yosemite mines; Little Cottonwood district: Albion, Alta Consolidated, Columbus-Rexal, Dwyer, Native Copper, Oxford and Geneva, South Hecla, Superior mines.

San Juan County Big Indian district: Big Indian Copper mine; Monticello district: Blue Bird, Danish Girl, Dream, Gold Queen, Copper Queen mines; Red Canyon district: Jerry group; San Juan River; White Canyon district: Happy Jack, Jomac, W.N. mines.

Sevier County Henry district: Trinity

prospect; Salina Creek district: Ball mine.

Summit County Park City district: Daly, J.A.C. Tunnel, Kearns-Keith, Ontario, Scottish Chief, Silver King, Wabash, Woodside mines.

Tooele County Dugway district: Bertha, Kellys Hole, New Park, Surplus mines; East Erickson district: Copper Jack mine, Hard-to-Beat, Sheepprock Canyons, Silver King, Silver Shield mines; Erickson district: Highland Lassie no. 1, Last Hope no. 3, Silver Reef mines; Gold Hill district: Alvarado, Bonnemort, Cane Springs, Calaveras, Centennial and Enterprise, Copper Bloom, Copperopolis, Copper Queen-Midland Mining Company, Cyclone, Doctor, Frankie, Gold Hill (U.S.), Lucy L., Ida Lull, Reaper, Rube, U.S., Victory no. 1, Yellow Hammer mines; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Grantsville district; Mercur district: Mineral Hill mine; Ophir district: Dry Canyon area - Kearsarge, Mono, Surprise mines; Lion Hill area - Buffalo mine; Ophir Hill area - Cliff, Ophir Hill Consolidated, Ophir Coalition, Sacramento mines; Rush Valley district: Ben Harrison, Calumet, Galena King, Honerine, Muerbrook, Salvation-Hercules, Tip Top mines; Wild Cat Mountains: Silver Queen mine; Yellow Springs district.

Utah County American Fork district: Dutchman, Mary Ellen and Live Yankee, Yankee mines; East Tintic district: Eureka Lily, Tintic Standard mines; Santaquin district: Black Balsam, Copper Bullion, Sally Ann, Santaquin Central mines; Silver Lake district: Milkmaid, Ontario mines.

Wasatch County Blue Ledge district: Mayflower mine.

Washington County Silver Reef district.

Wayne County Fruita: Oylar mine; Miners Mountain district.

Weber County Fremont Island district; Sierra Madre district: Eldorado, King Solomon, Napoleon-Maghera mines.

CHALCOTRICHITE (See CUPRITE)

CHENEVIXITE*

Basic hydrous arsenate of copper and ferric iron, probably $\text{Cu}_2\text{Fe}_2(\text{AsO}_4)_2 \cdot (\text{OH})_4 \cdot \text{H}_2\text{O}$. Massive. Compact earthy to opaline. H. 3.5-4.5. G. 3.9. Fracture earthy. Brittle. Color dark green to greenish yellow. Streak greenish yellow.

Juab County Tintic district: American Eagle, Mammoth mines.

Tooele County Gold Hill district: Gold Hill (U.S.) mine.

CHERT

(See CRYPTOCRYSTALLINE QUARTZ)

CHEVKINITE*

Titano-silicate of the cerium earths, indefinite formula. Monoclinic. Crystals prismatic. Color black. Luster splendid. Irregular fracture. Metamict crystals. G. 4.5. Found in volcanic ash in Utah.

Grand County Onion Creek.

CHLORITE

Hydrous magnesium aluminum silicate, $\text{Mg}_3(\text{Si}_4\text{O}_{10})(\text{OH})_2 \cdot \text{Mg}_3(\text{OH})_6$ essentially. Monoclinic. In pseudo-hexagonal tabular crystals. Usually foliated massive or aggregates of minute scales. Cleavage perfect. Folia flexible but not elastic. H. 2-2.5. G. 2.6-2.9. Luster vitreous to pearly. Color green of various shades.

Beaver County San Francisco district; Star district: Harrington-Hickory, Rebel, White Rock mines.

Box Elder County Rosebud district.

Davis County Antelope Island.

Iron County Paragonah: Iron Peak.

Juab County West Tintic district: Tintic Western mine.

Piute County Marysville district.

Salt Lake County Bingham district: Bingham Copper Pit.

Summit County Park City district.

Tooele County Dugway district: Bertha, Boston, Four Metals mines; East Erickson district: Ekker Canyon prospect; Gold Hill district: Gold Hill (U.S.), Rube mines; Ophir district:

Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

CHLOROPAL (See NONTRONITE)

CHLOR-UTAHLITE (See VARISCITE)

CHROME MICA-CLAY

A green chrome mica-clay. Contains approximately 0.4 to 0.6 percent Cr_2O_3 , and consists of mixed $2M_1$ and $1M$ mica polymorphs. Occurs in thin veinlets, layers, and streaks in sandstone. Micaceous habit. Color green, or gray-green.

Emery County San Rafael district: Flat Top Mesa, Temple Mountain, North Temple Mountain, Eagle Nest prospect, South Temple Mountain.

CHROMITE*

Iron chromate, FeCr_2O_4 . Isometric. Crystals not common; massive; fine granular to compact. Cleavage none. Fracture uneven. Brittle. H. 5.5. G. 4.6. Luster metallic. Color black. Streak brown. Sometimes feebly magnetic. In Utah found only in placers. Grand County Colorado River area; Green River.

San Juan County Colorado River placers.

Uintah County Green River district: Cub Creek.

CHRYSOCOLLA

Hydrous copper silicate, $\text{CuSiO}_3 \cdot 2\text{H}_2\text{O}$. Cryptocrystalline. Often opal-like; massive compact, earthy. H. 2-4. G. 2-2.4. Fracture conchoidal. Luster vitreous, pearly. Color green, bluish green to sky blue, brown to black.

Beaver County Beaver Lake district: Beaver-Harrison, OK, Skylark mines; Granite district: Beaver View mine; Lincoln district: Creole, Lincoln mines; San Francisco district: Horn Silver mine; Star district: Wild Bill mine.

Box Elder County Crater Island district: Copper Blossom mine; Lucin

district: Copper Mountain, Parkdale mines; Newfundland district: Copper Ridge.

Davis County Antelope Island.

Garfield County Circle Cliffs: Rocky Mountain mine.

Grand County Miners Basin district: Dewey, High Ore, Skylark mines.

Juab County Desert district: Rockwell shaft; Tintic district: Carissa, Dragon mines; West Tintic district: 88, 1903, Scotia, Tintic Western, War Eagle mines.

Morgan County Morgan district: Morgan Crescent mine.

Salt Lake County Little Cottonwood district: Emma, Little Emma mines.

San Juan County La Sal Mountains; Monticello district: Copper Queen mine.

Summit County Park City district: Daly, Daly-Judge, Little Bell, Scottish Chief, Silver King, Woodside mines.

Tooele County Dugway district: Belcher, Black Dragon, Black Maria, Bryan, Confidence, Kellys Hole, Metal States mines; East Erickson district: Copper Jack, Jessel Bezzel, Silver Shield mines; Erickson district: Highland Lassie no. 1 mine; Gold Hill district: Calaveras, Frankie, Gold Hill (U.S.), Gold Bond, Minnehaha, Monoco, Napoleon, Silver King, Unadine, Victory no. 1 mines; Ophir district: Dry Canyon area.

Washington County Mineral Mountain: Emma claims.

CHRYSOLITE (See OLIVINE)

CINNABAR

Mercuric sulfide, HgS . Hexagonal. Crystals usually rhombohedral or thick tabular. In crystalline incrustations, granular, massive, or as earthy coatings. H. 2-2.5. G. 8. Cleavage good. Slightly sectile. Luster adamantine to metallic to dull. Color vermilion-red when pure, brownish red when impure. Streak scarlet.

Iron County Cima mine; Iron Springs district: Granite Mountain, Iron Mountain.

Piute County Marysville district;

Quicksilver mine; Mt. Baldy district: Lucky Boy mine.

Tooele County Deep Creek Mountains; Gold Hill district; Grantsville district: Timpie Valley, Ruby Crystal mine; Mercur district: Golden Gate, Hillside, Mercur, Sacramento, Sparrowhawk, Sunshine mines.

CLAUSTHALITE

Lead selenide, PbSe. Isometric. Massive, commonly fine granular, sometimes foliated. Cleavage good. Fracture granular. H. 2.5-3. G. 7.8. Luster metallic. Color lead-gray, somewhat bluish. Streak darker. Associated with uranium and vanadium ores.

San Juan County Big Indian district: Mi Vida mine.

CLINOCHLORE

Hydrous magnesium aluminum silicate, $H_8Mg_5Al_2Si_3O_{18}$. Monoclinic. Crystals hexagonal in form, often tabular. Cleavage perfect. H. 2-2.5. G. 2.7. Luster somewhat pearly. Color deep grass-green to olive-green. Occurs in zone of hydrothermal alteration.

Plute County Marysvale district.
Utah County East Tintic district.

CLINOCLASE

Basic arsenate of copper, $Cu_3(AsO_4)(OH)_3$. Monoclinic. Crystals elongated and tabular, also as crusts or coatings. H. 2.5-3. G. 4.4. Cleavage good. Fracture uneven. Brittle. Luster vitreous and pearly. Color dark greenish black to greenish blue. Streak bluish green.

Juab County Tintic district: Mammoth mine.

Tooele County Gold Hill district: Gold Hill (U.S.) mine.

CLINOCLASITE (See CLINOCLASE)

CLINOHUMITE

Basic fluosilicate of magnesium, $4Mg_2SiO_4 \cdot Mg(F,OH)_2$. Monoclinic.

Cleavage poor. Fracture subconchoidal to uneven. Brittle. H. 6-6.5. G. 3.1. Luster vitreous to resinous. Color white, light yellow, brown.
Beaver County Beaver Lake district: West Spring.

CLINOZOISITE

Hydrous calcium aluminum silicate, $Ca_2Al_3O(SiO_4)(Si_2O_7)(OH)$. Monoclinic. Crystals are prismatic, columnar, also massive granular. H. 6-6.5. G. 3.3. Luster vitreous. Color grayish white, green, pink. Transparent to translucent.

Beaver County Bradshaw district; Lincoln district: Creole mine.

Juab County West Tintic district: Iron King, Tintic Western mines.

Tooele County Gold Hill district: Frankie mine; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines; Rush Valley district: Honerine mine.

COBALT BLOOM (See ERYTHRITE)

COBALTITE*

Sulfarsenide of cobalt and iron, (Co,-Fe)AsS. Isometric. Commonly in cubes or pyritohedrons, sometimes granular massive to compact. Cleavage perfect. Fracture uneven. Brittle. H. 5.5. G. 6.3. Luster metallic. Color silver-white, inclined to red; also steel-gray. Streak grayish black.

Tooele County Gold Hill district: U.S. mine.

COBALTOCALCITE

Cobalt carbonate, $CoCO_3$. Hexagonal. Crystals rare. Occurs as small spherical masses, with a crystalline surface and concentric and radiated structure; also as crusts. Cleavage poor. H. 4. G. 4.1. Color rose-red. Luster vitreous. Streak peach-blossom-red. Occurs as efflorescence with uranium minerals.

Emery County San Rafael district: Lucky Strike no. 2 mine.

COBALTOMENITE

Perhaps a cobalt selenite. Occurs as minute rose-red monoclinic crystals in areas of uranium mineralization.

Piute County Marysville district.

COFFINITE*

Hydrous uranous silicate, $U(SiO_4)_{1-x}(OH)_{4x}$. Found as aggregates or disseminations of tiny particles. Color black. Luster dull. Pulverulent to friable. Fracture earthy. H. 5-6. G. 5.1. Not fluorescent.

Emery County Green River district: Denise no. 1 mine; San Rafael district: Calyx, Vanura mines.

Grand County Beaver Mesa; Corvusite nos. 1-3 mines.

San Juan County Big Indian district: Big Buck, Cal Uranium, Homestake, La Sal, Mi Vida, Radon, Rattlesnake mines; Paradox Valley district: Gray Dawn, Vanadium Queen mines.

COLLOPHANE

Hydrous calcium carbonate phosphate, $Ca_{10}(PO_4)_6(CO_3) \cdot H_2O$. Massive. Cryptocrystalline apatite, or organic origin. Opaline or horn-like; with dense, layered or colloform structure. H. 3-4. G. 2.7. Luster weakly vitreous to dull. Color grayish white, yellow, or brown. Associated with fish scales in the Green River Formation; found in the Phosphoria Formation.

Daggett County Uinta Mountains.

Duchesne County Green River Formation; Uinta Mountains.

Uintah County Brush Creek; Frandson Canyon; Little Brush Creek; Rock Creek.

CONICHALCITE

Basic calcium copper arsenate, $CaCu(AsO_4)(OH)$. Orthorhombic. Crystals equant or short prismatic. Fibrous. Usually reniform and massive. Resembles malachite. H. 4.5. G. 4.3. Fracture uneven. Brittle. Luster vitreous to greasy. Color green, yellow

green. Streak green.

Juab County Tintic district: American Eagle, Carissa, Centennial Eureka, Gold Chain mines; West Tintic district: Scotia mine.

Tooele County Gold Hill district: Gold Hill (Western Utah), Pole Star Copper Company mines.

CONNELLITE

Hydrous basic chloride sulfate of copper, $Cu_{19}(SO_4)Cl_4(OH)_{32} \cdot 3H_2O$. Hexagonal. Acicular crystals, in radiated groups and as felted aggregates. H. 3. G. 3.3. Luster vitreous. Color azure blue. Streak pale greenish blue. Translucent.

Juab County Tintic district: Grand Central mine.

COPALITE

A hydrocarbon. Color pale yellow, gray, brown. G. 1.03. Associated with coal.

Carbon County Tidewell and Rideout district: Winter Quarters mine.

Sevier County Salina Canyon.

COPIAPITE

Hydrous basic iron magnesium sulfate, $(Fe,Mg)Fe_4(SO_4)_6(OH)_2 \cdot 20H_2O$. Triclinic. Small, brilliant plates, stacked one upon another in large numbers forming wormy or rod-like structures. Cleavage perfect. H. 2.5-3. G. 2.1. Color yellow to bronzy brown. Luster pearly. Transparent to translucent.

Emery County San Rafael district: Dexter group.

COPPER

Native copper, Cu. Isometric. Occurs in cubic, dodecahedral, or tetrahedral forms, often distorted; also massive. H. 2.5. G. 9. Cleavage none. Fracture hackly. Highly ductile and malleable. Luster metallic. Color copper red. Streak metallic and shining. Opaque.

Beaver County Beaver Lake district: Skylark mine; San Francisco district:

Imperial mine.

Box Elder County Ashbrook district: Vipont mine; Lucin district: Copper Mountain mine.

Juab County Tintic district: Carissa, Centennial Eureka mines.

Morgan County Morgan district: Morgan Crescent mine.

Salt Lake County Bingham district: Commercial, Highland Boy, Yampa mines; Little Cottonwood district: Native Copper mine.

San Juan County San Juan River.

Tooele County Dugway district: Buckhorn, Four Metals mines; Ophir district: Dry Canyon Area - Mono mine.

Washington County Tutsagubet district: Apex (Dixie) mine.

COPPER PITCH (See TENORITE)

COQUIMBITE

Hydrous sulfate of ferric iron, $\text{Fe}_2(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O}$. Hexagonal. Short hexagonal prisms, up to one-half inch long. H. 2.5. G. 2.1. Color pale violet to purple; small crystals colorless. Cleavage poor. Luster vitreous. Transparent. Taste astringent.

Emery County San Rafael district: Dexter group.

CORDIERITE

Magnesium aluminum silicate, $\text{Mg}_2\text{-Al}_3(\text{AlSi}_5\text{O}_{18})$. Orthorhombic. Crystals usually short prismatic pseudo-hexagonal twins. Also as imbedded grains and massive. Cleavage poor. H. 7-7.5. G. 2.6. Luster vitreous. Color different shades of blue. Transparent to translucent.

Utah County Silver Lake district: Deer, Silver Creeks.

CORKITE

Basic sulfate-phosphate of lead and ferric iron, $\text{PbFe}_3(\text{PO}_4)(\text{SO}_4)(\text{OH})_6$. Hexagonal. H. 3.5. G. 4.3. Cleavage perfect. Color dark green, yellowish green to pale yellow. Luster vitreous to resinous. Occurs in gossans with limonite.

Beaver County Star district: Harrington-Hickory, Rebel, White Rock, Wild Bill mines.

CORNWALLITE

Hydrous basic arsenate of copper, $\text{Cu}_5(\text{AsO}_4)_2(\text{OH})_4 \cdot \text{H}_2\text{O}$. Occurs as small botryoidal crusts with a radial fibrous structure. Somewhat resembles malachite. Fracture conchoidal. Slightly brittle. H. 4.5. G. 4.1. Color green to emerald green.

Juab County Tintic district: Centennial Eureka mine.

Tooele County Gold Hill district: Gold Hill (U.S.) mine.

CORUNDUM

Aluminum oxide, Al_2O_3 . Hexagonal. Crystals usually prismatic in habit. Often rounded into barrel shapes. Massive granular, rounded grains. H. 9. G. 4.1. Cleavage none. Fracture uneven. Brittle. Tough. Luster adamantine to pearly. Color various hues, usually some shade of brown, blue, or pink. Found in alluvium at south end of Sevier Lake; found in isolated boulders with hercynite in Sevier County.

Millard County South end of Sevier Lake.

Sevier County Pine Canyon, Black Hawk claims.

CORVUSITE

Hydrous oxide of vanadium, $\text{V}_2\text{V}_{12}\text{-O}_{34} \cdot n\text{H}_2\text{O}?$. Massive. H. 2.5-3. G. 2.8. Fracture conchoidal. Color and streak blue-black to brown. Opaque.

Emery County San Rafael district: Calyx, Rex no. 2, Temple Mountain mines, Temple Rock, South Temple Wash.

Grand County La Sal district: Jack claim; Thompsons district: Parco no. 23, Juniper mines.

San Juan County Monument Valley district: Mitten no. 1 mine.

COSALITE

Lead bismuth sulfide, $Pb_2Bi_2S_5$. Orthorhombic. Prismatic crystals, but usually massive, fibrous, or radiated. H. 2.5-3. G. 6.7. Fracture uneven. Luster metallic. Color lead-gray to steel-gray. Streak black. Opaque. Beaver County Pruess district: Black Bird, Cactus mines; San Francisco district: Horn Silver mine.

COTUNNITE

Lead chloride, $PbCl_2$. Orthorhombic. Crystals often flattened and elongated. Also massive, granular. H. 2.5. G. 5.8. Cleavage good. Fracture subconchoidal. Slightly sectile. Luster adamantine, silky, pearly. Colorless to white, also yellowish or greenish.

Juab County Tintic district.

COVELLITE

Cupric sulfide, CuS . Hexagonal. Crystals rarely in hexagonal plates. Commonly massive, or spheroidal. H. 1.5-2. G. 4.6. Cleavage perfect. Flexible in thin plates. Luster submetallic to resinous, of massive material subresinous to dull. Color indigo-blue, sometimes with a purple tarnish. Streak lead-gray to black.

Beaver County Beaver Lake district: Beaver-Harrison, OK mines; San Francisco district: Horn Silver mine.

Box Elder County Ashbrook district: Vipont mine.

Juab County Fish Springs district: Carnation, Emma, Galena, Utah mines; Tintic district: Grand Central, Iron Blossom mines.

Salt Lake County Big Cottonwood district: Cardiff mine; Bingham district: Highland Boy, Northern Chief, Yampa mines.

San Juan County Big Indian district: Big Indian Copper mine; La Sal Mountains; Monticello district: Copper Queen mine; Red Canyon district; White Canyon district: Happy Jack mine.

Summit County Park City district: Park City Consolidated mine.

Tooele County Dugway district: Ber-

tha, Pride of the West mines; Gold Hill district; Cane Springs, Copper Bloom, Ida Lull, Reaper mines; Ophir district: Dry Canyon area - Kearsarge mine.

CRANDALLITE

Hydrous basic phosphate of calcium and aluminum, $CaAl_3(PO_4)_2(OH)_2 \cdot H_2O$. Hexagonal. Rarely as minute trigonal prisms. Usually compact or fibrous masses. H. 5. G. 2.8. Cleavage good. Luster vitreous. Color yellow to yellowish white, white, gray.

Juab County Tintic district: Brooklyn mine.

Utah County Clay Canyon.

CRISTOBALITE

Silicon dioxide, SiO_2 . Isometric. Color white or milky white. No apparent cleavage. Brittle. H. 6.5. G. 2.3. Occurs in volcanic rocks.

Piute County Marysvale district.

CROCIDOLITE (See RIEBECKITE)

CRYOLITE

Sodium aluminum fluoride, Na_3AlF_6 . Monoclinic. Usually massive, coarsely granular. H. 2.5. G. 3. Cleavage none. Fracture uneven. Brittle. Luster vitreous to greasy. Colorless to white.

Emery County Southern part of County.

CRYPTOCRYSTALLINE QUARTZ

Silicon dioxide, SiO_2 . Cryptocrystalline. Often mammillary, massive. Fibrous and granular varieties. H. 6-7. G. 2.6. Luster dull, waxy, vitreous. Transparent to translucent, some opaque. Color white, gray, blue, brown, yellow, green, red, black. The main varieties found in Utah are: Chalcedony, the common variety has a waxy luster, color gray, blue, brown or white. Agate, or variegated chalcedony, is more colorful and is found in many gravels, veins, and replacements. Distinctive agate

patterns are the mosslike patterns in mossagate; distinct angular bands are characteristic of fortification agate; feathery-shaped impurities are typical of plume agate. Jasper, a granular opaque variety of cryptocrystalline quartz is red, and less commonly yellow, blue or green. Petrified wood is a term loosely applied to wood replaced by silica; the term silicified wood is preferred. Most silicified wood in Utah occurs in the Triassic Petrified Forest and Shinarump Members of the Chinle Formation. Dinosaur bone is commonly silicified. Most bone occurs in the Jurassic Brushy Basin Member of the Morrison Formation. Chert, a granular variety, is common in Upper Paleozoic strata, where it occurs as bends, lenses, concretions, and irregular-shaped masses. The Mississippian Deseret, Humbug, Gardner, Madison, and Pine Canyon strata contain abundant light-gray to brown and black chert. The Pennsylvanian Oquirrh Formation contains creamy, and gray to black chert. The Permian Park City Group has abundant purplish-black, gray to black, and reddish brown chert.

Beaver County Blue Valley (black agate with blue bands); Beaver Lake district, San Francisco district, and Rock Corral area (chert, chalcedony).

Emery County Castle Dale, Castle Valley, Cedar Mountain, Green River, Last Chance Desert, San Rafael River, San Rafael district, and Woodside areas (agate, chalcedony, chert, jasper, silicified bone and wood).

Garfield County Moss Agate Hills near Panguitch (moss agate); Circle Cliffs, and Escalante areas (agate, silicified bone and wood).

Grand County Agate Switch, and Cisco areas (agate, chalcedony, jasper); Moab, and Thompsons areas (agate, chalcedony, jasper, silicified bone and wood); Little Grand district (chert); Miners Basin district (chalcedony).

Iron County Cedar Breaks area (red and moss agate); Antelope Range, and Newcastle areas (chalcedony geodes); Iron Springs district (chalcedony).

Juab County Detroit district, Keg

Mountains, San Pitch Mountains, and Thomas Range areas (agate); Jericho (moss agate, plume agate, jasper); Thirteen miles south of Levan (fortification agate); Detroit district, Dugway Range, Mt. Nebo district, Thomas Range, Tintic district, Topaz Mountain, San Pitch Mountains, and West Tintic district areas (chalcedony, jasper).

Kane County Kanab (silicified wood); Kitchen Corral Canyon (chalcedony); Orderville (agate, silicified wood).

Millard County Detroit district (chalcedony, jasper).

Rich County Bear River Range (jasper).

San Juan County White Canyon district (chalcedony).

Sevier County Glenwood, Henry district areas (chalcedony).

Tooele County Deep Creek Mountains, and Gold Hill district areas (agate, chalcedony); Dugway Mountains (agate geodes); Blue Bell district, Mercur district, and Ophir district areas (jasper).

Utah County Two miles west of Alpine (jasper); East Tintic district, North Tintic district, and Utah district areas (jasper); Wasatch Mountains (chert).

Washington County Beaver Dam Wash, and Castle Cliffs areas (agate, silicified wood); central (chalcedony in basalts); Silver Reef district (jasper, silicified wood).

Wayne County Fruita, Hanksville, and Torrey areas (agate, jasper, silicified bone and wood).

CRYPTOMELANE

Manganese oxide, containing zinc or cobalt, indefinite formula. Occurs in slaggy, cavernous masses. Color dull black on the outside, blue gray on fresh surfaces. Psilomelane type mineral.

Utah County Lehi district: West Slope area - Wildcat mine.

CUBANITE

Copper iron sulfide, CuFe_2S_3 . Orthorhombic. Elongated and thick tabular crystals. Massive. H. 3.5. G. 4.1.

Fracture conchoidal. Strongly magnetic. Color brass to bronze-yellow. Streak black. Opaque.
Salt Lake County Bingham district: Dixon, Winnamuck mines.
Utah County East Tintic district: North Lily mine.

CUPRITE

Cuprous oxide, Cu_2O . Isometric. Crystals octahedral, cubic, or dodecahedral. Also massive, granular, or earthy. H. 3.5-4. G. 6.1. Fracture conchoidal to uneven. Brittle. Luster metallic-adamantine. Color red of various shades. Streak brownish red.
Beaver County Beaver Lake district: Skylark mine; Bradshaw district: Cave mine; San Francisco district: Imperial mine.

Box Elder County Ashbrook district: Vipont mine; Lucin district:

Copper Mountain mine.

Cache County Logan area.

Davis County Farmington district: Morning Star group.

Juab County Detroit district: Charm, Copperhead, E.P.H., Ibex mines; Mt. Nebo district: Eva mine; Tintic district: Boss Tweed, Carissa, Centennial Eureka mines.

Kane County Paria Mining Company mine.

Millard County Detroit district: Almond, Blue Bell, Major Drum mines.

Morgan County Morgan district: Morgan Crescent mine.

Salt Lake County Big Cottonwood district: Copper King mine; Bingham district: Galena, Old Jordan, Highland Boy, Yampa mines.

San Juan County Big Indian district: Big Indian Copper mine; Lisbon Valley: Climax nos. 1-2, Lisbon Copper mines.
Summit County Park City district: Daly-Judge mine.

Tooele County Dugway district: Black Dragon, Buckhorn, Four Metals mines, Kellys Hole; Gold Hill district: Pole Star Copper Company mine; Ophir district: Ophir Hill area - Hidden Treasure, Sacramento mines.

Utah County Santaquin district: Sally

Ann prospect.

Washington County Silver Reef district; Tutsagubet district: Apex (Dixie) mine.

CUPROADAMITE (See ADAMITE)

CUPRODESCLOIZITE
(See DESCLOIZITE)

CUPROPLUMBITE (See BALYDONITE)

CUPROSCHEELITE
(See CUPROTUNGSTITE)

CUPROSKLODOWSKITE

Hydrous basic copper uranium silicate, $\text{Cu}(\text{UO}_2)_2(\text{SiO}_3)_2(\text{OH})_2 \cdot 5\text{H}_2\text{O}$. Orthorhombic. Minute prismatic or acicular crystals. Usually grouped in radial clusters, also as thin films and botryoidal crusts. Cleavage good. H. 3-4. G. 3.5. Color yellowish green, grass green. Luster silky, pearly to dull.

San Juan County Red Canyon district: Frey no. 4, Posey mines.

CUPROTUNGSTITE*

Basic copper tungstate, $\text{Cu}_2(\text{WO}_4)(\text{OH})_2$. Microcrystalline masses and crusts. Friable to compact. Color pistachio-green, olive-green. Luster vitreous, waxy to earthy.

Tooele County Gold Hill district: Copper Bloom, Kena, Pole Star Copper Company mines.

CYANOTRICHITE

Hydrous basic copper aluminum sulfate, $\text{Cu}_4\text{Al}_2(\text{SO}_4)(\text{OH})_{12} \cdot 2\text{H}_2\text{O}$. Orthorhombic. Occurs as velvet-like druses or wool-like aggregates. G. 2.9. Luster silky. Color sky-blue or azure blue. Streak pale blue.

Juab County Tintic district: Carissa, Mammoth mines.

CYRTOLITE (See ZIRCON)

DAHLLITE (See CARBONATE APATITE)

DAMOURITE

Variety of muscovite mica. Monoclinic. Cleavage perfect basal. H. 2-2.5. G. 2.7-3. Luster somewhat pearly or silky. Small scales.

Iron County Paragonah: Iron Peak.

DANBURITE

Borosilicate of calcium, $BaB_2Si_2O_8$. Orthorhombic. Resembles topaz. H. 7. G. 2.9. Cleavage poor. Fracture uneven to subconchoidal. Brittle. Luster vitreous to greasy. Color pale yellow to colorless, yellowish brown. Transparent to translucent.

Tooele County Gold Hill district: Gold Bond mine.

DAUBREITE

An earthy oxychloride of bismuth, $BiOCl$. Tetragonal. Found only massive; compact, earthy, columnar to platy fibrous. Cleavage good. Very plastic. H. 2-2.5. G. 7.7. Luster greasy to silky. Color creamy-white, gray, yellowish brown.

Juab County Tintic district: Eagle, Blue Bell mines.

DAVISONITE

Hydrous basic phosphate of calcium and aluminum, perhaps $Ca_3Al(PO_4)_2(OH)_3 \cdot H_2O$. Possibly hexagonal. Occurs as botryoidal or spherulitic crusts. Cleavage perfect basal. H. 4.5. G. 2.85. Color white.

Utah County Clay Canyon.

DEHRNITE

Basic calcium sodium potassium phosphate, $(Ca, Na, K)_5(PO_4)_3(OH)$. Hexagonal. Occurs as botryoidal crusts composed of fibrous to bladed crystals; also as minute hexagonal prisms. H. 5. G. 3. Cleavage perfect basal. Colorless to pale green, greenish white, grayish. Luster weakly vitreous.

Utah County Clay Canyon.

DELESSITE

Chlorite variety, $4(Mg, Fe)O \cdot 2Al_2O_3 \cdot 4SiO_2 \cdot 5H_2O$. Monoclinic. Varies from fine scaly to earthy masses. Color greenish. H. 1-2. G. 2.8. Luster feebly pearly.

Utah County East Tintic district.

DELTAITE

Hydrous basic phosphate of calcium and aluminum, $Ca(Al_2Ca)(PO_4)_2(OH)_4 \cdot H_2O$. Hexagonal. As minute crystals; also as cherty or chalky crusts of matted fibers. Cleavage good. H. 5. G. 2.9. Color gray to lavender, pale blue; also canary yellow.

Utah County Clay Canyon.

DENNISONITE (See DAVISONITE)

DESCLOIZITE

Basic vanadate of lead, copper, zinc, $(Zn, Cu)Pb(VO_4)(OH)$. Orthorhombic. Small, short prisms. Often drusy; also massive, fibrous radiated with a mammillary surface. H. 3-3.5. G. 6.2. Fracture conchoidal to uneven. Brittle. Luster greasy. Color cherry red, brownish red, brown, black. Streak brownish red or yellowish.

Grand County Pack Creek.

Iron County Escalante district: Escalante mine.

Tooele County Gold Hill district: New Baltimore mine.

DIADOCHITE*

Hydrous basic iron sulfate-phosphate, $Fe_2(PO_4)(SO_4)(OH) \cdot 5H_2O$. Probably triclinic. Microcrystalline, earthy masses. Fracture earthy. H. 3-4. G. 2.2. Color yellow to orange brown.

Emery County San Rafael district: Dexter group.

DIASPORE

Hydrogen aluminum oxide, $HALO_2$ or $AlO(OH)$. Orthorhombic. Crystals thin platy and elongated; also foliated

massive, H. 6.5-7. G. 3.4. Cleavage good. Fracture conchoidal. Luster brilliant, pearly. Color white, gray, colorless, various tints. Very brittle.

Beaver County Beaver Lake district.

Box Elder County Ashbrook district.

DICHROITE (See CORDIERITE)

DICKITE

Hydrous aluminum silicate, $Al_2Si_2O_7 \cdot 2H_2O$. Monoclinic. Usually a clay-like mass, either compact, friable, or mealy. H. 2-2.5. G. 2.6. Cleavage perfect. Luster of plates, pearly; of mass, pearly to dull. Color white, grayish, yellowish. A hydrothermal alteration product.

Piute County Marysville district.

Utah County East Tintic district: Burgin mine.

Wasatch County Keetley area.

DIGENITE

Copper sulfide, Cu_2-xS . Isometric. Usually massive. Cleavage good. Brittle. Conchoidal fracture. H. 2.5-3. G. 5.5. Color blue to black. Opaque.

Salt Lake County Bingham district: Bingham Copper Pit.

DIOPSIDE

Calcium magnesium silicate, $CaMgSi_2O_6$. Monoclinic. In prismatic crystals; also granular massive, columnar and lamellar. H. 5-6. G. 3.2. Cleavage prismatic imperfect. Luster vitreous. Color white to light green. Characteristically found as a contact metamorphic mineral in limestone.

Beaver County Beaver Lake district: Skylark mine; Rocky district: Old Hickory mine; San Francisco district: Beaver Carbonate mine; Star district: Lady Bryan, Wild Bill mines.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Millard County House Range: Amasa Valley, Horseshoe, Mt. Baldy, New

Klondike, Notch Peak, Pine Peak, Pinke Peak, Rainbow, South, South Pit, Sidesprings mines.

Salt Lake County Little Cottonwood district: Alta mine.

Sevier County Henry district: Trinity prospect.

Tooele County Gold Hill district: Alvarado, Bonnemort, Cane Springs, Centennial and Enterprise, Copperopolis, Frankie, Gold Bond, Ida Lull mines; Ophir district: Ophir Hill area - Cliff, Hidden Treasure, Ophir Hill Consolidated, Ophir Coalition mines; Rush Valley district: Honerine mine.

DOLOMITE

Calcium magnesium carbonate, $CaMg(CO_3)_2$. Hexagonal. Habit rhombohedral, the crystal faces commonly curved. Also massive, coarse to fine granular. H. 3.5. G. 2.8. Cleavage rhombohedral perfect. Brittle. Luster vitreous to pearly. Colorless, white, yellowish brown, pink, rose.

Emery County San Rafael district: Temple Mountain.

Juab County Mt. Nebo district: Eva mine; Tintic district: Sioux mine.

Millard County Cricket Mountains.

Summit County Park City district: Park City Consolidated mine.

Tooele County Gold Hill district: Ophir district: Ophir Hill area.

Uintah County Sun Oil Company South Ouray well.

Utah County East Tintic district: Provo district: Monarch mine.

DOLORESITE

Hydrous vanadium oxide, $3V_2O_4 \cdot 4H_2O$. Monoclinic. Forms radiating groups in bands or veinlets, often shows botryoidal surfaces. Color black. Greenish black streak. Submetallic luster. G. 3.3. Opaque. Cleavage good.

San Juan County Big Indian district: Big Buck, Cal Uranium, Homestake, La Sal, Mi Vida, Radon, Rattlesnake mines.

DUPRENOYSITE

Lead arsenic sulfide, $Pb_2As_2S_2$. Monoclinic. Modified tabular and elongated crystals; also massive. H. 3. G. 5.5. Cleavage good. Fracture conchoidal. Brittle. Luster metallic. Color lead-gray to steel-gray. Streak reddish brown.

Beaver County San Francisco district: Horn Silver mine.

Salt Lake County Big Cottonwood district; Bingham district: Dixon, Winnamuck mines; Little Cottonwood district: Oxford, Geneva mines.

DUMORTIERITE*

Aluminum borosilicate, $(Al,Fe)_7(BO_3)(SiO_4)_3$. Orthorhombic. Rarely in distinct crystals. Usually in fibrous to columnar aggregates. Cleavage poor. H. 7. G. 3.3. Luster vitreous. Color blue, greenish blue, violet, pink. Transparent to translucent. Occurs as a detrital mineral in the Ferron Sandstone Member of the Mancos Shale. Emery County Emery: Phillips Huntington no. 1 well.

DYSCRASITE

Silver antimonide, Ag_3Sb . Orthorhombic. Crystals rare; massive. Cleavage good. Fracture uneven. Sectile. H. 3.5-4. G. 9.6-10. Luster metallic. Color and streak silver white; sometimes tarnished yellow or blackish.

Salt Lake County Big Cottonwood district: Maxfield mine.

EARDLEYITE

Status uncertain, composition indefinite, possibly a nickelian smithsonite. Color green to pale green. Associated with calcite, smithsonite, and quartz in small veins and replacements.

Utah County Wells Canyon.

EITELITE*

Sodium magnesium carbonate, $Na_2Mg(CO_3)_2$. Hexagonal. Occurs as tiny crystals a few millimeters in diameter. Good basal cleavage. Authigenic

mineral. Found in cores and cuttings from the Green River Formation.

Duchesne County Green River Formation; Sinclair Mortenson well.

ELATERITE (See WURTZILITE)

ELPIDITE*

Hydrous sodium zirconium silicate, $Na_2ZrSi_6O_{15} \cdot 3H_2O$. An authigenic mineral, found in the Green River Formation.

Uintah County Sun Oil Company South Ouray well.

EMBOLITE

Bromian cerargyrite, $Ag(Cl,Br)$. Isometric. Crystals are cubic. Ordinarily massive; in crusts and waxy coatings. Fracture uneven. Tough. Sectile and ductile. Very plastic. H. 2.5. G. 5.6. Luster resinous to adamantine, horn-like. Colorless when pure and fresh; usually gray, yellowish, greenish brown.

Washington County Silver Reef district: Cobb mine.

ENARGITE

Copper arsenic sulfide, Cu_3AsS_4 . Orthorhombic. Crystals elongated. Columnar, bladed, massive. Cleavage perfect. H. 3. G. 4.4. Luster metallic. Color and streak grayish black to iron black. Opaque.

Juab County Tintic district: Ajax, Carissa, Centennial Eureka, Chief Consolidated, Eagle and Blue Bell, Eureka Hill, Gold Chain, Grand Central, Homestake and Shoebridge, Iron Blossom, Lower Mammoth, Mammoth, Ophongia, Sioux, Swansea, Victoria mines.

Salt Lake County Bingham district: Bingham Copper Pit, Commercial, Galena, Old Jordan, Highland Boy, Yampa mines; Little Cottonwood district: Centennial Alta, Columbus-Rexal, South Hecla mines.

Utah County East Tintic district: Apex Standard, Eureka Bullion, Eureka Lily, Eureka Standard, North Lily, Tintic Standard mines.

ENDELLITE

Hydrous aluminum silicate, $\text{Al}_2\text{Si}_2\text{O}_7 \cdot 4\text{H}_2\text{O}$. Usually in claylike masses, either compact or friable. Perfect cleavage. H. 2. G. 2.6. Color usually white. Hydrothermal alteration product.

Utah County Fox Hills; East Tintic district.

ENGLISHITE

Hydrous basic phosphate of potassium, calcium, and aluminum of uncertain formula, perhaps $\text{K}_2\text{Ca}_4\text{Al}_8(\text{PO}_4)_8(\text{OH})_{10} \cdot 9\text{H}_2\text{O}$. Probably monoclinic. Occurs as layers and aggregates of subparallel plates. Cleavage perfect, micaceous. Flexible. H. 3. G. 2.6. Colorless and transparent. Luster vitreous, pearly.

Utah County Clay Canyon.

ENSTATITE

Magnesium silicate, MgSiO_3 . Orthorhombic. Distinct crystals rare, prismatic habit. Usually massive, fibrous, or lamellar. Cleavage prismatic. Fracture uneven. Brittle. H. 5.5. G. 3.2. Luster pearly to vitreous. Color grayish, yellowish, greenish white, olive-green and brown.

Juab County West Tintic district.

Tooele County Gold Hill district.

EPIDESMINE*

Hydrous calcium sodium aluminum silicate, $(\text{Ca}, \text{Na}, \text{K})_3\text{Al}_5(\text{Al}, \text{Si})\text{Si}_{14}\text{O}_{40} \cdot 15\text{H}_2\text{O}$. Orthorhombic. Occurs in minute crystals. G. 2.2. Cleavage good. Colorless to yellow. Found in lava flows.

Tooele County Rush Valley district; Soldier Creek.

EPIDOTE

Hydrous calcium aluminum iron silicate, $\text{Ca}_2(\text{Al}, \text{Fe})\text{Al}_2\text{O}(\text{SiO}_4)(\text{Si}_2\text{O}_7)(\text{OH})$. Monoclinic. Crystals usually prismatic. Also fibrous, granular, and

forming rock masses. Cleavage good. Brittle. Luster vitreous. H. 6-7. G. 3.4. Color usually pistachio-green or yellowish green.

Beaver County Bradshaw district: 2 R's group; Granite district: Big Pass, Burnt Hollow, Contact, Garnet, Molly, Oak, Oak Basin, Rattler, Scheelite, Ward groups; Lincoln district; Star district: Lady Bryan mine.

Box Elder County Grouse Creek Range; Rosebud district.

Davis County Antelope Island.

Garfield County Henry Mountains: Bromide, Oro mines.

Juab County West Tintic district: Iron King, Lockheed Iron, Tintic Western mines.

Salt Lake County Big Cottonwood district: Mountain Lake mine; Little Cottonwood district: Patsey Marley mine.

Sevier County Henry district: Trinity prospect.

Summit County Park City district.

Tooele County Gold Hill district: Doctor, Fraction Lode, Frankie, Gold Bond, Lucy L., Reaper mines; Ophir district: Ophir Hill area - Cliff, Hidden Treasure, Ophir Hill Consolidated, Ophir Coalition mines; Rush Valley district: Honerine mine.

Utah County Silver Lake district: Milkmaid mine, Silver Creek.

Weber County Sierra Madre district.

EPSOMITE

Hydrous magnesium sulfate, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$. Orthorhombic. Usually as long fibers in bunches of fibrous crusts. H. 2-2.5. G. 1.6. Cleavage good. Fracture conchoidal. Luster vitreous, silky, earthy. Colorless in pure crystals, white in massive aggregates. Very soluble.

Beaver County Gordon district: Sulphurdale; San Francisco district: Frisco Contact mine.

Emery County Castle Dale; Castle Valley.

Garfield County Coyote Creek district: Hampton mine.

Sanpete County Manti.

ERINITE

Basic copper arsenate, $\text{Cu}_5(\text{OH})_4(\text{AsO}_4)_2$. Orthorhombic probably. In mammillary crystalline groups. Cleavage good. H. 4.5. G. 4. Fracture conchoidal. Luster dull, resinous. Color dark green to emerald green. Juab County Tintic district: American Eagle, Centennial Eureka, Mammoth mines.

ERUBESCITE (See BORNITE)

ERYTHRITE

Hydrous cobalt nickel arsenate, $(\text{Co}, \text{Ni})_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$. Monoclinic. Prismatic crystals; often as radial or stellate groups. Incrustations, earthy. H. 1.5-2.5. G. 3.1. Cleavage good. Luster adamantine to vitreous, pearly. Color crimson-red, peach red, pink, white or gray, pale green. Streak paler than color. San Juan County White Canyon district: Happy Jack mine.

ESSONITE (See GARNET)

FAMATINITE

Copper sulfantimonate, Cu_3SbS_4 . Crystal system questionable. H. 3.5. G. 4.5. Fracture uneven. Brittle. Color gray with copper-red tinge. Opaque. Usually massive, granular to dense. Juab County Tintic district: Mammoth mine.

FERBERITE

Ferrous tungstate, FeWO_4 . Monoclinic. Crystals elongated and flattened. Also in groups of bladed crystals, or massive. H. 4-4.5. G. 7.5. Cleavage good. Fracture uneven. Brittle. Luster submetallic. Color black. Streak brownish black to black. Weakly magnetic. Tooele County Gold Hill district: Pole Star Copper Company mine.

FERNANDINITE

Hydrous calcium vanadyl vanadate,

$\text{CaO} \cdot \text{V}_2\text{O}_4 \cdot 5\text{V}_2\text{O}_5 \cdot 14\text{H}_2\text{O}$. Massive, cryptocrystalline to fibrous; rarely in rectangular plates. Color dull green. Emery County San Rafael district: Temple Mountain.

FERRIMOLYBDITE

Hydrous ferric molybdate, probably $\text{Fe}_2(\text{MoO}_4)_3 \cdot 8\text{H}_2\text{O}$. Probably orthorhombic. Massive, and as fibrous crusts or tufted and radial fibrous aggregates. Also as earthy powder or coating. Very soft. G. 3. Luster silky to earthy. Color canary yellow to greenish yellow. Streak pale yellow.

Iron County State Line district.

Salt Lake County Little Cottonwood district.

Tooele County Gold Hill district.

FERRISYMPLESITE

Apparently a hydrous ferric arsenate, and thought to be the oxidized equivalent of symplectite. Small irregular masses. Luster resinous. Color amber-brown. H. 2.5. G. 3.

Tooele County Gold Hill district: Gold Hill (U.S.) mine.

FERROLUDWIGITE (See LUDWIGITE)

FERROPALLIDITE

(See SZOMOLNOKITE)

FERVANITE

Hydrous ferric vanadate, $\text{Fe}_4\text{V}_4\text{O}_{16} \cdot 5\text{H}_2\text{O}$. Probably monoclinic. Occurs in parallel fibrous aggregates. Color golden brown. Luster brilliant. Cleavage not apparent. G. 3.3.

Grand County Polar Mesa district.

FIBROFERRITE

Hydrous basic ferric sulfate, $\text{Fe}(\text{SO}_4)(\text{OH}) \cdot 5\text{H}_2\text{O}$. Orthorhombic. Occurs as fine fibrous crusts and masses, botryoidal, radial fibrous. H. 2.5. G. 2. Cleavage basal. Luster silky to pearly. Color pale yellow, yellowish green to pale green.

Emery County Green River: 30 miles southwest; San Rafael district: Dexter group.

FLUELLITE

Hydrous aluminum fluoride, $\text{AlF}_3 \cdot \text{H}_2\text{O}$. Orthorhombic. Cleavage indistinct. H. 3. G. 2.7. Luster vitreous. Colorless to white. Transparent.

Plute County Marysvale district: Freedom no. 2, Prospector no. 1 mines.

FLUORAPATITE*

Calcium fluorine phosphate, $\text{Ca}_5(\text{PO}_4)_3\text{F}$. Hexagonal. Cleavage indistinct. Fracture conchoidal. Brittle. H. 5. G. 3.1. Luster vitreous. Color sea-green, pale blue, colorless, brownish. Occurs as an authigenic mineral in the Green River and Phosphoria Formations.

Daggett County Uinta Mountains.
Duchesne County Green River Formation; Uinta Mountains.

Utah County Brush Creek; Frandsen Canyon; Little Brush Creek; Rock Creek.

Wasatch County Uinta Mountains.

FLUORITE

Calcium fluoride, CaF_2 . Isometric. Habit usually cubic. Also massive; granular; compact. H. 4. G. 3.2. Cleavage octahedral. Brittle. Luster vitreous. Color various, light green, yellow, bluish green, purple, colorless.

Beaver County Bradshaw district: 2 R's group; Pine Grove district: Monarch mine; Granite district: Bismuth, Big Pass, Contact, Garnet mines; Indian Peak district: Blue Bell, Cougar Spar, Dugout, J.B., Nooday, Lost Sheep, Utah mines; Lincoln district: Creole mine; Newton district: Indian Creek, Sheep Rock, Sniffer and Mystery mines; San Francisco district: Cupric mine; Star district: Brown Thrush, Cabin, Fluorine Ledge, Hub, Lady Bryan, Lucky Boy nos. 1-2, Manassa, Monte Cristo, Moscow, Quartzite, North Virginia Extension, Virginia

nos. 1-5, Wild Bill mines.

Grand County Blue Spar property; Miners Basin district: Dewey, High Ore mines; Ryan Creek Scheelite prospect.

Iron County Escalante district: Escalante mine; Gold Springs district: Homestake mine.

Juab County Dugway Range; Fish Springs district: Carnation, Emma, Galena, Utah mines; Honeycomb Hills; Indian Creek; Thomas Range: Autunite no. 8, Buena no. 1, Good Will, Yellow Chief mines; Spor Mountain: Bell Hill, Blowout, Claybank, Blue Chalk, Hogsback, Northend, Rainbow, Roadside, Dell no. 1, Dell no. 5, Evening Star, Floride, Floride no. 5, Fluorine Queen, Fluorine Queen no. 4, Green Crystal, Harrisite, Hilltop, Lost Sheep, Lost Soul, Lucky Louie, Monella, Oversight, Rainbow no. 2, Thursday mines; Topaz Mountain; Trout Creek; West Tintic district: 88, 1903 mines.

Millard County Gordon district: Rain Bow mine; South Pavant Range: Cove Fort, Dog Valley.

Plute County Marysvale district: Bul lion Monarch, Freedom no. 1-2, La-Vita, Prospector no. 1 mines; Mt. Baldy district: Deer Trail mine; Ohio district: Bully Boy and Webster mines.
San Juan County Big Indian district: Mi Vida mine.

Summit County Park City district: Silver King, Woodside mines.

Tooele County Columbia district: Benmore, Sharp mines; Dutch Mountain; Dugway district: Black Maria, Bryan, Buckhorn, Confidence, Eureka, Four Metals, Golconda, Pride of the West, Kellys Hole, Lauris, Rainbow, Rattler mines; East Erickson district: Copper Jack, Hard-to-Beat Canyon, Sheeprock, Silver King, Silver Shield mines; Erickson district: Black Jack, Black Rock, Blain, Deer Trail, Indian Boy, May Farmer, Good Hope mines; Gold Hill district: Gold Bond mine; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Ophir district: Lion Hill area - Buffalo mine; Ophir Hill area - Ophir Coalition mine; Rush Valley district: Honerine mine; Wild Cat Mountains: Silver Queen mine.

Utah County Santaquin district: Black Balsam vein.

Weber County Cold Water Canyon; Sierra Madre district: Eldorado property.

FORSTERITE (See OLIVINE)

Magnesium variety of olivine, Mg_2-SiO_4 . Orthorhombic. In small equidimensional or tabular crystals. Usually in imbedded grains or in granular masses. H. 6-7. G. 3.2. Fracture conchoidal. Luster vitreous. Color olive to grayish green and brown, also white and yellow.

Salt Lake County Big Cottonwood district: Mountain Lake mine, Steamboat Tunnel; Little Cottonwood district: Alta mine.

FOSHAGITE

Hydrous basic calcium silicate, $H_2-Ca_5(SiO_4)_3 \cdot 2H_2O$. Orthorhombic. A zeolite. Occurs in compact fibrous masses. G. 2.4. Color white. Luster silky.

Salt Lake County Bingham district: Bingham Copper Pit.

FOURMARIERITE

Hydrous oxide of uranium and lead, $PbU_4O_{13} \cdot 7H_2O$. Orthorhombic. Crystals tabular and elongated. H. 3-4. G. 6. Cleavage basal. Luster adamantine. Color red to golden red and brown. Transparent.

Emery County San Rafael district: Delta, Lucky Strike no. 2 mines.

FRANCOLITE (See FLUORAPATITE)

FREIBERGITE

Argentian tetrahedrite. Tetrahedral. Groups of crystals, massive, or compact. Cleavage none. Fracture subconchoidal to uneven. H. 3-4.5. G. 4.6-5.1. Luster metallic. Color flint-gray to cherry red.

Salt Lake County Bingham district: Silver Shield mine.

Utah County East Tintic district.

GALENA

Lead sulfide, PbS. Isometric. Commonly in cubes. Also massive, cleavable, coarse or fine granular. H. 2.5. G. 7.6. Cleavage cubic. Luster metallic. Color and streak lead-gray. Opaque.

Beaver County Antelope district; Beaver Lake district: Galena mine; Bradshaw district: Cave, Hecla, Nip and Tuck mines; Granite district: Beaver View, Big Pass, Burnt Hollow mines; Indian Peak district; Lincoln district: Creole, Lincoln mines; McGarry district; Newton district; Indian Creek; Pine Grove district; Pruess district: Gold Reef, Indian Queen mines; San Francisco district: Beaver Carbonate, Cupric, Horn Silver, Imperial, King David, Michigan, Peacock Copper, Washington mines; Star district: Dotson, Hoosier Boy, Hub, Moscow, Red Warrior, Vicksburg, White Rock, Wild Bill mines.

Box Elder County Ashbrook district: Vipont mine; Box Elder district: Lucin district: Cenepah Tunnel, Copper Mountain, Tecoma Hill mines; Newfoundland district; Park Valley district: Century, Susannah mines; Rosebud district: A & W, Magnitude, Mogul mines; Willard district: Consolidated group, Louise Consolidated mine, Ogden Boilmakers, Silver Queen mines.

Cache County Hyrum area: Lucky Star, Tip Top claims; La Plata area: La Plata, Sunrise claims; Logan area: Paradise district; Richmond district. Davis County Wandering Jew mine. Emery County Emery district; San Rafael district: Dexter group, Lucky Strike no. 2 mines.

Grand County Richardson district; Ryan Creek Scheelite prospect.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Juab County Deseret district: Miller mine; Detroit district: Ibox mines; Fish Springs district: Utah mine; Juab district; Mona district; Mt. Nebo district: Ajaxto no. 2, Big Nebo, Blackett Tunnel, Eva, Freddie, Highland, Santaquin Chief, Santaquin King, Syndicate mines; North Tintic district:

Tintic Prince mine; Tintic district: Black Dragon, Beck Tunnel, Bullion Beck, Centennial Eureka, Chief Consolidated, Colorado, Dragon, Eagle and Blue Bell, Eureka Hill, Gemini, Godiva, Grand Central, Humbug, Iron Blossom, Lower Mammoth, Manmoth, May Day, Sioux, Swansea, Victoria mines; Spring Creek district: Queen of Sheba mine; West Tintic district: 88, 1903, Pyramid, Scotia, War Eagle mines.

Millard County Leamington district: Arbroath, Leamington Mining Company, Wood Canyon, Yellowstone mines; Saw Back district.

Morgan County Argenta district: Carbonate Hill, Carbonate Gem mines.

Piute County Gold Mountain district: Annie Laurie mine; Mt. Baldy district: Crystal, Deer Trail, Pluto mines; Ohio district: Bully Boy and Webster, Cascade, Copper Belt, Iris, Shamrock mines.

Rich County Swan Creek district: Victoria prospect.

Salt Lake County Big Cottonwood district: Alta Tunnel and Transportation Company, American Metals, Carbonate, Cardiff, Kennebec, Lulu, Maxfield, Prince of Wales, Tar Baby, Woodlawn mines; Bingham district: Boston Consolidated, Brooklyn, Burning Moscow, Butterfield, Caledonia, Colorado, Conger, Dalton and Lark, Dixon, Eagle Bird, Fortune, Frisco, Galena, Highland Boy, Jersey Blue, Midland, Montezuma, Neptune, Old Jordan, Old Telegraph, Petro, Phoenix, Queen, Queen Lode, Red Wing, Silver Shield, Tiewaukee, U.S. and Lark, Winnamuck, Yampa, York, Yosemite mines; Hot Springs district; Little Cottonwood district: Albion, Cabin, Columbus Consolidated and Wasatch Drainage Tunnel, Columbus - Rexal, Dwyer, Emma, Flagstaff, Little Emma, Michigan - Utah, Peruvian Consolidated, South Hecla, Superior mines.

San Juan County Big Indian district: Mi Vida mine; Monticello district: Blue Bird, Copper Queen, Danish Girl, Gold Queen mines; White Canyon district: Happy Jack mine.

Sanpete County Dry Canyon.

Sevier County Henry district: Trinity prospect; Salina Creek district: Ball, Lead Hill mines.

Summit County Marble district; Park City district: American Flag, California, Comstock, Creole, Daly, Daly West, Jupiter, Kearns - Keith, Little Bell, Nail Driver, New York, Ontario, Scottish Chief, Silver King, Silver King Consolidated, Woodside mines.

Tooele County Bingham district: May Flower mine; Blue Bell district: Benning Canyon, Black Hawk, Bogan, Hidden Splendor, Morgan mines; Columbia district: Sharp, Benmore, Sultana mines; Deep Creek Mountains; Dutch Mountain; Dugway district: Bertha, Bryan, Buckhorn, Bullion Canyon, Four Metals, Francis, Kellys Hole, Lauris, Raymond - Bald Eagle mines; East Erickson district: Dutch Peak, Indianapolis, Tintic - Delaware mines; Erickson district: Black Joe, Black Rock, Blain, Deer Trail, Indian Boy, May Farmer, Good Hope, Indian Chief, Last Hope no. 3, Utonia mines; Free Coinage district; Gold Hill district: Alvarado, Bonanza, Cash Boy, Christmas Mining Company, Climax, Copper Queen - Midland Mining Company, Cyclone, Garrison Monster, Gold Belt, Gold Hill (U.S.), Gold Hill Standard, Monoco, New Baltimore, Reaper, Red Jacket, Rube, Silver and Gold Mining Company, Spotted Fawn, Success, Unadine mines; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Grantsville district; Johnson Pass; Lakeside district; Mercur district: Mineral Hill mine; North Tintic district: New Bullion, Scranton mines; Ophir district: Dry Canyon area - Kearsarge, Mono, Queen of the Hills, Surprise mines; Lion Hill area - Buffalo mine; Ophir Hill area - Admiral Dewey, Cliff, Hidden Treasure, Ophir Hill Consolidated, Ophir Coalition, Sacramento mines; Osceola district; Rush Valley district: Argent, Ben Harrison, Calumet, Galena King, Honerine, Mescatine, Muerbrook, Salvation - Hercules, Tip Top mines; Silver Island district: Carrie Mack property; Tooele district; Willow Springs district.

Uintah County Bassett mine.

Utah County Alpine district: Alpine-Galena, Lucky Chance mines; American Fork district: Bay State, Bog, Dutchman, Mary Ellen, Live Yankee, Miller, Pacific, Pittsburgh, Silver Dipper, Water Fall, Yankee mines; East Tintic district: Apex Standard, Burgin, Eureka Bullion, Eureka Lily, Eureka Standard, North Lily, Tintic Standard mines; North Tintic district: Blowhole Hill, Lehi-Tintic, Tintic Empire, Tintic Paymaster mines; Payson district: Nelson, Syndicate mines; Provo district: Monarch mine; Santaquin district: Union Chief mine; Silver Lake district: Milkmaid, Ontario mines.

Wasatch County Blue Ledge district: Glencoe, Mayflower, McHenry, Valeo mines; Elkhorn district: Crawford, Nelson and Queen mines; Snake Creek district: Revelator, West Quincy mines.

Wayne County Miners Mountain district.

Weber County Fremont Island district; Sierra Madre district: Eldorado property; Weber district: New Azurite, Standard Mining Company mines.

GARNET GROUP

The group includes a number of important subspecies which conform to the general formula $A_3B_2(SiO_4)_3$. (A = calcium, magnesium, ferrous iron, or divalent manganese; B = aluminum, ferric iron, titanium, or chromium). Isometric. Common forms are dodecahedrons and trapezohedrons. Also in ground grains, massive granular, coarse or fine. H. 6.5-7.5. G. 3.5-4.3. Luster vitreous to resinous. Color varying with composition; mostly red, brown, yellow, white, green, black. Transparent to translucent. Grossularite is the most common garnet in Utah and occurs in contact metamorphic zones in crystalline limestones. Beaver County Beaver Lake district: Bat Ridge, Skylark mine; Bradshaw district: 2 R's group; Granite district: Big Pass, Contact, Molly, Oak, Oak Basin, Rattler, Scheelite, Ward groups;

Lincoln district: Creole mine; Pruess district: Cactus Gulch, Copper Gulch; Rocky district: Copper Ranch, Old Hickory mines; San Francisco district: Cupric mine; Star district: Commonwealth, Copper King, Kemple, Progressive, St. Mary's, Wild Bill mines; Washington district: Orizaba Consolidated mine, Lucero claim.

Box Elder County Dove Creek; Rosebud district.

Davis County Antelope Island.

Iron County Gold Springs district: Homestake mine.

Juab County Dugway Range; Thomas Range; Topaz Mountain; Tintic district: Carissa mine; Spring Creek district: Queen of Sheba mine; West Tintic district: Iron King, Tintic Western mines.

Millard County House Range: Amasa Valley, Horseshoe, Mt. Baldy, New Klondike, Pine Peak, Pinke Peak, Rainbow, South, South Pit, Sidesprings mines, Notch Peak, Painter Springs; Saw Back district.

Piute County Gold Mountain district.

Salt Lake County Big Cottonwood district: Mountain Lake mine; Bingham district; Little Cottonwood district: Alta, South Hecla mines.

San Juan County Chinle Wash; Comb Ridge; Moses Rock; Mule Ear; Navajo Reservation.

Sevier County Henry district: Trinity prospect.

Summit County Bonanza Flat; Park City district: Jupiter mine.

Tooele County Dugway district; Gold Hill district: Alvarado, Calaveras, Cane Springs, Copperopolis, Doctor, Fraction Lode, Frankie, Lucy L., Ida Lull mines; Granite Mountain district; Ophir district: Ophir Hill area - Chicago, Hidden Treasure, Ophir Hill Consolidated, Ophir Coalition mines; Rush Valley district: Settlement Canyon, Soldier Creek.

Utah County Silver Lake district: Deer Creek, Milkmaid mine, Silver Creek.

Wasatch County Bonanza Flat; Snake Creek district.

Weber County Ogden Canyon; Sierra Madre district; Strong's Canyon.

GARRELSITE*

Basic barium calcium magnesium boron silicate, $(Ba, Ca, Mg)B_3SiO_6(OH)_3$. Monoclinic. Crystals have steep dipyramidal shape, faces striated. Colorless, but darkened by inclusions. Occurs as sparce crystals in the Green River Formation.

Uintah County Sun Oil Company South Ouray well.

GEOCRONITE

Lead antimony arsenic sulfide, $Pb_5-(Sb, As)_2S_8$. Orthorhombic. Crystals rare. Massive, granular. H. 2.5. G. 6.3. Cleavage good. Fracture uneven. Luster metallic. Color and streak lead-gray to grayish blue. Opaque.

Juab County Tintic district; Colorado mine.

GEARKSUTITE

Hydrous calcium aluminum fluoride, $CaAl(OH)F_4 \cdot H_2O$. Probably monoclinic. Massive or nodular, earthy. Consists of very minute needles. H. 2. G. 2.7. Colorless to white. Luster dull.

Piute County Marysvale district; Freedom no. 2 mine.

Utah County East Tintic district.

GEL-BERTRANDITE

(See BERTRANDITE)

GERSDORFFITE

Essentially a sulfide-arsenide of nickel, $(Ni, Fe, Co)AsS$. Isometric. Octahedral, pyritohedral crystals; sometimes striated as in pyrite; lamellar and granular massive. Cleavage perfect. Fracture uneven. H. 5.5. G. 5.9. Luster metallic. Color silver-white to steel gray, often tarnished gray or grayish black. Streak grayish black. Opaque.

San Juan County White Canyon district; Happy Jack mine.

GIBBSITE

Aluminum hydroxide, $Al(OH)_3$. Mono-

clinic. Spheroidal concretions, incrustations, or earthy masses. H. 3. G. 2.3. Luster pearly. In hydrothermal alteration zones of ore deposits. Utah County East Tintic district.

GILSONITE

An asphalt. Occurs in veined masses. Conchoidal fracture. Brittle. H. 2-2.5. G. 1.06. Color black. Luster brilliant, lustrous. Streak brown. Burns with brilliant flame.

Duchesne County Castle Peak district; Myton.

Utah County Asphalt Wash; Black Dragon mine; Bonanza mine; Fort Duchesne; Rainbow mine.

GLAUBERITE

Sodium calcium sulfate, $Na_2Ca(SO_4)_2$. Monoclinic. Cleavage perfect. Fracture conchoidal. Brittle. H. 2.5-3. G. 2.8. Color usually gray or yellowish. Transparent and translucent. Taste slightly saline.

Box Elder County Shores of Great Salt Lake.

Davis County Shores of Great Salt Lake.

Salt Lake County Shores of Great Salt Lake.

Tooele County Shores of Great Salt Lake.

GLAUCONITE

Essentially a hydrous silicate of iron and potassium. Considerable variation in composition. Probably occurs in both colloidal and crystalline forms. Usually amorphous. Resembles chlorite. Color dull green. Found in ocean sediments near the continental shores. Found in the Cambrian Ladore Formation, and Jurassic Curtis Formation.

Daggett County Uinta Mountains. Utah County Eastern Uinta Mountains; Split Mountain; North of Vernal.

GEOTHITE

Hydrogen iron oxide, $HFeO_2$. Ortho-

rhombic. Rarely in distinct crystals, often flattened. In acicular crystals. Also massive, reniform, stalactitic in radiating fibrous aggregates. Cleavage good. H. 5-5.5. G. 4.4. Luster adamantine to dull. Brittle. Color yellowish brown to dark brown. Streak yellowish brown. Occurs with limonite forming gossans in Utah.

Beaver County San Francisco district; Pruess district: Blackbird, Cactus mines.

Box Elder County Lucin district: Copper Mountain, Tecoma Hill mines.

Grand County Miners Basin district: High Ore mine.

Iron County State Line district.

Piute County Marysville district: La Vita prospect, Silica Hills.

San Juan County White Canyon district: Happy Jack mine.

GOLD

Native gold, Au. Isometric. Crystals rare. Commonly reticulated, dendritic, filiform, spongy. Also massive or as flattened grains or scales. H. 2.5-3. G. 19.3. Fracture hackly. Very malleable and ductile. Color and streak gold-yellow when pure. Luster metallic. Opaque.

Beaver County Bradshaw district: Cave, Hecla, Jolly, Nip and Tuck mines; Fortuna district: Rocky Hollow; San Francisco district: Golden Reef, Michigan group mines; Granite district: Beaver View, Big Pass, Contact, Garnet group mines; Newton district: Indian Creek, Rob Roy mine; Pruess district: Gold Reef mine.

Box Elder County Ashbrook district: Vipont mine; Dove Creek; Lucin district: Copper Mountain, Tecoma Hill mines; Park Valley district: Century, Susannah mines; Promontory district: Lakeview mine; Rosebud district: Mogul mine, Red Buttes; Willard district: Overland claim.

Cache County Hyrum area: Moon claim.

Daggett County Red Creek: Yellow Canary uranium deposit.

Davis County Farmington district: Morning Star mine, Parrish Canyon.

Emery County Emery district; southern part of County.

Garfield County Colorado River district; Henry Mountains: Bromide, Cuprum, Oro mines.

Grand County Bald Mesa; Colorado River area; Miners Basin district: Dillon, M.I.F. mines, Placer Creek, Tornado deposit; Salt Valley; Wilson Mesa.

Iron County Gold Springs district: Homestake mine; Sand Springs; State Line district.

Juab County Detroit district: Charm, Copperhead, E.P.H., Ibex mines; Tintic district: Black Jack, Bullion Beck, Centennial, Empire, Eureka, Eureka Hill, Mammoth, May Day, Victoria mines; Trout Creek district; West Tintic district; Scotia, War Eagle mines.

Kane County Colorado River district.

Millard County House Range: Amasa Valley, Notch Peak; Leamington district: Yellowstone mine.

Morgan County Morgan district: Chicago-Utah, Iron King, Morgan Consolidated, Morgan Crescent, Red Eagle mines; Strawberry mine.

Piute County Deer Creek; Gold Mountain district: Annie Laurie, Sevier mines. Mt. Baldy district: Deer Trail, Pluto mines; Ohio district: Bully Boy and Webster, Cascade, Dalton, Wedge mines.

Salt Lake County Big Cottonwood district: New State mine; Bingham district: Bingham Copper Pit, Broad Gauge, Boston Consolidated, Burning Moscow, Brooklyn, Butterfield, Caledonia, Commercial, Dalton and Lark, Dixon, Galena, Last Chance, Montezuma, Nast, Old Jordan, Old Telegraph, Parnell, Red Wing, U.S. and Lark, Winnamuck, Yosemite mines; Little Cottonwood district: Dwyer claims; Lower Placer district.

San Juan County Bluff; Colorado River; Golden Queen mine; La Sal Mountains; Point Lookout Placer; Monticello district: Blue Bird, Copper Queen, Danish Girl, Duckett, Gold Queen, Log Cabin mines; San Juan River.

Summit County Park City district: Daly-Judge, New York, Silver King, Woodside mines.

Tooele County Columbia district: Sultana mine; Dugway district: Four Metals mine; East Erickson district: Indianapolis mine; Free Coinage district; Gold Hill district: Alvarado, Cane Springs, Copper Bloom, Lucy L., Midas, Reaper, Rube, Yellow Hammer mines; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Mercur district: Consolidated Mercur, Daisy, La Cigale, Golden Gate, Sacramento mines; Ophir district: Dry Canyon area - Surprise mine; Lion Hill area - Buffalo, East Side, Empire, Iron, Monarch, Northern Light, Woodruff mines; Rush Valley district: Honerine mine; Wild Cat Mountains: Silver Queen mine.

Utah County Green River district: Cub Creek; Little Split Mountain.

Utah County American Fork district: Yankee mine; East Tintic district: Apex Standard, Burgin, Eureka Bullion, Eureka Lily, Eureka Standard, Iron King, North Lily, Tintic Standard mines; Payson district: Nelson mine; Silver Lake district: Deer Creek, Milkmaid, Ontario mines.

Wasatch County Blue Ledge district: Glencoe, McHenry, Mayflower, Valeo mines; Elkhorn district: Crawford, Nelson and Queen properties; Snake Creek district: West Quincy mine.

Washington County Bull Valley district.

Weber County Cold Water Canyon; Fremont Island district; Sierra Madre district: King Solomon vein.

GOLDICHITE

Hydrous potassium ferric sulfate, $KFe(SO_4)_2 \cdot 4H_2O$. Monoclinic. Occurs as radiating clusters, or fine-grained crusts. Larger crystals striated. H. 2.5. G. 2.4. Color pale yellowish green. Cleavage good. Emery County San Rafael district: Dexter group.

GORDONITE

Hydrous basic magnesium aluminum phosphate, $MgAl_2(PO_4)_2(OH)_2 \cdot 8H_2O$. Triclinic. Usually in bundles which

radiate outward in sheaf-like aggregates. H. 3.5. G. 2.2. Cleavage good. Fracture conchoidal. Brittle. Luster vitreous to pearly. Colorless to smoky white.

Utah County Clay Canyon.

GOSLARITE*

Hydrous zinc sulfate, $ZnSO_4 \cdot 7H_2O$. Orthorhombic. Usually found as crusts, acicular to hair-like crystals; massive, granular or fibrous. H. 2-2.5. G. 1.9. Cleavage good. Brittle. Luster vitreous. Colorless, tints of brown, green, blue. Taste metallic, astringent.

Beaver County San Francisco district: Horn Silver mine.

Salt Lake County Bingham district: Dixon, Galena, Old Jordan, Winnamuck mines.

Summit County Park City district.

GRANTSITE*

Hydrous sodium calcium vanadate, questionable composition. Monoclinic. Occurs as aggregates of microscopic fibers or blades; botryoidal. H. soft. G. 2.9. Color dark olive-green to greenish black. Luster silky. Grand County Thompsons district: Parco no. 23 mine.

GRAPHITE

Native carbon, C. Hexagonal. Commonly in foliated masses. Also scaly, radiated, granular, earthy, to compact. H. 1-2. G. 2.1. Cleavage basal perfect. Flexible. Sectile. Greasy feel. Luster metallic. Color iron black to steel gray. Streak black. Tooele County Gold Hill district: Alvarado mine. Utah County Silver Lake district: Deer, Silver Creeks.

GREENOCKITE

Cadmium sulfide, CdS. Hexagonal. Usually as an earthy coating. H. 3-3.5. G. 4.9. Cleavage good. Fracture conchoidal. Brittle. Luster

adamantine to resinous. Color yellow, orange. Streak yellow-orange to brick-red.

Beaver County Star district: Moscow mine.

San Juan County Big Indian district: Mi Vida mine; White Canyon district: Happy Jack mine.

Utah County East Tintic district: North Lily mine.

GROSSULARITE (See GARNET)

GUANO

Essentially a tricalcium phosphate. Found in areas frequented by birds, comprised chiefly of their excrement. Box Elder County Bird Island; Gunnison Island.

Millard County Tabernacle Mountain.

GUMMITE

No single formula attributed to these materials, essentially oxides of uranium, usually with Pb, Th, rare earths, and large amounts of water. Massive, dense. Also as crusts. H. 2.5-5. G. 3.9-6.4. Fracture conchoidal, uneven. Brittle. Luster greasy to vitreous, often resembles gum. Color yellow, orange, brown, black.

Emery County San Rafael district: Delta mine.

San Juan County Paradox Valley district: Grey Dawn mine.

GYPSITE

Earthy mixture of gypsum with clay and sand. Found on playas.

Millard County West of Fillmore, dunes twenty feet high.

Tooele County Large dunes near Knolls.

GYPSUM

Hydrous calcium sulfate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. Monoclinic. Single crystals commonly simple in habit. Also granular massive, foliated, and rock forming. H. 2. G. 2.3. Cleavage perfect one direction, two imperfect.

Flexible, not elastic. Luster vitreous to pearly. Colorless, white, gray, yellowish or brownish. Gypsum occurs as extensive beds of sedimentary origin, associated with anhydrite. In southeastern Utah found in the Paradox Member of the Hermosa Formation; in east-central Utah it occurs in the Carmel, Entrada, and Summerville Formations; in central Utah in the Arapien Shale; in southwestern Utah in the Kaibab, Moenkopi, Carmel, and Curtis Formations; in northeastern Utah in the Thaynes and Carmel Formations. Huge selenite crystals have been found in caves in Wayne County, and other parts of the State.

Beaver County Pruess district: Blackbird, Cactus mines; San Francisco district: Horn Silver mine.

Box Elder County Promontory district: Lakeview Mining properties.

Duchesne County Lake Fork; Rock Creek.

Emery County Cedar Mountain district: Fullers Bottom; Horn Silver Gulch; San Rafael district: Delta mine, Flat Top Mesa; San Rafael River: Tidwell Ranch. Garfield County Circle Cliffs: Acme, Black Widow, Blue Goose, Rocky Mountain, Steam Boat mines; Coyote Creek district: Hampton mine; Water Pocket Canyon.

Grand County Agate Switch; Cane Creek; Fisher Valley; Gypsum Hills; Moab Valley; Onion Creek; Polar Mesa district; Paradox Basin; Salt Valley; Seven Mile anticline; Thompsons area. Iron County Cedar Canyon; Kanarraville.

Juab County Mona district; San Pitch Mountains: Chicken Creek, Levan, Nephi, Salt Creek; Tintic district: Mammoth mine.

Kane County Cannonville; Glendale; Johnson Creek; Kanab Creek; Kimball Valley; Orderville; Paria.

Millard County Fillmore; Gordon district: Cove Creek, Black, Excelsoir, Mariposa, New York, Philadelphia, Prince Albert, Sulphur King, Queen Victoria mines; Kanosh.

Plute County Gold Mountain district; Marysvale district: Quicksilver mine; Sevier Canyon.

Salt Lake County Shores of Great Salt Lake.

San Juan County Gypsum Creek; Moab Valley; Monticello district; Paradox Basin; San Juan River; White Canyon district; Happy Jack mine.

Sanpete County Gunnison; Mayfield; Twelve Mile Canyon.

Sevier County Glenwood; Henry district; Trinity prospect; Rock Candy Mountain; Sigurd.

Summit County Park City district; Wabash property.

Tooele County Dugway district; Bertha, Four Metals, Kellys Hole, Metal States, Surplus mines; Gold Hill district; Gold Hill (U.S.) mine; shores of Great Salt Lake; Knolls; Mercur district; Mercur mine; Ophir district; Ophir Hill area - Admiral Dewey prospect; Rush Valley district; Mescatine mine.

Uintah County Steinaker Draw; Ute-land Knoll district; Ouray; Whiterocks Canyon.

Utah County Utah district: Alpha, Emerald, Lucky Boy, Queen of the West, Spalding, Trotter mines.

Washington County Santa Clara district; Black Beauty no. 1 claim; Silver Reef district; St. George; Toquerville; Virgin River.

Wayne County Caineville; Fremont River; South Wash; Fruita; Oylerville; Last Chance Gulch; Muddy River.

GYROLITE

Hydrous basic calcium silicate, $H_2-Ca_2Si_3O_9 \cdot H_2O$. Hexagonal. A zeolite. Occurs in white concretions, lamellar, radiating structures. Basal cleavage. H. 3-4. G. 2.4.

Salt Lake County Bingham district; Bingham Copper Pit.

HALITE

Sodium chloride, NaCl. Isometric. Usually cubic crystals, faces often cavernous and stepped. Also massive, coarsely granular to compact. H. 2. G. 2.1. Cleavage cubic. Brittle. Luster vitreous. Colorless, white, yellow, red.

Box Elder County Great Salt Lake.

Davis County Great Salt Lake.

Grand County Cane Creek; Paradox Basin; Salt Valley; Seven Mile anticline.

Juab County San Pitch Mountains; Chicken Creek, Levan, Nephi, Salt Creek.

Piute County Marysville district.

Salt Lake County Great Salt Lake.

San Juan County Moab Valley.

Sanpete County Gunnison; Twelve Mile Canyon.

Sevier County Glenwood; Redmond; Sigurd.

Tooele County Great Salt Lake; Great Salt Lake Flats; Salduro; Wendover.

Washington County Virgin River.

HALLOYSITE

Hydrous aluminum silicate, $Al_2Si_2O_7 \cdot 2H_2O$. Massive, claylike or earthy. H. 1-2. G. 2.1. Fracture conchoidal. Luster pearly, waxy, dull. Color white, grayish, greenish, yellowish, bluish, reddish.

Box Elder County Lucin district; Copper Mountain, Tecoma Hill mines.

Juab County Tintic district; Dragon mine, Packard Peak.

Piute County Marysville district.

Summit County Park City district; Park-Bingham Tunnel.

Tooele County Blue Bell district; The Iron mine.

Utah County Fox Hills; East Tintic district.

Wasatch County Keetley area.

Washington County Mineral Mountain; Beauty Knoll claims.

HALOTRICHITE

Hydrous sulfate of divalent iron, $Fe-Al_2(SO_4)_4 \cdot 22H_2O$. Monoclinic. Occurs in silky fibrous forms, tufted. Also acicular. H. 1.5. G. 1.9. Cleavage poor. Fracture conchoidal. Brittle. Luster vitreous. Colorless to white, yellowish or greenish. Taste astringent.

Emery County San Rafael district; Dexter group.

Uintah County Ute-land Knoll district;

Ouray.

Utah County East Tintic district: Tintic Standard mine.

HEDENBERGITE

Calcium iron silicate, $\text{CaFeSi}_2\text{O}_6$. Monoclinic. Apyroxene. In prismatic crystals. Cleavage prismatic imperfect. H. 5-6. G. 3.5. Color black. Beaver County Star district: Lady Bryan, Moscow mines.

Grand County La Sal Mountains: North Mountain; Miners Basin district: Dewey, M.I.F. mines.

Tooele County Ophir district: Ophir Hill area - Hidden Treasure mine.

HELIUM

Helium, He. Inert, colorless, odorless gas. Helium is next to hydrogen in lightness. Density 0.178. Associated with natural gas.

Emery County Woodside Dome.

Grand County Harley Dome.

HELVITE

Complex beryllium silicate, $\text{Mn}_4\text{Be}_3\text{-Si}_2\text{O}_{12}\cdot\text{S}$. Isometric. Crystals are tetrahedrons. Occurs also in spherical masses. Cleavage poor. Fracture uneven to conchoidal. Brittle. H. 6. G. 3.2. Luster vitreous to earthy. Color red-brown. Garnet-like masses. Beaver County Granite district: Miller mine.

HEMATITE

Iron oxide, Fe_2O_3 . Hexagonal. Crystals often thick to thin tabular. Also micaceous to platy, columnar to granular, botryoidal, friable, earthy or compact. H. 5-6. G. 5.2. Cleavage none. Fracture subconchoidal to uneven. Brittle. Luster metallic to sub-metallic to dull. Color steel gray, red. Streak reddish brown.

Beaver County Beaver Lake district: Iron Mountain Pass, Skylark mines; Blue Mountains; English Springs; Granite district: Burnt Hollow, Contact, King of the Hills groups; Lincoln

district: Creole, Lincoln mines; Pine Grove district: Emma, Iron Duke (Iron Gloery or Ruby Iron), Iron Queen (Mooney, Wilson, Last Chance), King Iron prospects; San Francisco district: Imperial mine; Star district: Wild Bill mine.

Box Elder County Ashbrook district: Vipont mine; Lucin district: Copper Mountain, Tecoma Hill mines; Willard district: Gold Standard mine.

Cache County Hyrum area: Moon claim; Paradise district: Mineral Point.

Daggett County Red Creek: Yellow Canary uranium deposit; Red Creek Complex.

Davis County Antelope Island: Farmington district: Parrish Canyon.

Duchesne County Duchesne Iron prospect; Moon Lake Iron deposit; Red Ledge; Hilltop Iron claims.

Garfield County Henry Mountains: Bromide, Oro mines.

Grand County Miners Basin district: Dewey, High Ore mines.

Iron County Iron Springs district: Granite Mountain, Iron Mountain, Three Peaks (See under MINERAL LOCALITIES, Iron County); Pinto Iron district.

Juab County Detroit district: Charm, Copperhead, E.P.H., Ibex mines; Thomas Range: Bell Hill mine, Floride mine; Topaz Mountain; Tintic district: Emerald, Iron mines; West Tintic district: Lockheed Iron, Scotia, War Eagle, Iron King, Tintic Western mines. Millard County Gordon district: Excelsior, Mariposa, New York, Prince Albert, Queen Victoria mines, Cove Creek; Twin Peaks (martite variety). Morgan County Hardscrabble district: Norway group.

Piute County Marysvale district: East Slope no. 2, La Vita prospects; Mt. Baldy district: Deer Trail mine.

Salt Lake County Bingham district: Broad Gauge, Highland Boy, Yampa mines.

San Juan County White Canyon district: Happy Jack, Jomac mines.

Sevier County Henry district: Iron Peaks, Krotke Iron, Trinity mines.

Summit County Park City district: Jupiter mine.

Tooele County Blue Bell district: Bogan, The Iron mines; Columbia district: Iron Hope prospect; Dugway district: Bertha, Black Dragon, Bryan, Confidence, Four Metals, Kellys Hole, Lauris, Eagle mines; East Erickson district: Indianapolis, Silver King, Tintic-Delaware mines; Gold Hill district: Calaveras, Gold Bond, Reaper mines; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Rush Valley district: Soldier Creek mine.

Utah County Ashley Creek: Woodside Iron prospect; Browns Park area; Carbonate district: Dyer, Pope Iron mines.

Utah County East Tintic district: Iron King, Tintic Standard mines; North Tintic district: Selma mine; Provo district: Monarch mine; Santaquin district: Copper Bullion, Santaquin Central Tunnel, Union Chief mines; Silver Lake district: Deer, Silver Creeks; Utah district: Alpha, Emerald, Lucky Boy, Queen of the West, Spalding, Trotter mines.

Wasatch County Rhodes Plateau district: Ferry Iron deposit.

Washington County Bull Valley district: Buddy, Big Mountain, Emma, Enterprise, Iron Rod, Pilot, Soft Iron claims.

Weber County Sierra Madre district: Weber district.

HEMIMORPHITE

Hydrous silicate of zinc, $Zn_4(Si_2O_7)(OH)_2 \cdot H_2O$. Orthorhombic. Crystals tabular or prismatic. Also stalactitic, mammillary, fibrous, massive, granular. H. 4.5-5. G. 3.4. Cleavage good. Brittle. Luster vitreous. Color white, bluish, greenish, yellowish. Transparent to translucent.

Beaver County San Francisco district: Horn Silver mine; Star district: Cedar-Talisman, Hoosier Boy mines.

Box Elder County Lucin district: Tecoma Hill mine; Promontory district: Lakeview Mining properties.

Juab County Mt. Nebo district: Eva, Freddie mines; Tintic district: Boss Tweed, Bullion Beck, Colorado,

Gemini, May Day, Victoria mines; West Tintic district: Lockheed Iron mine.

Salt Lake County Little Cottonwood district: Emma, Little Emma mines.

Summit County Park City district: Quincy mine.

Tooele County Dugway district: Bertha, Bryan claims, Bullion Canyon; Gold Hill district: Garrison Monster mine; North Tintic district: Raymond-Bald Eagle, New Bullion, Scranton mines; Ophir district: Ophir Hill area - Hidden Treasure, Sacramento mines.

HERCYNITE*

Essentially an oxide of iron and aluminum, $FeAl_2O_4$. Isometric. Occurs as massive, coarse granular to compact, irregular or rounded embedded grains. H. 7.5-8. G. 4.4. Dark grayish green to dark green. Found in isolated boulders with corundum.

Sevier County Pine Canyon: Black Hawk claims.

HESSITE

Silver telluride, Ag_2Te . Monoclinic. Highly modified and often greatly distorted. Also massive, compact, fine-grained. H. 2-3. G. 8.2. Cleavage cubic indistinct. Somewhat sectile. Luster metallic. Color lead-gray to steel-gray. Opaque.

Tooele County Ophir district: Dry Canyon area - Kearsarge mine.

Utah County East Tintic district: Eureka Standard mine.

HETAEROLITE

Oxide of zinc and manganese, $ZnMn_2O_4$. Tetragonal. Crystals pyramidal; also massive. Cleavage indistinct. Fracture uneven. Brittle. H. 6. G. 5.2. Luster submetallic. Color black. Streak dark brown.

Utah County East Tintic district: Burgin mine.

HEULANDITE

Essentially a hydrous calcium aluminum silicate, $Ca(Al_2Si_7O_{18}) \cdot 6H_2O$.

Monoclinic. Crystals sometimes flattened. Also globular forms, granular. H. 3.5-4. G. 2.2. Cleavage good. Brittle. Luster pearly, vitreous. Color white to red, gray, brown. A zeolite.

Juab County Tintic district: Gemini mine.

Salt Lake County Little Cottonwood district.

HEWETTITE

Hydrous calcium vanadate, $\text{CaV}_6\text{O}_{16} \cdot 9\text{H}_2\text{O}$. Monoclinic. Found as nodular aggregates, fibrous coatings, microscopic needles. H. soft. G. 2.6. Luster silky. Color deep red. Emery County San Rafael district: Flat Top Mesa, Temple Mountain, Rex no. 2 mine, South Rock, South Temple Wash.

Grand County La Sal district: Jack claim; Polar Mesa district; Thompsons district: Cactus Rat mine.

San Juan County Paradox Valley district: Grey Dawn mine.

HIGGINSITE (See CONICHALCITE)

HORNBLLENDE

A complex series, general formula, $\text{Ca}_2\text{Na}(\text{Mg}, \text{Fe})_4(\text{Al}, \text{Fe}, \text{Ti})(\text{Al}, \text{Si})_8\text{O}_{22}(\text{O}, \text{OH})_2$. Monoclinic. A common amphibole. Cleavage prismatic. Luster vitreous. H. 5-6. G. 3.2. Color various shades of dark green to black. Beaver County Granite district: Bismuth mine; San Francisco district; Star district: Moscow mine.

Daggett County Red Creek Complex. Davis County Antelope Island.

Salt Lake County Little Cottonwood stock.

Tooele County Gold Hill district: Reaper mine.

Utah County Little Cottonwood stock.

Weber County Ogden Canyon; Sierra Madre district: Napoleon-Maghera group.

HUEBNERITE

Manganese tungstate, MnWO_4 .

Monoclinic. Commonly long prismatic crystals. Striated or furrowed. Cleavage perfect. Fracture uneven. Brittle. H. 4-4.5. G. 7.1. Luster submetallic, somewhat resinous. Color yellowish brown to reddish brown. Streak yellow to reddish brown.

Beaver County Newton district: Louise claims.

Tooele County East Erickson district: South Pine Canyon; Gold Hill district.

HUMITE

Basic magnesium fluosilicate, $\text{Mg}_7(\text{SiO}_4)_3(\text{F}, \text{OH})_2$. Orthorhombic. Cleavage poor. H. 6-6.5. G. 3.1. Brittle. Luster vitreous to resinous. Color white, yellow, brown, reddish.

Tooele County Gold Hill district: Calaveras, Frankie mines.

HUMMERITE

Hydrous magnesium vanadate. Triclinic. Crystals elongated. Color yellow, bright orange. Occurs as tiny veins in clay, and as efflorescence on sandstone.

Emery County San Rafael district: Temple Mountain.

HUNTITE*

Magnesium calcium carbonate, $\text{Mg}_3\text{Ca}(\text{CO}_3)_4$. Orthorhombic. Crystals exceedingly small, one micron or less in size. H. soft. G. 2.7. Occurs compact, chalklike masses. Fracture even to subconchoidal. Brittle. Porous. Crumbles in water emitting crackling noises. Smooth feel, adheres to tongue. Color white. Luster dull. Beaver County Rocky district: Little Rocky prospect.

Juab County Tintic district: 1800' level of Chief Consolidated mine.

HYALITE (See OPAL)

HYDROMAGNESITE

Hydrous magnesium carbonate hydroxide, $\text{Mg}_4(\text{OH})_2(\text{CO}_3)_3 \cdot 3\text{H}_2\text{O}$. Mono-

clinic. Crystals tiny. Occurs as tufts, rosettes, or acicular or bladed crystals. Also massive, chalky, or mealy. Cleavage perfect. Brittle. H. 3.5. G. 2.2. Luster vitreous, silky or pearly. Colorless to white. Salt Lake County Big Cottonwood district: Mountain Lake mine.

HYDROMICA

Mica-like clay mineral, approximately $K_2O \cdot 3(Al_2O_3 \cdot 2SiO_2) \cdot 3H_2O$. Usually in clay-like masses, compact or friable. Alteration product.

Emery County San Rafael district: Delta mine.

Salt Lake County Bingham district: Bingham Copper Pit.

San Juan County White Canyon district: Happy Jack mine.

Sevier County Henry district: Trinity prospect; Rock Candy Mountain.

Tooele County Dugway district: Bertha claim.

Utah County East Tintic district.

HYDROZINCITE*

Zinc carbonate hydroxide, $Zn_5(OH)_6(CO_3)_2$. Monoclinic. Crystals minute tiny blades. Usually massive, fibrous, earthy or compact. H. 2-2.5. G. 3.7. Cleavage good. Very brittle. Luster pearly, silky to earthy. Color white, gray, yellowish, brownish, pinkish, lilac.

Juab County Tintic district: Gemini, May Day mines.

Piute County Ohio district: Bully Boy and Webster mines.

Tooele County Dugway district: Bryan, Four Metals, Morrell mines; North Tintic district: Scranton mine; Ophir District: Ophir Hill area - Hidden Treasure, Sacramento mines.

Washington County Tutsagubet district: Apex (Dixie) mine.

HYPERSTHENE

Ferrous magnesium silicate, $(Fe, Mg) - SiO_3$. Orthorhombic. A pyroxene. Crystals rare, prismatic and tabular. Usually foliated massive. H. 5-6.

G. 3.4. Cleavage prismatic. Luster pearly. Color dark brownish green, grayish black, greenish black.

Beaver County Star district: Lady Bryan mine.

Salt Lake County Alta stock.

Tooele County Quirrh Mountains: Tickville Gulch.

ICELAND SPAR (See CALCITE)

IDDINGSITE

Hydrous magnesium iron silicate, probably $H_8 Mg_9 Fe_2 Si_3 O_{14}$. Orthorhombic. Lamellar crystals or foliated. H. 3. G. 2.7. Cleavage good. Luster bronze. Color chestnut brown to yellowish green. Alteration product. Tooele County Rush Valley district.

IDOCRASE

Hydrous calcium aluminum silicate, $Ca_{10}(Mg, Fe)_2 Al_4 (SiO_4)_5 (Si_2O_7)_2 (OH)$. Tetragonal. Crystals prismatic, often striated. H. 6.5 G. 3.4. Luster vitreous to resinous. Color green, brown, yellow, blue, red. Usually found in crystalline limestone resulting from contact metamorphism.

Beaver County Bradshaw district: 2 R's group; Granite district: Big Pass, Bismuth, Oak, Oak Basin, Rattler, Ward groups; Lincoln district: Creole mine.

Juab County West Tintic district.

Millard County House Range: Amasa Valley, Horseshoe, Mt. Baldy, New Klondike, Pine Peak, Pinke Peak, Rainbow, South, South Pit, Sidesprings mines, Notch Peak, Painter Springs. Salt Lake County Little Cottonwood district: Alta mine.

Tooele County Gold Hill district: Alvarado, Cane Springs, Midas mines; Pine Canyon.

Wasatch County Clayton Peak.

ILLITE (See HYDROMICA)

ILMENITE

Iron titanium oxide, $FeTiO_3$. Hexagonal. Commonly thick tabular crystals.

Also compact massive; detrital. H. 5-6. G. 4.7. Cleavage none. Parting due to twinning. Fracture conchoidal to subconchoidal. Luster metallic to submetallic. Color iron black. Streak black with greenish tinge. Occurs in igneous rocks, hydrothermal ore deposits, and with black sandstones of Late Cretaceous age in Utah.

Beaver County San Francisco district.
Emery County Emery.

Garfield County Escalante; Henry Mountains: Bromide, Oromines, southwestern flanks of Henry Mountains.

Kane County Southern part of Kaiparowits Plateau.

Tooele County Gold Hill district; Reaper mine.

ILSEMANNITE

Molybdenum oxide, $\text{Mo}_3\text{O}_8 \cdot n\text{H}_2\text{O}$?
Found only as earthy masses, stains, or as a disseminated pigment. Color black, blue black, blue.

Grand County La Sal district: Jack claim.

Piute County Marysvale district: Bul lion Monarch, Freedomnos. 1-2, Prospector no. 1, Quicksilver mines.

San Juan County Red Canyon district: Frey no. 4 mine; White Canyon district: Happy Jack mine.

Uintah County Uteland Knoll district.

INDIUM

Rare metal, indefinite mineral association. Found in contact metamorphic ore deposits and in replacement veins. Associated with scandium.

Tooele County Gold Hill district.

INGRAMITE

An asphaltic pyrobitumen. Occurs in the basal Green River Formation.

Utah County Colton: Higgins, James Peak (Brown Bear), Kyune Canyon, Midnight, Miller, Pleasant Valley, Thomas Ranch, Town mines.

Wasatch County Soldier Summit: Culmer Brothers, Soldier Summit, U.S. mines.

IOLITE (See CORDIERITE)

JAMESONITE

Lead iron antimony sulfide, $\text{Pb}_4\text{FeSb}_6\text{S}_{14}$. Monoclinic. Acicular to fibrous crystals. Also fibrous massive to columnar. H. 2.5. G. 5.6. Cleavage good. Brittle. Luster metallic. Color and streak gray-black, sometimes with iridescent tarnish. Opaque.

Beaver County San Francisco district: Horn Silver mine.

Juab County Tintic district; West Tintic district: Scotia mine.

Summit County Park City district: California mine.

Tooele County Gold Hill district: Gold Hill (U.S.), U.S. mines; Silver Island district: Carrie Mack property.

Utah County American Fork district: Mary Ellen and Live Yankee, Yankee mines; East Tintic district.

JAROSITE

Basic potassium ferric sulfate, $\text{KFe}_3(\text{SO}_4)_2(\text{OH})_6$. Hexagonal. Crystals minute and indistinct. Usually in crusts or coatings. Also granular massive, fibrous, nodular. H. 2.5-3.5. G. 3.1. Cleavage good. Fracture uneven to conchoidal. Brittle. Luster vitreous to resinous. Color ochreous, amber yellow, brown. Streak pale yellow.

Beaver County Granite district: Big Pass group; San Francisco district: Horn Silver mine; Star district: Moscow, Red Warrior, Wild Bill mines.

Emery County San Rafael district: Fuemrol no. 2 mine.

Juab County Detroit district; Tintic district: Eagle and Blue Bell mines.

Morgan County Argenta district: Carbonate Hill, Carbonate Gem mines.

Piute County Marysvale district: Copper Cap, Freedom no. 1, Silica Hills, Yellow Jacket mines; Mt. Baldy district: Deer Trail mine.

San Juan County White Canyon district: Happy Jack, Jomac mines.

Sevier County Rock Candy Mountain.
Tooele County Dugway district: Con-

fidence, Four Metals mines, Kellys Hole; Gold Hill district: Alvarado, Copper Bloom, Copper Queen Midland Mining Company, Cyclone, Gold Hill (U.S.), Rube, Success, U.S. mines; Mercur district: Sparrowhawk mine; Ophir district: Dry Canyon area - Kearsarge mine; Lion Hill area - Buffalo mine, Chloride Point, Douglas, Empire, Iron, Lion, Monarch, Northern Light, Woodruff, Zella mines; Ophir Hill area - Admiral Dewey, Cliff mines; Rush Valley district: Argent, Ben Harrison, Calumet, Galena King, Honerine, Mescatine, Muerbrook, Salvation-Hercules mines.

Utah County East Tintic district: Burgin, Tintic Standard mines.

Washington County Tutsagubet district: Apex (Dixie), Paymaster mines.

Wayne County Coleman Canyon to Oak Creek; Grand Wash to Capitol Wash; Rabbit Valley, Old Dixon prospect.

JASPER (See CRYPTOCRYSTALLINE QUARTZ)

JASPEROID (See CRYPTOCRYSTALLINE QUARTZ)

JEFFERISITE

Hydrous magnesium iron aluminum silicate, $10(\text{Mg}, \text{Fe})0.4(\text{AlFe})_2\text{O}_3 \cdot 10\text{SiO}_2 - 7\text{H}_2\text{O}$. Hydrated mica belonging to the vermiculites. Occurs in broad plates and small scales. H. 1.5. G. 2.3. Cleavage basal perfect. Pearly luster. Color dark yellowish brown. Alteration product.

Tooele County Gold Hill district: Centennial and Enterprise mines.

JET

Black variety of lignite coal. Organic gem stone. Soft, light in weight. Black color. Takes a velvety polish, can be worked with a lathe. Forms disk-like inclusions in narrow coal seams found along cliffs of Coaly Basin. Most important source of jet in North America.

Garfield County Henry Mountains.
Wayne County Henry Mountains: Mt. Ellen, Coaly Basin.

JOHANNITE

Hydrous basic copper uranium sulfate, $\text{Cu}(\text{UO}_2)_2(\text{SO}_4)_2(\text{OH})_2 \cdot 6\text{H}_2\text{O}$. Triclinic. Crystals minute, prismatic and tabular. In drusy aggregates, coatings. H. 2-2.5. G. 3.3. Cleavage good. Luster vitreous. Color emerald green. Streak pale green. Taste bitter.

Garfield County Henry Mountains.

Piute County Marysvale district: Bullion Monarch, Prospector no. 1 mines.

San Juan County Red Canyon district: Frey no. 4, Posey mines; White Canyon district: Happy Jack, Hideout mines.

Wayne County Fruita: Oyler mine.

JORDISITE

Molybdenum disulphide, MoS_2 . Amorphous. Occurs as a black powdery, colloidal form. Alters to blue ilsemanite.

Piute County Marysvale district: Buddy, Bullion Monarch, Freedom no. 1-2, Prospector no. 1 mines.

San Juan County Red Canyon district: Frey no. 4 mine.

KAINITE

Hydrous sulfate and chloride of potassium and magnesium, $\text{KMg}(\text{SO}_4)\text{Cl} \cdot 3\text{H}_2\text{O}$. Monoclinic. Granular massive and interbedded with other salts. Cleavage perfect. Fracture even. Brittle. H. 2.5-3. G. 2.2. Lustre vitreous. Colorless to white. An evaporite resulting from artificial ponding.

Tooele County Salduro; Wendover.

KAOLINITE

Hydrous aluminum silicate, $\text{Al}_2\text{Si}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$. Monoclinic. Occasionally found in minute, thin, rhombic or hexagonal plates. Claylike masses, either compact or friable. H. 2-2.5. G. 2.6. Cleavage basal. Luster dull to earthy. Color white, often colored by impurities.

Beaver County San Francisco district: Horn Silver mine.

Box Elder County Lucin district: Cop-

per Mountain, Tecoma Hill mines.
Cache County Smithfield area.
Emery County San Rafael district: Del-ta mine.
Piute County Marysvale district: White Horse deposit.
Salt Lake County Bingham district: Bingham Copper Pit.
Sevier County Henry district: Trinity prospect.
Tooele County Gold Hill district: Reaper mine; Granite Mountain district.
Utah County Cedar Valley; East Tintic district: Burgin, Eureka Standard mines; Fox Hills; Lehi district: Manning Canyon Shale; Jordan Narrows: Orem, Saratoga, Soldiers Pass quadrangles.
Wasatch County Keetley area.
Washington County Mineral Mountain: Beauty Knoll claims; Silver Reef district.

KASOLITE*

Hydrous lead uranium silicate, $Pb(UO_2)_2SiO_4 \cdot H_2O$. Monoclinic. Crystals small, stout prismatic habit, divergent groups, crusts, and granular masses. Cleavage perfect. Brittle. H. 4.5. G. 5.9. Color ocher yellow to brownish yellow. Luster dull to earthy.
Piute County Marysvale district.

KERMESITE

Antimony oxysulfide, Sb_2S_2O . Monoclinic. Crystals lath-shaped, elongated. Also tufted radiating aggregates. H. 1-1.5. G. 4.6. Cleavage good. Sectile. Luster adamantine. Color cherry red. Streak brownish red.
Utah County American Fork district: Bay State mine.

KIESERITE

Hydrous magnesium sulfate, $MgSO_4 \cdot H_2O$. Monoclinic. Mostly massive, coarse to fine granular, and intergrown with other salts. H. 3.5. G. 2.6. Colorless, white or yellowish. Luster vitreous. Cleavage good.
Grand County Paradox basin.
San Juan County Paradox Valley district.
Tooele County Salduro; Wendover.

KORNELITE

Hydrous ferric sulfate, $Fe_2(SO_4)_3 \cdot 7H_2O$. Monoclinic. Lath-like and acicular crystals. Also tufted aggregates, crusts, globular masses. G. 2.8. Cleavage good. Luster silky. Color pale rose-pink to violet.
Utah County East Tintic district: Tintic Standard mine.

KYANITE

Aluminum silicate, Al_2SiO_5 . Triclinic. Usually in long bladed crystals. H. 5-7.5. G. 3.6. Cleavage good. Luster vitreous. Color blue, white; also green, gray, black. Occurs in schists and gneiss.
Box Elder County Grouse Creek Range: Birch, Southern Conley, Western Grouse Creeks.
Daggett County Red Creek Complex.

LABRADORITE

Calcium sodium aluminum silicate, $CaAl_2Si_2O_8 \cdot NaAlSi_3O_8$. Triclinic. Variety of plagioclase. Crystals usually twinned. Basal cleavage plates show striations. Cleavage good in two directions. H. 6. G. 2.7. Colorless, white, gray, golden brown. A golden brown gem stone variety is found at Jericho and Clear Lake, occurs in lavas.
Utah County East of Jericho; Keg Mountains.
Millard County Clear Lake Railroad Station.
Tooele County Stansbury Mountains: Mack, Muskrat, North Canyons, Salt Mountain.

LANARKITE

Lead oxysulfate, $Pb_2(SO_4)O$. Monoclinic. Crystals elongated; also massive. Cleavage perfect. Thin laminae flexible. H. 2-2.5. G. 6.9. Luster adamantine to resinous. Color gray to greenish white, pale yellow. Fluoresces yellow.
Utah County East Tintic district: Burgin mine.

LAUMONTITE

Hydrous calcium sodium aluminum silicate, $(Ca, Na)_7Al_{12}(Al, Si)_2(Si_6O_{80}) \cdot 25H_2O$. Monoclinic. A zeolite. Common crystal form is a prism. Also columnar, radiating and divergent. H. 3.5-4. G. 2.3. Cleavage good. Luster vitreous to pearly. Color white to yellow or gray.

Garfield County Henry Mountains; Bro-mide, Oro mines.

LEADHILLITE

Basic sulfate-carbonate of lead, $Pb_4(SO_4)(CO_3)_2(OH)_2$. Monoclinic. Crystals usually pseudo-hexagonal. H. 2.5-3. G. 6.5. Cleavage good. Fracture conchoidal. Rather sectile. Luster resinous to adamantine. Colorless to white, gray, pale green, pale blue, yellowish.

Utah County Tintic district: Eureka Hill mine.

LEHIITE

Hydrous basic phosphate of sodium, potassium, calcium and aluminum of uncertain formula, perhaps $(Na, K)_2Ca_5Al_8(PO_4)_8(OH)_{12} \cdot 6H_2O$. Found as crusts and layers comprised of subparallel aggregates of fibers. H. 5.5. G. 2.9. Color white to gray.

Utah County Clay Canyon.

LEPIDOCROCITE

Basic ferric oxide, $FeO(OH)$. Orthorhombic. Occurs as scales flattened and slightly elongated. Also as rosettes, massive. Brittle. H. 5. G. 4.1. Luster submetallic. Color rubyred to reddish brown. Streak dull orange. Transparent.

Wayne County Fruita: Oyler mine.

LETTOSOMITE (See CYANOTRICHITE)

LEUCHTENBERGITE

Variety of clinocllore, $Mg_5(Mg, Al)AlSi_3O_{10} \cdot 4H_2O$. Monoclinic. Crystals usually hexagonal in form, often tabular. Cleavage perfect.

H. 2-2.5. G. 2.7. Luster pearly. Colorless. Often resembles talc.

Piute County Mt. Baldy district: Deer Trail mine.

Utah County East Tintic district.

LEUCOSPHEENITE*

Borosilicate, $(Na_2, Ba, Ca)_{10}B_2Ti_5Si_{19}O_{51}$. Monoclinic authigenic mineral. Crystals stout prismatic to platy rosettes. Occurs with oil shales in the Green River Formation.

Duchesne County Carter Oil Company wells; Sinclair Mortenson well.

Utah County Sun Oil Company South Ouray well.

LEUCOXENE (See ANATASE)

LEVERRIERITE

Hydrous silicate of aluminum. Monoclinic. Occurs in vermicular aggregates. H. 1.5. G. 2.5. Cleavage good basal. Colorless to brown.

Salt Lake County Bingham district: Highland Boy, Yampa mines.

Utah County Clay Canyon.

LEWISTONITE

Basic calcium potassium sodium phosphate, $(Ca, K, Na)_5(PO_4)_3(OH)$. Hexagonal. Occurs as stout hexagonal prisms, or in sheaf-like aggregates. H. 5. G. 3. Cleavage perfect. Colorless to pale green, white. Similar to apatite.

Utah County Clay Canyon.

LIEBIGITE

Hydrous calcium uranium carbonate, $Ca_2(UO_2)(CO_3)_3 \cdot 10H_2O$. Orthorhombic. Crystals equant or short prismatic. Most commonly as scaly or granular aggregates, crusts. H. 2.5-3. G. 2.4. Cleavage good. Luster vitreous to pearly. Color pale green to yellowish green. Fluoresces.

Grand County Thompsons district: Black Ape mine.

San Juan County Big Indian district: Mi Vida mine.

LIMONITE

Hydrous basic iron oxide, $\text{FeO}(\text{OH}) \cdot n\text{H}_2\text{O}$. Amorphous. Occurs in mammillary to stalactitic masses, concretionary, nodular, earthy. H. 5-5.5. G. 3.6-4. Luster vitreous, dull to earthy. Color dark brown to black. Streak yellowish brown. May show play of iridescence. Occurs as gossan capping.

Beaver County Beaver Lake district; Bradshaw district: Cave, Hecla mines; Fortuna district: Rocky Hollow; Granite district: Big Pass, Burnt Hollow groups; Lincoln district: Creole, Lincoln, Rattler Iron claims; Newton district: Sheep Rock mine; Pine Grove district: Central Wah Wah Iron deposit, Emma, Iron Duke (Iron Gloery or Ruby), Iron Queen, Mooney, Wilson or Last Chance, King Iron prospects; Pruess district: Blackbird, Cactus mines, Cactus Gulch; Star district: Commonwealth, Harrington-Hickory, Kemple, Mammoth, Progressive, Rebel, Red Warrior, St. Mary's, White Rock mines.

Box Elder County Ashbrook district: Vipont mine; Lucin district: Cunepah Tunnel, Jeff-Doran, Tecoma Hill mines; Newfoundland district: Copper Ridge; Promontory district: Lakeview Mining properties; Willard district: Gold Standard mine.

Daggett County Birch Creek deposit; Spring Creek deposit.

Davis County Antelope Island; Farmington district: Parrish Canyon.

Grand County Courthouse Wash; Miners Basin district: Dewey, High Ore, Skylark mines; Little Valley; Salt Valley.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Juab County Fish Springs district: Carnation, Emma, Galena, Utah mines; Thomas Range: Floride mine; Spring Creek district: Queen of Sheba mine; Tintic district: Black Dragon, Black Jack, Dragon, Empire, Emerald, Grand Central, Iron, Sunbeam mines; West Tintic district: Pyramid, Scotia, Tintic Western, War Eagle mines.

Kane County Kitchen Corral Canyon.

Millard County Antelope Springs; Leamington district: Fool Creek Canyon.

Morgan County Argenta district: Carbonate Hill, Carbonate Gem mines; Hardscrabble district: Norway group. Plute County Antelope Range; Gold Mountain district: Annie Laurie, Sevier mines; Mt. Baldy district: Deer Trail, Green Eyed Monster mines; Ohio district: Bully Boy and Webster mines; Sevier Canyon.

Salt Lake County Big Cottonwood district: Carbonate, Cardiff mines; Bingham district: Galena, Old Jordan, Highland Boy, Yampa mines; Little Cottonwood district: Alta Consolidated, Cabin, Emma, Flagstaff, Michigan-Utah mines; Smelter district.

San Juan County La Sal Mountains; Monticello district: Copper Queen, Duckett mines.

Sanpete County Ephraim.

Sevier County Henry district: Iron Peaks property; Rock Candy Mountain.

Summit County Park City district: Silver King, Woodside mines.

Tooele County Blue Bell district: Bogan, The Iron mines; Columbia Mining district: Benmore, Sharp, Sultana mines; Dugway district: Bertha, Black Dragon, Bryan, Confidence, Eagle, Four Metals, Kelly's Hole, Lauris, Metal States, Yellow Jacket mines; East Erickson district: Copper Jack, Green's Ridge, Silver Shield mines; Erickson district: Highland Lassie no. 1, Silver Reef mines; Gold Hill district: Alvarado, Boxton, Silver and Gold Mining Company, Unadine mines; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Mercur district: Mineral Hill mine; Ophir district: Dry Canyon area - Kearsarge, Mono, Queen of the Hills mines; Lion Hill area - Buffalo mine; Ophir Hill area - Admiral Dewey, Chicago, Cliff, Hidden Treasure, Sacramento mines; Rush Valley district: Argent, Ben Harrison, Calumet, Galena King, Honerine, Mescatine, Muerbrook, Salvation - Hercules mines.

Utah County American Fork district: Dutchman, Miller, Pittsburgh mines; East Tintic district: Burgin, Iron King, Tintic Standard mines; Lehi district: Hutchings claim; North Tintic district: Selma mine; Payson district: Nelson, Syndicate mines; Provo district: Mon-

arch mine; Santaquin district: Union Chief mine; Utah district: Alpha, Emerald, Lucky Boy, Queen of the West, Spalding, Trotter mines.

Washington County Tutsagubet district: Apex (Dixie) mine.

Wayne County Miners Mountain district: Old Faithful, Wonder Copper no. 1 mines; Rabbit Valley; Old Dixon prospect; Torrey; T.R. Lode no. 1 mine.

Weber County Ogden Canyon.

LINARITE

Basic lead copper sulfate, $PbCu(SO_4)(OH)_2$. Monoclinic. Crystals elongated and often tabular. Occurs singly, in crusts, and aggregates. H. 2.5. G. 5.3. Cleavage good. Fracture conchoidal. Brittle. Luster vitreous. Color deep azure blue. Streak pale blue.

Beaver County San Francisco district: Horn Silver mine.

Juab County West Tintic district: Scotia mine.

Salt Lake County Bingham district: Little Cottonwood district: Grizzly mine.

Summit County Park City district: Silver King, Woodside mines.

LITHIOPHORITE

Wad containing a percent or so of Li_2O , usually with Na_2O and K_2O . Occurs as fine scales, also compact, botryoidal. H. 3. G. 3.2. Luster dull to metallic. Color bluish black. Streak blackish gray.

Grand County Seven Mile Canyon: Shinarump nos. 1-3 claims.

Piute County Marysvale district: Buddy, Bullion Monarch, Freedom no. Prospector nos. 1 and 3 mines.

LODESTONE (See MAGNETITE)

LORANDITE

Thallium arsenic sulfide, $TlAsS_2$. Monoclinic. Cleavage good. Flexible. H. 2.5. G. 5.5. Luster metallic, adamantine. Color carmine-red, often dark lead-gray on the surface. Frequently covered with an ochre-yellow

powder. Streak cherry-red. Transparent to translucent.

Tooele County Mercur district.

LOUGHLINITE*

Basic sodium magnesium silicate, $(Na_2Mg)_2Si_3O_6(OH)_4$. Fibrous structure. Color pearly-white. Luster silky. G. 2.2. Very similar to sepiolite in appearance. Authigenic mineral in the Green River Formation.

Duchesne County Green River Formation.

LUCINITE (See VARISCITE)

LUCKITE (See MELANTERITE)

LUDWIGITE

Magnesium iron borate, $(Mg,Fe)_2FeBO_5$. Orthorhombic. Occurs in finely fibrous masses, felted aggregates. Also sheaf-like aggregates and rosettes of needle-like crystals. H. 5. G. 3.6. Tough on fracture. Luster silky. Color dark green to greenish black. Streak black to blackish green. Beaver County Beaver Lake district: West Spring.

Salt Lake County Big Cottonwood district: Great Western, Mountain Lake, Mountain View mines; Little Cottonwood district: Michigan-Utah, South Hecla mines.

LUZONITE

Copper arsenic sulfide, Cu_3AsS_4 . A dark, reddish, steel-gray mineral with the composition of enargite. Fracture uneven. Streak black. H. 3-4. G. 4.4. Utah County East Tintic district: North Lily, Tintic Standard mines.

MAGNESIOFERRITE

Magnesium iron oxide, $MgFe_2O_4$. Isometric. Rarely in crystals. Massive, granular. H. 5. G. 4.6. Luster metallic to dull. Color black to brownish black. Streak black. Magnetic. Summit County Park City district: Ontario Tunnel. Wasatch County Blue Ledge district: Ontario Tunnel.

MAGNESIOLUDWIGITE
(See LUDWIGITE)

MAGNESIORIEBECKITE*

Basic sodium magnesium iron silicate, $\text{Na}_2(\text{Mg,Fe})_3\text{Fe}_2\text{Si}_8\text{O}_{22}(\text{OH})_2$. An authigenic mineral. Associated with the Green River Formation.

Duchesne County Carter Oil Company wells; Green River Formation; Sinclair Mortenson well.

MAGNESITE

Magnesium carbonate, MgCO_3 . Hexagonal. Crystals rare. Commonly massive, coarse to fine granular to very compact. Earthy to chalky. H. 3.5-5. G. 3.1. Cleavage rhombohedral. Fracture conchoidal. Brittle. Luster vitreous. Color white, gray, yellow, brown.

Beaver County Rocky district: Old Hickory, Silver Shield Mining Company mines; San Francisco district; White Mountain: Grampian Hill.

Utah County Fish Springs district; Carnation, Emma, Galena, Utah mines.

MAGNETITE

Iron oxide, Fe_3O_4 . Isometric. Crystals commonly octahedrons. Massive, fine to coarse granular. H. 6. G. 5.2. Luster metallic. Color iron-black. Streak black. Strongly magnetic. Opaque.

Beaver County Antelope district; Beaver Lake district: Bat Ridge, Skylark mines; Blue Mountains; Bradshaw district: Cave mine; English Springs; Granite district: Burnt Hollow group; Lincoln district: Creole, Lincoln, Rattler Iron claims; McGarry district; Pruess district: Blackbird, Cactus mines; Rocky district: Adelia, Copper Ranch, Old Hickory mines; San Francisco district: Imperial mine; Star district: Commonwealth, Hub, Kemple, Lady Bryan, Progressive, St. Mary's, Wild Bill mines.

Box Elder County Willard district; Twin Pine claim.

Davis County Antelope Island.

Garfield County Colorado River dis-

trict; Henry Mountains: Bromide, Cuprum, Oro mines.

Iron County Iron Springs district: Granite Mountain, Iron Mountain, Three Peaks (See mine listing under IRON COUNTY); Paragonah: Iron Peak; Pinto Iron district.

Utah County Thomas Range: Bell Hill mine; West Tintic district: Iron King mine, Lockhead Iron property, Tintic Western mine.

Kane County Colorado River district. Millard County Twin Peaks: Black Diamond Iron prospect.

Salt Lake County Big Cottonwood district: Kentucky-Utah, Mountain Lake mines; Bingham district: Little Cottonwood district; Alta Consolidated, Michigan-Utah, South Hecla mines; Little Cottonwood stock.

San Juan County La Sal Mountains: Middle Mountain, Brumley Ridge; White Canyon district: Happy Jack mine.

Sevier County Henry district: Iron Peaks property, Trinity prospect.

Summit County Park City district.

Tooele County Dugway district: Buckhorn claim; East Erickson district: Ecker Canyon, Silver Shield mines; Gold Hill district: Alvarado, Centennial and Enterprise, Doctor, Unadine mines.

Utah County Little Cottonwood stock; Silver Lake district: Deer, Silver Creeks.

Wasatch County Rhodes Plateau district: Ferry Iron deposit.

Washington County Bull Valley district: Big Mountain, Emma, Pilot, Red-top claims; Mineral Mountain: Emma claims.

Weber County Weber district.

MALACHITE

Basic copper carbonate, $\text{Cu}_2\text{CO}_3(\text{OH})_2$. Monoclinic. Crystals rare. Commonly massive or incrusting. H. 3.5-4. G. 4. Cleavage fair. Fracture uneven. Luster silky, dull to earthy. Color green. Streak pale green.

Beaver County Antelope district; Beaver Lake district: Beaver Harrison, Copper Mountain, OK, Skylark mines; Bradshaw district: Cave, 2 R's mines; Granite district: Big Pass, Garnet, King-of-the-Hills groups; Lincoln dis-

trict: Creole, Lincoln mines; McGarry district; Pruess district: Cactus mine; Rocky district: Adelia mine; San Francisco district: Horn Silver, Imperial mines; Star district: Cedar-Talisman, Commonwealth, Copper King, Dotson, Harrington-Hickory, Hoosier Boy, Kemple, Progressive, Rebel, Red Warrior, St. Mary's, White Rock, Wild Bill mines. Box Elder County Ashbrook district: Vipont mine; Lucin district: Copper Mountain, Jeff Doran mines; Newfoundland district: Copper Ridge; Promontory district: Lakeview mine; Willard district: Mormon Girl, Ogden Boilmakers, Overland claims.

Cache County Hyrum district: Lucky Star claim; La Plata area: Sundown claim; Paradise district; Richmond district.

Daggett County Red Creek, Yellow Canary Uranium deposit.

Davis County Antelope Island; Farmington district: Morning Star group, Parrish Canyon; Wandering Jew mine.

Duchesne County Rock Creek.

Emery County Castle Dale; Castle Valley; Emery district; San Rafael district: Copper Globe deposit.

Garfield County Circle Cliffs: Acme, Blue Goose mines; Henry Mountains: Cuprum claim.

Grand County Hoosier mine; La Sal district: Bornite, McCoy mines. Miner's Basin district: Dewey, High Ore, McCormick, Moab no. 1 mines; Salt Valley.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Juab County Detroit district: Charm, Copperhead, E.P.H., Ibex mines; Thomas Range: Eagle Rock prospect; Tintic district: Boss Tweed, Carissa, Centennial Eureka, Gemini, Gold Chain, Iron Blossom, Sioux, Sunbeam mines; West Tintic district: Lockheed Iron, 1903, Pyramid, Scotia, Tintic Western, War Eagle mines.

Kane County Paria Mining Company.

Millard County Detroit district: Almond, Blue Bell, Major Drum mines; Leamington district: Fool Creek Canyon.

Morgan County Morgan district: Chicago-Utah, Iron King, Morgan Consolidated, Morgan Crescent, Red Eagle

mines; Round Valley: Copper Mountain mine.

Piute County Mt. Baldy district: Clyde, Deer Trail mines; Ohio district: Cascade, Copper Belt, Dalton, Iris, Shamrock, Wedge mines.

Salt Lake County Big Cottonwood district: Alta Tunnel and Transportation Company, Carbonate, Cardiff, Mountain Lake, Woodlawn mines; Bingham district: Bingham Copper Pit, Butterfield, Columbia, Commercial, Galena, Highland Boy, Midland, Old Jordan, Old Telegraph, U.S. and Lark, Yampa mines; Little Cottonwood district: Emma, Little Emma mines; Smelter district.

San Juan County Big Indian district: Big Indian Copper mine; La Sal Mountains; Lisbon Valley, Climax nos. 1-2, Lisbon Copper mines; Monticello district: Copper Queen, Tuffy Copper mines; Monument Valley district: Oljata, Skyline, Whirlwind mines; Red Canyon district; San Juan River; White Canyon district: Four Aces, Happy Jack, Jomac mines.

Sevier County Salina Creek district: Ball, Lead Hill mines, Sevier Canyon. Summit County Park City district: Comstock, Daly, Daly-Judge, Daly West, Jupiter, Nail Driver, Ontario, Scottish Chief, Silver King, Silver King Consolidated, Woodside mines.

Tooele County Dutch Mountain; Dugway district: Belcher, Black Maria, Black Dragon, Confidence, Juno, Metal States, Raymond-Bald Eagle mines; East Erickson district: Copper Jack, Jessel Bezel, Silver Shield mines; Erickson district: Highland Lassie no. 1 mine; Gold Hill district: Alvarado, Calaveras, Centennial, Copperopolis, Enterprise, Copper Bloom, Copper Hill, Copper Queen-Midland Mining Company, Doctor, Frankie, Garrison Monster, Gold Bond, Gold Hill (U.S.), Ida Lull, Lucy L., Minnehaha, Monoco, Napoleon, New Baltimore, Ozark, Pole Star Copper Company, Rea, Silver King, Unadine, Victory no. 1, Yellow Hammer mines; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Grantsville district: Greeley district; Mercur district: Mineral Hill mine; Ophir district: Dry Canyon area - Brooklyn,

Kearsarge, Mono, Queen of the Hills mines; Foothill area - Lakes of Killarney mine; Lion Hill area - Buffalo mine, Chloride Point; Ophir Hill area - Chicago, Cliff, Hidden Treasure, Sacramento mines; Rush Valley district: Ben Harrison, Calumet, Galena, Honerine, Muerbrook, Salvation-Hercules, Southport mines; Silver Island district: Carrie Mack property; Tooele district: Willow Springs district.

Utah County Brown Park area; Brush Creek district: Little Alta mine; Bullionville; Carbonate district: Dyer, Jessie Ewing mines, Red, Willow Creeks; Little Split Mountain; Uteland Knoll district: Ouray.

Utah County American Fork district: Miller mine; East Tintic district: Tintic Standard mine; Santaquin district: Black Balsam, Copper Bullion, Sally Ann mines.

Washington County Mineral Mountain: Emma claims; Silver Reef district: Buckeye, East Reef, Emily Jane, Maud, Requa mines; Tutsagubet district: Apex (Dixie), Paymaster mines.

Wayne County Capitol Wash; Capitol Wash to Sheets Gulch; Grand Wash to Capitol Wash; Miners Mountain district: Old Faithful, Wonder Copper no. 1 mines; Torrey: T.R. Lode no. 1 mine. Weber County Cold Water Canyon; Sierra Madre district: Eldorado, King Solomon mines; Weber district: New Azurite, Standard Mining Company mines.

MALLARDITE*

Hydrous manganese sulfate, $MnSO_4 \cdot 7H_2O$. Monoclinic. Occurs as fibrous masses and crusts. H. 2. G. 1.8. Cleavage good. Lustervitreous. Color pale rose. Soluble in water. Salt Lake County Bingham district: Lucky Boy mine.

MANGANITE

Basic manganese oxide, $MnO(OH)$. Monoclinic. Crystals prismatic, faces striated vertically. Also grouped in bundles, columnar to coarse fibrous, stalactitic. H. 4. G. 4.4. Cleavage good. Fracture uneven. Brittle. Lus-

ter submetallic. Color dark steel-gray. Streak reddish brown to nearly black.

Beaver County San Francisco district.

Emery County Muddy River.

Grand County Little Grand district: Needles, Salt Wash group.

Juab County Tintic district: Victoria mine.

Millard County Detroit district: Black Diamond, Guy, Last Chance, Martha, Silica Plug mines.

San Juan County La Sal Mountains.

Summit County Coalville.

Tooele County Erickson district: Huber-Rydalch mine.

MANGANOCALCITE

Manganese carbonate, $MnCO_3$. Hexagonal. Cleavage perfect. Brittle. H. 3-4.5. G. 3.5. Lustervitreous. Color rose-red, yellowish gray, brown. Piute County Marysville district; Mt. Baldy district: Deer Trail mine.

MANGANODOLOMITE (See DOLOMITE)

MARCASITE

Iron disulfide, FeS_2 . Orthorhombic. Crystals commonly tabular. Also massive and stalactitic with radiating structure and exterior covered with projecting crystals. Cockscomb structure is typical. H. 6-6.5. G. 4.8. Cleavage poor. Fracture uneven. Brittle. Luster metallic. Color pale bronze yellow. Streak grayish or brownish black. Beaver County Gordon district: Sulphurdale.

Juab County Tintic district: Bullion Beck, Gemini mines.

Millard County Gordon district: Cove Creek, Victor Conqueror mine.

Morgan County Morgan district: Chicago-Utah, Iron King, Morgan Consolidated, Red Eagle mines.

Salt Lake County Bingham district: Highland Boy, Midland, Yampa mines.

San Juan County White Canyon district: Happy Jack mine.

Sanpete County Dry Canyon.

Utah County East Tintic district: Burgin, Tintic Standard mines.

MARTITE (See HEMATITE)

MASSICOT

Lead oxide, PbO. Orthorhombic. Occurs massive, scaly or earthy. H. 2. G. 9.5. Cleavage good. Crystals flexible, but not elastic. Luster greasy to dull. Color sulfur yellow. Streak yellow.

Salt Lake County Bingham district; Little Cottonwood district; Emma mine. Summit County Park City district.

Utah County East Tintic district: Burgin mine.

MEERSCHAUM (See SEPIOLITE)

MELACONITE (See TENORITE)

MELANOVANDITE

Calcium vanadyl vanadate, $\text{Ca}_2\text{V}_4\text{V}_2\text{O}_{25}$. Triclinic. In velvety, divergent bunches or elongated crystals. H. 2.5. G. 3.4. Cleavage good. Brittle. Luster submetallic. Color black. Streak dark reddish brown. Opaque. Grand County Thompsons district: Juniper mine.

San Juan County Paradox Valley district: Vanadium Queen mine.

MELANTERITE

Hydrous ferrous sulfate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$. Monoclinic. Crystals short prismatic to equant. Usually in stalactitic or concretionary forms, fibrous aggregates or crusts, massive. H. 2. G. 1.9. Cleavage good. Fracture conchoidal. Brittle. Luster vitreous. Color various shades of green, greenish blue, blue. Taste sweet, astringent.

Emergy County San Rafael district: Dexter group.

Juab County Tintic district: Swansea mines.

Salt Lake County Bingham district: Lucky Boy mine.

Tooele County Mercur district: Brickyard mine; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines; Rush Valley district: Muerbrook mine.

Utah County East Tintic district: Burgin mine.

MERCURY

Native element, Hg. Liquid. Tin-white color. Metallic luster. Very brilliant. Opaque. Occurs as isolated droplets.

Iron County Gold Springs district: Homestake mine; State Line district. Salt Lake County Bingham district.

MESOLITE

Hydrous sodium calcium aluminum silicate, $\text{Na}_2\text{Al}_2\text{Si}_3\text{O}_{10} \cdot 2\text{H}_2\text{O} \cdot 2\text{CaAl}_2\text{Si}_3\text{O}_{10} \cdot 3\text{H}_2\text{O}$. Monoclinic. Occurs in acicular and capillary crystals; delicate divergent tufts. Cleavage good. H. 5. G. 2.3. Color white or colorless.

Salt Lake County Little Cottonwood district.

META-AUTUNITE

Hydrous calcium uranium phosphate, $\text{Ca}(\text{UO}_2)(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$. Tetragonal. Forms thin basal plates, or micaceous masses. Color yellow to pale green. Fluorescence yellow-green. H. 2-2.5. G. 3.2. Luster vitreous. Cleavage good. Not brittle.

Grand County Poison Spring Canyon; Thompsons district: Thom claim.

Piute County Marysvale district: Freedom no. 2, La Vita, Papsy's Hope mines.

METACINNABAR

Mercuric sulfide, HgS. Isometric. Crystals tetrahedral, with rough faces; massive. H. 3. G. 7.6. Fracture uneven. Brittle. Luster metallic. Color grayish black. Streak black. Opaque. Piute County Marysvale district: Quicksilver mine.

Tooele County Grantsville district: Timpie Valley, Ruby Crystal mine.

METAHEWETTITE

Hydrous calcium vanadate, $\text{CaV}_6\text{O}_{16} \cdot 9\text{H}_2\text{O}$. Monoclinic. Occurs in minute tabular or lath-shaped crys-

tals in pulverulent masses, coatings. H. soft. G. 2.7. Luster dull to silky. Color deep red. Streak maroon to brownish red.

Emery County San Rafael district: Temple Rock, South Temple Wash.

Garfield County Henry Mountains: Crescent Creek.

Grand County Pack Creek; Thompsons area; Thompsons district: Cactus Rat mines; Yellow Cat district: Yellow Cat group.

METAROSSITE

Hydrous calcium vanadate, $\text{CaV}_2\text{O}_6 \cdot 2\text{H}_2\text{O}$. A dehydration product from rossite. Found as platy to flaky masses and veinlets, which are soft and friable. Luster dull to pearly. Color light yellow. H. soft.

Grand County Thompsons area; Thompsons district: Parco no. 23 mine.

San Juan County Monticello district: Brushy Basin, Spring Creek.

Wayne County Coleman Canyon to Oak Creek.

METASTIBNITE

An amorphous form of stibnite. Luster submetallic. Color brick-red. Streak red. H. 2-3. Transparent in thin splinters.

Summit County Park City district: Silver King, Woodside mines.

METASTRENGITE

Hydrous ferric phosphate, $\text{FePO}_4 \cdot 2\text{H}_2\text{O}$. Monoclinic. Crystals tabular or stout prismatic. Also as botryoidal masses, and crusts with radial structure. Cleavage good. Fracture uneven. Luster vitreous. H. 3.5-4. G. 2.7. Color peach blossom red, reddish violet, rarely moss-green. Occurs in cavities of magnetite.

Iron County Iron Springs district: Iron Mountain, Blowout Hill.

METATORBERNITE

Hydrous copper uranium phosphate, $\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$. Tetragonal. In tabular crystals, often in rosettes

or sheaf-life aggregates. H. 2.5. G. 3.6. Cleavage basal perfect. Brittle. Luster vitreous to pearly. Color pale green to dark green.

Emery County Green River district: Mineral Ten claim; San Rafael district: Flat Top Mesa, Temple Mountain, South Temple Wash.

Piute County Marysvale district: Bul lion Monarch, East Slope no. 2, Freedom no. 2, La Vita mines.

San Juan County Monument Valley district: Skyline mine; Paradox Valley district: Grey Dawn mine; Red Canyon district: Markey no. 3 mine; White Canyon district: Happy Jack, W. N. mines.

Wayne County Capitol Wash to Sheets Gulch; Chimney Rock to Tantlus Flat; Coleman Canyon to Oak Creek; Fruita: Oylor mine; Grand Wash to Capitol Wash.

METATYUYAMUNITE

Hydrous calcium uranium vanadate, $\text{Ca}(\text{UO}_2)_2(\text{VO}_4)_2 \cdot 3-5\text{H}_2\text{O}$. Orthorhombic. Platy to microgranular crystals. Color lemon to greenish yellow. Luster dull. H. 2. G. 3.8. Cleavage good.

Grand County Thompsons district: Parco no. 23 mine.

San Juan County Monticello district: Harts Draw, Lakes claim, Robertson Pasture, Shay Mountain, Shay Road, Sunshine Mining claim.

META-URANOCIRCITE

Hydrous barium uranium phosphate, $\text{Ba}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$. Tetragonal. Crystals are thin tablets, usually composite, grade into fanlike groups. Cleavage perfect. Not brittle. Thin plates flexible. H. 2-2.5. G. 4. Luster pearly. Color yellow-green. Fluoresces green.

Juab County Honeycomb Hills

METAVARISCITE

Hydrous aluminum phosphate, $\text{Al}(\text{PO}_4) \cdot 2\text{H}_2\text{O}$. Monoclinic. Crystals thin to thick tabular, or lathlike shapes. H. 3.5. G. 2.5. Cleavage good. Luster vitreous. Color pale green. Tests the same as for variscite.

Box Elder County Utahlite Hill.

METAZEUNERITE

Hydrous copper uranium arsenate, $\text{Cu}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$. Tetragonal. Crystals tabular and resemble torbernite. Cleavage perfect basal. H. 2-2.5. G. 3.6. Fracture uneven. Brittle. Luster vitreous to pearly. Color grass-green. Fluorescent yellow-green.

Emery County San Rafael district: Dexter group, Green Vein Mesa, Consolidated, Green Vein no. 5, Original Green Vein mines, Pay Day, Fuemrol no. 2 mines.

Juab County Tintic district: Centennial Eureka mine.

San Juan County Red Canyon district: Markey no. 3 mine; White Canyon district; Happy Jack, Jomac, W.N. mines.

Wayne County Torrey.

MIARGYRITE

Silver antimony sulfide, AgSbS_2 . Monoclinic. Crystals usually thick tabular; also massive. Cleavage poor. Fracture uneven. Brittle. H. 2.5. G. 5.2. Luster metallic. Color iron-black to steel-gray. Streak cherry-red. Nearly opaque.

Utah County East Tintic district.

MICROCLINE

Potassium aluminum silicate, KAlSi_3O_8 . Triclinic. Crystals near orthoclase in angles and habit. Multiple twinning. Massive cleavage to granular compact. H. 6-6.5. G. 2.5. Cleavage good. Brittle. Luster vitreous, pearly. Color white, red, green.

Davis County Antelope Island; Wasatch Mountains, Farmington Complex.

Millard County House Range: North Peak intrusive, Painter Springs.

Salt Lake County Little Cottonwood stock.

San Juan County White Canyon district: Happy Jack mine.

Sevier County Henry district: Trinity prospect.

Tooele County Granite Mountain district.

Utah County Little Cottonwood stock.

MILLISITE

Hydrous basic phosphate of sodium, calcium, and aluminum, $(\text{N},\text{K})\text{CaAl}_6(\text{PO}_4)_4(\text{OH})_9 \cdot 3\text{H}_2\text{O}$. Probably tetragonal. Occurs as chalcedonic crusts or spherules with fibrous structure. H. 5.5. G. 2.8. Cleavage good. Color white to light gray.

Utah County Clay Canyon.

MIMETITE

Lead chloride phosphate arsenate, $\text{Pb}_5(\text{AsO}_4, \text{PO}_4)\text{Cl}$. Hexagonal. Crystals prismatic. Often in rounded barrel shapes. Also in mammillary crusts. H. 3.5-4. G. 7.2. Cleavage poor. Fracture uneven. Brittle. Luster resinous. Color pale yellow, orange-yellow, white, colorless.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Juab County Tintic district: Eureka Hill mine.

Summit County Park City district.

Tooele County Gold Hill district: Gold Hill (U.S.), New Baltimore, Red Jacket mines; Rush Valley district: Honerine mine.

Utah County East Tintic district: Burgin mine.

MINIUM

Lead oxide, Pb_3O_4 . Crystal system undetermined. Found only massive, earthy, or pulverulent; in microscopic crystalline scales. H. 2.5. G. 9.1. Color scarlet-red or brownish red. Luster greasy or dull. Streak orange-yellow.

Juab County Tintic district: Gemini, Godiva mines.

Utah County East Tintic district: Burgin mine.

MIRABILITE

Hydrous sodium sulfate, $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$. Monoclinic. Crystals short prismatic, resemble borax. Also massive as crusts, granular, stalactitic. H. 1-2. G. 1.5. Cleavage good. Fracture conchoidal. Luster vitreous.

Colorless to white.

Box Elder County Shores of Great Salt Lake.

Davis County Shores of Great Salt Lake.

Salt Lake County Shores of Great Salt Lake.

MIXITE

Hydrous basic copper bismuth arsenate, $\text{Cu}_{11}\text{Bi}(\text{AsO}_4)_5(\text{OH})_{10} \cdot 6\text{H}_2\text{O}$. Hexagonal. In hair-like crystals, tufted groups, or incrusting. Also compact, in reniform masses. H. 3-4. G. 3.8. Luster dull. Color emerald-green to bluish green, pale green or white. Streak lighter than color.

Juab County Tintic district: Ajax, Boss Tweed, Carissa mines.

MOLYBDENITE

Molybdenum disulfide, MoS_2 . Hexagonal. Occurs in hexagonal tabular or in short barrel-shaped prisms. Commonly foliated massive, or in scales. H. 1-1.5. G. 4.6. Cleavage basal perfect. Laminae flexible, but not elastic. Sectile. Luster metallic. Color lead-gray. Streak greenish. Greasy feel. Resembles graphite. Opaque. Beaver County Beaver Lake district; Granite district: Big Pass, Bismuth, Contact groups; Pruess district: Blackbird, Cactus mines; Star district.

Juab County West Tintic district.

Millard County House Range: Amasa Valley, Notch Peak intrusive.

Morgan County Arthur Fork.

Piute County Marysvale district: La Vita prospect.

Salt Lake County Big Cottonwood district: Alta-Gladstone Vein no. 5, Third Chance mines; Little Cottonwood stock.

San Juan County La Sal Mountains.

Tooele County Gold Hill district: Cane Springs, Rube, Reaper, Yellow Hammer mines.

Uintah County Uteland Knoll district: Ouray.

Utah County American Fork district; Silver Lake district: Deer Creek.

Weber County Sierra Madre district.

MOLYBDITE (See FERRIMOLYBDITE)

MONAZITE

Phosphate of the cerium metals, $(\text{Ce}, \text{La}, \text{Y}, \text{Th})(\text{PO}_4)$. Monoclinic. Crystals flattened, elongated, sometimes prismatic. H. 5-5.5. G. 4.6-5.4. Cleavage good. Fracture uneven. Brittle. Luster variable, resinous, waxy, vitreous. Color yellowish or reddish brown to brown, also shades of yellow, greenish, and nearly white.

Box Elder County Park Valley district. Emery County Emery.

Garfield County Escalante; Henry Mountains on southwest flanks.

Kane County Kaiparowits Plateau.

Morgan County Arthur Fork.

Tooele County East Erickson district: South Pine Canyon.

Uintah County Jensen.

Wayne County Caineville.

MONHEIMITE (See SMITHSONITE)

MONTGOMERYITE

Hydrous basic calcium aluminum phosphate, $\text{Ca}_4\text{Al}_5(\text{PO}_4)_6(\text{OH})_5 \cdot 11\text{H}_2\text{O}$. Monoclinic. Laths flattened and elongated. H. 4. G. 2.5. Cleavage good. Color usually deep green, rarely pale green to colorless. Luster vitreous. Utah County Clay Canyon.

MONTICELLITE*

Calcium magnesium silicate, CaMgSiO_4 . Orthorhombic. Occurs in small prismatic crystals or grains. H. 5. G. 3.2. Colorless to gray. Utah County American Fork district.

MONTMORILLONITE

Hydrous basic magnesium aluminum silicate, $(\text{Al}, \text{Mg})_8(\text{Si}_4\text{O}_{10})_3(\text{OH})_{10} \cdot 12\text{H}_2\text{O}$. Monoclinic. A clay mineral. Occurs massive, claylike. H. 1-1.5. G. 2.5. Luster feeble. Color white, grayish, rose-red, bluish.

Garfield County Cannonville; Henry Mountains: Crescent Creek; Henrieville; Tropic.

Grand County Wilson Mesa district.

Juab County Thomas Range: Spor Moun-

tain, Bell Hill, Blowout, Blue Chalk, Dell no. 5, Eagle Rock, Florida no. 5, Fluorine Queen, Green Crystal, Hogsbach, Northend, Rainbow, Roadside mines.

Piute County Marysville district.

Salt Lake County Bingham district: U.S. and Lark mine.

Sevier County Aurora; Henry district: Trinity prospect, Redmond, Rock Candy Mountain.

Summit County Park City district: Daly, Ontario mines.

Utah County East Tintic district.

Wasatch County Keetley area.

Washington County Silver Reef district.

MONTROSEITE

Basic iron vanadium oxide, $(V, Fe)O(OH)$. Orthorhombic. Microscopic bladed crystals. Color black. Opaque. Luster submetallic. H. soft. G. 4.1. Streak black. Cleavage perfect. Brittle.

Emery County San Rafael district: Callyx, Rex no. 2 mines.

Grand County Thompsons district: Juniper, Parco no. 23 mines.

San Juan County Big Indian district: Big Buck, Cal Uranium, Homestake, La Sal, Mi Vida, Radon, Rattlesnake mines; Paradox Valley district: Vanadium Queen mine.

MORDENITE

Hydrous sodium calcium aluminum silicate, $(Ca, Na_2)O \cdot Al_2O_3 \cdot 9SiO_2 \cdot 6H_2O$. Monoclinic. Found in minute crystals. Also in hemispherical or reniform concretions with fibrous structure. H. 3-4. G. 2.2. Cleavage good. Color white, yellowish, pinkish. A zeolite.

Piute County Marysville district: Quicksilver mine.

MORGANITE (See BERYL)

MUSCOVITE

Essentially $KAl_2(AlSi_3O_{10})(OH)_2$. Monoclinic. Crystals tabular, may resemble orthorhombic or hexagonal symmetry. Foliated, in scales, crypto-

crystalline, compact massive. H. 2-2.5. G. 2.7-3.1. Cleavage perfect basal. Folia flexible and elastic. Luster vitreous, silky, pearly. Transparent and colorless in thin sheets. Thicker sheets may be yellow, brown, green, or red.

Beaver County Beaver Lake district: Skylark mine; Star district: Hub, Lady Bryan, Moscow mines; Newton district: Sheep Rock mine; Rocky district: Copper Ranch mine.

Box Elder County Ashbrook district: Vipont mine; Lucin district: Tecoma Hill mines; Rosebud district; Willard district: Mormon Girl claim.

Daggett County Red Creek Complex. Juab County Goshute Indian Reservation; House Range: Painter Springs; Spring Creek district: Queen of Sheba mine.

Piute County Marysville district.

Salt Lake County Big Cottonwood district: Mountain Lake mine; Bingham district: Bingham Copper pit; Little Cottonwood stock.

Sevier County Henry district: Trinity prospect.

Summit County Park City district: Daly-Judge, Silver King, Silver King Consolidated, Woodside mines.

Tooele County Gold Hill district: Yellow Hammer mine; Granite Mountain district; Ophir district: Lion Hill area; Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Utah County American Fork district: Pittsburgh mine; East Tintic district. Wasatch County Bonanza Flat; Snake Creek district.

Washington County Silver Reef district.

NAHCOLITE*

Sodium bicarbonate, $NaHCO_3$. Monoclinic. Prismatic crystals and friable crystal aggregates, porous masses. Cleavage good. Fracture conchoidal. H. 2.5. G. 2.2. Luster vitreous. Colorless to white. Soluble in water. Found in cores and cuttings from the Green River Formation.

Duchesne County Carter Oil Company wells; Green River Formation; Sinclair Mortenson well.

Uintah County Sun Oil Company South Ouray well.

NATROALUNITE

Basic sodium aluminum sulfate, $\text{NaAl}_3(\text{SO}_4)_2(\text{OH})_6$. Hexagonal. Rarely in crystals; occurs as druses in massive alunite. Massive, granular to dense. Cleavage distinct. Brittle. H. 3.5-4. G. 2.7. Luster vitreous. Color white when pure.

Piute County Marysvale district: Al-Ke-Mee prospect.

NATROJAROSITE

Basic sodium ferric sulfate, $\text{NaFe}_3(\text{SO}_4)_2(\text{OH})_6$. Hexagonal. Occurs in earthy masses or crusts, comprised of tiny crystals. H. 3. G. 3.2. Cleavage good. Color cinnamon-brown. Fracture conchoidal. Luster vitreous. Brittle. Transparent to translucent.

Tooele County Gold Hill district: Gold Hill (Western Utah) mine.

NATROLITE

Hydrous sodium aluminum silicate, $\text{Na}_2\text{Al}_2\text{Si}_3\text{O}_{10}\cdot 2\text{H}_2\text{O}$. Monoclinic. Prismatic crystals, usually in radiating crystal groups. Also fibrous, massive, granular, compact. H. 5-5.5. G. 2.3. Cleavage perfect. Luster vitreous. Colorless to white, tints of yellow, red. Transparent to translucent.

Piute County Marysvale district: Silica Hills.

Tooele County Rush Valley district.

NATRON

Hydrous sodium carbonate, $\text{Na}_2\text{CO}_3\cdot 10\text{H}_2\text{O}$. Monoclinic. Cleavage distinct. Fracture conchoidal. Brittle. H. 1-1.5. G. 1.8. Luster vitreous. Colorless to white. Taste alkaline. Effloresces rapidly in dry air. Occurs as crystalline, granular, or columnar crusts, as mealy coatings, efflorescence.

Tooele County Deep Creek Valley.

NAVAJOITE

Hydrous vanadium oxide, probably $\text{V}_2\text{O}_5\cdot 3\text{H}_2\text{O}$. Probably monoclinic. Fibrous appearance. Occurs as a coating around grains, and as thin seams. H. 1-2. G. 2.6. Color dark brown. Streak brown. Luster adamantine.

San Juan County Monument Valley district: Mitten no. 1 mine.

NEIGHBORITE*

Sodium magnesium fluoride, NaMgF_3 . Orthorhombic. Occurs in rounded grains, or in twinned crystals. Color pink and brown. H. 4.5. G. 3. Luster vitreous. Uneven fracture. Cleavage none. Occurs in Green River Formation.

Uintah County Sun Oil Company South Ouray well.

NEPHELINE

Sodium potassium aluminum silicate, $(\text{Na},\text{K})(\text{AlSiO}_4)$. Hexagonal. Occurs rarely in small prismatic crystals, usually massive, compact, and in embedded grains. H. 5.5-6. G. 2.6. Cleavage distinct. Luster vitreous, greasy. Colorless, white, or yellowish. Transparent and translucent.

Tooele County Sheep Ridge.

NIGRITE (See ASPHALTUM)

NITER

Potassium nitrate, KNO_3 . Orthorhombic. Mostly found in crusts, silky tufts. Also massive, granular, earthy or mealy. H. 2. G. 2.1. Cleavage good. Fracture uneven. Brittle. Luster vitreous. Colorless to white, may be tinted. Transparent. Saline taste.

Iron County Near Parowan.

Millard County Near Fillmore.

NONTRONITE

Basic iron aluminum silicate, $\text{Fe}(\text{AlSi})_8\text{O}_{20}(\text{OH})_4$. Monoclinic. A clay mineral. Compact, massive; has opal-like appearance. Earthy. H. 1-

1.5. G. 2.5. Fragile. Color yellow, greenish-yellow.

Piute County Marysvale district.

Salt Lake County Bingham district: Bingham Copper Pit.

Tooele County Gold Hill district: Gold Hill (U.S.), Unadine mines; Rush Valley district: Honerine mine.

Utah County East Tintic district.

NORTHUPITE*

Sodium magnesium chloride-carbonate, $\text{Na}_3\text{MgCl}(\text{CO}_3)_2$. Isometric. Found as tiny octahedral crystals. Fracture conchoidal. Brittle. H. 3.5-4. G. 2.4. Luster vitreous. Colorless; also pale yellow, gray, or brown. Transparent. Found in the Green River Formation. Duchesne County Green River Formation.

NOSELITE

Sodium aluminum sulfate silicate, $\text{Na}_4\text{Al}_3\text{Si}_3\text{O}_{12}\cdot\text{SO}_4$. Isometric. Crystals are rare; commonly massive, in imbedded grains. H. 5.5. G. 2.3. Color gray, blue, brown. Luster vitreous. Transparent to translucent.

San Juan County La Sal Mountains: Middle Mountain, Brumley Ridge.

OBSIDIAN

Volcanic glass. Rock of gemstone qualities. Color black, red, gray, brown. H. 5-6. G. 2.4. Luster vitreous. Thin chips transparent to translucent.

Box Elder County Promontory district: Lakeview Mining properties.

Juab County Keg Mountains.

Millard County Black Rock; White Mountain.

Piute County Marysvale district.

OCTAHEDRITE (See ANATASE)

OKENITE

Basic hydrous calcium silicate, $\text{H}_2\text{CaSi}_2\text{O}_6\cdot\text{H}_2\text{O}$. Triclinic. A zeolite. Occurs in minute blade-shaped crystals. Commonly fibrous; also compact. Cleavage perfect. H. 4.5-5. G. 2.3.

Color white, with a shade of yellow or blue.

Salt Lake County Bingham district: Bingham Copper Pit.

OLIGOCLASE

Sodium, calcium aluminum silicate, $\text{NaAlSi}_3\text{O}_8\cdot\text{CaAl}_2\text{Si}_2\text{O}_8$. Triclinic. A plagioclase feldspar. Commonly massive, compact. H. 6. G. 2.6. Cleavage good two directions. Twinning common. Luster vitreous to pearly. Colorless to white. Translucent.

Davis County Antelope Island.

Grand County La Sal Mountains, North Mountain.

Millard County House Range, Notch Peak intrusive.

Tooele County Gold Hill district: Alvarado mine.

OLIVENITE

Basic copper arsenate, $\text{Cu}_2(\text{AsO}_4)\text{OH}$. Orthorhombic. Crystals variable in habit, elongated or short prismatic, acicular. Also granular, reniform, massive. H. 3. G. 4.4. Cleavage poor. Fracture conchoidal to uneven. Luster adamantine to vitreous, pearly. Color shades of gray, brown, yellow, green. Translucent to opaque.

Juab County Tintic district: Carissa, Gold Chain, Mammoth, Ophongona mines; West Tintic district: Scotia mine.

Summit County Park City district: Silver King, Woodside mines.

Tooele County Gold Hill district: Gold Hill (U.S.), Pole Star Copper Company mines.

OLIVINE

Magnesium iron silicate, $(\text{Mg},\text{Fe})_2\text{SiO}_4$. Orthorhombic. Crystals often flattened. Massive, compact, granular, embedded grains. H. 6.5-7. G. 3.3. Cleavage poor. Fracture conchoidal. Brittle. Luster vitreous. Color green, olive-green, sometimes brownish, reddish, yellowish. Beaver County San Francisco district. Tooele County Southern Oquirrh Mountains; Stansbury Mountains: Mack,

Muskrat, North Willow Canyons, Salt Mountain.
Utah County American Fork district: Deer, Silver Creeks; Fox Hills.

ONOFRITE

Mercuric selenide-sulfide, $Hg(S,Se)$. Isometric. Similar to metacinnabar. H. 3. G. 7.6. Fracture subconchoidal to uneven. Brittle. Luster metallic. Color grayish black. Streak black. Opaque.

Piute County Mt. Baldy district: Lucky Boy mine.

ONYX (See CALCITE)

OPAL

Hydrous silica, $SiO_2 \cdot nH_2O$. Amorphous. Massive; often botryoidal, stactitic, or earthy. H. 5-6. G. 1.9-2.2. Conchoidal fracture. Luster vitreous to resinous. Colorless, white, pale shades of yellow, red, brown, green, gray, blue. Often has a milky or opalescent appearance, and may display a fine play of colors.

Beaver County Beaver; Lincoln district: Creole mine; Milford; San Francisco district: Horn Silver mine.

Daggett County Red Creek: Yellow Canary uranium deposit.

Grand County Near Cisco.

Iron County Cima mine.

Juab County San Pitch Mountains; Orme property; Thomas Range: Autunite no. 8, Buena no. 1 claims, Nonella prospect, Topaz Mountain.

Piute County Marysvale district: J. and L. Alunite mine, Silica Hills.

Salt Lake County Bingham district: Galena, Old Jordan mines.

Sevier County Fish Lake.

Tooele County Gold Hill district: Alvarado, Gold Hill (U.S.), Monoco, Unadine mines.

ORPIMENT

Arsenic trisulfide, As_2S_3 . Monoclinic. Crystals short prismatic. Usually in foliated or columnar masses; sometimes with reniform surface. H. 1.5-2. G.

3.5. Cleavage good. Cleavage laminae flexible but not elastic. Sectile. Luster resinous, pearly. Color lemon-yellow.

Box Elder County Ashbrook district: Vipont mine.

Emery County San Rafael district: Fudemrol no. 2 mine.

Garfield County Coyote Creek district: Hampton mine.

Salt Lake County Bingham district: Butterfield Canyon.

Tooele County Mercur district: Brickyard, Golden Gate, Hillside, Mercur, Sacramento, Sunshine mines.

Washington County Bull Valley district: Pilot claims.

ORTHITE (See ALLANITE)

ORTHOCLASE

Potassium aluminum silicate, $KAlSi_3O_8$.

Monoclinic. Crystals usually elongated prismatic, commonly twinned.

Found commonly in crystals or in granular masses which are coarsely cleavable; also fine-grained, massive. H. 6. G. 2.6. Cleavage good two directions. Luster vitreous. Colorless, white, gray, flesh-red. Varieties are adularia, moonstone, and sanidine.

Beaver County Pruess district: Blackbird group, Cactus mine; Rock Corral.

Iron County Gold Springs district: Homestake mine.

Juab County Goshute Indian Reservation; Spring Creek district: Queen of Sheba mine; Thomas Range: Autunite no. 8, Evening Star prospects, Topaz Mountain.

Millard County House Range: Notch Peak intrusive, Painter Springs.

Piute County Gold Mountain district: Sevier mine; Marysvale district; Ohio district: Wedge mine.

Salt Lake County Big Cottonwood Canyon; Big Cottonwood district; Little Cottonwood district; Little Cottonwood stock.

San Juan County La Sal Mountains: Middle Mountain, Brumley Ridge.

Sevier County Henry district: Trinity prospect.

Tooele County Gold Hill district:

Rodenhouse Wash, Wilson Consolidated, Yellow Hammer mines; Granite Mountain district; Ophir district; Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Utah County Alpine district; Little Cottonwood stock.

OVERITE

Hydrous basic calcium aluminum phosphate, $\text{Ca}_3\text{Al}_8(\text{PO}_4)_8(\text{OH})_6 \cdot 15\text{H}_2\text{O}$. Orthorhombic. Flattened and elongated crystals. Also massive, and subparallel aggregates of coarse plates. H. 3.5-4. G. 2.5. Cleavage good. Luster vitreous. Color light apple-green to colorless.

Utah County Clay Canyon.

OZOCERITE

Mineral wax. Wax-like in appearance and consistency. Colorless to white when pure; often pale green, yellowish, brownish yellow, brown. Occurs in veins and fillings in brecciated zones. Carbon County Whitmore Canyon.

Utah County Colton: Higgins, James Peak (Brown Bear), Kyune Canyon, Midnight, Miller, Pleasant Valley, Thomas Ranch, Town mines.

Wasatch County Soldier Summit: Culmer Brothers, Soldier Summit, U.S. mines.

PALIGORSKITE

Hydrous magnesium aluminum silicate, questionable composition. Commonly known as mountain leather from its leather-like appearance.

Tooele County Ophir district: Dry Canyon area - Deseret mine.

PALLADIUM

Native palladium, Pd. Isometric. Occurs in small octahedrons, commonly in grains. H. 4.5-5. G. 11.9. Cleavage none. Ductile and malleable. Luster metallic. Color whitish steel-gray. Opaque.

Salt Lake County Bingham district: Bingham Copper Pit.

PARABUTLERITE*

Hydrous basic ferric sulfate, $\text{Fe}(\text{SO}_4)(\text{OH}) \cdot 2\text{H}_2\text{O}$. Orthorhombic. Occurs as encrustations with butlerite. Cleavage poor. Fracture conchoidal. H. 2.5. G. 2.5. Color light orange to orange-brown. Luster vitreous. Transparent.

Emery County San Rafael district: Calf Mesa, Dexter group.

PARAMONTROSEITE*

Vanadium oxide, VO_2 . In part or wholly pseudomorphous after montroseite. Metastable, and alteration product.

Emery County San Rafael district: Rex no. 2 mine.

Grand County Thompsons district: Juniper mine.

San Juan County Big Indian district: Cal Uranium, Homestake, Mi Vida mines; Paradox Valley district: Vanadium Queen mine.

PARGASITE

Variety of amphibole, $\text{Ca}_2(\text{Mg}, \text{Fe})_5\text{NaAlSi}_7\text{O}_{22}(\text{OH})_2$. Monoclinic. Occurs in stout lustrous crystals, also granular. Color green and blue green. H. 5-6. G. 3.2. Cleavage prismatic. Brittle.

Utah County East Tintic district.

PASCOITE

Hydrous calcium vanadate, $\text{Ca}_2\text{V}_6\text{O}_{17} \cdot 11\text{H}_2\text{O}$. Triclinic. Occurs as granular crusts which rarely show minute lath-like crystals. H. 2.5. G. 2.5. Cleavage distinct. Fracture conchoidal. Luster vitreous. Color dark red-orange to yellow-orange. Streak cadmium yellow.

Garfield County Crescent Creek.

Grand County Thompsons district: Black Ape mine.

San Juan County Big Indian district: Mi Vida mine.

PEARCEITE

Silver sulfarsenite, $\text{Ag}_{16}\text{As}_2\text{S}_{11}$. Monoclinic. An arsenic analogue of poly-

basite. Occurs in short tabular six-sided prisms. H. 3. G. 6.1. Fracture conchoidal. Brittle. Luster metallic. Color and streak black. Opaque. Box Elder County Ashbrook district: Vipont mine.

Juab County Tintic district: Bullion Beck, Gemini mines.

Utah County East Tintic district: Tintic Standard mine.

PENNINE (See PENNINITE)

PENNINITE

Variety of chlorite, $H_8(Mg,Fe)_5Al_2Si_3O_{18}$. Pseudo-rhombohedral and monoclinic. Occurs as plumose to flaky aggregates. H. 2-2.5. G. 2.7. Cleavage perfect. Laminae flexible. Color yellow-green to olive. Luster pearly.

Plute County Marysvale district.

Sevier County Henry district: Trinity prospect.

Wasatch County Snake Creek district.

PERICLASE

Magnesium oxide, MgO. Isometric. Often octahedral crystals. Usually in rounded or irregular grains. H. 5.5. G. 3.6. Cleavage perfect. Luster vitreous. Colorless to grayish white, brownish yellow, green, black.

Salt Lake County Big Cottonwood district: Mountain Lake mine; Little Cottonwood district.

Utah County Silver Lake district: Deer, Silver Creeks.

PETRIFIED WOOD

(See CRYPTOCRYSTALLINE QUARTZ)

PETZITE

Silver gold telluride, Ag_3AuTe_2 . Perhaps isometric. Massive. Fine granular to compact. Cleavage poor. Fracture subconchoidal. Slightly sectile to brittle. H. 2.5-3. G. 9. Luster metallic. Color steel-gray to iron-black, often tarnished. Opaque.

Utah County East Tintic district: Eureka Standard mine.

PHARMACOSIDERITE

Hydrous basic ferric arsenate, $Fe_3(AsO_4)_2(OH)_3 \cdot 5H_2O$. Isometric. Commonly in cubes; rarely granular. H. 2.5. G. 2.8. Cleavage good. Fracture uneven. Rather sectile. Luster adamantine, greasy. Color olive-green to honey yellow, yellowish brown, dark brown, reddish, greenish.

Juab County Tintic district: Gold Chain, Mammoth mines; West Tintic district: Scotia mine.

Tooele County Gold Hill district: Gold Hill (Western Utah) mine; Mercur district.

PHILLIPSITE

Hydrous potassium calcium aluminum silicate, $KCa(Al_3Si_5O_{16}) \cdot 6H_2O$. Monoclinic. A zeolite. Usually in groups of twinned crystals. H. 4.5-5. G. 2.2. Fracture uneven. Brittle. Luster vitreous. Color white, sometimes reddish. Tooele County Rush Valley district.

PHLOGOPITE

Basic potassium magnesium aluminum silicate, $KMg_3(AlSi_3O_{10})(OH)_2$. Monoclinic. Brown mica. In form and angles near biotite. Cleavage perfect basal. H. 2.5-3. G. 2.8. Luster pearly. Color yellowish brown to brownish red. Sevier County Henry district: Trinity prospect.

Tooele County Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Wasatch County Snake Creek district.

PHOSGENITE

Lead chloride-carbonate, $Pb_2(CO_3)Cl_2$. Tetragonal. Crystals short prismatic, usually terminated. Also massive, granular. H. 2-3. G. 6.1. Cleavage good. Fracture conchoidal. Rather sectile. Luster adamantine. Color yellowish, brownish, greenish, pale rose, gray.

Juab County Tintic district: Eureka Hill mine.

PHOSPHORITE

Phosphate rock, of variable composition. Essentially a carbonate fluorapatite in calcareous rocks, and an aluminum phosphate in clay shales. Mississippi phosphate shales are located in Ogden Canyon, Laketown Canyon, and in the East Tintic Mountains. The Permian Phosphoria Formation occurs in northern and north-eastern Utah. Daggett County Uinta Mountains. Duchesne County Uinta Mountains. Juab County East Tintic Mountains in basal Deseret Limestone. Rich County Crawford Mountains; Laketown Canyon; Woodruff Creek. Salt Lake County Dry Canyon. Summit County Franson Canyon; Park City district. Uintah County Brush Creek; Frandson Canyon; Little Brush Creek; Rock Creek. Utah County Spanish Fork Canyon; Little Diamond Fork. Wasatch County Midway; Uinta Mountains. Weber County Ogden Canyon.

PHOSPHURANYLITE

Hydrous basic calcium uranium phosphate, $\text{Ca}(\text{UO}_2)_4(\text{PO}_4)_2(\text{OH})_4 \cdot 7\text{H}_2\text{O}$. Orthorhombic. Found as thin coatings or aggregates that appear dense, earthy, or minutely scaly. Cleavage perfect. H. 2.5. G. 4.1. Color deep golden yellow to rich yellow. Not fluorescent. Emery County Green River district: Mineral Ten claim; San Rafael district: Delta mine, Wild Horse claims, Dripping Springs. Grand County Thompsons district: Cactus Rat, Cobalt no. 2 mines. Piute County Marysvale district: Freedom no. 2, J. and L. Alunite mines. San Juan County Paradox Valley district: Grey Dawn mine; Red Canyon district: Posey mine; White Canyon district: Gonaway-North Point claims, Happy Jack, Hideout mines.

PICKERINGITE

Hydrous magnesium aluminum sulfate, $\text{MgAl}_2(\text{SO}_4)_4 \cdot 22\text{H}_2\text{O}$. Monoclinic. Acicular crystals. Occurs as radial or

matted aggregates, tufted, as crusts or efflorescence. Cleavage poor. Fracture conchoidal. H. 1.5. G. 1.8. Luster vitreous. Colorless to white, yellowish, reddish. Taste astringent. Salt Lake County Alum Point.

PINTADOITE

Hydrous calcium vanadate, $\text{Ca}_2\text{V}_2\text{O}_7 \cdot 9\text{H}_2\text{O}$. Occurs as an efflorescence. Color light to dark green. Soluble in water. San Juan County Pintado Canyon.

PISANITE

Hydrous copper iron sulfate, $(\text{Fe,Cu})\text{SO}_4 \cdot 7\text{H}_2\text{O}$. Monoclinic. Equant to short prismatic crystals. Usually in stalactitic or concretionary forms, crusts, massive. H. 2. G. 1.9. Cleavage basal perfect. Luster vitreous. Color various shades of green, blue. Taste sweet, metallic, astringent. Salt Lake County Bingham district: Galena, Old Jordan mines.

PITCHBLENDE (See URANINITE)

PITTICITE

Hydrous ferric sulfate-arsenate of uncertain formula. Massive, reniform or stalactitic, and as coatings. H. 2-3. G. 2.4. Brittle. Fracture earthy to conchoidal. Luster dull to vitreous. Color yellowish, brownish, reddish. Emery County San Rafael district: Fudemrol no. 2 mine. Juab County Tintic district: Carissa mine.

PLAGIOCLASE (See ALBITE, OLIGOCLASE, ANDESINE, LABRADORITE, ANORTHITE)

PLANCHEITE

Hydrous copper silicate, $3\text{CuSiO}_3 \cdot \text{H}_2\text{O}$. Orthorhombic. Fibrous, often mammillary. H. 5.5. G. 3.3. Color blue. Beaver County Beaver Lake district on east side of Beaver Lake Mountains.

PLATINUM

Native platinum, Pt. Occurs with iridium, rhodium, and palladium. Isometric. Crystals rare, usually in grains or scales. H. 4-4.5. G. 14-19. Fracture hackly. Malleable and ductile. Luster metallic. Color whitish steel-gray to dark gray.

Garfield County Hite in placers.

Salt Lake County Bingham district: Bingham Copper Pit.

PLEONASTE (See HERCYNITE)

PLUMBOJAROSITE

Basic lead iron sulfate, $PbFe_6(SO_4)_4(OH)_{12}$. Hexagonal. Occurs as crusts, lumps, or compact masses. Also earthy. H. soft. G. 3.6. Cleavage poor. Luster dull to silky. Color golden brown to dark brown.

Beaver County San Francisco district: Horn Silver mine; Star district: Hub, Moscow, Red Warrior mines.

Box Elder County Lucin district: Tecoma Hill mines.

Utah County Fish Springs district: Carnation, Emma, Galena, Utah mines. Piute County Mt. Baldy district: Deer Trail mine.

Salt Lake County Big Cottonwood district: Cardiff mine; Little Cottonwood district: Cabin, Flagstaff, South Hecla mines.

Tooele County Gold Hill district: Boston, Copper Queen-Midland Mining Company, Cyclone, Garrison Monster, Gold Hill Standard, Monoco, New Baltimore, Red Jacket, Rube, Shay, Silver King, Success mines; Ophir district: Dry Canyon area - Kearsarge mine; Lion Hill area - Buffalo mine, Chloride Point, Douglas, Lion, Zella, Empire, East Side, Iron Monarch, Northern Light, Woodruff mines; Ophir Hill area - Cliff, Hidden Treasure, Sacramento mines; Rush Valley district: Argent, Ben Harrison, Galena King, Honerine, Mescatine, Muerbrook, Salvation - Hercules mines. Utah County American Fork district: Miller, Pittsburgh mines; East Tintic district: North Lily mine.

Washington County Tutsagubet district: Apex, Paymaster mines.

POLYBASITE

Silver copper antimony sulfide, $(Ag,Cu)_6Sb_2S_{11}$. Monoclinic. Short tabular crystals. Cleavage imperfect. Fracture uneven. H. 2-3. G. 6.1. Luster metallic. Color iron black. Streak black. Opaque.

Utah County East Tintic district: Tintic Standard mine.

POLYHALITE

Hydrous potassium calcium magnesium sulfate, $K_2Ca_2Mg(SO_4)_4 \cdot 2H_2O$. Triclinic. Crystals are small and rare; usually massive. Cleavage perfect. H. 3.5. G. 2.8. Luster vitreous to resinous. Colorless to white, gray, salmon pink. Transparent.

Grand County Cane Creek; Paradox Basin; Salt Valley; Seven Mile anticline.

San Juan County Moab Valley.

Tooele County Salduro; Wendover.

POTASH ALUM

Hydrous potassium aluminum sulfate, $KAl(SO_4)_2 \cdot 12H_2O$. Isometric. Occurs in hydrothermal alteration zones. Fracture conchoidal. Cleavage poor. H. 2-2.5. G. 1.7. Luster vitreous. Transparent. Colorless to white. Taste sweetish and astringent.

Piute County Marysvale district: Alum King mine.

Utah County East Tintic district.

POTASH CLAY (See HYDROMICA)

POWELLITE

Calcium molybdate, with some substitution of tungsten, $Ca(W,MoO_4)$. Tetragonal. Usually in minute pyramids, or thin tabular crystals. Also massive. H. 3.5-4. G. 4.2. Cleavage poor. Fracture uneven. Luster greasy, pearly. Color straw-yellow, brown, greenish, bluish, gray. Fluoresces.

Beaver County Beaver Lake district: Beaver-Harrison, OK mines.

Tooele County Gold Hill district: Yellow Hammer mine.

PRASE

(See CRYPTOCRYSTALLINE QUARTZ)

PREHNITE

Basic calcium aluminum silicate, Ca2Al2(Si3O10)(OH)2. Orthorhombic. Usually reniform, stalactitic, and in rounded groups of tabular crystals. H. 6-6.5. G. 2.9. Luster vitreous. Color usually light green, passing into white. Translucent.

Salt Lake County Little Cottonwood district.

Utah County Silver Lake district: Deer, Silver Creeks.

PROCHLORITE

Chlorite variety, lower in silica than clinocllore. Monoclinic. Massive, foliated, or granular. H. 1-2. G. 2.8. Color green. Luster feebly pearly. Laminae flexible, not elastic.

Sevier County Henry district: Trinity prospect.

PROSOPITE

Basic aluminofluoride of calcium, CaAl2(F,OH)8. Monoclinic. Crystals more or less tabular. Also massive, granular to powdery. H. 4.5. G. 2.8. Cleavage prismatic perfect. Fracture uneven. Brittle. Luster weak vitreous. Colorless to gray or white.

Tooele County Dugway district: Buckhorn claim; Wild Cat Mountains: Silver Queen mine.

PROUSTITE

Silver arsenic sulfide, Ag3AsS3. Hexagonal. Crystals prismatic. Also massive, compact. H. 2-2.5. G. 5.5. Cleavage distinct. Fracture conchoidal to uneven. Brittle. Luster adamantine. Color scarlet-vermillion. Streak vermillion. Translucent.

Beaver County San Francisco district: Horn Silver mine.

Box Elder County Ashbrook district: Vipont mine.

Juab County Tintic district: Chief Con-

solidated mine.

Tooele County Ophir district: Ophir Hill area - Jim Fisk mine.

PSEUDOBROOKITE*

Ferric titanium oxide, Fe2TiO5. Orthorhombic. Crystals usually tabular and elongated; sometimes needle-like. H. 6. G. 4.4. Cleavage distinct. Fracture uneven. Luster adamantine to greasy. Color dark reddish brown, brownish black, black. Streak reddish brown or ochre-yellow.

Juab County Thomas Range: Topaz Mountain.

PSEUDOWAVELLITE

(See CRANDALLITE)

PSILOMELANE

Basic barium manganese oxide, probably BaMnMn8O16(OH)4. Orthorhombic. Habit massive, botryoidal, crusts. Also stalactitic, earthy, pulverulent. H. 5-6. G. 4.7. Luster submetallic to dull. Color iron-black. Streak brownish black.

Emery County Cedar Mountain district: Muddy River.

Grand County Little Grand district: Tenmile Wash; Salt Valley.

Juab County Abraham Hot Springs; Detroit district: Black Boy group; San Pitch Mountains: Black Jack claims, Orme property; Tintic district: Emerald mine.

San Juan County White Canyon district: Happy Jack mine.

Summit County Beaver Canyon.

Tooele County Erickson district: Huber-Rydalch mine; Mercur district; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Utah County East Tintic district: Tintic Standard mine; North Tintic district: Oxen mine, Tip Top Tunnel; Silver Lake district: Deer Creek; Utah district: Alpha, Emerald, Lucky Boy, Queen of the West, Spalding, Trotter mines.

Weber County Weber district: Payday claims.

PTILOLITE

A zeolite,
 $10\text{SiO}_2 \cdot \text{Al}_2\text{O}_3 \cdot (\text{Ca}, \text{K}_2, \text{Na}_2)\text{O} \cdot 7\text{H}_2\text{O}$.
Orthorhombic. Occurs in short capillary needles, in tufts. H. 5. G. 2.1. Cleavage good. Colorless to white. Garfield County Coyote. Piute County Marysvale district.

PYRARGYRITE

Silver antimony sulfide, Ag_3SbS_3 . Hexagonal. Crystals commonly prismatic, often twinned. Also massive, compact. H. 2.5. G. 5.8. Cleavage distinct. Fracture conchoidal to uneven. Brittle. Luster adamantine. Color deep red. Streak purplish red. Dark ruby silver. Beaver County San Francisco district; Horn Silver mine. Box Elder County Ashbrook district: Vipont mine. Juab County Tintic district: Chief Consolidated mine. Salt Lake County Bingham district: Tiewaukee, Winnamuck, Dixon mines. Summit County Park City district: Park City Consolidated mine. Tooele County Ophir district: Ophir Hill area - Jim Fisk mine.

PYRITE

Disulfide of iron, FeS_2 . Isometric. Crystals occur most commonly cubic, often pyritohedral, sometimes octahedral. Faces striated. Frequently massive, fine granular, radiated and stalactitic. H. 6-6.5. G. 5. Cleavage poor. Fracture conchoidal. Brittle. Luster metallic. Color pale brass yellow. Emits sparks when struck with steel. Beaver County Beaver Lake district: Beaver-Harrison, OK, Skylark mines; Bradshaw district: Cave, Hecla, Nip and Tuck mines; Fortuna district: Rocky Hollow; Gordon district: Sulphurdale; Granite district: Big Pass, Bismuth, Molly mines; Lincoln district: Creole, Lincoln mines; Newton district: Indian Creek, Rob Roy, Sheep Rock mines; Pine Grove district; Pruess district; Blackbird, Cactus, Gold Reef mines;

Rocky district: Old Hickory mine; San Francisco district: Beaver Carbonate, Cupric, Horn Silver, King David, Michigan, Washington mines; Star district: Commonwealth, Harrington-Hickory, Hub, Kemple, Lady Bryan, Moscow, Progressive, Red Warrior, St. Mary's, White Rock, Wild Bill mines. Box Elder County Ashbrook district: Vipont mine; Lucin district: Tecoma Hill mines; Newfoundland district: Copper Ridge mine; North shore of Great Salt Lake; Park Valley district; Promontory district: Lakeview Mining properties; Rosebud district: Red Buttes; Willard district: Overland claim. Davis County Farmington district: Morning Star group, Parrish Canyon. Duchesne County Green River Formation. Emery County San Rafael district: Lucky Strike no. 2, Maybe mines, Temple Mountain. Garfield County Circle Cliffs: Acme, Lone B, Rocky Mountain, Stud Horse mines; Henry Mountains: Bromide, Oro mines. Grand County Hoosier mine; La Sal district: Bornite mine; Miner's Basin district: Dillon, M.I.F., Moab no. 1, Skylark, Tornado mines; Seven Mile Canyon: Shinarump nos. 1-3 claims. Iron County Iron Springs district: Granite Mountain, Iron Mountain; State Line district. Juab County Detroit district: Charm, Copperhead, E.P.H., Ibox mines; Fish Springs district: Carnation, Emma, Galena, Utah mines; North Tintic district: Tintic Prince mine; Spor Mountain: Bell Hill mine; Tintic district: Black Dragon, Chief Consolidated, Iron Blossom, Lower Mammoth, Sunbeam, Swansea mines; West Tintic district: Iron King, Lockheed, 1903, Scotia, Tintic Western, War Eagle mines. Millard County Antelope Springs; Detroit district: Almond, Blue Bell, Major Drum mines; Gordon district: Black, Philadelphia, Sulphur King, Victor Conqueror mines; House Range: Amasa Valley, North Peak, Painter Springs. Morgan County Argenta district: Carbonate Hill, Carbonate Gem mines; Morgan district: Chicago-Utah, Iron

King, Morgan Consolidated, Red Eagle mines.

Plute County Gold Mountain district: Annie Laurie, Sevier mines; Marysvale district: La Vita prospect; Mt. Baldy district: Clyde, Deer Trail, Green Eyed Monster mines; Ohio district: Bully Boy and Webster, Cascade, Copper Belt, Dalton, Iris, Shamrock mines.

Salt Lake County Big Cottonwood district: American Metals, Cardiff, Kentucky-Utah, Maxfield mines; Bingham district: Bingham Copper Pit, Boston Consolidated, Burning Moscow, Broad Gauge, Brooklyn, Butterfield, Caledonia, Columbia, Commercial, Conger, Colorado, Dalton and Lark, Dixon, Frisco, Fortune, Galena, Highland Boy, Last Chance, Minnie, Montezuma, Nast, Neptune, Old Jordan, Phoenix, Red Wing, Tiewaukee, U.S. and Lark, Winnamuck, Yampa, Yosemite mines; Little Cottonwood district: Albion, Alta-Gladstone Vein no. 5, Alta Consolidated, Columbus Consolidated and Wasatch Drainage Tunnel, Columbus Rexal, Dwyer, Emma, Little Emma, Peruvian Consolidated, South Hecla, Superior mines; Little Cottonwood stock.

San Juan County Big Indian district: Big Indian Copper mine; Monticello district: Alma, Blue Bird, Copper Queen, Danish Girl, Dream, Duckett, Gold Queen mines; Red Canyon district: Markey no. 3 mine; White Canyon district: Happy Jack, Jomac, W.N. mines. Sanpete County Dry Canyon.

Sevier County Rock Candy Mountain; Salina Creek district: Lead Hill mine.

Summit County Marble district; Park City district: California, Comstock, Daly, Daly-Judge, Daly West, J.A.C. Tunnel, Kearns-Keith, New York, Ontario, Silver King, Wabash, Woodside mines.

Tooele County Bingham district: May Flower mine; Blue Bell district: Benning Canyon, Little Valley, Morgan mines; Columbia district: Benmore, Sharp, Sultana mines; Dugway district: Bertha, Bullion Canyon, Four Metals, Kelly's Hole, Metal States, Surplus mines; East Erickson district: Copper Jack, Dutch Peak, Greens Ridge, Hard-to-Beat Canyon, Indianapolis, Sheep-

rock, Silver King, Silver Shield, Tintic-Delaware mines; Erickson district: Black Jack, Black Rock, Blain, Deer Trail, Indian Boy, May Farmer, Silver Reef, Utonia mines; Free Coinage district; Gold Hill district: Alvarado, Cane Springs, Calaveras, Cash Boy, Climax, Copper Bloom, Copper Queen-Midland Mining Company, Cyclone, Doctor, Frankie, Gold Hill (U.S.), New Baltimore, Pole Star Copper Company, Red Jacket, Silver and Gold Mining Company, Success, U.S., Victory no. 1 mines; Granite Mountain district: Desert, El Dorado, Mountain Queen mines; Greeley district; Grantsville district; Mercur district: Mineral Hill mines; North Tintic district: New Bullion, Scranton mines; Ophir district: Dry Canyon area - Mono mine; Lion Hill area - Buffalo mine, Chloride Point; Ophir Hill area - Cliff mine, Hidden Treasure, Ophir Hill Consolidated, Ophir Coalition, Sacramento mines; Osceola district; Rush Valley district: Argent, Ben Harrison, Calumet, Galena King, Honerine, Mescatine, Muerbrook, Salvation - Hercules, Tip Top mines; Silver Island district: Carrie Mack property; Tooele district; Wild Cat Mountains: Silver Queen mine.

Uintah County Brown Park area; Carbonate district: Dyer mine; Sun Oil Company South Ouray well; Ute land Knoll district: Ouray.

Utah County Alpine district: Lucky Chance mine; American Fork district: Bog, Dutchman, Mary Ellen and Live Yankee, Pacific, Silver Dipper, Water Fall, Yankee mines; East Tintic district: Burgin, Eureka Lily, Eureka Standard, Tintic Standard mines; North Tintic district: Lehi-Tintic, Tintic Empire, Tintic Paymaster, Selma mines; Payson district: Nelson mine; Provo district: Monarch mine; Santaquin district: Black Balsam, Copper Bullion, Santaquin Central mines; Silver Lake district: Milkmaid, Ontario mines.

Wasatch County Blue Ledge district: Mayflower mine.

Washington County Silver Reef district.

Wayne County Fruita: Oyler mine; Miners Mountain district.

Weber County Fremont Island district; Sierra Madre district; King Solomon, Napoleon-Maghera mines.

PYROLUSITE

Manganese dioxide, MnO_2 . Tetragonal. Rarely in crystals that are well-developed, commonly in composite subparallel groupings of minute crystals. Usually massive columnar; also in coatings, concretionary forms, granular to powdery. H. 6-6.5. G. 4.4-5. Cleavage good. Fracture uneven. Brittle. Luster metallic. Color light steel-gray to iron-gray. Streak black to bluish black. Opaque.

Beaver County Blue Mountains: Black Jack, Susie Q. claims; Indian Peak district: Steelville, Spor properties; Newton district: Black Rock deposit; Pine Grove district; San Francisco district. Cache County Hyrum area: Pig Hole Hollow.

Daggett County Daggett Chief property; Spring Creek deposit.

Emergy County Cedar Mountains; Muddy River; Rochester; Saucer Basin.

Garfield County Boulder Mountain: Pleasant Creek; Hutch Pasture; Panguitch; Table Cliff Plateau; Tushar Range: Hawkins claims.

Grand County Bald Mesa; Courthouse Wash; Little Grand district: Black Bird, Colorado Fuel and Iron Company, Desert Rock (Mongol), Dry Lake Wash, Duma Point, Needles, Salt Wash group, Tenmile Wash, White Wash mines; Muleshoe Wash; Salt Valley; Squaw Peak; Wilson Mesa district; White House.

Iron County Antelope Range: Black Jack, Lucky Joe, Taylor claims; Cedar Mountain: Black Hawk, Joe Louis claims; Escalante district: Clove prospect; Modena property.

Juab County Detroit district: Black Boy group, Charm, Copperhead, E.P.H., Ihex mines; Mt. Nebo district: Black Ledge claims; Thomas district: Fluorine Queen mine; Tintic district: Black Jack Empire, White Cloud; San Pitch Mountains: Black Jack, Orme properties.

Kane County Kitchen Corral Canyon.

Millard County Detroit district: Almond, Black Diamond, Blue Bell, Guy, Last Chance, Major Drum, Martha, Silica Plug mines.

Piute County Antelope Range; Dry Canyon; Marysvale district: Blackbird, Blue Miami Moon no. 1 mines; Mt. Baldy district: Deer Trail mine; Mt. Belknap; Ohio district: Bully Boy and Webster mines, Gilbert claims.

Rich County Bear River Range: Lakeview claims.

Salt Lake County Big Cottonwood district: Carbonate, Cardiff, Woodlawn mines; Bingham district; Camp Williams: Evans Lime Quarry; Little Cottonwood district: Emma, Little Emma, Michigan - Utah mines.

Sanpete County Mt. Pleasant.

Sevier County Henry district: Iron Peaks, Georgia, Jumbo, Yellow Hornet, Krotke Iron, Nooday, Trinity mines; Sevier Plateau.

Summit County Beaver Canyon; Coalville; Park City district: Daly, Ontario, Silver King, Woodside mines.

Tooele County Bluebell district: Bogan, Morgan mines; Columbia district: Benmore, Sharp mines; East Erickson district: Copper Jack, Silver King, Silver Shield mines; Erickson district: Black Jack, Blackrock, Blain, Deer Trail, Indian Boy, May Farmer, Huber - Rydalch, Queen Mary mines; Ophir district: Lion Hill area; Ophir Hill area - Cliff, Ophir Hill Consolidated, Ophir Coalition mines.

Utah County East Tintic district: Apex Standard, Black Jack, Burgin, Iron King, Tintic Standard, White Cloud mines; Lehi district: Pfeiffer Canyon area - Blue Rock claim; North Tintic district: Fields, North Tintic, Oxen, Tip Top mines; Utah district: Alpha, Emerald, Lucky Boy, Queen of the West, Spalding, Trotter mines.

Wasatch County Rhodes Plateau, East Star no. 1, Gray Hawk properties.

Washington County Santa Clara district: Black Beauty no. 1 claim; Toquer-ville; Wallace claims.

Wayne County Spring Gulch.

Weber County Huntsville; Weber district: Payday claims.

PYROMORPHITE

Lead chlorophosphate, $Pb_3Cl(PO_4)_3$. Hexagonal. Crystals prismatic, equant, rarely tabular. Often rounded barrel-shaped forms. Also globular, reniform forms. H. 3.5-4. G. 6.5-7.1. Luster resinous to adamantine. Cleavage in traces. Brittle. Color various shades of green, brown, yellow.

Iron County Escalante district: Escalante mine.

Juab County Spring Creek district: Queen of Sheba mine; Tintic district: Eureka Hill, Mammoth mines.

Summit County Park City district: Scottish Chief mine.

Tooele County Gold Hill district: Rubemine; Rush Valley district: Honerine mine; North Tintic district: Scranton mine.

Wasatch County Blue Ledge district: Glencoe, McHenry, Valeo mines; Snake Creek district: Revelator mine.

PYROPE (See GARNET)

PYROPHYLLITE*

Hydrous aluminum silicate, $H_2Al_2(SiO_3)_4$. Orthorhombic. Foliated, radiated, or somewhat fibrous; also granular to compact. Basal cleavage. Laminae flexible, not elastic. Feel greasy. H. 1-2. G. 2.8. Luster pearly. Color white, apple-green, grayish white, yellowish. Occurs in the Manning Canyon Shale.

Utah County Cedar Valley; Lehi district: Manning Canyon Shale; Jordan Narrows; Orem, Saratoga, Soldiers Pass quadrangles.

PYROXENE (See AUGITE, DIOPSIDE, HEDENBERGITE, HYPERSTHENE)

PYRRHOTITE

Sulfide of iron, $Fe_{1-x}S$, with x between 0 and 0.2. Hexagonal. Crystals rare. Practically always massive with granular or lamellar habit. H. 4. G. 4.6. Fracture uneven. Brittle. Luster metallic. Color bronze-yellow. Tarnishes on exposure. Streak dark grayish black. Magnetic. Opaque.

Juab County Trout Creek.

Salt Lake County Bingham district.

Tooele County Gold Hill district: Gold Hill (U.S.), U.S. mines; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines; Rush Valley district: Settlement Canyon.

QUARTZ

Silicon dioxide, SiO_2 . Hexagonal. Crystals commonly prismatic, prism faces usually horizontally striated. Also massive, coarse to fine grained crystalline to cryptocrystalline. H. 7. G. 2.7. Fracture conchoidal. Luster vitreous. Usually colorless, milky, rose, smoky.

Beaver County Bradshaw district; Indian Peak district: Blue Bell, Cougar Spar, Dugout, JB, Nooday, Lost Sheep, Utah mines; Lincoln district: Creole mine; Newton district: Louise, Rob Roy, Sheep Rock mines; Pine Grove district: Monarch; Pruess district: Blackbird, Cactus mines, Cactus Gulch; Rock Corral; San Francisco district; Star district: Thrush, Cabin, Fluorine Ledge, Lucky Boy nos. 1-2, Manassa, Monte Cristo, Quartzite, North Virginia Extension, Virginia nos. 1-5 mines.

Box Elder County Ashbrook district: Vipont mine; Rosebud district.

Davis County Antelope Island.

Emery County San Rafael district.

Grand County Agate Switch; Miners Basin district: Dewey, High Ore mines.

Iron County Gold Springs district; Iron Springs district: Granite Mountain, Iron Mountain.

Juab County Deseret district: Miller mine; Goshute Indian Reservation; Thomas Range: Autunite no. 8, Bell Hill, Blowout, Dell no. 1, Dell no. 5, Evening Star, Hilltop, Lost Sheep, Nonella, Oversight mines; Topaz Mountain; Tintic district: Sioux mine; San Pitch mine; San Pitch Mountains: Black Jack claims; Spring Creek district; Trout Creek district: Apex mine; West Tintic district: 1903, Tintic Western mines. Piute County Gold Mountain district: Sevier mine; Marysvale district: Quicksilver mine; Mt. Baldy district: Deer Trail mine; Ohio district: Bully Boy and Webster mines.

Salt Lake County Bingham district: Bingham Copper Pit, Galena, Old Jordan, U.S. and Lark mines; Little Cottonwood stock.

San Juan County La Sal Mountains; White Canyon district: Happy Jack mine.

Sevier County Henry district: Trinity prospect.

Summit County Park City district: Daly-Judge, Daly West, Jupiter, Kearns-Keith, Silver King, Silver King Consolidated, Woodside mines.

Tooele County Blue Bell district: Benning Canyon mine; Columbia district: Benmore, Sharp, Iron Hope, Sultana mines; Dugway district: Rattler mine; East Erickson district: Ekker Canyon, Indianapolis, Silver King mines; Gold Hill district: Gold Bond, Rodenhouse Wash, Star Dust, Success, U.S. mines; Granite district: Desert, El Dorado, Mountain Queen mines; Mercur district: Ophir district: Dry Canyon area; Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines; North Tintic district: Scranton mine.

Utah County Alpine district; American Fork district: Bog mine; Little Cottonwood stock; East Tintic district: Burgin mine; Silver Lake district: Deer, Silver Creeks, Wells Canyon.

Washington County Silver Reef district.
Weber County Sierra Madre district.

RABBITTITE

Hydrous basic carbonate of calcium magnesium, and uranium, $\text{Ca}_3\text{Mg}_3(\text{UO}_2)(\text{CO}_3)_6(\text{OH})_4 \cdot 18\text{H}_2\text{O}$. Monoclinic. Small acicular crystals. Cleavage prismatic. H. 2.5. G. 2.6. Luster silky. Color pale green. Occurs as an efflorescence.

Emery County San Rafael district: Lucky Strike no. 2 mine.

RACEWINITE

Hydrous aluminum calcium silicate. A zeolite. Coarsely crystalline, but no crystal forms. H. 2.5. G. 1.9. Conchoidal fracture. Black in masses, splinters brown to yellow.

Salt Lake County Bingham district: Highland Boy, Yampa mines.

RAUVITE

Hydrous calcium uranium vanadate, $\text{CaO} \cdot 2\text{UO}_3 \cdot 5\text{V}_2\text{O}_5 \cdot 16\text{H}_2\text{O}$. Occurs as dense botryoidal crusts, coatings. Metacolloid. Color purplish to bluish black. Luster adamantine to waxy. G. 2.9. Streak yellowish brown to olive. Not fluorescent.

Emery County San Rafael district: Flat Top Mesa, Temple Mountain, South Temple Mountain, South Temple Wash.

Grand County Beaver Mesa: Corvusite nos. 1-3 mines; Thompsons district: Cactus Rat mines.

Piute County Marysvale district: La Vita prospect.

REALGAR

Arsenic sulfide, AsS. Monoclinic. Crystals short prismatic. Also granular, compact, crusts. H. 1.5-2. G. 3.5. Cleavage good. Sectile. Luster resinous to greasy. Color aurora-red to orange-yellow. Streak orange-red.

Box Elder County Ashbrook district: Vipont mine.

Emery County San Rafael district: Fumemol no. 2 mine.

Garfield County Coyote Creek district: Hampton mine.

Salt Lake County Bingham district: Butterfield Canyon.

Tooele County Mercur district: Brickyard, Golden Gate, Mercur, Sacramento mines.

Washington County Beaver Dam Mountains; Bull Valley district: Pilot claims.

RED OCHER (See HEMATITE)

REEDMERGNERITE*

Sodium boron silicate, NaBSi_3O_8 . Triclinic. A boron analogue of albite, authigenic in origin. Crystals stubby prisms with characteristic wedge-shaped ends, usually microscopic. H. 6-6.5. G. 2.7. Cleavage basal perfect. Colorless.

Duchesne County Carter Oil Company wells; Green River Formation; Sinclair Mortenson well.

RHODOCHROSITE

Manganese carbonate, $MnCO_3$. Hexagonal. Distinct crystals not common. Cleavable masses to granular, compact; columnar; crusts. H. 3.5-4. G. 3.7. Cleavage rhombohedral good. Brittle. Luster vitreous to pearly. Color various shades of pink, yellow, gray, light brown.

Beaver County Blue Mountains: Black Jack, Susie Q claims; San Francisco district; Star district: Moscow mine.

Box Elder County Ashbrook district: Vipont mine.

Grand County Needles.

Iron County Modena property.

Juab County Detroit district: Black Boy group.

Millard County Detroit district: Almond, Blue Bell, Major Drum mines.

Piute County Ohio district: Dalton mine; Tushar Range: Dillon mine.

Rich County Bear River Range: Lakeview claims.

Salt Lake County Big Cottonwood district: Cardiff mine; Bingham district: Butterfield, Eagle Bird, Lucky Boy, Queen, Winnamuck and Dixon mines; Little Cottonwood district: Michigan-Utah mine.

Summit County Park City district: Daly, Ontario mines.

Tooele County Erickson district: Uttonia claim.

Utah County East Tintic district: Burgin, Tintic Standard mines.

Wasatch County Blue Ledge district: Mayflower mine.

RHODONITE

Manganese silicate, $MnSiO_3$. Triclinic. Crystals commonly tabular, large and rough with rounded edges. Commonly massive, cleavable to compact. H. 5.5-6. G. 3.6. Cleavage good. Luster vitreous. Color rose-red, pink, brown.

Summit County Park City district: Daly, Ontario mines.

Tooele County Erickson district: Uttonia claim.

RIEBECKITE*

Sodium iron silicate, $NaFe(SiO_3)_2$. Monoclinic. Prismatic crystals, vertically striated. Cleavage good. H. 4. G. 3.4. Luster vitreous. Color dark blue to black. Authigenic mineral in Green River Formation.
Duchesne County Green River Formation.

ROCKBRIDGEITE

Basic iron manganese phosphate, $(Fe,Mn)Fe_4(PO_4)_3(OH)_5$. Orthorhombic. Botryoidal masses and crusts with radial fibrous or columnar structure. Cleavage excellent. Brittle. H. 4.5. G. 3.3. Color dark green to olive-green, greenish black. Occurs in cavities in magnetite.

Iron County Iron Springs district: Iron Mountain, Blowout Hill.

ROEMERITE

Hydrous ferrous and ferric sulfate, $FeFe_2(SO_4)_2 \cdot 14H_2O$. Triclinic. Occurs as crystalline masses and very crude, equant crystals. Cleavage perfect. H. 3-3.5. G. 2.2. Color dark brown. Luster oily to vitreous. Transparent. Taste saline, astringent.

Emery County San Rafael district: Calf Mesa, Dexter group.

ROSASITE

Copper zinc carbonate-hydroxide, $(Cu,Zn)_2(OH)_2(CO_3)$. Apparently monoclinic. Cleavage good. Brittle. H. 4.5. G. 4.1. Color green to bluish green, sky blue. Occurs in mammillary, botryoidal or warty crusts with fibrous to spherulitic structure.

Tooele County Dugway district.

Washington County Tutsagubet district: Apex (Dixie) mine.

ROSCOELITE

Complex vanadium mineral, $(Al,V)_2(Al,Si_3)(K,Na)O_{10}(OH,F)_2$. Mono-

clinic. Habit is massive. Color green, gray, tan, brown. Luster pearly. H. soft. Cleavage good.

Emery County San Rafael district: Temple Mountain.

Grand County Thompsons area; Thompsons district: Cactus Rat, Parco no. 23 mines.

San Juan County Paradox Valley district: Grey Dawn mine.

ROSE QUARTZ (See QUARTZ)

ROSSITE

Hydrous calcium vanadate, $\text{CaV}_2\text{O}_6 \cdot 4\text{H}_2\text{O}$. Triclinic. Flaky to glassy and fibrous structure. Color yellow. H. 2-3. G. 2.5. Luster pearly to vitreous. Cleavage good. Brittle. Grand County Thompsons area; Thompsons district: Cactus Rat, Parco no. 23 mines.

RUBY SILVER

(See PROUSTITE and PYRRARGYRITE)

RUTHERFORDINE*

Uranyl carbonate, $(\text{UO}_2)(\text{CO}_3)$. Orthorhombic. Cleavage perfect. Hardness not known. G. 5.7. Luster of aggregates dull to earthy. Color yellow to greenish yellow. Occurs as earthy to pulverulent aggregates, and as crusts of tiny laths. Effervescence in acid. Emery County San Rafael district: Delta mine.

San Juan County "C" Group claims.

RUTILE

Titanium oxide, TiO_2 . Tetragonal. Crystals commonly prismatic, often slender acicular. Also granular, massive, fine to coarse. H. 6-6.5. G. 4.2. Cleavage distinct. Fracture conchoidal to uneven. Brittle. Luster adamantine. Color reddish-brown to red.

Beaver County Pruess district: Blackbird, Cactus mines.

Salt Lake County Bingham district.

Sevier County Henry district: Trinity prospect.

Tooele County Gold Hill district; Mer-

cur district.

Utah County East Tintic district.

Wayne County Caineville.

SABUGALITE

Hydrous acid phosphate of aluminum and hexavalent uranium, $\text{HAl}(\text{UO}_2)_4(\text{PO}_4)_4 \cdot 16\text{H}_2\text{O}$. Tetragonal. Occurs as thin plates, typically as densely aggregated crusts. Cleavage perfect. H. 2.5. G. 3.2. Color bright yellow to lemon yellow, closely resembling autunite. Luster weakly vitreous. Slightly flexible. Fluoresces bright lemon yellow.

Piute County Marysvale district: Freedom no. 2 mine.

San Juan County White Canyon district: Happy Jack mine.

SAGENITE (See RUTILE)

SAMARSKITE

Complex oxide, $(\text{Y}, \text{Er}, \text{Ce}, \text{U}, \text{Ca}, \text{Fe}, \text{Pb}, \text{Th}) - (\text{Cb}, \text{Ta}, \text{Ti}, \text{Sn})_2 \text{O}_6$. Orthorhombic. Prismatic. Crystals often rough. Massive and not easily identified. Cleavage indistinct. Fracture conchoidal. Brittle. H. 5-6. G. 5.7. Luster vitreous to resinous. Color velvet black, brown, yellowish brown. Streak dark reddish brown.

Tooele County East Erickson district: Hard-to-Beat, Sheeprock Canyons, Silver King mine; Granite Mountain district.

SANIDINE (See ORTHOCLASE)

SAPONITE

Hydrous silicate of magnesium and aluminum, uncertain formula. Monoclinic or orthorhombic. Usually amorphous and impure. Commonly massive. In nodules or cavities. H. soft. G. 2.2. Luster greasy. Color white, yellowish, grayish green, bluish, reddish.

Beaver County Star district.

Grand County Richardson district.

SAPPHIRE (See CORUNDUM)

SATIN SPAR (See GYPSUM)

SCANDIUM

Rare metal, Sc, indefinite mineral association. Occurs in contact metamorphic deposits and in replacement veins. Tooele County Gold Hill district.

SCAPOLITE

Varied composition from $(\text{Na}, \text{Ca})_4\text{Al}_3(\text{Al}, \text{Si})_3\text{Si}_6\text{O}_{24}(\text{Cl}, \text{CO}_3, \text{SO}_4)$, to $(\text{Ca}, \text{Na})_4\text{Al}_3(\text{Al}, \text{Si})_3\text{Si}_6\text{O}_{24}(\text{Cl}, \text{CO}_3, \text{SO}_4)$. Tetragonal. Crystals usually prismatic. Usually coarse crystals, or with faint fibrous appearance. H. 5.5-6. G. 2.7. Luster vitreous. Color white, gray, pale green, bluish, reddish.

Sevier County Henry district: Trinity prospect.

Tooele County Gold Hill district: Doctor, Gold Bond, Rube mines.

SCHHEELITE

Calcium tungstate, CaWO_4 . Tetragonal. Habit octahedral, also tabular. Massive, granular, reniform, columnar. H. 4.5-5. G. 6.1. Cleavage good. Fracture uneven. Luster vitreous. Colorless to white, yellowish white, pale yellow; also greenish, gray reddish, orange-yellow. Fluoresces.

Beaver County Bradshaw district: 2 R's group; Granite district: Big Pass, Bismuth, Burnt Hollow, Contact, Garnet, King-of-the-Hills, Major fault, Molly, Oak, Oak Basin, Rattler, Scheelite, Ward mines; Lincoln district: Creole mine; Rocky district: Copper Ranch, Old Hickory mines; San Francisco district: Cupric mine; Star district: Copper King, Little May Lilly mines.

Box Elder County Ashbrook district: Bovine mine; Grouse Creek Range: Rocky Pass mine; Newfoundland district: Desert Peak, Pack Rat Canyon; Rosebud district: A and W, Magnitude mines. Davis County Lucky Boy and Pioche mines.

Grand County Ryan Creek Scheelite property.

Utah County Trout Creek district: Apex, Bacon, Trout Creek mines; West Tintic

district: Iron King, Tintic Western mines.

Millard County House Range: Amasa Valley, Horseshoe, Mt. Baldy, New Klondike, Pine Peak, Pinke Peak, Rainbow, South, South Pit, Sidesprings mines, Notch Peak, Painter Springs. Salt Lake County Big Cottonwood district: Mountain Lake mine; Little Cottonwood district: South Hecla mine; Little Cottonwood stock.

Tooele County East Erickson district: Ekker Canyon prospect, Sheeprock Canyon; Gold Hill district: B. Estelle, Centennial and Enterprise, Copper Bloom, Copperopolis, Doctor, E.H.B., Enterprise, Fraction Lode, Frankie, Ida Lull, Lucy L., Mascot, Pole Star Copper Company, Star Dust, Wilson Consolidated, Yellow Hammer mines; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Utah County Silver Lake district: Deer Creek, Mayday Extension, Milkmaid mines.

Washington County Beaver Dam Mountains.

SCHOEPIITE

Hydrous uranium oxide, $4\text{UO}_3 \cdot 9\text{H}_2\text{O}$. Orthorhombic. Crystals are usually tabular, also equant or short prismatic. Cleavage basal. H. 2-3. G. 4.8. Luster adamantine. Color sulfur-yellow to citron yellow. Streak yellow. Transparent.

Emery County San Rafael district: Delta mine, Green Vein Mesa, Consolidated mine.

San Juan County Red Canyon district: Frey no. 4, Posey mines; White Canyon district: Happy Jack, Hideout mines.

Wayne County Fruita: Oylar mine.

SCHROECKINGERITE

Hydrous fluo-carbonate-sulfate of sodium, calcium, and uranium, $\text{NaCa}_3(\text{UO}_2)(\text{CO}_3)_3(\text{SO}_4)\text{F} \cdot 10\text{H}_2\text{O}$. Orthorhombic. Found as crusts, clusters, rosettes, or globular aggregates of flattened scales. H. 2.5. G. 2.5. Cleavage perfect basal. Laminae flexible.

Luster vitreous to pearly. Color greenish yellow. Transparent. Strongly fluorescent.

Emery County Bow Knot area; Green River district: Crabapple claim.

Grand County Cisco: Trader Smith's claims; Seven Mile Canyon; Thompsons district: McCoy, Parco no. 23 mines; Yellow Cat district: Yellow Cat group.

Juab County Thomas Range: Good Will, Yellow Chief groups; Topaz Mountain. Piute County Marysvale district: Bullion Monarch, East Slope no. 2, Freedom nos. 1-2, Prospector nos. 1 and 3 mines.

San Juan County White Canyon district: Hideout mine.

Wayne County Coleman Canyon to Oak Creek.

SCORODITE

Hydrous ferric aluminum arsenate, $(Fe, Al)AsO_4 \cdot 2H_2O$. Orthorhombic. Crystals usually pyramidal; also tabular and prismatic. Also massive, crusts, sinter-like, dense to earthy. H. 3.5-4. G. 3.2. Cleavage imperfect. Fracture subconchoidal. Luster vitreous. Color pale green to brown, sometimes colorless, bluish, violet, yellow.

Beaver County San Francisco district: Horn Silver mine; Star district.

Emery County San Rafael district: Temple Mountain, Fueamol no. 2 mine.

Juab County Tintic district: Carissa mine; West Tintic district: Scotia mine.

Tooele County Gold Hill district: Bonanza, Boston, Gold Hill (U.S.), Gold Hill Standard, Mascot, Monte Del Rey, Ozark, Silver and Gold Mining Company, Unadine, U.S. mines; Mercur district.

SEARLESITE*

Hydrous sodium boron silicate, $NaBSi_2O_6 \cdot H_2O$. Monoclinic. Occurs in minute spherulites composed of radiating fibers. Cleavage perfect. H. 2.4. Color white. Occurs in the Green River Formation.

Duchesne County Carter Oil Company wells; Green River Formation; Sinclair Mortenson well.

Utah County Sun Oil Company South Ouray well.

SELENITE (See GYPSUM)

SELENIUM

Native element, Se. Hexagonal. Acicular crystals, often hollow and tube-like. Cleavage good. Crystals flexible. Luster metallic. Color gray. Streak red. Transparent in thinnest fragments, red.

Grand County Thompsons district: Parco no. 23 mine.

San Juan County Paradox Valley district: Vanadium Queen mine.

SELIGMANNITE

Lead copper arsenic sulfide, $PbCuAsS_3$. Orthorhombic. Crystals equant, short prismatic to tabular. H. 3. G. 5.3. Cleavage poor. Fracture conchoidal. Brittle. Luster metallic. Color dark lead-gray to black. Streak chocolate-brown to purple-black. Opaque.

Salt Lake County Bingham district.

SENARMONTITE

Antimony trioxide, Sb_2O_3 . Triclinic, pseudoisometric. Habit octahedral; also granular massive, crusty. H. 2-2.5. G. 5.5. Cleavage in traces. Fracture uneven. Brittle. Luster resinous. Colorless to grayish white. Streak white. Transparent.

Garfield County Coyote district: Hampton mine.

SEPIOLITE

Basic magnesium silicate, $Mg_2Si_3O_6(OH)_4$. Amorphous. Compact, fine earthy texture, or clay-like. H. 2-2.5. G. 2. Cleavage none. Floats on water in dry masses. Color grayish white, white, yellowish, bluish, reddish. Opaque.

Duchesne County Indian Canyon.

San Juan County White Canyon district: Happy Jack mine.

Tooele County Rush Valley district: Honerine mine.

SERICITE (See MUSCOVITE)

SERPENTINE

Hydrous magnesium silicate, $Mg_3Si_2O_5(OH)_4$. Monoclinic. Crystals, except as pseudomorphs, unknown. Platy and fibrous varieties. H. 2-5. G. 2.2-2.7. Luster greasy, waxy, silky. Color light to dark green.

Beaver County Bradshaw district: 2 R's group; Pruess district: Blackbird, Cactus mines; Star district: Hub mine. Salt Lake County Big Cottonwood district.

Sevier County Henry district: Trinity prospect.

Summit County Park City district: Daly, Ontario mines.

Tooele County Gold Hill district: Reaper mine; Rush Valley district: Honerine mine.

SHERWOODITE

Hydrous calcium vanadate, $Ca_3V_3O_{22} \cdot 15H_2O$. Tetragonal. Crystals equant or slightly flattened. Occurs singly or in aggregates. Color dark blue-black. Streak light blue. H. 2. G. 2.8. Luster vitreous to earthy. Fracture subconchoidal to uneven.

Grand County Wilson Mesa district.

SHORTITE*

Sodium calcium carbonate, $Na_2Ca_2(CO_3)_3$. Orthorhombic. Wedge-shaped crystals, tabular or equant, striated. H. 3. G. 2.6. Cleavage distinct. Fracture conchoidal. Luster vitreous. Colorless to pale yellow. Transparent. Occurs in the Green River Formation.

Duchesne County Carter Oil Company wells; Green River Formation; Sinclair Mortenson well.

Utah County Sun Oil Company South Ouray well.

SICKLERITE

Lithium iron manganese phosphate, $(Li, Fe, Mn)(PO_4)$. Orthorhombic. Found only massive as an alteration product. H. 4. G. 3.3. Color yellowish brown

to dark brown. Cleavage good. Streak light yellowish brown, brown, reddish brown.

Juab County Tintic district.

SIDERITE

Ferrous carbonate, $FeCO_3$. Hexagonal. Crystals commonly rhombohedral. Crystal faces curved like dolomite. Often cleavable massive, fine to coarse granular. Also botryoidal, compact and earthy. H. 4. G. 3.9. Cleavage perfect. Brittle. Luster vitreous to pearly. Color yellowish brown, grayish, greenish.

Beaver County Pruess district: Blackbird, Cactus mines.

Cache County Paradise district: Mineral Point.

Iron County Iron Springs district: Granite Mountain, Iron Mountain.

Salt Lake County Big Cottonwood district: Lulu mine; Bingham district: Highland Boy, Yampa mines; Little Cottonwood district: Columbus-Rexall, Emma mines.

Tooele County Dugway district: Boston, Bullion Canyon, Great Easter, Nautilus, Pride of the West mines; Gold Hill district: Alvarado, Copper Queen-Midland Mining Company, Gold Hill (U.S.), Midas, Midland mines; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Utah County East Tintic district: Burgin mine; Silver Lake district: Deer, Silver Creeks.

Wasatch County Blue Ledge district: Mayflower mine.

SIDERONATRITE

Hydrous sodium iron sulfate, $2Na_2O \cdot Fe_2O_3 \cdot 4SO_3 \cdot 7H_2O$. Probably orthorhombic. Fibrous, massive. Perfect cleavage. H. 2-2.5. G. 2.3. Easily fusible. Color yellow.

Wayne County Capitol Reef Monument.

SIDEROTIL

Hydrous ferrous sulfate, $FeSO_4 \cdot 5H_2O$ (?), water content uncertain. Crystallographic and physical

data are lacking. Occurs in fibrous crusts and divergent groups of needle-like crystals. Color white to yellowish, pale green.

Salt Lake County Bingham district.

San Juan County White Canyon district: Happy Jack mine.

Tooele County Gold Hill district: Alvarado mine.

Utah County East Tintic district: Tintic Standard mine.

SILICIFIED BONE and WOOD

(See CRYPTOCRYSTALLINE QUARTZ)

SILVER

Native silver, Ag. Isometric. Crystal habit cubic, octahedral, dodecahedral. Commonly in acicular forms, reticulated. Also massive, flattened scales, coatings, or wiry forms. H. 2.5-3. G. 10.5. Cleavage none. Fracture hackly. Ductile and malleable. Luster metallic. Color and streak silver-white; often gray or black due to tarnish. Opaque.

Beaver County Star district: Harrington-Hickory, Rebel, White Rock mines.

Box Elder County Ashbrook district: Vipont mine; Lucin district: Tecoma Hill mine.

Cache County Hyrum area: Lucky Star, Tip Top claims; La Plata area: Yellow Jacket claim.

Emery County Emery district.

Juab County Tintic district: Black Jack Empire, Bullion Beck, Centennial Eureka, Chief Consolidated, Gemini, Grand Central, Mammoth, Swansea mines.

Morgan County Strawberry mine.

Salt Lake County Bingham district: Dalton and Lark, Galena, Old Jordan, Neptune, Tiewaukee, U. S. and Lark mines.

Summit County Park City district: Scottish Chief mine.

Tooele County Blue Bell district: Black Hawk mine; Columbia district: Benmore, Sharp mines; Dugway district: Buckhorn, Four Metals mines; Ophir district: Dry Canyon area - Brooklyn, Mono mines; Ophir Hill area - Jim Fisk mine; Wild Cat Mountains: Silver Queen mine.

Utah County East Tintic district: Bur-

gin mine.

Wasatch County Blue Ledge district: Mayflower mine.

Washington County Silver Reef district: Barbee and Walker, Thompsons mines.

Weber County Fremont Island district.

SIMPLOTITE

Hydrous calcium vanadate, $\text{CaV}_4\text{O}_9 \cdot 5\text{H}_2\text{O}$. Monoclinic. Occurs as micaceous plates, and as hemispherical aggregates. Color dark-green to black. Cleavage good. H. 1. G. 2.6. Luster vitreous.

San Juan County Paradox Valley district: Vanadium Queen mine.

SKLADOWSKITE

Hydrous basic magnesium uranium silicate, $\text{Mg}(\text{UO}_2)_2(\text{SiO}_3)_2(\text{OH})_2 \cdot 5\text{H}_2\text{O}$. Orthorhombic. Cleavage perfect. H. soft. G. 3.7. Brittle. Color pale citron yellow. Luster silky, subvitreous. Not fluorescent.

Juab County Honeycomb Hills.

Piute County Marysvale district: Freedom no. 2 mine.

Wayne County Fruita: Oyler mine.

SMALTITE

Cobalt nickel arsenide, $(\text{Co},\text{Ni})\text{As}_{3-x}$. Isometric. Occurs in crystals, skeletal growths, aggregates. Also massive, dense. Cleavage good. H. 5.5-6. G. 6.5. Brittle. Luster metallic. Color tin white and silver gray. Opaque.

San Juan County White Canyon district: Happy Jack mine.

SMITHSONITE

Zinc carbonate, ZnCO_3 . Hexagonal. Rarely well crystallized; usually reniform, stalactitic, crusts, granular, earthy. H. 4-4.5. G. 4.4. Cleavage rhombohedral. Brittle. Luster vitreous to pearly. Color grayish, greenish, bluish, yellowish, brownish.

Beaver County Granite district: Beaver View mine; Lincoln district: Lincoln mine; Star district: Cedar - Talisman, Hoosier Boy, Moscow, Red Warrior

mines; San Francisco district: Horn Silver mine.

Box Elder County Lucin district: Cune-pah Tunnel, Tecoma Hill mine; Promontory district: Lakeview Mining properties; Saline Station.

Cache County Hyrum area: Moon, Tip Top claims; Smithfield area.

Juab County Mt. Nebo district: Eva, Freddie Lode mines; Tintic district: Bullion Beck, Chief Consolidated, Colorado, Eagle and Bell, Gemini, Godiva, Lower Mammoth, May Day, New Bullion, Yankee, Uncle Sam mines.

Morgan County Argenta district: Carbonate Hill, Carbonate Gem mines.

Salt Lake County Big Cottonwood district: Alta Tunnel and Transportation Company, Carbonate, Cardiff mines; Little Cottonwood district: Dwyer, Emma, South Hecla mines.

Tooele County Dugway district: Bertha, Bryan, Four Metals, Francis, Juno, Raymond-Bald Eagle mines; Gold Hill district: Garrison Monster mine; North Tintic district: New Bullion, Scranton mines; Ophir district: Dry Canyon area-Brooklyn, Kearsarge mines; Lion Hill area-Chloride Point; Ophir Hill area-Cliff, Hidden Treasure, Sacramento mines; Rush Valley district: Honerine mine.

Uintah County Brush Creek district: Little Alta mine.

Utah County American Fork district: East Tintic district: North Lily mine; Payson district: Syndicate mine; Wells Canyon.

Washington County Tutsagubät district: Apex (Dixie) mine.

SMOKY QUARTZ (See QUARTZ)

SODALITE

Sodium aluminum silicate with chlorine, $\text{Na}_4(\text{AlSi}_3\text{O}_8)\text{Cl}$. Isometric. Crystals rare, commonly massive, in imbedded grains. Cleavage good. H. 5.5-6. G. 2.2. Luster vitreous. Color usually blue, also white, gray, green. Transparent to translucent.

San Juan County La Sal Mountains: Middle Mountain, Brumley Ridge.

SODDYITE*

Hydrous uranium silicate, $5\text{UO}_3 \cdot 2\text{SiO}_2 \cdot 6\text{H}_2\text{O}$. Orthorhombic. Occurs as distinct crystals, also massive, earthy. Cleavage perfect. H. 3.5. G. 4.7. Color dull yellow to canary yellow; amber, greenish yellow. Streak pale yellow. Luster vitreous.

Juab County Honeycomb Hills.

SODIUM ANALOGUE OF HEWETTITE
(See BARNESITE)

SOUMANSITE (See WARDITE)

SPADAITE

Hydrous magnesium silicate, perhaps $\text{MgSiO}_3 \cdot \text{H}_2\text{O}$. Amorphous. Has a massive habit. H. 2.5. Color reddish.

Tooele County Gold Hill district: Alvarado mine, Cane Springs, Rube mine.

SPANGOLITE*

Hydrous basic sulfate of copper and aluminum, $\text{Cu}_6\text{Al}(\text{SO}_4)(\text{OH})_{12}\text{Cl} \cdot 3\text{H}_2\text{O}$. Hexagonal. Occurs in very small crystals, either short prismatic or tabular. H. 2. G. 3.1. Fracture conchoidal. Cleavage good. Brittle. Luster vitreous. Color dark green, bluish green.

Juab County Tintic district.

SPECULARITE (See HEMATITE)

SPESSARITE (See GARNET)

SPHAEROBOALHITE
(See COBALTOCALCITE)

SPHALERITE

Zinc sulfide, ZnS . Isometric. Often in tetrahedrons and dodecahedrons. Also cleavable masses, coarse to fine granular, fibrous, concretionary, botryoidal. H. 3.5-4. G. 4. Cleavage perfect dodecahedral. Brittle. Luster resinous. Color yellow, brown, black, depending upon iron content. Streak brownish to light yellow.

Beaver County Bradshaw district: Cave

mine; Granite district: Beaver View mine; Lincoln district: Lincoln mine; San Francisco district: Beaver Carbonate, Cupric, Peacock Copper, Washington mines; Stardistrict: Harrington-Hickory, Hub, Moscow, Red Warrior, White Rock, Wild Bill mines.

Box Elder County Ashbrook district: Vipont mine; Lucin district: Tecoma Hill mine; Park Valley district: Century, Susannah mines.

Emery County San Rafael district: Fudemrol no. 2 mine.

Grand County Ryan Creek Scheelite prospect.

Juab County Fish Springs district: Carnation, Emma, Galena mines; Mt. Nebo district: Ajaxto no. 2, Eva, Freddie Lode, Highland, Santaquin Chief mines; Tintic district: Bullion Beck, Chief Consolidated, Colorado, Eureka Hill, Iron Blossom, Lower Mammoth, Swamsea mines; Trout Creek district; West Tintic district: Lockheed Iron, Scotia mines.

Millard County Leamington district: Wood Canyon.

Piute County Gold Mountain district: Annie Laurie mine; Mt. Baldy district: Clyde, Deer Trail mines; Ohio district: Bully Boy and Webster, Cascade mines.

Salt Lake County Big Cottonwood district: American Metals, Cardiff, Maxfield mines; Bingham district: Boston Consolidated, Brooklyn, Burning Moscow, Butterfield, Dalton and Lark, Dixon, Eagle Bird Lode, Frisco, Galena, Highland Boy, Last Chance, Nast, Neptune, Old Jordan, Queen, Tiewaukee, U.S. and Lark, Winnamuck, Yampa, Yosemite mines; Little Cottonwood district: Columbus Consolidated and Wasatch Drainage Tunnel, Dwyer, Emma, Little Emma, South Hecla, Superior mines.

San Juan County Big Indian district: Mi Vida mine; Monticello district: Blue Bird, Danish Girl, Dream, Gold Queen mines; White Canyon district: Happy Jack mine.

Sanpete County Dry Canyon.

Sevier County Salina Creek district: Ball, Lead Hill mines.

Summit County Park City district: California, Comstock, Daly, Daly Judge,

Daly West, Kearns - Keith, Ontario, Silver King, Woodside mines.

Tooele County Bingham district: May Flower mine; Blue Bell district: Bennion Canyon mine; Columbia district: Sharp, Benmore mines; Dugway district: Bertha, Bryan, Buckhorn, Eureka, Francis, Kellys Hole, Surplus mines; East Erickson district: Indianapolis, Tintic - Delaware mines; Erickson district: Black Jack, Black Rock, Blain, Deer Trail, Indian Boy, May Farmer, Utonia mines; Gold Hill district: Bonanza, Cash Boy, Climax, Copper Queen-Midland Mining Company, Gold Bond, Gold Hill (U.S.), Rube, Silver and Gold Mining Company, Success, U.S. mines; North Tintic district: New Bullion, Scranton mines; Ophir district: Dry Canyon area - Mono mine; Ophir Hill area - Cliff, Hidden Treasure, Ophir Hill Consolidated, Ophir Coalition, Sacramento mines; Rush Valley district: Ben Harrison, Calumet, Galena King, Honerine, Mescatine, Muerbrook, Tip Top mines.

Utah County American Fork district: Bay State, Bog, Dutchman, Pacific, Silver Dipper, Water Fall, Yankee mines; East Tintic district: Burgin, Apex Standard, Eureka Bullion, Eureka Lily, Eureka Standard, North Lily, Tintic Standard mines; Payson district: Syndicate mine; Silver Lake district: Ontario mine.

Wasatch County Blue Ledge district: Glencoe, Mayflower, McHenry, Valeo mines; Snake Creek district: Revelator, West Quincy mines.

SPHENE

Calcium titanosilicate, $\text{CaTiO}(\text{SiO}_4)$. Monoclinic. Crystals varied in habit, commonly wedge-shaped. Cleavage good. H. 5-5.5. G. 3.5. Luster resinous to adamantine. Color gray, green, brown, yellow, black.

Beaver County San Francisco district.

Juab County West Tintic district.

Salt Lake County Little Cottonwood stock.

San Juan County La Sal Mountains: Middle Mountain, Brumley Ridge.

Tooele County Gold Hill district: Frankie mine; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir

Coalition mines.

Utah County Little Cottonwood stock:
Silver Lake district: Deer Creek.

SPINEL

Magnesium aluminate, $MgAl_2O_4$. Isometric. Habit usually octahedral. Also massive, coarse granular to compact. H. 7.5-8. G. 3.5. Octahedral parting. Fracture conchoidal. Brittle. Luster vitreous. Color red to blue, green, brown to nearly colorless.

Beaver County Granite district: Garnet group.

Daggett County Red Creek Complex.

Summit County Park City district.

Tooele County Gold Hill district: Undine mine.

Utah County American Fork district: Lake Solitude.

Wasatch County Clayton Peak.

SPODUMENE

Lithium aluminum silicate, $LiAl(SiO_3)_2$. Monoclinic. Crystals prismatic. Cleavage perfect. Brittle. H. 6.5-7. G. 3.2. Luster vitreous, somewhat pearly. Color greenish white, grayish, yellowish white. Transparent to translucent.

Juab County Honeycomb Hills.

STAUROLITE

Basic iron aluminum silicate, $Fe_2Al_3O_7(SiO_4)_4(OH)$. Orthorhombic. Habit prismatic, cruciform twins very common. H. 7-7.5. G. 3.7. Luster resinous to vitreous. Color red-brown to brownish black. Translucent.

Daggett County Red Creek Complex.

Wayne County Caineville.

STEIGERITE

Hydrous aluminum vanadate, $Al_2(VO_4)_2 \cdot 6\frac{1}{2}H_2O$. Cryptocrystalline. Occurs as pulverulent coatings, which resemble gum-like masses, chalcedony and flat plates. Luster waxy. Color canary yellow.

Grand County Thompsons district: Cactus Rat mines.

STELLERITE

Hydrous calcium aluminum silicate, $CaAl_2Si_7O_{18} \cdot 7H_2O$. Orthorhombic. A zeolite. Crystals tabular. Cleavage perfect. H. 3.5-4. G. 2.1. Associated with volcanic rocks.

Piute County Circleville Mountain.

STEPHANITE

Silver antimony sulfide, Ag_5SbS_4 . Orthorhombic. Crystals short prismatic to tabular. Also massive, compact, or disseminated. H. 2-2.5. G. 6.2. Cleavage imperfect. Fracture uneven. Brittle. Luster metallic. Color and streak iron black. Opaque.

Juab County Tintic district: Humbug mine.

Salt Lake County Little Cottonwood district: Emma, Little Emma mines.

Tooele County Ophird district: Dry Canyon area - Mono mine.

STERRETTITE*

Basic aluminum phosphate, $Al_6(PO_4)_4(OH)_6$. Orthorhombic. H. 5. G. 2.4. Cleavage fair. Luster vitreous. Colorless, yellowish. Transparent.

Utah County Clay Canyon.

STIBICONITE

Basic antimony oxide, probably $Sb_3O(OH)$. Isometric. Habit massive, compact. Also as a powder, crust, or botryoidal. H. 4-5.5. G. 5.6. Luster pearly to earthy. Color pale yellow, yellowish white, reddish white. Transparent.

Garfield County Coyote Creek district: Hampton mine.

Tooele County Ophird district: Lion Hill area.

STIBNITE

Antimony trisulfide, Sb_2S_3 . Orthorhombic. Crystals are stout to slender prismatic, often bent and twisted. Commonly in confused aggregates of acicular crystals, in radiated groups, or granular. H. 2. G. 4.6. Cleavage good.

Flexible, not elastic. Slightly sectile. Fracture subconchoidal. Luster metallic. Color and streak lead-gray.

Box Elder County Willard district: Dry Lake mine.

Garfield County Coyote Creek district: Hampton mine.

Juab County West Tintic district: Tintic Western mine.

Salt Lake County Little Cottonwood district: Bay State mine.

Summit County Park City district: Silver King mine.

Tooele County Deep Creek Mountains; Gold Hill district: Gold Hill (U.S.) mine; Mercur district: Golden Gate, Sparrowhawk mines; Ophir district: Chloride Point.

Washington County Bull Valley district: Pilot claims; Gunlock.

STILBITE

Hydrous sodium calcium aluminum silicate, $(\text{Na}_2, \text{Ca})\text{Al}_2\text{Si}_6\text{O}_{16} \cdot 6\text{H}_2\text{O}$. Monoclinic. Crystals are usually in the form of cruciform penetration twins. Also sheaf-like aggregates, radiated, globular and columnar. H. 3.5. G. 2.1. Cleavage good. Fracture uneven. Brittle. Luster vitreous to pearly. Color white; occasionally yellow, brown, reddish.

Beaver County Pruess district: Blackbird, Cactus mines.

Salt Lake County Bingham district: Bingham Copper Pit; Little Cottonwood district.

STOLZITE

Lead tungstate, PbWO_4 . Tetragonal. Usually in dipyramidal crystals; also thick tabular. H. 2.5-3. G. 8.1. Cleavage imperfect. Fracture conchoidal to uneven. Brittle. Luster resinous. Color reddish brown, brown, yellowish, reddish, green.

Box Elder County Grouse Creek Range.

Salt Lake County Little Cottonwood district: Emma mine.

Tooele County Gold Hill district: Wilson Consolidated mine.

STRONTIANITE

Strontium carbonate, SrCO_3 . Orthorhombic. Crystals usually acicular, radiating. Also columnar, fibrous, granular. Cleavage good. H. 3.5-4. G. 3.7. Luster vitreous. Color white, gray, yellow, green. Transparent to translucent.

Sanpete County Dry Canyon.

SULFUR

Native sulfur, S. Orthorhombic. Habit dipyramidal, thick tabular. Also massive, reniform, crusts, stalactitic. H. 1.5-2.5. G. 2. Cleavage poor. Brittle. Fracture conchoidal to uneven. Luster resinous to greasy. Color yellow, greenish, reddish.

Beaver County Bradshaw district: Cave mine; Gordon district: Sulphurdale; San Francisco district: Horn Silver mine; Sulphur district: Wah Wah Valley.

Davis County Antelope Island.

Emery County Black Dragon Canyon; Cedar Mountain district; Mexican Bend; San Rafael River; San Rafael district: Calf Mesa, Dexter group.

Iron County Cima mine; Lund.

Millard County Gordon district: Cove Creek, Black, Excelsior, Mariposa, New York, Philadelphia, Prince Albert, Queen Victoria, Sulphur King, Victor Conqueror mines; South Pavant Range: Cove Fort.

San Juan County White Canyon: Happy Jack mine.

Tooele County Mercur district: Brickyard, Hillside, Sacramento, Sunshine mines; Rush Valley district: Calumet mine.

Utah County Spanish Fork Canyon: Diamond Fork; Santaquin district: Union Chief mine.

SULVANITE

Copper vanadium sulfide, Cu_3VS_4 . Isometric. Crystals cubic; usually massive. H. 3.5. G. 4. Cleavage basal perfect. Color bronze-gold. Luster metallic, tarnishing dull. Streak black. Opaque.

Tooele County Mercur district.

SWARTZITE*

Hydrous carbonate of calcium, magnesium, and uranium, $\text{CaMg}(\text{UO}_2)(\text{CO}_3)_3 \cdot 12\text{H}_2\text{O}$. Monoclinic. Occurs as clusters of tiny prismatic crystals. G. 2.3. Color green. Fluoresces bright green.

San Juan County Elk Ridge; Coral claim.

SYLVANITE

Silvergold telluride, $(\text{Ag,Au})\text{Te}_2$. Monoclinic. Short prismatic crystals. Often skeletal; also bladed and imperfectly columnar to granular. H. 1.5-2. G. 8.1. Cleavage perfect. Brittle. Fracture uneven. Luster metallic, brilliant. Color and streak steel-gray to silver-white.

Iron County State line district.

Piute County Ohio district: Bully Boy and Webster mines.

Utah County East Tintic district.

SYLVITE

Potassium chloride, KCl . Isometric. Crystals usually cubic. Also massive, coarsely granular to compact, crusts. H. 2. G. 1.9. Cleavage perfect cubic. Not as brittle as halite. Luster vitreous. Colorless or white; grayish, bluish, yellowish, reddish. Taste sharp, bitter.

Grand County Cane Creek; Crescent Junction; Paradox Basin; Salt Valley; Seven Mile Canyon.

San Juan County Moab Valley; Paradox Valley.

Tooele County Great Salt Lake Flats; Salduro; Wendover.

SZAIBELYITE

Basic borate of manganese and magnesium, $(\text{Mg,Mn})(\text{BO}_2)(\text{OH})$. Probably orthorhombic. Occurs as veinlets or masses with fibrous structure; embedded nodules, sometimes dense or chalky. H. 3-3.5. G. 2.6. Fibers not flexible. Luster silky to dull or earthy. Color white to buff or straw yellow. Beaver County Beaver Lake district: West Spring.

Salt Lake County Big Cottonwood district: Mountain Lake mine.

SZOMOLNOKITE

Hydrous ferrous sulfate, $\text{FeSO}_4 \cdot \text{H}_2\text{O}$. Monoclinic. Crystals commonly distorted. Also globular to stalactitic. H. 2.5. G. 3. Fracture conchoidal to uneven. Brittle. Luster vitreous. Color yellow, yellowish red, reddish brown; also blue or colorless.

Utah County East Tintic district: Burgin, Tintic Standard mines.

TABBYITE

An asphaltum. Occurs as minor veins and impregnations.

Duchesne County Tabby Creek.

TALC

Hydrous magnesium silicate, $\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$. Monoclinic. Crystals rare. Usually in foliated massive habit. Also compact. H. 1. G. 2.7. Cleavage perfect basal. Folia somewhat flexible. Sectile. Luster pearly to greasy. Color apple-green; gray, white; silver-white. Greasy feel.

Juab County West Tintic district.

Salt Lake County Bingham district: U.S. and Lark mines.

Tooele County Gold Hill district: Rube mine; Mercur district; Ophir district: Ophir Hill area - Cliff mine.

TENNANTITE

Copper iron arsenic sulfide, $(\text{Cu,Fe})_{12}\text{As}_4\text{S}_{13}$. Isometric. Crystals tetrahedral. Also massive, coarse or fine, granular to compact. H. 3-4.5. G. 4.6-5.1. Fracture subconchoidal to uneven. Rather brittle. Luster metallic. Color iron-black to black. Streak black to brown to cherry-red. Opaque. Box Elder County Ashbrook district: Vipont mine.

Juab County Tintic district.

Rich County Swan Creek district: Victoria prospect.

Salt Lake County Bingham district: Tiwaukee mine.

Tooele County Dugway district: Bertha claim; Gold Hill district: Gold Hill (U.S.), Success mines; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

TENORITE

Copper oxide, CuO. Monoclinic. Occurs in paper-thin twinned aggregates and laths. Also in minute scales, earthy masses. H. 3.5. G. 5.8-6.4. Cleavage good. Fracture conchoidal to uneven. Brittle. Scales flexible and elastic. Luster metallic. Color steel-gray to black.

Beaver County Lincoln district: Creole mine; San Francisco district: Horn Silver.

Box Elder County Lucin district: Copper Mountain mine.

Juab County Tintic district: Swansea mine.

Morgan County Morgan district: Morgan Crescent mine.

Salt Lake County Bingham district: Galena, Old Jordan mines.

Tooele County Dugway district: Belcher, Kellys Hole, Metal States, Surplus mines; Gold Hill district: Copper Bloom, Frankie, Gold Bond, Lucy L., Monoco, Yellow Hammer mines.

Washington County Silver Reef district.

TETRADYMIT

Bismuth tellurium sulfide, $\text{Bi}_2\text{Te}_2\text{S}$. Hexagonal. Crystals rarely distinct. Commonly foliated to granular massive, bladed. H. 1.5-2. G. 7.3. Cleavage basal perfect. Laminae flexible, not elastic. Slightly sectile. Luster metallic. Color and streak pale steel-gray; tarnishes dull or iridescent. Opaque. Utah County American Fork district; East Tintic district.

TETRAHEDRITE

Essentially copper, iron, zinc, and silver antimony sulfide, $(\text{Cu, Fe, Zn, Ag})_{12}\text{Sb}_4\text{S}_{13}$. Isometric. Habit tetrahedral, frequently in crystals. Also massive, coarse or fine granular to compact. H. 3-4.5. G. 4.9.

Fracture subconchoidal to uneven. Rather brittle. Luster metallic. Color iron-black. Streak black to brown to cherry-red. Opaque.

Beaver County Pruess district: Blackbird group, Cactus mine; Star district: Harrington - Hickory, Rebel, White Rock mines.

Box Elder County Willard district: Ogden Boilmakers, Overland claims.

Juab County Tintic district: Lower Mammoth mine.

Piute County Mt. Baldy district: Clyde mine; Ohio district: Bully Boy and Webster, Cascade, Copper Belt, Dalton, Iris, Shamrock mines.

Salt Lake County Big Cottonwood district: Cardiff, Maxfield mines; Bingham district: Dixon, Eighty Nine, Old Jordan, Silver Shield, Winnamuck mines; Little Cottonwood district: Columbus Consolidated and Watch Drainage Tunnel, Columbus - Rexal, Emma, Peruvian Consolidated, South Hecla, Superior mines.

Summit County Park City district: American Flag, Daly, Daly-Judge, Daly West, Ontario, Silver King, Silver King Consolidated, Woodside mines.

Tooele County Dugway district: Bertha claim; Erickson district: OK, Silver Reef mines; Gold Hill district: Christmas Mining Company, Copper Bloom, Evans, Pole Star Copper, Rea, Reaper, Unadine, Victory no. 1 mines; Ophir district: Dry Canyon area - Queen of the Hills mine; Ophir Hill area; Rush Valley district: Honerine mine.

Utah County American Fork district: Bog, Pacific, Silver Dipper, Water Fall, Yankee mines; East Tintic district: Apex Standard, Burgin, Eureka Bullion, Eureka Lily, Eureka Standard, North Lily, Tintic Standard mines; Silver Lake district: Milkmaid, Ontario mines.

Wasatch County Elkhorn district: Crawford, Nelson, Queen properties.

THAUMASITE

Hydrous calcium silicate, carbonate, and sulfate, $\text{CaSiO}_3 \cdot \text{CaCO}_3 \cdot \text{CaSO}_4 \cdot 15\text{H}_2\text{O}$. Hexagonal. Occurs in masses of interlaced needles. Also massive, compact. H. 3.5. G. 1.8. Cleavage

poor. Luster vitreous. Colorless to white.

Beaver County Rocky district: Old Hickory mine.

Salt Lake County Bingham district: Bingham Copper Pit.

Summit County Park City district.

THENARDITE

Sodium sulfate, Na_2SO_4 . Orthorhombic. Occurs in crystalline masses, pulverulent crusts, and efflorescences. Cleavage perfect. H. 2.5-3. G. 2.7. Slightly brittle. Fracture uneven to hackly. Luster vitreous. Colorless, grayish, yellowish, reddish. Transparent to translucent.

Box Elder County Shores of Great Salt Lake.

Davis County Shores of Great Salt Lake.

Tooele County Shores of Great Salt Lake.

THERMONATRITE*

Hydrous sodium carbonate, $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$. Orthorhombic. Cleavage difficult. H. 1-1.5. G. 2.2. Some sectile. Luster vitreous. Colorless to white, grayish, yellowish. Transparent. Taste alkaline. Authigenic mineral in the Green River Formation.

Duchesne County Green River Formation.

THINOLITE

A calcite pseudomorph. Found as tufa along shores of ancient Lake Bonneville, especially the Provo shoreline, forms cement to gravels.

Salt Lake County Lake Bonneville shorelines.

Utah County Lake Bonneville shorelines.

THOMPSONITE

A zeolite, $(\text{Ca}, \text{Na})_6\text{Al}_8(\text{Al}, \text{Si})_2\text{Si}_{10}\text{O}_{40} \cdot 12\text{H}_2\text{O}$. Orthorhombic. Distinct crystals rare. Commonly columnar, in radiated spherical

concretions, and closely compact. H. 5. G. 2.2. Cleavage good. Brittle. Luster vitreous to pearly. Color white, reddish green, brown.

Piute County Marysvale district: Silica Hills.

Salt Lake County Bingham district: Bingham Copper Pit.

Tooele County Rush Valley district: Settlement Canyon.

THUCOLITE

Radioactive mineral hydrocarbon, composition indefinite. Color jet black to brown-black. H. 2.5-4. G. 1.5-2. Luster resinous. Conchoidal fracture. Commonly brittle. Also may be friable. Opaque.

Emery County San Rafael district: Calyx mine, Temple Mountain.

THULITE (See ZOISITE)

TIEMANNITE

Mercuric selenide, HgSe . Isometric. Crystals tetrahedral. Commonly massive, granular compact. H. 2.5. G. 8.2. Fracture uneven to conchoidal. Brittle. Luster metallic. Color steel-gray to dark gray. Streak nearly black. Opaque.

Piute County Marysvale district: Quicksilver mine; Mt. Baldy district: Lucky Boy mine.

TINTICITE

Hydrous basic iron phosphate, $\text{Fe}_3(\text{PO}_4)_2(\text{OH})_3 \cdot 3\frac{1}{2}\text{H}_2\text{O}$. Probably orthorhombic. Occurs as dense and earthy to porcelaneous masses, composed of submicroscopic crystals. H. 2.5. G. 2.8. Color creamy white.

Utah County East Tintic district: Tintic Standard mine.

TITANITE (See SPHENE)

TOBERMORITE

Hydrous calcium silicate, $\text{CaSiO}_3 \cdot \text{H}_2\text{O}$. A zeolite. Occurs as compact, fine-grained aggregates. Color white, gray, pinkish.

Salt Lake County Bingham district; Bingham Copper Pit.

TOPAZ

Aluminum fluosilicate, $Al_2(SiO_4)(F,OH)_2$. Orthorhombic. Usually in prismatic crystals. Also in crystalline masses, fine to coarse granular. H. 8. G. 3.4. Cleavage basal perfect. Luster vitreous. Colorless, straw yellow, pink, bluish, greenish.

Beaver County Granite district; Miller mine; Mooney Springs.

Juab County Dugway Range; Thomas Range; Topaz Mountain.

Tooele County Dugway district; Ophir district; Ophir Hill area - Hidden Treasure mine.

TORBERNITE

Hydrous copper uranium phosphate, $Cu(UO_2)_2(PO_4)_2 \cdot 8-12H_2O$. Tetragonal. Crystals thin to thick tabular, usually square in outline. Also foliated, micaceous, and scaly aggregates. H. 2-2.5. G. 3.2. Cleavage perfect basal. Laminae rather brittle. Luster vitreous, pearly. Color emerald green. Streak paler than the color.

Beaver County Newton district; Indian Creek, Sniffer and Mystery claims.

Emery County Green River district; Venura, Yellow Queen claims; San Rafael district; Copper Globe district; Flat Top Mesa, Temple Mountain.

Garfield County Circle Cliffs: Acme, Black Widow, Blue Goose, Horse Head, Rocky Mountain, Steam Boat mines; Oak Creek prospect; Spotted Dog claim.

Kane County Bulloch claims; Virgin River.

Plute County Antelope Range; Marysville district; Bullion Monarch, Copper Butte, Freedom nos. 1-2, Prospector nos. 1 and 3 mines.

San Juan County La Sal Mountains; Monument Valley district; Skyline mine; Paradox Valley district; Grey Dawn mine; Red Canyon district; Mark-ey no. 3, Posey mines; White Canyon district; Happy Jack, Hideout, W.N. mines.

Sanpete County R.A.J. prospect.

Uintah County Snow claims.

Wayne County Capitol Reef Monument; Fruita; Oyler mine.

TOURMALINE

Complex silicate of boron and aluminum, $XY_3Al_6(BO_3)_3(Si_6O_{18})(OH)_4$. X = Na, Ca and Y = Al, Fe, Li, Mg. Hexagonal. Usually in crystals which are prismatic, vertically striated. Also massive compact, coarse to fine columnar, either radiating or parallel. H. 7-7.5. G. 3-3.2. Luster vitreous to resinous. Color varies with composition. Common iron tourmaline (schorlite) is black. Also red, pink, green, blue, yellow. Beaver County Bradshaw district; Lincoln district; Pruess district; Blackbird, Cactus mines, Cactus, Copper Gulches. Juab County Spring Creek district; Queen of Sheba mine.

Millard County House Range; Amasa Valley.

San Juan County White Canyon district; Happy Jack mine.

Tooele County Gold Hill district; Calaveras, Centennial and Enterprise, Copper Bloom, Doctor, Frankie, Gold Bond, Pole Star Copper Company, Reaper, Victory no. 1, Yellow Hammer mines; Granite Mountain district; Mercur district.

TRAVERTINE (See CALCITE)

TREMOLITE

Basic calcium magnesium silicate, $Ca_2Mg_5(Si_8O_{22})(OH)_2$. Monoclinic. Crystals prismatic. Often bladed, in radiating columnar aggregates. Also coarse to fine granular, compact. H. 5-6. G. 3-3.3. Cleavage prismatic. Luster vitreous. Color white to light green.

Beaver County Bradshaw district; Granite district; Big Pass, Bismuth mines; Lincoln district; Star district; Lady Bryan, Moscow mines; White Mountain; Grampian Hill.

Davis County Bear Canyon.

Juab County West Tintic district.

Millard County House Range; Amasa Valley, Notch Peak intrusive.

Salt Lake County Little Cottonwood district; Alta mine.

Sevier County Henry district; Trinity prospect.

Tooele County Gold Hill district; Lucy L. mine; Ophir district; Ophir Hill area-

Cliff, Ophir Hill Consolidated, Ophir Coalition mines.

TRIDYMITE

Silicon dioxide, SiO_2 . Hexagonal or pseudo-hexagonal. Crystals usually thin tabular. Also in twins or united in fan-shaped groups. H. 7. G. 2.3. Cleavage poor. Fracture conchoidal. Luster vitreous. Colorless to white. Occurs in acidic volcanic rocks.

Tooele County Fairfield quadrangle.

TROILITE (See PYRRHOTITE)

TRONA*

Hydrous sodium acid carbonate, $\text{Na}_3\text{H}(\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$. Monoclinic. Authigenic mineral from cuttings in Green River Formation. Cleavage perfect. Fracture uneven. H. 2.5-3. G. 2.1. Luster vitreous. Colorless, gray, yellowish. Taste alkaline.

Duchesne County Green River Formation.

TROOSTITE (See WILLEMITE)

TSCHEFFKINITE (See CHEVKINITE)

TSCHERMIGIT (See AMMONIA ALUM)

TUNGSTENITE

Tungsten disulfide, WS_2 . Hexagonal. Found only in massive fine scaly or feathery aggregates. H. 2.5. G. 7.4. Cleavage basal good. Sectile. Color dark lead-gray. Opaque.

Salt Lake County Little Cottonwood district: Emma, Little Emma mines.

TURQUOIS

Hydrous basic copper aluminum phosphate, $\text{CuAl}_6(\text{PO}_4)_4(\text{OH})_8 \cdot 4\text{H}_2\text{O}$. Triclinic. Rarely in minute crystals. Usually cryptocrystalline. Massive, reniform, stalactitic. H. 6. G. 2.7. Luster waxy. Color blue, bluish green, green. Transmits light on thin edges. Resembles chrysocola.

Salt Lake County Bingham district:

Bingham Copper Pit.

Tooele County East Erickson district: Copper Jack, Jessel Bezzel, Silver Shield mines.

TYROLITE

Hydrous basic arsenate of copper and calcium, probably $\text{Cu}_5\text{Ca}(\text{AsO}_4)_2(\text{CO}_3)(\text{OH})_4 \cdot 6\text{H}_2\text{O}$. Orthorhombic. Rare in lath-shaped crystals. Usually as fan-shaped and foliated aggregates, crusts, reniform, divergent masses. H. 2. G. 3-3.2. Cleavage basal perfect. Thin laminae flexible. Sectile. Luster vitreous to pearly. Color apple-green to sky-blue. Streak paler than color.

Juab County Tintic district: Ajax, Gold Chain, Mammoth mines.

Salt Lake County Little Cottonwood district: Centennial Alta mine.

Tooele County Gold Hill district: Gold Hill (U.S.) mine.

TYUYAMUNITE

Hydrous basic vanadate of uranium and calcium, $\text{Ca}(\text{UO}_2)_2(\text{VO}_4)_2 \cdot 8-10\text{H}_2\text{O}$. Orthorhombic. Occurs as scales and flattened laths; as radial aggregates. Commonly massive, compact to cryptocrystalline; also pulverulent. H. 2. G. 3.6. Cleavage basal perfect. Luster adamantine, waxy. Color canary-yellow, greenish yellow.

Daggett County Red Creek: Yellow Canary Uranium deposit.

Emery County Green River; San Rafael district: Temple Mountain, South Temple Wash.

Garfield County Henry Mountains: Crescent Creek, Starlight claims; Trachyte district: Trachyte Creek.

Grand County Pack Creek; Richardson district: Thompsons area; Thompsons district: Cactus Rat, Parco no. 23 mines; Yellow Cat district: Yellow Cat group.

Kane County Bulloch claims.

Piute County Marysvale district: La Vita prospect.

Rich County Crawford Mountains.

San Juan County Big Indian district: Mi Vida, Radon mines; East Canyon;

Lisbon Valley; Monument Valley district: Mitten no. 1, Oljeta, Skyline, Whirlwind mines.

Uintah County Browns Park: Red Creek.

UINTAITE (See GILSONITE)

UINTAHITE (See GILSONITE)

UMOHOITE

Hydrous uranium molybdate, $(\text{UO}_2)(\text{MoO}_4) \cdot 4\text{H}_2\text{O}$. Probably hexagonal. Foliated or platy masses. Somewhat resembling biotite, but lacking micaceous cleavage. H. 1-2. G. 4.6. Color black to bluish black. Luster bright submetallic. Opaque.

Piute County Marysvale district: Freedom nos. 1-2 mines.

URANINITE

Uranium dioxide, UO_2 . Isometric. Occurs in octahedral, cubic, and sometimes dodecahedral forms. Also massive (pitchblende), dense, reniform. H. 5-6. G. 10.7. Fracture uneven to conchoidal. Luster submetallic to greasy and dull. Color velvety black, brownish black, grayish, greenish.

Emery County Green River district: Crabapple, Venura, Yellow Queen claims; San Rafael district: Calf Mesa, Dexter group, Calyx, Delta, Lucky Strike no. 2, Marshbank Canyon, Maybe, Pay Day, Temple Mountain, Rex no. 2 mines.

Garfield County Circle Cliffs: Black Widow, Horse Head mines; Oak Creek prospect.

Grand County Seven Mile Canyon; Thompsons district: Juniper mine; Yellow Cat district: Eli Malich's Lucky Day, L.A. Sutherland Sock claims.

Juab County Honeycomb Hills.

Morgan County Arthur Fork.

Piute County Marysvale district: Buddy, Bullion Monarch, Freedom Lease, Freedom nos. 1-2, Prospector nos. 1 and 3 mines; Mt. Baldy district: Deer Trail mine.

San Juan County Big Indian district: Big Buck, Cal Uranium, Homestake, La Sal, Mi Vida, Radon, Rattlesnake mines;

Monument Valley: Holiday Mesa, Mitten no. 1, Skyline mines; Paradox Valley district: Grey Dawn, Vanadium Queen mines; Red Canyon district: Frey no. 4, Markey no. 3, Posey mines; White Canyon district: Happy Jack, Hideout, Notch, White Canyon no. 1 mines.

Tooele County East Erickson district: Hard-to-Beat, Sheeprock Canyons, Silver King mine.

Wayne County Fruita: Oyler mine.

Weber County Ogden Canyon.

URANITE (See AUTUNITE and TORBERNITE)

URANOCHER (See URANOPILITE)

URANOCIRCITE
(See META-URANOCIRCITE)

URANOPHANE

Hydrous basic calcium uranium silicate, $\text{Ca}(\text{UO}_2)_2(\text{SiO}_3)_2(\text{OH})_2 \cdot 5\text{H}_2\text{O}$. Monoclinic. Crystals are minute needles, with poorly developed faces. Occurs in radiating aggregates, massive, fibrous. Cleavage perfect. H. 2.5. G. 3.8. Brittle. Luster vitreous to pearly, dull to waxy. Color lemon yellow, pale straw yellow, honey brown, greenish yellow, orange yellow. Weakly fluorescent.

Beaver County Newton district: Sniffer and Mystery claims; Pine Grove district: Monarch mine.

Garfield County Circle Cliffs: Black Widow, Horse Head mines; Henry Mountains.

Juab County Honeycomb Hills; Thomas Range: Good Will, Yellow Chief mines, Topaz Mountain.

Piute County Marysvale district: Bullion Monarch, Copper Butte, East Slope no. 2, Papsy's Hope, Prospector no. 1 mines.

San Juan County Monument Valley district: Oljeta, Skyline, Whirlwind mines; Paradox Valley district: Grey Dawn mine; Red Canyon district: Posey mine; White Canyon district: Happy Jack, Hideout mines.

URANOPIILITE

Hydrous basic uranium sulfate, $(\text{UO}_2)_6(\text{SO}_4)(\text{OH})_{10} \cdot n\text{H}_2\text{O}$. Probably monoclinic. Occurs as velvety crusts, globular, or reniform masses, composed of microscopic crystals, elongated and flattened. G. 3.8. Cleavage perfect. Luster silky. Color bright yellow. Fluoresces bright yellowish green. Piute County Marysville district: Bul lion Monarch, Prospector no. 1 mines. San Juan County White Canyon district: Happy Jack mine. Wayne County Capitol Wash.

URANOSPINITE

Hydrous calcium uranium arsenate, $\text{Ca}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$. Tetragonal. Crystals thin tabular. H. 2-3. G. 3.4. Cleavage distinct. Luster pearly. Color lemon-yellow to yellow-green. Juab County Honeycomb Hills. Kane County Paria.

URANTHALITE (See LIEBIGITE)

UTAHITE (See CARPHOSIDERITE)

UTAHLITE (See VARISCITE)

UTAH ONYX (See CALCITE)

UVANITE*

Hydrous uranium vanadate, $\text{U}_2\text{V}_6\text{O}_{21} \cdot 15\text{H}_2\text{O}$. Probably orthorhombic. Occurs as minute crystalline masses and coatings. Cleavage good. Color brownish yellow. Emery County San Rafael district: Flat Top Mesa, Temple Mountain, Wild Mountain mine, Temple Rock, South Temple Wash.

UVAROVITE (See GARNET)

VALENTINITE

Antimony trioxide, Sb_2O_3 . Orthorhombic. Crystals commonly prismatic or tabular. Occurs as fan-shaped or stellate groups. Also massive, lamellar, columnar, or granular. H. 2.5-3. G.

5.7. Cleavage perfect. Brittle. Luster adamantine to pearly. Colorless, white, yellowish, reddish, gray, brownish.

Garfield County Coyote Creek district: Hampton mine.

VANADINITE

Lead chloride-vanadate, $\text{Pb}_5(\text{VO}_4)_3\text{Cl}$. Hexagonal. Crystals short to long prismatic. Also acicular to hair-like. H. 2.5-3. G. 6.8. Fracture uneven to conchoidal. Brittle. Luster resinous to adamantine. Color orange-red, brownish red, brownish, yellow.

Beaver County Star district: Harrington-Hickory, Rebel, White Rock mines. Box Elder County Rosebud district: A & W, Magnitude mines.

Utah County Santaquin district: Blue Eagle prospect.

VANADIUM HYDROMICA

(See ROSCOELITE)

VANDENDRIESSCHEITE*

Hydrous lead uranium oxide, $\text{PbO} \cdot 7\text{UO}_3 \cdot 12\text{H}_2\text{O}$ (?). Orthorhombic. Occurs as dense microcrystalline aggregates. Color yellow-orange, brownish orange, orange-red. Cleavage good.

Emery County San Rafael district: Delta mine.

VANOXITE*

Hydrous vanadium oxide, $\text{V}_4\text{V}_2\text{O}_{13} \cdot 8\text{H}_2\text{O}$ (?). Occurs in microscopic crystals, bladed. Massive, occurs as a cement in sandstone. Color black. Opaque.

Garfield County Henry Mountains; Little Rockies district: Del Monte group, Ekker mine; North Wash district: S.Y. Guthrie group; Trachyte district: Blitz nos. 1-2, June Bell nos. 1-4, Minnie Pearl nos. 1-2, Straight Creek, Trachyte nos. 1-2, V.C.A. claims.

Grand County Thompsons area; Thompsons district: Cactus Rat, Parco no. 23 mines.

San Juan County Big Indian district: Mi Vida mine.

VARISCITE

Hydrous aluminum phosphate, $\text{Al}(\text{PO}_4) \cdot 2\text{H}_2\text{O}$. Orthorhombic. Crystals rare. Occurs in fine-grained masses, nodules, veinlets, or crusts. H. 3.5-4.5. G. 2.6. Cleavage good. Fracture uneven. Luster vitreous, waxy. Color green, bluish green to colorless.

Box Elder County Lucin district: Empire mine; Promontory district: Promontory Point; Snowville; Utahlite Hill. Tooele County Mercur district: Golden Gate, Mercur, Sparrowhawk mines; Stansbury Mountains: Amatrice Hill. Utah County Clay Canyon.

VERMICULITE

This term includes a number of micaceous minerals, all hydrated silicates, in part related to chlorites. Alteration products chiefly of micas. Laminae are soft, pliable. Luster pearly, bronze-like. Color white, yellow, brown. Davis County Antelope Island.

VESUVIANITE (See IDOCRASE)

VITROITE (See BERTRANDITE)

VIVIANITE

Hydrous ferrous phosphate, $\text{Fe}_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$. Monoclinic. Usually prismatic, sometimes tabular. Reniform, globular, or incrusting masses. Also earthy. Cleavage perfect. H. 1.5-2. G. 2.7. Sectile. Flexible. Luster vitreous. Colorless, weathering pale blue or greenish blue, bluish black.

Salt Lake County Bingham district: Bingham Copper Pit.

VOGLITE*

Hydrous calcium copper uranium carbonate, probably $\text{Ca}_2\text{Cu}(\text{UO}_2)(\text{CO}_3)_4 \cdot 6\text{H}_2\text{O}$. Triclinic or monoclinic. Occurs as coatings and aggregates of tiny scales. Cleavage perfect. Luster pearly. Color emerald green, bright grass green.

San Juan County White Canyon district: White Canyon no. 1 mine.

VOLBORTHITE

Hydrous copper vanadate, probably $\text{Cu}_3(\text{VO}_4)_2 \cdot 3\text{H}_2\text{O}$. Probably monoclinic. Occurs as scaly, spongy, or fibrous crusts; also as rosette-like aggregates. H. 3.5. G. 3.5. Cleavage perfect. Luster vitreous to pearly. Color dark olive-green, yellowish green.

Daggett County Red Creek, Yellow Canary Uranium deposit.

Grand County Richardson district.

Washington County Silver Reef district: B Reef, Tecumseh Hill, Wells mines.

VOLTAITE

Hydrous potassium iron sulfate, $(\text{K}, \text{Fe})_3\text{Fe}(\text{SO}_4)_3 \cdot 4\text{H}_2\text{O}$ (?). Isometric. Crystals cubic, octahedral. H. 3. G. 2.7. No cleavage. Fracture conchoidal. Luster resinous. Color greenish black to black. Opaque.

Emery County San Rafael district: Calf Mesa, Dexter group.

WAD

Manganese ore composed of a mixture of hydrous manganese oxides. Occurs in earthy or compact masses; also reniform, concretionary, or incrusting. H. 1-6. G. 2.8-4.4. Luster dull. Color black, bluish, brownish black. Streak black, bluish black, reddish brown. Emery County Cedar Mountain district. Garfield County Hutch Pasture.

Juab County Tintic district: Black Jack Empire, White Cloud mines; West Tintic district: War Eagle claim.

Millard County Detroit district: Almond, Black, Diamond, Blue Bell, Guy, Last Chance, Martha, Major Drum, Silica Plug mines.

Sevier County Sevier Plateau: Black Beauty claims.

Tooele County Columbia district: Benmore, Sharp mines; Erickson district: Huber - Rydalch, Queen Mary mines; Ophir district: Lion Hill area - Buffalo, East Side, Empire, Iron, Monarch, Northern Light, Woodruff mines; Ophir Hill

area - Hidden Treasure, Ophir Hill Consolidated, Ophir Coalition, Sacramento mines; Rush Valley district: Honerine mines.

Utah County American Fork district: Miller mine; East Tintic district: Tintic Standard mine; Lehi district: Wildcat mine; North Tintic district: Oxen mine, Tip Top Tunnel; Utah district: Alpha, Emerald, Lucky Boy, Queen of the West, Spalding, Trotter mines.

WARDITE

Hydrous basic sodium calcium aluminum phosphate,

$\text{Na}_4\text{CaAl}_2(\text{PO}_4)_8(\text{OH})_{18}\cdot 6\text{H}_2\text{O}$. Tetragonal. Crystals are pyramidal. Also granular aggregates and crusts, radially fibrous, concentrically banded spherulites. H. 5. G. 2.8. Cleavage perfect. Luster vitreous. Color blue-green to pale green, colorless.

Utah County Clay Canyon.

WAVELLITE

Hydrous basic aluminum phosphate, $\text{Al}_3(\text{OH})_3(\text{PO}_4)_2\cdot 5\text{H}_2\text{O}$. Orthorhombic. Crystals rare. Usually occurs as hemispherical or globular aggregates with radial structure. Also as crusts or stactitic. H. 3.5-4. G. 2.3. Cleavage perfect. Fracture uneven. Brittle. Luster vitreous. Color greenish white, green, yellow, brownish, blue, white, colorless.

Salt Lake County Bingham district: Bingham Copper Pit.

WEEKSITE

Hydrous potassium uranium silicate, $\text{K}_2(\text{UO}_2)_2(\text{Si}_2\text{O}_5)_3\cdot 4\text{H}_2\text{O}$. Orthorhombic. Occurs chiefly as radiating fibrous clusters. H. 1-2. G. 4.1. Luster waxy. Color yellow.

Juab County Thomas Range: Autunite no. 8, Good Will, Yellow Chief mines, Topaz Mountain.

WERNERITE (See SCAPOLITE)

WHEELERITE

A yellowish resin, resembling amber. Garfield County Cannonville.

WHEWELLITE

Hydrous calcium oxalate, $\text{CaC}_2\text{O}_4\cdot \text{H}_2\text{O}$. Monoclinic. Occurs only as crystals, equant, or prismatic. Cleavage good. H. 2.5. G. 2.2. Fracture conchoidal. Brittle. Colorless, sometimes yellowish, brownish. Transparent. Probably of organic origin.

San Juan County Big Indian district: Radon mine.

WILLEMITE

Zinc silicate, ZnSiO_4 . Hexagonal. Occurs in hexagonal prisms. Usually massive to granular. H. 5.5. G. 4.1. Cleavage good. Luster vitreous, resinous. Color yellow-green, flesh-red, brown.

Beaver County Star district: Cedar-Talisman, Hoosier Boy mines.

WIRE SILVER (See SILVER)

WOLFRAMITE (See also FERBERITE and HUEBERNITE)

Manganese iron tungstate, $(\text{Mn}, \text{Fe})\text{WO}_4$. Monoclinic. Habit commonly short prismatic crystals, less frequently long prismatic, or tabular. Also lamellar or massive granular. H. 4-4.5. G. 7.3. Cleavage good. Fracture uneven. Brittle. Luster submetallic. Color dark gray, brownish black, iron black.

Beaver County Newton district: North Creek.

Tooele County East Erickson district: Ekker Canyon prospect; Gold Hill district: Kena, Pole Star Copper Company mines; Ophir district: Ophir Hill area-Ophir Hill Consolidated, Ophir Coalition mines.

WOLLASTONITE

Calcium silicate, CaSiO_3 . Triclinic. Usually occurs in tabular crystals. Commonly massive, cleavable to fib-

rous, also compact. H. 5-5.5. G. 2.8. Cleavage perfect. Luster vitreous to pearly. Colorless, white, gray. Translucent.

Beaver County Bradshaw district; Granite district: Big Pass group; Lincoln district; Pruess district: Blackbird, Cactus mines; San Francisco district: Cupric, Imperial mines.

Utah County West Tintic district.

Millard County House Range: Amasa Valley, Notch Peak intrusive.

Salt Lake County Big Cottonwood district; Maxfield mine; Little Cottonwood district: South Hecla mine.

Tooele County Gold Hill district: Alvarado, Bonnemort, Cane Springs, Frankie, Gold Hill (U.S.), Silver King mines; Ophir district: Ophir Hill area - Hidden Treasure, Sacramento mines; Rush Valley district: Honerine mine, Soldier Creek.

Utah County Silver Lake district: Deer Creek.

WULFENITE

Lead molybdate, $PbMoO_4$. Tetragonal. Occurs as square tabular crystals. Also massive, coarse to fine granular. H. 2.5-3. G. 6.8. Cleavage distinct. Fracture subconchoidal to uneven. Not very brittle. Luster resinous to adamantine. Color orange-yellow, yellowish gray, olive-green, brown, reddish brown.

Beaver County Rocky district: Adelia mine; San Francisco district: Horn Silver mine; Star district: Harrington-Hickory, Rebel, White Rock mines.

Box Elder County Lucin district: Empire, Tecoma Hill mines; Rosebud district: A and W, Magnitude mines.

Plute County Mt. Baldy district: Pluto mine; Ohio district: Bully Boy and Webster mines.

Rich County Swan Creek district: Victoria prospect.

Salt Lake County Big Cottonwood district: Woodlawn mine; Little Cottonwood district: Alta Consolidated, Centennial Alta, City Rocks, Emma, Flagstaff, Little Emma, Michigan - Utah mines.

Tooele County Dugway district: Bos-

ton, Buckhorn, Four Metals mines; Gold Hill district: Cash Boy, Cyclone, Gold Hill (U.S.), Red Jacket, Standard, Shay mines.

Utah County American Fork district: Miller mine.

WURTZILITE

Asphaltic pyrobitumen. Color black. Luster vitreous. Sectile. Elastic. Slightly soluble in carbon disulfide. Deep red in thin plates. Occurs as veins in Green River and Uinta Formations.

Duchesne County Antelope Canyon; Avintaguin Canyon; Indian Canyon; Rat Hole Canyon; Red Creek.

WURTZITE

Zinc sulfide, ZnS . Hexagonal. Occurs in short prismatic to tabular crystals. Often fibrous, columnar, and as concentric banded crusts. H. 3.5-4. G. 3.9. Cleavage good. Luster resinous. Color brownish black. Streak brown. Beaver County San Francisco district: Horn Silver mine.

Plute County Mt. Baldy district: Clyde mine.

Tooele County Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Uintah County Sun Oil Company South Ouray well.

Utah County East Tintic district: North Lily mine.

XANTOPHYLLITE

Brittle mica, perhaps, $H_8(Mg, Ca)_4 Al_{16} Si_5 O_{52}$. Monoclinic. Perfect basal cleavage. H. 4-5. G. 3.1. Brittle. Structure foliated, micaceous. Color leek-green.

Salt Lake County Big Cottonwood district: Mountain Lake mine.

XENOTIME

Essentially yttrium phosphate, $Y(PO_4)$. Tetragonal. Short to prismatic crystals, often resembling zircon. Occurs as rudely radial aggregates, rosettes. H.

4-5. G. 4.4-5.1. Cleavage good. Brittle. Luster vitreous. Color commonly yellowish brown to reddish brown, yellowish, greenish. Translucent to opaque.

Morgan County Arthur Fork.

ZEUNERITE

Hydrous copper uranium arsenate, $\text{Cu}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$. Tetragonal. Crystals are usually rectangular tablets. Color pale-green to emerald green. G. 3.7.

Emery County San Rafael district: Calf Mesa, Dexter group.

Utah County Tintic district: Centennial Eureka mine.

Piute County Marysvale district: Freedom no. 2 mine.

ZINKENITE

Lead antimony sulfide, probably $\text{Pb}_6\text{Sb}_{14}\text{S}_{27}$. Hexagonal. Crystals seldom distinct. Occurs in columnar and radial fibrous groups, massive. H. 3-3.5. G. 5.3. Cleavage indistinct. Fracture uneven. Luster metallic. Color and streak steel-gray. Sometimes tarnished iridescent.

Summit County Park City district: Daly West mine.

ZIPPEITE

Hydrous basic uranium sulfate, $(\text{UO}_2)_2(\text{SO}_4)(\text{OH})_2 \cdot 4\text{H}_2\text{O}$. Probably orthorhombic. Occurs as fragile crusts and reniform spheroidal aggregates. Also pulverulent to earthy. H. 2. G. 3.2. Cleavage perfect. Luster dull to earthy. Color orange yellow, orange red, reddish brown. Fluoresces lemon yellow to green.

Emery County Green River district: Sodaroll claim; San Rafael district: Calf Mesa, Dexter group, Green Vein Mesa, Consolidated mine, Lucky Strike no. 2 mine, Temple Mountain.

Garfield County Henry Mountains.

Grand County Seven Mile Canyon; Thompsons district: Parco no. 23 mine.

Piute County Marysvale district: Bullion Monarch, Freedom no. 2, Prospector

no. 1 mines.

San Juan County Red Canyon district: Posey mine; White Canyon district: Happy Jack, Hideout mines.

Wayne County Fruita: Oylar mine; Grand Wash to Capitol Wash.

ZIRCON

Zirconium silicate, ZrSiO_4 . Tetragonal. Crystals commonly in square prisms, sometimes pyramidal. Also irregular forms, and grains. H. 7.5. G. 4.7. Cleavage poor. Fracture conchoidal. Brittle. Luster adamantine. Colorless, pale yellowish, grayish, yellowish green, brownish, reddish brown. Cyrtolite variety found east of Willard, contains uranium, thorium, and the rare earths.

Beaver County San Francisco district: Horn Silver mine.

Box Elder County Willard.

Emery County Emery.

Garfield County Henry Mountains.

Kane County Kaiparowits Plateau.

Piute County Mt. Baldy district: Deer Trail mine.

Salt Lake County Little Cottonwood stock.

Tooele County Gold Hill district:

Reaper mine; Granite Mountain district; Mercur district: Mercur mine; Ophir district: Ophir Hill area - Ophir Hill Consolidated, Ophir Coalition mines.

Utah County Little Cottonwood stock; Silver Lake district: Milkmaid mine,

Silver Creek.

Wayne County Caineville.

ZOISITE

Hydrous calcium aluminum silicate, $\text{Ca}_2\text{Al}_3(\text{SiO}_4)_3(\text{OH})$. Orthorhombic. Crystals prismatic, vertically striated. Also massive, columnar to compact. H. 6-6.5. G. 3.3. Cleavage good. Fracture uneven to subconchoidal. Brittle. Luster vitreous to pearly. Color grayish white, gray, apple-green, rose red. Thulite, a rose-red variety, is found in the Granite district.

Beaver County Granite district: Miller mine.

Davis County Antelope Island.

Juab County Tintic district.

Salt Lake County Little Cottonwood district.

Tooele County Gold Hill district: Alvarado, Bonnemort, Cane Springs, Rube mines; Rush Valley district: Calumet mine.

Utah County East Tintic district.

ZUNYITE*

Essentially basic aluminum silicate, $(Al(OH,F,Cl)_2)_6Al_2(SiO_4)_3$. Occurs in minute transparent tetrahedrons. H. 7. G. 2.9. Colorless to brown. Common zoned.

Juab County Tintic district: Mintintic property.

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APPENDIX

Minerals Of Utah

The list below contains 627 names which appeared in Chapter III. Of these, 134 are duplicate mineral names, rock terms, or hydrocarbon names, and were not programmed in the computer analyses reported in the remaining five lists. If a mineral has two names, the one that has priority or more common usage was used in the computer analysis, and the second rank name is indicated as follows: Adularia (See Orthoclase).

Abernathyite	Anorthite	Bertrandite
Acmite	Anorthoclase	Beryl
Actinolite	Anthophyllite	Beta-Uranophane (See Beta-Uranotile)
Adamite	Antigorite	Beta-Uranotile
Adularia (See Orthoclase)	Antlerite	Beudantite
Aegerite (See Wurtzilite)	Apatite	Bickerite (See Austinite)
Aegirine (See Aegirite)	Apjohnite	Bieberite
Aegirite	Apophyllite	Bindheimite
Aeonite (See Wurtzilite)	Aquamarine (See Beryl)	Binnite (See Tennantite)
Agate (See Cryp. Quartz)	Aragonite	Bitite
Aguilarite	Ardunite	Birnessite
Aikinite	Argentite	Bischofite
Alabaster (See Gypsum)	Argentojarosite	Bismite
Alaskaite	Argulite (hydrocarbon)	Bismoclite
Albertite (hydrocarbon)	Argyrodite	Bismuth
Albite	Arsenic	Bismuthinite
Alisonite (See Galena)	Arseniosiderite	Bismutite
Allanite	Arsenobismite	Bixbite (See Beryl)
Allophane	Arsenopyrite	Bixbyite
Almandine (See Spinel)	Asbestos (See Serpentine)	Bloedite
Almandite (See Garnet)	Asphalt (See Asphaltum)	Bog Ore (See Goethite)
Altaite	Asphaltum (hydrocarbon)	Boltwoodite
Aluminite	Atacamite	Boothite
Alunite	Augite	Borickite
Alunogen	Aurichalcite	Bornite
Amatrice (See Variscite)	Austinite	Boulangerite
Amethyst (See Quartz)	Autunite	Bournonite
Ammonia Alum	Axinite	Braunite
Ammoniojarosite	Azurite	Brickerite (See Austinite)
Amphibole	Balydonite	Brochantite
Analcime (See Analcite)	Barite	Bronzite (See Enstatite)
Analcite	Barnesite	Brookite
Anatase	Barytocalcite	Brucite
Andalusite	Bassanite	Burbankite
Andersonite	Bassetite	Bushmanite (See Pickeringite)
Andesine	Bayleyite	Butlerite
Andradite (See Garnet)	Beaverite	Calamine (See Hemimorphite)
Anglesite	Becquerelite	Calaverite
Anhydrite	Biedellite	Calciovolborthite
Ankerite	Bentonite (See Montmorillonite)	Calcite
Annabergite		Caledonite
		Carbonate Apatite
		Carbon Dioxide (gas)
		Carminite
		Carnallite
		Carmelian (See Cryp. Quartz)
		Carnotite
		Carphosiderite
		Cassiterite
		Celadonite
		Celestite

Cerargyrite	Cuprite	Fervanite
Cerussite	Cuproadamite (See Adamite)	Fibroferrite
Cervantite	Cuprodescloizite (See Descloizite)	Fluellite
Chabazite	Cuproplumbite (See Balydonite)	Fluorapatite
Chalcanthite	Cuproscheelite (See Cuprotungstite)	Fluorite
Chalcedony (See Cryp. Quartz)	Cuprosklodowskite	Forsterite
Chalcocite	Cuprotungstite	Foshagite
Chalcophanite	Cyanotrichite	Formarierite
Chalcophyllite	Cyrtolite (See Zircon)	Francolite (See Fluorapatite)
Chalcopyrite	Dahllite (See Carbonate Apatite)	Freibergite
Chalcotrichite (See Cuprite)	Damourite	Galena
Chenevixite	Danburite	Garnet
Chert (See Cryp. Quartz)	Daubreeite	Garrelsita
Chevkinite	Davisonite	Gearksutite
Chlorite	Dehnmite	Gel-Bertrandite (See Bertrandite)
Chloropal (See Nontronite)	Delessite	Geocronite
Chlor-Utahlite (See Variscite)	Deltaite	Gersdorffite
Chrome Mica-Clay	Dennisonite (See Davisonite)	Gibbsite
Chromite	Descloizite	Gilsonite (hydrocarbon)
Chrysocolla	Diadochite	Glauberite
Chrysolite (See Olivine)	Diaspore	Glaucconite
Cinnabar	Dichroite (See Cordierite)	Goethite
Clausthalite	Dickite	Gold
Clinochlore	Digenite	Goldichite
Clinoclase	Diopside	Gordonite
Clinoclasite (See Clinoclase)	Dolomite	Goslarite
Clinohumite	Doloresite	Grantsite
Clinozoisite	Dufrenoyisite	Graphite
Cobalt Bloom (See Erythrite)	Dumortierite	Greenockite
Cobaltite	Dyscarsite	Grossularite (See Garnet)
Cobaltocalcite	Eardleyite	Guano (rock)
Cobaltomenite	Eitelite	Gummite
Coffinite	Elaterite (See Wurtzilite)	Gypsite (rock)
Collophane	Elpidite	Gypsum
Conchalcite	Embolite	Gyrolite
Connellite	Enargite	Halite
Copalite (hydrocarbon)	Endellite	Halloysite
Copiapite	Englshite	Halotrichite
Copper	Enstatite	Hedenbergite
Copper Pitch (See Tenorite)	Epidesmine	Helium (gas)
Coquimbite	Epidote	Helvite
Cordierite	Epsomite	Hematite
Corkite	Erinite	Hemimorphite
Cornwallite	Erubescite (See Bornite)	Hercynite
Corundum	Erythrite	Hessite
Corvusite	Essonite (See Garnet)	Hetaerolite
Cosalite	Famatinite	Heulandite
Cotunnite	Ferberite	Hewettite
Covellite	Fernandinite	Higginsite (See Conchalcite)
Crandallite	Ferrimolybdite	Hornblende
Cristobalite	Ferrisymplesite	Huebnerite
Crocidolite (See Riebeckite)	Ferroludwigite (See Ludwigite)	Humite
Cryolite	Ferropallidite (See Szomolnokite)	Hummerite
Cryptocrystalline Quartz		Huntite
Cryptomelane		Hyalite (See Opal)
Cubanite		Hydromagnesite
		Hydromica

Hydrozincite
 Hypersthene
 Iceland Spar (See Calcite)
 Iddingsite
 Idocrase
 Illite (See Hydromica)
 Ilmenite
 Ilsemannite
 Indium
 Ingramite (hydrocarbon)
 Iolite (See Cordierite)
 Jamesonite
 Jarosite
 Jasper (See Cryp. Quartz)
 Jasperoid (See Cryp. Quartz)
 Jefferisite
 Jet (hydrocarbon)
 Johannite
 Jordisite
 Kainite
 Kaolinite
 Kasolite
 Kermesite
 Kieserite
 Kornelite
 Kyanite
 Labradorite
 Lanarkite
 Laumontite
 Leadhillite
 Lehiite
 Lepidocrocite
 Lettsomite (See Cyanotrichite)
 Leuchtenbergite
 Leucosphenite
 Leucoxene (See Anatase)
 Leverrierite
 Lewistonite
 Liebigite
 Limonite
 Linarite
 Lithiophorite
 Lodestone (See Magnetite)
 Lorandite
 Loughlinite
 Lucinite (See Variscite)
 Luckite (See Melanterite)
 Ludwigite
 Luzonite
 Magnesioferrite
 Magnesioludwigite (See Ludwigite)
 Magnesoriebeckite
 Magnesite
 Magnetite
 Malachite
 Mallardite
 Manganite
 Manganocalcite
 Manganodolomite (See Dolomite)
 Marcasite
 Martite (See Hematite)
 Massicot
 Meerschaum (See Sepiolite)
 Melaconite (See Tenorite)
 Melanovanadite
 Melanterite
 Mercury
 Mesolite
 Meta-Autunite
 Metacinnabar
 Metahewettite
 Metarossite
 Metastibnite
 Metastrongite
 Metatorbernite
 Metatuyamunite
 Meta-Uranocircite
 Metavariscite
 Metazeunerite
 Miargyrite
 Microcline
 Millisite
 Mimetite
 Minium
 Mirabilite
 Mixite
 Molybdenite
 Molybdite (See Ferrimolybdite)
 Monazite
 Monheimite (See Smithsonite)
 Montgomeryite
 Monticellite
 Montmorillonite
 Montroseite
 Mordenite
 Morganite (See Beryl)
 Muscovite
 Nahcolite
 Natroalunite
 Natrojarosite
 Natrolite
 Natron
 Navajoite
 Neighborite
 Nepheline
 Nigrite (hydrocarbon)
 Niter
 Nontronite
 Northupite
 Noselite
 Obsidian (rock)
 Octahedrite (See Anatase)
 Okenite
 Oligoclase
 Olivenite
 Olivine
 Onofrite
 Onyx (See Calcite)
 Opal
 Orpiment
 Orthite (See Allanite)
 Orthoclase
 Overite
 Ozocerite (hydrocarbon)
 Paligorskite
 Palladium
 Parabutlerite
 Paramontroseite
 Pargasite
 Pascoite
 Pearceite
 Pennine (See Penninite)
 Penninite
 Periclase
 Petrified Wood (See Cryp. Quartz)
 Petzite
 Pharmacosiderite
 Phillipsite
 Phlogopite
 Phosgenite
 Phosphorite
 Phosphuranylite
 Pickeringite
 Pintadoite
 Pisanite
 Pitchblende (See Uraninite)
 Pitticite
 Plagioclase
 Plancheite
 Platinum
 Pleonaste (See Hercynite)
 Plumbojarosite
 Polybasite
 Polyhalite
 Potash Alum
 Potash Clay (See Hydromica)
 Powellite
 Prase (See Cryp. Quartz)
 Prehnite
 Prochlorite
 Prosopite
 Proustite
 Pseudobrookite
 Pseudowavellite (See Crandallite)
 Psilomelane
 Ptilolite
 Pyrargyrite

Pyrite	Smithsonite	Tschemigite (See
Pyrolusite	Smoky Quartz (See Quartz)	Ammonia Alum)
Pyromorphite	Sodalite	Tungstenite
Pyrope (See Garnet)	Soddyite	Turquoise
Pyrophyllite	Sodium Analogue of Hewettite	Tyrolite
Pyroxene	(See Barnesite)	Tyuyamunite
Pyrrhotite	Soumansite (See Wardite)	Uintaite (See Gilsonite)
Quartz	Spadaite	Uintahite (See Gilsonite)
Rabbittite	Spangolite	Umohoite
Racewinite	Specularite (See Hematite)	Uraninite
Rauvite	Spessarite (See Garnet)	Uranite (See Autunite
Realgar	Sphaerocobaltite (See	and Torbernite)
Red Ocher (See Hematite)	Cobaltocalcite)	Uranocher (See Uranopilite)
Reedmergnerite	Sphalerite	Uranocircite (See
Rhodochrosite	Sphene	Meta-Uranocircite)
Rhodonite	Spinel	Uranophane
Riebeckite	Spodumene	Uranopilite
Rockbridgeite	Staurolite	Uranospinite
Roemerite	Steigerite	Uranothallite (See
Rosasite	Stellerite	Liebigite)
Roscoelite	Stephanite	Utahite (See
Rose Quartz (See Quartz)	Sterrettite	Carphosiderite)
Rossite	Stibiconite	Utahlite (See Variscite)
Ruby Silver (See Prou-	Stibnite	Utah Onyx (rock)
stite and Pyrargyrite)	Stilbite	Uvanite
Rutherfordine	Stolzite	Uvarovite (See Garnet)
Rutile	Strontianite	Valentinite
Sabugalite	Sulfur	Vanadinite
Sagenite (See Rutile)	Sulvanite	Vanadium Hydromica (See
Samarskite	Swartzite	Roscoelite)
Sanidine (See	Sylvanite	Vandendriesscheite
Orthoclase)	Sylvite	Vanoxite
Saponite	Szaibelyite	Variscite
Sapphire (See Corundum)	Szomolnokite	Vermiculite
Satin Spar (See Gypsum)	Tabbyite (hydrocarbon)	Vesuvianite (See Idocrase)
Scandium	Talc	Vitroite (See Bertrandite)
Scapolite	Tennantite	Vivianite
Scheelite	Tenorite	Voglite
Schoepite	Tetradymite	Volborthite
Schroekingite	Tetrahedrite	Voltaite
Scorodite	Thaumasite	Wad
Searlesite	Thenardite	Wardite
Selenite (See Gypsum)	Thermonatrite	Wavellite
Selenium	Thinolite	Weeksite
Seligmannite	Thompsonite	Wernerite (See Scapolite)
Senarmontite	Thucolite (hydrocarbon)	Wheelerite (hydrocarbon)
Sepiolite	Thulite (See Zoisite)	Whewellite
Sericite (See Muscovite)	Tiemannite	Willemite
Serpentine	Tinticite	Wire Silver (See Silver)
Sherwoodite	Titanite (See Sphene)	Wolframite
Shortite	Tobermorite	Wollastonite
Sicklerite	Topaz	Wulfenite
Siderite	Torbernite	Wurtzilite (hydrocarbon)
Sideronatrite	Tourmaline	Wurtzite
Siderotil	Travertine (rock)	Xantophyllite
Silicified Bone and Wood	Tremolite	Xenotime
(See Cryp. Quartz)	Tridymite	Zeunerite
Silver	Troilite (See Pyrrhotite)	Zinkenite
Simplotite	Trona	Zippeite
Sklodowskite	Troostite (See Willemite)	Zircon
Smaltite	Tscheffkinite (See Chevkinite)	Zoisite
		Zunyite

Utah Minerals Listed by County

The mineral compilation of the State emphasizes the numerous varieties of minerals found in mines and mining districts. Listings of rock-forming minerals are only given where they may be of local significance; but it should be recalled that most of the common rock-forming minerals would be formed in each county. Counties which have many mines have extensive mineral listings, whereas those with little or no metallic production have limited minerals reported. Tooele County, for instance, with 188 minerals recognized, has the largest mineral listing; whereas Carbon County has only 2. The total number of minerals described in each county is indicated by the number given within parentheses following the county name.

BEAVER COUNTY (118)

Actinolite
Albite
Alunite
Andalusite
Anglesite
Anhydrite
Apatite
Aragonite
Argentite
Argentojarosite
Augite
Aurichalcite
Autunite
Azurite
Barite
Beaverite
Beryl
Bindheimite
Biotite
Bismuthinite
Bismutite
Bornite
Brochantite
Brucite
Calcite
Cerargyrite
Cerussite
Chalcanthite
Chalcocite
Chalcopyrite
Chlorite
Chrysocolla
Clinohumite
Clinozoisite
Copper
Corkite
Cosalite
Covellite
Crypto. Quartz
Cuprite
Diaspore
Diopside

Dufrenoyite
Epidote
Epsomite
Fluorite
Galena
Garnet
Goethite
Gold
Goslarite
Greenockite
Gypsum
Hedenbergite
Helvite
Hematite
Hemimorphite
Hornblende
Huebnerite
Huntite
Hypersthene
Idocrase
Ilmenite
Jamesonite
Jarosite
Kaolinite
Limonite
Linarite
Ludwigite
Magnesite
Magnetite
Malachite
Manganite
Marcasite
Molybdenite
Muscovite
Olivine
Opal
Orthoclase
Planchete
Plumbojarosite
Powellite
Proustite
Pyrargyrite
Pyrite

Pyrolusite
Quartz
Rhodochrosite
Rutile
Saponite
Scheelite
Scorodite
Serpentine
Sphalerite
Silver
Smithsonite
Sphalerite
Spheue
Spinel
Stilbite
Sulfur
Szaibelyite
Tenorite
Tetrahedrite
Thaumasite
Topaz
Torbernite
Tourmaline
Tremolite
Uranophane
Vanadinite
Willemite
Wolframite
Wollastonite
Wulfenite
Wurtzite
Zircon
Zoisite

BOX ELDER COUNTY (67)

Alunite
Anglesite
Aragonite
Argentite
Argyrodite
Arsenopyrite
Azurite
Barite
Bindheimite
Bismuthinite
Bismutite
Bloedite
Bornite
Calcite
Cerargyrite
Cerussite
Chalcocite
Chalcopyrite
Chlorite
Chrysocolla
Copper
Covellite
Cuprite
Diaspore
Epidote

Galena
 Garnet
 Glauberite
 Goethite
 Gold
 Gypsum
 Halite
 Halloysite
 Hematite
 Hemimorphite
 Kaolinite
 Kyanite
 Limonite
 Magnetite
 Malachite
 Metavariscite
 Mirabilite
 Monazite
 Muscovite
 Orpiment
 Pearceite
 Plumbojarosite
 Proustite
 Pyrrargyrite
 Pyrite
 Quartz
 Realgar
 Rhodochrosite
 Scheelite
 Silver
 Smithsonite
 Sphalerite
 Stibnite
 Stolzite
 Tennantite
 Tenorite
 Tetrahedrite
 Thenardite
 Vanadinite
 Variscite
 Wulfenite
 Zircon

CACHE COUNTY (13)

Anglesite
 Azurite
 Cerussite
 Cuprite
 Galena
 Gold
 Hematite
 Kaolinite
 Malachite
 Pyrolusite
 Siderite
 Silver
 Smithsonite

CARBON COUNTY (2)

Calcite
 Carnotite

DAGGETT COUNTY (26)

Anthophyllite
 Azurite
 Beryl
 Bornite
 Brochantite
 Carbonate Apatite
 Carnotite
 Chalcocite
 Chalcopyrite
 Collophane
 Fluorapatite
 Glauconite
 Gold
 Hematite
 Hornblende
 Kyanite
 Limonite
 Malachite
 Muscovite
 Opal
 Phosphorite
 Pyrolusite
 Spinel
 Staurolite
 Tyuyamunite
 Volborthite

DAVIS COUNTY (33)

Anglesite
 Aragonite
 Azurite
 Biotite
 Bloedite
 Bornite
 Chalcocite
 Chalcopyrite
 Chlorite
 Chrysocolla
 Cuprite
 Epidote
 Galena
 Garnet
 Glauberite
 Gold
 Halite
 Hematite
 Hornblende
 Limonite
 Magnetite
 Malachite
 Microcline
 Mirabilite

Oligoclase
 Pyrite
 Quartz
 Scheelite
 Sulfur
 Thenardite
 Tremolite
 Vermiculite
 Zoisite

DUCHESNE COUNTY (26)

Acmite
 Analcite
 Anhydrite
 Bassanite
 Burbankite
 Carbonate Apatite
 Collophane
 Eitelite
 Fluorapatite
 Gypsum
 Hematite
 Leucospheinite
 Loughlinite
 Magnesioriebeckite
 Malachite
 Nahcolite
 Northupite
 Phosphorite
 Pyrite
 Reedmergnerite
 Riebeckite
 Searlesite
 Sepiolite
 Shortite
 Thermonatrite
 Trona

EMERY COUNTY (89)

Abernathyite
 Alunogen
 Anglesite
 Anhydrite
 Ankerite
 Arsenic
 Autunite
 Azurite
 Bassetite
 Bayleyite
 Becquerelite
 Bieberite
 Boltwoodite
 Bornite
 Brochantite
 Brookite
 Butlerite
 Carnotite
 Cassiterite

Celestite
 Cerussite
 Chalcanthite
 Chalcopyrite
 Chrome Mica-Clay
 Cobaltocalcite
 Coffinite
 Copiapite
 Coquimbite
 Corvusite
 Cryolite
 Crypto. Quartz
 Diadochite
 Dolomite
 Dumortierite
 Epsomite
 Fernandinite
 Fibroferrite
 Fourmarierite
 Galena
 Gold
 Goldichite
 Gummite
 Gypsum
 Halotrichite
 Hewettite
 Hummerite
 Hydromica
 Ilmenite
 Jarosite
 Kaolinite
 Malachite
 Manganite
 Melanterite
 Metaheawettite
 Metatorbernite
 Metazeunerite
 Monazite
 Montroseite
 Orpiment
 Parabutlerite
 Paramontroseite
 Phosphuranylite
 Pitticite
 Psilomelane
 Pyrite
 Pyrolusite
 Quartz
 Rabbittite
 Rauvite
 Realgar
 Roemerite
 Roscoelite
 Rutherfordine
 Schoepite
 Schroeckingerite
 Scorodite
 Silver
 Sphalerite
 Sulfur

Torbernite
 Tyuyamunite
 Uraninite
 Uvanite
 Vandendriesscheite
 Voltaite
 Wad
 Zeunerite
 Zippeite
 Zircon

GARFIELD COUNTY (44)

Alunogen
 Anhydrite
 Arsenopyrite
 Autunite
 Azurite
 Beta-Uranotile
 Bornite
 Calcite
 Carnotite
 Chalcopyrite
 Chrysocolla
 Crypto. Quartz
 Epidote
 Epsomite
 Gold
 Gypsum
 Hematite
 Ilmenite
 Johannite
 Laumontite
 Magnetite
 Malachite
 Metaheawettite
 Monazite
 Montmorillonite
 Orpiment
 Pascoite
 Platinum
 Ptilolite
 Pyrite
 Pyrolusite
 Realgar
 Senarmontite
 Stibiconite
 Stibnite
 Torbernite
 Tyuyamunite
 Uraninite
 Uranophane
 Valentinite
 Vanoxite
 Wad
 Zippeite
 Zircon

GRAND COUNTY (80)

Actinolite
 Aegerite
 Aluminate
 Andersonite
 Anhydrite
 Augite
 Autunite
 Azurite
 Barite
 Barnesite
 Becquerelite
 Biotite
 Boltwoodite
 Bornite
 Calciovolborthite
 Calcite
 Carnallite
 Camotite
 Celestite
 Chalcocite
 Chalcopyrite
 Chevkinite
 Chromite
 Chrysocolla
 Coffinite
 Corvusite
 Crypto. Quartz
 Descloizite
 Fervanite
 Fluorite
 Galena
 Goethite
 Gold
 Grantsite
 Gypsum
 Halite
 Hedenbergite
 Hematite
 Hewettite
 Ilsemannite
 Kieserite
 Liebigite
 Limonite
 Lithiophorite
 Malachite
 Manganite
 Melanovanadite
 Meta-Autunite
 Metaheawettite
 Metarossite
 Metatyuyamunite
 Montmorillonite
 Montroseite
 Oligoclase
 Opal
 Paramontroseite
 Pascoite
 Phosphuranylite
 Polyhalite

Psilomelane
 Pyrite
 Pyrolusite
 Quartz
 Rauvite
 Rhodochrosite
 Roscoelite
 Rossite
 Saponite
 Scheelite
 Schroeckingerite
 Selenium
 Sherwoodite
 Sphalerite
 Steigerite
 Sylvite
 Tyuyamunite
 Uraninite
 Vanoxite
 Volborthite
 Zippeite

IRON COUNTY (47)

Actinolite
 Albite
 Analcite
 Andesine
 Anhydrite
 Annabergite
 Apatite
 Argentite
 Augite
 Autunite
 Azurite
 Barite
 Biotite
 Carnotite
 Cerargyrite
 Chlorite
 Cinnabar
 Crypto. Quartz
 Damourite
 Descloizite
 Diopside
 Ferrimolybdite
 Fluorite
 Galena
 Gamet
 Goethite
 Gold
 Gypsum
 Hematite
 Limonite
 Magnetite
 Malachite
 Mercury
 Metastrengite
 Mimetite
 Niter

Opal
 Orthoclase
 Pyrite
 Pyrolusite
 Pyromorphite
 Quartz
 Rhodochrosite
 Rockbridgeite
 Siderite
 Sulfur
 Sylvanite

TUAB COUNTY (144)

Actinolite
 Adamite
 Albite
 Andalusite
 Anglesite
 Anhydrite
 Ankerite
 Aragonite
 Arduinite
 Argentite
 Arseniosiderite
 Arsenobismite
 Arsenopyrite
 Atacamite
 Aurichalcite
 Autunite
 Azurite
 Barite
 Bertrandite
 Beryl
 Beta-Uranotile
 Bindheimite
 Biotite
 Bismite
 Bismoclite
 Bismuth
 Bismuthinite
 Bismutite
 Bixbyite
 Borickite
 Braunite
 Brochantite
 Calcite
 Carnotite
 Carphosiderite
 Cerargyrite
 Cerussite
 Chalcocite
 Chalcophyllite
 Chalcopyrite
 Chenevixite
 Chlorite
 Chrysocolla
 Clinoclase
 Clinozoisite
 Conichalcite

Connellite
 Copper
 Cornwallite
 Cotunnite
 Covellite
 Crandallite
 Crypto. Quartz
 Cuprite
 Cyanotrichite
 Daubreeite
 Dolomite
 Enargite
 Enstatite
 Epidote
 Erinite
 Famatinite
 Fluorite
 Galena
 Gamet
 Geocronite
 Gold
 Gypsum
 Halite
 Halloysite
 Hematite
 Hemimorphite
 Heulandite
 Huntite
 Hydrozincite
 Idocrase
 Jamesonite
 Jarosite
 Labradorite
 Leadhillite
 Limonite
 Linarite
 Magnesite
 Magnetite
 Malachite
 Manganite
 Marcasite
 Melanterite
 Meta-Uranocircite
 Metazeunerite
 Mimetite
 Minium
 Mixite
 Molybdenite
 Montmorillonite
 Muscovite
 Olivenite
 Opal
 Orthoclase
 Pearceite
 Pharmacosiderite
 Phosgenite
 Pitticite
 Plumbojarosite
 Proustite
 Pseudobrookite

Psilomelane
 Pyrargyrite
 Pyrite
 Pyrolusite
 Pyromorphite
 Pyrrhotite
 Quartz
 Rhodochrosite
 Scheelite
 Schroekingite
 Scorodite
 Sicklerite
 Silver
 Sklodowskite
 Smithsonite
 Sodydyite
 Spangolite
 Sphalerite
 Sphene
 Spodumene
 Stephanite
 Stibnite
 Talc
 Tennantite
 Tenorite
 Tetrahedrite
 Topaz
 Tourmaline
 Tremolite
 Tyrolite
 Uraninite
 Uranophane
 Uranospinite
 Wad
 Weeksite
 Wollastonite
 Zeunerite
 Zunyite

KANE COUNTY (24)

Allophane
 Aluminite
 Ammonia Alum
 Ammoniojarosite
 Anhydrite
 Autunite
 Azurite
 Barite
 Calcite
 Carnotite
 Crypto. Quartz
 Cuprite
 Gold
 Gypsum
 Ilmenite
 Limonite
 Magnetite
 Malachite
 Monazite

Pyrolusite
 Torbernite
 Tyuyamunite
 Uranospinite
 Zircon

MILLARD COUNTY (46)

Albite
 Andesine
 Anglesite
 Anhydrite
 Anorthite
 Apatite
 Aragonite
 Augite
 Azurite
 Biotite
 Bismutite
 Cerussite
 Chalcopyrite
 Corundum
 Crypto. Quartz
 Cuprite
 Diopside
 Dolomite
 Fluorite
 Galena
 Garnet
 Gold
 Gypsum
 Hematite
 Idocrase
 Labradorite
 Limonite
 Magnetite
 Malachite
 Manganite
 Marcasite
 Microcline
 Molybdenite
 Niter
 Oligoclase
 Orthoclase
 Pyrite
 Pyrolusite
 Rhodochrosite
 Scheelite
 Sphalerite
 Sulfur
 Tourmaline
 Tremolite
 Wad
 Wollastonite

MORGAN COUNTY (24)

Anglesite
 Azurite
 Barite

Biotite
 Cerussite
 Chalcopyrite
 Chrysocolla
 Copper
 Cuprite
 Galena
 Gold
 Hematite
 Jarosite
 Limonite
 Malachite
 Marcasite
 Molybdenite
 Monazite
 Pyrite
 Silver
 Smithsonite
 Tenorite
 Uraninite
 Xenotime

PIUTE COUNTY (91)

Albite
 Allophane
 Aluminite
 Alunite
 Anatase
 Anglesite
 Anhydrite
 Argentite
 Autunite
 Azurite
 Barite
 Beta-Uranotile
 Biotite
 Calcite
 Celadonite
 Cerargyrite
 Cerussite
 Chabazite
 Chalcopyrite
 Chlorite
 Cinnabar
 Clinocllore
 Cobaltomenite
 Cristobalite
 Dickite
 Fluellite
 Fluorite
 Galena
 Garnet
 Gearksutite
 Goethite
 Gold
 Gypsum
 Halite
 Halloysite
 Hematite

Hydrozincite
 Ilsemannite
 Jarosite
 Johannite
 Jordisite
 Kaolinite
 Kasolite
 Leuchtenbergite
 Limonite
 Lithiophorite
 Malachite
 Manganocalcite
 Meta-Autunite
 Metacinnabar
 Metatorbernite
 Molybdenite
 Montmorillonite
 Mordenite
 Muscovite
 Natroalunite
 Natrolite
 Nontronite
 Onofrite
 Opal
 Orthoclase
 Phosphuranylite
 Pinninite
 Plumbojarosite
 Potash Alum
 Ptilolite
 Pyrite
 Pyrolusite
 Quartz
 Rauvite
 Rhodochrosite
 Sabugalite
 Schroeckingerite
 Sklodowskite
 Sphalerite
 Stellerite
 Sylvanite
 Tetrahedrite
 Thomsonite
 Tiemannite
 Torbernite
 Tyuyamunite
 Umohoite
 Uranninite
 Uranophane
 Uranopilite
 Wulfenite
 Wurtzite
 Zeunerite
 Zippelite
 Zircon

Calcite
 Cerussite
 Crypto. Quartz
 Galena
 Phosphorite
 Pyrolusite
 Rhodochrosite
 Tennantite
 Tyuyamunite
 Wulfenite

SALT LAKE COUNTY (140)

Actinolite
 Aikinite
 Alaskaitite
 Allanite
 Allophane
 Anglesite
 Anorthite
 Apatite
 Apjohnite
 Apophyllite
 Aragonite
 Argentite
 Arsenopyrite
 Aurichalcite
 Azurite
 Barite
 Beaverite
 Biotite
 Bismite
 Bismuth
 Bismuthinite
 Bismutite
 Bleedite
 Bornite
 Bournonite
 Brucite
 Calaverite
 Calcite
 Calcedonite
 Cerargyrite
 Cerussite
 Cervantite
 Chabazite
 Chalcantinite
 Chalcocite
 Chalcopyrite
 Chlorite
 Chrysocolla
 Copper
 Covellite
 Cubanite
 Cuprite
 Digenite
 Diopside
 Dufrenoyite
 Dyscarsite
 Enargite

Epidote
 Ferrimolybdenite
 Forsterite
 Foshagite
 Galena
 Garnet
 Glauberite
 Gold
 Goslarite
 Gypsum
 Gyrolite
 Halite
 Hematite
 Hemimorphite
 Heulandite
 Hornblende
 Hydromagnesite
 Hydromica
 Hypersthene
 Idocrase
 Kaolinite
 Leverrierite
 Limonite
 Linarite
 Ludwigite
 Magnetite
 Malachite
 Mallardite
 Marcasite
 Massicot
 Melanterite
 Mercury
 Mesolite
 Microcline
 Mirabilite
 Molybdenite
 Montmorillonite
 Muscovite
 Nontronite
 Okenite
 Opal
 Orpiment
 Orthoclase
 Palladium
 Periclase
 Phosphorite
 Pickeringite
 Pisanite
 Platinum
 Plumbojarosite
 Prehnite
 Pyrargyrite
 Pyrite
 Pyrolusite
 Pyrrhotite
 Quartz
 Racewinite
 Realgar
 Rhodochrosite
 Rutile

RICH COUNTY (12)

Azurite
 Barite

Scheelite
Seligmannite
Serpentine
Siderite
Siderotil
Silver
Smithsonite
Sphalerite
Sphene
Stibnite
Stilbite
Stolzite
Szaibelyite
Talc
Tennantite
Tenorite
Tetrahedrite
Thammasite
Thenardite
Thinolite
Thomsonite
Tobermorite
Tremolite
Tungstenite
Turquoise
Tyrolite
Vivianite
Wavellite
Wollastonite
Wulfenite
Xantophyllite
Zircon
Zoisite

SAN JUAN COUNTY (105)

Aegirite
Allophane
Alunite
Andersonite
Anhydrite
Antlerlite
Apatite
Augite
Autunite
Azurite
Barite
Bayleyite
Bequerelite
Beta-Uranotile
Bieberite
Boltwoodite
Boothite
Bornite
Brochantite
Calciovolborthite
Calcite
Carnallite
Carnotite
Chalcanthite

Chalcocite
Chalcopyrite
Chromite
Chrysocolla
Clausthalite
Coffinite
Copper
Corvusite
Covellite
Cuprite
Cuprosklodowskite
Doloresite
Erythrite
Fluorite
Galena
Garnet
Gersdorffite
Goethite
Gold
Greenockite
Gummite
Gypsum
Halite
Hematite
Hewettite
Hydromica
Ilsemannite
Jarosite
Johannite
Jordisite
Kieserite
Liebigite
Limonite
Magnetite
Malachite
Manganite
Marcasite
Melanovanadite
Metarossite
Metatorbernite
Metatyuyamunite
Metazeunerite
Microcline
Molybdenite
Montroseite
Navajoite
Noselite
Orthoclase
Paramontroseite
Pascoite
Phosphuranylite
Pintadoite
Polyhalite
Psilomelane
Pyrite
Quartz
Roscoelite
Rutherfordine
Sabugalite
Schoepite

Schroeckingerite
Selenium
Sepiolite
Simplotite
Smaltite
Sodalite
Sphalerite
Sphene
Sulfur
Swartzite
Sylvite
Torbernite
Tourmaline
Tyuyamunite
Uraninite
Uranophane
Uranopilite
Vanoxite
Voglite
Whewellite
Zippeite

SANPETE COUNTY (14)

Anhydrite
Autunite
Beidellite
Epsomite
Galena
Gypsum
Halite
Limonite
Marcasite
Pyrite
Pyrolusite
Sphalerite
Strontianite
Torbernite

SEVIER COUNTY (45)

Albite
Alunite
Anhydrite
Antigorite
Apatite
Azurite
Calcite
Celestite
Cerussite
Chalcanthite
Chalcocite
Chalcopyrite
Corundum
Crypto. Quartz
Diopside
Epidote
Galena
Garnet
Gypsum

Halite
Hematite
Hercynite
Hydromica
Jarosite
Kaolinite
Limonite
Magnetite
Malachite
Microcline
Montmorillonite
Muscovite
Opal
Orthoclase
Pinnite
Phlogopite
Prochlorite
Pyrite
Pyrolusite
Quartz
Rutile
Scapolite
Serpentine
Sphalerite
Tremolite
Wad

SUMMIT COUNTY (61)

Anglesite
Argentite
Azurite
Balydonite
Barite
Bornite
Boulangerite
Bournonite
Brochantite
Calaverite
Calcite
Cerargyrite
Cerussite
Chabazite
Chalcanthite
Chalcocite
Chalcopyrite
Chlorite
Chrysocolla
Covellite
Cuprite
Dolomite
Epidote
Fluorite
Galena
Garnet
Gold
Goslarite
Gypsum
Halloysite
Hematite

Hemimorphite
Jamesonite
Limonite
Linarite
Magnesioferrite
Magnetite
Malachite
Manganite
Massicot
Metastibnite
Mimetite
Montmorillonite
Olivenite
Phosphorite
Psilomelane
Pyrargyrite
Pyrite
Pyrolusite
Pyromorphite
Quartz
Rhodochrosite
Rhodonite
Serpentine
Silver
Sphalerite
Spinel
Stibnite
Tetrahedrite
Thaumasite
Zinkenite

TOOELE COUNTY (188)

Actinolite
Adamite
Aikinite
Albite
Allanite
Analcite
Anatase
Andalusite
Anglesite
Anhydrite
Anorthoclase
Apatite
Apophyllite
Aragonite
Argentite
Argentojarosite
Arseniosiderite
Arsenopyrite
Augite
Aurichalcite
Austinite
Axinite
Azurite
Barite
Beaverite
Beidellite
Bertrandite

Beryl
Beudandite
Biotite
Bischofite
Bismite
Bismuth
Bismuthinite
Bismutite
Bloedite
Bornite
Boulangerite
Brochantite
Calaverite
Calcite
Carminite
Carnallite
Carphosiderite
Cerargyrite
Cerussite
Chalcanthite
Chalcocite
Chalcopyrite
Chenevixite
Chlorite
Chrysocolla
Cinnabar
Clinoclase
Clinozoisite
Cobaltite
Conichalcite
Copper
Cornwallite
Covellite
Crypto. Quartz
Cuprite
Cuprotungstite
Danburite
Descloisite
Diopside
Dolomite
Enstatite
Epidesmine
Epidote
Ferberite
Ferrimolybdate
Ferrisymplectite
Fluorite
Galena
Garnet
Glauberite
Gold
Graphite
Gypsum
Halite
Halloysite
Hedenbergite
Hematite
Hemimorphite
Hessite
Hornblende

Huebnerite
Humite
Hydromica
Hydrozincite
Hypersthene
Iddingsite
Idocrase
Ilmenite
Jamesonite
Jarosite
Jefferisite
Kainite
Kaolinite
Kieserite
Labradorite
Limonite
Lorandite
Magnetite
Malachite
Manganite
Melanterite
Metacinnabar
Microcline
Mimetite
Molybdenite
Monazite
Muscovite
Natrojarosite
Natrolite
Natron
Nepheline
Nontronite
Oligoclase
Olivenite
Olivine
Opal
Orpiment
Orthoclase
Paligorskite
Pharmacosiderite
Phillipsite
Phlogopite
Plumbojarosite
Polyhalite
Powellite
Prosopite
Proustite
Psilomelane
Pyrargyrite
Pyrite
Pyrolusite
Pyromorphite
Pyrrhotite
Quartz
Realgar
Rhodochrosite
Rhodonite
Rosasite
Rutile
Samarskite

Scapolite
Scheelite
Scorodite
Sepiolite
Serpentine
Siderite
Siderotil
Silver
Smithsonite
Spadaite
Sphalerite
Spene
Spinel
Stephanite
Stibiconite
Stibnite
Stolzite
Sulfur
Sulvanite
Sylvite
Talc
Tennantite
Tenorite
Tetrahedrite
Thenardite
Thomsonite
Topaz
Tourmaline
Tremolite
Tridymite
Turquoise
Tyrolite
Uraninite
Variscite
Wad
Wolframite
Wollastonite
Wulfenite
Wurtzite
Zircon
Zoisite

UINTAH COUNTY (40)

Analcite
Apophyllite
Autunite
Azurite
Barytocalcite
Bornite
Burbankite
Calcite
Carbonate Apatite
Carnotite
Cerargyrite
Cerussite
Chalcocite
Chromite
Collophane
Dolomite

Elpidite
Fluorapatite
Galena
Garrelsita
Glaucconite
Gold
Gypsum
Halotrichite
Hematite
Ilsemanite
Leucosphenite
Malachite
Molybdenite
Monazite
Nahcolite
Neighborite
Phosphorite
Pyrite
Searlesite
Shortite
Smithsonite
Torbernite
Tyuyamunite
Wurtzite

UTAH COUNTY (135)

Actinolite
Albite
Allanite
Allophane
Altaite
Alunite
Anatase
Anglesite
Antlerite
Apatite
Aragonite
Argentite
Argentojarosite
Azurite
Barite
Beidellite
Biotite
Bismuthinite
Bornite
Brochantite
Brucite
Calcite
Cerargyrite
Cerussite
Chalcocite
Chalcophanite
Chalcopyrite
Clinocllore
Cordierite
Crandallite
Crypto. Quartz
Cryptomelane
Cubanite

Cuprite
 Davisonite
 Dehnrnite
 Delessite
 Deltaite
 Dickite
 Dolomite
 Eardleyite
 Enargite
 Endellite
 Englishite
 Epidote
 Fluorite
 Freibergite
 Galena
 Garnet
 Gearsutite
 Gibbsite
 Gold
 Gordonite
 Graphite
 Greenockite
 Gypsum
 Halloysite
 Halotrichite
 Hematite
 Hessite
 Hetaerolite
 Hornblende
 Hydromica
 Jamesonite
 Jarosite
 Kaolinite
 Kermesite
 Kornelite
 Lanarkite
 Lehiite
 Leuchtenbergite
 Leverrierite
 Lewistonite
 Limonite
 Luzonite
 Magnetite
 Malachite
 Marcasite
 Massicot
 Melanterite
 Miargyrite
 Microcline
 Millisite
 Mimetite
 Minium
 Molybdenite
 Montgomeryite
 Monticellite
 Montmorillonite
 Muscovite
 Nontronite
 Olivine
 Orthoclase

Overite
 Pargasite
 Pearceite
 Periclase
 Petzite
 Phosphorite
 Plumbojarosite
 Polybasite
 Potash Alum
 Prehnite
 Psilomelane
 Pyrite
 Pyrolusite
 Pyrophyllite
 Quartz
 Rhodochrosite
 Rutile
 Scheelite
 Siderite
 Siderotil
 Silver
 Smithsonian
 Sphalerite
 Spheue
 Spinel
 Sterrettite
 Sulfur
 Sylvanite
 Szomolnokite
 Tetradyomite
 Tetrahedrite
 Thinolite
 Tinticite
 Vanadinite
 Variscite
 Wad
 Wardite
 Wollastonite
 Wulfenite
 Wurtzite
 Zircon
 Zoisite

WASATCH COUNTY (33)

Alunite
 Barite
 Bornite
 Calcite
 Carbonate Apatite
 Cerussite
 Chabazite
 Chalcopyrite
 Dickite
 Fluorapatite
 Galena
 Garnet
 Gold
 Halloysite
 Hematite

Idocrase
 Kaolinite
 Magnesioferrite
 Magnetite
 Montmorillonite
 Muscovite
 Pinninite
 Phlogopite
 Phosphorite
 Pyrite
 Pyrolusite
 Pyromorphite
 Rhodochrosite
 Siderite
 Silver
 Sphalerite
 Spinel
 Tetrahedrite

WASHINGTON COUNTY (47)

Adamite
 Aguilarite
 Alunite
 Argentite
 Aurichalcite
 Autunite
 Azurite
 Birnessite
 Bornite
 Calcite
 Carnotite
 Celestite
 Cerargyrite
 Cerussite
 Chalcocite
 Chalcopyrite
 Chrysocolla
 Copper
 Crypto. Quartz
 Cuprite
 Embolite
 Gold
 Gypsum
 Halite
 Halloysite
 Hematite
 Hydrozincite
 Jarosite
 Kaolinite
 Limonite
 Magnetite
 Malachite
 Montmorillonite
 Muscovite
 Orpiment
 Plumbojarosite
 Pyrite
 Pyrolusite
 Quartz

Realgar
Rosasite
Scheelite
Silver
Smithsonite
Stibnite
Tenorite
Volborthite

WAYNE COUNTY (33)

Alunite
Anatase
Anhydrite
Azurite
Brochantite
Carnotite
Chalcanthite
Chalcocopyrite
Crypto. Quartz
Galena
Gypsum
Jarosite
Johannite
Lepidocrocite

Limonite
Malachite
Metarossite
Metatorbernite
Metazeunerite
Monazite
Pyrite
Pyrolusite
Rutile
Schoepite
Schroeckingerite
Sideronatriite
Sklodowskite
Staurolite
Torbernite
Uraninite
Uranopilite
Zippeite
Zircon

WEBER COUNTY (26)

Anglesite
Azurite

Barite
Biotite
Bornite
Calcite
Cerussite
Chalcocopyrite
Epidote
Fluorite
Galena
Garnet
Gold
Hematite
Homblende
Limonite
Magnetite
Malachite
Molybdenite
Phosphorite
Psilomelane
Pyrite
Pyrolusite
Quartz
Silver
Uraninite

Utah Minerals Listed by Crystal Systems

The minerals of the State fall into 8 categories; the 6 crystal systems, amorphous minerals, and minerals with an undetermined status. An alphabetical listing of the crystal systems follows with the minerals that fall into each system. The total number of minerals found in each system is indicated by the number in parentheses. It is apparent that the six crystal systems vary greatly in the number of minerals which represent them.

AMORPHOUS (12)

Allophane
Borickite
Chrysocolla
Collophane
Glauconite
Jordisite
Limonite
Metastibnite
Opal
Rauvite
Sepiolite
Spadaite

HEXAGONAL (71)

Alunite
Ammoniojarosite
Andersonite
Ankerite
Apatite
Argentojarosite
Arsenic
Arseniosiderite
Beaverite
Beryl
Beudantite
Bismuth
Brucite
Burbankite
Calcite
Carbonate Apatite
Carphosiderite
Chabazite
Chalcophanite
Chalcophyllite
Cinnabar
Cobaltocalcite
Connellite
Coquimbite
Corkite
Corundum

Covellite
Crandallite
Davisonite
Dehrnite
Deltaite
Dolomite
Eitelite
Fluorapatite
Graphite
Greenockite
Gyrolite
Hematite
Ilemnite
Jarosite
Lewistonite
Magnesite
Manganocalcite
Mimetite
Mixite
Molybdenite
Natroalunite
Natrojarosite
Nepheline
Pinnite
Plumbojarosite
Proustite
Pyrrarygyrite
Pyromorphite
Pyrrhotite
Quartz
Rhodochrosite
Selenium
Siderite
Smithsonite
Spangolite
Tetradymite
Thaumasite
Tourmaline
Tridymite
Tungstenite
Umohoite
Vanadinite
Willemite

Wurtzite
Zinkenite

ISOMETRIC (52)

Aguilarite
Altaite
Ammonia Alum
Analcite
Argentite
Argyrodite
Bindheimite
Bixbyite
Bornite
Cerargyrite
Chromite
Clausthalite
Cobaltite
Copper
Cristobalite
Cuprite
Digenite
Embolite
Fluorite
Galena
Garnet
Gersdorffite
Gold
Halite
Helvite
Hercynite
Magnesioferrite
Magnetite
Metacinnabar
Northupite
Noselite
Onofrite
Palladium
Periclase
Petzite
Pharmacosiderite
Platinum
Potash Alum
Pyrite
Silver
Smaltite
Sodalite
Sphalerite
Spinel
Stibiconite

Sülvanite
Sylvite
Tennantite
Tetrahedrite
Tiemannite
Uraninite
Voltaite

MONOCLINIC (139)

Acmite
Actinolite
Aegirite
Allanite
Aluminite
Alunogen
Annabergite
Antigorite
Apjohnite
Arsenopyrite
Augite
Azurite
Balydonite
Barnesite
Barytocalcite
Bassetite
Bayleyite
Beta-Uranotile
Bieberite
Biotite
Bischofite
Bismite
Bloedite
Boothite
Boulangerite
Brochantite
Butlerite
Calaverite
Camotite
Chevkinite
Chlorite
Chrome Mica-Clay
Clinochlore
Clinoclase
Clinohumite
Clinozoisite
Cobaltomenite
Cryolite
Damourite
Delessite
Dickite
Diopside
Doloresite
Dufrenoyite
Englishite
Epidote
Erythrite
Ferberite
Fervanite
Garrels site

Gearsutite
Gibbsite
Glauberite
Goldichite
Grantsite
Gypsum
Halotrichite
Hedenbergite
Hessite
Heulandite
Hewettite
Hornblende
Huebnerite
Hydromagnesite
Hydrozincite
Jamesonite
Kainite
Kaolinite
Kasolite
Kermesite
Kieserite
Kornelite
Lanarkite
Laumontite
Leadhillite
Leuchtenbergite
Leucosphenite
Leverrierite
Linarite
Lorandite
Malachite
Mallardite
Manganite
Melanterite
Mesolite
Metahewettite
Metastrongite
Metavariscite
Miargyrite
Mirabilite
Monazite
Montgomeryite
Montmorillonite
Mordenite
Muscovite
Nahcolite
Natrolite
Natron
Navajoite
Nontronite
Orpiment
Orthoclase
Pargasite
Pearceite
Pinninite
Phillipsite
Phlogopite
Pickeringite
Pisanite
Polybasite

Prochlorite
Prosopite
Rabbitite
Realgar
Riebeckite
Rosasite
Roscoelite
Saponite
Seariesite
Serpentine
Simplotite
Sphene
Spodumene
Stillbite
Swartzite
Sylvanite
Szomolnokite
Talc
Tenorite
Tremolite
Trona
Kranophane
Uranopillite
Vivianite
Voglite
Voborhthite
Whewellite
Wolframite
Xantophyllite

ORTHORHOMBIC (118)

Adamite
Aikinite
Aluminite
Andalusite
Anglesite
Anhydrite
Anthophyllite
Antlerite
Aragonite
Ardunite
Atacamite
Aurichalcite
Austinite
Barite
Bequerelite
Beidellite
Bertrandite
Bismuthinite
Boltwoodite
Bourmonite
Brookite
Calciovolborthite
Calcedonite
Carminite
Carnallite
Camotite
Celesite
Cerussite

Cervantite
Chalcocite
Conichalcite
Cordierite
Cosalite
Cotunnite
Cubanite
Cuproskłodowskite
Cyanotrichite
Danburite
Descloizite
Diaspore
Dumortierite
Dyscarsite
Enargite
Enstatite
Epidesmine
Epsomite
Erinite
Ferrimolybdate
Fibroferrite
Fluellite
Forsterite
Foshagite
Fourmarierite
Geocronite
Goethite
Goslarite
Hemimorphite
Humite
Huntite
Hypersthene
Iddingsite
Lepidocrocite
Liebigite
Ludwigite
Marcasite
Massicot
Metatyuyamunite
Monticellite
Montroseite
Neighborite
Niter
Olivenite
Olivine
Overite
Parabutlerite
Phosphuranylite
Plancheite
Prehnite
Pseudobrookite
Psilomelane
Ptilolite
Pyrophyllite
Rockbridgeite
Rutherfordine
Samarskite
Saponite
Schoepite
Schroekingite

Scorodite
Seligmannite
Shortite
Sicklerite
Sideronatrite
Skłodowskite
Soddyite
Staurolite
Stellerite
Stephanite
Sterrettite
Stibnite
Strontianite
Sulfur
Szaibelyite
Thenardite
Thermonatrite
Thomsonite
Tinticite
Topaz
Tyrolite
Tyuyamunite
Uvanite
Valentinite
Vandendriesscheite
Variscite
Wavellite
Weeks site
Zippeite
Zoisite

TETRAGONAL (36)

Abernathyite
Anatase
Apophyllite
Argyrodite
Arseniosiderite
Autunite
Bismoclite
Bismutite
Braunite
Cassiterite
Chalcopyrite
Daubreeite
Freibergite
Hetaerolite
Idocrase
Meta-Autunite
Metatorbernite
Meta-Uranocircite
Metazeunerite
Millisite
Phosgenite
Powellite
Pyrolusite
Rutile
Sabugalite
Scapolite
Scheelite
Sherwoodite

Stolzite
Torbernite
Uranospinite
Wardite
Wulfenite
Xenotime
Zeunerite
Zircon

TRICLINIC (28)

Albite
Alunogen
Andesine
Anorthite
Anorthoclase
Axinite
Chalcanthite
Copiaite
Diadochite
Gordonite
Hummerite
Johannite
Kyanite
Labradorite
Melanovanadite
Microcline
Okenite
Oligoclase
Pascoite
Polyhalite
Reedmergerite
Rhodonite
Roemerite
Rossite
Senarmontite
Turquoise
Voglite
Wollastonite

UNDETERMINED (45)

Alaskaite
Arsenobismite
Bassanite
Birnessite
Celadonite
Chenevixite
Coffinite
Cornwallite
Corvusite
Crypto, Quartz
Cryptomelane
Cuprotungstite
Eardleyite
Elpidite
Endellite
Famatinite
Fernandinite
Ferrisymplesite
Gummite

Halloysite	Paramontroseite
Hydromica	Phosphorite
Ilsemannite	Pintadoite
Jefferisite	Pitticite
Lehiite	Racewinite
Lithiophorite	Siderotil
Loughlinite	Steigerite
Luzonite	Thinolite
Magnesioriebeckite	Tobermorite
Mercury	Vanoxite
Metarossite	Vermiculite
Minium	Wad
Paligorskite	Zunyite

Utah Minerals Listed by Chemical Class

The minerals of the State have been assigned to 21 chemical classes. Less than 40 percent of Utah's minerals fall into a single chemical class, such as a simple sulfide or oxide. Many fall into 2 chemical classes, such as azurite, which is listed as a carbonate, and also as a hydroxyl-hydrous mineral. Several lie in 3 chemical classes and a few in 4 classes. One of the surprising results in this tabulation is the abundance of hydroxyl-hydrous minerals. A total of 277 minerals, or 55 percent of the minerals of Utah, contain water. An alphabetical listing of the chemical classes follows with the minerals that fall into each class. The total minerals found in each class is indicated by the number in parentheses.

ANTIMONATES-ANTIMONITES (2) BORATES (4)

Bindheimite	Axinite
Dyscarsite	Dumortierite
	Ludwigite
	Szaibelyite

ARSENATES-ARSENITES (28)

Abernathyite	<u>CARBONATES (47)</u>
Adamite	Andersonite
Annabergite	Ankerite
Arseniosiderite	Aragonite
Arsenobismite	Aurichalcite
Austinite	Azurite
Balydonite	Barytocalcite
Beudantite	Bayleyite
Carminite	Bismutite
Chalcophyllite	Burbankite
Chenevixite	Calcite
Clinoclase	Calcedonite
Conichalcite	Carbonate Apatite
Cornwallite	Cerussite
Erinite	Cobaltocalcite
Erythrite	Collophane
Ferrisymplesite	Dolomite
Metazeunerite	Eardleyite
Mimetite	Eitelite
Mixite	Huntite
Olivenite	Hydromagnesite
Pharmacosiderite	Hydrozincite
Pitticite	Leadhillite
Scorodite	Liebigite
Smaltite	Magnesite
Tyrolite	Malachite
Uranospinite	Manganocalcite
Zeunerite	

Nahcolite
Natron

Rabbittite
Rhodochrosite
Rosasite
Rutherfordine
Scapolite
Schroëckingerite
Shortite
Siderite
Smithsonite
Strontianite
Swartzite
Thaumasite
Thermonatrite
Thinolite
Trona
Tyrolite
Voglite

HALIDES (26)

Atacamite
Bischofite
Bismoclite
Carmallite
Cernargyrite
Connellite
Cotunnite
Cryolite
Daubreeite
Embolite
Fluellite
Fluorite
Gearksutite
Halite
Kainite
Mimetite
Neighborite
Northupite
Phosgenite
Prosopite
Pyromorphite
Scapolite
Sodalite
Spangolite
Sylvite
Vanadinite

HYDROXYL-HYDROUS (277)

Abernathyite	Chabazite	Gypsum
Actinolite	Chalcophanite	Gyrolite
Adamite	Chalcophyllite	Halloysite
Allanite	Chenevixite	Halotrichite
Allophane	Chlorite	Hemimorphite
Aluminite	Chrome Mica-Clay	Heulandite
Alunite	Chrysocolla	Hewettite
Alunogen	Clinocllore	Hornblende
Ammonia Alum	Clinoclase	Humite
Ammoniojarosite	Clinohumite	Hydromagnesite
Analcite	Clinozoisite	Hydromica
Andersonite	Coffinite	Hydrozincite
Annabergite	Collophane	Iddingsite
Anthophyllite	Conichalcite	Idocrase
Antigorite	Connellite	Ilsemannite
Antlerite	Copiapite	Jarosite
Apjohnite	Coquimbite	Jefferisite
Apophyllite	Corkite	Johannite
Ardunite	Comwallite	Kainite
Argentojarosite	Corvusite	Kaolinite
Arseniosiderite	Crandallite	Kásolite
Arsenobismite	Cuprosklodowskite	Kieserite
Atacamite	Cuprotungstite	Kornelite
Aurichalcite	Cyanotrichite	Laumontite
Austinite	Damourite	Leadhillite
Autunite	Davisonite	Lehite
Axinite	Dehrnite	Lepidocrocite
Azurite	Delessite	Leuchtenbergite
Balydonite	Deltaite	Leverrierite
Barnesite	Desclouizite	Lewistonite
Bassanite	Diadochite	Liebigite
Bassettite	Diaspore	Limonite
Bayleyite	Dickite	Linarite
Beaverite	Doloresite	Loughlinite
Becquerelite	Elpidite	Magnesianriebeckite
Beidellite	Endellite	Malachite
Bertrandite	Englishite	Mallardite
Beta-Uranotile	Epidesmine	Manganite
Beudantite	Epidote	Melanterite
Bieberite	Epsomite	Mesolite
Bindheimite	Erinite	Meta-Autunite
Biotite	Erythrite	Metahewettite
Birnessite	Fernandinite	Metarossite
Bischofite	Ferrimolybdite	Metastrongite
Bloedite	Ferrisymplesite	Metatorbernite
Boltwoodite	Fervanite	Metatyuyamunite
Boothite	Fibroferrite	Meta-Uranocircite
Borickite	Fluellite	Metavariscite
Brochantite	Foshagite	Metazeunerite
Brucite	Fourmarierite	Millisite
Butlerite	Garrelsite	Mirabilite
Calciovolborthite	Gearsutite	Mixite
Calcedonite	Gibbsite	Montgomeryite
Carbonate Apatite	Glaucosite	Montmorillonite
Carminite	Goethite	Montroseite
Camallite	Goldichite	Mordenite
Camotite	Gordonite	Muscovite
Carphosiderite	Goslarite	Natroalunite
	Grantsite	Natrojarosite
	Gummitte	Natrolite

Natron
 Navajoite
 Nontronite
 Okenite
 Olivenite
 Opal
 Overite
 Paligorskite
 Parabutlerite
 Pargasite
 Pascoite
 Pharmacosiderite
 Phillipsite
 Phlogopite
 Phosphuranylite
 Pickeringite
 Pinninite
 Pintadoite
 Pisanite
 Pitticite
 Plancheite
 Plumbojarosite
 Polyhalite
 Potash Alum
 Prehnite
 Prochlorite
 Prosopite
 Psilomelane
 Ptilolite
 Pyrophyllite
 Rabbittite
 Racewinite
 Rauvite
 Rockbridgeite
 Roemerite
 Rosasite
 Roscoelite
 Rossite
 Sabugalite
 Saponite
 Schroeckingerite
 Scorodite
 Searlesite
 Sepiolite
 Serpentine
 Sherwoodite
 Sideronatrite
 Siderotil
 Simplotite
 Sklodowskite
 Soddyite
 Spadaite
 Spangolite
 Staurolite
 Steigerite
 Stellerite
 Sterrettite
 Stibiconite
 Stilbite
 Swartzite

Szaibelyite
 Szomolnokite
 Talc
 Thaumassite
 Thermonatrite
 Thomsonite
 Tinticite
 Tobermorite
 Topaz
 Torbernite
 Tourmaline
 Tremolite
 Trona
 Turquoise
 Tyrolite
 Tyuyamunite
 Umohoite
 Uranophane
 Uranopilite
 Uranospinite
 Uvanite
 Vandendriesscheite
 Vanoxite
 Variscite
 Vermiculite
 Vivianite
 Voglite
 Volborthite
 Voltaite
 Wad
 Wardite
 Wavellite
 Weeksite
 Whewellite
 Xantophyllite
 Zeunerite
 Zippeite
 Zoisite
 Zunyite

MOLYBDATES (4)

Ferrimolybdite
 Powellite
 Umohoite
 Wulfenite

NATIVE ELEMENTS (11)

Arsenic
 Bismuth
 Copper
 Gold
 Graphite
 Mercury
 Palladium
 Platinum
 Selenium
 Silver
 Sulfur

NITRATES (1)

Niter

OXALATES (1)

Whewellite

OXIDES (54)

Anatase
 Becquerelite
 Birnessite
 Bismite
 Bismoclite
 Bismutite
 Bixbyite
 Braunite
 Brookite
 Cassiterite
 Cervantite
 Chalcophanite
 Chromite
 Corundum
 Corvusite
 Cryptomelane
 Cuprite
 Diaspore
 Doloresite
 Gibbsite
 Goethite
 Gummite
 Hematite
 Hercynite
 Hetaerolite
 Ilmenite
 Ilsemannite
 Lepidocrocite
 Limonite
 Lithiophorite
 Magnesioferrite
 Magnetite
 Manganite
 Massicot
 Minium
 Montroseite
 Navajoite
 Paramontroseite
 Periclase
 Pseudobrookite
 Psilomelane
 Pyrolusite
 Rutile
 Samarskite
 Schoepite
 Senarmontite
 Spinel
 Stibiconite
 Tenorite
 Uraninite

Valentinite
Vandendriesscheite
Vanoxite
Wad

PHOSPHATES (42)

Apatite
Autunite
Bassetite
Borickite
Carbonate Apatite
Collophane
Corkite
Crandallite
Davisonite
Dehrite
Deltaite
Diadochite
Englishite
Fluorapatite
Gordonite
Lehiite
Lewistonite
Meta-Autunite
Metastrengite
Metatorbernite
Meta-Uranocircite
Metavariscite
Millisite
Mimetite
Monazite
Montgomeryite
Overite
Phosphorite
Phosphuranylite
Pyromorphite
Rockbridgeite
Sabugalite
Sicklerite
Sterrettite
Tinticite
Torbernite
Turquoise
Variscite
Vivianite
Wardite
Wavellite
Xenotime

SELENATES-SELENITES (4)

Clausthalite
Cobaltomenite
Onofrite
Tiemannite

SILICATES (138)

Acmite

Actinolite
Aegirite
Albite
Allanite
Allophane
Analcite
Andalusite
Andesine
Anorthite
Anorthoclase
Anthophyllite
Antigorite
Apophyllite
Ardunite
Augite
Axinite
Beidellite
Bertrandite
Beryl
Beta-Uranotile
Biotite
Boltwoodite
Celadonite
Chabazite
Chevkinite
Chlorite
Chrome Mica-Clay
Chrysocolla
Clinocllore
Clinohumite
Clinzoisite
Coffinite
Cordierite
Cristobalite
Crypto. Quartz
Cuprosklodowskite
Damourite
Danburite
Delessite
Dickite
Diopside
Dumortierite
Elpidite
Endellite
Enstatite
Epidesine
Epidote
Forsterite
Foshagite
Garnet
Garrelsite
Glaucanite
Gyrolite
Halloysite
Hedenbergite
Helvite
Hemimorphite
Heulandite
Hornblende
Humite

Hydromica
Hypersthene
Iddingsite
Idocrase
Jefferisite
Kaolinite
Kasolite
Kyanite
Labradorite
Laumontite
Leuchtenbergite
Leucosphenite
Leverrierite
Loughlinite
Magnesioriebeckite
Mesolite
Microcline
Monticellite
Montmorillonite
Mordenite
Muscovite
Natrolite
Nepheline
Nontronite
Noselite
Okenite
Oligoclase
Olivine
Opal
Orthoclase
Paligorskite
Pargasite
Pinnite
Phillipsite
Phlogopite
Planchete
Prehnite
Prochlorite
Ptilolite
Pyrophyllite
Quartz
Racewinitite
Reedmergnerite
Rhodonite
Riebeckite
Roscoelite
Saponite
Scapolite
Searlesite
Sepiolite
Serpentine
Sklodowskite
Sodalite
Soddyite
Spadaite
Sphene
Spodumene
Staurolite
Stellerite
Stilbite

Talc
Thaumasite
Thomsonite
Torbermorite
Topaz
Tourmaline
Tremolite
Tridymite
Uranophane
Vermiculite
Weeksite
Willemite
Wollastonite
Xantophyllite
Zircon
Zoisite
Zunyite

SULFATES (70)

Aluminite
Alunite
Alunogen
Ammonia Alum
Ammoniojarosite
Anglesite
Anhydrite
Antlerite
Apjohnite
Argentojarosite
Barite
Bassanite
Beaverite
Beudantite
Bieberite
Bloedite
Boothite
Brochantite
Butlerite
Calcedonite
Carphosiderite
Celestite
Chalcanthite
Chalcopyllite
Connellite
Copiapite
Coquimbite
Corkite
Cyanotrichite
Diadochite
Epsomite
Fibroferrite
Glauberite
Goldichite
Goslarite
Gypsum
Halotrichite
Jarosite
Johannite
Kainite

Kieserite
Kornelite
Lanarkite
Leadhillite
Linarite
Mallardite
Melanterite
Mirabilite
Natroalunite
Natrojarosite
Noselite
Parabutlerite
Pickeringite
Pisanite
Pitticite
Plumbojarosite
Polyhalite
Potash Alum
Roemerite
Scapolite
Schroëckingerite
Sideronatrite
Siderotil
Spangolite
Szomolnokite
Thaumasite
Thenardite
Uranopilite
Voltaite
Zippeite

SULFIDES (37)

Aguilarite
Aikinite
Alaskaite
Argentite
Argyrodite
Arsenopyrite
Bismuthinite
Bornite
Chalcocite
Chalcopyrite
Cinnabar
Cobaltite
Cosalite
Covellite
Cubanite
Digenite
Dufrenoyite
Galena
Gersdorffite
Greenockite
Jordisite
Kermesite
Marcasite
Metacinnabar
Meta stibnite
Molybdenite
Onofrite

Orpiment
Pyrite
Pyrrhotite
Realgar
Sphalerite
Stibnite
Sulvanite
Tetradymite
Tungstenite
Wurtzite

SULFOSALTS (19)

Boulangerite
Bournonite
Enargite
Famatinite
Freibergite
Geocronite
Jamesonite
Lorandite
Luzonite
Miargyrite
Pearceite
Polybasite
Proustite
Pyrrargyrite
Seligmannite
Stephanite
Tennantite
Tetrahedrite
Zinkenite

TELLURIDES (5)

Altaite
Calaverite
Hessite
Pezite
Sylvanite

TUNGSTATES (7)

Cuprotungstite
Ferberite
Heubnerite
Powellite
Scheelite
Stolzite
Wolframite

URANINATES (37)

Abernathyite
Andersonite
Autunite
Bassetite
Bayleyite
Beta-Uranotile
Boltwoodite

Carnotite
Cuprosklodowskite
Fourmarierite
Johannite
Kasolite
Liebigite
Meta-Autunite
Metatorbernite
Metatyuyamunite
Meta-Uranocircite
Metazeunerite
Phosphuranylite
Rauvite
Rutherfordine
Sabugalite
Schroëckingerite
Sklodowskite
Soddyite
Swartzite
Torbernite

Tyuyamunite
Umohoite
Uranophane
Uranopilite
Uranospinite
Uvanite
Voglite
Weeksite
Zeunerite
Zippeite

VANADATES (25)

Barnesite
Calciovolborthite
Carnotite
Descloizite
Femandinite
Fervanite

Grantsite
Hewettite
Hummerite
Melanovanadite
Metahewettite
Metarossite
Metatyuyamunite
Pascoite
Pintadoite
Rauvite
Roscoelite
Rossite
Sherwoodite
Simplotite
Steigerite
Tyuyamunite
Uvanite
Vanadinite
Volborthite

Utah Minerals Listed Under Selected Metallic Elements

Thirty metallic elements were selected by the author for consideration in this compilation. Most of these elements have formed ore deposits of actual or potential economic value in Utah; few metallic elements such as chromium, cobalt, nickel, and tin occur in minerals that may have only mineralogical significance. An alphabetical listing of the thirty selected metallic elements is given below. After each element is a list of Utah minerals containing it. The numbers in parentheses indicate the number of minerals in each list.

ANTIMONY MINERALS (20)

Bindheimite
Boulangerite
Bourmonite
Cervantite
Dyscarsite
Famatinite
Geocronite
Jamesonite
Kermesite
Metastibnite
Miargyrite
Polybasite
Pyrargyrite
Senarmontite
Stephanite
Stibiconite
Stibnite
Tetrahedrite
Valentinite
Zinkenite

ARSENIC MINERALS (43)

Abernathyite

Adamite
Annabergite
Arsenic
Arseniosiderite
Arsenobismite
Arsenopyrite
Austinite
Balydonite
Beudantite
Carminite
Chalcophyllite
Chenevixite
Clinoclase
Cobaltite
Conichalcite
Comwallite
Dufrenoyite
Enargite
Erinite
Erythrite
Ferrisymplesite
Geocronite
Gersdorffite
Lorandite
Luzonite
Metazeunerite

Mimetite
Mixite
Olivenite
Orpiment
Pearceite
Pharmacosiderite
Pitticite
Proustite
Realgar
Scorodite
Seligmannite
Smaltite
Tennantite
Tyrolite
Uranospinitite
Zeunerite

BARIUM MINERALS (8)

Barite
Barytocalcite
Burbankite
Danburite
Garrelsite
Leucosphenite
Meta-Uranocircite
Psilomelane

BERYLLIUM MINERALS (4)

Allanite
Bertrandite
Beryl
Helvite

BISMUTH MINERALS (12)

Aikinite
Alaskaite
Arsenobismite

Bismite
Bismoclase
Bismuth
Bismuthinite
Bismutite
Cosalite
Daubreeite
Mixite
Tetradymite

CADMIUM MINERALS (1)

Greenockite

CERIUM MINERALS (5)

Allanite
Burbankite
Chevkinite
Monazite
Samarskite

CHROMIUM MINERALS (2)

Chrome Mica-Clay
Chromite

COBALT MINERALS (9)

Annabergite
Bieberite
Cobaltite
Cobaltocalcite
Cobaltomenite
Cryptomelane
Erythrite
Gersdorffite
Smaltite

COPPER MINERALS (61)

Aikinite
Alaskaite
Antlerite
Atacamite
Aurichalcite
Azurite
Balydonite
Beaverite
Boothite
Bornite
Bournonite
Brochantite
Calcedonite
Calciovolborthite
Chalcanthite
Chalcocite
Chalcophyllite
Chalcopyrite
Chenevixite

Chrysocolla
Clinoclase
Conichalcite
Connellite
Copper
Cornwallite
Covellite
Cubanite
Cuprite
Cuprosklodowskite
Cuprotungstite
Cyanotrichite
Descloizite
Digenite
Enargite
Erinite
Famatinite
Freibergite
Johannite
Linarite
Luzonite
Malachite
Metatorbernite
Metazeunerite
Mixite
Olivenite
Pisanite
Planchette
Polybasite
Rosasite
Seligmannite
Spangolite
Sulvanite
Tennantite
Tenorite
Tetrahedrite
Torbernite
Turquoise
Tyrolite
Voglite
Volborthite
Zeunerite

GOLD MINERALS (4)

Calaverite
Gold
Petzite
Sylvanite

IRON MINERALS (99)

Acmite
Actinolite
Aegirite
Allanite
Ammoniojarosite
Ankerite
Anthophyllite
Argentojarosite

Arseniosiderite
Arsenopyrite
Augite
Axinite
Bassetite
Beaverite
Beidellite
Beudantite
Biotite
Bixbyite
Borickite
Bornite
Butlerite
Carminite
Carphosiderite
Chalcophanite
Chalcopyrite
Chenevixite
Chromite
Cobaltite
Copiapite
Coquimbite
Corkite
Cubanite
Delessite
Diadochite
Dumortierite
Epidote
Ferberite
Ferrimolybdite
Ferrisymplectite
Fervanite
Fibroferrite
Freibergite
Garnet
Gersdorffite
Glauconite
Goethite
Goldichite
Halotrichite
Hedenbergite
Hematite
Hercynite
Hornblende
Hypersthene
Iddingsite
Idocrase
Ilmenite
Jamesonite
Jarosite
Jefferisite
Kornelite
Lepidocrocite
Limonite
Ludwigite
Magnesioferrite
Magnesioriebeckite
Magnetite
Marcasite
Melanterite

Metastrengite
 Montroseite
 Natrojarosite
 Nontronite
 Olivine
 Parabutlerite
 Pargasite
 Pharmacosiderite
 Pinninite
 Pisanite
 Pitticite
 Plumbojarosite
 Pseudobrookite
 Pyrite
 Pyrrhotite
 Riebeckite
 Rockbridgeite
 Roemerite
 Scorodite
 Sicklerite
 Siderite
 Sideronatrite
 Siderotil
 Staurolite
 Szomolnokite
 Tennantite
 Tinticite
 Tourmaline
 Vivianite
 Voltaite
 Wolframite

LEAD MINERALS (40)

Aikinite
 Alaskaitite
 Altaite
 Anglesite
 Balydonite
 Beaverite
 Beudantite
 Bindheimite
 Boulangerite
 Bournonite
 Calcedonite
 Carminite
 Cerussite
 Clausthalite
 Corkite
 Cosalite
 Cotunnite
 Desclozite
 Dufrenoyite
 Fourmarierite
 Galena
 Geocronite
 Gummite
 Jamesonite
 Kasolite
 Lanarkite

Leadhillite
 Linarite
 Massicot
 Mimetite
 Minium
 Phosgenite
 Plumbojarosite
 Pyromorphite
 Seligmannite
 Stolzite
 Vanadinite
 Vandendriesscheite
 Wulfenite
 Zinkenite

LITHIUM MINERALS (3)

Lithiophorite
 Sicklerite
 Spodumene

MANGANESE MINERALS (23)

Allanite
 Apjohnite
 Axinite
 Birnessite
 Bixbyite
 Braunite
 Chalcophanite
 Cryptomelane
 Hetaerolite
 Huebnerite
 Lithiophorite
 Mallardite
 Manganite
 Manganocalcite
 Psilomelane
 Pyrolusite
 Rhodochrosite
 Rhodonite
 Rockbridgeite
 Sicklerite
 Szaibelyite
 Wad
 Wolframite

MERCURY MINERALS (5)

Cinnabar
 Mercury
 Metacinnabar
 Onofrite
 Tiemannite
 Ferrimolybdite
 Ilsemanite
 Jordisite

Molybdenite
 Powellite
 Umohoite
 Wulfenite

NICKEL MINERALS (5)

Annabergite
 Eardleyite
 Erythrite
 Gersdorffite
 Smaltite

PHOSPHORUS MINERALS (42)

Apatite
 Autunite
 Bassetite
 Borickite
 Carbonate Apatite
 Collophane
 Corkite
 Crandallite
 Davisonite
 Dehrite
 Deltaite
 Diadochite
 Englishite
 Fluorapatite
 Gordonite
 Lehiite
 Lewistonite
 Meta-Autunite
 Meta strengite
 Metatorbernite
 Meta-Uranocircite
 Metavariscite
 Millisite
 Mimetite
 Monazite
 Montgomerite
 Overite
 Phosphorite
 Phosphuranylite
 Pyromorphite
 Rockbridgeite
 Sabugalite
 Sicklerite
 Sterrettite
 Tinticite
 Torbernite
 Turquoise
 Variscite
 Vivianite
 Wardite
 Wavellite
 Xenotime

PLATINUM MINERALS (1)

Platinum

SILVER MINERALS (20)

Aguilarite
Alaskaite
Argentite
Argentojarosite
Argyrodite
Cerargyrite
Dyscarsite
Embolite
Freibergite
Hessite
Miargyrite
Pearceite
Petzite
Polybasite
Proustite
Pyrargyrite
Silver
Stephanite
Sylvanite
Tetrahdrite

STRONTIUM MINERALS (3)

Burbankite
Celestite
Strontianite

TELLURIUM MINERALS (6)

Altaite
Calaverite
Hessite
Petzite
Sylvanite
Tetradymite

TIN MINERALS (2)

Cassiterite
Samarskite

TUNGSTEN MINERALS (8)

Cuprotungstite
Ferberite
Huebnerite
Powellite
Scheelite
Stolzite
Tungstenite
Wolframite

TITANIUM MINERALS (9)

Anatase

Brookite
Chevkinite
Ilmenite
Leucosphenite
Pseudobrookite
Rutile
Samarskite
Sphene

VANADIUM MINERALS (32)

Barnesite
Calciovolborthite
Carnotite
Corvusite
Descloizite
Doloresite
Fernandinite
Fervanite
Grantsite
Hewettite
Hummerite
Melanovanadite
Metahewettite
Metarossite
Metatyuyamunite
Montroseite
Navajoite
Paramontroseite
Pascoite
Pintadoite
Rauvite
Roscoelite
Rossite
Sherwoodite
Simplotite
Steigerite
Sulvanite
Tyuyamunite
Uvanite
Vanadinite
Vanoxite
Volborthite

URANIUM MINERALS (45)

Abernathyite
Andersonite
Autunite
Bassetite
Bayleyite
Becquerelite
Beta-Uranotile
Boltwoodite
Carnotite
Coffinite
Cuprosklodowskite
Fourmarierite
Gummite
Johannite
Kasolite

Liebigite
Meta-Autunite
Metatorbernite
Metatyuyamunite
Meta-Uranocircite
Metazeunerite
Phosphuranylite
Rabbittite
Rauvite
Rutherfordine
Sabugalite
Samarskite
Schoepite
Schroekingierite
Sklodowskite
Soddyite
Swartzite
Torbernite
Tyuyamunite
Umohoite
Uraninite
Uranophane
Uranopilite
Uranospinite
Uvanite
Vandendriesscheite
Voglite
Weeksite
Zeunerite
Zippeite

ZINC MINERALS (18)

Adamite
Aurichalcite
Austinite
Chalcophanite
Cryptomelane
Descloizite
Eardleyite
Freibergite
Goslarite
Hemimorphite
Hetaerolite
Hydrozincite
Rosaite
Smithsonite
Sphalerite
Tetrahedrite
Willemite
Wurtzite

ZIRCONIUM MINERALS (2)

Elpidite
Zircon

Utah Minerals Listed Under Counties by Selected Metallic Elements

The 30 metallic elements listed with the minerals they form in Utah (section above) were programmed for a computer analysis to determine their occurrence and distribution in the 29 counties of Utah. Specific mineral occurrences can be found by referring to Chapter III. The counties, metallic elements, and minerals are alphabetically arranged. Figures in parentheses indicate the number of minerals in each list.

BEAVER COUNTY

ANTIMONY (4)

Bindheimite
Jamesonite
Pyrargyrite
Tetrahedrite

ARSENIC (3)

Dufrenoyite
Proustite
Scorodite

BARIUM (1)

Barite

BERYLLIUM (2)

Beryl
Helvite

BISMUTH (3)

Bismuthinite
Bismutite
Cosalite

CADMIUM (1)

Greenockite

COPPER (18)

Aurichalcite
Azurite
Beaverite
Bornite
Brochantite
Chalcanthite
Chalcocite
Chalcopyrite
Chrysocolla
Copper
Covellite
Cuprite
Linarite
Malachite
Plancheite
Tenorite
Tetrahedrite
Torbernite

GOLD (1)

Gold

IRON (30)

Actinolite
Argentojarosite
Augite
Beaverite
Biotite
Bornite
Chalcopyrite
Corkite
Epidote
Garnet
Goethite
Hedenbergite
Hematite
Homblende
Hypersthene
Idocrase
Ilmenite
Jamesonite
Jarosite
Limonite
Ludwigite
Magnetite
Marcasite
Olivine
Plumbojarosite
Pyrite
Scorodite
Siderite
Tourmaline
Wolframite

LEAD (13)

Anglesite
Beaverite
Bindheimite
Cerussite
Corkite
Cosalite
Dufrenoyite
Galena
Jamesonite
Linarite
Plumbojarosite

Vanadinite

Wulfenite

MANGANESE (6)

Huebnerite
Manganite
Pyrolusite
Rhodochrosite
Szaibelyite
Wolframite

MOLYBDENUM (3)

Molybdenite
Powellite
Wulfenite

PHOSPHORUS (4)

Apatite
Autunite
Corkite
Torbernite

SILVER (7)

Argentite
Argentojarosite
Cerargyrite
Proustite
Pyrargyrite
Silver
Tetrahedrite

TITANIUM (3)

Ilmenite
Rutile
Sphene

TUNGSTEN (4)

Huebnerite
Powellite
Scheelite
Wolframite

URANIUM (3)

Autunite
Torbernite
Uranophane

VANADIUM (1)

Vanadinite

ZINC (8)

Aurichalcite
Goslarite
Hemimorphite
Smithsonite
Sphalerite
Tetrahedrite
Willemite
Wurtzite

ZIRCONIUM (1)
Zircon

BOX ELDER COUNTY

ANTIMONY (4)
Bindheimite
Pyrargyrite
Stibnite
Tetrahedrite

ARSENIC (6)
Arsenopyrite
Orpiment
Pearceite
Proustite
Realgar
Tennantite

BARIUM (1)
Barite

BISMUTH (2)
Bismuthinite
Bismutite

COPPER (12)
Azurite
Bornite
Chalcocite
Chalcopyrite
Chrysocolla
Copper
Covellite
Cuprite
Malachite
Tennantite
Tenorite
Tetrahedrite

GOLD (1)
Gold

IRON (12)
Arsenopyrite
Bornite
Chalcopyrite
Epidote
Garnet
Goethite
Hematite
Limonite
Magnetite
Plumbojarosite
Pyrite
Tennantite

LEAD (8)
Anglesite
Bindheimite

Cerussite
Galena
Plumbojarosite
Stolzite
Vanadinite
Wulfenite

MANGANESE (1)
Rhodochrosite

MOLYBDENUM (1)
Wulfenite

PHOSPHORUS (3)
Metavariscite
Monazite
Variscite

SILVER (8)
Argentite
Argyrodite
Gerargyrite
Pearceite
Proustite
Pyrargyrite
Silver
Tetrahedrite

TUNGSTEN (2)
Scheelite
Stolzite

VANADIUM (1)
Vanadinite

ZINC (4)
Hemimorphite
Smithsonite
Sphalerite
Tetrahedrite

ZIRCONIUM (1)
Zircon

CACHE COUNTY

COPPER (3)
Azurite
Cuprite
Malachite

GOLD (1)
Gold

IRON (2)
Hematite
Siderite

LEAD (3)
Anglesite

Cerussite
Galena

MANGANESE (1)
Pyrolusite

SILVER (1)
Silver

ZINC (1)
Smithsonite

CARBON COUNTY

URANIUM (1)
Carnotite

VANADIUM (1)
Carnotite

DAGGETT COUNTY

COPPER (7)
Azurite
Bornite
Brochantite
Chalcocite
Chalcopyrite
Malachite
Volborthite

GOLD (1)
Gold

IRON (8)
Anthophyllite
Bornite
Chalcopyrite
Glaucanite
Hematite
Hornblende
Limonite
Staurolite

MANGANESE (1)
Pyrolusite

PHOSPHORUS (4)
Carbonate Apatite
Collophane
Fluorapatite
Phosphorite

VANADIUM (3)
Carnotite
Tyuyamunite
Volborthite

URANIUM (2)
Carnotite

Tyuyamunite

EMERY COUNTY

Voltaite

DAVIS COUNTY

COPPER (7)

Azurite
Bornite
Chalcocite
Chalcopyrite
Chrysocolla
Cuprite
Malachite

IRON (10)

Biotite
Bornite
Chalcopyrite
Epidote
Garnet
Hematite
Hornblende
Limonite
Magnetite
Pyrite

LEAD (2)

Anglesite
Galena

TUNGSTEN (1)

Scheelite

DUCHESNE COUNTY

BARIUM (2)

Burbankite
Leucosphenite

CERIUM (1)

Burbankite

COPPER (1)

Malachite

IRON (5)

Acmite
Hematite
Magnesioriebeckite
Pyrite
Riebeckite

PHOSPHORUS (4)

Carbonate Apatite
Collophane
Fluorapatite
Phosphorite

STRONTIUM (1)

Burbankite

TITANIUM (1)

Leucosphenite

ARSENIC (8)

Abernathyite
Arsenic
Metazeunerite
Orpiment
Pitticite
Realgar
Scorodite
Zeunerite

BARIUM (1)

Psilomelane

CERIUM (1)

Monazite

CHROMIUM (1)

Chrome Mica-Clay

COBALT (2)

Bieberite
Cobaltocalcite

COPPER (10)

Azurite
Bornite
Brochantite
Chalcanthite
Chalcopyrite
Malachite
Metatorbernite
Metazeunerite
Torbernite
Zeunerite

GOLD (1)

Gold

IRON (22)

Ankerite
Bassetite
Bornite
Butlerite
Chalcopyrite
Coplite
Coquimbite
Diadochite
Dumortierite
Fibroferrite
Goldichite
Halotrichite
Ilmenite
Jarosite
Melanterite
Montroseite
Parabutlerite
Pitticite
Pyrite
Roemerite
Scorodite

LEAD (6)

Anglesite
Cerussite
Fourmarierite
Galena
Gummite
Vandendriesscheite

MANGANESE (4)

Manganite
Psilomelane
Pyrolusite
Wad

PHOSPHORUS (7)

Autunite
Bassetite
Diadochite
Metatorbernite
Monazite
Phosphuranylite
Torbernite

SILVER (1)

Silver

STRONTIUM (1)

Celestite

TIN (1)

Cassiterite

TITANIUM (2)

Brookite
Ilmenite

URANIUM (25)

Abernathyite
Autunite
Bassetite
Bayleyite
Becquerelite
Boltwoodite
Carnotite
Coffinite
Fourmarierite
Gummite
Metatorbernite
Metazeunerite
Phosphuranylite
Rabbittite
Rauvite
Rutherfordine
Schoepite
Schrockerite
Torbernite
Tyuyamunite
Uraninite
Uvanite
Vandendriesscheite
Zeunerite
Zippeite

VANADIUM (11)
Carnotite
Corvusite
Fernandinite
Hewettite
Hummerite
Metahewettite
Paramontroseite
Rauvite
Roscoelite
Tyuyamunite
Uvanite

ZINC (1)
Sphalerite

ZIRCONIUM (1)
Zircon

GARFIELD COUNTY

ANTIMONY (4)
Senarmontite
Stibiconite
Stibnite
Valentinite

ARSENIC (3)
Arsenopyrite
Orpiment
Realgar

CERIUM (1)
Monazite

COPPER (7)
Azurite
Bornite
Chalcopyrite
Chrysocolla
Johannite
Malachite
Torbernite

GOLD (1)
Gold

IRON (8)
Arsenopyrite
Bornite
Chalcopyrite
Epidote
Hematite
Ilmenite
Magnetite
Pyrite

MANGANESE (2)
Pyrolusite
Wad

PHOSPHORUS (3)
Autunite
Monazite
Torbernite

PLATINUM (1)
Platinum

TITANIUM (1)
Ilmenite

URANIUM (9)
Autunite
Beta-Uranotile
Carnotite
Johannite
Torbernite
Tyuyamunite
Uraninite
Uranophane
Zippeite

VANADIUM (6)
Carnotite
Metahewettite
Montroseite
Pascoite
Tyuyamunite
Vanoxite

ZIRCONIUM (1)
Zircon

GRAND COUNTY

BARIUM (2)
Barite
Psilomelane

CERIUM (1)
Chevkinite

CHROMIUM (1)
Chromite

COPPER (9)
Azurite
Bornite
Calciovolborthite
Chalcocite
Chalcopyrite
Chrysocolla
Descloizite
Malachite
Volborthite

IRON (14)
Actinolite
Aegirite
Augite

Biotite
Bornite
Chalcopyrite
Chromite
Pervanite
Goethite
Hedenbergite
Hematite
Limonite
Montroseite
Pyrite

LEAD (2)
Descloizite
Galena

LITHIUM (1)
Lithiophorite

MANGANESE (5)
Lithiophorite
Manganite
Psilomelane
Pyrolusite
Rhodochrosite

MOLYBDENUM (1)
Ilsemannite

PHOSPHORUS (3)
Autunite
Meta-Autunite
Phosphuranylite

STRONTIUM (1)
Celestite

TITANIUM (1)
Chevkinite

TUNGSTEN (1)
Scheelite

URANIUM (15)
Andersonite
Autunite
Becquerelite
Boltwoodite
Carnotite
Coffinite
Liebigite
Meta-Autunite
Metatyuyamunite
Phosphuranylite
Rauvite
Schroeckingerite
Tyuyamunite
Uraninite
Zippeite

VANADIUM (23)

Barnesite
 Calciovolborthite
 Carnotite
 Corvusite
 Descloizite
 Fervanite
 Grantsite
 Hewettite
 Melanovanadite
 Metahewettite
 Metarossite
 Metatyuyamunite
 Montroseite
 Paramontroseite
 Pascoite
 Rauvite
 Roscoelite
 Rossite
 Sherwoodite
 Steigerite
 Tyuyamunite
 Vanoxite
 Volborthite

ZINC (2)

Descloizite
 Sphalerite

IRON COUNTY

ARSENIC (2)

Annabergite
 Mimetite

BARIUM (1)

Barite

COBALT (1)

Annabergite

COPPER (3)

Azurite
 Descloizite
 Malachite

GOLD (2)

Gold
 Sylvanite

IRON (13)

Actinolite
 Augite
 Biotite
 Ferrimolybdite
 Garnet
 Goethite
 Hematite
 Limonite
 Magnetite

Metastrongite

Pyrite
 Rockbridgeite
 Siderite

LEAD (4)

Descloizite
 Galena
 Mimetite
 Pyromorphite

MANGANESE (3)

Pyrolusite
 Rhodochrosite
 Rockbridgeite

MERCURY (2)

Cinnabar
 Mercury

MOLYBDENUM (1)

Ferrimolybdite

NICKEL (1)

Annabergite

PHOSPHORUS (6)

Apatite
 Autunite
 Metastrongite
 Mimetite
 Pyromorphite
 Rockbridgeite

SILVER (3)

Argentite
 Cerargyrite
 Sylvanite

TELLURIUM (1)

Sylvanite

URANIUM (2)

Autunite
 Carnotite

VANADIUM (2)

Carnotite
 Descloizite

ZINC (1)

Descloizite

JUAB COUNTY

ANTIMONY (8)

Bindheimite
 Famatinite
 Geocronite
 Jamesonite

Pyrrargyrite

Stephanite
 Stibnite
 Tetrahedrite

ARSENIC (25)

Adamite
 Arseniosiderite
 Arsenobismite
 Arsenopyrite
 Chalcophyllite
 Chenevixite
 Clinoclase
 Conichalcite
 Cornwallite
 Enargite
 Erinite
 Geocronite
 Metazeunerite
 Mimetite
 Mixite
 Olivenite
 Pearceite
 Pharmacosiderite
 Pitticite
 Proustite
 Scorodite
 Tennantite
 Tyrolite
 Uranospinite
 Zeunerite

BARIUM (3)

Barite
 Meta-Uranocircite
 Psilomelane

BERYLLIUM (2)

Bertrandite
 Beryl

BISMUTH (8)

Arsenobismite
 Bismite
 Bismoclite
 Bismuth
 Bismuthinite
 Bismutite
 Daubreeite
 Mixite

COPPER (31)

Atacamite
 Aurichalcite
 Azurite
 Brochantite
 Chalcocite
 Chalcophyllite
 Chalcopyrite
 Chenevixite

Chrysocolla	Bindheimite	Meta-Uranocircite
Clinoclase	Cerussite	Metazeunerite
Conichalcite	Cotunnite	Schroëckingerite
Connellite	Galena	Sklodowskite
Copper	Geocronite	Soddyite
Comwallite	Jamesonite	Uraninite
Covellite	Leadhillite	Uranophane
Cuprite	Linarite	Uranospinite
Cyanotrichite	Mimetite	Weeksite
Energite	Minium	Zeunerite
Erinite	Phosgenite	
Famatinite	Plumbojarosite	VANADIUM (1)
Linarite	Pyromorphite	Carnotite
Malachite		
Metazeunerite	LITHIUM (2)	ZINC (7)
Mixite	Sicklerite	Adamite
Olivenite	Spodumene	Aurichalcite
Spangolite		Hemimorphite
Tennantite	MANGANESE (8)	Hydrozincite
Tenorite	Bixbyite	Smithsonite
Tetrahedrite	Braunite	Sphalerite
Tyrolite	Manganite	Tetrahedrite
Zeunerite	Psilomelane	
	Pyrolusite	
GOLD (1)	Rhodochrosite	<u>KANE COUNTY</u>
Gold	Sicklerite	ARSENIC (1)
	Wad	Uranospinite
IRON (30)		
Actinolite	MOLYBDENUM (1)	BARIUM (1)
Ankerite	Molybdenite	Barite
Arseniosiderite		
Arsenopyrite	PHOSPHORUS (7)	CERIUM (1)
Biotite	Autunite	Monazite
Bixbyite	Borickite	
Borickite	Crandallite	COPPER (4)
Carphosiderite	Meta-Uranocircite	Azurite
Chalcopyrite	Mimetite	Cuprite
Chenevixite	Pyromorphite	Malachite
Epidote	Sicklerite	Torbernite
Garnet		
Hematite	SILVER (8)	GOLD (1)
Idocrase	Argentite	Gold
Jamesonite	Cerargyrite	
Jarosite	Pearceite	IRON (4)
Limonite	Proustite	Ammoniojarosite
Magnetite	Pyrargyrite	Ilmenite
Marcasite	Silver	Limonite
Melanterite	Stephanite	Magnetite
Pharmacosiderite	Tetrahedrite	
Pitticite		
Plumbojarosite	TITANIUM (2)	MANGANESE (1)
Pseudobrookite	Pseudobrookite	Pyrolusite
Pyrite	Sphene	
Pyrrhotite		
Scorodite	TUNGSTEN (1)	PHOSPHORUS (3)
Sicklerite	Scheelite	Autunite
Tennantite		Monazite
Tourmaline	URANIUM (13)	Torbernite
	Autunite	
LEAD (14)	Beta-Uranotile	TITANIUM (1)
Anglesite	Carnotite	Ilmenite

URANIUM (5)

Autunite
Carnotite
Torbernite
Tyuyamunite
Uranospinite

VANADIUM (2)

Carnotite
Tyuyamunite

ZIRCONIUM (1)

Zircon

MILLARD COUNTY

BISMUTH (1)

Bismutite

COPPER (4)

Azurite
Chalcopyrite
Cuprite
Malachite

GOLD (1)

Gold

IRON (11)

Augite
Biotite
Chalcopyrite
Garnet
Hematite
Idocrase
Limonite
Magnetite
Marcasite
Pyrite
Tourmaline

LEAD (3)

Anglesite
Cerussite
Galena

MANGANESE (4)

Manganite
Pyrolusite
Rhodochrosite
Wad

MOLYBDENUM (1)

Molybdenite

PHOSPHORUS (1)

Apatite

TUNGSTEN (1)

Scheelite

ZINC (1)

Sphalerite

MORGAN COUNTY

BARIUM (1)

Barite

CERIUM (1)

Monazite

COPPER (7)

Azurite
Chalcopyrite
Chrysocolla
Copper
Cuprite
Malachite
Tenorite

GOLD (1)

Gold

IRON (7)

Biotite
Chalcopyrite
Hematite
Jarosite
Limonite
Marcasite
Pyrite

LEAD (3)

Anglesite
Cerussite
Galena

MOLYBDENUM (1)

Molybdenite

PHOSPHORUS (2)

Monazite
Xenotime

SILVER (1)

Silver

ZINC (1)

Smithsonite

PIUTE COUNTY

ANTIMONY (1)

Tetrahedrite

ARSENIC (1)

Zeunerite

BARIUM (1)

Barite

COBALT (1)

Cobaltomenite

COPPER (8)

Azurite
Chalcopyrite
Johannite
Malachite
Metatorbernite
Tetrahedrite
Torbernite
Zeunerite

GOLD (2)

Gold
Sylvanite

IRON (11)

Biotite
Chalcopyrite
Garnet
Goethite
Hematite
Jarosite
Limonite
Nontronite
Pinnite
Plumbojarosite
Pyrite

LEAD (6)

Anglesite
Cerussite
Galena
Kasolite
Plumbojarosite
Wulfenite

LITHIUM (1)

Lithiophorite

MANGANESE (4)

Lithiophorite
Manganocalcite
Pyrolusite
Rhodochrosite

MERCURY (4)

Cinnabar
Metacinnabar
Onofrite
Tiemannite

MOLYBDENUM (5)

Ilsemannite
Jordisite
Molybdenite
Umohoite
Wulfenite

PHOSPHORUS (6)

Autunite
 Meta-Autunite
 Metatorbernite
 Phosphuranylite
 Sabugalite
 Torbernite

SILVER (4)

Argentite
 Cerargyrite
 Sylvanite
 Tetrahedrite

TELLURIUM (1)

Sylvanite

TITANIUM (1)

Anatase

URANIUM (19)

Autunite
 Beta-Uranotile
 Johannite
 Kasolite
 Meta-Autunite
 Metatorbernite
 Phosphuranylite
 Rauvite
 Sabugalite
 Schroeckingerite
 Sklodowskite
 Torbernite
 Tyuyamunite
 Umohoite
 Uraninite
 Uranophane
 Uranopilite
 Zeunerite
 Zippeite

VANADIUM (2)

Rauvite
 Tyuyamunite

ZINC (4)

Hydrozincite
 Sphalerite
 Tetrahedrite
 Wurtzite

ZIRCONIUM (1)

Zircon

RICH COUNTY

ARSENIC (1)

Tennantite

BARIUM (1)

Barite

COPPER (2)

Azurite
 Tennantite

IRON (1)

Tennantite

LEAD (3)

Cerussite
 Galena
 Wulfenite

MANGANESE (2)

Pyrolusite
 Rhodochrosite

MOLYBDENUM (1)

Wulfenite

PHOSPHORUS (1)

Phosphorite

URANIUM (1)

Tyuyamunite

VANADIUM (1)

Tyuyamunite

SALT LAKE COUNTY

ANTIMONY (6)

Bourmonite
 Cervantite
 Dyscarsite
 Pyrargyrite
 Stibnite
 Tetrahedrite

ARSENIC (8)

Enargite
 Arsenopyrite
 Dufrenoyite
 Orpiment
 Realgar
 Seligmannite
 Tennantite
 Tyrolite

BARIUM (1)

Barite

BERYLLIUM (1)

Allanite

BISMUTH (6)

Aikinite
 Alaskaitite
 Bismite
 Bismuth
 Bismuthinite

Bismutite

CERIUM (1)

Allanite

COPPER (26)

Aikinite
 Alaskaitite
 Aurichalcite
 Azurite
 Beaverite
 Bornite
 Bourmonite
 Calcedonite
 Chalcantinite
 Chalcocite
 Chalcopyrite
 Chrysocolla
 Copper

Covellite

Cubanite

Cuprite

Digenite

Enargite

Linarite

Malachite

Pisanite

Seligmannite

Tennantite

Tenorite

Tetrahedrite

Tyrolite

GOLD (2)

Calaverite

Gold

IRON (28)

Actinolite

Allanite

Arsenopyrite

Beaverite

Biotite

Bornite

Chalcopyrite

Cubanite

Epidote

Garnet

Hematite

Hornblende

Hypersthene

Idocrase

Limenite

Ludwigite

Magnetite

Marcasite

Melanterite

Nontronite

Pisanite

Plumbojarosite

Pyrite

Pyrrhotite
Siderite
Siderotil
Tennantite
Vivianite

LEAD (15)

Aikinite
Alaskaite
Anglesite
Beaverite
Bourmonite
Calcedonite
Cerussite
Dufrenoyisite
Galena
Linarite
Massicot
Plumbojarosite
Seligmannite
Stolzite
Wulfenite

MANGANESE (6)

Allanite
Apjohnite
Mallardite
Pyrolusite
Rhodochrosite
Szaibelyite

MERCURY (1)

Mercury

MOLYBDENUM (2)

Molybdenite
Wulfenite

PHOSPHORUS (5)

Apatite
Phosphorite
Turquoise
Vivianite
Wavellite

PLATINUM (1)

Platinum

SILVER (7)

Alaskaite
Argentite
Cerargyrite
Dyscarsite
Pyrargyrite
Silver
Tetrahedrite

TELLURIUM (1)

Calaverite

TITANIUM (2)

Rutile
Sphene

TUNGSTEN (3)

Scheelite
Stolzite
Tungstenite

ZINC (6)

Aurichalcite
Goslarite
Hemimorphite
Smithsonite
Sphalerite
Tetrahedrite

ZIRCONIUM (1)

Zircon

SAN JUAN COUNTY

ARSENIC (4)

Erythrite
Gersdorffite
Metazeunerite
Smaltite

BARIIUM (2)

Barite
Psilomelane

CADMIUM (1)

Greenockite

CHROMIUM (1)

Chromite

COBALT (4)

Bieberite
Erythrite
Gersdorffite
Smaltite

COPPER (20)

Antlerite
Azurite
Boothite
Bornite
Brochantite
Calciovorborthite
Chalcanthite
Chalcocite
Chalcopyrite
Chrysocolla
Copper
Covellite
Cuprite
Cuprosklodowskite
Johannite

Malachite
Metatorbernite
Metazeunerite
Torbernite
Voglite

GOLD (1)

Gold

IRON (16)

Aegirite
Augite
Bornite
Chalcopyrite
Chromite
Garnet
Gersdorffite
Goethite
Hematite
Jarosite
Limonite
Magnetite
Marcasite
Montroseite
Pyrite
Tourmaline

LEAD (3)

Clausthalite
Galena
Gummite

MANGANESE (2)

Manganite
Psilomelane

MOLYBDENUM (3)

Ilsemanite
Jordisite
Molybdenite

NICKEL (3)

Erythrite
Gersdorffite
Smaltite

PHOSPHORUS (6)

Apatite
Autunite
Metatorbernite
Phosphuranylite
Sabugalite
Torbernite

TITANIUM (1)

Sphene

URANIUM (28)

Andersonite
Autunite

Bayleyite
 Becquerelite
 Beta-Uranotile
 Boltwoodite
 Carnotite
 Coffinite
 Cuprosklodowskite
 Gummite
 Johannite
 Liebigite
 Metatorbernite
 Metatyuyamunite
 Metazeunerite
 Phosphuranylite
 Rutherfordine
 Sabugalite
 Schoepite
 Schroeckingerite
 Swartzite
 Torbernite
 Uraninite
 Uranophane
 Uranopilite
 Voglite
 Zippeite

VANADIUM (17)
 Calciovolborthite
 Carnotite
 Corvusite
 Doloresite
 Hewettite
 Melanovanadite
 Metarossite
 Metatyuyamunite
 Montroseite
 Navajoite
 Paramontroseite
 Pascoite
 Pintadoite
 Roscoelite
 Simplotite
 Tyuyamunite
 Vanoxite

ZINC (1)
 Sphalerite

SANPETE COUNTY

COPPER (1)
 Torbernite

IRON (4)
 Beidellite
 Limonite
 Marcasite
 Pyrite

LEAD (1)
 Galena

MANGANESE (1)
 Pyrolusite

PHOSPHORUS (2)
 Autunite
 Torbernite

STRONTIUM (1)
 Strontianite

URANIUM (2)
 Autunite
 Torbernite

ZINC (1)
 Sphalerite

SEVIER COUNTY

COPPER (5)
 Azurite
 Chalcantithite
 Chalcocite
 Chalcocopyrite
 Malachite

IRON (10)
 Chalcocopyrite
 Epidote
 Garnet
 Hematite
 Hercynite
 Jarosite
 Limonite
 Magnetite
 Pinninite
 Pyrite

LEAD (2)
 Cerussite
 Galena

MANGANESE (2)
 Pyrolusite
 Wad

PHOSPHORUS (1)
 Apatite

STRONTIUM (1)
 Celestite

TITANIUM (1)
 Rutile

ZINC (1)
 Sphalerite

SUMMIT COUNTY

ANTIMONY (8)

Boulangerite
 Bournonite
 Jamesonite
 Metastibnite
 Pyrargyrite
 Stibnite
 Tetrahedrite
 Zinkenite

ARSENIC (3)
 Balydonite
 Mimetite
 Olivenite

BARIUM (2)
 Barite
 Psilomelane

COPPER (15)
 Azurite
 Balydonite
 Bornite
 Bournonite
 Brochantite
 Chalcantithite
 Chalcocite
 Chalcocopyrite
 Chrysocolla
 Covellite
 Cuprite
 Linarite
 Malachite
 Olivenite
 Tetrahedrite

GOLD (2)
 Calaverite
 Gold

IRON (10)
 Bornite
 Chalcocopyrite
 Epidote
 Garnet
 Hematite
 Jamesonite
 Limonite
 Magnesioferrite
 Magnetite
 Pyrite

LEAD (12)
 Anglesite
 Balydonite
 Boulangerite
 Bournonite
 Cerussite
 Galena
 Jamesonite
 Linarite
 Massicot

Mimetite	Pharmacosiderite	Gold
Pyromorphite	Proustite	
Zinkenite	Realgar	IRON (48)
	Scorodite	Actinolite
MANGANESE (5)	Tennantite	Allanite
Manganite	Tyrolite	Argentojarosite
Psilomelane		Arseniosiderite
Pyrolusite	BARIUM (3)	Arsenopyrite
Rhodochrosite	Barite	Augite
Rhodonite	Danburite	Axinite
	Psilomelane	Beaverite
PHOSPHORUS (3)		Beidellite
Mimetite	BERYLLIUM (3)	Beudantite
Phosphorite	Allanite	Biotite
Pyromorphite	Bertrandite	Bornite
	Beryl	Carminite
SILVER (5)		Carphosiderite
Argentite	BISMUTH (5)	Chalcopyrite
Cerargyrite	Aikinite	Chenevixite
Pyrargyrite	Bismite	Cobaltite
Silver	Bismuth	Epidote
Tetrahedrite	Bismuthinite	Ferberite
	Bismutite	Ferrimolybdate
TELLURIUM (1)		Ferrisymplesite
Calaverite	CERIUM (3)	Garnet
	Allanite	Hedenbergite
ZINC (4)	Monazite	Hematite
Goslarite	Samaraskite	Hornblende
Hemimorphite		Hypersthene
Sphalerite	COPPER (27)	Iddingsite
Tetrahedrite	Aikinite	Idocrase
	Aurichalcite	Ilmenite
<u>TOOELE COUNTY</u>	Azurite	Jamesonite
ANTIMONY (7)	Beaverite	Jarosite
Boulangerite	Bornite	Jefferisite
Jamesonite	Brochantite	Limonite
Pyrargyrite	Chalcanthite	Magnetite
Stephanite	Chalcocite	Melanterite
Stibiconite	Chalcopyrite	Natrojarosite
Stibnite	Chenevixite	Nontronite
Tetrahedrite	Chrysocolla	Olivine
	Clinoclase	Pharmacosiderite
ARSENIC (22)	Conicalcrite	Plumbojarosite
Adamite	Copper	Pyrite
Arseniosiderite	Cornwallite	Pyrrhotite
Arsenopyrite	Covellite	Scorodite
Austinite	Cuprite	Siderite
Beudantite	Cuprotungstite	Siderotil
Carminite	Descloizite	Tennantite
Chenevixite	Malachite	Tourmaline
Clinoclase	Olivinite	Wolframite
Cobaltite	Rosasite	
Conicalcrite	Sulvanite	LEAD (15)
Cornwallite	Tennantite	Aikinite
Ferrisymplesite	Tenonite	Anglesite
Lorandite	Tetrahedrite	Beaverite
Mimetite	Tyrolite	Beudantite
Olivinite		Boulangerite
Orpiment	GOLD (2)	Carminite
	Calaverite	Cerussite

Descloizite
Galena
Jamesonite
Mimetite
Plumbojarosite
Pyromorphite
Stolzite
Wulfenite

MANGANESE (10)

Allanite
Axinite
Huebnerite
Manganite
Psilomelane
Pyrolusite
Rhodochrosite
Rhodonite
Wad
Wolframite

MERCURY (2)

Cinnabar
Metacinnabar

MOLYBDENUM (4)

Ferrimolybdite
Molybdenite
Powellite
Wulfenite

PHOSPHORUS (6)

Apatite
Mimetite
Monazite
Pyromorphite
Turquoise
Variscite

SILVER (9)

Argentite
Argentojarosite
Cerargyrite
Hessite
Proustite
Pyrargyrite
Silver
Stephanite
Tetrahdrite

TELLURIUM (2)

Calaverite
Hessite

TIN (1)

Samarskite

TITANIUM (5)

Anatase
Ilmenite

Rutile
Samarskite
Sphene

TUNGSTEN (7)

Cuprotungstite
Ferberite
Huebnerite
Powellite
Scheelite
Stolzite
Wolframite

URANIUM (2)

Samarskite
Uraninite

VANADIUM (2)

Descloizite
Sulvanite

ZINC (11)

Adamite
Aurichalcite
Austinite
Descloizite
Hemimorphite
Hydrozincite
Rosasite
Smithsonite
Sphalerite
Tetrahdrite
Wurtzite

ZIRCONIUM (1)

Zircon

UINTAH COUNTY

BARIUM (4)

Barytocalcite
Burbankite
Garrelsite
Leucosphenite

CERIUM (2)

Burbankite
Monazite

CHROMIUM (1)

Chromite

COPPER (5)

Azurite
Bornite
Chalcocite
Malachite
Torbernite

GOLD (1)

Gold

IRON (6)

Bornite
Chromite
Glauconite
Halotrichite
Hematite
Pyrite

LEAD (2)

Cerussite
Galena

MOLYBDENUM (2)

Ilsemannite
Molybdenite

PHOSPHORUS (7)

Autunite
Carbonate Apatite
Collophane
Fluorapatite
Monazite
Phosphorite
Torbernite

SILVER (1)

Cerargyrite

STRONTIUM (1)

Burbankite

TITANIUM (1)

Leucosphenite

URANIUM (4)

Autunite
Carnotite
Torbernite
Tyuyamunite

VANADIUM (2)

Carnotite
Tyuyamunite

ZINC (2)

Smithsonite
Wurtzite

ZIRCONIUM (1)

Elpidite

UTAH COUNTY

ANTIMONY (5)

Jamesonite
Kermesite
Miargyrite
Polybasite
Tetrahdrite

ARSENIC (4)	Freibergite	Englishite
Enargite	Garnet	Gordonite
Luzonite	Halotrichite	Lehiite
Mimetite	Hematite	Lewistonite
Pearceite	Hornblende	Millisite
	Jamesonite	Mimetite
BARIUM (2)	Jarosite	Montgomeryite
Barite	Kornelite	Overite
Psilomelane	Limonite	Phosphorite
	Magnetite	Sterrettite
BERYLLIUM (1)	Marcasite	Tinticite
Allanite	Melanterite	Variscite
	Nontronite	Wardite
	Olivine	
BISMUTH (2)	Pargasite	SILVER (12)
Bismuthinite	Plumbojarosite	Argentite
Tetradymite	Pyrite	Argentojarosite
	Siderite	Cerargyrite
CADMIUM (1)	Siderotil	Freibergite
Greenockite	Szomolnokite	Hessite
	Tinticite	Miargyrite
CERIUM (1)		Pearceite
Allanite	LEAD (12)	Petzite
	Altaite	Polybasite
COBALT (1)	Anglesite	Silver
Cryptomelane	Cerussite	Sylvanite
	Galena	Tetrahedrite
COPPER (14)	Jamesonite	
Antlerite	Lanarkite	TELLURIUM (5)
Azurite	Massicot	Altaite
Bornite	Mimetite	Hessite
Brochantite	Minium	Petzite
Chalcocite	Plumbojarosite	Sylvanite
Chalcopyrite	Vanadinite	Tetradymite
Cubanite	Wulfenite	
Cuprite		TITANIUM (3)
Enargite	MANGANESE (8)	Anatase
Freibergite	Allanite	Rutile
Luzonite	Chalcophanite	Sphene
Malachite	Cryptomelane	
Polybasite	Hetaerolite	TUNGSTEN (1)
Tetrahedrite	Psilomelane	Scheelite
	Pyrolusite	
GOLD (3)	Rhodochrosite	VANADIUM (1)
Gold	Wad	Vanadinite
Petzite		
Sylvanite	MOLYBDENUM (2)	ZINC (9)
	Molybdenite	Chalcophanite
IRON (32)	Wulfenite	Cryptomelane
Actinolite	NICKEL (1)	Eardleyite
Allanite	Eardleyite	Freibergite
Argentojarosite		Hetaerolite
Beidellite	PHOSPHORUS (18)	Smithsonite
Biotite	Apatite	Sphalerite
Bornite	Crandallite	Tetrahedrite
Chalcophanite	Davisonite	Wurtzite
Chalcopyrite	Dehnrnite	
Cubanite	Deltaite	ZIRCONIUM (1)
Delessite		Zircon
Epidote		

WASATCH COUNTY

ANTIMONY (1)
Tetrahedrite

BARIUM (1)
Barite

COPPER (3)
Bornite
Chalcopyrite
Tetrahedrite

IRON (10)
Bornite
Chalcopyrite
Garnet
Hematite
Idocrase
Magnesioferrite
Magnetite
Pinnite
Pyrite
Siderite

LEAD (3)
Cerussite
Galena
Pyromorphite

MANGANESE (2)
Pyrolusite
Rhodochrosite

PHOSPHORUS (4)
Carbonate Apatite
Fluorapatite
Phosphorite
Pyromorphite

SILVER (2)
Silver
Tetrahedrite

ZINC (2)
Sphalerite
Tetrahedrite

WASHINGTON COUNTY

ANTIMONY (1)
Stibnite

ARSENIC (3)
Adamite
Orpiment
Realgar

COPPER (12)
Aurichalcite

Azurite
Bornite
Chalcocite
Chalcopyrite
Chrysocolla
Copper
Cuprite
Malachite
Rosa site
Tenorite
Volborthite

GOLD (1)
Gold

IRON (8)
Bornite
Chalcopyrite
Hematite
Jarosite
Limonite
Magnetite
Plumbojarosite
Pyrite

LEAD (2)
Cerussite
Plumbojarosite

MANGANESE (2)
Birnessite
Pyrolusite

PHOSPHORUS (1)
Autunite

SILVER (5)
Aguilarite
Argentite
Cerargyrite
Embolite
Silver

STRONTIUM (1)
Celestite

TUNGSTEN (1)
Scheelite

URANIUM (2)
Autunite
Carnotite

VANADIUM (2)
Carnotite
Volborthite

ZINC (5)
Adamite
Aurichalcite

Hydrozincite
Rosa site
Smithsonite

WAYNE COUNTY

ARSENIC (1)
Metazeunerite

CERIUM (1)
Monazite

COPPER (9)
Azurite
Brochantite
Chalcanthite
Chalcopyrite
Johannite
Malachite
Metatorbernite
Metazeunerite
Torbernite

IRON (7)
Chalcopyrite
Jarosite
Lepidocrocite
Limonite
Pyrite
Sideronatrite
Staurolite

LEAD (1)
Galena

MANGANESE (1)
Pyrolusite

PHOSPHORUS (3)
Metatorbernite
Monazite
Torbernite

TITANIUM (2)
Anatase
Rutile

URANIUM (11)
Carnotite
Johannite
Metatorbernite
Metazeunerite
Schoepite
Schroëckingerite
Sklodowskite
Torbernite
Uraninite
Uranopillite
Zippeite

VANADIUM (2)
Carnotite
Metarossite

ZIRCONIUM (1)
Zircon

WEBER COUNTY

BARIUM (2)
Barite
Psilomelane

COPPER (4)
Azurite
Bornite
Chalcopyrite
Malachite

IRON (10)
Biotite
Bornite
Chalcopyrite
Epidote
Garnet
Hematite
Hornblende
Limonite
Magnetite
Pyrite

LEAD (3)
Anglesite
Cerussite
Galena

MANGANESE (2)
Psilomelane
Pyrolusite

MOLYBDENUM (1)
Molybdenite

PHOSPHORUS (1)
Phosphorite

SILVER (1)
Silver

URANIUM (1)
Uraninite

UTAH GEOLOGICAL AND MINERALOGICAL SURVEY

103 Civil Engineering Building
University of Utah
Salt Lake City, Utah 84112

THE UTAH GEOLOGICAL AND MINERALOGICAL SURVEY since 1949 has been affiliated with the College of Mines and Mineral Industries at the University of Utah. It operates under a director with the advice and counsel of an Advisory Board appointed by the Board of Regents of the University of Utah from organizations and categories specified by law.

The survey is enjoined to cooperate with all existing agencies to the end that the geological and mineralogical resources of the state may be most advantageously investigated and publicized for the good of the state. The *Utah Code, Annotated, 1953 Replacement Volume 5, Chapter 36, 53-36-2*, describes the Survey's functions.

Official maps, bulletins, and circulars about Utah's resources are published. (Write to the Utah Geological and Mineralogical Survey for the latest list of publications available).

THE LIBRARY OF SAMPLES FOR GEOLOGIC RESEARCH. A modern library for stratigraphic sections, drill cores, well cuttings, and miscellaneous samples of geologic significance has been established by the Survey at the University of Utah. It was initiated by the Utah Geological and Mineralogical Survey in cooperation with the Departments of Geology of the universities in the state, the Utah Geological Society, and the Intermountain Association of Petroleum Geologists. This library was made possible in 1951 by a grant from the University of Utah Research Fund and by the donation of collections from various oil companies operating in Utah.

The objective is to collect, catalog, and systematically file geologically significant specimens for library reference, comparison, and research, particularly cuttings from all important wells driven in Utah, and from strategic wells in adjacent states, the formations, faunas, and structures of which have a direct bearing on the possibility of finding oil, gas, salines or other economically or geologically significant deposits in this state. For catalogs, facilities, hours, and service fees, contact the office of the Utah Geological and Mineralogical Survey.

THE SURVEY'S BASIC PHILOSOPHY is that of the U. S. Geological Survey, i.e., our employees shall have no interest in Utah lands. For permanent employees this restriction is lifted after a 2-year absence; for consultants employed on special problems, there is a similar time period which can be modified only after publication of the data or after the data have been acted upon. For consultants, there are no restrictions beyond the field of the problem, except where they are working on a broad area of the state and, here, as for all employees, we rely on their inherent integrity.

DIRECTORS:

William P. Hewitt, 1961-

Arthur L. Crawford, 1949-1961

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