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STATE OF MONTANA

Forrest H. Anderson, *Governor*

Special Publication 53

BUREAU OF MINES AND GEOLOGY

February 1971

U. M. Sahinen, *Director*

**INDEX OF GRADUATE THESES
ON MONTANA GEOLOGY**

Compiled by

R. B. Berg

STATE OF MONTANA
BUREAU OF MINES AND GEOLOGY
U. M. Sahinen, Director

SPECIAL PUBLICATION 53

INDEX OF GRADUATE THESES

ON

MONTANA GEOLOGY

Compiled by

R. B. Berg
Montana Bureau of Mines and Geology



MONTANA COLLEGE OF MINERAL SCIENCE AND TECHNOLOGY
Butte, Montana
1971

For sale by
Montana Bureau of Mines and Geology
Montana College of Mineral Science and Technology
Butte, Montana 59701

Price 35 cents

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INDEX OF GRADUATE THESES

ON

MONTANA GEOLOGY

by

R. B. Berg

INTRODUCTION

The Montana Bureau of Mines and Geology has published two editions of an index of unpublished geologic studies in Montana (Special Publication 29 in 1963 and Special Publication 34 in 1965). These two publications listed studies in progress as well as completed theses. Publication of an annual list of current geological and geophysical studies in Montana was begun in 1969 (Special Publication 46) and continued in 1970 (Special Publication 50). Current studies will continue to be listed separately in this annual series, therefore the present index includes only completed theses. Theses written in 1970 are not included except for a few completed early in the year. No attempt was made to delete theses that have been published either in part or in their entirety, but if a major part of a thesis is known to have been published it is so referenced in the index. The next edition of an index of graduate theses on Montana geology will be published in approximately five years.

USE OF THE INDEX

This index consists of three lists. List 1 contains all entries arranged alphabetically by author; List 2 contains

selected entries, most of which do not lend themselves to being located on a map, arranged by subject matter; and List 3 contains all entries arranged by the institution granting the degree. Localities of most entries are shown on Plates 1 and 2 and Figure 1. The localities of some theses for which precise information as to location was not available are plotted approximately. Notations of corrections or additions to this index will be welcomed by Montana Bureau of Mines and Geology, Butte MT 59701.

ACQUISITION OF THESES

Masters theses can generally be obtained on interlibrary loan from the institution granting the degree. Interlibrary loans must be arranged through a library. Ph.D. dissertations completed prior to 1938 may also be obtained by interlibrary loan, but those completed after 1938 can be obtained on microfilm or Xerographic copy from University Microfilms, Ann Arbor, Michigan. The order numbers and prices of these copies are given in Dissertation Abstracts, available for reference in most college and university libraries.

INDEX OF GRADUATE THESES ON MONTANA GEOLOGY

SOURCES OF INFORMATION USED IN THE
COMPILATION OF THIS INDEX

Letters were written to more than three hundred colleges and universities that grant degrees in geology asking them for information on theses dealing with the geology of Montana. The replies from these inquiries are a major segment of the recent entries in this index. The effort of many individuals who took the time to send us information on theses dealing with Montana geology is sincerely appreciated.

In addition, the following sources were searched for theses pertaining to Montana geology:

- Bledsoe, Barton, 1954, Masters theses in science, 1952: Washington, D. C., Biblio Press, 252 p.
- Chelini, J. M., 1963, Preliminary compilation, index of unpublished geologic studies in Montana: Montana Bur. Mines and Geology Spec. Pub. 29, 81 p.
- 1965, Index of unpublished geologic studies in Montana: Montana Bur. Mines and Geology Spec. Pub. 34, 88 p.
- Chronic, B. J., Jr., and Chronic, Halka, 1958, Bibliography of theses written for advanced degrees in geology and related sciences at universities and colleges in the United States and Canada through 1957: Boulder, Colo., Pruett Press, Inc.
- 1965, Bibliography of theses in geology, 1958-1963: Washington, D. C., Am. Geol. Inst. Rept.
- Thermophysical Properties Research Center, 1955-1966, Masters theses in the pure and applied sciences: Lafayette, Ind., Thermophysical Properties Research Center, School of Mechanical Eng., Purdue Univ.
- University Microfilms, Inc., 1957-1969, Dissertation abstracts: Ann Arbor, Mich., Univ. Microfilms, Inc.
- 1969-Sept. 1970, Dissertation abstracts international: Ann Arbor, Mich., Univ. Microfilms, Inc.
- Ward, D. C., 1965, Bibliography of theses in geology, 1964, *in* Geoscience Abs., v. 7, no. 12, p.101-137.
- and O'Callaghan, T. C., 1969, Bibliography of theses in geology, 1965-66: Washington, D. C., Am. Geol. Inst. Rept.

- 1 **ACHAUER, Charles W.**, Stratigraphy and microfossil studies of the Sappington Formation, southwestern Montana. M.A., 1957, University of Montana.
Published: Achauer, C. W., 1959, Stratigraphy and microfossils of the Sappington Formation in southwestern Montana, *in* Hammond, C. R., and Trapp, Henry, Jr., eds., Sawtooth-Disturbed Belt area, Billings Geol. Soc., Guidebook, 10th Ann. Field Conf., Aug. 1959: p. 41-49.
- 2* **ADAM, William L.**, Geology of the Lima Peaks area, Beaverhead County, Montana, and Clark County, Idaho. M.S., 1949, University of Michigan.
Location: T. 14 and 15 S., R. 8 and 9 W. (Pl. 2).
Published: Results incorporated in the following articles: Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404.
 Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 3* **ADKINSON, Burton Wilbur**, The Alpine glacial history and postglacial adjustments of a section of the Cabinet Mountains, Montana. Ph. D., 1942, Clark University.
Location: Lincoln and Sanders Counties (Pl. 1).
- 4* **ALEXANDER, Roger G., Jr.**, The geology of the Whitehall area, Montana. Ph. D., 1951, Princeton University.
Location: 30 miles southeast of Butte (Pl. 2).
Published: Alexander, Roger G., Jr., 1955, Geology of the Whitehall area, Montana: Yellowstone-Bighorn Research Assoc., Inc., Proj. Contr. 195.
- 5* **AL-HASHIMI, Abdul Razak K.**, Copper dispersion in the Boulder batholith, Montana. Ph. D., 1969, Boston University.
Location: Butte-Helena area (Pl. 2).
Remarks: The purpose of the study was to determine the abundance of copper in biotites from rocks of the Boulder batholith and its satellitic plutons and to relate such abundance data to copper dispersion in the batholith as a whole and ore deposits associated with it.
Published: Al-Hashimi, A. R. K., and Brownlow, A. H. (in press), Copper content of biotites from the Boulder batholith, Montana: Econ. Geology. Brownlow, A. H., and Al-Hashimi, A. R. K., 1969, Copper dispersion in the Boulder batholith, Montana (abs.): Am. Geophys. Union Trans., v. 50, p. 335
- 6* **ALLEN, Jack C., Jr.**, Structure and petrology of the Royal stock and Mt. Powell batholith, Flint Creek Range, western Montana. Ph. D., 1962, Princeton University.
Location: West of Deer Lodge (Pl. 2).
Published: Allen, J. C., Jr., 1966, Structure and petrology of the Royal stock, Flint Creek Range, central-western Montana: Geol. Soc. America Bull., v. 77, p. 291-302.
- 7* **ALLINGHAM, John W.**, Metamorphism at the contact of the Cable stock, Montana. M.S., 1954, California Institute of Technology.
Location: Northwest of Anaconda in Deer Lodge County (Pl. 2).
- 8* **ALLSMAN, Paul L.**, Oxidation and enrichment of the manganese deposits of Butte, Montana. M.S., 1955, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
- 9 **ANDERSON, Robert J.**, Upper Mississippian and lower Pennsylvanian formations of Bridger Mountains, Montana. M.S., 1957, University of Wisconsin.
- 10* **ANDERSON, Roy E.**, Geology of lower Bass Creek Canyon, Bitterroot Range, Montana. M.S., 1959, University of Montana.
Location: Ravalli County (Pl. 2).
- 11* **ANDRETTA, Daniel B.**, Geology of the Moose Creek stock, Highland Mountains, Montana. M.S., 1961, Montana State University.
Location: Silver Bow County (Pl. 2).
- 12 **ANDRICHUK, John M.**, Regional stratigraphic analysis of the Devonian System in Wyoming, Montana, southern Saskatchewan, and Alberta. Ph. D., 1951, Northwestern University.
Remarks: Broad stratigraphic study based on surface and subsurface data.
Published: Andrichuk, John M., 1952, Devonian of the northern Rocky Mountains and Great Plains area, *in* Sonnenberg, F. P., ed., Billings Geol. Soc., Guidebook, 3rd Ann. Field Conf., Sept. 1952: p. 57-63.
- 13* **AU-NGOC, Ho**, Geology and ore deposits of the Norwich mine, Silver Bow County, Montana. M.S., 1957, Montana College of Mineral Science and Technology.
Location: Sec. 10 and 15, T. 3 N., R. 8 W., two miles west of Butte (Pl. 2).
- 14* **AUSTIN, Ward H., and STOEVEER, E. C.**, Reconnaissance geology of the south flank of Cinnamon Mountain, Gallatin County, Montana. M.S., 1950, University of Michigan.
Location: T. 8 and 9 S., R. 4 E. (Pl. 2).
 *Indicates that the area described in the thesis is plotted on Plate 1 or 2 or Figure 1.

- 15* **BADGLEY, E. Kirk, Jr.**, Correlation of Late Cretaceous-Early Tertiary sediments in eastern Montana. M.A., 1953, University of Wyoming.
Location: The sections are on a north-south line (114 miles) extending from the Fort Peck Reservoir on the Missouri River, along Freedom and Porcupine Domes, to a point just south of the Yellowstone River on Armells Creek (Pl. 1).
Remarks: Fox Hills, Hell Creek, Tullock, and Lebo Formations studied.
- 16 **BAILLIE, Andrew D.**, Devonian System of the Williston Basin area. Ph. D., 1953, Northwestern University.
Location: Williston Basin extending into northeast corner of Montana.
Remarks: Stratigraphic study based mainly on sub-surface data
Published: Baillie, A. D., 1953, Devonian System of the Williston Basin area: Manitoba Dept. Mines and Nat. Res., Mines Br. Pub. 52-5, 105 p.
- 17* **BALLARD, William W.**, Sedimentary petrology of post-Madison-pre-Kootenai rock, north flank of Little Belt Mountains, Montana. Ph. D., 1961, University of Texas.
Location: Southeast of Great Falls (Pl. 1).
- 18* **BANKA, Eleanor C.**, A petrographic study of some porphyry intrusives in the Beartooth Mountains, near Red Lodge, Montana. M.S., 1960, Smith College.
Location: (Pl. 1).
- 19* **BARKSDALE, Julian D.**, The Shonkin Sag laccolith. Ph. D., 1936, Yale University.
Location: Chouteau County (Pl. 1).
- 20* **BARNES, James V.**, Structural analysis of the northern end of Tobacco Root Mountains, Madison County, Montana. Ph. D., 1954, Indiana University.
Location: Madison County (Pl. 2).
- 21* **BARNES, W. C.**, Geology of the northeast Whitefish Range, Montana. Ph. D., 1963, Princeton University.
Location: Flathead County (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 22* **BARRELL, Joseph**, The geology of the Elkhorn district, Montana. Ph. D., 1900, Yale University.
Location: Center of Jefferson County (Pl. 2).
Published: Weed, W. H., 1901, Geology and ore deposits of the Elkhorn mining district, *with* an appendix on the microscopical petrography, by Joseph Barrell: U. S. Geol. Survey, 21st Ann. Rept., p. 400.
- 23* **BASLER, Albert L.**, Geology of the Emigrant Peak intrusive complex, Park County, Montana. M.S., 1965, Montana State University.
Location: South-central Park County (Pl. 2).
- 24* **BEARD, Thomas**, Geology of part of the Blacktail Range, Beaverhead County, Montana. M.S., 1949, University of Michigan.
Location: T. 9 and 10 S., R. 8 and 9 W. (Pl. 2).
- 25* **BECK, Fredrick M.**, Geology of the Sphinx Mountain area, Madison and Gallatin Counties, Montana. M.A., 1959, University of Wyoming.
Location: Approximately 80 square miles in T. 7 and 8 S., R. 1, 2, and 3 E., Madison County (Pl. 2).
- 26* **BECKER, R. W.**, Geology of a part of the Tendoy Mountains west of Lima, Beaverhead County, Montana. M.S., 1948, University of Michigan.
Location: T. 13 and 14 S., R. 9 and 10 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 27* **BEER, Lawrence P.**, Geology of the Thompson Lakes NW 15-minute quadrangle, northwest Montana. M.S., 1960, University of Massachusetts.
Location: Lincoln County (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 28* **BELL, Robert E.**, Geology and stratigraphy of the Fort Peck fossil field, northwest McCone County, Montana. M.S., 1965, University of Minnesota.
Location: (Pl. 1).

- 29 **BELL, William C.**, Montana Middle Cambrian Brachiopoda. M.A., 1936, University of Montana.
Location: Included are fossils from "Deiss' Cambrian sections in northwestern Montana", also "from type sections of Cambrian rocks in central and south-central Montana, and northwestern Yellowstone Park".
Published: Bell, W. C., 1941, Cambrian Brachiopoda from Montana: Jour. Paleontology, v. 15, p. 193-255.
- 30 **BELL, William C.**, Revision of Cambrian Brachiopoda from Montana. Ph. D., 1939, University of Michigan.
- 31* **BENNER, Richard**, Geology of Lima Peaks area of the Tendoy Mountains, Beaverhead County, Montana, and Clark County, Idaho. M.S., 1948, University of Michigan.
Location: T. 14 S., R. 8 W. (Pl. 2).
Published: Included in Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 32 **BENSON, Anthony L.**, The Devonian System in western Wyoming and adjacent areas. Ph. D., 1965, Ohio State University.
Remarks: Some measured sections in southwestern Montana.
- 33* **BENSON, James C.**, A petrographic study of the Mississippian Heath Formation, Sumatra oil field, central Montana. M.S., 1956, University of Wisconsin.
Location: (Pl. 1).
- 34* **BENTLEY, Robert D.**, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 9, Cloverleaf Lake area. Ph. D., 1969, Columbia University.
Location: (Fig. 1).
- 35* **BENTZIN, David A.**, Geology of the Weasel Creek area, northern Whitefish Range, Flathead and Lincoln Counties, Montana. M.S., 1960, University of Montana.
Location: (Pl. 1).
- 36* **BERG, Arthur B.**, The geology of the northwestern corner of the Tobacco Root Mountains, Madison County, Montana. M.S., 1959, University of Minnesota.
Location: (Pl. 2).
- 37* **BERG, Richard B.**, Petrology of anorthosite bodies, Bitterroot Range, Ravalli County, Montana. Ph. D., 1965, University of Montana.
Location: (Pl. 2).
Published: Berg, R. B., 1968, Petrology of anorthosites of the Bitterroot Range, Montana, in Isachsen, Y. W., ed., The origin of anorthosite and related rocks: New York State Mus. and Sci. Service Mem. 18, 466 p.
- 38* **BERGH, Hugh W.**, Paleomagnetism of the Stillwater Complex, Montana. Ph. D., 1968, Princeton University.
Location: South of Big Timber (Pl. 1).
- 39* **BERRY, George W.**, Stratigraphy and structure of Three Forks, Montana. Ph. D., 1941, Cornell University.
Location: (Pl. 2).
Published: Berry, G. W., 1943, Stratigraphy and structure at Three Forks, Montana: Geol. Soc. America Bull., v. 54, p. 1-30.
- 40* **BEVAN, Arthur C.**, Geology of the Beartooth Mountains, Montana. Ph. D., 1921, University of Chicago.
Location: South of Big Timber (Pl. 1).
Published: Bevan, Arthur C., 1923, Summary of the geology of the Beartooth Mountains, Montana: Jour. Geology, v. 31, p. 441-465.
- 41 **BHATT, Bharat K.**, Petrology and stratigraphy of the Swift and the Morrison Formations near Drummond, Montana. M.S., 1967, University of Montana.
- 42* **BIERWAGEN, Elmer E.**, Geology of the Black Mountain area, Lewis and Clark and Powell Counties, Montana. Ph. D., 1964, Princeton University.
Location: (Pl. 2).
- 43* **BIRKHOLZ, Donald O.**, Geology of the Camas Creek area, Meagher County, Montana. M.S., 1967, Montana College of Mineral Science and Technology.
Location: (Pl. 1).
- 44* **BISHOP, Gale A.**, Biostratigraphic mapping in the upper Pierre Shale utilizing the cephalopod genus *Baculites*, Cedar Creek anticline, Montana. M.S., 1967, South Dakota School of Mines and Technology.
Location: Dawson County (Pl. 1).

- 45 BLACKSTONE, Donald L.**, Brachiopoda from the Madison Limestone of Montana. M.A., 1934, University of Montana.
Location: "Fossils . . . were collected from 18 localities in the state. The principal collections were made . . . in northwestern Montana. Other collections came from the Pryor Mountains."
- 46* BLACKSTONE, Donald L.**, Structure and stratigraphy of the Pryor Mountains, Montana. Ph. D., 1936, Princeton University.
Location: Big Horn and Carbon Counties (Pl. 1).
Published: Blackstone, D. L., Jr., 1940, Structure of the Pryor Mountains, Montana: Jour. Geology, v. 48, p. 590-618.
- 47* BLIXT, John E.**, Geology of the North Moccasin Mountains, Fergus County, Montana. M.S., 1932, Montana College of Mineral Science and Technology.
Location: (Pl. 1).
Published: Blixt, J. E., 1933, Geology and gold deposits of the North Moccasin Mountains, Fergus County, Montana: Montana Bur. Mines and Geology Mem. 8, 25 p.
- 48* BLUEMLE, J. P.**, Erosional surfaces and glacial geology along the southwest flank of the Crazy Mountains, Montana. M.S., 1962, Montana State University.
Location: North of Livingston (Pl. 1).
- 49* BOETTCHER, A. L.**, Geology and petrology of the Rainy Creek intrusive near Libby, Montana. M.S., 1963, Pennsylvania State University.
Location: (Pl. 1).
Published: Boettcher, A. L., 1966, Vermiculite, hydrobiotite, and biotite in the Rainy Creek igneous complex near Libby, Montana: Clay Minerals, v. 6, p. 283-296.
 -----1967, The Rainy Creek alkaline-ultramafic igneous complex near Libby, Montana. Pt. 1, Ultramafic rocks and fenite: Jour. Geology, v. 75, p. 526-533.
- 50* BOETTCHER, A. L.**, The Rainy Creek igneous complex near Libby, Montana. Ph. D., 1966, Pennsylvania State University.
Location: (Pl. 1).
Published: See Entry 49 above.
- 51* BOLE, George R.**, The geology of a part of the Manhattan quadrangle, Gallatin County, Montana. M.A., 1962, University of California, Berkeley.
Location: N½ Manhattan quadrangle, directly north of U.S. Highway 10, east of Three Forks (Pl. 2).
- 52* BOWERS, Gerald F.**, Geology of the Kissick Canyon area, Beaverhead-County, Montana. M.S., 1949, University of Michigan.
Location: T. 10 and 11 S., R. 10 and 11 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404.
 Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 53 BOYD, Francis R., Jr.**, Geology of the Yellowstone rhyolite plateau. Ph. D., 1956 or 1957, Harvard University.
- 54* BRANT, Russel A., ELMER, N. C., GILLESPIE, W. A., and PETERSON, J. R.**, Geology of the Armstead area, Beaverhead County, Montana. M.S., 1949, University of Michigan.
Location: T. 10 S., R. 10 and 11 W. (Pl. 1).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404.
 Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 55* BRASHER, George K.**, Geology of part of the Snowcrest Range, Beaverhead County, Montana. M.S., 1950, University of Michigan.
Location: T. 11 and 12 S., R. 5 and 6 W. (Pl. 2).
- 56* BRENNER, Robert L.**, Geology of the Lubrecht Experimental Forest, Missoula County, Montana. M.S., 1965, University of Montana.
Location: (Pl. 2).
- 57* BRINKER, Willard F.**, Placer tin deposits north of Basin, Montana. M.S., 1944, Montana College of Mineral Science and Technology.
Location: Jefferson County (Pl. 2).
- 58* BROCKUNIER, Sawyer R.**, Geology of the Little Rocky Mountains, Montana. Ph. D., 1936, Yale University.
Location: Southern Phillips and Blaine Counties (Pl. 1).
- 59* BROWN, Charles W.**, Stratigraphic and structural geology of north-central-northeast Yellowstone National Park, Wyoming and Montana. Ph. D., 1957, Princeton Univ.
Location: (Pl. 1).

- 60* **BROWN, Lawrence E.**, Genesis of the ores of the Jardine-Crevasse Mountain area, Park County, Montana. M.S., 1965, Kansas State University.
Location: (Pl. 1).
- 61 **BRUDER, K. F., and WHEELER, C. T.**, Geology of the Greaser Creek area. M.S., 1955, University of Michigan.
- 62* **BRUEHL, Donald H.**, Petrography and structure of an area north of Cooke City, Montana. M.S., 1961, Wayne State University.
Location: (Pl. 1).
- 63* **BRYDEN, Elmer L.**, Geology of an area north of Gardiner, Montana. M. S., 1950, Wayne State University.
Location: (Pl. 1).
- 64* **BUBB, John N.**, Geology of part of the Greenhorn Range and vicinity, Madison County, Montana. M.A., 1961, Oregon State University.
Location: South of Ennis (Pl. 2).
- 65* **BUIE, Bennett F.**, Dikes and related intrusives of the Highwood Mountains area, Montana. Ph. D., 1939, Harvard University.
Location: North-central Montana (Pl. 1).
- 66* **BULL, Stratton H.**, Geology of the Clover Divide area, Snowcrest Range, Montana. M.S., 1949, University of Michigan.
Location: T. 12 and 13 S., R. 6 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 67* **BURCHFIELD, Gail R.**, The geology of a portion of the Bridger Range, Montana. M.S., 1951, University of Iowa.
Location: North of Bozeman (Pl. 2).
- 68 **BURFEIND, Walter J.**, A gravity investigation of the Tobacco Root Mountains, Jefferson basin, Boulder batholith, and adjacent areas of southwestern Montana. Ph. D., 1967, Indiana University.
- 69* **BURGER, H. Robert, III**, Structure, petrology, and economic geology of the Sheridan district, Madison County, Montana. Ph. D., 1966, Indiana University.
Location: East of Twin Bridges (Pl. 2).
Published: Burger, H. R., III, 1967, Bedrock geology of the Sheridan district, Madison County, Montana: Montana Bur. Mines and Geology Mem. 41, 22 p. ————1969, Structural evolution of the southwestern Tobacco Root Mountains, Montana. Geol. Soc. America Bull., v. 80, p. 1329-1342.
- 70* **BURGESS, Charles H.**, Stocks of the Highwood Mountains, Montana. Ph. D., 1936, Harvard University.
Location: North-central Montana (Pl. 1).
- 71* **BUSH, John Harold**, The basalts of Yellowstone Valley, southwestern Montana. M.S., 1967, Montana State University.
Location: 25 to 35 miles south of Livingston in Park County (Pl. 2).
- 72* **BUTLER, James R.**, Geology of the Cathedral Peak area, Beartooth Mountains, Montana. Ph. D., 1962, Columbia University.
Location: South of Big Timber (Pl. 1).
Published: Butler, J. R., 1966, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 6, Cathedral Peak area, Montana: Geol. Soc. America Bull., v. 77, p. 45-64.
- 73* **BUTLER, Thomas A.**, Republic mines and vicinity, New World mining district, Montana and Wyoming. M.S., 1965, University of Idaho.
Location: Sec. 36, T. 9 S., R. 14 E. (Pl. 1).
- 74 **CALHOUN, Fred Harvey Hall**, The relations of the Keewatin ice sheet to the mountains of Montana. Ph. D., 1902, University of Chicago.
Published: Calhoun, F. H. H., 1906, The Montana lobe of the Keewatin ice sheet: U. S. Geol. Survey Prof. Paper 50.
- 75 **CAMPBELL, Newell P.**, Stratigraphy and petrology of the Jefferson Formation (Upper Devonian), Little Belt Mountains, Montana. M.S., 1966, University of Colorado.
- 76* **CARLSON, Gustaf M.**, Applications of the microscope to ore testing with special reference to a Butte ore. M.S., 1932, University of Minnesota.
Location: (Pl. 2).
Remarks: Discusses types of analysis possible with use of the microscope.

LIST 1, 77 - 93

- 77* **CASELLA, Clarence J.**, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 5, The Line Creek area. Ph. D., 1962, Columbia University.
Location: (Fig. 1).
Published: Casella, C. J., 1964, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 4, Relationship between Precambrian and Laramide structures in the Line Creek area: Geol. Soc. America Bull., v. 75, p. 969-986.
- 78* **CASS, John T.**, Geology of the northern part of the Highland Mountains, Montana. A.M., 1953, Indiana University.
Location: South of Butte (Pl. 2).
Remarks: Includes an estimate of phosphate reserves in this area.
- 79 **CATANZARO, Edward J.**, A study of discordant zircons from the Little Belt (Montana), Beartooth (Montana), and Santa Catalina (Arizona) Mountains. Ph. D., 1962, Columbia University.
Published: Catanzaro, E. J., and Kulp, J. L., 1964, Discordant zircons from the Little Belt (Montana), Beartooth (Montana), and Santa Catalina (Arizona) Mountains: Geochim. et Cosmochim. Acta, v. 28, p. 87-124.
- 80 **CETRONE, Ronald, and PASCHAL, Lawrence W., Jr.**, Correlation between a well in Fallon County, Montana, and a well in Harding County, South Dakota. M.S., 1957, South Dakota School of Mines and Technology.
- 81* **CHALMERS, Ann L.**, Quaternary glacial geology and geomorphology of the Teton drainage area, Teton County, Montana. M.S., 1968, Montana State University.
Location: (Pl. 1).
- 82* **CHASE, R. B.**, Geology of lower Sweathouse Creek Canyon, Bitterroot Range, Ravalli County, Montana. M.S., 1961, University of Montana.
Location: (Pl. 2).
- 83* **CHASE, Ronald B.**, Petrology and structure of the northeastern contact zone of the Idaho batholith, Bitterroot Range, Montana. Ph. D., 1969, University of Montana.
Location: Ravalli County (Pl. 2).
Published: Chase, R. B. (in press), Petrology of the northeastern border zone of the Idaho batholith, Bitterroot Range, Montana: Montana Bur. Mines and Geology Mem.
- 84 **CHELINI, J. M.**, Market study and compendium of data on industrial minerals and rocks of Montana. M.S., 1966, Montana College of Mineral Science and Technology.
- 85* **CHILDERS, Milton O.**, Structure and stratigraphy of the southwest Marias Pass area, Flathead County, Montana. Ph. D., 1960, Princeton University.
Location: (Pl. 1).
- 86* **CHRISTENSEN, Evart W.**, Petrography of plumasite, altered enstatite, and metamorphosed quartz-iron rocks from the Gilliam prospect, Madison County, Montana. A.M., 1956, Indiana University.
Location: Gilliam prospect, sec. 26, T. 1 S., R. 3 W. (Pl. 2).
- 87* **CHRISTIE, Harold H.**, Geology of the southern part of the Gravelly Range, southwestern Montana. M.A., 1961, Oregon State University.
Location: South of Virginia City (Pl. 2).
- 88 **CLABAUGH, Stephen E.**, Corundum deposits of Montana. Ph. D., 1950, Harvard University.
Published: Clabaugh, S. E., 1952, Corundum deposits of Montana: U. S. Geol. Survey Bull. 983, 100 p.
- 89* **CLAPP, Michael M.**, Beltian stratigraphy and structure in southern part of Ovando quadrangle, Montana. M.A., 1936, University of Montana.
Location: Northeast of Missoula in Powell County (Pl. 1).
- 90* **CLARK, Dean S.**, Reconnaissance geology of a portion of Powell and Deer Lodge Counties, Montana. A.M., 1953, Indiana University.
Location: (Pl. 2).
Remarks: Reconnaissance mapping of the area to ascertain the existence of commercial phosphate rock.
- 91* **CLARK, John H.**, Geology of the northeast quarter of the Mt. Wright quadrangle, Montana. M.S., 1964, Washington State University.
Location: Teton County (Pl. 1).
- 92* **CLAWSON, Paul N.**, Geology of the Greenough barite mine, Missoula County, Montana. M.S., 1957, University of Montana.
Location: (Pl. 2).
- 93 **CLEMENT, James H.**, Correlation of Paleozoic formations and pre-Jurassic structures in central and north-central Montana. M.S., 1951, Montana College of Mineral Science and Technology.

- 94* **COBB, Edward H.**, Geology of the Gibson Lake region, Montana. M.S., 1941, Yale University.
Location: Lewis and Clark Range in Saypo quadrangle, southern Teton and northern Lewis and Clark Counties (Pl. 1).
- 95 **COBBAN, William A.**, Stratigraphy of the Colorado and Montana Groups (Upper Cretaceous) of the central and northern Great Plains, with descriptions of the Colorado scaphites. Ph. D., 1949, Johns Hopkins University.
Location: Northern flank of the Black Hills in northwestern South Dakota, southeastern Montana, and northeastern Wyoming; northeastern flank of the Bighorn Mountains in south-central, central Montana, and in northwestern Montana. Also areas in Kansas and South Dakota.
- 96* **COLLIER, J. Maurice**, Geology of upper Ruby basin, Beaverhead County, Montana. M.S., 1965, University of Arizona.
Location: West of Wisdom (Pl. 2).
- 97* **COLVILLE, Alan A.**, Paleomagnetic investigation in the vicinity of the northern Tobacco Root Mountains, Madison County, Montana. Ph. D., 1961, Indiana University.
Location: (Pl. 2).
- 98* **CORRY, Andrew V.**, A study of the Continental fault near Butte, Montana. M.S., 1931, Montana College of Mineral Science and Technology.
Location: T. 2, 3, and 4 N., R. 6 and 7 W. (Pl. 2).
- 99* **COTTER, Edward J.**, Mississippian carbonate banks in central Montana. Ph. D., 1963, Princeton University.
Location: Southeast flank of the Big Snowy Mountains (Pl. 1).
- 100* **COURTIS, David M.**, Geology of the Cutoff Mountain area, Park County, Montana. M.S., 1965, University of Michigan.
Location: West of Cooke City (Pl. 1).
- 101* **COWEN, Michael T.**, Petrography of the volcanic rocks of the Jefferson Island quadrangle, Montana. A.M., 1958, Indiana University.
Location: Jefferson and Madison Counties (Pl. 2).
- 102* **CREMER, Edward A.**, Gravity values in the southern Deer Lodge Valley, Montana. M.S., 1966, University of Montana
Location: (Pl. 2).
Published: Konizeski, R. L., and others, 1968, Geology and ground-water resources of the Deer Lodge Valley, Montana: U. S. Geol. Survey Water-Supply Paper 1862.
- 103* **CROWLEY, Francis A.**, Niobium-rare earth deposits in southern Ravalli County, Montana. M.S., 1958, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
Published: Crowley, F. A., 1960, Columbium-rare earth deposits, southern Ravalli County, Montana: Montana Bur. Mines and Geology Bull. 18, 47 p.
- 104* **CSEJTEY, Bella**, Geology of the southeast flank of the Flint Creek Range, western Montana. Ph. D., 1962, Princeton University.
Location: Area north of Anaconda (Pl. 2).
- 105* **CUMMINS, Dean L.**, Geology of the Tendoy-Medicine Lodge area, Beaverhead County, Montana. M.S., 1948, University of Michigan.
Location: T. 12 S., R. 9 and 10 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404.
Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 106* **DAHLEM, David H.**, Geology of the Yaak River-Kootenai River complex. M.S., 1959, Montana College of Mineral Science and Technology.
Location: Between lat 48°30' and 48°37'30" N., and long 115°52'30" and 116°03'10" W. (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 107* **DANIELSON, Richard E.**, Geology of a portion of the Augusta quadrangle, Montana. M.A., 1956, University of Washington.
Location: Lewis and Clark County (Pl. 1).

- 108* **DAVIS, Robert I.**, Geology of the McKenzie Canyon area, Beaverhead County, Montana. M.S., 1949, University of Michigan.
Location: T. 11 S., R. 10 and 11 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 109 **DAY, Damon P.**, Petrography, origin, and environment of deposition of the Horsethief Sandstone (Upper Cretaceous), Montana. M.S., 1965, Michigan Technological University.
- 110* **DENNIS, Lyman C.**, Geology of the North Fork Valley, Montana. M.S., 1936, University of Minnesota.
Location: Glacier National Park and Blackfoot National Forest; T. 34 to 37 N., R. 19 to 23 W. (Pl. 1).
- 111 **DENSON, Norman M.**, Trilobites from the Park Shale of Montana and Yellowstone National Park. M.A., 1939, University of Montana.
Location: Fossils collected from ten sections in central Montana and Yellowstone National Park.
- 112 **DENSON, Norman M.**, Late Middle Cambrian trilobite faunas and stratigraphy of Alberta, Montana, Wyoming, and Utah. Ph. D., 1942, Princeton University.
- 113* **DILLON, Edward L.**, Stratigraphy of an area near Lima, Beaverhead County, Montana. M.S., 1949, University of Illinois.
Location: T. 14 and 15 S., R. 7 and 8 W. (Pl. 2).
- 114* **DOBBIN, C. E.**, The continuity of the lithologic units in Fox Hills, Lance, and Fort Union Formations of eastern Montana, and its bearing on the Laramie problem. Ph. D., 1924, Johns Hopkins University.
Location: Fox Hills, Lance, and Fort Union Formations in Wolf Mountain coal field in southeastern Montana, Jordan coal field, and Forsyth coal field, Rosebud County (Pl. 1).
- 115* **DORR, John A., Jr., and WHEELER, Walter H.**, Geology of a part of the Ruby basin, Madison County, Montana. M.S., 1948, University of Michigan.
Location: T. 7 and 8 S., R. 4 and 5 W. (Pl. 2).
Remarks: Detailed study of Tertiary stratigraphy and paleontology.
- 116 **DOUGLASS, Earl**, The Neocene lake beds of western Montana and descriptions of some new vertebrates from the Loup Fork. M.S., 1899, University of Montana.
Location: Includes many of the intermontane basins of western Montana, "valleys of the upper Missouri (above the region of Helena), Gallatin, Madison, Jefferson, Beaverhead, Ruby (Stinkingwater), Big Hole, Hellgate, and Bitterroot Rivers, and their tributaries".
Published: *In* Fields, R. W., ed., Soc. Vertebrate Paleontology, Guidebook, 8th Field Conf., Missoula, Montana, Aug. 1958: App.
- 117* **DOUGLASS, Myrl R.**, Geology and geomorphology of the south-central Big Snowy Mountains, Montana. M.S., 1954, University of Kansas.
Location: (Pl. 1).
- 118* **DREXLER, James S.**, Geology of the Red Peaks area, Beaverhead County, Montana, and Clark County, Idaho. M.S., 1949, University of Michigan.
Location: T. 14, 15, and 16 S., R. 6 and 7 W. (Pl. 2).
Published: Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 119 **DUNCAN, Donald C.**, Upper Cambrian trilobites from Montana and Yellowstone National Park. M.A., 1937, University of Montana.
Location: Fossils collected from ten Cambrian type sections in central and south-central Montana and Yellowstone National Park.
- 120* **DYSON, James L.**, Ruby Gulch gold mining district, Little Rocky Mountains, Montana. Ph. D., 1938, Cornell University.
Location: (Pl. 1).
Published: Dyson, J. L., 1939, Ruby Gulch gold mining district, Little Rocky Mountains, Montana: Econ. Geology, v. 34, p. 201-213.
- 121* **ECKELMANN, F. Donald**, Archean research in the Beartooth Mountains, Montana-Wyoming. Origin and structure of granitic gneiss and migmatites in the Quad Creek area. Ph. D., 1956, Columbia University.
Location: (Fig. 1).
(Continued on p. 11.)

- Published:** Eckelmann, F. D., and Poldervaart, Arie, 1957, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 1, Archean history of the Quad Creek area: Geol. Soc. America Bull., v. 68, p. 1225-1262.
- 122*** **ECKERTY, Donald G.**, The geology of the Elkhorn Mountains volcanics in southern Jefferson and northern Madison Counties, Montana. M.A., 1968, Indiana University.
Location: (Pl. 2).
- 123*** **EDMUND, Richard A.**, The geology of a portion of the Bridger Range, Livingston quadrangle, Montana. M.S., 1951, University of Iowa.
Location: (Pl. 1).
- 124** **EDWARD, Albert**, The petrography of the Purcell sills. Ph. D., 1930, University of Wisconsin.
- 125*** **EISENBEIS, H. Richard**, The petrogenesis of the Milltown dam sill, Missoula County, Montana. M.A., 1958, University of Montana.
Location: (Pl. 2).
- 126*** **ELLIOTT, Harold C.**, The Emory mine, Powell County, Montana. M.S., 1939, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
- **ELMER, N. C.**, (see Entry 54).
- 127*** **EMERSON, D. O.**, Secondary uranium minerals at the W. Wilson mine near Clancy, Montana. M.S., 1955, Pennsylvania State University.
Location: Jefferson County (Pl. 2).
- 128*** **EMMONS, William H.**, The geology of Haystack Mountains, Montana. Ph. D., 1904, University of Chicago.
Location: Southeast of Livingston in Park and Sweet Grass Counties (Pl. 1).
Published: Emmons, W. H., 1908, Geology of the Haystack stock, Cowles, Park County, Montana: Jour. Geology, v. 16, p. 193-229.
- 129*** **ENGLISH, Van H.**, Cordilleran glaciation in a section of the Cabinet Mountains, Montana. Ph. D., 1942, Clark University.
Location: The Bull Lake Valley from Kootenai and Clark Fork Rivers and to the summits on either side. Most work confined to Libby quadrangle and small part of Priest Lake quadrangle (Pl. 1).
- 130*** **ENGSTROM, David B.**, Geology of part of Centennial Mountain quadrangle, Bearpaw Mountains, Montana. M.A., 1953, University of California, Berkeley.
Location: (Pl. 1).
Published: Stewart, D. B., Pecora, W. T., Engstrom, D. B., and Dixon, H. R., 1957, Preliminary geologic map of the Centennial Mountain quadrangle, Bearpaw Mountains, Montana: U.S. Geol. Survey Misc. Geol. Inv. Map I-235.
- 131*** **EYDE, Theodore H.**, The Potosi tungsten district, Madison County, Montana. M.S., 1957, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
Published: Eyde, T. H., 1958, The Potosi tungsten district, Madison County, Montana: Montana Bur. Mines and Geology Inf. Circ. 21, 51 p.
- 132*** **EYRICH, Henry T.**, Economic geology of part of the New World mining district, Park County, Montana. Ph. D., 1969, Washington State University.
Location: (Pl. 1).
- 133*** **FEICHTINGER, Sylvia H.**, Geology of a portion of the Norris quadrangle, Madison and Gallatin Counties, Montana. M.S., 1970, Montana State University.
Location: Approximately the northern half of the Norris quadrangle, west of the Madison River (Pl. 2).
- 134*** **FINFROCK, Lawrence J.**, The stratigraphy of the Madison Group of south-central Montana and north-west Wyoming. M.S., 1948, University of Illinois.
Location: Paleontological study of section of Madison Group near Logan, Gallatin County (Pl. 2).
- 135*** **FISHER, Bernard**, Igneous rocks of the northeastern Bearpaw Mountains, Montana. Ph. D., 1946, Harvard University.
Location: (Pl. 1).
- 136*** **FITZGERALD, Wilfred H.**, Rhodochrosite-rhodonite relationships in the Butte mining district, Montana. M.S., 1942, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
- 137*** **FIX, Philip**, Structure of the Gallatin Valley, Montana. Ph. D., 1940, University of Colorado.
Location: Includes large area surrounding Bozeman (Pl. 2).
- 138*** **FLANAGAN, William H.**, Geology of the southern part of the Snowcrest Range, Beaverhead County, Montana. A.M., 1958, Indiana University.
(Continued on p. 12.)

- Location:** (Pl. 1).
Remarks: Emphasis on the Permian Phosphoria Formation.
- 139* **FORD, Robert B.**, Occurrence and origin of the graphite deposits near Dillon, Montana. M.S., 1952, University of Wisconsin.
Location: Crystal Graphite mine in Beaverhead County, near Dillon (Pl. 2).
Published: Ford, R. B., 1954, Occurrence and origin of the graphite deposits near Dillon Montana: Econ. Geology, v. 49, p. 31-43.
- 140 **FOSTER, Norman H.**, Faunal zonation and stratigraphy of the Mississippian Madison Group, Wyoming and Montana. Ph. D., 1963, University of Kansas.
- 141* **FOTOUCHI, Manchour, and SARABY, Fereydoon**, Geology of the Dunkleberg district, Drummond quadrangle, Montana. M.S., 1958, Michigan Technological University.
Location: Granite County (Pl. 2).
- 142* **FOWELLS, Joseph E.**, Supergene alteration products of the Butte primary minerals. M.S., 1942, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
- 143* **FOWLER, Wayne E.**, Geology of the Trusty Lake-Quartz Hill Gulch area, Beaverhead County, Montana. Ph. D., 1955, Indiana University.
Location: Vicinity of Divide Melrose field (Pl. 2).
- 144* **FOX, Kenneth F.**, Geology of the Mill Creek basin, Park County, Montana. M.S., 1960, Montana College of Mineral Science and Technology.
Location: South of Livingston (Pl. 1).
- 145* **FOX, Richard D.**, Hydrogeology of the Cascade-Ulm area, Montana. M.S., 1965, University of Montana.
Location: South of Great Falls (Pl. 1).
Published: Fox, R. D., 1966, Geology and ground-water resources of the Cascade-Ulm area, Montana: Montana Bur. Mines and Geology Bull. 52, 64 p.
- 146 **FOX, Stephen K., Jr.**, The stratigraphy and micro-paleontology of the Cody Shale in southern Montana. Ph. D., 1939, Princeton University.
- 147 **FRANCIS, David R.**, The Jurassic stratigraphy of the Williston Basin area. M.S., 1956, Northwestern University.
Published: Francis, D. R., 1956, Jurassic stratigraphy of the Williston Basin area: Saskatchewan Dept. Mineral Res. Rept. 18
- 148 **FRATT, Walter J.**, The Big Snowy Group (Mississippian) in the Bridger Range in Montana. M.S., 1957, University of Wisconsin.
- 149* **FREEMAN, Leroy B., SWEET, John M., and TILLMAN, Chauncey**, Geology of the Henrys Lake Mountains, Fremont County, Idaho, and Madison and Gallatin Counties, Montana. M.S., 1950, University of Michigan.
Location: T. 12 and 13 S., R. 3 and 4 E. (Pl. 2).
- 150* **FREEMAN, Val L.**, Geology of part of the Johnny Gulch quadrangle, Montana. M.S., 1954, University of California, Berkeley.
Location: Thirty miles southeast of Helena, bounded by lat $46^{\circ}07'30''$ N. and $46^{\circ}15'$ N., and long $111^{\circ}37'30''$ W. and $111^{\circ}42'57''$ W., including a part of the eastern foothills of the Elkhorn Mountains. (Pl. 2).
- 151* **FRITZCHE, Hans**, Geology of ore deposits of the Silver Star mining district, Madison County, Montana. M.S., 1935, Montana College of Mineral Science and Technology
Location: T. 1, 2, and 3 S., R. 6 and 7 W. (Pl. 2).
- 152* **FRUGONI, James J., and WARNER, Marvin E.**, A magnetic study of selected intrusives in Jefferson, Madison, and Gallatin Counties, Montana. A.M., 1958, Indiana University.
Location: (Pl. 2).
- 153 **FRYE, Charles I.**, The Hell Creek Formation in North Dakota. Ph. D., 1967, The University of North Dakota.
Remarks: Includes information on the Hell Creek Formation in Garfield County, Montana.
- 154 **GALLAGHER, Alton V.**, Geology of the Lower Cretaceous Cut Bank conglomerate in northwest Montana. M.S., 1957, Michigan State University.
- 155 **GALLANT, Ray B.**, An analysis of the physical characteristics of Kootenai sandstones in Montana. M.S., 1941, Montana College of Mineral Science and Technology.
- 156* **GARBARINI, George S.**, Geology of the McLeod area, Beartooth Range, Montana. Ph. D., 1957, Princeton University.
Location: (Pl. 1).

- 157 **GARREY, George H.**, Glaciation between the Rockies and the Cascades in northwestern Montana, northern Idaho, and eastern Washington. M.S., 1902, University of Chicago, Dept. of Geophys. Sciences.
- 158* **GARTIG, Derry G.**, Petrography, structure, and age relationship of the dikes in an area north of Cooke City, Montana. M.S., 1957, Wayne State University.
Location: (Pl. 1).
- 159 **GAST, Paul W.**, Absolute age determinations from early Precambrian rocks (southeastern Manitoba, Montana, and Wyoming). Ph. D., 1959, Columbia University.
- 160* **GEALY, William J.**, Geology of the Antone Peak quadrangle, southwest Montana. Ph. D., 1953, Harvard University.
Location: Southeast of Dillon (Pl. 2).
- 161 **GEEHAN, R. W.**, A geologic map of Montana. E.M., 1932, University of Minnesota.
- 162* **GEORGE, G. R.**, Stratigraphy of part of the Crow Indian Reservation, Big Horn County, Montana. M.S., 1967, Oregon State University.
Location: (Pl. 1).
- 163 **GIBBS, Frank K.**, The Silurian System in eastern Montana. M.S., 1967, University of Montana.
- **GILLESPIE, W. A.** (see Entry 54).
- 164 **GILLETTE, Christopher B.**, Lineament tectonics of the Montana mining districts. M.S., 1965, Montana College of Mineral Science and Technology.
- 165* **GILMOUR, Ernest H.**, The geology of the southwestern part of the Stryker quadrangle, northwestern Montana. M.S., 1963, University of Montana.
Location: Northwest of Kalispell (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 166* **GILMOUR, Ernest H.**, Carbonate petrology and paleontology of the Alaska Bench Formation, central Montana. Ph. D., 1967, University of Montana.
Location: Most of the measured sections are from within the area of lat 46° 30' and 47° N. and long 109° and 109° 45' W. (Pl. 1).
(Continued, next column)
- Published:** Gilmour, E. H., 1969, Carbonate petrology of the Alaska Bench Formation, central Montana, *in* Cronoble, W. R., and Lane, B. B., eds., The economic geology of eastern Montana and adjacent areas, Montana Geol. Soc.: p. 179-200.
- 167* **GLANCY, Patrick A.**, Cenozoic geology of the southeastern part of the Gallatin Valley, Montana. M.S., 1964, Montana State University.
Location: Approximately 50 square miles which included Bozeman fan, Mt. Ellis fan, Fort Ellis subarea, and Beacon Hill subarea (Pl. 2).
- 168* **GOODWIN, Peter W.**, Ordovician formations of Wyoming. Ph. D., 1964, University of Iowa.
Location: Ordovician sections studied in Montana include SW¼ sec. 30, T. 26 N., R. 25 E.; NW¼ sec. 33, T. 12 N., R. 19 E.; NW¼ sec. 32, T. 12 N., R. 18 E.; and sec. 7, T. 6 S., R. 26 E. to sec. 12, T. 6 S., R. 25 E. (Pl. 1).
- 169* **GOSSER, Charles F.**, Petrography and metamorphism of the Star Lake area, Montana. M.S., 1960, Wayne State University.
Location: Beartooth Range (Pl. 1).
- 170* **GOUDARZI, Hossein**, Geology and ore deposits of the Quartz Hill mining area, Beaverhead County, Montana. M.S., 1941, Montana College of Mineral Science and Technology.
Location: Southwest of Divide (Pl. 2).
- 171 **GRANT, Richard E.**, Cambrian faunas of the Snowy Range Formation, southwestern Montana and northwestern Wyoming. Ph. D., 1958, University of Texas.
Remarks: Snowy Range Formation (Cambrian) and Maywood unit (Devonian) were measured at thirty-two localities in the Horseshoe Hills (north of Three Forks), Bridger Mountains, and in the vicinity of Yellowstone National Park.
- 172 **GRASSMUECK, Gerhard**, Gold enrichment in Montana ores by meteoric water as shown by microscopic study. M.S., 1934, Montana College of Mineral Science and Technology.
Location: Golden Valley vein situated south of Pipestone, about 25 miles from Butte on what is called Cedar Hill; Frazier vein in the same district, about 2 miles west from the Golden Valley vein; Mammoth vein on the east slope of South Boulder Valley; and Prospect vein, about 1 mile west of Virginia City (Pl. 2).

- 173* **GRIFFIN, Judson Roy**, The stratigraphy and paleontology of Boulder Valley, Sweet Grass County, Montana. M.S., 1927, University of Illinois.
Location: South of Big Timber (Pl. 1).
- 174* **GROFF, Sidney L.**, Petrography of the Kootenai Creek area, Bitterroot Range, Montana. M. A., 1954, University of Montana.
Location: Ravalli County (Pl. 2).
Published: Groff, S. L., 1954, Petrology of a portion of the eastern front of the Bitterroot Range, Montana (abs.): Geol. Soc. America Bull., v.65, p. 1376-1377.
- 175* **GUSTAFSON, Velmar O.**, Geology of a portion of the Bridger Range, Livingston quadrangle, Montana. M.S., 1951, University of Iowa.
Location: Northeast of Bozeman (Pl. 2).
- 176* **GUTTORMSEN, Paul A., Jr.**, Geology of the Swamp Creek-Triangle Gulch area, Beaverhead County, Montana. M.S., 1952, Montana College of Mineral Science and Technology.
Location: West of Divide (Pl. 2).
- 177* **GWINN, Vinton E.**, Cretaceous and Tertiary stratigraphy and structural geology of the Drummond area, Montana. Ph. D., 1960, Princeton University.
Location: (Pl. 2).
Published: Gwinn, V. E., 1961, Geology of the Drummond area, central-western Montana. Geologic map 4: Montana Bur. Mines and Geology Spec. Pub. 21.
- 178* **HALL, Frank W., II**, Geology of the northwest Pleasant Valley quadrangle, Montana. M.S., 1962, University of Montana.
Location: Central part of the Salish Mountains, 20 miles west of Whitefish.
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 179* **HALL, Frank W., II**, Bedrock geology, north half of Missoula 30-minute quadrangle. Ph. D., 1959, University of Montana.
Location: West of Missoula (Pl. 2).
- 180 **HALL, Hubert H.**, Mississippian stratigraphy in southwestern Alberta and northwestern Montana. Ph. D., 1952, University of Wisconsin.
Location: Graphic sections of Mississippian rocks were presented for the Pentagon Mountain area, the Teton Canyon area in northern Montana, and the Crows Nest area in southern Alberta.
- 181* **HALL, William B.**, Geology of part of the upper Gallatin Valley of southwestern Montana. Ph. D., 1961. University of Wyoming.
Location: The area mapped in detail covers approximately 196 square miles and lies within Gallatin County and Yellowstone National Park. The reconnaissance area covers approximately 410 square miles. Included in this area are parts of Gallatin County, Madison County, and Yellowstone National Park (Pl. 2).
- 182* **HALLOCK, Allan R.**, The geology of a portion of the Horseshoe Hills, Montana. M.S., 1955, Montana College of Mineral Science and Technology.
Location: Northeast of Three Forks (Pl. 2).
- 183* **HAMBLETON, William W.**, A petrofabric study of layering in the Stillwater Complex, Montana. M. S., 1947, Northwestern University.
Location: Beartooth Mountains, south-central Montana (Pl. 1).
Remarks: Obtained data referred to in U. S. Geol. Survey Prof. Paper 358, p. 38, 1961.
- 184 **HAMBLIN, Ralph H.**, Stratigraphy and insoluble residues of the upper Paleozoic formations of Montana. M.S., 1939, Montana College of Mineral Science and Tech.
- 185 **HANNA, William F.**, Magnetic properties of selected volcanic rocks of southwestern Montana. Ph. D., 1965, Indiana University.
Published: Hanna, W. F., 1967, Paleomagnetism of Upper Cretaceous volcanic rocks in southwestern Montana: Jour. Geophys. Research, v. 72, p. 595-610.
- 186 **HANSEN, Alan R.**, Mission Canyon Formation (Mississippian; Montana). Ph. D., 1959, University of Utah.
- 187* **HANSEN, James C.**, A study of a portion of the post-Madison strata of the Moore area, central Montana. M. S., 1959, University of Oklahoma.
Location: E½ T. 12 and 13 N., R. 15 E.; T. 12 and 13 N., R. 16 E.; and W½ T. 12 and 13 N., R. 17 E. (Pl. 1).
- 188* **HANSEN, Peter Allen**, Geology of the Blackleaf Canyon area, Heart Butte quadrangle, Montana. M.S., 1962, Washington State University.
Location: Teton County (Pl. 1).
- 189* **HARRIS, Frank G.**, Geology of the Dry Creek area, Lewis and Clark County, Montana. M.S., 1963, University of Missouri.
Location: T. 18 N., R. 4 through 6 W.; and T. 19 N., R. 4 through 6 W. (Pl. 1).

- 190* HARRIS, Rae L., Jr.**, Geologic evolution of the Bear-tooth Mountains, Montana and Wyoming. Pt. 3, Gardner Lake area, Wyoming. Ph. D., 1957, Columbia University.
Location: (Fig. 1).
Published: Harris, R. L., 1959, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 3, Gardner Lake area, Wyoming: Geol. Soc. America Bull., v. 70, p. 1185-1216.
- 191* HARRIS, William L.**, Stratigraphy and economic geology of the Great Falls-Lewistown coal fields. M.S., 1968, University of Montana.
Location: (Pl. 1).
Published: Silverman, A. J., and Harris, W. L., 1967, Stratigraphy and economic geology of the Great Falls-Lewistown coal field, central Montana: Montana Bur. Mines and Geology Bull. 56, 20 p.
- 192* HARVEY, John F.**, Structural geology, northern Bridger Range, Montana. M.S., 1951, University of Wisconsin.
Location: North of Bozeman (Pl. 2).
- 193* HAWKINS, D. B.**, Some geochemical aspects of the Cedar Tree laccolith, Gallatin Canyon, southwest Montana. M.S., 1956, Montana State University.
Location: South of Bozeman (Pl. 2).
- 194* HAYNES, Winthrop P.**, A contribution of the geology of the region about Three Forks, Montana. Ph. D., 1914, Harvard University.
Location: (Pl. 2).
- 195* HEIM, Herbert C.**, Petrography of the Dinwoody Formation of southwestern Montana. A. M., 1962, Indiana University.
Location: Head of Pole Canyon, sec. 16, T. 1 S., R. 3 W. (Madison County); Fossil Creek, Gravelly Range, NW¼ NE¼ sec.(?), T. 12 S., R. 2 W. (Madison County); and Little Water Canyon, Tendoy Mountains, S½ sec. 2, T. 13 S., R. 10 W. (Beaverhead County) (Pl. 2).
- 196* HERR, George A.**, Clay minerals in the Phosphoria Formation in Beaverhead County, Montana. A.M., 1955, Indiana University.
Location: Southeast of Dillon (Pl. 2).
- 197* HESS, David F.**, Geology of pre-Beltian rocks in the central and southern Tobacco Root Mountains with reference to superposed effects of the Laramide-age Tobacco Root batholith. Ph. D., 1967, Indiana University.
Location: (Pl. 2).
- 198* HINTZMAN, Davis E.**, Geology and ore deposits of the Clinton mining district, Missoula County, Montana. M.S., 1961, University of Montana.
Location: (Pl. 2).
Published: Hintzman, D. E., 1964, Geology and ore deposits of the Clinton mining district, Missoula County, Montana: Montana Bur. Mines and Geology Bull. 40, 38 p.
- 199* HOLCOMBE, Troy L.**, Geology of the Elk Creek area, Lewis and Clark County, Montana. M.S., 1963, University of Missouri.
Location: South end of the Sawtooth Mountains, T. 19 N., R. 8 W. (Pl. 1).
- 200* HOLLAND, F. D., Jr.**, Stratigraphic details of lower Mississippian rocks of northeastern Utah and southwestern Montana. M.A., 1950, University of Missouri.
Location: Vicinity of Three Forks, T. 2 N., R. 2 E. and 1 W. (Pl. 2).
Remarks: Extensive faunal lists.
Published: Holland, F. D., Jr., 1952, Stratigraphic details of lower Mississippian rocks of northeastern Utah and southwestern Montana: Am. Assoc. Petroleum Geologists Bull., v. 36, p. 1697-1734.
- 201* HOLSER, William T.**, Metamorphism and associated mineralization in the Philipsburg region, Montana. Ph. D., 1949, Columbia University.
Location: (Pl. 2).
- 202* HONKALA, Frederick S.**, Geology of the Centennial region, Beaverhead County, Montana. Ph. D., 1949, University of Michigan.
Location: T. 12, 13, 14, and 15 S., R. 1, 2, 3, 4, 5 W. (Pl. 2).
- 203* HOOD, William C.**, Weathering of the Butte quartz monzonite near Butte, Montana. Ph. D., 1963, University of Montana.
Location: (Pl. 2).
- 204* HOTCHKISS, William R.**, Geology of the Devils Slide area, Park County, Montana. M.S., 1965, Montana State University.
Location: T. 8 and 9 S., R. 7 and 8 E. (Pl. 1).
Remarks: Stratigraphy, structure, and geomorphology of an area including the old Electric coal mining district.
- 205* HRUSKA, Donald C.**, Geology of the Dry Range area, Meagher County, Montana. M.S., 1967, Montana College of Mineral Science and Technology.
Location: (Pl. 1).

- 206*** HUGHES, Gordon J., Precambrian stratigraphy and structure in the Henderson-Willow Creek igneous belt, Granite County, Montana. M.S., 1970, Michigan Technological University.
Location: (Pl. 2).
- 207*** HUH, Oscar K., Upper Paleozoic stratigraphy in southwestern Montana and central Idaho. M.S., 1965, Pennsylvania State University.
Location: Southwestern Beaverhead County (Pl. 2).
- 208** HUH, Oscar K., Mississippian stratigraphy and sedimentology across the Wasatch line, east-central Idaho and extreme southwestern Montana. Ph. D., 1968, Pennsylvania State University.
Published: Huh, O. K., 1967, The Mississippian System across the Wasatch line, east-central Idaho, extreme southwestern Montana, *in* Centennial basin of southwestern Montana—Montana Geol. Soc., 18th Ann. Field Conf. 1967, Guidebook (Billings): p. 31-62.
- 209*** HUME, J. D., and LEEDER, Robert W., Geology of the Pike Mountain area, Gallatin County, Montana. M.S., 1950, University of Michigan.
Location: T. 8 and 9 S., R. 4 E. (Pl. 2).
- 210*** HUTCHINSON, Robert M., Geology of the Browns Lake area, southwestern Montana. A.M., 1948, University of Michigan.
Location: T. 3 and 4 S., R. 9 and 10 W. (Pl. 2).
- 211*** HUTCHISON, David M., Volcanic ash in the northern part of the Bitterroot Valley, Ravalli County, Montana. M.S., 1959, University of Montana.
Location: (Pl. 2).
- 212*** ILLICH, Harold A., Petrology and stratigraphy of the Flathead Formation, Philipsburg-Drummond, Montana. M.S., 1966, University of Montana.
Location: (Pl. 2).
- 213*** INGERSOLL, Robert G., Jr., A geochemical reconnaissance of the mining region from Corbin to Comet, Jefferson County, Montana. M.S., 1964, Montana College of Mineral Science and Technology.
Location: T. 7 N., R. 4 W., and portions of T. 6 and 8 N., R. 4 W. (Pl. 2).
Remarks: A geochemical survey of copper, lead, zinc, and heavy metals concentration in study area.
- 214*** JACKSON, Everett D., Primary textures and mineral associations in the ultramafic zone of the Stillwater Complex, Montana. Ph. D., 1960, University of California, Los Angeles.
(Continued, next column)
- Location: South of Big Timber (Pl. 1).
Published: Jackson, E. D., 1961, Primary textures and mineral associations in the ultramafic zone of Stillwater Complex, Montana: U. S. Geol. Survey Prof. Paper 358, 106 p.
- 215*** JACOBS, Alan M., Pleistocene proto-cirque hollows in the Cataract Creek valley, Tobacco Root Mountains, Montana. Ph. D., 1967, Indiana University.
Location: Madison County (Pl. 2).
- 216*** JACQUES, Richard D., Geology of the northwest corner of Yellowstone National Park, Montana. M.S., 1950, University of Michigan.
Location: T. 8 and 9 S., R. 5 E. (Pl. 2).
- 217*** JAHN, B. M., K-Ar mica ages and the margin of a regional metamorphism, Gravelly Range, Montana. M.S., Brown University
Location: (Pl. 2).
- 218*** JAMES, Harold L., Chromite deposits near Red Lodge, Carbon County, Montana. Ph. D., 1945, Princeton University.
Location: (Pl. 1).
Published: James, H. L., 1946, Chromite deposits near Red Lodge, Carbon County, Montana: U. S. Geol. Survey Bull. 945-F, p. 151-189.
- 219*** JANSONS, Uldis, Petrography, petrology, and trace element relations of the Cooke City (Montana) porphyry. M.S., 1963, University of Montana.
Location: (Pl. 1).
- 220*** JEMMETT, Joseph P., Geology of some of the phosphate deposits in the Centennial Mountains of Idaho and Montana. M.S., 1955, University of Idaho.
Location: Beaverhead County, Montana, and Clark County, Idaho (Pl. 2).
- 221*** JENKS, William F., Geology of portions of the Libby and Trout Creek quadrangles, Montana and Idaho. Ph. D., 1936, Harvard University.
Location: Area between lat 47° and 48°30' N., and long 115°30' and 116° W. (Pl. 1).
Published: Gibson, Russel, Jenks, W. F., and Campbell, Ian, 1941, Stratigraphy of the Belt Series in Libby and Trout Creek quadrangles, northwestern Montana and northern Idaho: Geol. Soc. America Bull., v. 52, p. 363-380.
That part of thesis lying in Libby quadrangle (north of 48° N.) is included in U. S. Geol. Survey Bull. 956.

- 222* **JENSEN, Fred S.**, The geology of the Nashua quadrangle, Montana. Ph. D., 1951, Johns Hopkins University.
Location: Between lat 48° and 48° 15' N., and long 105° 15' and 106° 30' W.; includes T. 26 to 29 N., R. 40 to 42 E. (Pl. 1).
Published: Jensen, F. S., and Varnes, H. D., 1964, Geology of the Fort Peck area, Garfield, McCone, and Valley Counties, Montana: U. S. Geol. Survey Prof. Paper 414-F.
- 223* **JEROME, Norbert R.**, Geology between Miller and Eightmile Creeks, northern Sapphire Range, western Montana. M.S., 1968, University of Montana.
Location: Missoula County (Pl. 1).
- 224* **JOBIN, Daniel A.**, Provenance of detrital minerals from pre-Beltian areas, Montana. M.S., 1949, University of Montana.
Location: T. 5, 6, 7, 8, and 9 S., R. 2, 3, 4, 5, 6, and 7 W. (Pl. 2).
- 225* **JOHNS, Willis M.**, Structure and mineralization of the southern Tidal Wave district, Madison County, Montana. M.S., 1958, Montana College of Mineral Science and Technology.
Location: East of Twin Bridges (Pl. 2).
Published: Johns, W. M., 1961, Geology and ore deposits of the southern Tidal Wave mining district, Madison County, Montana: Montana Bur. Mines and Geology Bull. 24, 53 p.
- 226* **JOHNSON, Alvin C.**, The geology of the Big Ben area, Cascade County, Montana. Ph. D., 1964, University of Michigan.
Location: Near Neihart (Pl. 1).
- 227 **JOHNSON, Durwood M.**, Middle Jurassic of north-central Montana and adjacent areas of Canada. M.S., 1961, University of Montana.
Location: Includes eastern Toole, northern Chouteau, Liberty, Hill, Blaine, and Phillips Counties, and extends 36 miles north into Alberta and Saskatchewan.
Remarks: Cores and cuttings of 58 wells and electric logs from 143 wells were examined.
- 228 **JOHNSON, R. D.**, Pre-Jurassic sedimentation, tectonics, and stratigraphy in southern Alberta and adjoining areas of British Columbia and Montana. M.S., 1954, University of British Columbia.
- 229 **JONES, Roy M.**, Micropaleontology of the Colorado Formation, Montana. M.S., 1941, Montana College of Mineral Science and Technology.
- 230* **JONES, Verner E.**, Chromite deposits of Sheridan, Montana. M.A., 1930, Cornell University.
Location: (Pl. 2).
- 231* **JONES, Verner E.**, Origin of the Spring Hill gold ores near Helena, Montana. Ph. D., 1933, Cornell University.
Location: South of Helena (Pl. 2).
- 232* **JURE, Albert E.**, The petrography of the Purcell sills. Ph. D., 1930, University of Wisconsin.
Location: Plotted approximately as in Glacier National Park (Pl. 1).
- 233* **KARLSTROM, Thor N. V.**, Geology and ore deposits of the Hecla mining district, Montana. Ph. D., 1953, University of Chicago.
Location: West of Melrose, Beaverhead County (Pl. 2).
Published: Karlstrom, T. N. V., 1948, Geology and ore deposits of the Hecla mining district, Beaverhead County, Montana: Montana Bur. Mines and Geology Mem. 25, 87 p.
- 234* **KAUFFMAN, Marvin E.**, Geology of the Garnet-Bearmouth area, western Montana. Ph. D., 1960, Princeton University.
Location: Northwest of Drummond (Pl. 2).
Published: Kauffman, M. E., and Earll, F. N., 1964, Geology of the Garnet-Bearmouth area, western Montana: Montana Bur. Mines and Geology Mem. 39, 40 p.
- 235* **KEENMON, Kendall A.**, Geology of the Blacktail-Snowcrest region, Beaverhead County, Montana. Ph. D., 1950, University of Michigan.
Location: Southeast of Dillon (Pl. 2).
Published: Scholten, Robert, Keenmon, K. A., and Kupsch, W. O., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404.
- 236* **KELLEY, W. N., Jr.**, Geology and origin of the Woods Creek iron deposit, Ravalli County, Montana. M.S., 1967, Pennsylvania State University.
Location: (Pl. 2).
- 237* **KILDAL, Edwin**, Geology of the Red Peaks area, Beaverhead County, Montana, and Clark County, Idaho. M.S., 1949, University of Michigan.
Location: T. 14, 15, and 16 S., R. 6 and 7 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. (Continued, p. 18)

- Scholten, R., and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 238* **KIRK, Charles T.**, Conditions of mineralization in the copper veins at Butte, Montana. Ph. D., 1911, University of Wisconsin.
Location: (Pl. 2).
- 239 **KLAPPER, Gilbert J.**, Upper Devonian and lower Mississippian conodont zones in Montana, Wyoming, and South Dakota. Ph. D., 1962, University of Iowa.
Remarks: The tracing of upper Devonian and lower Mississippian conodont zones; to establish the position of the Devonian-Mississippian boundary.
- 240* **KLEMME, Hugh D.**, The geology of Sixteenmile Creek area, Montana. Ph. D., 1949, Princeton University.
Location: North of Bozeman (Pl. 1).
- 241* **KLEPPER, Montis R.**, Geology of the southern Elkhorn Mountains, Jefferson and Broadwater Counties, Montana. Ph. D., 1950, Yale University.
Location: Southeast of Boulder (Pl. 2).
- 242* **KLUSMAN, Ronald W.**, Electron microprobe analysis of feldspars. Ph. D., 1969, Indiana University.
Location: Madison County (Pl. 2).
Remarks: Samples from the Tobacco Root batholith were analyzed.
Published: Klusman, R. W., and Towell, D. G., 1970, Some observed systematics of calcium zonation in plagioclase of rocks from the Tobacco Root batholith, southwestern Montana (abs.); Rocky Mountain Sec. Ann. Meeting, Geol. Soc. America, Rapid City, South Dakota: May 6-9, 1970.
- 243* **KNAPP, George F.**, A diorite sill in the Lewis and Clark Range, Montana. M.S., 1963, University of Massachusetts.
Location: Southwest wall of Wood Canyon, west of Great Falls (Pl. 1).
- 244* **KOERNER, Harold E.**, Geology and vertebrate paleontology of Miocene Fort Logan and Deep River Formations of Montana. Ph. D., 1939, Yale University.
Location: Fifty miles east of Helena in Meagher County, T. 9 to 12 N., R. 4 to 6 E. (Pl. 1).
- 245* **KOESTERS, Baerbel**, Geology of the Morrison Lake area, Montana-Idaho. M.S., 1963, Pennsylvania State University.
Location: T. 13 and 14 S., R. 12 W. (Pl. 2).
- 246* **KOESTERS, Baerbel**, Structure of the Hawley Creek area, Idaho-Montana. Ph. D., 1966, Pennsylvania State University.
Location: T. 12, 13, and 14 S., R. 12 W., Montana; T. 15 and 16 N., R. 27 and 28 E., Idaho. (Pl. 2).
- 247* **KONIZESKI, R. L.**, Paleogeology of the middle Pliocene Deer Lodge local fauna, western Montana. Ph. D., 1953, University of Chicago.
Location: Deer Lodge Valley (Pl. 2).
Published: Konizeski, R. L., 1957, Paleogeology of the middle Pliocene Deer Lodge local fauna, western Montana: Geol. Soc. America Bull., v. 68, p. 131-150.
- 248* **KOSKINEN, Victor K.**, Marker bed "F" in the Colorado Shale, Keven-Sunburst dome area, Toole County, Montana. M.S., 1951, Washington State University.
Location: Field work from T. 29 to 37 N., and from R. 3 E. to 3 W. (Pl. 1).
- 249* **KOTROWSKI, Frank E.**, Structure and stratigraphy of Towne Point fault block, Carbon County, Montana. A.M., 1949, Indiana University.
Location: Sec. 8, 9, 16, 17, 18, 20, and 21, T. 8 S., R. 20 E. (Pl. 1).
- 250* **KOZAK, Samuel J.**, Structural geology of the Cherry Creek basin area, Madison County, Montana. Ph. D., 1961, University of Iowa.
Location: Southwest of Bozeman (Pl. 2).
- 251* **KRAUSE, H. H.**, Geology of the Saddle Mountain-Carten Creek area, Powell County, Montana. M.S., 1964, University of Kansas.
Location: East of Drummond (Pl. 2).
- 252* **KRUSEKOPF, H. H., Jr.**, Geology of the Tendoy Range near Dell, Beaverhead County, Montana. M.A., 1948, University of Michigan.
Location: T. 12 and 13 S., R. 9 and 10 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404.
Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 253 **KUECHLER, Adolph H.**, A preliminary study of certain Montana clays. M.S., 1933, Montana College of Mineral Science and Technology.

(Continued, next column)

- 254 **KUENZI, Laurence M.**, Stratigraphy of the Pennsylvanian Amsden Formation, southwestern Montana. M.S., 1951, University of Wisconsin.
Location: Correlation and description of several sections along the northeast side of the Bridger Range from Fairy Lake area to the northern end of the range.
- 255* **KUENZI, W. David**, Tertiary stratigraphy in the Jefferson River basin, Montana. Ph. D., 1966, University of Montana.
Location: Whitehall area (Pl. 2).
Published: Kuenzi, W. D., and Richard, B. H., 1969, Middle Tertiary unconformity, North Boulder and Jefferson basins, southwestern Montana. *Geol. Soc. America Bull.*, v. 80, p. 315-320.
- 256* **KUPSCH, Walter O.**, Geology of part of the Beaverhead Mountains, Nicholia Creek basin, Montana. M.S., 1948, University of Michigan.
Location: T. 14, 15, and 16 S., R. 10 and 11 W. (Pl. 2).
Published: Scholten, Robert, Keenmon, K. A., Kupsch, W. D., 1955, Geology of Lima region, southwestern Montana and adjacent Idaho: *Geol. Soc. America Bull.*, v. 66, p. 345-404.
 Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: *Geol. Soc. America Spec. Paper* 104, 71 p.
- 257* **KUPSCH, Walter O.**, Geology of the Lima Peaks area, Beaverhead County, Montana, and Clark County, Idaho. Ph. D., 1950, University of Michigan.
Location: South of Lima (Pl. 2).
Published: (See Entry 256 above.)
- 258* **LAMMERS, Edward C.**, The structural geology of the Livingston Peak area, Montana. Ph. D., 1936, University of Chicago.
Location: Southeast of Livingston (Pl. 1).
Published: Lammers, E. C. H., 1937, The structural geology of the Livingston Peak area, Montana: *Jour. Geology*, v. 45, p. 268-295.
- 259* **LANDIS, Charles A., Jr.**, Geology of the Graphite Mountain-Tepee Mountain area, Montana-Idaho. M.S., 1963, Pennsylvania State University.
Location: T. 12 and 13 S., R. 11 and 12 W. (Pl. 2).
- 260* **LANGE, Ian M.**, Sulfur isotope geology of Butte, Montana. Ph. D., 1968, University of Washington.
Location: (Pl. 2).
- 261* **LANGE, Steven S.**, Geology of the east side of the Lewis and Clark Range at Lewis and Clark Pass, Montana. M.S., 1963, University of Missouri.
Location: Lewis and Clark County, T. 16 N., R. 6 and 7 W. (Pl. 1).
- 262* **LANGFIELD, Peter M.**, Geology of Ford Creek area, Sawtooth Range, Montana. M.S., 1967, University of Montana.
Location: Lewis and Clark County, T. 19 N., R. 9 W., plus the six sections adjacent on the north.
- 263* **LANGTON, Claude M.**, Geology along the Lewis thrust in the Schafer Meadows district, Montana. M.A., 1931, Cornell University.
Location: Flathead County (Pl. 1).
- 264* **LANGTON, Claude M.**, Geology of the northeastern part of the Idaho batholith and adjacent region in Montana. Ph. D., 1934, University of Chicago.
Location: Mainly in Missoula and Ravalli Counties (Pl. 2).
Published: Langton, C. M., 1935, Geology of the northeastern part of the Idaho batholith and adjacent region in Montana: *Jour. Geology*, v. 43, p. 27-60.
- 265* **LARSON, Lawrence T.**, Geology and mineralogy of certain manganese oxide deposits, Philipsburg, Montana. Ph. D., 1962, University of Wisconsin.
Location: (Pl. 2).
- 266* **LATUSZYNSKI, Felix V.**, Geology of the southwest Pleasant Valley quadrangle, Montana. M.S., 1962, University of Montana.
Location: Central part of the Salish Mountains, 20 miles west of Whitefish (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: *Montana Bur. Mines and Geology Bull.* 79.
- 267* **LAUER, Timothy C.**, The stratigraphy and structure of the Snowflake Ridge area, Gallatin County, Montana. M.S., 1966, Oregon State University.
Location: West of Gardiner (Pl. 2).
- 268 **LeBAUER, Lawrence R.**, Petrology of the Wolsey Shale and Meagher Formation (Middle Cambrian) of southwestern Montana. Ph. D., 1962, Indiana University.
- 269 **LECKIE, George G.**, Distribution of clay minerals in the Paleozoic rocks of southwestern Montana. A.M., 1962, Indiana University.

- 270* **LECKIE, George G.**, Petrology of Big Snowy Group, Amsden Formation, and Quadrant Sandstone at Sappington Canyon, Jefferson County, Montana. Ph. D., 1964, Indiana University.
Location: Jefferson County, S½ NW¼ sec. 25, T. 1 N., R. 2 W. (Pl. 2).
- **LEEDER, Robert W.** (see Entry 209)
- 271* **LEISCHNER, Lyle M.**, Border zone petrology of the Idaho batholith in vicinity of Lolo Hot Springs, Montana. M.S., 1959, University of Montana.
Location: A 20 square mile area along the Lewis and Clark Highway about 6 miles northeast of Lolo Pass (Pl. 2).
Published: Leischner, L. M., 1959, Border-zone petrology of the Idaho batholith in vicinity of Lolo Hot Springs, Montana (abs.): Geol. Soc. America Bull., v. 70, p. 1782.
- 272* **LEMISH, John**, Geology of the West Fork of the Madison River area, Montana. M.S., 1948, University of Michigan.
Location: T. 11 and 12 S., R. 2 and 3 E. (Pl. 2).
- 273* **LEONARD, John R.**, Mississippian stratigraphy of the Gallatin basin, Montana. M.A., 1946, University of Kansas.
Location: Includes a large area round Bozeman (Pl. 1).
- 274* **LeVAN, Donald C., and McLEAN, W. F.**, Structure and stratigraphy of the Red Canyon area, Gallatin County, Montana. M.S., 1951, University of Michigan.
Location: T. 11 and 12 S., R. 4 and 5 E. (Pl. 2).
- 275* **LEVANDOWSKI, Donald W.**, Geology and mineral deposits of the Sheridan-Alder area, Madison County, Montana, Ph. D., 1956, University of Michigan.
Location: T. 4, 5, and 6 S., R. 3 and 4 W. (Pl. 2).
- 276* **LEVESON, David Jeffrey**, Orbicular rocks of the Lonesome Mountain area, Beartooth Mountains, Montana and Wyoming. Ph. D., 1960, Columbia University.
Location: (Fig. 1).
Published: Leveson, D. J., 1963, Orbicular rocks of the Lonesome Mountain area, Beartooth Mountains, Montana and Wyoming: Geol. Soc. America Bull., v. 74, p. 1015-1040.
- 277 **LEVINSON, Alfred A.**, Petrography of pre-Beltian Cherry Creek marbles, southwestern Montana. M.S., 1949, University of Michigan.
Location: Specimens collected from Madison, Beaverhead, and Gallatin Counties, by E. Wm. Heinrich.
- 278* **LINDQUIST, Alec E.**, Structure and mineralization of the Whitehall mining district, Jefferson County, Montana. M.S., 1966, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
- 279* **LIPP, E. G.**, Geology of an area east of Sheep Canyon, near Dell, Montana. M.S., 1948, University of Michigan.
Location: T. 13 and 14 S., R. 8 and 9 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 280* **LOBANOFF, Nikita**, Geology of the Independence mining district, Park and Sweet Grass Counties, Montana. M.A., 1959-60, Columbia University.
Location: (Pl. 1).
- 281* **LONG, William A.**, Geology of the north-central part of the Missoula quadrangle, Montana. M.S., 1956, University of Montana.
Location: West of Missoula (Pl. 2).
- 282* **LORENZ, Howard W.**, Geology and ground-water resources of the Helena Valley, Montana. M.S., 1949, University of Nebraska.
Location: (Pl. 2).
Published: Lorenz, H. W., and Swenson, F. A., 1951, Geology and ground-water resources of the Helena Valley, Montana: U. S. Geol. Survey Circ. 83, 68 p.
- 283* **LOVERING, Thomas S.**, A report on the New World mining district, Park County, Montana. Ph. D., 1924, University of Minnesota.
Location: North of Cooke City (Pl. 1).
- 284* **LUCCHITTA, Baerbel K.**, Structure of the Hawley Creek area, Idaho-Montana. Ph. D., 1966, Pennsylvania University.
Location: Beaverhead County (Pl. 2).

- 285* **LUDMAN, Allan**, Geology of the Mt. Doherty igneous complex, Jefferson County, Montana. M.A., 1965, Indiana University.
Location: Northeast of Whitehall (Pl. 2).
- 286* **LYONS, John B.**, Geology of the northern Big Belt Range, Montana. Ph. D., 1942, Harvard University.
Location: Northeast of Helena (Pl. 2).
- 287* **McALEER, Joseph H.**, Ore minerals and wall rock alteration on deep levels at Butte, Montana. M.S., 1966, University of California, Berkeley.
Location: (Pl. 2).
- 288 **McALPIN, Archie J.**, *Paleopsephurus wilsoni*, a new polyodontid fish from the upper Cretaceous of Montana, with a discussion of allied fish, living and fossil. Ph. D., 1941, University of Michigan.
- 289 **McCABE, Hugh R.**, Regional stratigraphic analysis of the Mississippian Madison Group, Williston Basin area. Ph. D., 1961, Northwestern University.
Published: McCabe, H. R., Mississippian stratigraphy of Manitoba (and Williston Basin): Manitoba Dept. of Mines and Nat. Res. Pub. 58-1, 99 p.
- 290* **McCALLUM, Ian Stewart**, Equilibrium relationships among the coexisting minerals in the Stillwater Complex, Montana. Ph. D., 1968, University of Chicago.
Location: South of Big Timber (Pl. 1).
- 291* **McCLERNAN, Henry G.**, Geology of the Sheep Creek area, Meagher County, Montana. M.S., 1969, Montana College of Mineral Science and Technology.
Location: (Pl. 1).
- 292 **McDOWELL, Fred W.**, Potassium argon dating of Cordilleran intrusives. Ph. D., 1966, Columbia University.
Remarks: Some dates from the Idaho and Boulder batholith.
- 293* **McGILL, George E.**, Geology of the northwest flank of the Flint Creek Range, western Montana. Ph. D., 1958, Princeton University.
Location: Granite County (Pl. 2).
Published: McGill, G. E., 1959, Northwest flank Flint Creek Range, Montana. Geologic Map 3: Montana Bur. Mines and Geology Spec. Pub. 18.
- 294* **McGUIRE, Robert H., Jr.**, The lower Cretaceous Kootenai Formation in Granite and Powell Counties, Montana. M.S., 1957, University of Montana.
Location: (Pl. 2).
- 295 **McKELVEY, G. E.**, Lithofacies of the Wallace and related formations of the Belt Series. M.S., 1967, Franklin and Marshall College.
- 296 **McLEAN, James R.**, The Upper Cretaceous Judith River Formation in the Canadian Great Plains—its history and lithostratigraphy. Ph. D., 1970, University of Saskatchewan.
- **McLEAN, W. F.** (see Entry 274).
- 297* **McMANNIS, William J.**, Geology of the Bridger Range area, Montana. Ph. D., 1952, Princeton University.
Location: North of Bozeman (Pl. 2).
Published: McMannis, W. J., 1955, Geology of the Bridger Range, Montana: Geol. Soc. America Bull., v. 66, p. 1385-1430.
- 298* **McMILLAN, Donald T.**, Geology and ore deposits of the contact area at Silver Star, Montana. M.S., 1939, Montana College of Mineral Science and Technology.
Location: Sec. 1, 2, and 3, T. 2 S., R. 6 W. (Pl. 2).
- 299* **McTHENIA, Andrew W., Jr.**, Geology of the Madison River Canyon area north of Ennis, Montana. M.A., 1960, Columbia University.
Location: (Pl. 2).
- 300* **McUSIC, J. M.**, Geology of the Red Conglomerate Peaks area, Beaverhead County, Montana, and Clark County, Idaho. M.S., 1949, University of Michigan.
Location: T. 15 and 16 S., R. 7 and 8 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 301 **MAGEE, John J.**, Big Snowy Group of the northern Great Plains. M.S., 1949, University of Colorado.
Remarks: A regional isopach and lithofacies study interpreting paleogeography of large area.
- 302* **MAHORNEY, James R.**, Geology of the Garrity Hill area, Deer Lodge County, Montana. A.M., 1956, Indiana University.
Location: West of Anaconda (Pl. 2).
- 303 **MALONEY, Neil J.**, Geology of the eastern part, Beaty Butte Four quadrangle, Montana. M.S., 1961, Oregon State University.

- 304* **MANN, John A.**, The geology of part of the Gravelly Range area, Madison County, Montana. Ph. D., 1950, Princeton University.
Location: South of Virginia City (Pl. 2).
Published: Mann, John A., 1954, Geology of part of the Gravelly Range, Montana: Yellowstone-Bighorn Research Assoc., Inc., Proj. Contr. 190.
- 305* **MANNION, Lawrence E.**, Geology of a part of the Blacktail Range, Beaverhead County, Montana. M.S., 1949, University of Michigan.
Location: T. 9 and 10 S., R. 8 and 9 W. (Pl. 2).
- 306* **MANSKE, Douglas C.**, Geology of the Baldy Mountain area, Madison County, Montana. M.A., 1961, Oregon State University.
Location: South of Virginia City (Pl. 2).
- 307* **MANTEI, Erwin J.**, Variation in gold content of minerals of the Marysville quartz diorite stock, Montana. Ph. D., 1965, Missouri School of Mines and Metallurgy.
Location: Northwest of Helena (Pl. 2).
Published: Mantei, E. J., and Brownlow, A. H., 1967, Variation in gold content of minerals of the Marysville quartz diorite stock, Montana: Geochim. et Cosmochim. Acta, v. 31, p. 225-236.
- 308* **MARTIN, Viva D.**, Glaciation of the Two Medicine Valley, Glacier National Park, Montana. A.M., 1927, Indiana University.
Location: (Pl. 1).
- 309* **MARVIN, Richard**, Description and geological history of selected areas in the vicinity of Gallatin Canyon, Gallatin County, Montana. M.S., 1952, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
Remarks: Emphasis is placed on Mica Creek, Spanish Creek, Dudley-Levinski Creeks, and Table Mountain areas.
- 310* **MASTERS, John M.**, Zircons in two Laramide porphyry dikes, Beartooth Mountains, Montana. M.S., 1966, University of Cincinnati.
Location: (Pl. 1).
- 311* **MATSON, Robert E.**, Petrography and petrology of Smoky Butte intrusives, Garfield County, Montana. M.S., 1960, University of Montana.
Location: T. 18 N., R. 36 E. (Pl. 1).
- 312* **MAXWELL, Dwight**, Clay mineralogy of the Belt Series in Montana and northern Idaho. Ph. D., 1964, University of Montana.
Published: Maxwell, D. T., and Hower, John, 1967, High-grade diagenesis and low-grade metamorphism of illite in the Precambrian Belt Series: Am. Mineralogist, v. 52, p. 843-857.
- 313* **MAY, Paul R.**, Geology of the Monument Mountain-Gallatin River area, Yellowstone National Park and Gallatin County, Montana. M.S., 1950, University of Michigan.
Location: T. 9 and 10 S., R. 5 and 6 E. (Pl. 2).
- 314* **MELCHIOR, Robert C.**, Cretaceous and early Paleocene palynology of the west dome of Shawmut anticline, Sweet Grass County, Montana. Ph. D., 1963, University of Minnesota.
Location: North of Big Timber (Pl. 1).
- 315* **MERO, William E.**, The geology of Black Lion Mountain and a portion of Canyon Creek, Beaverhead County, Montana. M.A., 1962, University of California, Berkeley.
Location: A 24 square mile area in the Pioneer Range of southwestern Montana, 50 miles southwest of Butte (Pl. 2).
- 316* **MERRIAM, Robert W.**, A Madison bioherm, Big Snowy Mountains, Montana. M.S., 1958, Washington State University.
Location: South of Lewistown (Pl. 1).
Remarks: Includes a geologic map of Swimming Woman Canyon.
- 317* **MERRILL, Robert D.**, Geology at the southern terminus of the Sawtooth Range, northwestern Montana. M.S., 1965, University of Massachusetts.
Location: Northeastern part of Coopers Lake quadrangle, west of Great Falls in Lewis and Clark County (Pl. 1).
- 318* **MEYER, Charles**, Hydrothermal wall rock alteration at Butte, Montana. Ph. D., 1950, Harvard University.
Location: (Pl. 2).
- 319* **M'GONIGLE, John W.**, Structure of the Maiden Peak area, Beaverhead Range, Montana-Idaho. Ph. D., 1965, Pennsylvania State University.
Location: T. 10, 11, and 12 S., R. 12 and 13 W. (Pl. 2).
- 320* **MIFFLIN, Martin D.**, Geology of a part of the southern margin of the Gallatin Valley, southwest Montana. M.S., 1963, Montana State University.
Location: Southwest of Bozeman (Pl. 2).

- 321* **MILLER, Richard N.**, Geology of the South Moccasin Mountains, Fergus County, Montana. M.S., 1954, Montana College of Mineral Science and Technology.
Location: North of Lewistown (Pl. 1).
Published: Miller, R. N., Geology of the South Moccasin Mountains, Fergus County, Montana: Montana Bur. Mines and Geology Mem. 37, 44 p.
- 322 **MINER, Ernest L.**, Paleobotanical examinations of Cretaceous and Tertiary coals; (1) Cretaceous coals from Greenland, (2) Cretaceous and Tertiary coals from Montana. Ph. D., 1934, University of Michigan.
- 323 **MITCHELL, Will, Jr.**, Origin and occurrence of black manganese in Montana. M.S., 1942, Montana College of Mineral Science and Technology.
- 324 **MOBERLY, Ralph M., Jr.**, Mesozoic Morrison, Cloverly, and Crooked Creek Formations, Bighorn Basin, Wyoming and Montana. Ph. D., 1956, Princeton University.
- 325* **MOHSEN, L. A.**, Distribution of manganese in the Philipsburg batholith, Montana, and its relationship to associated manganese ore deposits. Ph. D., 1969, Boston University.
Location: Philipsburg area (Pl. 2).
Remarks: The purpose of the study was to determine whether a relationship exists between manganese distribution in the batholith and the manganese ore deposits at the western edge of the batholith.
Published: Brownlow, A. H., and Mohsen, L. A., 1969, Distribution of manganese in the Philipsburg batholith, Montana, and its relationship to associated manganese ore deposits (abs.): Geol. Soc. America Ann. Meeting, Atlantic City.
- 326* **MONTGOMERY, Joel K.**, Geology of the Nimrod area, Granite County, Montana. M.S., 1958, University of Montana.
Location: West of Drummond (Pl. 1).
- 327* **MOORE, George T.**, Intrusions in the Middle Cambrian formations, Cottonwood Canyon, Jefferson County, Montana. A.M., 1954, Indiana University.
Location: Parts of sec. 29, 30, 31, and 32, T. 2 N., R. 2 W. (Pl. 2).
- 328* **MOORE, George T.**, The geology of the Mount Fleecer area, Montana. Ph. D., 1956, Indiana University.
Location: T. 1 and 2 N., R. 10 and 11 W. (Pl. 2).
Remarks: Emphasis on commercially interesting phosphate deposits.
- 329 **MORGRIDGE, Dean L.**, The Mississippian Sappington Formation of southwestern Montana. M.S., 1955, University of Wisconsin.
- 330 **MORITZ, Carl A.**, Mesozoic stratigraphy of a portion of southwestern Montana. Ph. D., 1950, Harvard University.
Location: Eighteen stratigraphic sections within an area between the Idaho-Montana boundary and lat 46° N., and long 111°30' and 113° W.
Published: Moritz, C. A., 1951, Triassic and Jurassic stratigraphy of southwestern Montana: Am. Assoc. Petroleum Geologists Bull., v. 35, p. 1781-1814.
- 331* **MORRIS, A. A.**, Granodiorite intrusive associated with Clark Fork lineament. M. A., 1963, University of Montana.
Location: Sec. 16, T. 11 N., R. 15 W., in road cut north side of U. S. Highway 10, one mile east of Cramer Creek (Pl. 2).
Remarks: Includes the study of hydrothermal alteration of this granodiorite stock.
- 332* **MOWATT, Thomas C.**, An investigation of some geochemical relationships in the Stillwater Complex, Montana. Ph. D., 1965, University of Montana.
Location: South of Big Timber (Pl. 1).
Published: Mowatt, T. C., and Hower, John, 1968, Some geochemical relationships and their petrological implications, Stillwater Complex, Montana (abs.): Geol. Soc. America, Rocky Mountain Section Meeting, Bozeman, Montana.
Mowatt, T. C., and Hower, John, 1969, Crystal-field theory and the geochemistry of transition elements in pyroxenes, Stillwater Complex, Montana (abs.): Geol. Soc. America, Rocky Mountain Section Meeting, Salt Lake City.
- 333 **MUNDT, Philip A.**, A regional study of the (Pennsylvanian) Amsden Formation (Wyoming, Montana). Ph. D., 1956, Stanford University.
- 334* **MUTCH, Thomas A.**, Geology of the northeast flank of the Flint Creek Range, Montana. Ph. D., 1960, Princeton University.
Location: West of Deer Lodge (Pl. 2).
Published: Mutch, T. A., 1961, Geology of the northeast flank of the Flint Creek Range, western Montana. Geologic Map 5: Montana Bur. Mines and Geology Spec. Pub. 22.
- 335 **NASCIMBENE, Giovanni**, Bentonites and the geochronology of the Bearpaw sea (Upper Cretaceous; Alberta-Montana). M.Sc., 1963, University of Alberta.

- 336* **NAVE, Floyd R.**, Geology of a portion of the Bridger Range, Montana. M.S., 1952, University of Iowa.
Location: North of Bozeman (Pl. 2).
- 337* **NELSON, Clifford M.**, Gypsum Spring and Lower Sundance Formations, eastern Bighorn Mountains, Wyoming and Montana. M.S., 1963, Michigan State University.
Location: One measured section in Montana, sec. 22, T. 9 S., R. 33 E., Big Horn County (Pl. 1).
- 338 **NELSON, Harry E.**, Lightweight aggregate for concrete from Montana shales. M.S., 1947, Montana College of Mineral Science and Technology.
- 339* **NELSON, Warren**, A seismic study of North Boulder Valley and other selected areas, Jefferson and Madison Counties, Montana. A.M., 1962, Indiana University.
Location: Sec. 1 to 3, 10 to 15, 22 to 25, T. 2 N., R. 3 W., Jefferson County; sec. 29 to 32, T. 3 N., R. 2 W., and sec. 5 to 8, T. 2 N., R. 2 W., Jefferson County; sec. 2 to 4, 9 to 11, and 14 to 16, T. 2 N., R. 2 W., Jefferson County (Pl. 2).
- 340 **NEWTON, G. B.**, Fauna of the Jefferson Formation, south-central Montana and northwest Wyoming. M.S., 1967, Wayne State University.
- 341* **NOBLES, Laurence H.**, Glacial geology of the Mission Valley, western Montana. Ph. D., 1952, Harvard University.
Location: Area south of Flathead Lake (Pl. 1).
Published: Nobles, L. H., 1952, Glacial sequence in the Mission Valley, western Montana (abs.): Geol. Soc. America Bull., v. 63, p. 1286.
- 342* **NOEL, James A.**, The geology of the east end of the Anaconda Range and adjacent areas, Montana. Ph. D., 1956, Indiana University.
Location: Area southeast of Anaconda (Pl. 2).
- 343* **NOLD, John L.**, Geology of the northeastern border zone of the Idaho batholith, Montana and Idaho. Ph. D., 1968, University of Montana.
Location: Southwest of Missoula, mainly in Idaho (Pl. 2).
- 344* **NORTON, Norman J.**, Palynology of the Upper Cretaceous and Lower Tertiary in the type locality of the Hell Creek Formation. Ph. D., 1963, University of Minnesota.
Location: Large area surrounding Jordan (Pl. 1).
- 345* **OBERT, Karl R.**, Geology of the Sheep Mountain-Gray Jockey Peak area, Beaverhead County, Montana. M.A., 1962, University of California, Berkeley.
Location: West of Divide (Pl. 2).
- 346* **O'CONNOR, John E.**, Geology of part of the Blacktail Range, Beaverhead County, Montana. M.S., 1941, University of Michigan.
Location: T. 9 and 10 S., R. 8 and 9 W. (Pl. 2).
- 347* **O'CONNOR, Michael P.**, Stratigraphy and petrology across the Precambrian Piegan Group-Missoula Group boundary, southern Mission and Swan Ranges, Montana. Ph. D., 1967, University of Montana.
Location: Southeast of Flathead Lake (Pl. 1).
- 348* **OLSON, Norman K.**, Depositional factors of the Upper Cretaceous Eagle Formation, south-central Montana. M.S., 1961, University of Iowa.
Location: (Pl. 1).
- 349* **ORE, Henry T.**, The geology of a portion of the Heart Butte quadrangle, Sawtooth Mountains, Montana. M.S., 1959, Washington State University.
Location: Teton County (Pl. 1).
- 350* **OSBORNE, Robert H.**, Geology of the northwest quarter of the Cave Mountain quadrangle, Montana. M.S., 1963, Washington State University.
Location: Teton County (Pl. 1).
- 351* **PAGE, William D.**, Geologic investigations of the northern part of Horse Plains quadrangle, Montana. M.S., 1963, University of Colorado.
Location: Southwest of Kalispell (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 352 **PAINE, William R.**, Stratigraphy of the Permian Phosphoria Formation in Montana. M.S., 1952, Montana College of Mineral Science and Technology.
- 353* **PALMER, Harold S.**, The South Moccasin Mountains, Fergus County, Montana. Ph. D., 1923, Yale University.
Location: Area delimited between Kootenai (Cretaceous) Formation and the Colorado Shale (Pl. 1).
Published: Palmer, H. S., 1925, Structure of the South Moccasin laccolith, Fergus County, Montana: Am. Jour. Sci., v. 10, p. 119-133.

- 354* **PARKER, John S.**, A preliminary seismic investigation of Tertiary basin fill in the Jefferson Island quadrangle, Montana. A.M., 1961, Indiana University.
Location: East of Whitehall (Pl. 2).
- 355* **PARTRIDGE, Lloyd R.**, The Permian Phosphoria and Triassic Dinwoody Formation, northern Big-horn Basin, Wyoming and Montana. M.A., 1949, University of Wyoming.
Location: Sections were measured in an area extending from the south end of Sheep Mountain, Big Horn County, Wyoming, northward to the south rim of Dryhead Canyon, Big Horn County, Montana (Pl. 1).
- 356 **PATTERSON, Dale D.**, The correlation of the Montana Group of Cretaceous age between Salt Creek, Wyoming, and Billings, Montana. M.S., 1956, University of Illinois.
- 357 **PAULL, Richard A.**, Depositional history of the Muddy Sandstone, Bighorn Basin, Wyoming. Ph. D., 1957, University of Wisconsin.
- 358* **PECORA, William T., II**, Petrology and mineralogy of the Bearpaw Mountains, Montana. Ph. D., 1940, Harvard University.
Location: South of Chinook (Pl. 1).
- 359* **PEIRCE, Howard W.**, Geologic studies of the Permian Phosphoria Formation in restricted areas, Melrose phosphate field, Montana. A.M., 1952, Indiana University.
Location: West of Melrose (Pl. 2).
- 360* **PEOPLES, Joe Webb**, Geology of the Stillwater igneous complex, Beartooth Mountains, Montana. Ph. D., 1932, Princeton University.
Location: South of Big Timber (Pl. 1).
Published: Peoples, J. W., and Howland, A. L., 1940, Chromite deposits of the eastern part of the Stillwater Complex, Stillwater County, Montana. U.S. Geol. Survey Bull. 922-N. (Also several other shorter articles.)
- 361* **PEPPER, Miles W.**, The geology of the Sumatra quadrangle, Montana. M.S., 1955, Montana College of Mineral Science and Technology.
Location: Northwest of Hysham in Rosebud County (Pl. 1).
- 362 **PEPPERS, Russel A.**, Stratigraphy of the Muddy (New Castle) Formation of the Powder River basin, Wyoming and Montana. M.S., 1959, University of Illinois.
- 363* **PETERSON, James L.**, Heavy minerals of the Judith River Formation in Musselshell and Golden Valley Counties of central Montana. M.S., 1961, University of Kansas.
Location: (Pl. 1).
- **PETERSON, J. R.** (see Entry 54).
- 364* **PHAIR, George**, The geology of the Shell Mountain area, Park County, Montana. M.S., 1942, The State University Rutgers, New Brunswick, New Jersey.
Location: Southeast of Livingston (Pl. 1).
- 365* **PHELPS, George B.**, Geology of the Newlan Creek area, Meagher County, Montana. M.S., 1969, Montana College of Mineral Science and Technology.
Location: (Pl. 1).
- 366* **PIERCE, William G.**, The Rosebud coal field, Rosebud and Custer Counties, Montana, with a supplementary chapter on Pleistocene terraces in eastern Montana. Ph. D., 1931, Princeton University.
Location: (Pl. 1).
Published: Pierce, W. G., 1936, The Rosebud coal field, Rosebud and Custer Counties, Montana: U. S. Geol. Survey Bull. 847-B, p. 43-120.
- 367* **PINCKNEY, Darrell M.**, 1965, Veins in the northern part of the Boulder batholith, Montana. Ph. D., 1965, Princeton University.
Location: South of Helena (Pl. 2).
Published: Pinckney, D. M., 1965, Veins in the northern part of the Boulder batholith, Montana. U. S. Geol. Survey Open-File Rept.
- 368* **PLANK, Robert M.**, Geology of the McKenzie Canyon area, Beaverhead County, Montana. M.S., 1949, University of Michigan.
Location: T. 11 S., R. 10 and 11 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 369* **POULTER, Glenn J.**, The Geology of the Georgetown thrust area southwest of Philipsburg, Montana. Ph. D., 1957, Princeton University.
Location: (Pl. 2).
(Continued, next page)

- Published:** Poulter, G. J., 1957, Geology of the Georgetown thrust area southwest of Philipsburg, Granite and Deer Lodge Counties, Montana: Montana Bur. Mines and Geology Map 1 (Geologic Map 1).
- 370 POWE, George R.**, A study of the brachiopod fauna of certain Mississippian formations of central Montana. M.S., 1937, Montana College of Mineral Science and Technology.
- 371* PRINZ, Martin**, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 4, Mafic dike swarms of the southern Beartooth Mountains. Ph. D., 1961, Columbia University.
Location: (Fig. 1).
Published: Prinz, Martin, 1964, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 5, Mafic dike swarms of the southern Beartooth Mountains: Geol. Soc. America Bull., v. 75, p. 1217-1248.
-----1965, Structural relationships of mafic dikes in the Beartooth Mountains, Montana-Wyoming: Jour. Geology, v. 73, p. 165-174.
-----and Bentley, R. D., 1964, Cylindrical columnar jointing in dolerite dikes, Beartooth Mountains, Montana-Wyoming: Geol. Soc. America Bull., v. 75, p. 1165-1168.
-----and Poldervaart, Arie, 1964, Layered mylonite from Beartooth Mountains, Montana: Geol. Soc. America Bull., v. 75, p. 741-744.
- 372* PULJU, Hugo J.**, Geology of the Black Butte area, Cascade County, Montana. M.S., 1964, Montana College of Mineral Science and Technology.
Location: South of Great Falls, T. 16 N., R. 4 E., and portions of T. 16 N., R. 5 E., and T. 17 N., R. 4 E. (Pl. 1).
- 373* PUUMALA, Paava P., and ROE, J. T.**, A geological reconnaissance of the igneous activity in the Mt. Fleecer area, Silver Bow County, Montana. M.S., 1948, Montana College of Mineral Science and Technology.
Location: Southwest of Butte (Pl. 2).
- 374 RABBITT, John C.**, The Ostracoda of the Mississippian Big Snowy Group in Montana. M.S., 1937, Montana College of Mineral Science and Technology.
- 375 RADTKE, Arthur S.**, Minor elements in iron ores from the western United States. Ph. D., 1965, Stanford University.
Remarks: Some samples from Montana were analyzed.
- 376* RAMBOSEK, A. F.**, Geology and ore deposits of the Golden Sunlight mine and vicinity. M.S., 1946, Montana College of Mineral Science and Technology.
Location: North of Whitehall (Pl. 2).
- 377* RAMSEIER, Frederick N.**, Geochemical exploration of the Elkhorn mining district and Tizer basin, Jefferson County, Montana. M.S., 1963, Montana College of Mineral Science and Technology.
Location: Rectangle 10 miles long and 3 miles wide from Elkhorn to Crow Creek, northeast of Boulder (Pl. 2).
Remarks: Soil and stream-sediment analyses for zinc and total heavy metals concentrations.
- 378* RAMSPOTT, Lawrence D.**, Geology of the Eighteen-mile Peak area and petrology of the Beaverhead pluton, Idaho-Montana. Ph. D., 1962, Pennsylvania State University.
Location: T. 15 and 16 S., R. 11 W., Montana; and T. 12, 13, and 14 N., R. 28 and 29 E., Idaho (Pl. 2).
Published: Scholten, Robert, and Ramspott, L. D., 1968, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 379 RAU, Jon L.**, Stratigraphy and paleontology of the Three Forks Formation (Upper Devonian) in southwestern Montana. Ph. D., 1959, Yale University.
Location: In north-central and northwestern Gallatin County, northern Madison County, southeastern Jefferson County, western and southwestern Broadwater County, and western Park County. Most detailed work in Horseshoe Hills and London Hills in Gallatin and Madison Counties, respectively.
- 380 RAWSON, Richard R.**, Petrographic facies analysis of the Ray Member Kibbey Formation, Williston Basin and central Montana. Ph. D., 1966, University of Wisconsin.
Published: Rawson, R. R., 1968, The Kibbey Limestone of the Williston Basin and central Montana: Wyoming Geol. Assoc. Earth Sci. Bull., Sept., 1968, p. 35-47.
-----1969, Petrographic analysis of the Kibbey Limestone, in Cronoble, W. R., and Lane, B. B., eds., The economic geology of eastern Montana and adjacent areas: Montana Geol. Soc., 256 p.
- 381* RAY, James C.**, The covellite zone-paragenesis of the ore minerals in the Butte district, Montana. M.A., 1915, Stanford University.
Location: (Pl. 2).

- 382* **RAY, James C.**, Genesis of the ore deposits of the Butte district, Montana. Ph. D., 1929, Stanford University.
Location: (Pl. 2).
- 383* **RAY, Jimmie D.**, Stratigraphy and structure of the Cinnamon Mountain area, Gallatin County, Montana. M.S., 1966, Oregon State University.
Location: Southwest of Bozeman (Pl. 2).
- 384* **REGNIER, Jerome**, Mineralogy and paragenesis of the eastern part of the Elliston mining district, Montana. M.S., 1951, Montana College of Mineral Science and Technology.
Location: Southwest of Helena (Pl. 2).
- 385* **REID, Rolland R.**, Crystalline rocks of northern Tobacco Root Mountains, Madison County, Montana. Ph. D., 1959, University of Washington.
Location: (Pl. 2).
Published: Reid, R. R., 1957, Bedrock geology of the north end of the Tobacco Root Mountains, Madison County, Montana: Montana Bur. Mines and Geology Mem. 36, 27 p.
-----1963, Metamorphic rocks of the northern Tobacco Root Mountains, Madison County, Montana: Geol. Soc. America Bull., v. 74, p. 293-306.
- 386* **REITER, Frederick H.**, Geology of a portion of the Gallatin Range in southwestern Montana. M.S., 1950, University of Michigan.
Location: T. 8 S., R. 5 E. (Pl. 2).
- 387 **RENICK, Howard, Jr.**, Magnetotelluric investigations in the area of the Tobacco Root Mountains, southwestern Montana, southeastern Montana, and southern Illinois, Indiana, and Ohio. Ph. D., 1969, Indiana University.
- 388 **RENZETTI, Phyllis J.**, Fauna of the Three Forks Shale (Devonian) of southwestern Montana. Ph. D., 1961, Indiana University.
- 389* **RESHKIN, Mark**, Geomorphic history of the Jefferson basin, Jefferson, Madison, and Silver Bow Counties, Montana. Ph. D., 1963, Indiana University.
Location: Area bounded by lat 45°15' and 46°05' N., and long 111°45' and 112°30' W. (Pl. 2).
- 390* **REYNER, Millard L.**, Geology of the Tidal Wave mining district, Madison County, Montana. M.S., 1947, Montana College of Mineral Science and Technology.
Location: East of Twin Bridges (Pl. 1).
- 391* **REYNOLDS, Sargent T.**, Geology of the northern half of the Bannack quadrangle, Beaverhead County, Montana. M.A., 1962, University of California, Berkeley.
Location: West of Dillon (Pl. 2).
- 392* **REZAK, Richard**, Stromatolites of the Belt Series in Glacier National Park and vicinity, Montana. Ph. D., 1957, Syracuse University.
Location: (Pl. 1).
Published: Rezak, Richard, 1957, Stromatolites of the Belt Series in Glacier National Park and vicinity, Montana: U. S. Geol. Survey Prof. Paper 294-D, p. 127-151.
- 393* **RICHARD, Benjamin H.**, Geologic history of the intermontane basins of the Jefferson Island quadrangle, Montana. Ph. D., 1966, Indiana University.
Location: East of Whitehall (Pl. 2).
Published: Kuenzi, W. D., and Richard, B. H., 1969, Middle Tertiary unconformity, North Boulder and Jefferson basins, southwest Montana: Geol. Soc. America Bull., v. 80, p. 315-320.
- 394* **RICHARDS, John C.**, Geology and ore deposits of the Pennsylvania mine, Three Forks, Montana. M.S., 1947, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
- 395* **RICHARDS, Paul W.**, Structural geology of the Crazy Mountain syncline-Beartooth Mountain border east of Livingston, Montana. Ph. D., 1952, Cornell University.
Location: (Pl. 1).
- 396* **RIEL, Stanley J.**, A basal Oligocene local fauna from McCarty Mountain, southwestern Montana. M.A., 1963, University of Montana.
Location: Sec. 28, T. 4 S., R. 8 W. (Pl. 2).
- 397* **RITTER, Dale F.**, Terrace development along the front of the Beartooth Mountains, southern Montana. Ph. D., 1969, Princeton University.
Location: Red Lodge area (Pl. 1).
- 398* **ROBERTSON, Forbes S.**, Geology and mineral deposits of the Elliston mining district, Powell County, Montana. Ph. D. 1956, University of Washington.
Location: Southwest of Helena (Pl. 2).
- 399 **ROBINSON, Ernest G.**, A correlation of the Mesozoic strata of southwestern Alberta, Canada, and Montana. M.S., 1925, Cornell University.

LIST 1, 400 - 415

- 400* **ROCKETT, Thomas J.**, The Lewis overthrust and associated minor structures (Montana). M.S., 1958, Boston College.
Location: Glacier National Park area (Pl. 1).
- **ROE, J. T.** (see Entry 373).
- 401 **ROONEY, Lawrence Fredrich**, A stratigraphic study of the Permian Formations of part of southwestern Montana. Ph. D. 1956, Indiana University.
- 402* **ROOT, Forrest K.**, Structure, petrology, and mineralogy of pre-Beltian metamorphic rocks of the Pony-Sappington area, Madison County, Montana. Ph. D., 1965, Indiana University.
Location: (Pl. 2).
- 403* **ROPES, Leverett Harvey**, Proposal for instrumentation and study of the Gallatin seismic-sensitive well. M.S., 1963, Montana State University.
Location: Located north of Belgrade, sec. 25, T. 1 N., R. 4 E., on the quaternary stream gravels of the Gallatin Valley (Pl. 2).
Remarks: Developing suitable instrumentation for recording water-level fluctuations in the Gallatin well.
- 404* **ROSE, Robert R.**, The stratigraphy and structure of the southern Madison Range, Madison and Gallatin Counties, Montana. M.S., 1966, Oregon State University.
Location: (Pl. 2).
- 405* **ROSS, Richard B.**, A Jurassic Sawtooth fauna from southwestern Montana. M.S., 1950, University of Michigan.
Location: On the north slope of Taylor Fork, 2½ miles upstream from the confluence of the Gallatin River and Taylor Fork, T. 9 S., R. 3 and 4 E., Gallatin County (Pl. 2).
Remarks: Study of marine invertebrate fossils from near the top of the siltstone member of the Sawtooth Formation.
- 406* **ROWAN, Lawrence C.**, Structural analysis of the Line Creek area, Beartooth Mountains, Montana-Wyoming. Ph. D., 1964, University of Cincinnati.
Location: (Fig. 1).
Published: Rowan, L. C., 1969, Structural geology of the Quad-Wyoming-Line Creeks area, Beartooth Mountains, Montana, *in* Larsen, L. H., ed., Igneous and metamorphic geology: Geol Soc. America Mem. 115, 561 p.
- 407 **ROWE, Jesse P.**, Deposits of volcanic ash of Montana. M.A., 1903, University of Nebraska.
- 408 **ROWE, Jesse P.**, Montana coal and lignite deposits. Ph. D., 1906, University of Nebraska.
- 409 **ROWE, Royle C.**, Description and correlative evidence of the Brachiopoda and faunal members of the Mississippian Madison Limestone. M.A., 1927, University of Montana.
Location: Western Montana with collections from Powell, Pondera, Madison, Park, Granite, and Lewis and Clark Counties.
- 410* **RUBEL, Daniel**, Tertiary volcanic rocks of the Cooke City-Pilot Peak area, Montana-Wyoming. M.S., 1959, Wayne State University.
Location: (Pl. 1).
- 411* **RUBEL, Daniel N.**, Geology of the Independence area, Sweet Grass and Park Counties, Montana. Ph. D., 1964, University of Michigan.
Location: West of Cooke City (Pl. 1).
- 412* **RUPPEL, Edward T.**, Geology of the Limestone Hills, Broadwater County, Montana. M.A., 1950, University of Wyoming.
Location: West of Townsend (Pl. 2).
Published: Freeman, V. L., Ruppel, E. T., and Klepper, M. R., 1958, Geology of part of the Townsend Valley, Broadwater and Jefferson Counties, Montana: U. S. Geol. Survey Bull. 1042-N, p. 481-556.
- 413* **RUPPEL, Edward T.**, Geology of the Basin quadrangle, Montana. Ph. D., 1958, Yale University.
Location: Parts of Jefferson, Lewis and Clark, and Powell Counties, and northern part of Boulder Mountains, between lat 46°15' and 46°30' N., and long 112°15' and 112°30' W. Town of Basin is in southeast corner (Pl. 2).
Published: Ruppel, E. T., 1963, Geology of the Basin quadrangle, Lewis and Clark, and Powell Counties, Montana: U.S. Geol. Survey Bull. 1151, 121 p.
- 414 **RYALL, Alan S.**, P waves of the Hebgen Lake, Montana earthquake of August 18, 1959. Ph. D., 1962, University of California, Berkeley.
- 415* **RYDER, Robert T.**, The Beaverhead Formation: A Late Cretaceous syntectonic deposit in southwestern Montana and east-central Idaho. Ph. D., 1968, Pennsylvania State University.
Location: (Pl. 2).

(Continued, next page)

- Published:** Ryder, R. T., 1967, Lithosomes in the Beaverhead Formation, Montana-Idaho, *in* Henderson, L. B., ed., Montana Geol. Soc., 18th Ann. Field Conf., Guidebook, Billings: p: 63-70.
- Location:** Northwest of Townsend (Pl. 2)
- Published:** Schell, E. M., 1963, Ore deposits of the northern part of the Park (Indian Creek) district, Broadwater County, Montana: Montana Bur. Mines and Geology Bull. 35, 47 p.
- 416 SAHINEN, Uno M., Mining districts of Montana. M.S., 1935, Montana College of Mineral Science and Technology.
Remarks: Includes descriptions of 169 separate mining districts within the state.
- 417* SAHL, Howard L., Geology of the Soap Creek dome, Big Horn County, Montana. M.S., 1952, University of Nebraska.
Location: South of Hardin (Pl. 1).
- 418 SAHNI, Ashok, The vertebrate fauna of the Judith River Formation, Montana. Ph. D., 1968, University of Minnesota.
- 419* SALISBURY, Gerald P., Structural geology of the Elk Basin anticline, Park County, Wyoming, and Carbon County, Montana. M.A., 1948, University of Wyoming.
Location: T. 57 and 58 N., R. 99 and 100 W., Park County, Wyoming; and T. 9 S., R. 23 E., Carbon County, Montana (Pl. 1).
- 420 SALMON, Eleanor S., A molluscan faunule from the (Cretaceous) Pierre Formation in eastern Montana. M.A., 1934, Columbia University.
- 421* SAULNIER, Henry S., The paleopalynology of the Paleocene Fort Union coals of Red Lodge, Montana. M. S., 1950, University of Massachusetts.
Location: Red Lodge area (Pl. 1).
- 422* SAYERS, Frank E., The geology of a portion of the Manhattan quadrangle, the Horseshoe Hills area, Gallatin County, Montana. M.A., 1962, University of California, Berkeley.
Location: The northwest corner of the Gallatin Valley directly north of Logan and Manhattan (Pl. 2).
- 423* SCHAIOWITZ, Michael, The petrology of a multiple basic sill in the Three Forks, Sappington, and Lodgepole Formations, Madison County, Montana. M.A., 1964, Indiana University.
Location: Southeast of Whitehall (Pl. 2).
- 424* SCHELL, Elmer M., Geology of the Marietta mine and adjacent area, Elkhorn Mountains, Broadwater County, Montana. M.S., 1961, University of Montana.
(Continued, next column)
- 425 SCHETTER, William C., The Precambrian surface of Idaho, Montana, North Dakota, South Dakota, and Wyoming. M.S., 1962, University of Oregon.
- 426* SCHEUFLER, J. H., Geology of Beartooth Butte (approximate title). M.S., 1954, Wayne State University.
Location: Beartooth Mountains (Fig. 1).
- 427* SCHNEIDER, Gary B., Cenozoic geology of the Madison Bluffs area, Gallatin County, Montana. M.S., 1970, Montana State University.
Location: Madison Bluffs area, east side of lower Madison River, extending for 20 miles south of its mouth (Pl. 2).
- 428* SCHOLTEN, Robert, Geology of a part of the Beaverhead Mountains and the Nicholia Creek basin, Beaverhead County, Montana. M.S., 1948, University of Michigan.
Location: T. 16 S., R. 10 and 11 W. (Pl. 2).
Published: Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404.
Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 429* SCHOLTEN, Robert, Geology of the Lima Peaks area, Beaverhead County, Montana, and Clark County, Idaho. Ph. D., 1950, University of Michigan.
Location: (Pl. 2).
- 430* SCHULL, H. Walter, Geology of the south wall of the South Line Creek Canyon, Beartooth Mountains, Montana-Wyoming. M.A., 1959, Columbia University.
Location: (Fig. 1).
- 431* SCHWARTZMAN, David N., Excess argon in minerals from the Stillwater Complex (Precambrian, Montana). M.S., 1966, Brown University.
Location: South of Big Timber (Pl. 1).
- 432 (Deleted)
- 433* SEASHORE, Robert H., Geology in the region about Belton in northwestern Montana. M.S., 1924, University of Iowa.
(Continued, next page)

LIST 1, 434 - 448

- Location:** The Belton area adjoins the southwestern corner of Glacier National Park and includes the valley of Lake McDonald and the lower 25 miles of the Middle Fork Flathead River (Pl. 1).
- 434* **SEGLUND, James**, Geology of part of the Tendoy Mountains, near Red Rock, Beaverhead County, Montana. M.S., 1949, University of Michigan.
Location: T. 11 and 12 S., R. 10 and 11 W. (Pl. 2).
- 435 **SEVERSON, John L.**, A comparison of the Madison Group (Mississippian) with its subsurface equivalents in central Montana. Ph. D., 1952, University of Wisconsin.
Location: Graphic section of Mississippian rocks were compared in the following areas: Sun River section west of Choteau, Fairy Lake section in the Bridger Mountains, Belt Creek section in the Little Belt Mountains, the Judith River and Half Moon Pass sections in the Big Snowy Mountains.
- 436* **SHELDEN, A. W.**, Geology of the northwest 15-minute Ural quadrangle, Lincoln County, Montana. M.S., 1961, Montana State University.
Location: West of Eureka (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 437* **SHENON, Philip J.**, Geology and ore deposits of the Bannack district, Beaverhead County, Montana. Ph. D., 1926, University of Minnesota.
Location: West of Dillon, Beaverhead County (Pl. 2).
Published: Shenon, P. J., 1931, Geology and ore deposits of Bannack and Argenta, Beaverhead County, Montana: Montana Bur. Mines and Geology Bull. 6, 80 p.
- 438* **SHIRLEY, Brooke H.**, Geology of a portion of Big Horn County, Montana. M.S., 1941, University of Iowa.
Location: Southwestern part of St. Xavier quadrangle along Montana-Wyoming border (Pl. 1).
- 439 **SHOEMAKER, R. E.**, Fossil leaves of the Hell Creek and Tullock Formations of eastern Montana. M.S., 1964, University of Minnesota.
- 440* **SHORT, Maxwell Naylor**, Deep-level chalcocite at Superior, Arizona, and at Butte, Montana. Ph. D., 1923, Harvard University.
Location: (Pl. 2).
- 441* **SHURR, George W.**, Paleocene tectonics in south-central Montana. M.S., 1967, Northwestern University.
Location: Northeast of Billings (Pl. 1).
Remarks: A paleoslope study utilizing statistical procedures.
- 442* **SIEJA, Donald M.**, Clay mineralogy of Glacial Lake Missoula varves, Missoula County, Montana. M.S., 1959, University of Montana.
Location: Samples collected in Missoula Valley and Clark Fork Valley from Bonner to about 8 miles northwest of Albertson. Also collected in Blackfoot Valley near Clearwater Junction and Jocko Valley near Valley Creek confluence (three localities plotted on Pl. 2).
- 443 **SILVER, Burr A.**, North American mid-Jurassic through mid-Cretaceous stratigraphic patterns of Colorado Plateau, Rocky Mountains, and Great Plains. Ph. D., 1966, University of Washington.
- 444* **SIMMS, Frederick E., Jr.**, The igneous petrology, geochemistry, and structural geology of part of the northern Crazy Mountains, Montana. Ph. D., 1966, University of Cincinnati.
Location: Between lat 45°45' and 46°30' N., and long 110°15' and 110°45' W., north of Livingston (Pl. 1).
- 445* **SIMS, John D.**, A sedimentary petrographic study of the upper Fort Union Group (Eocene), northern Crazy Mountains, Montana. M.S., 1964, University of Cincinnati.
Location: North of Livingston, (Pl. 1).
- 446* **SIMS, John D.**, Geology and sedimentology of the Livingston Group, northern Crazy Mountains, Montana. Ph. D., 1967, Northwestern University.
Location: North of Livingston (Pl. 1).
- 447 **SKEELS, Dorr C.**, The structural geology of the Trail Creek Canyon Mountain area, Montana. Ph. D., 1936, Princeton University.
- 448* **SKINNER, William R.**, Geologic evolution of the Bear-tooth Mountains, Montana and Wyoming. Pt. 8, Ultramafic rocks in the Highline Trail Lakes area, Wyoming. Ph. D., 1966, Columbia University.
Location: (Fig. 1).
Published: Skinner, W. R., Bowes, D. R., and Khoury, S. G., 1969, Polyphase deformation in the Archean basement complex, Beartooth Mountains, Montana and Wyoming: Geol. Soc. America Bull., v. 80, p. 1053-1060.

- 449 **SMALL, William D.**, Cordilleran geochronology deduced from hydrothermal leads. Ph. D., 1969 University of British Columbia.
Remarks: Some samples from Montana.
- 450* **SMALLWOOD, Kenneth K.**, Geology of the Wasa mining area, Granite County, Montana. M.S., 1956, University of Montana.
Location: West of Garrison (Pl. 2).
- 451* **SMITH, A. G.**, Structure and stratigraphy of the north-west Whitefish Range, Lincoln County, Montana. Ph. D., 1963, Princeton University.
Location: (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 452* **SMITH, Jan G.**, The geology of the Clear Creek area, Montana-Idaho. M.S., 1961, Pennsylvania State University.
Location: T. 14 and 15 S., R. 12 W., Montana; and T. 14 N., R. 27 and 28 E., Idaho (Pl. 2).
Published: Scholten, Robert, and Ramspott, L. D., 1968, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 453* **SMITH, Robert B.**, A regional gravity survey of western and central Montana. Ph. D., 1967, University of Utah.
Location: (Pl. 1).
Published: Smith, R. B., 1969, Regional gravity studies of western and central Montana: Am. Geophys. Union Trans., v. 50, no. 10, p. 6.
- 454* **SMITH, William T.**, Geology of part of the Tendoy-Medicine Lodge area, Beaverhead County, Montana. M.S., 1948, University of Michigan.
Location: T. 12 S., R. 9 and 10 W. (Pl. 2).
Published: *Included in* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 455* **SOMMERS, David A.**, Geology of Ural NE 15-minute quadrangle, Lincoln County, Montana. M.S., 1961, University of Rochester.
(Continued, next column)
- Location:** Eureka area (Pl. 1).
Published: *Included in* Johns, W. M., 1970, Geology and mineral deposits of Lincoln and Flathead Counties, Montana: Montana Bur. Mines and Geology Bull. 79.
- 456* **SOMMERS, David A.**, Stratigraphy and structure of a portion of the Bob Marshall Wilderness Area, northwestern Montana: Ph. D., 1966, University of Massachusetts.
Location: Northeastern portion of Ovando quadrangle, mainly in Powell County (Pl. 1).
Published: McGill, G. E., and Sommers, D. A., 1967, Stratigraphy and correlation of the Precambrian Belt Supergroup of the southern Lewis and Clark Range, Montana: Geol. Soc. America Bull., v. 78, p. 343-352.
- 457 **SOUL, Norman**, The identification and study of sulfide silver-bearing minerals by selective iridescent filming. M.S., 1939, Montana College of Mineral Science and Technology.
Remarks: A presentation of method of application of experimental procedures in the identification of naturally formed minerals by selective iridescent filming. This thesis does not pertain directly to the geology of Montana; however, some samples were used from various mines in the state.
- 458* **SOWERS, G. M.**, Structure and petrology of the Precambrian granites near Red Lodge, Montana. M.S., 1944, Johns Hopkins University.
Location: (Pl. 1).
- 459* **SPAHN, Ronald A., Jr.**, Geology of the southwestern Horseshoe Hills area, Gallatin County, Montana. M.S., 1967, Montana State University.
Location: East of Three Forks (Pl. 2).
- 460* **SPANG, J. A.**, A structural study across a transition of radiometric age dates in the Gallatin Canyon area, Gallatin County, Montana. M.S., 1967, Brown University.
Location: (Pl. 2).
- 461* **SPEICE, Charles**, Pine Field Cedar Creek anticline, eastern Montana. M. S., 1957, South Dakota School of Mines and Technology.
Location: South of Glendive (Pl. 1).
- 462* **SPENCER, Edgar W.**, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. Pt. 2, Fracture patterns. Ph. D., 1957, Columbia University.
(Continued, next page)

- Location:** (Fig. 1).
Published: Spencer, E. W., 1959, Geologic evolution of the Beartooth Mountains, Montana and Wyoming. II, Fracture patterns: Geol. Soc. America Bull., v. 70, p. 467-508.
- 463 SPENO, Leo A.**, The Tyler Formation of central Montana. M.S., 1958, University of Colorado.
Remarks: A lithologic and stratigraphic study based on surface and subsurface work. Interpretation of depositional environment.
- 464* SPIROFF, Kiril**, Geological observations of the Block P mine, Hughesville, Montana. M.S., 1934, Michigan Technological University.
Location: In Barker mining district north of Neihart (Pl. 1).
- 465* STEJER, Francis A.**, The geology and ore deposits of the Bonanza mine, Emery mining district, Powell County, Montana. M.S., 1948, Montana College of Mineral Science and Technology.
Location: East of Deer Lodge (Pl. 2).
- 466* STEPHEN, Walter M.**, The Rainbow mine, Montana. M.A., 1911, Columbia University.
Location: Western Mineral County (Pl. 1).
Remarks: Outline for development of a group of claims, including calculations for the plant, method of mining and costs.
Note: There is a copy of this thesis in the Special Collections Library, Columbia University, but it is not for circulation.
- 467* STEUER, Fred**, Geology of the McCarthy Mountain area, Beaverhead and Madison Counties, Montana. M.S., 1956, University of Utah.
Location: North of Dillon (Pl. 2).
- 468* STEVENSON, Ralph G., Jr.**, Mineralogy, petrology, and geochemistry of a complex mineral association near Pony, southwestern Montana. Ph. D., 1965, Indiana University.
Location: Sec. 10, T. 2 S., R. 3 W., Madison County, (Pl. 2).
Remarks: Contact metamorphism of an impure carbonate rock was followed by extensive retrogressive metamorphism and zeolitization resulting in the formation of over 50 distinct mineral species.
- 469* STEWART, John C.**, The stratigraphy, physiography, and structural geology of the Dryhead-Garvin basin, south-central Montana. Ph. D., 1956(1957), Princeton University.
(Continued, next column)
- Location:** Southwest of Hardin (Pl. 1).
Published: Stewart, J. C., 1959, Geology of the Dryhead-Garvin basin, Big Horn and Carbon Counties, Montana. Geologic Map 2: Montana Bur. Mines and Geology Spec. Pub. 17.
- 470 STOCKER, George R.**, Surface to subsurface correlation of the Madison Group (Mississippian) in eastern Montana and adjacent areas based on insoluble residues. M.S., 1954, University of Kansas.
- **STOEVER, E. C.** (see Entry 14).
- 471* STONE, Jerome**, The geology of the Elliston phosphate district, Powell County, Montana. M.A., 1952, University of Montana.
Location: An area of about 20 square miles, lying a few miles west of the Continental Divide, north of Elliston (Pl. 2).
- 472* STOUT, Koehler S.**, Geology and mines of the Ogden Mountain mining district, Powell County, Montana. M. S., 1949, Montana College of Mineral Science and Technology.
Location: North of Garrison (Pl. 2).
- 473 STRONG, Ceylon P., Jr.**, Physical and biostratigraphic relations of the Colorado Group in west-central Montana. Ph. D., 1969, University of Washington.
- 474* STUART, Charles J.**, Metamorphism in the central Flint Creek Range, Montana. M.S., 1966, University of Montana.
Location: East of Philipsburg (Pl. 2).
- 475* SUMMERFORD, H. Edgar**, Geology of a portion of the St. Xavier quadrangle, Montana. M.S., 1941, University of Iowa.
Location: South of Hardin (Pl. 1)
- 476 SUTTNER, Lee J.**, Analysis of the Upper Jurassic-Lower Cretaceous Morrison and Kootenai Formations, southern Montana. Ph. D., 1966, University of Wisconsin.
- 477* SWEENEY, George L.**, A geological reconnaissance of the Whitefish Range, Flathead and Lincoln Counties, Montana. M.A., 1955, University of Montana.
Location: Northwest of Kalispell (Pl. 1).
- 478* TANNER, Joseph J.**, Geology of the Castle Mountain area, Montana. Ph. D., 1949, Princeton University
Location: Southeast of White Sulphur Springs (Pl. 1).

- 479* **TANSLEY, Wilfred**, Geology and petrology of the Tobacco Root Mountains, Montana. Ph. D., 1933, University of Chicago.
Location: Madison County (Pl. 2).
Published: Tansley, Wilfred, Schafer, P. A., and Hart, L. H., 1933, A geological reconnaissance of the Tobacco Root Mountains, Madison County, Montana: Montana Bur. Mines and Geology Mem. 9, 57 p.
- 480* **TAPPE, John**, Petrology of the Big Timber stock, Crazy Mountains, Montana. Ph. D., 1966, University of Cincinnati.
Location: Northeast of Livingston (Pl. 1).
Remarks: A quantitative study of minerals and chemical variation in a zoned stock.
- 481* **TEIR, Lennart**, Rhyolitic epithermal mineralization of the Boulder batholith, Montana. M.S., 1941, Oregon State University.
Location: Butte area (Pl. 2).
- 482 **TERRY, Orlyn L.**, The stratigraphy and paleontology of the Otter Formation, Montana. M.S., 1953, Washington State University.
Location: Field work mainly in area of the Big Snowy and Little Belt Mountains.
Published: Terry, O. L., 1953, Stratigraphy and paleontology of the Otter Formation, Montana (abs.): Geol. Soc. America Bull., v. 64, p. 1557.
- 483* **THEODOSIS, Steven D.**, The geology of the Melrose area, Beaverhead and Silver Bow Counties, Montana. Ph. D., 1956, Indiana University.
Location: (Pl. 2).
- 484* **THIEL, Paul T.**, Mineralogical variations in a diabase sill near Nimrod, Granite County, Montana. M.S., 1961, University of Montana.
Location: Sill crops out on south side of Clark Fork River for about 6 miles downstream from Nimrod (Pl. 2).
- 485 **THOM, William T., Jr.** Problems of the Cretaceous-Eocene boundary in Montana and the Dakotas. Ph. D., 1917, Johns Hopkins University.
Location: Central Montana, eastward.
Remarks: Montana map missing from thesis.
- 486 **THOMAS, Harry G.**, Correlation of the Mississippian Madison Group of the Bighorn Mountains and the Powder River basin area, Wyoming and Montana. M.S., 1953, Northwestern University.
Remarks: Stratigraphic study based on surface and subsurface data.
- 487* **THOMAS, Leonard C.**, The Precambrian Cherry Creek Series of the Madison Valley of southwestern Montana. M.S., 1928, University of Iowa.
Location: South of Ennis (Pl. 2).
- 488* **THOMPSON, Willard D.**, Geology of the northern part of the Cherry Creek metamorphics, Madison County, Montana. M.S., 1959, Montana State University.
Location: The northeast flank of the Gravelly Range, Montana, about 12 miles south of Ennis (Pl. 2).
- 489* **THURLOW, Ernest E.**, Geology and ore deposits of the Lower Hot Springs mining district, Madison County, Montana. M.S., 1941, Montana College of Mineral Science and Technology.
Location: South of Norris (Pl. 2).
- 490* **TODD, Stanley Glenn**, Bedrock geology of the southern part of Tom Miner basin, Park and Gallatin Counties, Montana. M.S., Montana State University.
Location: South of Bozeman (Pl. 1).
- 491* **TOLER, L. G.**, Weathering of a quartz monzonite near Lolo Hot Springs, Missoula County, Montana. M.S., 1959, University of Montana.
Location: A road cut about 300 yards south of Lolo Hot Springs in Missoula County (Pl. 2).
- 492 **TWETO, Ogden L.**, Petrography of the Precambrian and Paleozoic rocks of Montana and Yellowstone National Park. M.A., 1937, University of Montana.
- 493* **TYSDAL, Russell G.**, Geology of a part of the north end of the Gallatin Range, Gallatin County, Montana. M.S., 1966, Montana State University.
Location: South of Bozeman (Pl. 2).
- 494 **UMPLEBY, Joseph B.**, Drainage history of Warm Springs Creek, central Montana. M.S., 1909, University of Chicago.
- 495* **UNDERWOOD, Prescott, Jr.**, Geology in the southwestern Big Snowy Mountains, Montana. M.S., 1954, University of Kansas.
Location: Southwest of Lewistown (Pl. 1).
- 496* **VAIL, Peter Robbins**, The igneous and metamorphic complex of the East Boulder River area, Montana. M.S., 1955, Northwestern University.
Location: South of Big Timber (Pl. 1).
Remarks: This study is of a Precambrian fault block lying north of the Stillwater Complex.

- 497* **van de KAMP, P. C.**, Origins of para-amphibolites. Ph. D., 1967, University of Bristol.
Location: Refers to specimens from the Quad Creek area and Gardner Lakes area, Beartooth Mountains, south of Big Timber (Fig. 1, localities 6 and 17)
Published: van de Kamp, P. C., 1969, Origin of amphibolites in the Beartooth Mountains, Wyoming and Montana: New data and interpretation: Geol. Soc. America Bull., v. 80, p. 1127-1136.
- 498* **VAN VOAST, Wayne A.**, General geology and geomorphology of the Emigrant Gulch-Mill Creek area, Park County, Montana. M.S., 1964, Montana State University.
Location: South of Livingston (Pl. 1).
- 499* **VAUGHN, W. J., Jr.**, Geology of the West Fork of the Madison River area, Montana. M.S., 1948, University of Michigan.
Location: T. 12 S., R. 1 and 2 W. (Pl. 2).
Remarks: Results incorporated in Ph. D. thesis of Honkala, F. S. (202).
- 500* **VERRALL, Peter**, Geology of the Horseshoe Hills area, Montana. Ph. D., 1955, Princeton University.
Location: North of Three Forks (Pl. 2).
- 501* **VHAY, John S.**, The geology of a part of the Bear-tooth Mountains front near Nye, Montana. Ph. D., 1934, Princeton University.
Location: South of Big Timber (Pl. 1).
- 502* **VIELE, George W.**, The geology of the Flat Creek area, Lewis and Clark County, Montana. Ph. D., 1960, University of Utah.
Location: Northwest of Wolf Creek (Pl. 1).
- 503 **VITCENDA, John F.**, Correlation of the Charles Formation (Mississippian) from central Montana into the Bighorn Mountains, Wyoming. M.S., 1958, University of Wisconsin.
- 504* **WALLACE, Stewart R.**, Geology of part of the Tendo Mountains, Beaverhead County, Montana. M.S., 1948, University of Michigan.
Location: T. 13 and 14 S., R. 10 W. (Pl. 2).
Published: *Included in:* Scholten, Robert, Keenmon, K. A., and Kupsch, W. D., 1955, Geology of the Lima region, southwestern Montana and adjacent Idaho: Geol. Soc. America Bull., v. 66, p. 345-404. Scholten, Robert, and Ramspott, L. D., 1969, Tectonic mechanisms indicated by structural framework of central Beaverhead Range, Idaho-Montana: Geol. Soc. America Spec. Paper 104, 71 p.
- 505* **WALLACE, Stewart R.**, The petrology of the Judith Mountains, Fergus County, Montana. Ph. D., 1951, University of Michigan.
Location: T. 16 and 17 N., R. 19, 20, and 21 E. (Pl. 1).
Remarks: Available as open-file report at U. S. Geol. Survey, Washington, D. C., and Denver, Colorado.
- 506 **WARDE, John M.**, Geology and clays of the Kootenai Formation of Montana: Clay industry of Montana. M.S., 1937, Montana College of Mineral Science and Technology.
- **WARNER, Marvin E.** (see Entry 152).
- 507 **WARNER, Maurice A.**, The origin of the Permian Rex chert, Idaho, Utah, Montana, and Wyoming. Ph. D., 1956, University of Wisconsin.
- 508* **WEART, Richard C.**, Pennsylvanian and Permian fusulinids of western Montana and central Idaho. Ph. D., 1950, University of Illinois.
Location: (Pl. 2).
Remarks: Six areas on map are fusulinid zones studied in Montana.
- 509* **WEAVER, Charles E.**, Petrography and petrology of the rocks near the Pennsylvanian Quadrant-Permian Phosphoria boundary in southwestern Montana. M.S., 1950, Pennsylvania State University.
Location: Two areas southeast of Dillon (Pl. 2).
- 510* **WEBER, W. Mark**, General geology and geomorphology of the Middle Creek area, Gallatin County, Montana. M.S., 1965, Montana State University.
Location: South of Bozeman (Pl. 2).
- 511* **WENDELL, Clarence A.**, A microscopic study of the Butte vein minerals. M.S., 1935, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
- **WHEELER, Walter H.** (see Entry 115).
- 512* **WHITE, Brian G.**, Structural analysis of a small area in the northeast border zone of the Idaho batholith. M.S., 1969, University of Montana.
Location: Area lies in Idaho southwest of Missoula (Pl. 2).
- 513 **WHITE, William A.**, A study of Montana black sands. M.S., 1934, Montana College of Mineral Science and Technology.

- 514* **WILLIAMS, Higbee G.**, Geology and ore deposits of an area east of Warm Springs, Montana. M.S., 1951, Montana College of Mineral Science and Technology
Location: Study of the geology and ore deposits of the Oro Fino, Girard Gulch, and Tuxedo mining districts (Pl. 2).
- 515* **WILLIAMS, Myron T.**, Correlation and stratigraphy of certain beds near Harrison, Montana. M.S., 1928, University of Iowa.
Location: Bounded on the north by Jefferson River, on the west by South Boulder Creek, on the east by Willow Creek, and on the south by the main highway from Willow Creek to Harrison (Pl. 2).
- 516 **WILLIS, Ronald P.**, Upper Mississippian-Lower Pennsylvanian stratigraphy of central Montana and Williston Basin. Ph. D., 1958, University of Illinois.
Location: Principal area of study in central Montana between the Little Belt Mountains and Porcupine Dome.
- 517* **WILSON, Daniel A.**, A seismic-gravity investigation of the North Boulder River and Jefferson River valleys, Madison and Jefferson Counties, Montana. A.M., 1962, Indiana University.
Location: East of Whitehall (Pl. 2).
- 518* **WILSON, John T.**, Geology of the Mill Creek-Stillwater area, Montana. Ph. D., 1936, Princeton University.
Location: Southeast of Livingston (Pl. 1).
- 519* **WILSON, Leslie E.**, Stratigraphy and paleontology of a part of Garfield County, Montana, with notes on an unconformity at the base of the Upper Cretaceous Lance Formation. M.S., 1926, University of Washington.
Location: T. 15 and 16 N., R. 38 and 39 E. (Pl. 1).
- 520* **WILSON, Michael D.**, The stratigraphy and origin of the Beaverhead Group in the Lima area, southwestern Montana. Ph. D., 1967, Northwestern University.
Location: (Pl. 2).
- 521* **WILSON, Roy A.**, Geologic and economic resources of Bridger Mountains, Montana. M.S., 1917, University of Montana.
Location: North of Bozeman (Pl. 1).
- 522* **WILSON, Roy A.**, Geology of a part of the Mission Range, Montana. Ph. D., 1921, University of Chicago.
Location: Southeast of Flathead Lake (Pl. 1).
- 523* **WIN, Mauns Soe**, Geology and ore deposits of the Margret Ann mine, Silver Bow County, Montana. M.S., 1955, Montana College of Mineral Science and Technology.
Location: Sec. 1, T. 3 N., R. 8 W., in the city of Walkerville (Pl. 2).
- 524* **WINTERS, Allen S.**, Geology and ore deposits of the Castle Mountains mining district, Meagher County, Montana. M.S., 1965, Montana College of Mineral Science and Technology.
Location: Southeast of White Sulphur Springs (Pl. 1).
Published: Winters, A. S., 1968, Geology and ore deposits of the Castle Mountains mining district, Meagher County, Montana: Montana Bur. Mines and Geology Bull. 64, 64 p.
- 525* **WISE, Donald U.**, Tectonics and tectonic heredity in the southern Beartooth Mountains, Wyoming. Ph. D., 1957, Princeton University.
Location: (Fig. 1).
- 526* **WITTE, Hermann C.**, Geology of the Limekiln Canyon and Four Eyes Canyon areas, southwestern Montana. M.S., 1964, Pennsylvania State University.
Location: T. 10 and 11 S., R. 10 and 11 W., and T. 15 S., R. 9 and 10 W. (Pl. 2).
- 527* **WOAKES, Michael E.**, Potassium-argon dating of mineralization at Butte, Montana. M.S., 1960, University of California, Berkeley.
Location: (Pl. 2).
- 528 **WOLFE, David F.**, Noncombustible mineral matter in the Pawnee coal bed, Powder River County, Montana. M.S., 1969, Montana College of Mineral Science and Technology.
- 529* **WOODWARD, Lee A.**, Geology of central part of the Flathead Range, Montana. M.S., 1958, University of Montana.
Location: East of Flathead Lake (Pl. 1).
- 530* **WRAY, James E.**, A field and petrographic study of the Ruby Creek area, Madison County, Montana. M.S., 1959, Michigan State University.
Location: South of Ennis (Pl. 2).
- 531* **YATES, Michael T.**, Elastic anisotropy in rocks from the Stillwater igneous complex, Montana, and the Tinaquillo peridotite, Venezuela. Ph. D., 1968, Princeton University.
Location: South of Big Timber (Pl. 1).

LIST 1, 532 - 538

- 532* **YLLARRAMENDI, John A. Kavanagh**, A study of selected igneous bodies of the Norris-Red Bluff area, Madison County, Montana. M.S., 1965, Montana State University.
Location: Norris area (Pl. 2).
- 533* **YOUNG, Francis M.**, A study of the heavy minerals of the streams of the West Fork of the Bitterroot River, Ravalli County, Montana. M.S., 1965, Montana College of Mineral Science and Technology.
Location: (Pl. 2).
- 534 **YOUNG, Keith P.**, Stratigraphy and paleontology of the Cretaceous Frontier Formation, southern Montana. Ph. D., 1948, University of Wisconsin.
Location: Specimens collected in Big Horn and Yellowstone Counties, Montana.
Published: Young, K. P., 1951, Foraminifera and stratigraphy of the Frontier Formation (Upper Cretaceous), southern Montana: Jour. Paleontology, v. 25, p. 35-68.
- 535* **ZEIGLER, John M.**, Geology of the Blacktail area, Beaverhead County, Montana. Ph. D., 1954, Harvard University.
Location: Southeast of Dillon (Pl. 2).
- 536* **ZEIHEN, Lester G.**, Some observations on the mineralogy of the chromite deposits of south-central Montana. M.S., 1937, Montana College of Mineral Science and Technology.
Location: South of Big Timber (Pl. 1).
- 537* **ZIEBELL, Walter R.**, Minerals of the Idaho batholith. M.S., 1949, University of Illinois.
Location: (Pl. 2).
- 538* **ZOBLE, J. E.**, Stratigraphy of the Cretaceous Cloverly Formation and Crooked Creek Member of the Thermopolis Formation in the northeastern Bighorn Basin, Carbon County, Montana. M.A., 1957, University of Wyoming.
Location: The line of section is approximately 28 miles long, extending from sec. 33, T. 9 S., R. 27 E., to sec. 9, T. 7 S., R. 24 E. (Pl. 1).

LIST 2 – SELECTED ENTRIES ARRANGED BY SUBJECT

Stratigraphy and Paleontology

- 1 **ACHAUER, Charles W.**, Stratigraphy and microfossil studies of the Sappington Formation, southwestern Montana. M. A., 1957, University of Montana.
Published: Achauer, C. W., 1959, Stratigraphy and microfossils of the Sappington Formation in southwestern Montana, *in* Hammond, C. R., and Trapp, Henry, Jr., eds. Sawtooth Disturbed Belt Area, Billings Geol. Soc., Guidebook, 10th Ann. Field Conf., Aug. 1959: p. 41-49.
- 9 **ANDERSON, Robert J.**, Upper Mississippian and lower Pennsylvanian formations of Bridger Mountains, Montana. M.S., 1957, University of Wisconsin.
- 12 **ANDRICHUK, John M.**, Regional stratigraphic analysis of the Devonian System in Wyoming, Montana, southern Saskatchewan, and Alberta. Ph. D., 1951, Northwestern University.
Remarks: Broad stratigraphic study based on surface and subsurface data.
Published: Andrichuk, John M., 1952, Devonian of the northern Rocky Mountain and Great Plains area, *in* Sonnenberg, F. P., ed., Billings Geol. Soc., Guidebook, 3d Ann. Field Conf., Sept. 1952: p. 57-63.
- 16 **BAILLIE, Andrew D.**, Devonian System of the Williston Basin area. Ph. D., 1953, Northwestern University.
Location: Williston Basin extending into northeast corner of Montana.
Remarks: Stratigraphic study based mainly on subsurface data.
Published: Baillie, A. D., 1953, Devonian System of the Williston Basin area: Manitoba Dept. Mines and Nat. Res., Mines Br. Pub. 52-5, 105 p.
- 29 **BELL, William C.**, Montana Middle Cambrian Brachiopoda. M. A., 1936, University of Montana.
Location: Included are fossils from "Deiss' Cambrian sections in northwestern Montana", also "from type sections of Cambrian rocks in central and south-central Montana, and northwestern Yellowstone Park".
Published: Bell, W. C., 1941, Cambrian Brachiopoda from Montana: Jour. Paleontology, v. 15, p. 193-255.
- **BELL, William C.**, Revision of Cambrian Brachiopoda from Montana. Ph. D., 1939, University of Michigan.
- 32 **BENSON, Anthony L.**, The Devonian System in western Wyoming and adjacent areas. Ph. D., 1965, Ohio State University.
Remarks: Some measured sections in southwestern Montana.
- 33* **BENSON, James C.**, A petrographic study of the Mississippian Heath Formation, Sumatra oil field, central Montana. M.S., 1956, University of Wisconsin.
Location: (Pl. 1).
- 41 **BHATT, Bharat K.**, Petrology and stratigraphy of the Swift and the Morrison Formations near Drummond, Montana. M. S., 1967, University of Montana.
- 45 **BLACKSTONE, Donald L.**, Brachiopoda from the Madison Limestone of Montana. M. A., 1934, University of Montana.
Location: "Fossils . . . were collected from eighteen localities in the state. The principal collections were made . . . in northwestern Montana. Other collections came from the Pryor Mountains."
- 75 **CAMPBELL, Newell P.**, Stratigraphy and petrology of the Jefferson Formation (Upper Devonian), Little Belt Mountains, Montana. M.S., 1966, University of Colorado.
- 80 **CETRONE, Ronald, and PASCHAL, Lawrence W., Jr.**, Correlation between a well in Fallon County, Montana, and a well in Harding County, South Dakota. M.S., 1957, South Dakota School of Mines and Technology.
- 93 **CLEMENT, James H.**, Correlation of Paleozoic formations and pre-Jurassic structures in central and north-central Montana. M.S., 1951, Montana College of Mineral Science and Technology.
- 95 **COBBAN, William A.**, Stratigraphy of the Colorado and Montana Groups (Upper Cretaceous) of the central and northern Great Plains, with descriptions of the Colorado scaphites. Ph. D., 1949, Johns Hopkins University.
Location: Northern flank of the Black Hills in northwestern South Dakota, southeastern Montana, and northeastern Wyoming; northeastern flank of the Bighorn Mountains in south-central, central Montana; and in northwestern Montana. Also areas in Kansas and South Dakota.

LIST 2, Stratigraphy and paleontology—Continued

- 109 **DAY, Damon P.**, Petrography, origin and environment of deposition of the Horsethief Sandstone (Upper Cretaceous), Montana. M.S., 1965, Michigan Technological University.
- 111 **DENSON, Norman M.**, Trilobites from the Park Shale of Montana and Yellowstone National Park. M.A., 1939, University of Montana.
Location: Fossils collected from ten sections in central Montana and Yellowstone National Park.
- 112 **DENSON, Norman M.**, Late Middle Cambrian trilobite faunas and stratigraphy of Alberta, Montana, Wyoming, and Utah. Ph. D., 1942, Princeton University.
- 114* **DOBBIN, C. E.**, The continuity of the lithologic units in Fox Hills, Lance, and Fort Union Formations of eastern Montana, and its bearing on the Laramie problem. Ph. D., 1924, Johns Hopkins University.
Location: Fox Hills, Lance, and Fort Union Formations in Wolf Mountain coal field in southeastern Montana, Jordan coal field, and Forsyth coal field, Rosebud County (Pl. 1).
- 116 **DOUGLASS, Earl**, The Neocene lake beds of western Montana and descriptions of some new vertebrates from the Loup Fork. M.S., 1899, University of Montana.
Location: Includes many of the intermontane basins of western Montana, "valleys of the upper Missouri (above the region of Helena), Gallatin, Madison, Jefferson, Beaverhead, Ruby (Stinkingwater), Big Hole, Hellgate, and Bitterroot Rivers, and their tributaries".
Published: *In* Fields, R. W., ed., Soc. Vertebrate Paleontology, Guidebook, 8th Ann. Field Conf., Missoula, Montana, Aug. 1958: App.
- 119 **DUNCAN, Donald C.**, Upper Cambrian trilobites from Montana and Yellowstone National Park. M.A., 1937, University of Montana.
Location: Fossils collected from ten Cambrian-type sections in central and south-central Montana and Yellowstone National Park.
- 134* **FINFROCK, Lawrence J.**, The stratigraphy of the Madison Group of south-central Montana and north-west Wyoming. M.S., 1948, University of Illinois.
Location: Paleontological study of section of Madison Group near Logan, Gallatin County (Pl. 2).
- 140 **FOSTER, Norman H.**, Faunal zonation and stratigraphy of the Mississippian Madison Group: Wyoming and Montana. Ph. D., 1963, University of Kansas.
- 146 **FOX, Stephen K., Jr.**, The stratigraphy and micro-paleontology of the Cody Shale in southern Montana. Ph. D., 1939, Princeton University.
- 147 **FRANCIS, David R.**, The Jurassic stratigraphy of the Williston Basin area. M.S., 1956, Northwestern University.
Published: Francis, D. R., 1956, Jurassic stratigraphy of the Williston Basin area: Saskatchewan Dept. Min. Res. Rept. 18.
- 148 **FRATT, Walter J.**, The Big Snowy Group (Mississippian) in the Bridger Range in Montana. M.S., 1957, University of Wisconsin.
- 153 **FRYE, Charles I.**, The Hell Creek Formation in North Dakota. Ph. D., 1967, University of North Dakota.
Remarks: Includes information on the Hell Creek Formation in Garfield County, Montana.
- 154 **GALLAGHER, Alton V.**, Geology of the Lower Cretaceous Cut Bank conglomerate in northwest Montana. M.S., 1957, Michigan State University.
- 155 **GALLANT, Ray B.**, An analysis of the physical characteristics of Kootenai sandstones in Montana. M.S., 1941, Montana College of Mineral Science and Technology.
- 163 **GIBBS, Frank K.**, The Silurian System in eastern Montana. M.S., 1967, University of Montana.
- 171 **GRANT, Richard E.**, Cambrian faunas of the Snowy Range Formation, southwestern Montana and northwestern Wyoming. Ph. D., 1958, University of Texas.
Remarks: Snowy Range Formation (Cambrian) and Maywood unit (Devonian) were measured at 32 localities in the Horseshoe Hills (north of Three Forks), Bridger Mountain, and in the vicinity of Yellowstone National Park.
- 180 **HALL, Hubert H.**, Mississippian stratigraphy in southwestern Alberta and northwestern Montana. Ph. D., 1952, University of Wisconsin.
Location: Graphic sections of Mississippian rocks were presented for the Pentagon Mountain area, the Teton Canyon area in northern Montana, and the Crows Nest area in southern Alberta.
- 184 **HAMBLIN, Ralph H.**, Stratigraphy and insoluble residues of the upper Paleozoic formations of Montana. M.S., 1939, Montana College of Mineral Science and Technology.

- 186 HANSEN, Alan R., Mission Canyon Formation (Mississippian; Montana). Ph. D., 1959, University of Utah.
- 207* HUH, Oscar K., Upper Paleozoic stratigraphy in southwestern Montana and central Idaho. M.S., 1965, Pennsylvania State University.
Location: Southwestern Beaverhead County (Pl. 2).
- 208 HUH, Oscar K., Mississippian stratigraphy and sedimentology across the Wasatch line, east-central Idaho and extreme southwestern Montana. Ph. D., 1968, Pennsylvania State University.
Published: Huh, O.K., 1967, The Mississippian System across the Wasatch line, east-central Idaho, extreme southwestern Montana, *in* Centennial basin of southwestern Montana—Montana Geol. Soc., 18th Ann. Field Conf. 1967, Guidebook (Billings): p. 31-62.
- 227 JOHNSON, Durwood M., Middle Jurassic of north-central Montana and adjacent areas of Canada. M.S., 1961, University of Montana.
Location: Includes eastern Toole, northern Chouteau, Liberty, Hill, Blaine, and Phillips Counties, and extends 36 miles north into Alberta and Saskatchewan.
Remarks: Cores and cuttings of 58 wells and electric logs from 143 wells were examined.
- 228 JOHNSON, R. D., Pre-Jurassic sedimentation, tectonics, and stratigraphy in southern Alberta and adjoining areas of British Columbia and Montana. M.S., 1954, University of British Columbia.
- 229 JONES, Roy M., Micropaleontology of the Colorado Formation, Montana. M.S., 1941, Montana College of Mineral Science and Technology.
- 239 KLAPPER, Gilbert J., Upper Devonian and lower Mississippian conodont zones in Montana, Wyoming, and South Dakota. Ph. D., 1962, University of Iowa.
Remarks: The tracing of Upper Devonian and lower Mississippian conodont zones; to establish the position of the Devonian-Mississippian boundary.
- 254 KUENZI, Laurence M., Stratigraphy of the Pennsylvanian Amsden Formation, southwestern Montana. M.S., 1951, University of Wisconsin.
Remarks: Correlation and description of several sections along the northeast side of the Bridger Range from Fairy Lake area to the northern end of the range.
- 268 LeBAUER, Lawrence R., Petrology of the Wolsey Shale and Meagher Formation (Middle Cambrian) of southwestern Montana. Ph. D., 1962, Indiana University.
- 273* LEONARD, John R., Mississippian stratigraphy of the Gallatin basin, Montana. M.A., 1946, University of Kansas.
Location: Includes a large area around Bozeman (Pl. 2).
- 288 McALPIN, Archie J., *Paleopsephurus wilsoni*, a new polyodontid fish from the upper Cretaceous of Montana, with a discussion of allied fish, living and fossil. Ph. D., 1941, University of Michigan.
- 289 McCABE, Hugh R., Regional stratigraphic analysis of the Mississippian Madison Group, Williston Basin area. Ph. D., 1961, Northwestern University.
Published: McCabe, H. R., 1959, Mississippian stratigraphy of Manitoba (and Williston Basin): Manitoba Dept. of Mines and Nat. Res. Pub. 58-1, 99 p.
- 295 McKELVEY, G. E., Lithofacies of the Wallace and related formations of the Belt Series. M.S., 1967, Franklin and Marshall College.
- 296 McLEAN, James Ross, The Upper Cretaceous Judith River Formation in the Canadian Great Plains: Its history and lithostratigraphy. Ph. D., 1970, University of Saskatchewan.
- 301 MAGEE, John J., Big Snowy Group of the northern Great Plains. M.S., 1949, University of Colorado.
Remarks: A regional isopach and lithofacies study interpreting paleogeography of large area.
- 322 MINER, Ernest L., Paleobotanical examinations of Cretaceous and Tertiary coals; (1) Cretaceous coals from Greenland, (2) Cretaceous and Tertiary coals from Montana. Ph. D., 1934, University of Michigan.
- 324 MOBERLY, Ralph M., Jr., Mesozoic Morrison, Cloverly, and Crooked Creek Formations, Bighorn Basin, Wyoming and Montana. Ph. D., 1956, Princeton University.
- 329 MORGRIDGE, Dean L., The Mississippian Sappington Formation of southwestern Montana. M.S., 1955, University of Wisconsin.
- 330 MORITZ, Carl A., Mesozoic stratigraphy of a portion of southwestern Montana. Ph. D., 1950, Harvard University.
(Continued, next page)

LIST 2, Stratigraphy and paleontology—Continued

- Location:** Eighteen stratigraphic sections within an area between the Idaho-Montana boundary and lat 46° N., and long 111°30' and 113° W.
Published: Moritz, C. A., 1951, Triassic and Jurassic stratigraphy of southwestern Montana: *Am. Assoc. Petroleum Geologists Bull.*, v. 35, p. 1781-1814.
- 333 **MUNDT, Philip A.**, A regional study of the (Pennsylvanian) Amsden Formation (Wyoming, Montana). Ph. D., 1956, Stanford University.
- 335 **NASCIMBENE, Giovanni**, Bentonites and the geochronology of the Bearpaw sea (Upper Cretaceous; Alberta, Montana). M.Sc., 1963, University of Alberta.
- 340 **NEWTON, G. B.**, Fauna of the Jefferson Formation, south-central Montana and northwest Wyoming. M.S., 1967, Wayne State University.
- 344* **NORTON, Norman J.**, Palynology of the Upper Cretaceous and Lower Tertiary in the type locality of the Hell Creek Formation. Ph. D., 1963, University of Minnesota.
Location: Large area surrounding Jordan (Pl. 1).
- 347* **O'CONNOR, Michael P.**, Stratigraphy and petrology across the Precambrian Piegan Group-Missoula Group boundary, southern Mission and Swan Ranges, Montana. Ph. D., 1967, University of Montana.
Location: Southeast of Flathead Lake (Pl. 1).
- 348* **OLSON, Norman K.**, Depositional factors of the Upper Cretaceous Eagle Formation, south-central Montana. M.S., 1961, University of Iowa.
Location: (Pl. 1).
- 352 **PAINE, William R.**, Stratigraphy of the Permian Phosphoria Formation in Montana. M.S., 1952, Montana College of Mineral Science and Technology.
- 356 **PATTERSON, Dale D.**, The correlation of the Montana Group of Cretaceous age between Salt Creek, Wyoming, and Billings, Montana. M.S., 1956, University of Illinois.
- 357 **PAULL, Richard A.**, Depositional history of the Muddy Sandstone, Bighorn Basin, Wyoming. Ph. D., 1957, University of Wisconsin.
- 362 **PEPPERS, Russel A.**, Stratigraphy of the Muddy (Newcastle) Formation of the Powder River basin, Wyoming and Montana. M.S., 1959, University of Illinois.
- 370 **POWE, George R.**, A study of the brachiopod fauna of certain Mississippian formations of central Montana. M.S., 1937, Montana College of Mineral Science and Technology.
- 374 **RABBITT, John C.**, The Ostracoda of the Mississippian Big Snowy Group in Montana. M.S., 1937, Montana College of Mineral Science and Tehcnology.
- 379 **RAU, Jon L.**, Stratigraphy and paleontology of the Three Forks Formation (Upper Devonian) in southwestern Montana. Ph. D., 1959, Yale University.
Location: In north-central and northwestern Gallatin County, Northern Madison County, southeastern Jefferson County, western and southwestern Broadwater County, and western Park County. Most detailed work in Horseshoe Hills and London Hills in Gallatin and Madison Counties, respectively.
- 380 **RAWSON, Richard R.**, Petrographic facies analysis of the Ray Member, Kibbey Formation, Williston Basin and central Montana. Ph. D., 1966, University of Wisconsin.
Published: Rawson, R. R., 1968, The Kibbey Limestone of the Williston Basin and central Montana. *Wyoming Geol. Assoc. Earth Sci. Bull.*, Sept. 1968, p. 35-47.
 -----1969, Petrographic analysis of the Kibbey Limestone, *in* Cronoble, W. R., and Lane, B., eds., *The economic geology of eastern Montana and adjacent areas: Montana Geol. Soc.*, 256 p.
- 388 **RENZETTI, Phyllis J.**, Fauna of the Three Forks Shale (Devonian) of southwestern Montana. Ph. D., 1961, Indiana University.
- 399 **ROBINSON, Ernest G.**, A correlation of the Mesozoic strata of southwestern Alberta, Canada, and Montana. M.S., 1925, Cornell University.
- 401 **ROONEY, Lawrence F.**, A stratigraphic study of the Permian Formation of part of southwestern Montana. Ph. D., 1956, Indiana University.
- 407 **ROWE, Jesse P.**, Deposits of volcanic ash of Montana. M.A., 1903, University of Nebraska.
- 409 **ROWE, Royle C.**, Description and correlative evidence of the Brachiopoda and faunal members of the Mississippian Madison Limestone. M.A., 1927, University of Montana.
Location: Western Montana with collections from Powell, Pondera, Madison, Park, Granite, and Lewis and Clark Counties.

- 415* **RYDER, Robert T.**, The Beaverhead Formation: A late Cretaceous-Paleocene syntectonic deposit in southwestern Montana and east-central Idaho. Ph. D., 1968, Pennsylvania State University.
- 418 **SAHNI, Ashok**, The vertebrate fauna of the Judith River Formation, Montana. Ph. D., 1968, University of Minnesota.
- 420 **SALMON, Eleanor S.**, A molluscan faunule from the (Cretaceous) Pierre Formation in eastern Montana. M.A., 1934, Columbia University.
- 425 **SCHETTER, William C.**, The Precambrian surface of Idaho, Montana, North Dakota, South Dakota, and Wyoming. M.S., 1962, University of Oregon.
- 435 **SEVERSON, John L.**, A comparison of the Madison Group (Mississippian) with its subsurface equivalents in central Montana. Ph. D., 1952. University of Wisconsin.
Location: Graphic section of Mississippian rocks was compared in the following areas: Sun River section west of Choteau, Fairy Lake section in the Bridger Mountains, Belt Creek section in the Little Belt Mountains, the Judith River and Half Moon Pass sections in the Big Snowy Mountains.
- 439 **SHOEMAKER, R. E.**, Fossil leaves of the Hell Creek and Tullock Formations of eastern Montana. M.S., 1964, University of Minnesota.
- 443 **SILVER, Burr A.**, North American mid-Jurassic through mid-Cretaceous stratigraphic patterns of Colorado Plateau, Rocky Mountains, and Great Plains. Ph. D., 1966, University of Washington.
- 446* **SIMS, John D.**, Geology and sedimentology of the Livingston Group, northern Crazy Mountains, Montana. Ph. D., 1967, Northwestern University.
Location: North of Livingston (Pl. 1).
- 463 **SPENO, Leo A.**, The Tyler Formation of central Montana. M.S., 1958, University of Colorado.
Remarks: A lithologic and stratigraphic study based on surface and subsurface work. Interpretation of depositional environment.
- 470 **STOCKER, George R.**, Surface to subsurface correlation of the Madison Group (Mississippian) in eastern Montana and adjacent areas based on insoluble residues. M.S., 1954, University of Kansas.
- 473 **STRONG, Ceylon P., Jr.**, Physical and biostratigraphic relations of the Colorado Group in west-central Montana. Ph. D., 1969, University of Washington.
- 476 **SUTTNER, Lee J.**, Analysis of the Upper Jurassic-Lower Cretaceous Morrison and Kootenai Formations, southern Montana. Ph. D., 1966, University of Wisconsin.
- 482 **TERRY, Orlyn L.**, The stratigraphy and paleontology of the Otter Formation, Montana. M.S., 1953, Washington State University.
Remarks: Includes isopach-lithofacies map, fossil plates, descriptions, and identifications; measured sections.
Published: Terry, O. L., 1953, Stratigraphy and paleontology of the Otter Formation, Montana (abs.): Geol. Soc. America Bull., v. 64, p. 1557.
- 485 **THOM, William T., Jr.**, Problems of the Cretaceous-Eocene boundary in Montana and the Dakotas. Ph. D., 1917, Johns Hopkins University.
Location: Central Montana, eastward.
- 486 **THOMAS, Harry G.**, Correlation of the Mississippian Madison Group of the Bighorn Mountains and the Powder River basin area, Wyoming and Montana. M.S., 1953, Northwestern University.
Remarks: Stratigraphic study based on surface and subsurface data.
- 492 **TWETO, Ogden L.**, Petrography of the Precambrian and Paleozoic rocks of Montana and Yellowstone National Park. M.A., 1937, University of Montana.
Remarks: Three hundred samples were studied.
- 503 **VITCENDA, John F.**, Correlation of the Charles Formation (Mississippian) from central Montana into the Bighorn Mountains, Wyoming. M.S., 1958, University of Wisconsin.
- 507 **WARNER, Maurice A.**, The origin of the Permian Rex chert, Idaho, Utah, Montana, and Wyoming. Ph. D., 1956, University of Wisconsin.
- 513 **WHITE, William A.**, A study of Montana black sands. M.S., 1934, Montana College of Mineral Science and Technology.
- 516 **WILLIS, Ronald P.**, Upper Mississippian-Lower Pennsylvanian stratigraphy of central Montana and Williston Basin. Ph. D., 1958, University of Illinois.
Remarks: Principal area of study is in central Montana between the Little Belt Mountains and Porcupine Dome.

LIST 2, Stratigraphy and paleontology cont'd: Geochemistry, mineralogy, and petrology; isotope geology and geochronology

- 534 YOUNG, Keith P., Stratigraphy and paleontology of the Cretaceous Frontier Formation, southern Montana. Ph. D., 1948, University of Wisconsin.
Remarks: Specimens collected in Big Horn and Yellowstone Counties, Montana.
Published: Young, Keith P., 1951, Foraminifera and stratigraphy of the Frontier Formation (Upper Cretaceous), southern Montana: Jour. Paleontology, v. 25, p. 35-68.

Geochemistry, Mineralogy, and Petrology

- 253 KUECHLER, Adolph H., A preliminary study of certain Montana clays. M.S., 1933, Montana College of Mineral Science and Technology.
- 269 LECKIE, George G., Distribution of clay minerals in the Paleozoic rocks of southwestern Montana. A. M., 1962, Indiana University.
- 277 LEVINSON, Alfred A., Petrography of pre-Beltian Cherry Creek marbles, southwestern Montana. M.S., 1949, University of Michigan.
Location: Specimens collected from Madison, Beaverhead, and Gallatin Counties, by E. Wm. Heinrich.
- 312 MAXWELL, Dwight, Clay mineralogy of the Belt Series in Montana and northern Idaho. Ph. D., 1964, University of Montana.
Published: Maxwell, D. T., and Hower, John, High-grade diagenesis and low-grade metamorphism of illite in the Precambrian Belt Series: Am. Mineralogist, v. 52, p. 843-857.
- 323 MITCHELL, Will, Jr., Origin and occurrence of black manganese in Montana. M.S., 1942, Montana College of Mineral Science and Technology.
- 375 RADTKE, Arthur S., Minor elements in iron ores from the western United States. Ph. D., 1965, Stanford University.
Remarks: Some samples from Montana were analyzed.
- 457 SOUL, Norman, The identification and study of sulfide-silver-bearing minerals by selective iridescent filming. M.S., 1939, Montana College of Mineral Science and Technology.
Remarks: A presentation of method of application of experimental procedures in the identification of naturally formed minerals by selective iridescent-filming. This thesis does not pertain directly to the geology of Montana, however, some samples were used from various mines in the state.
- 506 WARDE, John M., Geology and clays of the Kootenai Formation of Montana: Clay industry of Montana. M.S., 1937, Montana College of Mineral Science and Technology.
- 528 WOLFE, David F., Noncombustible mineral matter in the Pawnee coal bed, Powder River County, Montana. M.S., 1969, Montana College of Mineral Science and Technology.

Isotope Geology and Geochronology

- 79 CATANZARO, Edward J., A study of discordant zircons from the Little Belt (Montana), Beartooth (Montana), and Santa Catalina (Arizona) Mountains. Ph. D., 1962, Columbia University.
Published: Catanzaro, E. J., and Kulp, J. L., 1964, Discordant zircons from the Little Belt (Montana), Beartooth (Montana), and Santa Catalina (Arizona) Mountains: Geochim. et Cosmochim. Acta, v. 28, p. 87-124.
- 431* SCHWARTZMAN, David N., Excess argon in minerals from the Stillwater Complex (Precambrian, Montana). M.S., 1966, Brown University.
- 159 GAST, Paul W., Absolute age determinations from early Precambrian rocks (southeastern Manitoba, Montana, and Wyoming). Ph. D., 1959, Columbia University.
- 260* LANGE, Ian M., Sulfur isotope geology of Butte, Montana. Ph. D., 1968, University of Washington.
Location: (Pl. 2).
- 292 McDOWELL, Fred W., Potassium argon dating of Cordilleran intrusives. Ph. D., 1966, Columbia Univ.
Remarks: Some dates from the Idaho and Boulder batholiths.

LIST 2, Isotope geology and geochronology—contd.; Geophysics; Geomorphology; Ground Water

- 449 **SMALL, William D.**, Cordilleran geochronology deduced from hydrothermal leads. Ph. D., 1969, University of British Columbia.
Remarks: Some samples from Montana.
- 527* **WOAKES, Michael E.**, Potassium-argon dating of mineralization at Butte, Montana. M.S., 1960, University of California, Berkeley.
Location: (Pl. 2).

Geophysics

- 38* **BERGH, Hugh W.**, Paleomagnetism of the Stillwater Complex, Montana. Ph. D., 1968, Princeton University.
Location: (Pl. 1).
- 68 **BURFEIND, Walter J.**, A gravity investigation of the Tobacco Root Mountains, Jefferson basin, Boulder batholith, and adjacent areas of southwestern Montana. Ph. D., 1967, Indiana University.
- 185 **HANNA, William F.**, Magnetic properties of selected volcanic rocks of southwestern Montana. Ph. D., 1965, Indiana University.
Published: Hanna, W. F., 1967, Paleomagnetism of Upper Cretaceous volcanic rocks in southwestern Montana: Jour. Geophys. Research, v. 72, p. 595-610.
- 387 **RENICK, Howard, Jr.**, Magnetotelluric investigations in the area of the Tobacco Root Mountains, southwestern Montana, southeastern Montana, and southern Illinois, Indiana, and Ohio. Ph. D., 1969, Indiana University.
- 414 **RYALL, Alan S.**, P-waves of the Hebgen Lake, Montana, earthquake of August 18, 1959. Ph. D., 1962, University of California, Berkeley.
- 453* **SMITH, Robert B.**, A regional gravity survey of western and central Montana. Ph. D., 1967, University of Utah.
Location: (Pl. 1).
Published: Smith, R. B., 1969, Regional gravity studies of western and central Montana: Am. Geophys. Union Trans., v. 50, no. 10, p. 6.
- 531* **YATES, Michael T.**, Elastic anisotropy in rocks from the Stillwater igneous complex, Montana, and the Tinaquillo Peridotite, Venezuela. Ph. D., 1968, Princeton University.

Geomorphology

- 74 **CALHOUN, Fred Harvey Hall**, The relations of the Keewatin ice sheet to the mountains of Montana. Ph. D., 1902, University of Chicago.
Published: Calhoun, F. H. H., 1906, The Montana lobe of the Keewatin ice sheet: U. S. Geol. Survey Prof. Paper 50, 62 p.
- 157 **GARREY, George H.**, Glaciation between the Rockies and the Cascades in northwestern Montana, northern Idaho, and eastern Washington. M.S., 1902, University of Chicago.

Ground Water

- 403 **ROPES, Leverett Harvey**, Proposal for instrumentation and study of the Gallatin seismic-sensitive well. M.S., 1963, Montana State University.
Location: Located north of Belgrade, Montana, sec. 25, T. 1 N., R. 4 E., on the Quaternary stream gravels of the Gallatin Valley.
- Remarks:** Developing suitable instrumentation for recording water-level fluctuations in the Gallatin well.

LIST 2, Economic geology; Entries not plotted

Economic Geology

- 84 **CHELINI, J. M.**, Market study and compendium of data on industrial minerals and rocks of Montana. M.S., 1966, Montana College of Mineral Science and Technology.
Published: Chelini, J. M., 1967, Market study and compendium of data on industrial minerals and rocks in Montana: Montana Bur. Mines and Geology Bull. 62.
- 88 **CLABAUGH, Stephen E.**, Corundum deposits of Montana. Ph. D., 1950, Harvard University.
Published: Clabaugh, S. E., 1952, Corundum deposits of Montana: U. S. Geol. Survey Bull. 983, 100 p.
- 164 **GILLETTE, Christopher B.**, Lineament tectonics of the Montana mining districts. M.S., 1965, Montana College of Mineral Science and Technology.
- 338 **NELSON, Harry E.**, Lightweight aggregate for concrete from Montana shales. M.S., 1947, Montana College of Mineral Science and Technology.
- 408 **ROWE, Jesse P.**, Montana coal and lignite deposits. Ph. D., 1906, University of Nebraska.
- 416 **SAHINEN, Uuno M.**, Mining districts of Montana. M.S., 1935, Montana College of Mineral Science and Technology.
Remarks: Includes descriptions of 169 separate mining districts within the state.

Entries Not Plotted

- 53 **BOYD, Francis R., Jr.**, Geology of the Yellowstone rhyolite plateau. Ph. D., 1956 (1957), Harvard University.
- 61 **BRUDER, K. F., and WHEELER, C. T.**, Geology of the Greaser Creek area. M.S., 1955, University of Michigan.
- 124 **EDWARD, Albert**, The petrography of the Purcell sills. Ph. D., 1930, University of Wisconsin.
- 161 **GEEHAN, R. W.**, A geologic map of Montana. E.M., 1932, University of Minnesota.
- 303 **MALONEY, Neil J.**, Geology of the eastern part, Beaty Butte Four quadrangle, Montana. M.S., 1961, Oregon State University.
- 447 **SKEELS, Dorr C.**, The structural geology of the Trail Creek Canyon Mountain area, Montana. Ph. D., 1936, Princeton University.
- 494 **UMPLEBY, Joseph B.**, Drainage history of Warm Springs Creek, central Montana. M.S., 1909, University of Chicago.

LIST 3—ALL ENTRIES ARRANGED BY INSTITUTION GRANTING DEGREE

University of Alberta,
Edmonton, Alberta, Canada
335

University of Arizona
Tucson, Arizona 85721
96

Boston College
Chestnut Hill, Massachusetts 02167
400

Boston University
Boston, Massachusetts 02115
5, 325

University of Bristol
Bristol, England
497

University of British Columbia
Vancouver 8, British Columbia, Canada
228, 449

Brown University
Providence, Rhode Island 02912
217, 431, 460

University of California at Berkeley
Berkeley, California 94720
51, 130, 150, 287, 315, 345, 391, 414, 422, 527

University of California at Los Angeles
Los Angeles, California 90024
214

California Institute of Technology
Pasadena, California 91109
7

University of Chicago
Chicago, Illinois 60637
40, 74, 128, 157, 233, 247, 258, 264, 290, 479,
494, 522

University of Cincinnati
Cincinnati, Ohio 45221
310, 406, 444, 445, 480

Clark University
Worcester, Massachusetts 01610
3, 129

University of Colorado
Boulder, Colorado 80302
75, 137, 301, 351, 463

Columbia University
New York, New York 10027
34, 72, 77, 79, 121, 159, 190, 201, 276, 280,
292, 299, 371, 420, 430, 448, 462, 466

Cornell University
Ithaca, New York 14850
39, 120, 230, 231, 263, 395, 399

Franklin and Marshall College
Lancaster, Pennsylvania 17604
295

Harvard University
Cambridge, Massachusetts 02138
53, 65, 70, 88, 135, 160, 194, 221, 286, 318,
330, 341, 358, 440, 535

University of Idaho
Moscow, Idaho 83843
73, 220

University of Illinois
Urbana, Illinois 61801
113, 134, 173, 356, 362, 508, 516, 537

Indiana University
Bloomington, Indiana 47401
20, 68, 69, 78, 86, 90, 97, 101, 122, 138, 143,
152, 185, 195, 196, 197, 215, 242, 249, 268,
269, 270, 285, 302, 308, 327, 328, 339, 342,
354, 359, 387, 388, 389, 393, 401, 402, 423,
468, 483, 517

University of Iowa
Iowa City, Iowa 52240
67, 123, 168, 175, 239, 250, 336, 348, 433,
438, 475, 487, 515

Johns Hopkins University
Baltimore, Maryland 21218
95, 114, 222, 458, 485

University of Kansas
Lawrence, Kansas 66044
117, 140, 251, 273, 363, 470, 495

LIST 3, All entries arranged by institution granting degree

Kansas State University
Manhattan, Kansas 66504
60

University of Massachusetts
Amherst, Massachusetts 01002
27, 243, 317, 421, 456

University of Michigan
Ann Arbor, Michigan 48104
2, 14, 24, 26, 30, 31, 52, 54, 55, 61, 66, 100,
105, 108, 115, 118, 149, 202, 209, 210, 216,
224, 226, 235, 237, 252, 256, 257, 272, 274,
275, 277, 279, 288, 300, 305, 313, 322, 346,
368, 386, 405, 411, 428, 429, 434, 454, 499,
504, 505

Michigan State University
East Lansing, Michigan 48823
154, 337, 530

Michigan Technological University
(formerly Michigan College of Mining and Technology)
Houghton, Michigan 49931
109, 141, 206, 464

University of Minnesota
Minneapolis, Minnesota 55455
28, 36, 76, 110, 161, 283, 314, 344, 418, 437,
439

University of Missouri
Columbia, Missouri 65201
189, 199, 200, 261

→ University of Missouri at Rolla (see page 47, last item)

University of Montana
(formerly Montana State University)
Missoula, Montana 59801
1, 10, 29, 35, 37, 41, 45, 56, 82, 83, 89, 92,
102, 111, 116, 119, 125, 145, 163, 165, 166,
174, 178, 179, 191, 198, 203, 211, 212, 219,
223, 227, 255, 262, 266, 271, 281, 294, 311,
312, 326, 331, 332, 343, 347, 396, 409, 424,
442, 450, 471, 474, 477, 484, 491, 492, 512,
521, 529

Montana College of Mineral Science and Technology
(formerly Montana School of Mines)
Butte, Montana 59701
8, 13, 43, 47, 57, 84, 93, 98, 103, 106, 126,
131, 136, 142, 144, 151, 155, 164, 170, 172,
176, 182, 184, 205, 213, 225, 229, 253, 278,
291, 298, 309, 321, 323, 338, 352, 361, 365,
370, 372, 373, 374, 376, 377, 384, 390, 394,
416, 457, 465, 472, 489, 506, 511, 513, 514,
523, 524, 528, 533, 536

Montana State University
(formerly Montana State College)
Bozeman, Montana 59715
11, 23, 48, 71, 81, 133, 167, 193, 204, 320,
403, 427, 436, 459, 488, 490, 493, 498, 510,
532

University of Nebraska
Lincoln, Nebraska 68508
282, 407, 408, 417

University of North Dakota
Grand Forks, North Dakota 58201
153

Northwestern University
Evanston, Illinois 60201
12, 16, 147, 183, 289, 441, 446, 486, 496, 520

Ohio State University
Columbus, Ohio 43210
32

University of Oklahoma
Norman, Oklahoma 73069
187

University of Oregon
Eugene, Oregon 97403
425

Oregon State University
Corvallis, Oregon 97331
64, 87, 162, 267, 303, 306, 383, 404, 481

Pennsylvania State University
University Park, Pennsylvania 16802
49, 50, 127, 207, 208, 236, 245, 246, 259, 284,
319, 378, 415, 452, 509, 526

Princeton University
Princeton, New Jersey 08540
4, 6, 21, 38, 42, 46, 59, 85, 99, 104, 112, 146,
156, 177, 218, 234, 240, 293, 297, 304, 324,
334, 360, 366, 367, 369, 397, 447, 451, 469,
478, 500, 501, 518, 525, 531

University of Rochester
Rochester, New York 14627
455

Rutgers, The State University
New Brunswick, New Jersey 08903
364

LIST 3, All entries arranged by institution granting degree

University of Saskatchewan
Saskatoon, Saskatchewan, Canada
296

Smith College
Northampton, Massachusetts 01060
18

South Dakota School of Mines and Technology
Rapid City, South Dakota 57701
44, 80, 461

Stanford University
Stanford, California 94305
333, 375, 381, 382

Syracuse University
Syracuse, New York 13210
392

University of Utah
Salt Lake City, Utah 84112
186, 453, 467, 502

University of Washington
Seattle, Washington 98105
107, 260, 385, 398, 443, 473, 519

Washington State University
Pullman, Washington 99163
91, 132, 188, 248, 316, 349, 350, 482

Wayne State University
Detroit, Michigan 48202
62, 63, 158, 169, 340, 410, 426

University of Wisconsin
Madison, Wisconsin 53706
9, 33, 124, 139, 148, 180, 192, 232, 238, 254,
265, 329, 357, 380, 435, 476, 503, 507, 534

University of Wyoming
Laramie, Wyoming 82070
15, 25, 181, 355, 412, 419, 538

University of Texas
Austin, Texas 78712
17, 171

Yale University
New Haven, Connecticut 06520
19, 22, 58, 94, 241, 244, 353, 379, 413

→ University of Missouri at Rolla
(formerly Missouri School of Mines and Metallurgy)
Rolla, Missouri 65401
307

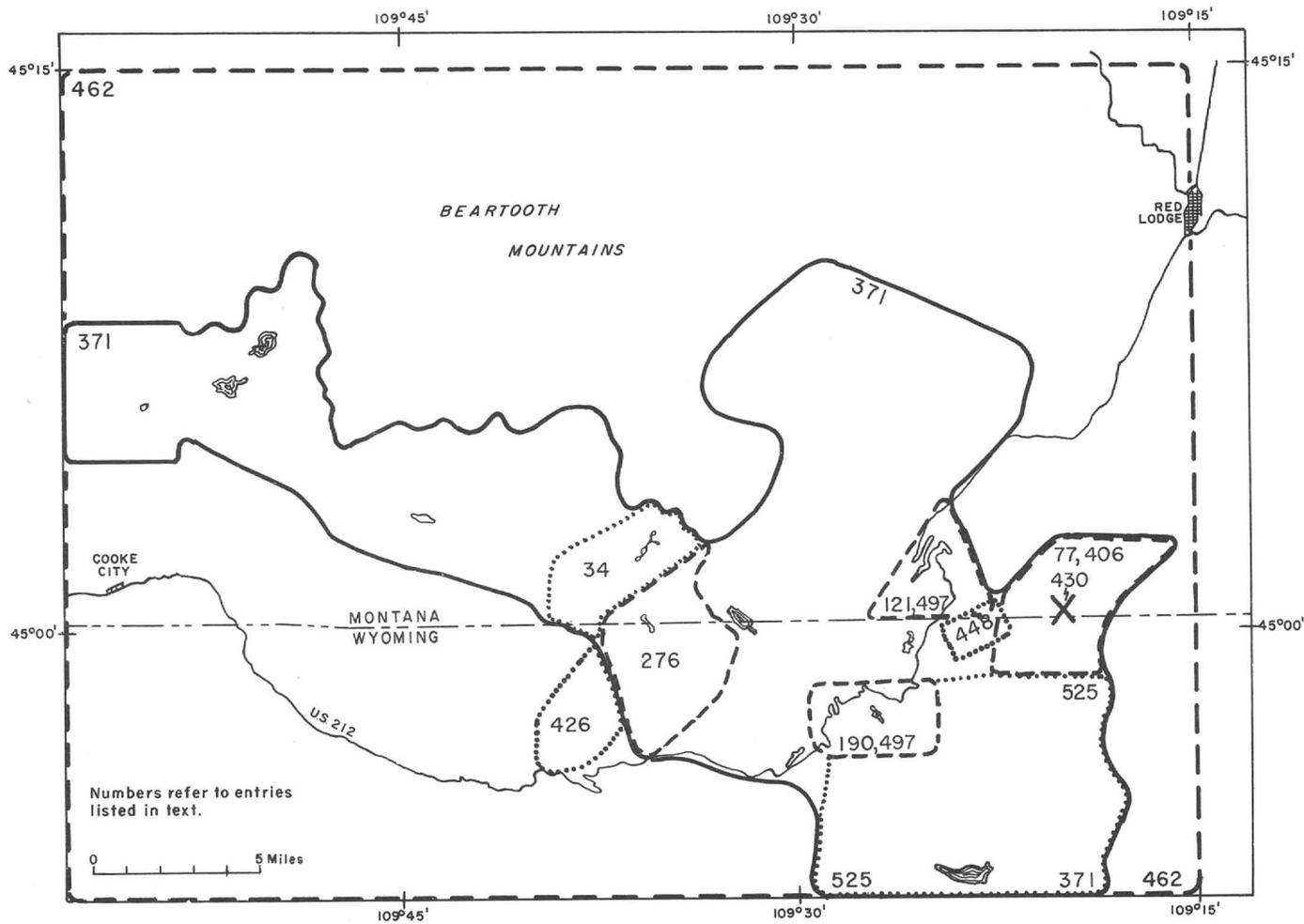
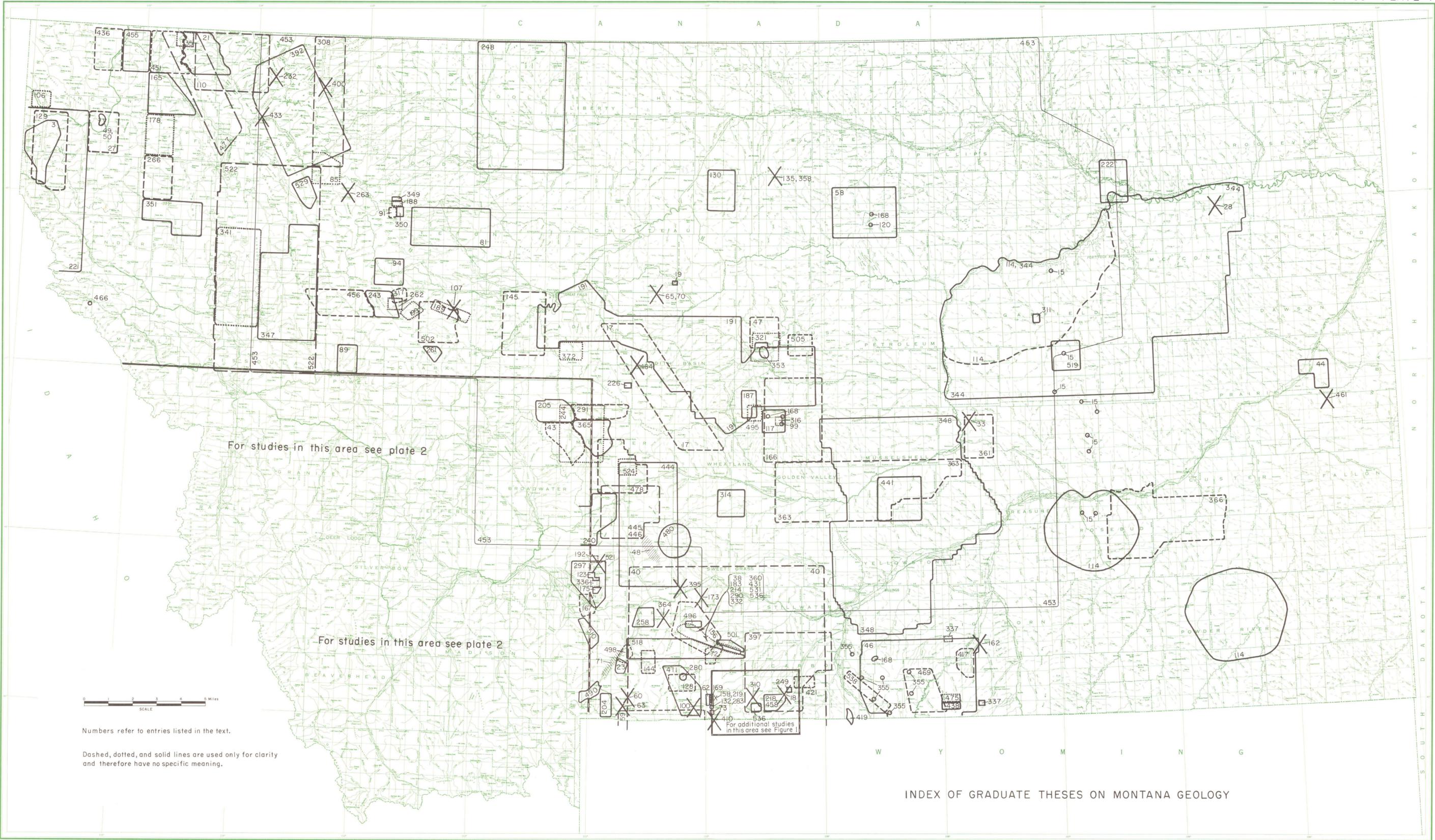


Figure 1.—Index map for southern Beartooth Mountains.

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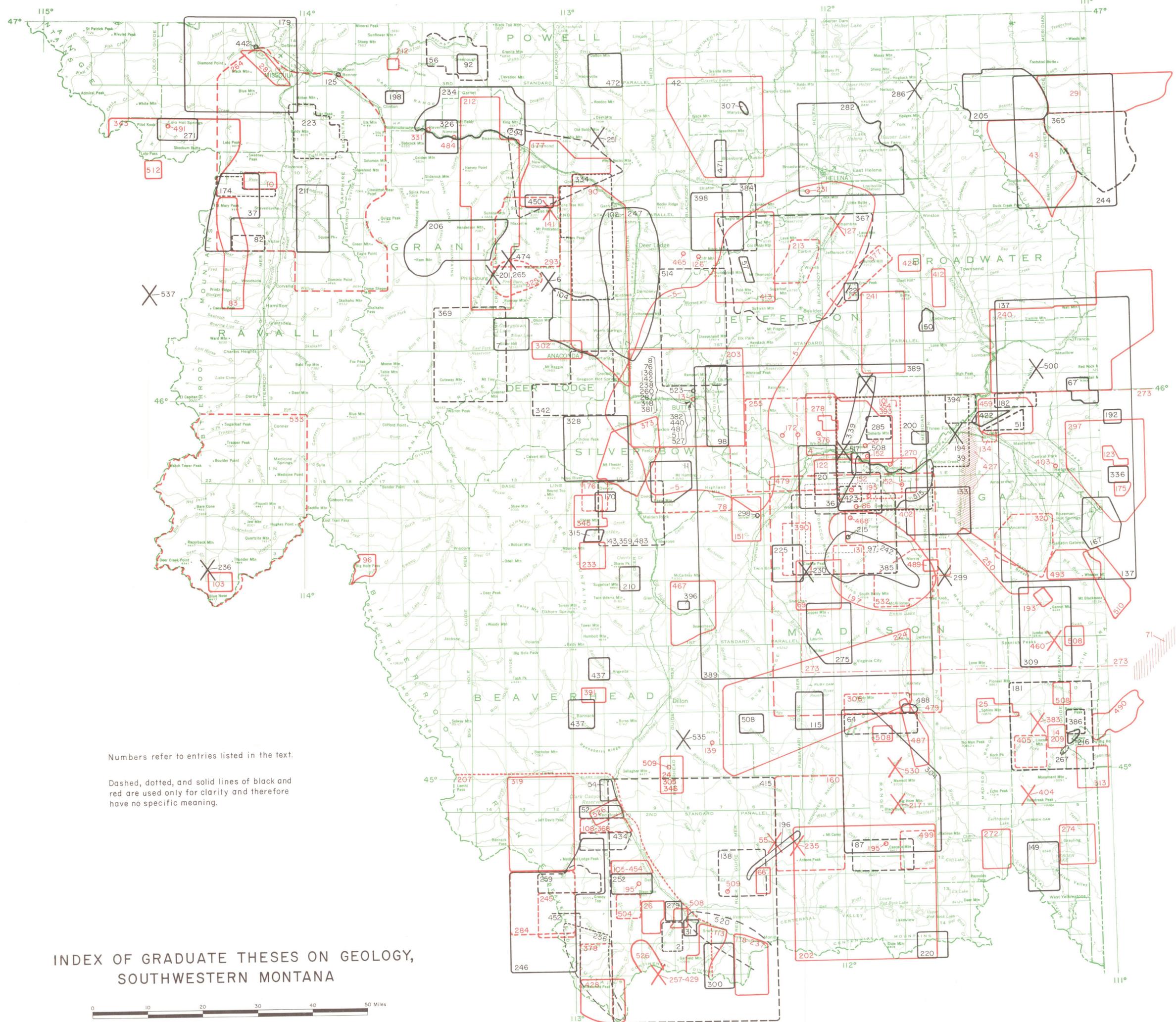
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Base from U.S.S. 1:100,000 Montana map, 1958 edition

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INDEX OF GRADUATE THESES ON GEOLOGY,
SOUTHWESTERN MONTANA

