METALLOGENIC MAP OF ZINC, LEAD, AND BARIUM DEPOSITS AND OCCURRENCES IN PALEOZOIC SEDIMENTARY ROCKS, EAST-CENTRAL UNITED STATES

By Sandra H. B. Clark

INTRODUCTION

This pamphlet, which accompanies map I–1773, is a descriptive compilation of 545 zinc, lead, and barium districts, deposits, and occurrences in Paleozoic sedimentary rocks in the east-central United States. Numbers generally are assigned to the deposits and occurrences in a left to right and top to bottom pattern within each state (listed alphabetically). The numbers correspond to the numbers within each state on the accompanying map. More than one name is given for localities that have been called by different names at different times. The name listed first is that most recently or commonly used in the literature, or is from a nearby geographical locality. Other names for the occurrences are listed in parenthesis. Names of subdistricts and (or) some of the larger mines are listed in parentheses after district names. These names are included to aid the reader in identifying localities as listed in other reports and are not necessarily current. This is especially true for names of quarries, which may or may not be currently operating or being operated by the same company.

Commodities are listed in order of abundance, if known, in the order listed in previous reports, or, if there is no other information, Pb and Zn before Ba. Minor or byproduct commodities are in parentheses. Commodities are shown by chemical symbols: Pb, lead; Zn, zinc; Ba, barium; Cu, copper; F, fluorine; As, arsenic; U, uranium; Ag, silver; Cd, cadmium. Size is given as occurrence or prospect or as small, medium or large for deposits which have been mined. Definitions of small, medium and large are those used by Guild (1981, p. A4). Stratigraphic names and geologic ages are taken from the references cited and do not necessarily conform to the usage of the U.S. Geological Survey. References listed are selected to provide information on the specific deposit or occurrence shown, but are not comprehensive listings of references to each deposit or occurrence. The compilation is generally restricted to deposits and mineral occurrences that have been described in the literature, although data for a few occurrences are from unpublished sources. Dashes indicate unknown or no information available.

CONTENTS

ALABAMA

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Cherokee County	Ba	Occurrence	Lower Cambrian shale (Weisner Formation)	Vein cutting shale.	Adams and Jones, 1940, p. 37-38.
2	Beaver Creek Valley-Greens Valley area	Ba	Small	In residual soil overlying Cambrian and Ordovician limestone and dolomite	--	Adams and Jones, 1940, p. 32-34; Hughes and Lynch, 1973, p. 32-34.
3	Pelham Range	Pb	Prospects	Ordovician limestone	Thin veins. On military reservation.	Neathery and others, 1972, p. 23.
4	Angel District (Evans mine, Angel Station)	Ba	Small	In residual soil overlying Cambrian and Lower Ordovician dolomite and limestone (Copper Ridge, Chepultepec, Newala, and Longview Formations)	Fracture filling and replacement; boxwork patterns.	Adams and Jones, 1940, p. 34-37; Hughes and Lynch, 1973, p. 34-41.
5	Cedar Springs, Wellington, and "Old Lead Mine"	Pb, Zn (Ba, F)	do.	Lower Cambrian to Lower Ordovician limestone and dolomite	Thin veins.	Neathery and others, 1972, p. 21-24.
6	Leeds area	Ba	do.	In residual clay overlying Lower Ordovician Newala Limestone	Calcite veins and irregular vein-like replacement of barite in limestone.	Adams and Jones, 1940, p. 17-18, 32; Hughes and Lynch, 1973, p. 31-32.
7	Vincent, Harpersville, Wilsonville district	Ba	do.	In residuum of Cambrian and Lower Ordovician dolomite and limestone	Barite occurs in residuum of the Copper Ridge and Chepultepec Formations, but may have been derived from weathering of the overlying limestone.	Adams and Jones, 1940, p. 17-18, 30-31; Hughes and Lynch, 1973, p. 30-31.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
8	Longview Saginaw district (Longview Lime works)	Ba	do.	In residual clay overlying Lower Ordovician Newala Limestone	In one quarry brecciated Newala Limestone is cemented and partly replaced by calcite. Barite occurred immediately above this horizon.	Adams and Jones, 1940, p. 31; Hughes and Lynch, 1973, p. 29-30.
9	Sinks District (Julian Fancher, D.C. Weaver, Herron, Hardy Pratt)	Ba (F)	Medium	In residual clay overlying Ordovician dolomite or limestone (Newala Limestone and Mosheim Limestone)	As veins in limestone. Fluid inclusions have a temperature of 70°C-92°C (uncorrected for pressure). Veins contain calcite, marcasite, sphalerite, goethite, and massive sulfur.	Adams and Jones, 1940, p. 21-29; Hughes and Lynch, 1973, p. 24-29; Jones and McVay, 1934.

GEORGIA

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Hale dolomite quarry	Ba, F, Pb	Occurrence	Ordovician dolomite (Knox Group)	In a five-foot thick brecciated zone.	Butts and Gildersleeve, 1948, p. 111.
2	Ruralville area	Ba	Small	In soil which contains fragments from Ordovician Knox Group	Residual deposit of white crystalline barite in yellow to reddish-yellow clay loam.	Hull, 1920, p. 134-136.
3	Eton district	Ba	do.	In red soil which overlies Ordovician Knox Group	Residual deposit with white crystalline barite and some dark fragments with radiating structure.	Hull, 1920, p. 129-133.
4	Plainville area	Ba	do.	In brown soil and in Cambrian limestone (Conasauga Formation)	Residual deposits and veins in underlying limestone.	Hull, 1920, p. 136-139.
5	Big Dry Creek	Pb	Occurrence	Limestone	Small galena cubes have been found in a limestone quarry.	Cook, 1978, p. 24; Hurst and Crawford, 1970, p. 147.
6	Gibson property	Ba	Prospect	Residual in soil which contains weathered seams of Ordovician Knox dolomite	Fragments in dark red soil, thought to be derived from veins or fracture fillings.	Hull, 1920, p. 139-140.
7	Holcombe property	Ba	Small	In soil overlying Ordovician dolomite (Knox Group)	Fragments in red clay.	Hull, 1920, p. 127-129.
8	Cartersville district	Ba (Mn, Fe)	Large	In soils; primary ore-bearing strata are Lower Cambrian dolomite (Rome and Shady Formations)	As white to very light-blue, fine-grained, granular masses in residuum and in veins, pods and fracture fillings. Residual clays up to 200 feet thick.	Kesler, 1950; Reade and others, 1980.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
9	Stilesboro area	Ba	Prospect	In soil overlying Ordovician limestone (Chickamauga Formation)	Fragments in reddish-yellow soil.	Hull, 1920, p. 126-127.

ILLINOIS

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Upper Mississippi Valley lead-zinc district (The district includes about 35 lead and zinc mines in Illinois. Sub-districts are Elizabeth, Apple River-Warren, Stockton, Simmons Mound, Morseville, Scales Mound, and Galena). This locality is the same as site 1 of Wisconsin.	Zn, Pb (Cu, Ba)	Large	Middle Ordovician limestone and dolomite (most deposits in Galena Dolomite, Decorah Formation, and Platteville Formation); deposits of sulfides found in all formations exposed within the mineralized part of the district.	Ore bodies can be classified as (1) reverse-fault and fold controlled ore bodies, (2) joint-controlled ore bodies, and (3) placer and residual deposits. The ores in the fault and fold deposits occur as (1) vein fillings along fractures and bedding planes; (2) cavity fillings in solution breccias; and (3) disseminations by replacement and impregnation in favorable beds, particularly in shaly strata. Joint controlled deposits are veins in vertical joints and pod-like deposit in beds crossed by joints (Heyl and others, 1959).	Bradbury, 1959; Heyl and others, 1959; Heyl, 1968a; Heyl and West, 1982; McLimans, 1977.
2	Oneco diggings area	Pb	Small	Middle Ordovician Galena Dolomite	Gash veins.	Heyl and others, 1959, p. 293-294; Heyl and West, 1982, p. 1804.
3	Stadermann gold mine (Eleroy area)	Au, Cu, Pb, Zn, Ba	do.	Upper Ordovician Maquoketa Shale	Small veins and lenses contain galena, sphalerite and barite; gold-bearing quartz veins in dolomite.	Heyl and others, 1959, p. 293-294; Heyl and West, 1982, p. 1804.
4	Freeport area	Pb	do.	Middle Ordovician	--	Heyl and others, 1959, p. 293; Heyl and West, 1982, p. 1804; Willman and others, 1946, p. 9.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
5	Yellow Creek or Stebbins lead mine area	Pb	do.	Middle Ordovician Galena Dolomite and Platteville Formation	Mined before 1920.	Heyl and West, 1982, p. 1804, 1807.
6	--	Pb	Occurrence	--	--	Heyl and others, 1959, p. 293.
7	--	Pb	do.	--	--	Do.
8	Mt. Carroll diggings	Pb	Small	Middle Ordovician Galena Dolomite	In gash veins and openings; thousands of shallow workings.	Heyl and others, 1959, p. 293; Heyl and West, 1982, p. 1804, 1807; Willman and others, 1946.
9	--	Pb	do.	--	--	Heyl and West, 1982.
10	--	Pb	do.	--	--	Do.
11	--	Pb	Occurrence	--	--	Do.
12	--	Pb	do.	--	--	Do.
13	--	Zn	do.	--	--	Do.
14	Quarry of Midway Stone Company	Zn	Occurrence	Silurian dolomite (Racine Formation)	Sphalerite with pyrite and marcasite on joint faces in fracture zone.	J. C. Bradbury, written commun. 1983; Heyl, 1968b; Heyl and West, 1982, p. 1804.
15	Mecca Mine No. 1, Midland Electric Coal Corporation	Zn	Occurrence	Pennsylvanian coal (Carbondale Group, No. 6 coal)	597 ppm Zn in ash; identified as sphalerite.	Zubovic, 1960.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
16	Millbrook, near Barron Mill farm	Zn (Pb)	do.	Middle Ordovician Galena-Platteville Dolomite	Sphalerite at a depth of 60-62 feet in a water well; interpreted as residue in a solution cavity along a fault or joint within the Sandwich fault zone.	Bradbury, 1957, p. 4; Payne, 1938.
17	LaSalle Stone Company quarry (abandoned)	Ba	do.	Pennsylvanian LaSalle Limestone	As cavity fillings.	Schrode, 1952.
18	Essex Mine, Northern Illinois Coal Corporation	Zn	do.	Pennsylvanian coal (Carbondale Group, No. 5 coal)	415 ppm Zn in ash.	Zubovic, 1960.
19	Allentown Mine, Midland Coal Company	Zn	do.	Coal	--	Cobb, 1981; Cobb and others, 1980.
20	Mecco Mine (eastern and western pits) Midland Coal Company	Zn	do.	do.	--	Do.
21	Midland Coal Company (western pit)	Zn	do.	do.	--	Do.
22	Edwards Mine, Midland Coal Company	Zn	do.	do.	--	Do.
23	Norris Mine, Consolidated Coal Company	Zn	do.	do.	--	Do.
24	Sun Spot Mine, AMAX Coal Company	Zn	do.	do.	--	Do.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
25	Buckheart Mine (northern pit), Freeman United Coal Mining Company	Zn	do.	do.	--	Do.
26	Buckheart Mine (southern pit), Freeman United Coal Mining Company	Zn	do.	do.	--	Do.
27	Big Eagle No. 1 Mine, Great American Energy Corporation	Zn	do.	do.	--	Do.
28	Crown No. 2 Mine, Freeman United Coal Company	Zn	do.	do.	--	Do.
29	Peabody Coal Company No. 17 Mine	Zn	do.	Pennsylvanian Coal (Carbondale Group No. 6 coal)	268 ppm Zn in ash.	Zubovic, 1960.
30	Grand Tower	Pb	do.	Devonian limestone (probably Backbone Limestone)	Along a fault; found during railroad construction.	Bradbury, 1957, p. 2-3.
31	Hutchins Creek (near Alto Pass)	Pb, Zn (Cu)	Prospects	Devonian limestone (Backbone Limestone and Clear Creek Chert)	Small crystals disseminated in limestone; along faults.	Bradbury, 1957, p. 1-2; Desborough, 1959.
32	Eagle No. 2 Surface Mine, Peabody Coal Company	Zn	Occurrence	Coal	--	Cobb, 1981; Cobb and others, 1980.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
33 (Kentucky 3)	Illinois-Kentucky fluorspar district (In Illinois more than 80 mines, mine groups, occurrences in the Cave in Rock and Rosiclare districts, Interstate, Stewart, Hicks Dome, Empire and Lusk Creek Fault groups and Golconda area)	F(Zn,Pb,Ba)	Medium zinc-lead production. Large fluorspar production.	Mississippian limestone, shale and sandstone	Vein deposits, which are along normal faults related to horsts and grabens; bedded deposits; solution-slump breccias, which extend downward below some bedded deposits; and diatremes, which are related to the Hicks dome structure (Pinckney, 1976).	Grogan and Bradbury 1968; Heyl and others, 1965; Pinckney, 1976; Trace, 1976; Worl and others, 1974, p. 4-5 and map.

INDIANA

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	--	Zn	Occurrence	Middle Ordovician dolomite (Trenton Limestone)	In well cuttings.	Shaffer, 1981, p. 30.
2	Z22[1/]	Zn	do.	do.	In well cuttings; sphalerite shows for 70 feet.	Do.
3	Z23	Zn	do.	do.	In well cuttings.	Do.
4	Z20A and 20B	Zn, Pb	do.	do.	do.	Do.
5	Z25	Zn	do.	do.	do.	Do.
6	Z21	Zn	do.	Devonian dolomite (Muscatatuck Group)	do.	Do.
7	Z38	Zn	do.	Middle Ordovician silty dolomite (Trenton Limestone)	do.	Shaffer, 1981, p. 31.
8	Z34A and 34B	Zn	do.	Middle Ordovician dolomite (Trenton Limestone)	do.	Do.
9	--	Zn, Pb	do.	do.	do.	Shaffer, 1981, p. 30.
10	Z17 and Z18	Zn	do.	Silurian dolomite (Salamonie Dolomite)	do.	Do.
11	Z16	Zn	do.	Devonian limestone (Muscatatuck Group)	do.	Do.
12	Z84	Zn, Pb	do.	Middle Ordovician dolomite (Trenton Limestone?)	Quarry exposures at the Kentland cryptoexplosion structure.	Shaffer, 1981, p. 32, 35.

1/ Sample Numbers, Shaffer, 1981, p. 30-32.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
13	Babcock Construction Company quarry	Zn	do.	--	In quarry.	Erd and Greenberg, 1960, p. 50, 51, 55; Shaffer, 1981, p. 32.
14	--	Zn, Pb	do.	Devonian limestone (Muscatatuck Group)	Surface exposure.	Shaffer, 1981, p. 32.
15	Z15	Zn	do.	do.	In well cuttings.	Shaffer, 1981, p. 30.
16	Z35	Zn	do.	Silurian dolomite (Wabash Formation)	do.	Shaffer, 1981, p. 31.
17	--	Zn	do.	Silurian limestone (Salamonie Dolomite)	do.	Shaffer, 1981, p. 30.
18	Z7 and Z53	Zn	do.	Middle Ordovician dolomite (Trenton Limestone)	do.	Do.
19	Z19	Zn	do.	Silurian dolomite (Salamonie Dolomite)	do.	Do.
20	--	Zn	do.	Devonian limestone (Muscatatuck Formation)	do.	Shaffer, 1981, p. 31.
21	Z50	Zn	do.	Silurian dolomite (Wabash Formation)	do.	Do.
22	Z51	Zn	do.	do.	do.	Do.
23	--	Zn	do.	Devonian limestone (Muscatatuck Formation)	do.	Do.
24	Z48A and 48B	Zn	do.	do.	do.	Do.
25	Z55, 56, 57, 68, 69	Zn	do.	Silurian dolomite (Wabash Formation)	do.	Do.
26	Z76	Zn	do.	do.	do.	Do.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
27	Z28	Zn	do.	Upper Ordovician shaly limestone (Maquoketa Group)	do.	Shaffer, 1981, p. 30.
28	--	Zn	do.	--	Outcrop along Big Pipe Creek 1 mile north of Bunker Hill.	Erd and Greenberg, 1960, p. 50, 51, 57; Shaffer, 1981, p. 25.
29	Z47	Zn, Pb	do.	Middle Ordovician dolomite (Trenton Limestone)	In well cuttings.	Shaffer, 1981, p. 31.
30	Eric Stone Company quarry	Zn	do.	--	--	Erd and Greenberg, 1960, p. 50, 51, 55; Shaffer, 1981, p. 25.
31	Z79	Zn	do.	Devonian limestone (Muscatatuck Group)	Surface exposure.	Shaffer, 1981, p. 31.
32	Z2	Zn	do.	Silurian dolomite (Wabash Formation)	do.	Shaffer, 1981, p. 30.
33	Z3	Zn	do.	Middle Ordovician dolomite (Trenton Limestone)	do.	Do.
34	Z4	Zn	do.	do.	do.	Do.
35	Z1	Zn	do.	Middle Ordovician dolomite (Trenton Formation)	do.	Do.
36	Heller Stone Company quarry	Zn	do.	--	--	Erd and Greenberg, p. 50, 51, 63; Shaffer, 1981, p. 25.
37	Z75	Zn	do.	Silurian dolomite (Wabash Formation)	Surface exposure.	Shaffer, 1981, p. 32.
38	Z49	Zn	do.	Lower Ordovician dolomite (Knox Group)	In well cuttings.	Shaffer, 1981, p. 31.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
39	--	Ba	do.	--	Surface exposure.	Shaffer, 1981, p. 25.
40	--	Ba	do.	--	do.	Shaffer, 1981, p. 25.
41	Bluff along Mud Pine Creek	Zn, Ba	do.	--	do.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 62; Shaffer, 1981, p. 25.
42	--	Zn	do.	--	From a small coal mine.	Erd and Greenberg, 1960, p. 50, 51, 62; Shaffer, 1981, p. 25.
43	Z41	Zn	do.	Middle Ordovician dolomite (Black River Formation)	In well cuttings.	Shaffer, 1981, p. 31.
44	Z77	Zn	do.	Silurian dolomite (Wabash Formation)	Surface exposure.	Shaffer, 1981, p. 32.
45	--	Zn	do.	do.	In well cuttings.	Shaffer, 1981, p. 30.
46	Z42	Zn	do.	Middle Ordovician dolomite (Trenton Limestone)	do.	Shaffer, 1981, p. 31.
47	--	Ba	do.	--	Surface exposure.	Shaffer, 1981, p. 38.
48	Z80	Zn	do.	Devonian dolomite (Muscatatuck Group)	Surface exposure.	Shaffer, 1981, p. 32.
49	Z73	Zn	do.	do.	do.	Do.
50	Z12	Zn	do.	Middle Ordovician dolomite (Trenton Limestone)	In well cuttings.	Shaffer, 1981, p. 30.
51	Z37	Zn	do.	Lower Ordovician dolomite (Knox Group)	do.	Shaffer, 1981, p. 31.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
52	Z36	Zn	do.	do.	do.	Do.
53	DeBolt quarry	Zn, Ba	do.	--	--	Erd and Greenberg, 1960, p. 18-19, 50, 51, 63; Shaffer, 1981, p. 25, 26.
54	Abandoned quarry	Ba	do.	--	--	Erd and Greenberg, 1960, p. 18-19, 63; Shaffer, 1981, p. 26.
55	--	Zn	do.	--	Surface exposure.	Shaffer, 1981, p. 25.
56	Z31	Zn	do.	Mississippian limestone (Sanders Formation)	In well cuttings.	Shaffer, 1981, p. 31.
57	Wallace quarry (abandoned)	Zn, Ba	do.	--	Surface exposure.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 60; Shaffer 1981, p. 25.
58	Waveland Stone Company quarry	Zn, Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 59; Shaffer, 1981, p. 25.
59	Russellville Stone Company quarry	Zn, Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 60; Shaffer, 1981, p. 25.
60	Abandoned quarry	Zn	do.	--	--	Erd and Greenberg, 1960, p. 50, 51, 61; Shaffer, 1981, p. 25.
61	Parkersburg quarry (abandoned)	Zn	do.	--	--	Erd and Greenberg, 1960, p. 50, 51, 59; Shaffer, 1981, p. 25.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
62	New Ross Limestone Company quarry	Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 59; Shaffer, 1981, p. 25.
63	Z5	Zn	do.	Silurian dolomite (Wabash Formation)	In well cuttings.	Shaffer, 1981, p. 30.
64	Z43	Zn	do.	Mississippian limestone (Blue River Group)	do.	Shaffer, 1981, p. 31.
65	Z46	Zn	do.	Mississippian limestone (Sanders Group)	do.	Do.
66	--	Zn	do.	--	Surface exposure.	Shaffer, 1981, p. 25.
67	Z78	Zn	do.	Pennsylvanian siltstone (Racoon Creek Group)	do.	Shaffer, 1981, p. 32.
68	Ohio and Indiana Stone Company quarry	Zn, Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 61; Shaffer, 1981, p. 25, 26.
69	Lone Star Cement Company quarry	Zn	do.	--	--	Erd and Greenberg, 1960, p. 50, 51, 61; Shaffer, 1981, p. 25.
70	Indiana State Farm quarry	Zn	do.	--	--	Do.
71	--	Ba	do.	--	Surface exposure.	Shaffer, 1981, p. 26.
72	Z44	Zn	do.	Mississippian limestone (Sanders Group)	do.	Do.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
73	Chinook Mine	Zn	do.	Pennsylvanian coal (Seelyville Coal III)	Pyrite and marcasite are the main sulfides; sphalerite is rarely present, occurring in fusinite associated with cleat pyrite.	Boctor and others, 1976.
74	--	Zn	do.	Pennsylvanian shale (Racoon Creek Group)	do.	Shaffer, 1981, p. 31.
75	--	Zn	do.	do.	do.	Do.
76	Z45	Zn	do.	Mississippian limestone (Blue River Group)	do.	Do.
77	--	Zn	do.	Devonian dolomite (Muscatatuck Group)	do.	Do.
78	Bicknell Coal Company	Zn	do.	Sandstone	In siderite concretions.	Erd and Greenberg, 1960, p. 50, 51, 56; Shaffer, 1981, p. 25.
79	Z33	Zn	do.	Mississippian limestone (Blue River Group)	In well cuttings.	Shaffer, 1981, p. 30.
80	Z8	Zn	do.	Silurian? limestone (Wabash Formation?)	do.	Do.
81	--	Zn	do.	Mississippian limestone (Sanders Group)	do.	Do.
82	Z9	Zn	do.	Mississippian limestone (Blue River Group)	do.	Do.
83	Z10	Zn	do.	Devonian dolomite (Muscatatuck Group)	do.	Do.
84	Z52	Zn	do.	do.	do.	Do.
85	McCormicks Creek State Park	Zn	do.	--	Outcrop along McCormicks Creek.	Erd and Greenberg, 1960, p. 50, 51, 60; Shaffer, 1981, p. 25.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
86	Gosport	Zn	do.	--	In cut near railroad station.	Erd and Greenberg, 1960, p. 50, 51, 59; Shaffer, 1981, p. 25.
87	Gosport	Zn	do.	--	In cut on secondary road.	Erd and Greenberg, 1960, p. 50, 51, 59; Shaffer, 1981, p. 25.
88	--	Zn, Ba	do.	--	In abandoned quarry.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 60; Shaffer, 1981, p. 25, 26.
89	Z32	Zn	do.	Devonian dolomite (Muscatatuck Group)	In well cuttings.	Shaffer, 1981, p. 31.
90	Brooklyn Shale Company Pit	Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 59; Shaffer, 1981, p. 25.
91	Z30	Zn	do.	Mississippian limestone (Sanders Group)	In well cuttings.	Shaffer, 1981, p. 31.
92	--	Zn, Ba	do.	--	do.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 57; Shaffer, 1981, p. 25.
93	--	Ba	do.	--	In road cut on Indiana 37.	Erd and Greenberg, 1960, 18, 19, 57; Shaffer, 1981, p. 25.
94	Z39	Zn	do.	Devonian dolomite (Muscatatuck Group)	In well cuttings. Near a surface exposure Z71 (not shown separately) of sphalerite in Mississippian limestone (Sanders Group).	Shaffer, 1981, p. 31, 32.
95	--	Zn, Ba	do.	--	In abandoned quarry.	Erd and Greenberg, 1960, 18, 19, 50, 51, 57; Shaffer, 1981, p. 25.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
96	Z29	Zn	do.	Devonian dolomite (Mascatatuck Group)	In well cuttings.	Shaffer, 1981, p. 31.
97	Z6	Zn	do.	Silurian dolomite (Salamonie Dolomite)	do.	Shaffer, 1981, p. 30.
98	--	Zn, Ba	do.	--	do.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 57; Shaffer, 1981, p. 25.
99	Bloomington Crushed Stone Company quarry	Zn, Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 58; Shaffer, 1981, p. 25.
100	Griffys Creek	Zn	do.	--	Outcrop on small tributary to Griffys Creek.	Erd and Greenberg, 1960, p. 50, 51, 57; Shaffer, 1981, p. 25.
101	--	Zn	do.	--	Outcrop and wash in stream.	Erd and Greenberg, 1960, p. 50, 51, 58; Shaffer, 1981, p. 25.
102	--	Zn	do.	--	do.	Do.
103	--	Zn, Ba	do.	--	In abandoned quarry.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 57; Shaffer, 1981, p. 25.
104	--	Zn	do.	--	Exposure in temporary excavation.	Erd and Greenberg, 1960, p. 50, 51, 58; Shaffer, 1981, p. 25.
105	--	Zn	do.	Devonian limestone (Muscatatuck Group)	do.	Do.
106	--	Ba	do.	--	In road cut on Indiana 46.	Erd and Greenberg, 1960, p. 18, 19, 58; Shaffer, 1981, p. 25.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
107	--	Ba	do.	--	In road cut on Indiana 37.	Do.
108	--	Zn	do.	--	In abandoned quarry.	Erd and Greenberg, 1960, p. 50, 51, 58; Shaffer, 1981, p. 25.
109	--	Ba	do.	--	In road cut on Indiana 37.	Do.
110	--	Ba	do.	--	do.	Do.
111	Smithville quarry (abandoned)	Ba	do.	--	do.	Erd and Greenberg, 1960, p. 18, 19, 58; Shaffer, 1981, p. 25.
112	--	Ba	do.	--	--	Do.
113	Ralph Rogers Company quarry	Zn	do.	--	--	Erd and Greenberg, 1960, p. 50, 51, 56; Shaffer, 1981, p. 25.
114	Webster quarry (abandoned)	Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 56; Shaffer, 1981, p. 25.
115	--	Zn	do.	Mississippian limestone	Two surface exposures. One in Sanders Group (Z70).	Erd and Greenberg, 1960, p. 50, 51, 58; Shaffer, 1981, p. 25, 32.
116	--	Zn, Ba	do.	--	--	Shaffer, 1981, p. 25.
117	--	Ba	do.	--	In road cut.	Do.
118	--	Ba	do.	--	In outcrop in drainage ditch along Indiana 58.	Do.
119	--	Ba	do.	--	In outcrop along road.	Do.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
120	--	Zn	do.	Mississippian limestone (Sanders Group)	In well cuttings.	Shaffer, 1981, p. 30.
121	Z81	Zn	do.	Mississippian limestone (Blue River Group)	--	Shaffer, 1981, p. 32.
122	Nally, Ballard, and Cuto quarry	Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 57; Shaffer, 1981, p. 25.
123	--	Zn, Ba	do.	--	In abandoned quarry and railroad cut.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 56; Shaffer, 1981, p. 25.
124	Radcliff and Berry, Inc. quarry	Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 59; Shaffer, 1981, p. 25.
125	--	Ba	do.	--	In abandoned quarry.	Erd and Greenberg, 1960, p. 18, 19, 62; Shaffer, 1981, p. 26.
126	--	Zn, Ba	do.	Mississippian Harrodsburg Limestone (?)	From an abandoned quarry immediately west of Seymour Gravel Company quarry (Indiana 127).	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 55; Shaffer, 1981, p. 25.
127	Seymour Gravel Company quarry	Zn, Ba	do.	Mississippi Harrodsburg Limestone	In geodes.	Do.
128	--	Zn	do.	Mississippian limestone (Salamonie ? Dolomite)	In well cuttings.	Shaffer, 1981, p. 30.
129	--	Zn	do.	Devonian limestone (Muscatatuck Group)	--	Shaffer, 1981, p. 32.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
130	Meshburger Stone Company quarry	Zn	do.	--	--	Erd and Greenberg, 1960, p. 50, 51, 53; Shaffer, 1981.
131	Z74	Zn	do.	do.	--	Do.
132	Paul Frank quarry	Zn, Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 55; Shaffer, 1981, p. 25.
133	--	Ba	do.	--	In road cut on Indiana 129.	Erd and Greenberg, 1960, p. 18, 19, 61; Shaffer, 1981, p. 26.
134	Scott County Stone Company quarry	Zn	do.	--	--	Erd and Greenberg, 1960, p. 50, 51, 61; Shaffer, 1981, p. 25.
135	--	Ba	do.	--	In railroad cut.	Erd and Greenberg, 1960, p. 18, 19, 55; Shaffer, 1981, p. 25.
136	Tri-County Stone Company quarry	Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 62; Shaffer, 1981, p. 26.
137	Salem Lime and Stone Company quarry (abandoned)	Zn	do.	--	--	Erd and Greenberg, 1960, p. 50, 51, 62; Shaffer, 1981, p. 25.
138	Hoosier Lime and Stone Company quarry	Zn	do.	--	--	Do.
139	--	Zn, Ba	do.	--	In cut for dam spillage.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 62; Shaffer, 1981, p. 25, 26.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
140	--	Zn	do.	--	In railroad cut.	Erd and Greenberg, 1960, p. 50, 51, 62; Shaffer, 1981, p. 25.
141	--	Zn	do.	--	In road cut on Indiana Route 60.	Erd and Greenberg, 1960, p. 50, 51, 63; Shaffer, 1981, p. 25.
142	--	Zn	do.	--	In abandoned quarry.	Erd and Greenberg, 1960, p. 50, 51, 63; Shaffer, 1981, p. 25.
143	--	Zn, Ba	do.	--	In abandoned quarry.	Erd and Greenberg, 1960, p. 18, 19, 50, 51, 63; Shaffer, 1981, p. 25, 26.
144	--	Zn	do.	--	Surface exposure.	Shaffer, 1981, p. 25.
145	Z13	Zn	do.	Mississippian limestone (Sanders Group)	In well cuttings.	Shaffer, 1981, p. 30.
146	--	Zn	do.	--	In road cut on Indiana 70.	Erd and Greenberg, 1960, p. 50, 51, 61; Shaffer, 1981, p. 25.
147	Scheeler quarry	Ba	do.	--	--	Erd and Greenberg, 1960, p. 18, 19, 60; Shaffer, 1981, p. 26.
148	--	Zn	do.	Mississippian limestone (Blue River Group)	In well cuttings.	Shaffer, 1981, p. 31.

KENTUCKY

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Central Kentucky district (More than 200 vein deposits; 177 mines and prospects described by Robinson, 1931)	Ba (Zn, Pb, F)	Medium	Mostly in Middle Ordovician limestone; 96% of the veins are in Lexington Limestone Formation, Tyrone Limestone, and lower Clay's Ferry Formation. Some veins extend into Upper Ordovician Richmond Group.	In steeply dipping veins and fault breccia fillings on the Jessamine dome. Most veins are in nearly vertical strike-slip faults.	Jolly and Heyl, 1964; Plummer, 1971; Fohs, 1913; Robinson, 1931.
2	Cumberland River area (Central Tennessee district)	Ba, F, Zn, Pb	Prospects	Upper Ordovician limestone (Leipers Limestone) and Mississippian shale and limestone (Fort Payne Formation)	Steeply dipping veins and fault breccia fillings; veinlets of barite in shale; barite in geodes and as irregular nodular segregations in limestone.	Jolly and Heyl, 1964; Plummer, 1971; Taylor, 1962.
3 (Illinois 33)	Illinois-Kentucky fluorspar district (In Kentucky more than 120 mines, mine groups, prospects, and occurrences in the Western Kentucky district)	F (Zn, Pb, Ba)	Medium zinc-lead production. Large fluorspar production.	Mississippian limestone, shale, and sandstone	Vein deposits, bedding replacement deposits, and residual deposits; most large vein deposits are in the principal NE- or E-trending faults; some are in cross or oblique faults or other fractures. Some veins are fissure fillings; others have resulted from replacement of wall rock. In some deposits fluorspar cements breccia fragments.	Currier, 1923, 1937; Grogan and Bradbury, 1968; Pinckney, 1976; Williams and others, 1954; Worl and others, 1974, p. 5 and map.

MARYLAND

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Sauble quarry, Johnsville	Ba	Occurrence	Cambrian(?) Wakefield Marble	Lumps, small bands and stringers in brecciated and crushed marble.	Brobst, 1965, p. 5; Heyl and Pearre, 1965, p. 40, fig. 2; Ostrander, 1942, Watson and Grasty, 1915, p. 361-362.

MICHIGAN

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Point Aux Barques lighthouse	Zn	Occurrence	Mississippian Coldwater Formation	Sphalerite and calcite shell replacement.	Heinrich, 1976, p. 195; Lane, 1900, p. 229.
2	Collison's well, Snell's well, and an unnamed well	Pb	do.	Pyritiferous shale	Galena reported from 3 wells at depths of 40 to 75 feet.	Lane, 1900, p. 161.
3	Muller's well	Zn	do.	--	Iron and zinc sulfides reported from a depth of 113-118 feet.	Lane 1900, p. 145.
4	Bauer's well, Sebewaing	Zn	do.	Mississippian Bayport Limestone	Fragments of sphalerite reported from a depth 118 feet.	Heinrich, 1976, p. 195; Lane, 1900, p. 221, 229.
5	Cass City	Zn	do.	Mississippian sandstone (Marshall Formation)	In nodular concretions and drusy cavities.	Davis, 1909, p. 185, 203; Heinrich, 1976, p. 196; Rominger, 1876, p. 104-105.
6	Grand Ledge Clay Products Company	Zn, Pb	do.	Pennsylvanian Saginaw Formation	In ironstone concretions.	Dorr and Eschman, 1970, p. 255; Heinrich, 1976, p. 195.
7	Bellevue	Zn, Ba	do.	Mississippian Bayport Limestone	As fine crystals in cavities.	Dorr and Eschman, 1970, p. 255; Heinrich, 1976, p. 195, p. 55.
8	Coldwater	Zn, Pb	do.	Mississippian Coldwater Shale	In clay-ironstone concretions.	Dorr and Eschman, 1970, p. 255; Heinrich, 1976, p. 195.

NEW YORK

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Rossie (Bigelow, Macomb)	Pb, Zn	Small	Precambrian to Ordovician limestone and sandstone	Silurian mineralization.	Brown, 1983; Buddington, 1934; Neumann, 1952a; Newland, 1919, p. 140-142.
2	Redwood	Pb	do.	Cambrian sandstone (Potsdam Sandstone)	Vein; small amount of galena disseminated in limestone.	Buddington, 1934, p. 206-207; Miller, 1910, p. 58; Newland, 1919, p. 142.
3	Pillar Point	Ba	do.	Ordovician limestone (Trenton Limestone)	Small veins.	Merrill, 1895, p. 582; Newland, 1919, p. 33.
4	Martinsburg	Pb, Zn	Occurrence	do.	--	Miller, 1910, p. 58.
5	Fairfield	Ba	do.	Ordovician shale (Utica shale)	In small veins and geodes.	Newland, 1919, p. 34.
6	Salisbury	Zn (Pb,Cu)	do.	Ordovician limestone (Trenton Limestone)	Filling of solution cavities and fissures.	Newland, 1919, p. 306.
7	Little Falls	Ba	do.	Ordovician dolomitic limestone (Beekmantown Group?)	In small veins and geodes.	Newland, 1919, p. 34.
8	Saratoga Springs	Zn	do.	Ordovician dolomite (Beekmantown Group)	Veins	Newland, 1919, p. 306.
9	Blue Corners	Zn, Fe	do.	do.	On small inclined fractures.	Lesure and Klemic, 1977.
10	White Creek	Zn, Pb	Small	Cambrian quartzite and minor conglomerate	Disseminations, semi-massive lenses, and minor veinlets (J. F. Slack, oral commun., 1987).	Hartnagel and Broughton, 1951, p. 61; Mather, 1843, p. 498; Newland, 1919, p. 143.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
11	Sprakers	Zn, Pb	Occurrence	shale	--	Hartnagel and Broughton, 1951, p. 61; Newland, 1919, p. 143.
12	Carlise	Ba	do.	Silurian shale	Veins 0.25 - 1.5 inches wide.	Beck, 1842, p. 207; Newland, 1919, p. 34.
13	Schoharie	Ba, Sr, Pb	do.	Silurian shale and limestone	Nodular aggregates of crystals.	Beck, 1842, p. 207-208; Newland, 1919, p. 34, 143.
14	Niagra Falls	Zn	do.	Silurian (?) limestone	--	Hall, 1843, p. 447.
15	Lockport	Zn (Pb)	do.	Silurian dolomite (Lockport Group)	Linings of small cavities and stringers.	Newland, 1919, p. 307.
16	Manning	Zn (Pb, Sr, Ba)	do.	Silurian dolomite (Lockport Group) and overlying Holocene peat bogs	Metals concentrated in Silurian patch reefs, transported by ground waters and selectively concentrated in peat bogs as finely divided sulfides.	Cannon, 1955.
17	Rochester (Penfield and other quarries)	Zn	do.	Silurian dolomite (Lockport Group)	In solution cavities.	Bassett and Kinsland, 1973; Jensen, 1942; Kinsland, 1977.
18	Wolcott	Ba	do.	Silurian	In geodes.	Beck, 1842, p. 209.
19	College Hill	Zn (Cu, Pb)	do.	Silurian dolomite (Lockport Group)	Disseminated or in geodes; in reef zones.	Dale, 1953, p. 103-108.
20	Buffalo	Ba	do.	Devonian	"In laminae, in... rounded masses called septaria" (Beck, 1842).	Beck, 1842, p. 209.
21	Silver Creek	Ba	do.	Late Devonian mudrock and shale	Barite nodules.	Pepper and others, 1985.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
22	Laona	Ba	do.	Devonian	"In laminae, in... rounded masses called septaria" (Beck, 1842).	Beck, 1842, p. 209.
23	Syracuse	Ba	do.	Silurian (?) limestone	"In plates or tables interlacing each other" (Beck, 1842).	Beck, 1842, p. 206.
24	Tully Limestone (7 localities)	Zn, Ba	do.	Devonian limestone	Replacement of matrix and grains, shell fillings.	Heckel, 1973, p. 59, 75, C9.
25	Auburn	Ba	do.	Devonian ?	"In laminae, in ... rounded masses called septaria" (Beck, 1842).	Beck, 1842, p. 209.
26	Cayuga and Seneca Lakes (3 localities)	Ba, Zn	do.	Devonian shale (Genessee Shale)	In limestone concretions.	Martens, 1925.
27	Canaan	Pb, Zn (Ag)	Small	Limestone	Veins. Numerous small veins reported in the area.	Beck, 1842, p. 46; Mather, 1843, p. 500-501.
28	Claverack	Pb	Occurrence	--	Vein	Mather, 1843, p. 502; Beck, 1842, p.46.
29	Livingston	Pb, Zn?	do.	--	In an old mine in Livingston.	Mather, 1843, p. 503.
30	Ancram (Livingston lead mine)	Pb (Cu,Zn,Ba,Ag)	Small	Ordovician dolomite (Wallomsac Formation)	Mineralization in faults of possible Triassic age N.M. Radcliff, oral commun., 1981).	Hartnagel and Broughton, 1951, p. 61; Beck, 1842, p. 45-46, 409; Mather, 1843, p. 498-500; Newland, 1919, p. 142-143; Peterson, 1950, p. 47.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
31	Smithfield (Northeast)	Pb (Cu, Ag)	do.	Ordovician limestone	Many small veins.	Beck, 1842, p. 46; Mather, 1843, p. 500-502; Newland, 1919, p. 143.
32	Fishkill	Pb (Cu)	Occurrence	Limestone	In a thin vein of quartz.	Mather, 1843, p. 503.
33	Shawangunk district (Guymard, Ellenville, Shawangunk, Ulster and Otisville mines)	Zn, Pb (Cu)	Small	Silurian sandstone and conglomerate (Shawangunk Conglomerate)	In sheeted zones along faults; veins and stockworks.	Crawford and Beales, 1983, p. 436-445; Eilertsen, 1950; Gray, 1961; Ingham, 1940; Mather, 1843, p. 359-362; Newland, 1919, p. 300-306; Neumann, 1952b; Sims and Holtz, 1951.
34	Haverstraw	Ba	Occurrence	--	Minute crystals associated with calcite.	Beck, 1842, p. 206.

OHIO

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Sohio #1 Lautzenheiser	Zn	Occurrence	Middle Ordovician Trenton Limestone	Well	Botoman and Stieglitz, 1978, p. 4, 5.
2	Lorex #1 Reckner	Zn	do.	do.	do.	Do.
3	Liberty #1 Slahunek	Zn	do.	Lower Ordovician Knox Group	do.	Do.
4	S.M.E. Cement, Inc. North quarry	Ba, Zn	do.	Devonian Ten Mile Creek Dolomite	--	Carlson, 1983, and written commun., 1984.
5	France Stone Company, Sylvania (East) quarry	Ba	do.	Devonian Detroit River Group	--	Do.
6	Maumee Stone Company, Maumee quarry	Zn, Sr, F	do.	Silurian Greenfield Formation and Lockport Group	--	Botoman and Stieglitz, 1978, p. 4, 6.
7	Maumee Stone Company, Lime City quarry	Pb, Zn, F, Sr	do.	do.	--	Botoman and Stieglitz, 1978, p. 4, 6.
8	Kraemer Stone Company, White Rock quarry (Clay Center quarry)	Zn, Pb, F, Sr	do.	Silurian Lockport Group	Well known collecting locality.	Botoman and Stieglitz, 1978, p. 4-5, 8; Howard, 1959; McAlister, 1946; Montague, 1948; Morrison, 1935; Zodac, 1947.
9	Maumee Stone Company Rocky Ridge quarry	Zn, Sr, F	do.	do.	--	Botoman and Stieglitz, 1978, p. 4, 6.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
10	Old Purtee quarry	Zn	do.	do.	--	Carlson, 1983, and written commun., 1984.
11	U.S. Gypsum Company, Genoa quarry	Zn, Pb, F	do.	do.	--	Botoman and Stieglitz, 1978, p. 4, 6; E. H. Carlson, 1984, written commun.
12	Ohio Lime Company Woodville quarry and Martin Marietta Chemicals quarries	Zn, Pb, Ba, F, Sr	do.	do.	--	Botoman and Stieglitz, 1978, p. 4, 6; Green, 1971.
13	Charles Pfizer and Company quarry	Zn, Pb, F, Sr	do.	do.	--	Botoman and Stieglitz, 1978; Carlson, 1983, and written commun., 1984.
14	Kellstone (North side) quarry	Zn	do.	Devonian Lucas Dolomite and Columbus Limestone	--	Carlson, 1983, and written commun., 1984.
15	Kellstone (South side) quarry	Zn	do.	do.	--	Do.
16	Sandusky Crushed Stone Company quarry	Zn	do.	Devonian Detroit River Group	--	Do.
17	Leeds' barite occurrence	Ba	do.	Devonian Huron Shale	Coal seams traversed by "sheets" of barite.	Leeds, 1875, p. 105.
18	Milan	Ba, Zn	do.	Devonian Huron Member of the Ohio Shale	In concretions.	Hyde and Landy, 1966; Leavens, 1968.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
19	Vermilion River	Ba	do.	Devonian Cleveland Member of the Ohio Shale	In concretions.	Holden and Carlson, 1979.
20	Maumee Stone Company, Auglaize quarry	Zn, F	do.	Devonian Dundee and Detroit River Formations	--	Botoman and Stieglitz, 1978, p. 4, 6; E. H. Carlson, 1984, written commun.
21	France Stone Company (formerly Pugh) quarry	Zn, F, Sr Ba	do.	do.	--	Botoman and Stieglitz, 1978, p. 4, 6; Parr and Chang, 1977, 1978, 1979, 1980.
22	France Stone Company North Baltimore quarry	Zn, F	do.	Silurian Tymochtee Formation	--	Botoman and Stieglitz, 1978, p. 4, 6.
23	MacRitchie Material, Inc. quarry	Zn	do.	Silurian Greenfield Formation and Lockport Group	--	Carlson, 1983, and written commun. 1984.
24	Basic Refractories Combustion Engineering quarry	Pb	do.	do.	--	Do.
25	Old quarries at Tiffin	Zn, Pb	do.	do.	--	Do.
26	Ottawa Stone Company, Inc. quarry	Zn, F	do.	Silurian Raisin River and Tymochtee Formations	--	Botoman and Stieglitz, 1978, p. 4, 6.
27	Putnum Stone Company, Inc. quarry	Zn, F	do.	do.	--	Do.
28	Ridge Township Stone quarry	Zn, F	do.	Silurian Tymochtee Formation	--	Do.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
29	Delphos Quarries Company quarry	Zn, F	do.	Silurian Tymochtee Formation	--	Do.
30	National Lime and Stone Company, Rimer quarry	Zn	do.	Silurian Raisin River and Tymochtee Formations	--	Do.
31	J. W. Karch Stone Company quarry	Zn	do.	Silurian Greenfield Formation	--	Carlson, 1983, and written commun. 1984.
32	National Lime and Stone Company, Buckland quarry	Zn	do.	Silurian Greenfield Formation and Lockport Group	--	Botoman and Stieglitz, 1978, p. 4, 5.
33	National Lime and Stone Company, Lima quarry	Zn, F	do.	Silurian Tymochtee Formation	--	Do.
34	Western Ohio Stone Company quarry	Zn	do.	do.	--	Do.
35	National Lime and Stone Company, Findlay quarry	Zn	do.	Silurian Tymochtee Formation	--	Carlson, 1983 and written commun., 1984.
36	Ashland #1 Cotner	Zn	do.	Middle Ordovician Wells Creek (Glenwood) Formation	Well	Botoman and Stieglitz, 1978, p. 4, 5.
37	National Lime and Stone Company, Carey quarry	Zn, Sr	do.	Silurian Greenfield Formation and Lockport Group	--	Botoman and Stieglitz, 1978, p. 4, 6.
38	Brinkerhoff #1 Fox	Zn	do.	Lower Ordovician Knox Dolomite	Well	Do.
39	White #1 Stubb	Zn	do.	Middle Ordovician Trenton Limestone	Well	Botoman and Stieglitz, 1978, p. 4, 5.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
40	C. M. McCarthy quarry	Zn	do.	Silurian Raisin River and Tymochtee Formations	--	Botoman and Stieglitz, 1978, p. 4, 6.
41	Hardin Quarry Company quarry	Zn, F	do.	Silurian Tymochtee Formation	--	Botoman and Stieglitz, 1978, p. 4, 5.
42	McMahon-Bullington #1 Wolf	Zn	do.	Lower Ordovician Knox Formation	Well	Do.
43	Wooster, outcrop near	Zn(Pb)	do.	Mississippian Cuyohaga Formation	As crystals in shale, as fillings or replacements of fossils, and as fossiliferous concretions associated with pyrite and calcite.	Botoman and Stieglitz, 1978, p. 4, 6; Ver Steeg, 1940.
44	Blood #1 Schlabach, Blood #2 Schmidt	Pb	do.	Silurian dolomite (Lockport Group)	Wells; rare galena as a vug filling.	Botoman and Stieglitz, 1978, p. 4, 6; Multer, 1963, p. 13.
45	Marshallville, outcrops near	Zn, Ba(Pb)	do.	Pennsylvanian shale of the basal Pottsville Formation above unconformity	In clay-ironstone septarian concretions in black, bituminous, thinly laminated shale.	Botoman and Stieglitz, 1978, p. 4, 6; Ver Steeg, 1942.
46	R. Immel Coal mine	Zn	do.	Pennsylvanian Allegheny Group	Wurtzite in concretions in coal.	Botoman and Stieglitz, 1978, p. 4, 6; Seaman and Hamilton, 1950.
47	Ellsworth, outcrop near	Zn, Ba	do.	Pennsylvanian	In shrinkage cracks in siderite in shale.	Botoman and Stieglitz, 1978, p. 4, 6; Greene, 1935.
48	Site 1	Zn	do.	Pennsylvanian Allegheny Group	Wurtzite in siderite concretions in shale.	Hollenbaugh and Carlson, 1983.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
49	Site 2, Negley	Zn	do.	do.	do.	Do.
50	Site 4	Zn	do.	do.	do.	Do.
51	Site 3	Zn	do.	do.	do.	Do.
52	Site 5	Zn	do.	do.	do.	Do.
53	Site 6	Zn	do.	do.	do.	Do.
54	Site 7 Steubenville	Zn	do.	Pennsylvanian Conemaugh Group	do.	Botoman and Stieglitz, 1978, p. 4, 6; Hollenbaugh and Carlson, 1983; Seaman and Hamilton, 1950.
55	Ohio Geological Survey stratigraphic section 12771	Zn	do.	Silurian Brassfield Formation	--	Botoman and Stieglitz, 1978, p. 4, 5.
56	Ohio Geological Survey stratigraphic section 15756, Old Marble Cliff, Lewisburg quarry	Zn	do.	do.	--	Do.
57	Ohio Geological Survey stratigraphic section 15772	Zn	do.	do.	--	Do.
58	Cominco-American CA-54 Swingley	Zn	do.	Lower Ordovician Knox Dolomite	Well	Botoman and Stieglitz, 1978, p. 4, 6.
59	G. E. Havens Limestone Company quarry and vicinity	Zn	do.	Silurian Greenfield Formation	--	Botoman and Stieglitz, 1978, p. 4, 5; Rogers, 1936, p. 114.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
60	Blue Rock quarry, American Aggregates Corporation	Zn	do.	Silurian Greenfield Formation	--	Botoman and Stieglitz, 1978, p. 4, 5.
61	Old Rucker quarry	Zn	do.	do.	--	Botoman and Stieglitz, 1978, p. 4, 6; Napper, 1917.
62	Ohio Geological Survey stratigraphic section 13610; Davon Inc., Highland Plant quarry	Zn, Ba	do.	Silurian Brassfield Formation	--	Botoman and Stieglitz, 1978, p. 4, 5.
63	Marshall quarry	Zn	do.	Silurian Lilley-Peebles Formation	--	Do.
64	Ohio Geological Survey stratigraphic section 13609	Zn	do.	Silurian Brassfield Formation	--	Botoman and Stieglitz, 1978, p. 4, 5.
65	Serpent Mound	Zn, F, Ba	do.	Silurian dolomite. Greenfield Lilley-Peebles, Bisher, and Brassfield Formations	In shatter breccia in cryptoexplosion structure.	Botoman and Stieglitz, 1978, p. 4, 5; A. V. Heyl 1983, oral commun.; Heyl and Brock, 1962; Reidel, 1975; Reidel and Koucky, 1981; Stout, 1941, p. 17, 78.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
66	Ohio Geological Survey stratigraphic section 14350	Zn	do.	Silurian Brassfield Formation	--	Botoman and Stieglitz, 1978, p. 4, 5.
67	Ohio Geological Survey stratigraphic section 9732	Zn	do.	Silurian Brassfield Formation	--	Do.
68	Cominco-American #1 Rockey	Zn, Ba	do.	Lower Ordovician Knox Group	Well	Do.
69	Ohio Geological Survey stratigraphic section 12667	Zn, Ba	do.	Silurian Brassfield Formation	--	Do.
70	Cominco-American #1 Hughes	Zn, Ba, Cu ?)	do.	Lower Ordovician Knox Dolomite	Well	Do.
71	Old Glouster Brick quarry	Zn	do.	Pennsylvanian Conemaugh Group	Wurtzite in siderite concretions in shale.	Botoman and Stieglitz, 1978, p. 4, 6; Seaman and Hamilton, 1950.

PENNSYLVANIA

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Harrison Township	Zn(?), Pb(?)	Occurrence	--	--	Smith, 1977, p. 295.
2	Ridgebury, east of (2 localities)	Pb, Cu	Occurrences	Devonian Catskill Formation	--	Smith, 1977, p. 289.
3	Roaring Branch of Lycoming Creek	Pb, Zn, Cu	Occurrence	Upper Devonian Catskill Formation	--	Smith, 1977, p. 293.
4	Millview Quarry	Pb, Zn (As, Cu)	do.	Devonian coquinoid limestone (Catskill Formation)	Disseminated grains, blebs and veinlets; mostly concentrated near top of coquinite bed.	Smith, 1977, p. 221-222.
5	Prospect 12	Pb, Cu	do.	Devonian sandstone (Catskill Formation)	--	Smith, 1977, p. 291.
6	Oil City, east of	Pb, Zn	do.	--	Oil-well cutting.	Smith, 1977, p. 295.
7	Sugar Hill Quarry	Zn, Ba (Cu)	do.	Pennsylvanian siderite nodules in shale above the Vanport Limestone	Sphalerite and wurtzite in nodules.	Smith, 1977, p. 223-225.
8	Coal mine west of Parker	Pb	do.	Carboniferous fire clay	--	Smith, 1977, p. 289.
9	Raccoon Creek near Beaver	Pb, Zn	do.	Coal measures	Nodules	Smith, 1977, p. 288.
10	North Vandergrift	Zn, Pb (?)	do.	Limy shale at base of Upper Freeport coal	Nodules	Do.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
11	Valley Camp, brickyard quarry	Zn, Ba, Cu	Occurrences	Pennsylvanian black shales (Conemaugh Formation)	The four most productive mineral localities for occurrence of wurtzite along shrinkage cracks in clay-ironstone concretions. Eleven other occurrences listed by Seaman and Hamilton (1950).	Lapham and Geyer 1959, p. 29-30; Seaman and Hamilton, 1950, p. 43-50.
12	Glassmere Brick Company quarry					
13	Wittmer					
14	Donohoe					
15	Victor (Hector) Hollow	Pb, Zn	Occurrence	Mississippian Pocono Sandstone	Considered by Smith (1977) to have a reasonable but slight chance of indicating a significant prospect in the area.	Smith, 1977, p. 291.
16	Scranton	Zn	do.	Pennsylvanian coal measures	--	Smith, 1977, p. 292.
17	Sullivan Trail Coal Company, west	Zn	do.	do.		Smith, 1977, p. 293.
18	Pine Hill, Milford	Zn	do.	Devonian Mahantango Siltstone	--	Smith, 1977, p. 294.
19	Milford Road	Zn(?)(Pb, Cu)	do.	Devonian Hamilton Sandstone	--	Do.
20	DeHass, A. M.	Pb	do.	Silurian Tonoloway Limestone (?)	--	Smith, 1977, p. 291.
21	Lymehurst quarry	Pb, Zn	do.	Silurian limestone (Tonoloway Formation)	In a calcite veinlet.	Smith, 1977, p. 180-182.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
11	Valley Camp, brickyard quarry					
12	Glassmere Brick Company quarry					
13	Wittmer	Zn, Ba, Cu	Occurrences	Pennsylvanian black shales (Conemaugh Formation)	The four most productive mineral localities for occurrence of wurtzite along shrinkage cracks in clay-ironstone concretions. Eleven other occurrences listed by Seaman and Hamilton (1950).	Lapham and Geyer 1959, p. 29-30; Seaman and Hamilton, 1950, p. 43-50.
14	Donohoe					
15	Victor (Hector) Hollow	Pb, Zn	Occurrence	Mississippian Pocono Sandstone	Considered by Smith (1977) to have a reasonable but slight chance of indicating a significant prospect in the area.	Smith, 1977, p. 291.
16	Scranton	Zn	do.	Pennsylvanian coal measures	--	Smith, 1977, p. 292.
17	Sullivan Trail Coal Company, west	Zn	do.	do.		Smith, 1977, p. 293.
18	Pine Hill, Milford	Zn	do.	Devonian Mahantango Siltstone	--	Smith, 1977, p. 294.
19	Milford Road	Zn(?)(Pb, Cu)	do.	Devonian Hamilton Sandstone	--	Do.
20	DeHass, A. M.	Pb	do.	Silurian Tonoloway Limestone (?)	--	Smith, 1977, p. 291.
21	Lymehurst quarry	Pb, Zn	do.	Silurian limestone (Tonoloway Formation)	In a calcite veinlet.	Smith, 1977, p. 180-182.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
22	Lime Bluff quarry	Zn (Pb, Cu, As)	do.	Limestone, upper Tonoloway Formation of Late Silurian age and possibly lowermost Keyser Formation of Devonian age.	In calcite veins.	Smith, 1977, p. 177-180.
23	Washingtonville	Ba (Zn, Cu)	do.	Devonian mudstone (Marcellus Formation)	In nodules.	Way and Smith, 1983.
24	Almedia mine area (Webb mine, Dave's Seafood outcrops)	Pb, Zn (Cu, As, Ag)	do.	do.	Veins in outcrop, ore in a fracture zone, as irregular replacements of limestone and along joint planes. Possibly a crackle breccia.	Smith, 1977, p. 163-168.
25	Buffalo Valley	Pb	do.	Silurian Tonoloway(?) Limestone	--	Smith, 1977, p. 295.
26	Winfield quarry	Zn, Pb	do.	Silurian limestone (upper part of the Tonoloway Formation)	Replacement of pyrite-bearing laminated limestone; calcite and sphalerite gash veins.	Smith, 1977, p. 185-187.
27	Doughty mine (Dougherty)	Pb, Zn (Cu)	Small	Silurian limestone (Tonoloway Formation)	In calcite veins and a replacement bed.	Smith, 1977, p. 170-175.
28	Kreamer	Zn	do.	Devonian conglomerate (Ridgley Member, Old Port Formation below Needmore shale)	--	Smith, 1977, p. 295.
29	Penn Haven Junction	Pb (U)	do.	Devonian sandstone (Catskill Formation)	Occurrence of clausthalite and uraninite on quartz-encrusted joint surfaces and disseminated.	Klemic and others, 1963; p. 67, 78-79, 87; Smith, 1977, p. 290.
30	Nesquehoning, Coal strip mine southwest of	Pb	do.	Pennsylvanian coal measures	--	Smith, 1977, p. 290.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
31	Walksville	Pb, Zn (Cu)	do.	Devonian sandstone (Upper Trimmers Rock sandstone)	In tension fractures and thin quartz veinlets along bedding-plane fractures.	Klemic and others, 1963, p. 58, 90-91; Smith, 1977, p. 290.
32	I. Turn's farm	Zn (Cu)	Occurrence	Silurian red beds (Bloomsburg Red Beds)	--	Smith, 1977, p. 294.
33	Bowmanstown	Pb	do.	Devonian sandstone (Lower Catskill Formation)	--	Do.
34	Lehigh Gap	Pb	do.	Silurian sandstone (Tuscarora-Shawangunk Formation)	--	Smith, 1977, p. 290.
35	Schneider	Zn	do.	Lower Ordovician dolomite (Beekmantown Group)	--	Smith, 1977, p. 293.
36	Hecktown, limonite mine on von Steuben farm	Zn	do.	--	Considered by Smith (1977) to have a reasonable but slight chance of indicating a significant prospect in the area.	Smith, 1977, p. 294.
37	Bushkill Drive	Zn, Cu	do.	Cambrian dolomite (Leithsville Formation)	In dolomite breccia above a fault.	Smith, 1977, p. 39-41.
38	Wadeville	Pb, Zn, Cu, Ni	do.	Pennsylvanian coal measures	Nickel as millerite.	Smith, 1977, p. 295.
39	State Game Land	Pb	do.	Graywacke	--	Do.
40	Pottsville	Pb	do.	Pennsylvanian coal measures	--	Do.
41	Adamsville	Pb, Zn	do.	Devonian sandstone (Palmerton Sandstone)	--	Do.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
42	Friedensville District-New Hartman mine, Ueberroth mine, Old Hartman mine, Correll or Saucon mine, Triangle or Three Corners mine	Zn	Large	Lower Ordovician dolomite (Rickenback Formation of Beekmantown Group)	Replacement of breccias.	Callahan, 1968, p. 94-107; Rose, 1970, p. 7-8; Smith, 1977, p. 82-88, 102-111, 140-149.
Included in 42	Greene mine	Zn	Occurrence	Jacksonburg Formation and (or) Beekmantown Group	Considered by Smith (1977) to have a reasonable but slight chance of indicating a significant prospect in the area.	Smith, 1977, p. 29.
Included in 42	Allentown quarry at Little Lehigh-Jordan Creek	Zn	do.	Cambrian Limestone (Allentown Formation)	Do.	Do.
43	Rickenback	Zn	do.	Lower Ordovician Beekmantown Group	Do.	Smith, 1977, p. 28.
44	Oley Valley	Zn (Cu)	Prospects	Lower and Middle Ordovician dolomite and limestone (Ontelaunee Formation)	In breccias near the crest of an anticline.	Smith, 1977, p. 112-113.
45	Frystown	Ba	Prospects	Cambro-Ordovician shale (Hamburg sequence)	Fetid barite nodule-like fragments.	Smith, 1974, p. 4-7; Berkheiser, 1984, 43 p.
46	Milesburg Gap area	Zn, Pb, Ba	Prospects	Silurian quartzite (Tuscarora Formation)	In veinlets, along faults, in breccias.	Smith, 1977, p. 208, 217.
47	Skytop	Pb, Ba	Occurrence	Silurian quartzite (Tuscarora and Juniata Formations)	--	Smith, 1977, p. 209.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
48	Keystone mine area, North Sinking Valley (approximately 30 localities)	Zn, Pb, As	Small	Cambrian through Middle Ordovician limestone and dolomite	In veins and disseminated.	Rose, 1970, p. 8; Smith, 1977, p. 89-102.
49	Southern Sinking Valley area, including Albright farm occurrence (14 localities)	Zn, Pb, Ba	Small	Ordovician limestone and dolomite	In veins confined to a stratigraphic zone.	Rose, 1970, p. 8; Smith, 1977, p. 124-140.
50	Mill Run	Pb (Zn)	Occurrence	Devonian sandstone (Chemung(?) Formation)	Galena disseminated in sandstone.	Smith, 1977, p. 219.
51	Canoe Creek quarry	Zn	do.	Silurian limestone (Keyser Formation)	Mineralization on a joint.	Smith, 1977, p. 168-170.
52	Thompson	Pb, Zn	Prospect	Silurian limestone (Tonoloway Formation)	Mineralization along and near a joint.	Smith, 1977, p. 183-185.
53	Hares Valley area (14 locations)	Zn, Pb, As	Prospects and occurrences	Silurian clastic rocks (mainly Tuscarora Formation)	Mineralization along joints, associated with faults, thin veins, limonite gossans.	Smith, 1977, p. 188-207; Smith and others, 1971.
54	Roaring Spring area	Zn (Pb)	Occurrences	Ordovician dolomite (Bellefonte and upper Axemann Formations)	In dolomite bed that has been partly replaced by silica, in chert nodules, quartz and dolomite rosettes and in shaly laminae between beds.	Smith, 1977, p. 115-120.
55	Knisley and Sproul Lime and Stone Company Quarries	Zn	do.	Silurian-Devonian limestone (Tonoloway and Keyser Formations	In calcite-filled joints.	Smith, 1977, p. 176-177.
56	Soister Limonite Mine (3 locations)	Fe(Zn)	do.	Ordovician dolomite (Beekmantown Group)	Possibly in a collapse-rubble breccia.	Smith, 1977, p. 120-124.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
57	Woodbury Prospect area (10 locations)	Zn, Pb	Prospects	Cambrian-Ordovician limestone and dolomite	In breccias.	Smith, 1977, p. 149-162.
58	Entriken	Pb	Occurrence	Mississippian sandstone of the Pocono Formation	--	Smith, 1977, p. 292.
59	Shirleysburg	Pb(?)	do.	Silurian quartzite (Tuscarora Formation)	Considered by Smith (1977) to have a reasonable, but slight chance of indicating a significant prospect in the area.	Smith, 1977, p. 292.
60	Ft. Littleton area	Ba, Cu	Small	Silurian limestone (Tonoloway Formation)	Replacement of wall rock and breccia fragments in a fault zone.	Socolow, 1959.
61	New Enterprise Quarry	Zn	Occurrence	Ordovician (Milroy Member of the Loysburg Formation)	--	Smith, 1977, p. 289.
62	Centerville	Zn	do.	Devonian limestone near base of Shriver Formation	0.5% Zn in goethite. Considered by Smith (1977) to have a reasonable, but slight chance of indicating a significant prospect in the area.	Smith, 1977, p. 288.
63	Hyndman	Pb	do.	Mississippian through Pennsylvanian	Outcrop along Gooseberry run.	Smith, 1977, p. 288.
64	Lake Koon	Ba	do.	Middle Devonian shale (Marcellus Shale)	Nodules in shale.	DeWitt, 1974 and oral commun., 1981.
65	Cooks Mills	Ba	do.	Middle Devonian shale (Marcellus Shale)	do.	DeWitt, 1974 and oral commun., 1981.
66	Chambersburg area	Ba	Small	In residual soil overlying Cambrian and Ordovician limestone	Veins	Brobst, 1965, p. 7; Rose, 1970, p. 9; Stone, 1939, p. 5-8.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
67	Waynesboro area	Ba	Occurrence	In residual clays and Cambrian limestone	Vein filling in brecciated limestone.	Do.
68	Medusa West York quarry and York area	Zn (Cu, Pb, Ba)	do.	Cambrian limestone (Kinzers Formation)	Sphalerite float near a small fault.	Smith, 1977, p. 52-54.
69	York Stone and Supply Company New quarry	Zn (Cd, Cu)	do.	Cambrian dolomite (Ledger Formation)	In irregular horizontal lens at least partly localized within a particular bed.	Smith, 1977, p. 80-81.
70	Billmeyer quarry	Pb, Cu, As, Ag	do.	Cambrian dolomite (Ledger Formation)	Three occurrences of mineralization in crystalline dolomite.	Smith, 1977, p. 33-37.
71	Marietta	Pb	do.	Cambrian Vintage Dolomite(?)	Considered by Smith (1977) to have a reasonable but slight chance of indicating a significant prospect in the area.	Smith, 1977, p. 292.
72	Kline's quarry	Zn (Pb, Ca)	do.	Cambrian dolomite (Vintage Formation) and quartz phyllite (Antietam-Harpers Formation)	In pyrite veins, quartz pods, hairline fractures and vugs.	Smith, 1977, p. 49-52.
73	North Manor Hill area	Zn	Occurrence	Cambrian dolomite (Vintage Formation)	As blebs disseminated in dolomite; as veinlets and limonite replacing pyrite.	Smith, 1977, p. 54-57.
74	Bamford Mine area	Zn	Small	Cambrian dolomite (mainly Ledger Dolomite)	Veins conformable to bedding.	Rose, 1970, p. 8; Smith, 1977, p. 19-32; Freedman, 1972.
75	Blue Ball	Zn (Cu, Pb, Ag)	do.	Cambrian dolomite (Snitz Creek Formation)	Disseminated in distinct bed(s); also along fractures and faults.	Smith, 1977, p. 37-39.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
76	Gap Northeast	Zn (Pb, Cu)	Prospect	do.	Geochemical anomalies for zinc to the south and southwest.	Smith, 1977, p. 46-49.
77	Pequea and Burnt Mills Silver Mines Area	Pb, Ag	Small	Cambrian dolomite (Vintage Formation)	In quartz veins along bedding planes.	Rose, 1970, p. 8; Smith, 1977, p. 62-79.

TENNESEE

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	J. Curtis No. 1 Memphis Equipment Company	Zn	Occurrence	Lower Ordovician Knox Group	In well cuttings.	Tennessee Division of Geology, 1969, unpublished data.
2	Heywood Cordle No. 1, Memphis Equipment Company	Zn	do.	do.	do.	Do.
3	Fee (Joyner) No. 1, Draughon Bros.	Zn	do.	do.	do.	Do.
4	Central Tennesee district (Elmwood and Gordonsville mines; deposits near Sugar Creek, Gainesboro, Hartsville, Lebanon, Carthage; six small mines on veins, numerous prospects and occurrences)	Zn (Ba, F, Pb)	Large	Lower Ordovician dolomite and limestone (Knox Group; most ore is in the lower and middle Mascot Dolomite; subordinant amounts of ore are in the underlying Kingsport Formation). Fissure vein deposits are mainly in Middle Ordovician carbonate rocks, but are known in rocks as young as the Lower Mississippian Warsaw Limestone.	Predominant structures of large ore bodies are solution collapse breccias. Large ore deposits appear to be spatially associated with pre-Middle Ordovician structure. Fissure-vein deposits contain barite, fluorite, and calcite with small amounts of sphalerite and galena.	Braun, E. R., 1983, p. 359; Callahan, 1977; Jewell, 1947; Kyle, 1976; Main, 1976; White, 1979; Winslow and Hill, 1973.
5	W. E. Bertram No. 1, Sam Jarvis	Zn	Occurrence	Lower Ordovician Knox Group	In well cuttings.	Tennessee Division of Geology, 1969, unpublished data.
6	W. M. Phillips, No. 1, Bystoree, N.C.	Zn	do.	Lower Ordovician Knox Group	do.	Do.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
7	Pall Mall	Ba	Medium	Residual clay overlying Mississippian limestone (St. Louis Formation).	Barite is restricted to a single favorable bed; no mineralization is known in the underlying limestones; possibly a bedded replacement deposit.	Maher, 1970, p. 14-15.
8	L. F. Choate No. 1, Travis Smith	Zn	Occurrence	Lower Ordovician Knox Group	In well cuttings.	Tennessee Division of Geology, 1969, unpublished data.
9	Grissom No. 1, Pike Oil Co.	Zn	do.	do.	do.	Do.
10	Clemner-Roberson No. 1, Sun Oil Company	Zn	do.	do.	do.	Do.
11	Sewanee Fuel and Iron Company No. 1, Sequatchie Gas Company	Zn	do.	do.	do.	Do.
12	Powell River district (most production from the New Prospect, Bunch Hollow and Kings Bend mines. Ninty-two mines, prospects, and occurrences described)	Zn, Pb	Small	Cambrian limestone and dolomite; the most productive deposits are in the Maynardville Limestone Member of the Nolichucky Shale; smaller deposits in the Copper Ridge Dolomite	Three types of deposits: (1) replacement deposits along faults, with some open-space filling in the breccia, (2) fracture fillings, and (3) bedded replacement deposits apparently unrelated to faults or fractures.	Brokaw, and others, 1966b.
13	Straight Creek district (Straight Creek mines, five prospects)	Zn, Pb	do.	Cambrian dolomite (Maynardville Limestone and Copper Ridge Dolomite)	Ore is in a zone of crushed and broken dolomite in all gradations from small veinlets to large masses almost entirely replacing the country rock.	Maher, 1958, p. 2, 27; Secrist, 1924, p. 47-52.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
14	Evanston district (Livesay or Mill cut, six other prospects)	Zn	do.	Cambrian limestone in the Rome Formation	Small replacement veinlets and disseminated flakes and masses.	Secrist, 1924, p. 53-64.
15	Copper Ridge district (Idol and Flat Gap mines, eight prospects)	Zn	Large	Lower Ordovician dolomite and limestone. (Mainly in the Kingsport and Mascot Formations)	Principal ore zone is a brecciated dolomite. Brecciated zones are at facies boundaries between sediments that formed on topographic highs and those deposited in subtidal environments. Occurs in gangue of white, coarsely crystalline dolomite. Brecciated horizons coincide with local strike of bedding.	Churnet and Misra, 1983; Hill, 1969; Hill and others 1971; Hoagland, 1962; Sayrs and Clayton, 1949; Secrist, 1924, p. 80-96.
16	Rodgersville Area (Caney Valley mine and prospect)	Ba	Small	Barite in residual soils overlying lower Ordovician Mascot Dolomite	--	Maher, 1970, p. 30.
17	Click Ridge	Ba	Prospect	Cambrian limestone (Honaker Dolomite)	Clear green crystalline barite in calcite vein.	Brobst and Hobbs, 1968, p. 274.
18	Orebank mines and prospect	Ba	Small	In residual clay overlying Lower Ordovician dolomite (Upper Knox Group)	A small barite mine and a brown iron ore mine with abundant barite.	Maher, 1970, p. 29.
19	Barite nodule locality 6	Ba	Occurrence	Middle Ordovician carbonaceous shale (Athens Shale)	Nodules of barite and pyrite in black shale.	Carpenter and Fagan, 1969.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
20	Fall Branch-Greeneville district (ten mines that produced barite, about twenty-six barite prospects, Fall Branch Zinc Mine and eight zinc prospects)	Ba, Zn	Small	Barite in residuum overlying carbonate rocks (mainly upper Knox Group, but minor mineralization in carbonate rocks of the Conasauga Group of Cambrian age, and in shales of Middle Ordovician age). Zinc in Lower Ordovician dolomite (Mascot and Chepultepec Formations)	Barite in veins and crystalline aggregates in bedrock. Zinc in brecciated dolomite cemented by white, crystalline dolomite.	Brokaw and others, 1966a, p. A17-A20; Maher, 1970, p. 15-17; Secrist, 1924, p. 96-104.
21	Watauga Point and Carden	Zn, Pb	Prospects	Middle Cambrian Honaker Dolomite	Replacement of country rock and fracture-fillings.	Maher, 1958, p. 9-25; Secrist, 1924, p. 140-141.
22	Nidifer Branch (Barite prospect in Stony Creek District)	Ba	do.	Cambrian Shady Dolomite and its residuum	--	Maher, 1970, p. 29; King and others, 1944, p. 187.
23	Dugger, Doughtery and Wagner zinc prospects; Draught Creek barite prospect and Dry Run Mine (Mn, Ba)	Mn,Zn,Ba	Prospects; small production from Dry Run Mine	Cambrian Shady Dolomite and its residuum	Vein and fracture filling; residual barite and manganese deposits. In Butler and Stony Creek manganese districts.	King and others, 1944, p. 168-174; King and Ferguson, 1960, p. 86; Maher, 1970, p. 17, 29.
24	Embreeville (Bumpass Cove District)	Fe, Zn, Pb, Mn	Medium	Cambrian Shady Dolomite and residual clay	Most production from oxidized deposits in residual clay; also disseminated and associated with brecciated country rock and sparry dolomite.	Rodgers, 1948.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
25	Lost Creek (Rhodelia)	Ba (Zn)	Small	In residual soil and underlying Middle Ordovician argillaceous dolomite (Dot Formation) and Lower Ordovician dolomite (Mascot formation)	In a collapse breccia. Barite occurs as veins, coatings around breccia blocks, and fragments of coatings and veins embedded in argillaceous dolomite matrix.	McCormick and others, 1971; Harris, 1969, p. 35-37; Fagan, 1969; Carpenter and others, 1971, p. 792-795.
26	--	Ba	Prospect	In residuum of Lower Ordovician Upper Knox Group	--	Maher, 1970, p. 32.
27	Moore	Pb, Zn	do.	Cambrian dolomite (Rome Formation)	In stringers and blebs of white, crystalline calcite and in dolomite; dolomite has a shattered texture.	Maher and Finlayson, 1965, p. 46.
28	Oak Ridge	Ba	Occurrence	In residuum above Lower Ordovician Knox Group (uppermost Longview Dolomite or lower Kingsport Formation	White barite in cherty residual clay.	Maher and Finlayson, 1965, p. 45.
29	Owl Hole Gap	Zn	do.	Cambrian dolomite	--	Maher, 1958, p. 28.
30	Mascot-Jefferson City District (Mascot, Young, New Market, Grasselli, Davis-Bible, Jefferson City, Coy, North Friends Station, Jarnigan, Athletic, Beaver Creek mines)	Zn	Large (the leading zinc-producing district of the United States)	Lower Ordovician dolomite (Mascot, Kingsport and upper Longview Formations of the Knox Group)	Associated with white crystalline dolomite in solution-collapse breccias below the middle Ordovician unconformity.	Fulweiler and McDougal, 1971; Harris, 1971; Hoagland, 1967; Hoagland and others, 1965; Kendall, 1960; Oder and Ricketts, 1961.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
31	Barite nodule locality 1	Ba	Occurrence	Middle Ordovician carbonaceous shale (Athens Shale)	Nodules of barite and pyrite in black shale.	Carpenter and Fagan, 1969.
32	Barite nodule locality 2	Ba	do.	do.	do.	Do.
33	Barite nodule localities 3 and 4	Ba	do.	do.	do.	Do.
34	Barite nodule locality 5	Ba	do.	do.	do.	Do.
35	Naft prospect (Rader prospect, R. N. Hartman mine)	Ba (Zn)	Small	Lower Ordovician dolomite (Mascot Formation)	Two ore-bearing horizons; one mostly of pyrite and barite forming narrow seams and veinlets; one with sphalerite in addition to barite and pyrite, which in places formed pockets.	Secrist, 1924, p. 102-104.
36	Kodak	Ba	do.	In residual clay above upper Knox Group (Kingsport Formation?)	--	Maher, 1970, p. 32.
37	Kimberlin	Pb	do.	Cambrian dolomite (Rome Formation)	--	Ramsey, 1926.
38	Trotter	Zn (Fe)	Prospect	Lower Ordovician slightly phosphatic carbonaceous dolomite (Mascot Formation)	Disseminated in breccia matrix and fillings in solution cavities and channels of a paleokarst terrane, filling of bedding-plane fractures.	Carpenter and others, 1971, p. 796-797.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
39	Del Rio District (Eleven mines and six prospects)	Ba	Medium	In mylonite and breccia in fault zones; Cambrian quartzite (mostly Unicoi Formation) Precambrian quartzite (Snowbird Group); some in Precambrian slate and Lower Cambrian Erwin Formation	Veins localized by overthrust faults and related structures.	Fergeson and Jewell, 1951; Maher, 1970, p. 13-14, 31.
40	Blowing Cave	Ba	Small	Residual clays overlying Lower Ordovician dolomite (Knox Group)	Possibly the first barite deposit noted in east Tennessee.	Kain, 1818; Maher, 1970, p. 32.
41	Nuns Cove	Ba, Zn	Prospect	Residuum and dolomite of the Upper Knox Group (Newala Limestone)	--	Brobst and Hobbs, 1960, p. 274-275; Maher and Finlayson, 1965; p. 44-45; Maher, 1970, p. 17-18, 32.
42	Little Mountain (Fairgarden)	Ba, Zn	do.	Residuum and dolomite of the Upper Knox Group	Discrete blebs or crystalline barite and less abundant fine-grained sphalerite.	Maher, 1970, p. 17, 18, 32; Maher and Finlayson, 1965, p. 44-45.
43	Chestnut Ridge (W. Harrison)	Ba	Occurrence	In cherty residual clay derived from Lower Ordovician Kingsport Formation	White, medium- to coarse-crystalline barite masses with chert and clay.	Maher and Finlayson, 1965, p. 45.
44	C. C. Patrick	Ba (Pb, Zn, Fe, F)	Small	Lower Ordovician dolomite (Knox Group)	Replacement and open-space filling of massively bedded, finely crystalline cherty dolomite.	Maher, 1970, p. 32; Secrist, 1924, p. 134.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
45	McReynolds	Ba	Prospect	In residual clay underlying Ordovician limestone (Kingsport Formation)	Large and small pieces of barite on the surface.	Dunlap, 1945.
46	Friendsville (Griffiths)	Ba, Pb, Zn, Fe (F)	do.	Lower Ordovician dolomite (Upper Knox Group)	Solution-collapse breccia. Barite is distributed throughout the mineralized horizon; galena and sphalerite occur in detached pockets in the brecciated zone, as replacements of breccia fragments or small veinlets; oxidized ores occur in clay residuum.	Dunlap, 1945; Secrist, 1924, p. 128-130.
47	J. F. Chapman	Ba (Fe, Pb)	do.	Residual clay overlying Lower Ordovician dolomite (Mascot Formation)	Bedrock not exposed at surface.	Dunlap, 1945.
48	Unitia	Ba, Pb, Zn	do.	do.	Opened for lead about 1905. Dump contains barite, galena, and sphalerite.	Maher, 1970, p. 32.
49	Heaton	Ba	do.	do.	--	Maher, 1970, p. 32.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
50	Sweetwater District (112 mines and prospects in 1960)	Ba (F, Pb, Zn)	Medium	In residual clay and underlying Lower Ordovician dolomite and limestone (Knox Group, mainly the Kingsport Formation; also Chepultepec, Longview and Mascot Formations)	Nodules and larger masses of barite, chert, and limonite in reddish or yellow clay. Bedrock contains veins and breccia masses cemented by barite, fluorite and pyrite with some local concentrations of sphalerite and galena. Some structures that localized barite thought to be produced by solution and some by tectonic movement (Maher, 1970, p. 13).	Laurence, 1960; Maher, 1970, p. 11-13.
51	Notchy Creek	Ba	do.	In residuum of Lower Ordovician Kingsport Formation	--	Maher, 1970, p. 34.
52	W. L. Baugh	Ba	do.	In residuum of very cherty Lower Ordovician Kingsport Formation	--	Do.
53	Hambright	Pb (Zn, Ba, Fe)	do.	Lower Ordovician limestone and dolomite (Mascot Formation)	Replacement veinlets in limestone, no brecciation, minor amounts of coarsely crystalline dolomite.	Swingle, 1959, p. 70-73.
54	Griffen (Cleveland)	Ba	do.	In residual clay overlying Lower Ordovician dolomite (principally Kingsport Formation and probably Mascot Formation)	Dump material consists chiefly of clay, chert, and barite and contains fragments of brecciated dolomite cemented by barite, chert and gangue dolomite.	Maher, 1970, p. 18-19; Swingle, 1959, p. 59-62.
55	Shofner	Ba	Prospect	In residuum above Lower Ordovician Knox Dolomite	Obscured by Highway 75 construction.	Maher, 1970, p. 34.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
56	Hardwick (Dollie D)	Pb, Zn (Ba)	Small	Upper Cambrian dolomite (Maynardville Limestone)	Open-space breccia filling and replacement; deposit shaped like an inverted funnel.	Dunlap, 1946; Swingle, 1959, p. 73-75.

VERMONT

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Franklin County	Zn, Pb	Prospect	Lower Cambrian dolomite (Dunham Formation)	In highly deformed sedimentary breccia as matrix filling and solution breccia in favorable beds. Deformed by Taconic and Acadian orogenies.	J. P. Broderick, oral commun., 1982.
2	Lion Hill (Oram, Brandon, Leicester)	Zn, Pb, (Cu)	do.	Upper Cambrian dolomite (Monkton or Winooski Formation)	In highly deformed folded and sheared autochthonous rock, mineralization deformed by Taconic orogeny (Ordovician).	Grant, 1968, p. 29-30; Jacobs, 1943(?), p. 18; Jacobs, 1944(?), p. 39; J. P. Broderick, oral commun., 1982.
3	Orwell	Zn	Occurrence	--	--	Morrill and Chaffee, 1964, p. 33.
4	Wallingford	Pb	do.	--	--	Morrill and Chaffee, 1964, p. 47.
5	Danby	Pb	do.	--	--	Morrill and Chaffee, 1964, p. 15.

VIRGINIA

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Runion	Zn, Pb	Prospect	Devonian sandstone	In veinlets of ankerite.	Luttrell, 1966, p. 114.
2	Shenandoah Valley District (Timberville and Bowers-Campbell mines and numerous prospects)	Zn (Pb)	Medium	Lower Ordovician dolomite (upper Beekmantown Group)	With white, crystalline dolomite in breccia-type ore bodies, as vein fillings and as isolated replacement crystals.	Brent, 1960, p. 126-132; Hayes, 1960; Herbert and Young, 1956; Young, 1956, 1967.
3	Grove Hill	Zn	Occurrence	Lower Ordovician dolomite (upper Beekmantown Group)	Associated with a minor bedding plane fault; disseminated crystals replace thin gouge; larger crystals are in vein dolomite cementing fractured beds.	Herbert and Young, 1956, p. 39.
4	Wiseland	Zn	do.	Lower Ordovician dolomite (upper Beekmantown Group)	Small crystals in "recrystalline" dolomite.	Herbert and Young, 1956, p. 36.
5	Williamsville	Ba	Occurrence	Devonian shale (Millboro shale)	Barite nodules in shale.	S. H. B. Clark, this paper.
6	Staunton	Pb, Zn	Prospects	Lower Ordovician (Beekmantown Group)	Small prospects for galena west of Staunton.	Luttrell, 1966, p. 122.
7	--	Ba	--	--	--	Sweet and Rowe, 1984, p. 8.
8	Earhart prospect	Ba	Small mine	--	Residual barite in soil.	Edmundson, 1938, p. 80; Luttrell, 1966, p. 44.
9	Clifton Forge	Ba	Occurrence	Devonian shale (Needmore Shale and Millboro Shale Members of the Romney Shale)	Barite concretions and shrinkage cracks in concretions filled with veins of calcite, gypsum and barite.	Lesure, F. G., 1957, p. 55-57.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
10	Becktel	Ba	do.	--	Associated with chert float.	Edmundson, 1938, p. 79; Luttrell, 1966, p. 16.
11	Shorter	Ba	Prospect	Lower Ordovician dolomite Beekmantown Group)	In dolomite.	Edmundson, 1938, p. 57, 80; Luttrell, 1966, p. 119.
12	Johnson	Ba	do.	In soil overlying Lower Ordovician dolomite (Beekmantown Group)	Residual deposit.	Edmundson, 1938, p. 57, 79; Luttrell, 1966, p. 74.
13	Williamson	Ba	Small	In soil derived from the Cambrian Conococheague Limestone	Residual deposit.	Edmundson, 1938, p. 59; Luttrell, 1966, p. 39.
14	Crush mine and prospect	Ba	do.	Lower Ordovician dolomite (Beekmantown Group)	In dolomite and in the overlying residual clay.	Edmundson, 1938, p. 58-59; Luttrell, 1966, p. 39.
15	Huffman	Ba	Prospect	Residual soil overlying Lower Ordovician Beekmantown dolomite	Residual deposit.	Edmundson, 1938, p. 62; Luttrell, 1966, p. 68.
16	Gusler-Austin and Reynold mines	Ba	Small	Residual soil overlying Lower Ordovician dolomite (Beekmantown Group) in the Gusler-Austin Mine; residual soil derived from Cambrian Conocheaque Limestone in the Reynold mine	Fragments in residual soil; replacement masses cement breccias in dolomite at the Gusler-Austin Mine.	Edmundson, 1938, p. 60-62; Luttrell, 1966, p. 60, 111.
17	Caldwell	Ba	Prospect, shallow workings	Middle Ordovician Athens Shale	Dark-gray barite containing carbonaceous matter occurs in shale along a fault.	Edmundson, 1938, p. 60; Luttrell, 1966, p. 30.
18	Stony Creek	Ba	Occurrence	Devonian shale (Millboro Shale)	Float	R. C. McDowell, oral commun., 1983.
19	Mason Cove	Ba	do.	Devonian shale (Romney Shale)	Nodules and in calcareous concretions in shale.	S. H. B. Clark, this paper.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
20	Rucker mine	Ba	Small	In residual soil overlying Lower Ordovician Beekmantown Group	--	Edmundson, 1938, p. 62-63; Luttrell, 1966, p. 113.
21	Troutville	Pb, Zn	Prospect	Cambrian dolomite (Elbrook Formation)	In dolomite breccia cemented by white dolomite.	Currier, 1935, p. 94; Luttrell, 1966, p. 132.
22	Reed mine	Ba	Small	Cambrian dolostone or limestone (Elbrook Formation)	As cement in breccia and replacement bodies along fractures and bedding planes.	Luttrell, 1966, p. 110-111; Edmundson, 1938, p. 63.
23	Bonsacks	Zn, Cu	Prospect	Cambrian dolostone (Rome Formation)	Disseminated cavity fillings in brecciated dolomite veined with white dolomite.	Luttrell, 1966, p. 22; Watson, 1905, p. 73, 1907, p. 530; Woodward, 1932, p. 116.
24	Martin and Wertz prospect (Martin prospect)	Zn, Pb	do.	Cambrian dolostone (Rome Formation)	In dolostone breccia cemented with white dolomite.	Luttrell, 1966, p. 91; Watson, 1905, p. 71-72, 1907, p. 530; Woodward, 1932, p. 116.
25	Peppers Ferry Mine	Pb, Zn	Small	Brecciated dolostone	One solid mass of lead ore and small pockets.	Luttrell, 1966, p. 104.
26	Cloyd	Zn	Prospect	Cambrian Rome or Elbrook Formation?	Zinc ore reported.	Currier, 1935, p. 95; Luttrell, 1966, p. 35; Watson, 1905, p. 75-76.
27	Christianburg	Zn (Fe, Pb)	Prospect	Probably in dolomite of the Rome Formation (Cambrian)	--	Currier, 1935, p. 95; Luttrell, 1966, p. 34.
28	Walker and Vaughn	Zn, Pb	do.	Cambrian dolostone (Rome Formation)	--	Currier, 1935, p. 95; Luttrell, 1966, p. 138.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
29	Langhorn and Wills prospects (Bonys Run)	Zn, Pb	Small	Cambrian dolostone (Rome Formation?)	Disseminated in white dolomite and cementing fractures in gray dolomite.	Currier, 1935, p. 95; Dietrich, 1954, p. 28; Luttrell, 1966, p. 79; Watson, 1905, p. 75-76; Woodward, 1932, p. 116.
30	Camp Kiwanianna	Zn, Cu	Prospect	Cambrian dolostone (Shady Dolomite)	Disseminated.	Dietrich, 1954, p. 30; Luttrell, 1966, p. 31.
31	Tices Mill (Piedmont)	Zn, Cu, Au	Small	do.	Disseminated splotches and veins in breccia and replacement of carbonate cementing the basal sandstone of the Shady Dolomite.	Dietrich, 1954, p. 28-30, 1959, p. 150; Luttrell, 1966, p. 129-130.
32	Alleghany Springs	Zn, Pb	Prospect	do.	Disseminated.	Luttrell, 1966, p. 7.
33	Pilot Knob	Pb, Zn, Cu	do.	Cambrian Shady Dolomite	Disseminated and filling fractures in breccia.	Fontaine, 1883, p. 190; Luttrell, 1966, p. 105-106.
34	Taylors Ridge	Zn, Pb	Occurrence	--	Zinc minerals reported from 2 miles east of Springville near the end of Taylors Ridge.	Currier, 1935, p. 109; Luttrell, 1966, p. 127.
35	Kimberling and No Business Creeks	Zn, Pb	do.	Limestone, probably of Devonian age	Associated with pyrite and oxides of iron and manganese.	Currier, 1935, p. 109; Luttrell, 1966, p. 78.
36	The Jumps	Ba	do.	Cambrian limestone (Shady Dolomite)	Sunbursts of barite occassionally, accessory pyrite.	Windolph, 1985a, 1985b.
37	Cedar Bluff	Pb, Zn	Prospect	Cambrian limestone (Nolichucky Shale)	South of a major overthrust fault.	Currier, 1935, p. 109.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
38	Russell-Tazewell Counties area	Ba	Medium	Lower Ordovician limestone and dolomite (Beekmantown Group)	Fracture fillings and replacement masses in bedrock and irregular fragments in the overlying residual soil.	Brobst, 1965, p. 8; Edmundson, 1938, p. 63-76.
39	Orr	Ba (Cu)	Small	Lower Ordovician dolomite (Beekmantown Group)	Replacement masses.	Edmundson, 1938, p. 79; Luttrell, 1966, p. 101.
40	Smyth County area	Ba	Medium	Lower Ordovician limestone and dolomite (Beekmantown Group)	Veins and replacement masses in bedrock and irregular fragments in the overlying residual soil.	Brobst, 1965, p. 8; Edmundson, 1938, p. 76-79.
41	Rye Valley District (Rye Valley Mining Company Mine; R. N. Ward, Livesay, Calhon, Martin, Scott, Van Hoy Prospects)	Pb, Zn (Mn, Pyrite, Au)	Small	Cambrian dolostone (Shady Formation)	In brecciated zones cemented by coarse-grained white dolomite.	Currier, 1935, p. 106-109; Watson, 1905, p. 105-113, 1907, p. 540-541.
42	Cedar Springs District (Cedar Springs mine; James, Davis, Bennington, Wilkinson properties, Porter Branch mine)	Zn (Fe, Mn, Pb)	Small	Cambrian dolostone (Shady Formation)	In dolomite veins in crackle and shatter breccia, also in residual iron deposit.	Currier, p. 105-106; Watson, 1905 p. 100-105, 1907, p. 538-540.
43	Mount Ephraim Church (Sand Mountain area)	Zn	Prospect	Cambrian dolostone (Shady Formation)	In breccia with veins of coarse white dolomite and calcite.	Currier, 1935, p. 104.
44	J. C. Groseclose	Ba	Prospect	--	Abundant fragments of barite float.	Edmundson, 1938, p. 80; Luttrell, 1966, p. 59.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
45	Taylor	Zn (Pb)	Prospect	Cambrian dolostone (Shady Formation)	In breccia carrying white dolomite and quartz.	Currier, 1935, p. 105.
46	Cripple Creek area	Zn (Fe, Pyrite)	Small	Cambrian dolostone (Shady Formation)	In residual iron deposits; also reported in dolomite.	Currier, 1935, p. 103-104.
47	Austinville-Ivanhoe District (Austinville and Ivanhoe mines, numerous small mines and prospects)	Zn, Pb	Large	Lower Cambrian dolomite (Shady Dolomite)	In breccias and as replacement of sedimentary features; localization of ore is thought to be at facies boundary zones.	Brown, 1935, 1953; Brown and Weinburg, 1968; Currier, 1935, p. 99-103; Luttrell, 1966, p. 12-13, 71; Stose and Stose, 1957, p. 210; Watson, 1905, p. 83-99, 1907, p. 532-538.
48	Bertha District (Bertha, Barren Springs and Falling Cliff mines, several other pits)	Zn (Fe, Pb)	Small	Residual clay overlying the Cambrian Shady Dolomite	Residual clays worked; disseminated sphalerite only in small amounts in underlying rocks, which lack brecciation.	Currier, 1935, p. 97-98; Luttrell, 1966, p. 18-19; Watson, 1905, p. 78-83, 1907, p. 532.
49	Allisonia District (Delton mines, Forney, Graham and Robinson and Flanigan prospects)	Zn, Pb, Fe	Small	Cambrian dolostone (Rome and Shady Formation	Zinc mined from oxidized zone; also in breccia with white dolomite cement.	Currier, 1935, p. 95-97; Watson, 1905, p. 75, 1907, p. 531.
50	Brickey (Hagan)	Zn	Prospect	Cambrian dolostone (Rome Formation)	Vein/shear zone.	Sweet and Rowe, 1984, p. 7, 26.
51	Pat Keith	Zn, Pb	Prospect	Cambrian dolostone (Copper Ridge Dolomite)	Disseminated small masses.	Luttrell, 1966, p. 103-104; Woodward, 1938, p. 69.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
52	Osborn Mine	Zn, Pb	Small	Middle Cambrian limestone (Maryville Limestone)	Possibly near the trace of a major thrust fault.	Currier, 1935, p. 109; Luttrell, 1966, p. 101; Watson, 1905, p. 113-116; Woodward, 1938, p. 67-69.
53	Masons Store	Zn	Prospect	Middle Ordovician Holston Limestone	Seams contained small quantities of calamine in thin, irregular zones along the bedding of the rocks.	Luttrell, 1966, p. 92.
54	Lane	Zn	do.	Cambrian dolostone (Rome Formation)	Disseminated near a zone of thrust faulting.	Brent, 1963, p. 42; Luttrell, 1966, p. 79.
55	Bowman (Bowman-Graves, Arcadia, Graves)	Zn (Cu)	Small	Cambrian dolostone (Honaker Formation and Copper Ridge Dolomite)	In white dolomite in a brecciated zone near a thrust fault.	Currier, 1935, p. 110; Luttrell, 1966, p. 24; Secrist, 1924, p. 33-37.
56	Barite nodule locality 7	Ba	Occurrence	Middle Ordovician carbonaceous shale (Athens Shale)	Nodules of barite and pyrite in black shale.	Carpenter and Fagan, 1969, p. 17-29.

WEST VIRGINIA

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Monongahela River	Zn	Occurrence	Pennsylvanian Brush Creek Shale	Sphalerite is found in the cores of small siderite nodules.	Martens, 1964, p. 28.
2	Tunnelton	Ba (Pb)	do.	Pennsylvanian	Barite and a very small amount of galena in siderite concretions about 15 feet below the Upper Freeport Coal.	Bayles, 1936, 42 p. Martens, 1964, p. 39.
3	Parsons	Zn	do.	A lens of coal in Devonian sandstone	Thin veins of light brown sphalerite along joints in a lens of coal; much pyrite associated with the coal.	Heck, 1940a; Martens, 1964, p. 28.
4	Knobly Mountain	Zn	do.	Devonian Oriskany Sandstone	Light-brown sphalerite, mostly in small grains occurs in a block of sandstone at the base of a cliff composed of Oriskany Sandstone.	Martens, 1964, p. 28, 34.
5	Dry Run of Mill Creek	Pb	do.	Upper Devonian alternating flagstone and shale. Basal Chemung or upper Portage Formation.	In thin quartz veinlets.	Reger and Tucker, 1924, p. 708.
6	Romney	Ba	do.	Devonian shale	Barite in veins in large limestone concretions in shale.	Martens, 1963, p. 4; 1964, p. 31.
7	Howell farm	Zn (Pb)	Prospect	Cambrian dolomitic limestone (Tomstown Formation)	Breccia filling along bedding.	Ludlum, 1955, p. 855-861.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
8	Hopeville	Ba	Occurrence	Devonian Marcellus Shale	Barite and pyrite in limestone nodules in shale.	Martens, 1964, p. 29-30.
9	Petersburg	Ba (?)	do.	Devonian shale	In a large septarium concretion.	Johnson, 1961, p. 58; Martens, 1963, p. 4.
10	Moorefield	Ba	do.	do.	In concretions.	Martens, 1963, p. 4.
11	Riverton	Ba	do.	do.	do.	Do.
12	Jericho Draft	Zn	Occurrence	Devonian Ridgley Sandstone	Disseminated sphalerite(?) in calcareous sandstone.	Lesure and others, 1982.

WISCONSIN

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
1	Upper Mississippi Valley lead-zinc district (The district includes 313 mines in Wisconsin. Subdistricts in Wisconsin are Hazel Green-Shullsburg, Meekers Grove (Jenkinsville), Big Patch, Plattsville, Calamine-Truman-Darlington, Potosi, Fairplay, Beetown, Fennimore, Mifflin-Cokerville, and Mineral Point-Linden-Dodgeville). This is the same locality as site 1 of Illinois.	Zn, Pb, (Cu, Ba)	Large	Middle Ordovician limestone and dolomite (most deposits in Galena Dolomite, Decorah Formation, and Platteville Formation); deposits of sulfides found in all formations exposed within the mineralized part of the district.	Ore bodies can be classified as (1) reverse-fault and fold controlled ore bodies, (2) joint-controlled ore bodies, and (3) placer and residual deposits. The ores in the fault and fold deposits occur as (1) vein fillings along fractures and bedding planes; (2) cavity fillings in solution breccias; and (3) disseminations by replacement and impregnation in favorable beds, particularly in shaly strata. Joint controlled deposits are veins in vertical joints and podlike deposits in beds crossed by joints (Heyl and others, 1959).	Heyl and others, 1959; Heyl, 1968a, Heyl and West, 1982, p. 1803-1807; McLimans, 1977.
2	Little Kickapoo lead diggings	Pb, Cu	Small	Lower Ordovician silicified and brecciated dolomite (Oneota Dolomite, Prairie du Chien Group)	As large crystals and masses.	Heyl and others, 1959, p. 294; Heyl and West, 1982, p. 1804, 1806; Strong, 1882, p. 75-78.
3	Wauzeka Ridge lead diggings	Pb, Cu	do.	Lower Ordovician Prairie du Chien Group	Similar to Little Kickapoo lead diggings (3).	Heyl and others, 1959, p. 294; Heyl and West, 1982, p. 1804, 1806.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
4	Woodman lead mine	Pb, Cu	do.	Lower Ordovician Prairie du Chien Group; markedly silifified by jasperoid.	Workings follow fractures and brecciated areas along which galena and calcite were deposited.	Do.
5	Bridgeport quarry	Pb, Zn	Occurrence	Lower Ordovician brecciated dolomite (Oneota Dolomite, Prairie du Chien Group)	As replacements, crystals lining vugs, and veinlets in breccia.	Do.
6	Little Grant lead diggings	Pb	Small	Lower Ordovician Prairie du Chien Group	In vertical fractures associated with abundant iron sulfides.	Heyl and others, 1959, p. 294; Heyl and West, 1982, p. 1804.
7	Castle Rock	Pb	Occurrence	--	--	Heyl and others, 1959, p. 293; Heyl and West, 1982, p. 1804.
8	Keyesville lead diggings	Pb, Cu	Small	do.	--	Heyl and others, 1959, p. 295; Heyl and West, 1982, p. 1804.
9	Akan lead mine	Pb, Cu	do.	do.	--	Do.
10	Orion lead mine	Pb, Cu	do.	do.	In openings in silicified rock.	Do.
11	Sextonville lead diggings	Pb, Cu	do.	do.	--	Do.
12	Otter Creek area	Pb	Occurrence	--	--	Heyl and others, 1959, p. 293; Heyl and West, 1982, p. 1804, 1806.

Map number	Name	Commodities	Size	Host rock	Comments	Selected references
13	Demby-Weist mines	Pb, Zn	Small	Lower Ordovician Prairie du Chien Group and Jordan Sandstone member of the Upper Cambrian Trempealeau Formation.	Veins and lodes in vertical or steeply dipping faults or fissures.	Heyl and others, 1959, p. 280-282; Heyl and West, 1982, p. 1804, 1806.
14	Black Earth lead diggings	Pb	do.	Lower Ordovician Prairie du Chien Group	Worked about 1828.	Heyl and others, 1959, p. 295; Heyl and West, 1982, p. 1804, 1806.
15	Pine Bluff lead diggings	Pb	do.	do.	do.	Do.
16	Lodi	Pb	Occurrence	--	--	Heyl and West, 1982, p. 1804.
17	Rio lead diggings	Pb	Small	--	--	Heyl and others, 1959, p. 295; Heyl and West, 1982, p. 1804.
18	Cambria	Pb	do.	--	--	Do.
19	Doylestown	Pb	do.	--	--	Do.
20	Columbus	Pb	Occurrence	--	--	Heyl and West, 1982, p. 1804.
21	Fitchburg	Pb	do.	--	--	Do.
22	Avon	Pb	do.	--	--	Do.
23	Clarno	Pb	do.	--	--	Heyl and others, 1959, p. 293; Heyl and West, 1982, p. 1804.

REFERENCES CITED

Adams, G. I., and Jones, W. B., 1940, Barite deposits of Alabama: Alabama Geological Survey Bulletin 45, 38 p.

Anderson, G. M., 1973, The hydrothermal transport and deposition of galena and sphalerite near 100°C: Economic Geology, v. 68, p. 480–492.

_____ 1975, Precipitation of Mississippi Valley type ores: Economic Geology, v. 70, p. 937–942.

_____ 1983, Some geochemical aspects of sulfide precipitation in carbonate rocks, *in* Kisvarsanyi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., International conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, p. 61–76.

Anderson, G. M., and Macqueen, R. W., 1982, Ore deposits models–6. Mississippi Valley type lead-zinc deposits: Geoscience Canada, v. 9, p. 108–117.

Barnes, H. L., 1983, Ore-depositing reactions in Mississippi Valley-type deposits, *in* Kisvarsanyi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., International Conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, p. 77–85.

Bassett, W. A., and Kinsland, G. L., 1973, Mineral collecting at Penfield Quarry, *in* Hewitt, P. C., ed., Guidebook to field trips: New York State Geological Association 45th Annual Meeting, p. H1–H9.

Bastin, E. S., and others, 1939, Contributions to a knowledge of the lead and zinc deposits of the Mississippi Valley region: Geological Society of America Special Paper 24, 156 p.

Bayles, R. E., 1936, Minerals of West Virginia: West Virginia University, M.S. thesis, 42 p.

Beales, F. W., 1975, Precipitation mechanisms for Mississippi Valley-type ore deposits: Economic Geology, v. 70, p. 943–948.

Beales, F. W., and Jackson, S. A., 1966, Precipitation of lead-zinc ores in carbonate reservoirs as illustrated by Pine Point ore field, Canada: Institution of Mining and Metallurgy Transactions, section B, v. 75, Bulletin 720, p. B278–B285.

Beck, L. C., 1842, Mineralogy of New York: Albany, N.Y., 534 p.

Berkheiser, S. W., Jr., 1984, Fetid barite occurrences, western Berks County, Pennsylvania: Pennsylvania Geological Survey Mineral Resources Report 84, 43 p.

Boctor, N. Z., Kullerud, Gunnar, and Sweany, J. L., 1976, Sulfide minerals in Seelyville coal bed III, Chinook Mine, Indiana: Mineralium Deposita, v. 11, no. 3, p. 249–266.

Botoman, George, and Stieglitz, R. D., 1978, The occurrence of sulfide and associated minerals in Ohio: Ohio Geological Survey Report of Investigations 104, 11 p.

Bradbury, J. C., 1957, Outlying occurrences of galena, sphalerite, and fluorite in Illinois: Illinois Geological Survey Industrial Minerals Note 7, 5 p.

_____ 1959, Crevice lead-zinc deposits of northwestern Illinois: Illinois State Geological Survey Report of Investigation 210, 49 p.

Braun, E. R., 1983, Ore controls-Middle Tennessee zinc district, *in* Kisvarsanyi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., International conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, p. 349–359.

Brent, W. B., 1960, Geology and mineral resources of Rockingham County: Virginia Division of Mineral Resources Bulletin 76, 174 p.

_____ 1963, Geology of the Clinchport quadrangle, Virginia: Virginia Division of Mineral Resources Report of Investigations 5, p. 42.

Brobst, D. A., 1965, Barite in the United States, exclusive of Alaska and Hawaii: U.S. Geological Survey Miscellaneous Investigations Resource Map MR–43, scale 1:31,680.

Brobst, D. A., and Hobbs, R. G., 1968, Barite, *in* U.S. Geological Survey and U.S. Bureau of Mines, Mineral Resources of the Appalachian Region: U.S. Geological Survey Professional Paper 580, p. 270–277.

Brokaw, A. L., Dunlap, J. C., and Rodgers, John, 1966a, Geology and mineral deposits of the Mosheim and Johnson anticlines, Greene County, Tennessee: U.S. Geological Survey Bulletin 1222–A, p. A1–A21.

Brokaw, A. L., Rodgers, John, Kent, D. F., Laurence, R. A., and Behre, C. H., Jr., 1966 b, Geology and mineral deposits of the Powell River area, Claiborne and Union Counties, Tennessee: U.S. Geological Survey Bulletin 1222–C, p. C1–C56.

Brown, C. E., 1983, Mineralization, mining, and mineral resources in the Beaver Creek area of the Grenville lowlands in St. Lawrence County, New York: U.S. Geological Survey Professional Paper 1279, 21 p.

Brown, J. S., ed., 1967, Genesis of stratiform lead-zinc-barite-fluorite deposits in carbonate rocks (the so-called Misssissippi Valley type deposits)—A symposium, New York, '1966: Economic Geology Monograph 3, 433 p.

_____ 1970, Mississippi Valley type lead-zinc ores; a review and sequel to the "Behre Symposium:" Mineralium Deposita: v. 5, p. 103–119.

Brown, W. H., 1935, Quantitative study of ore zoning, Austinville mine, Wythe County, Virginia: Economic Geology, v. 30, no. 4, p. 425–433.

_____ 1953, The geology [Austinville basin, Virginia]: Mining Engineering, v. 5, no. 12, p. 1216–1221.

Brown, W. H., and Weinberg, E. L., 1968, Geology of the Austinville-Ivanhoe District, Virginia, *in* Ridge, J. D., ed. Ore deposits of the United States, 1933–1967, v. 1: New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, p. 169–186.

Buddington, A. F., 1934, Geology and mineral resources of the Hammond, Antwerp and Lowville Quadrangles: New York State Museum Bulletin 296, p. 202–209.

Butts, Charles, and Gildersleeve, Benjamin, 1948, Geology and mineral resources of the Paleozoic area in northwest Georgia: Georgia Geological Survey Bulletin 54, 176 p.

Callahan, W. H., 1968, Geology of the Friedensville zinc mine, Lehigh County, Pennsylvania, *in* Ridge, J. D., ed., Ore deposits of the United States; 1933–1967, v. 1: New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, v. 1, p. 95–107.

Callahan, W. H., 1977, The history of the discovery of the zinc deposit at Elmwood, Tennessee – concept and consequence: Economic Geology, v. 72, p. 1382–1392.

Cannon, H. L., 1955, Geochemical relations of zinc-bearing peat to the Lockport Dolomite, Oreleans County, New York: U.S. Geological Survey Bulletin 1000–D, p. 119–185.

Carlson, E. H., 1983, The occurrence of Mississippi Valley-type mineralization in northwestern Ohio, *in* Kisvarsanyi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., International conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, p. 424–435.

Carpenter, R. H., and Fagan, J. M., 1969, Barite nodules in the Athens Shale in northeastern Tennessee and southwest Virginia: Southeastern Geology, 1969, v. 10, p. 17–29.

Carpenter, R. H., Fagan, J. M., and Wedow, Helmuth, Jr., 1971, Evidence on the age of barite, zinc, and iron mineralization in the Lower Paleozoic rocks of east Tennessee: Economic Geology, v. 66, no. 5, p. 792–798.

Cathles, L. M., and Smith, A. T., 1983, Thermal constraints on the formation of Mississippi Valley-type lead-zinc deposits and their implications for episodic basin dewatering and deposit genesis: Economic Geology, v. 78, p. 983–1002.

Churnet, H. G., and Misra, K. C., 1983, Sphalerite mineralization and its relationship to carbonate facies boundaries, Cooper Ridge district, east Tennessee, *in* Kisvarsanyi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., International Conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, p. 360–372.

Clark, S. H. B., and Neeley, C. L., 1983, Zinc, lead, and barite deposits and occurrences in Paleozoic rocks, east central United States: U.S. Geological Survey Open-File Report 83–187, 79 p. and 1 sheet.

Cobb, J. C., 1981, Geology and geochemistry of sphalerite in coal: Champlain, Illinois, Illinois State Geological Survey, 204 p.

Cobb, J. C., Steele, J. D., Treworgy, C. G., and Ashby, J. F., 1980, The abundance of zinc and cadmium in sphalerite-bearing coals in Illinois: Illinois Geological Survey Industrial Minerals Note 74, 28 p.

Cook, R. B., 1978, Minerals of Georgia—their properties and occurrences: Georgia Geological Survey Bulletin 92, 189 p.

Coveney, R. M., and Martin, S. P., 1983, Molybdenum and other heavy metals of the Mecca Quarry and Logan Quarry Shales: Economic Geology, v.78, p. 132–149.

Crawford, M. J., and Beales, F. W., 1983, The Shawangunk mine: a possible sandstone-hosted Mississippi Valley-type ore deposit in New York, *in* Kisvarsanyi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., International Conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, p. 436–445.

Currier, L. W., 1923, Fluorspar deposits of Kentucky: Kentucky Geological Survey, series 6, v. 13, 198 p.

_____ 1935, Zinc and lead region of southwestern Virginia: Virginia Geological Survey Bulletin 43, 122 p.

Currier, L. W., 1937, Origin of the bedding replacement deposits of fluorspar in the Illinois field: Economic Geology, v. 32, p. 364–386.

Dale, N. C., 1953, Geology and mineral resources of the Oriskany quadrangle: New York State Museum Bulletin 345, p. 103–108.

Davis, C. A., 1909, Report on the geology of Tuscola County, Michigan: Michigan Geological Survey Annual Report 1908, pt. C, p. 125–353.

Desborough, G. A., 1959, Sulphide mineralization and associated structure in northern Union County, Illinois: Washington Academy of Sciences Journal, v. 49, no. 6, p. 172–177.

DeWitt, Wallace, Jr., 1974, Geologic map of the Beans Cove and Hyndman quadrangles and part of the Fairhope quadrangle, Bedford County, Pennsylvania: U.S. Geological Survey Miscellaneous Investigations Series Map I–801, scale 1:24,000.

Dietrich, R. V., 1954, Geology of the Pilot Mountain area, Virginia: Bulletin of the Virginia Polytechnic Institute, Engineering Station Series 91, v. 47, no. 4, 32 p.

_____ 1959, Geology and mineral resources of Floyd County of the Blue Ridge Upland, southwestern Virginia: Bulletin of the Virginia Polytechnic Institute, Engineering Experiment Station Series 134, v. 52, no. 12, 160 p.

Dorr, J. A, Jr., and Eschman, D. F., 1970, Geology of Michigan: Ann Arbor, Michigan, University of Michigan Press, 476 p.

Dozy, J. J., 1970, A geological model for the genesis of the lead-zinc ores of the Mississippi Valley, U.S.A.: Transactions of the Institute of Mining and Metallurgy, v. 79, p. B163–B170.

Dunlap, J. C., 1945, Barite prospects in the vicinity of Friendsville, Blount County, Tennessee: U.S. Geological Survey Strategic Minerals Investigations Preliminary Report 3–191.

_____ 1946, Geology of Hardwick mine area, Bradley County, Tennessee: U.S. Geological Survey Strategic Minerals Investigation Preliminary Report 3–185.

Edmundson, R. S., 1938, Barite deposits of Virginia: Virginia Geological Survey Bulletin 53, 85 p.

Eilertsen, N. A., 1950, Investigation of the Shawangunk mine zinc-lead deposit, near Summitville, Sullivan Co., N.Y.: U.S. Bureau of Mines Report of Investigations 4675, 41 p.

Erd, R. C., and Greenberg, S. S., 1960, Minerals of Indiana: Indiana Geological Survey Bulletin 18, 73 p.

Ettensohn, F. R., and Barron, L. S., 1981, Depositional model for the Devonian-Mississippian black shales of America: A paleoclimatic-paleogeographic approach, *in* Roberts, T. G., ed., Chattanooga and Ohio Shales of the southern Appalachian Basin: Geological Society of America Guidebook, v. 2, p. 344–367.

Fagan, J. M., 1969, Geology of the Lost Creek barite mine: Tennessee Department of Conservation, Division of Geology Report of Investigations 23, p. 40–44.

Ferguson, H. W., and Jewell, W. B., 1951, Geology and barite deposits of the Del Rio district, Cocke County, Tennessee: Tennessee Department of Conservation, Division of Geology Bulletin 57, 235 p.

Fohs, F. J., 1913, Barytes deposits of Kentucky: Kentucky Geological Survey, series 4, v. 1, p. 441–588.

Fontaine, W. M., 1883, Notes on the geology and mineral resources of the Floyd, Virginia, plateau: The Virginias, v. 4, p. 190.

Freedman, J. L., 1972, Geochemical prospecting for zinc, lead, copper, and silver, Lancaster Valley, southeastern Pennsylvania: U.S. Geological Survey Bulletin 1314–C, 49 p.

Fulweiler, R. E., and McDougal, S. E., 1971, Bedded-ore structures, Jefferson City mine, Jefferson City, Tennessee: Economic Geology, v. 66, p. 763–769.

Garven, Grant, and Freeze, R. A., 1982, The role of regional groundwater flow in the formation of ore deposits in sedimentary basins: a quantitative analysis, *in* Ozoray, G., ed., Proceedings of the Second National Hydrogeological Conference, sponsored by the International Association of Hydrogeologists, Canadian Chapter, p. 59–68.

Giordano, T. H., and Barnes, H. L., 1981, Lead transport in Mississippi Valley-type ore solutions: Economic Geology, v. 76, p. 2200–2211.

Grant, R. W., 1968, Mineral collecting in Vermont: Vermont Geological Survey Special Publication 2, 49 p.

Gray, Carlyle, 1961, Zinc and lead deposits of the Shawangunk Mountains, New York: New York Academy of Science Transactions Series 2, v. 23, p. 315–331.

Green, Richard, 1971, Ohio Lime, Woodville: Rocks and Minerals, v. 46, p. 280–281.

Greene, G. U., 1935, The occurrence of sphalerite at Ellsworth, Ohio: American Mineralogist, v. 20, p. 882–883.

Grogan, R. M., and Bradbury, J. C., 1968, Fluorite-zinc-lead deposits of the Illinois-Kentucky mining district, *in* Ridge, J. D., ed., Ore deposits of the United States, 1933–1967, v. 1: New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, p. 370–399.

Guild, P. W., 1981, Preliminary metallogenic map of North America: numerical listing of deposits: U.S. Geological Survey Circular 858–A, 93 p.

Hall, James, 1843, Geology of New York, Part IV, Survey of the Fourth Geological District: Albany, N.Y., 683 p.

Hall, W. E., and Friedman, Irving, 1963, Composition of fluid inclusions, Cave-in-Rock fluorite district, Illinois, and upper Mississippi Valley zinc-lead district: Economic Geology, v. 58, p. 886–911.

Harris, L. D., 1969, Kingsport Formation and Mascot Dolomite (Lower Ordovician) of East Tennessee: Tennessee Division of Geology Report of Investigations 23, p. 1–39.

_____ 1971, A lower Paleozoic paleoaquifer, the Kingsport Formation and Mascot Dolomite of Tennessee and southwest Virginia: Economic Geology, v. 66, no. 5, p. 735–743.

Hartnagel, C. A., and Broughton, J. G., 1951, The mining and quarry industries of New York State, 1937 to 1948: New York State Museum Bulletin 343, 130 p.

Hatch, J. R., 1983, Geochemical processes that control minor and trace element composition of United States coals, *in* Shanks, W. C., III, ed., Cameron volume on unconventional mineral deposits: New York Society of Mining Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., p. 89–98.

Hayes, L. G., 1960, The Bowers-Campbell mine [Virginia]—Tri-State's boot-shaped zinc deposit: Mining Engineering, v. 12, no. 9, p. 997–1000.

Heck, E. T., 1940a, Devonian coal in Tucker County, West Virginia: West Virginia Academy of Science Proceedings, Series 40, v. 13, no. 10–I, p. 81–82.

_____ 1940b, Barium in Appalachian salt brines: American Association of Petroleum Geologists Bulletin, v. 24, no. 3, p. 486–492.

Heckel, P. H., 1973, Nature, origin, and significance of the Tully limestone: Geological Society of America Special Paper 138, 244 p.

Heinrich, E. W., 1976, The Mineralogy of Michigan: Michigan Geological Survey Bulletin 6, 225 p.

Herbert, Paul, Jr., and Young, R. S., 1956, Sulfide mineralization in the Shenandoah Valley of Virginia: Virginia Division of Geology Bulletin 70, 58 p.

Heyl, A. V., Jr., 1968a, The Upper Mississippi Valley base-metal district, *in* Ridge, J. D., ed., Ore deposits of the United States, 1933–1967, v. 1: New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, p. 431–459.

_____ 1968b, Minor epigenetic, diagenetic, and syngenetic sulfide, fluorite, and barite occurrences in the central United States: Economic Geology, v. 63, no. 6, p. 585–594.

_____ 1982, Outlying mineral occurrences related to the Upper Mississippi Valley mineral district, Wisconsin, Iowa, Illinois, and Minnesota: Economic Geology, v. 77, no. 8, p. 1803–1817.

_____ 1972, The 38th parallel lineament and its relationship to ore deposits: Economic Geology, v. 67, no. 7, p. 879–894.

_____ 1983, Geologic characteristics of three major Mississippi Valley districts, *in* Kisrarsayi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., International Conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, p. 27–60.

Heyl, A. V., Jr., Agnew, A. F., Lyons, E. J., and Behre, C. H., Jr., 1959, The geology of the Upper Mississippi Valley zinc-lead district: U.S. Geological Survey Professional Paper 309, 310 p.

Heyl, A. V., Jr., and Brock, M. R., 1962, Zinc occurrence in the Serpent Mound structure of southern Ohio: U.S. Geological Survey Professional Paper 450–D, p. D95–D97.

Heyl, A. V., Jr., Brock, M. R., Jolly, J. L., and Wells, C. E., 1965, Regional structure of southeast Missouri and Illinois-Kentucky mineral districts: U.S. Geological Survey Bulletin 1202–B, p. B1–B20.

Heyl, A. V., Jr., Landis, G. P., and Zartman, R. E., 1974, Isotopic evidence for the origin of Mississippi Valley-type mineral deposits—a review: Economic Geology, v. 69, no. 6, p. 992–1006.

Heyl, A. V., Jr., and Pearre, N. C., 1965, Copper, zinc, lead, iron, cobalt, and barite deposits in the Piedmont upland of Maryland: Maryland Geological Survey Bulletin 28, 72 p.

Heyl, A. V., Jr., and West, W. S., 1982, Outlying mineral occurrences related to the upper Mississippi Valley mineral district, Wisconsin, Iowa, and Minnesota: Economic Geology, v. 77, no. 8, p. 1803–1817.

Hill, W. T., 1969, Mine geology of the New Jersey Zinc Company's Flat Gap Mine at Treadway in the Copper Ridge district: Tennessee Division of Geology Report of Investigations 23, p. 76–90.

Hill, W. T., McCormick, J. E., and Wedow, Helmuth, Jr., 1971, Problems on the origin of ore deposits in the Lower Ordovician formations of East Tennessee: Economic Geology, v. 66, no. 5, p. 799–804.

Hoagland, A. D., 1962, Distribution of zinc in soils overlying the Flat Gap mine: Society of Mining Engineers Transactions, v. 223, no. 4, p. 399–402.

_____ 1967, Interpretations relating to the genesis of east Tennessee zinc deposits: Economic Geology Monograph 3, p. 52–58.

Hoagland, A. D., Hill, W. T., and Fulweiler, R. E., 1965, Genesis of the Ordovician zinc deposits in east Tennessee: Economic Geology, v. 60, no. 4, p. 693–714.

Holden, W. F., and Carlson, E. H., 1979, Barite concretions from the Cleveland Shale in north-central Ohio: Ohio Journal of Science, v. 79, no. 5, p. 227–232.

Hollenbaugh, D. W., and Carlson, E. H., 1983, The occurrence of wurtzite polytypes in eastern Ohio: Canadian Mineralogist, v. 21, p. 697–703.

Howard, C. L. H., 1959, Celestite and fluorite from Clay Center, Ohio: Cleveland Museum of Natural History, Museum News, v. 1, p. 125–130.

Hughes, T. H., and Lynch, R. E., Jr., 1973, Barite in Alabama: Geological Survey of Alabama Circular 85, 43 p.

Hull, J. P. D., 1920, Report on the barytes deposits of Georgia: Geological Survey of Georgia Bulletin 36, 146 p.

Hurst, V. J., and Crawford, T. J., 1970, Sulfide deposits in the Coosa Valley area, Georgia: Washington, D. C., U.S. Department of Commerce Economic Development Administration, 190 p.

Hyde, C., and Landy, R. A., 1966, Whewellite from septarian concretions near Milan, Ohio: The American Mineralogist, v. 51, p. 228–229.

Ingham, A. I., 1940, The zinc and lead deposits of Shawangunk Mountain, New York: Economic Geology, v. 35, p. 751–760.

Jacobs, E. C., 1943(?), Report of the State Geologist on the mineral industries and geology of Vermont, 1941–1942: Vermont Geological Survey, State Geologist 23rd Report, 83 p.

_____ 1944(?), Report of the State Geologist on the mineral industries and geology of Vermont, 1943–1944: Vermont Geological Survey, State Geologist 24th Report, p. 38–41.

Jensen, D. E., 1942, Minerals of the Lockport dolomite in the vicinity of Rochester, New York: Rocks and Minerals, v. 17, p. 199–203.

Jewell, W. B., 1947, Barite, fluorite, galena, sphalerite veins of middle Tennessee: Tennessee Department of Conservation, Division of Geology Bulletin 51, 114 p.

Johnson, H. E., 1961, (letter) A hugh septarium from West Virginia: Rocks and Minerals, November-December, p. 581.

Jolly, J. L., and Heyl, A. V., Jr., 1964, Mineral paragenesis and zoning in the central Kentucky mineral district: Economic Geology, v. 59, no. 4, p. 596–624.

Jones, W. B., and McVay, T. N., 1934, Barite deposits of the Sinks district, Bibb County, Alabama: Economic Geology, v. 29, p. 761–766.

Kain, J. H., 1818, Remarks on the mineralogy and geology of the northwestern part of the State of Virginia and the eastern part of the State of Tennessee: American Journal of Science, v. 1, p. 60–67.

Kendall, D. L., 1960, Ore deposits and sedimentary features, Jefferson City mine, Tennessee: Economic Geology, v. 55, no. 5, p. 985–1003.

Kesler, T. L., 1950, Geology and mineral deposits of the Cartersville district, Georgia: U.S. Geological Survey Professional Paper 224, 97 p.

King, P. B., Ferguson, H. W., Craig, L. C., and Rodgers, John, 1944, Geology and manganese deposits of northeastern Tennessee: Tennessee Department of Conservation, Division of Geology Bulletin 52, 283 p.

King, P. B., and Ferguson, H. W., 1960, Geology of northeasternmost Tennessee: U.S. Geological Survey Professional Paper 311, 136 p.

King, P. B., and Beikman, H. M., (compilers) 1974, Geologic map of the United States: U.S. Geological Survey, scale 1:2,500,000.

Kinsland, G. L., 1977, Formation temperature of fluorite in the Lockport Dolomite in Upper New York State as indicated by fluid inclusion studies – with a discussion of heat sources: Economic Geology, v. 72, no. 5, p. 849–854.

Kisvarsanyi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., 1983, International conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, 603 p.

Klemic, Harry, Warman, J. C., and Taylor, A. R., 1963, Geology and uranium occurrences of the northern half of the Lehighton, Pennsylvania, quadrangle and adjoining areas: U.S. Geological Survey Bulletin 1138, 97 p.

Kyle, J. R., 1976, Brecciation, alteration and mineralization in the Central Tennessee zinc district: Economic Geology, v. 71, no. 5, p. 892–903.

Lane, A. C., 1900, Geological Report on Huron County, Michigan: Michigan Geological Survey, Report 7, pt. II, 329 p.

Lapham, D. M., and Geyer, A. R., 1959, Mineral collecting in Pennsylvania: Pennsylvania Geological Survey Bulletin G 33, 148 p.

Laurence, R. A., 1960, Geologic problems in the Sweetwater barite district, Tennessee: American Journal of Science, v. 258–A, p. 170–179.

Leavens, P. B., 1968, New data on Whewellite: The American Mineralogist, v. 53, p. 455–463.

Lechler, P. J., and others, 1979, Distribution and geochemical characterization of the Hannibal Member of the New Albany Shale in Indiana: Proceedings of the Third Eastern Gas Shales Symposium, Morgantown, West Virginia, U.S. Department of Energy METC/SP–7916, p. 511–525.

Lechler, P. J., Leininger, R. K., Shaffer, N. R., and Ripley, E. M., 1980, Enrichment of heavy metals in the New Albany Shale, southern Indiana (abs.): Geological Society of America Abstracts with Programs, v. 12, no. 5, p. 232–249.

Leeds, A. R., 1875, On an asphaltic coal from the shale of the Huron River, Ohio, containing seams of sulphate of baryta: Lyceum of Natural History of New York, Annals, v. 11, p. 105.

Lesure, F. G., 1957, Geology of the Clifton Forge iron district, Virginia: Virginia Polytechnic Institute Engineering Experiment Station Series Bulletin 118, 130 p.

Lesure, F. G., and Klemic, Harry, 1977, Favorable area for zinc exploration, Saratoga County, New York: U.S. Geological Survey Open-File Report 77–319, 4 p.

Lesure, F. G., Williams, B. B., and Dunn, M. L., Jr., 1982, Mineral resources of the Mill Creek, Mountain Lake, and Peters Mountain Wilderness Study Areas, Craig and Giles Counties, Virginia, and Monroe County, West Virginia: U.S. Geological Survey Bulletin 1510, 76 p.

Ludlum, J. C., 1955, Regional setting and mineralogic features of the Howell zinc prospect, Jefferson County, West Virginia: Economic Geology, v. 50, no. 8, p. 855–861.

Luttrell, G. W., 1966, Base- and precious-metal and related ore deposits of Virginia: Virginia Division of Mineral Resources, Mineral Resources Report 7, 167 p.

Maher, S. W., 1958, The zinc industry of Tennessee: Tennessee Department of Conservation, Division of Geology Information Circular no. 6, 28 p.

_____ 1970, Barite resources of Tennessee: Tennessee Department of Conservation, Division of Geology Report of Investigation 28, 40 p.

Maher, S. W., and Finlayson, C. P., 1965, Investigations of miscellaneous mineral deposits in east Tennessee: Tennessee Academy of Science Journal, v. 40, no. 2, p. 43–47.

Main, F. H., 1976, Zinc in Tennessee: New Jersey Zinc's contribution, *in* Appalachian Regional Commission, Proceedings of the Appalachian Mineral Resources Evaluation Conference, p. 113–121.

Martens, J. H. C., 1925, Barite and associated minerals in concretions in the Genesee Shale [central New York]: American Mineralogist, v. 10, p. 102–104.

_____ 1963, Sulphate minerals in West Virginia: West Virginia Geological and Economic Survey Bulletin 25, 13 p.

_____ 1964, Minerals of West Virginia: West Virginia Geological and Economic Survey Educational Series 8, 41 p.

Mather, W. W., 1843, Geology of New-York, Part 1, Comprising the geology of the First Geological District: Albany, N.Y., 653 p.

McAlister, R. F., 1946, Famous Clay Center Ohio locality: The Mineralogist, v. 14, p. 623–624.

McCormick, J. E., Evans, L., L., Palmer, R. A., and Rasnick, F. D., 1971, Environment of the zinc deposits of the Mascot-Jefferson City district, Tennessee: Economic Geology, v. 66, no. 5, p. 757–762.

McLimans, R. K., 1977, Geological, fluid inclusion, and stable isotope studies of the upper Mississippi Valley zinc-lead district, southwest Wisconsin: University Park, Pa., The Pennsylvania State University, Ph. D. dissertation, 187 p.

McLimans, R. K., Barnes, H. L., and Ohmoto, H., 1980, Sphalerite stratigraphy of the upper Mississippi Valley zinc-lead district, southwestern Wisconsin: Economic Geology, v. 75, no. 3, p. 351–361.

Merrill, F. J. H., 1895, Mineral resources of New York State: New York State Museum Bulletin 15, p. 363–595.

Miller, W. J., 1910, Geology of the Port Leyden quadrangle, Lewis County, New York: New York State Museum Bulletin 135, 61 p.

Montague, J. O., 1948, Clay Center, Ohio: The Mineralogist, v. 16, June-July issue, p. 300–302.

Morrill, Philip, and Chaffee, R. G., 1964, Vermont mines and mineral localities: Hanover, New Hampshire, Dartmouth College Museum, 57 p.

Morrison, R. B., 1935, The occurrence and origin of celestite and fluorite at Clay Center, Ohio: American Mineralogist, v. 20, p. 780–790.

Multer, H. G., 1963, Geology of the Silurian producing zones in the Moreland oil pool, Wayne County, northeastern Ohio: Ohio Geological Survey Report of Investigations 46, 48 p.

Napper, C. W., 1917, Concretionary forms in the Greenfield limestone: Ohio Journal of Science, v. 18, p. 7–13.

Neatherly, T. L., Clarke, O. M., Jr., Smith, W. E., Szabo, M. W., and White, D. H., Jr., 1972, Mineral resources of Calhoun County, Alabama: Alabama Geological Survey Circular 81, p. 21–24.

Neumann, G. L., 1952a, Lead-zinc deposits of southwestern St. Lawrence County, N.Y.: U.S. Bureau of Mines Report of Investigations 4907, 25 p.

_____ 1952b, Guymard lead-zinc deposit, Orange County, N.Y.: U.S. Bureau of Mines Report of Investigations 4909, 10 p.

Newland, D. H., 1919, The mineral resources of the State of New York: New York State Museum Bulletins 223 and 224, 315 p.

Noble, E. A., 1963, Formation of ore deposits by water of compaction: Economic Geology, v. 58, no. 7, p. 1145–1156.

Oder, C. R. L., and Ricketts, J. E., 1961, Geology of the Mascot-Jefferson City zinc district, Tennessee: Tennessee Department of Conservation, Division of Geology Report of Investigations 12, 29 p.

Ohle, E. L., 1959, Some considerations in determining the origin of ore deposits of the Mississippi Valley type: Economic Geology, v. 54, no. 5, p. 769–789.

_____ 1980, Some considerations in determining the origin of ore deposits of the Mississippi Valley type—Part II: Economic Geology, v. 75, no. 2, p. 161–172.

Ostrander, C. W., 1942, Barite prospect near Johnsville, Frederick County, Maryland: Natural History Society of Maryland Bulletin, v. 12, no. 3, p. 44.

Parr, D. F., and Chang, L. L. Y., 1977, Descriptive mineralogy of Pugh Quarry, northwestern Ohio—marcasite and pyrite: Ohio Journal of Science, v. 77, p. 213–222.

_____ 1978, Descriptive mineralogy of Pugh Quarry, northwestern Ohio—sphalerite: Ohio Journal of Science, v. 78, p. 272–279.

_____ 1979, Descriptive mineralogy of Pugh Quarry, northwestern Ohio—calcite, dolomite, and fluorite: Ohio Journal of Science, v. 79, p. 24–31.

_____ 1980, Descriptive mineralogy of Pugh Quarry, northwestern Ohio—barite and celestite: Ohio Journal of Science, v. 80, p. 20–29.

Payne, J. N., 1938, Discovery of sphalerite and galena near Millbrook, Kendall County: Illinois Academy of Science Transactions, v. 31, no, 2, p. 182–183.

Pepper, J. F., Clark, S. H. B., and deWitt, Wallace Jr., 1985, Spherulitic nodules of barite in Late Devonian shales of western New York: U.S. Geological Survey Bulletin 1653, 11 p.

Peterson, R. B., 1950, The mineral industries of New York State: Albany, New York State Department of Commerce, 108 p.

Pinckney, D. M., 1976, Mineral resources of the Illinois-Kentucky mining district: U.S. Geological Survey Professional Paper 970, 15 p.

Plummer, L. N., 1971, Barite deposition in Central Kentucky: Economic Geology, v. 66, no. 2, p. 252–258.

Pratt, W. P., 1984, Mississippi Valley-type lead-zinc deposits, Conference report: Geology, v. 12, no. 3, p. 184.

Price, P. H., Hare, C. E., McCue, J. B., and Hoskins, H. A., 1937, Salt brines of West Virginia: West Virginia Geological Survey Report, v. 8, 203 p.

Ramsey, J. G. M., 1926, The annals of Tennessee: Kingsport, Kingsport Press, 2nd ed., p. 376.

Reade, E. H., Power, W. R., Keeners, M. J., White, D. H., 1980, Barite deposits in the Cartersville District, Bartow County, Georgia, *in* Robert Frey, ed., Excursions in southeastern geology, v. II: American Geological Institute Guidebook for Geological Society of America 1980 Annual Meeting, p. 379–384.

Reger, D. B., and Tucker, R. C., 1924, Mineral and Grant Counties: West Virginia Geological Survey, 866 p.

Reidel, S. P., 1975, Bedrock geology of the Serpent Mound cryptoexplosion structure, Adams, Highland, and Pike Counties, Ohio: Ohio Geological Survey Report of Investigations 95, 1 sheet with text.

Reidel, S. P., and Koucky, F. L., 1981, The Serpent Mound cryptoexplosion structure, southwestern Ohio, *in* GSA Cincinnati '81 Field Trip Guidebooks, v. 2: Falls Church, Virginia, American Geological Institute, p. 391–403.

Robinson, L. C., 1931, Vein deposits of central Kentucky: Kentucky Geological Survey, Series 6, v. 41, 127 p.

Rodgers, John, 1948, Geology and mineral deposits of Bumpass Cove, Unicoi and Washington Counties, Tennessee: Tennessee Department of Conservation, Division of Geology Bulletin 54, 82 p.

Roedder, Edwin, 1967, Environment of deposition of stratiform (Mississippi Valley-type) ore deposits, from studies of fluid inclusions: Economic Geology Monograph 3, p. 349–362.

_____ 1976, Fluid-inclusion evidence on the genesis of ores in sedimentary and volcanic rocks, *in* Wolf, K. N., ed. Handbook of stratabound and stratiform ore deposits: Amsterdam, Elsevier Scientific Publishing Company, Amsterdam, p. 67–110.

Rogers, J. K., 1936, Geology of Highland County: Ohio Geological Survey, Fourth Series, Bulletin 38, 148 p.

Rominger, C. L., 1876, Lower peninsula 1873–1876, Geology of lower peninsula, Michigan: Geological Survey of Michigan Reports, v. III, pt. 1, 150 p.

Rose, A. W., 1970, Metal mines and occurrences in Pennsylvania: Pennsylvania Geological Survey Bulletin M 50, part 3, 14 p.

Sangster, D. F., 1983, Mississippi Valley-type lead-zinc deposits: a geological melange, *in* Kisvarsanyi, Geza, Grant, S. K., Pratt, W. P., and Koenig, J. W., ed., International conference on Mississippi Valley type lead-zinc deposits: Rolla, Missouri, University of Missouri-Rolla, p. 7–19.

Sayrs, R. L., and Clayton, A. B., 1949, Investigations of Idol and Dalton zinc deposits, Grainger County, Tennessee: U.S. Bureau of Mines Report of Investigations 4497, 7 p.

Schrode, R. S., 1952, Barite in the LaSalle Limestone of Illinois: Illinois Academy of Science Transactions, (1951), v. 44, p. 126–128; Illinois Geological Survey Circular 179, p. 126–128.

Seaman, D. M., and Hamilton, Howard, 1950, Occurrence of polymorphous wurtzite in western Pennsylvania and eastern Ohio: American Mineralogist, v. 35, p. 43–50.

Secrist, M. H., 1924, Zinc deposits of east Tennessee: Tennessee Department of Conservation, Division of Geology Bulletin 31, 165 p.

Shaffer, N. R., 1981, Possibility of Mississippi Valley-type mineral deposits in Indiana: Indiana Geological Survey Special Report 21, 49 p.

Shaffer, N. R., Leininger, R. K., Ripley, E. M., and Gilstrap, M. S., 1981, Heavy metals in organic-rich New Albany Shale of Indiana (**abs**): Geological Society of America Abstracts with Programs, v. 13, p. 551.

Sims, P. K., and Hotz, P. E., 1951, Zinc-lead deposit at Shawangunk mine, Sullivan County, New York: U.S. Geological Survey Bulletin 978–D, p. 101–121.

Smith, R. C., II, 1974, Fetid barite from Berks County, Pennsylvania: Pennsylvania Geology, v. 5, no. 6, p. 4–7.

_____ 1977, Zinc and lead occurrences in Pennsylvania: Pennsylvania Geological Survey Mineral Resources Report 72, 318 p.

Smith, R. C., II, Herrick, D. C., Rose, A. W., and McNeal, J. M., 1971, Zinc-lead occurrences near Mapleton, Huntingdon County, Pennsylvania: The Pennsylvania State University Earth and Mineral Sciences Experimental Station Circular 83, 36 p.

Snyder, F. G., 1968, Geology and mineral deposits, midcontinent United States, *in* Ridge, J. D., ed., Ore deposits of the United States, 1933–1967, v. 1: New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, p. 255–286.

Socolow, A. A., 1959, Geology of a barite occurrence, Fulton County, Pennsylvania: Pennsylvania Topographic and Geological Survey Information Circular 17, 5 p.

Stone, R. W., 1939, Non-metallic minerals, *in* The minerals of Pennsylvania: Pennsylvania Geological Survey Bulletin M 18–C, 46 p.

Stose, A. I. J., and Stose, G. W., 1957, Geology and mineral resources of the Gossan lead district and adjacent areas in Virginia: Virginia Division of Mineral Resources Bulletin 72, 233 p.

Stout, W. E., 1941, Dolomites and limestones of western Ohio: Ohio Geological Survey, Fourth Series, Bulletin 42, 468 p.

Strong, Moses, 1882, Geology of the Mississippi region north of the Wisconsin River: [Wisconsin Geological Survey], Geology of Wisconsin Survey of 1873–1879, v. 4, p. 3–98.

Sverjensky, D. A., 1981, The origin of a Mississippi Valley-type deposit in the Viburnum Trend, southeast Missouri: Economic Geology, v. 76, no. 7, p. 1848–1872.

Sverjensky, D. A., Rye, R. O., and Doe, B. R., 1979, The lead and sulfur isotope compositions of a galena from a Mississippi Valley-type deposit in the New Lead Belt, Southeast Missouri: Economic Geology, v. 74, no. 1, p. 149–153.

Sweet, P. C., and Rowe, W. D., 1984: Selected Virginia mineral-resource information: Virginia Division of Mineral Resources Publication 51, 28 p.

Swingle, G. D., 1959, Geology, mineral resources, and ground water of the Cleveland area, Tennessee: Tennessee Division of Geology Bulletin 61, 125 p.

Taylor, A. R., 1962, Geology of the Amandaville Quadrangle, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ–186, scale 1:24,000.

Trace, R. D., 1976, Illinois-Kentucky fluorspar district, *in* Shaw, D. R., ed., Geology and resources of fluorine in the United States: U.S. Geological Survey Professional Paper 933, p. 63–72.

Ver Steeg, Karl, 1940, Sphalerite and galena in sedimentary rocks in Ohio: Science, v. 92, p. 259.

_____ 1942, Galena in concretions of Pottsville age: Science, v. 95, p. 223.

Watson, T. L., 1905, Lead and zinc deposits of Virginia: Geological Survey of Virginia, Bulletin 1, 156 p.

_____ 1907, Mineral resources of Virginia, Lynchburg, Virginia: J. P. Bell Company, p. 520–548.

Watson, T. L., and Grasty, J. S., 1915, Barite of the Appalachian States: American Institute of Mining Engineers Bulletin 98, p. 345–390.

Way, J. H., and Smith, R. C. II, 1983, Barite in the Devonian Marcellus Formation, Montour County: Pennsylvania Geology, v. 14, no. 1, p. 4–9.

Weinberg, E. L., 1971, Sulfide mineralization, southwestern Virginia: Blacksburg, Virginia, Virginia Polytechnic Institute and State University Department of Geological Sciences, Guidebook no. 5, Blacksburg, Virginia, p. 6–23.

White, D. E., 1958, Liquid of inclusions in sulfides from Tri-State (Missouri-Kansas-Oklahoma) is probably connate in origin (**abs.**): Geological Society of America Bulletin, v. 69, p. 1660–1661.

_____ 1968, Environments of generation of some base-metal ore deposits: Economic Geology, v. 63, no. 4, p. 301–335.

_____ 1974, Diverse originis of hydrothermal ore fluids: Economic Geology, v. 69, p. 954–973.

White, Lane, 1979, Middle Tennessee zinc; Jersey Miniere plans growth at Elwood-Gordonsville Mine: Engineering and Mining Journal, v. 180, no. 8, p. 66–76.

Wedow, Helmuth, Jr., 1983, A search for stratiform massive-sulfide exploration targets in Appalachian Devonian rocks—a case study using computer-assisted attribute-coincidence mapping: U.S. Geological Survey Open-File Report 83–352, 82 p.

Williams, J. S., Duncan, Helen, Hardin, G. C., Jr., Trace, R. D., Thurston, W. R., and Klepser, H. J., 1954 (1955), Fluorspar deposits in western Kentucky: U.S. Geological Survey Bulletin 1012, 127 p.

Willman, H. B., and Reynolds, R. R., and Herbert, Paul, Jr., 1946, Geological aspects of prospecting and areas for prospecting in the zinc-lead district of northwestern Illinois: Illinois Geological Survey Report of Investigation 116, 48 p.

Windolph, J. F., Jr., 1985a, Geologic map of the Amonate Quadrangle, Virginia-West Virginia: U.S. Geological Survey Geologic Quadrangle Map GQ–1597.

_____ 1985b, Maps showing coal resources of the Amonate Quadrangle, Buchanan and Tazewell Counties, Virginia and McDowell County, West Virginia: U.S. Geological Survey Miscellaneous Field Studies Map MF–1730.

Winslow, K. R., and Hill, W. T., 1973, The Elmwood project: Mining Congress Journal, v. 59, no. 3, p. 19–27.

Woodward, H. P., 1932, Geology and mineral resources of the Roanoke area, Virginia: Virginia Geological Survey Bulletin 34, 172 p.

_____ 1938, Outline of the geology and mineral resources of Russell County, Virginia: Virginia Geological Survey Bulletin 49, 91 p.

Worl, R. G., Van Alstine, R. E., and Heyl, A. V., 1974, Fluorite in the United States, exclusive of Hawaii: U.S. Geological Survey Mineral Investigations Resource Map MR–60, 13 p., map.

Young, R. S., 1956, Sulfides in Virginia: Virginia Division of Geology, Virginia Minerals, v. 2, no. 1, p. 1–7.

_____ 1967, Reconsideration of the Shenandoah Valley sulfide district, Virginia (abs.): Virginia Journal of Science, v. 18, no. 4, p. 190.

Zodac, Peter, 1947, Trip to Detroit: Rocks and Minerals, v. 22, p. 1011–1017.

Zubovic, P., 1960, Minor element content of coal from Illinois beds 5 and 6 and their correlatives in Indiana and western Kentucky: U.S. Geological Survey Open-File Report, 79 p.

☆U.S. GOVERNMENT PRINTING OFFICE: 1988 - 201-985/93952