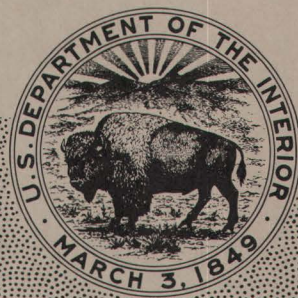


GEOLOGICAL SURVEY CIRCULAR 675



Bibliography of the Geology of
the Green River Formation,
Colorado, Utah, and Wyoming,
to March 1, 1973

**Bibliography of the Geology of
the Green River Formation,
Colorado, Utah, and Wyoming,
to March 1, 1973**

By Marjorie C. Mullens

GEOLOGICAL SURVEY CIRCULAR 675

United States Department of the Interior

ROGERS C. B. MORTON, *Secretary*



Geological Survey

V. E. McKelvey, *Director*

CONTENTS

	Page
Introduction -----	1
U.S. Geological Survey reports on the Green River Formation, Colorado, Utah, and Wyoming -----	1
Reports by U.S. Geological Survey authors on geology of the Green River Formation, Colorado, Utah, and Wyoming, in non-U.S. Geological Survey publications -----	6
Selected reports by non-U.S. Geological Survey authors on geology of the Green River Formation, Colorado, Utah, and Wyoming -----	10

Bibliography of the Geology of the Green River Formation, Colorado, Utah, and Wyoming, to March 1, 1973

By Marjorie C. Mullens

INTRODUCTION

The Green River Formation in northwestern Colorado, northeastern Utah, and southwestern Wyoming contains thick and extensive deposits of oil shale. The richest oil-shale deposits underlie an area of 12,000 square kilometers (5,000 sq mi) in the Piceance Creek and Uinta Basins in northwestern Colorado and northwestern Utah. Cashion and Donnell (1968) reported that these basins contain about 105 billion metric tons of oil in beds which are more than 4.6 meters thick and which contain an average of 5.7 percent of oil by weight. Considerably more oil is present in beds that contain less than 5.7 percent oil or are less than 4.6 meters thick in these basins and in other areas underlain by the Green River Formation. Duncan and Swanson (1965) estimated that the known recoverable and marginal resources of oil in the entire Green River Formation are about 280 billion metric tons. In late 1972, however, none of the oil shale was being mined for oil on a commercial basis.

The Green River Formation also contains gilsonite, bituminous sands, oil and gas, and sodium and aluminum minerals. Some of these minerals were being produced commercially in late 1972.

This bibliography, which contains 597 references, was compiled to aid studies on the geology and resources of the Green River Formation. References included are mainly on the areal geology, stratigraphy, paleontology, geochemistry, and mineralogy of the Green River Formation, but some concern exploitation of the oil-shale deposits.

The bibliography is arranged in three parts: U.S. Geological Survey reports on the Green River Formation, Colorado, Utah, and Wyoming; reports by U.S. Geological Survey authors on geology of the Green River Formation, Colorado, Utah, and Wyoming, in non-U.S. Geological Survey publications; and selected reports by non-U.S. Geological Survey authors on the geology of the Green River Formation, Colorado, Utah, and Wyoming. The two parts by Geological Survey authors are as complete as possible but the other part includes only selected references. In reports where mention of the Green River Formation is only incidental, brackets are used to indicate the pages pertinent to the Green River Formation.

U.S. GEOLOGICAL SURVEY REPORTS ON THE GREEN RIVER FORMATION, COLORADO, UTAH, AND WYOMING

- Andrews, D. A., and Hunt, C. B., 1948, Geologic map of eastern and southern Utah: U.S. Geol. Survey Oil and Gas Inv. Prelim. Map 70, scale 1:500,000. [Reprinted 1956]
- Austin, A. C., 1971, Structure contours and overburden on the top of the Mahogany zone, Green River Formation, in the northern part of the Piceance Creek Basin, Rio Blanco County, Colorado: U.S. Geol. Survey Misc. Field Studies Map MF-309.
- Baker, A. A., 1947, Stratigraphy of the Wasatch Mountains in the vicinity of Provo, Utah: U.S. Geol. Survey Oil and Gas Inv. Prelim. Chart 30.
- Berry, E. W., 1930, A flora of Green River age in the Wind River Basin of Wyoming: U.S. Geol. Survey Prof. Paper 165-B, p. 55-81.
- Bradley, W. H., 1926, Shore phases of the Green River Formation in northern Sweetwater County, Wyoming: U.S. Geol. Survey Prof. Paper 140-D, p. 121-131.
- , 1929a, The varves and climate of the Green

- River epoch: U.S. Geol. Survey Prof. Paper 158-E, p. 87-110.
- 1929b, Algae reefs and oolites of the Green River Formation: U.S. Geol. Survey Prof. Paper 154-G, p. 203-223 [1930].
- 1930, The occurrence and origin of analcite and meerschaum beds in the Green River Formation of Utah, Colorado, Wyoming: U.S. Geol. Survey Prof. Paper 158-A, p. 1-7.
- 1931, Origin and microfossils of the oil shale of the Green River Formation of Colorado and Utah: U.S. Geol. Survey Prof. Paper 168, 58 p.
- 1945, Geology of the Washakie Basin, Sweetwater and Carbon Counties, Wyoming, and Moffat County, Colorado: U.S. Geol. Survey Oil and Gas Inv. Prelim. Map 32.
- 1961, Geologic map of a part of southwestern Wyoming and adjacent States: U.S. Geol. Survey Misc. Geol. Inv. Map I-332.
- 1964, Geology of Green River Formation and associated Eocene rocks in southwestern Wyoming and adjacent parts of Colorado and Utah: U.S. Geol. Survey Prof. Paper 496-A, 86 p. [1965].
- Bradley, W. H., and Eugster, H. P., 1969, Geochemistry and paleolimnology of the trona deposits and associated authigenic minerals of the Green River Formation of Wyoming: U.S. Geol. Survey Prof. Paper 496-B, 71 p.
- Brown, R. W., 1929, Additions to the flora of the Green River Formation: U.S. Geol. Survey Prof. Paper 154-J, p. 279-292 [1930].
- 1934, The recognizable species of the Green River flora: U.S. Geol. Survey Prof. Paper 185-C, p. 45-77 [1935].
- Burbank, W. S., Lovering, T. S., Goddard, E. N., and Eckel, E. B., compilers, 1935, Geologic map of Colorado: U.S. Geol. Survey Geol. Map, scale 1:500,000. [Reprinted 1959]
- Cashion, W. B., 1959, Geology and oil-shale resources of Naval Oil-Shale Reserve No. 2, Uintah and Carbon Counties, Utah: U.S. Geol. Survey Bull. 1072-O, p. 753-793 [1960].
- 1961, Potential oil-shale reserves of the Green River Formation in the southeastern Uinta Basin, Utah and Colorado, in *Short papers in the geologic and hydrologic sciences*: U.S. Geol. Survey Prof. Paper 424-C, p. C22-C24.
- 1964, The distribution and quality of oil shale in the Green River Formation of the Uinta Basin, Utah-Colorado, in *Geological Survey research 1964*: U.S. Geol. Survey Prof. Paper 501-D, p. D86-D89.
- 1967, Geology and fuel resources of the Green River Formation, southeastern Uinta Basin, Utah and Colorado: U.S. Geol. Survey Prof. Paper 548, 48 p.
- 1968, Maps showing structure, overburden, and thickness for a rich oil-shale sequence in the Eocene Green River Formation, east-central Uinta Basin, Utah and Colorado: U.S. Geol. Survey open-file rept., 1 p., 4 maps, scale 1:250,000.
- 1969, Geologic map of the Black Cabin Gulch quadrangle, Rio Blanco County, Colorado: U.S. Geol. Survey Geol. Quad. Map GQ-812.
- Cashion, W. B., and Brown, J. H., Jr., 1956, Geology of the Bonanza-Dragon oil-shale area, Uintah County, Utah, and Rio Blanco County, Colorado: U.S. Geol. Survey Oil and Gas Inv. Map OM-153.
- Cashion, W. B., and Donnell, J. R., 1972, Chart showing correlation of selected key units in the organic-rich sequence of Green River Formation, Piceance Creek Basin, Colorado, and Uinta Basin, Utah: U.S. Geol. Survey Oil and Gas Inv. Chart OC-65.
- Clark, F. R., 1928, Economic geology of the Castlegate, Wellington, and Sunnyside quadrangles, Carbon County, Utah: U.S. Geol. Survey Bull. 793, 165 p. [p. 21-22].
- Coffin, D. L., Welder, F. A., and Glanzman, R. K., 1971, Geohydrology of the Piceance Creek structural basin between the White and Colorado Rivers, northwestern Colorado: U.S. Geol. Survey Hydrologic Inv. Atlas HA-370.
- Culbertson, W. C., 1961, Stratigraphy of the Wilkins Peak Member of the Green River Formation, Firehole Basin quadrangle, Wyoming, in *Short papers in the geologic and hydrologic sciences*: U.S. Geol. Survey Prof. Paper 424-D, p. D170-D173.
- 1962, Laney Shale Member and Tower Sandstone lentil of the Green River Formation, Green River area, Wyoming, in *Short papers in geology and hydrology*: U.S. Geol. Survey Prof. Paper 450-C, p. C54-C57.
- 1965, Tongues of the Green River and Wasatch Formations in the southeastern part of the Green River Basin, Wyoming, in *Geological Survey research 1965*: U.S. Geol. Survey Prof. Paper 525-D, p. D139-D143.
- 1966, Trona in the Wilkins Peak Member of the Green River Formation, southwestern Wyoming, in *Geological Survey research 1966*: U.S. Geol. Survey Prof. Paper 550-B, p. B159-B164.
- Culbertson, W. C., and Pitman, J. K., 1973, Oil shale, in *United States mineral resources*: U.S. Geol. Survey Prof. Paper 820, p. 497-503.
- Cullins, H. L., 1968, Geologic map of the Banty Point quadrangle, Rio Blanco County, Colorado: U.S. Geol. Quad. Map GQ-703.
- 1969, Geologic map of the Mellen Hill quadrangle, Rio Blanco and Moffat Counties, Colorado: U.S. Geol. Survey Geol. Quad. Map GQ-835 [1970].
- Cuttitta, Frank, 1953a, A photometric method for the estimation of the oil yield of oil shale, in Brannock, W. W., *Contributions to geochemistry, 1949*: U.S. Geol. Survey Bull. 992, p. 15-31.
- 1953b, A volumetric method for the estimation of the oil yield of oil shale, in Brannock, W. W., *Contributions to geochemistry, 1949*: U.S. Geol. Survey Bull. 992, p. 33-37.
- Dane, C. H., 1955, Stratigraphic and facies relationships of the upper part of the Green River Formation and the lower part of the Uinta Formation in Duchesne, Uintah, and Wasatch Counties, Utah: U.S. Geol. Survey Oil and Gas Inv. Chart OC-52.

- Desborough, G. A., Pitman, J. K., and Donnell, J. R., 1973, Microprobe analysis of biotites—a method of correlating tuff beds in the Green River Formation, Colorado and Utah: U.S. Geol. Survey Jour. Research, v. 1 no. 1, p. 39–44.
- Donnell, J. R., 1957, Preliminary report on oil-shale resources of Piceance Creek Basin, northwestern Colorado: U.S. Geol. Survey Bull. 1042–H, p. 255–271.
- 1961, Tertiary geology and oil-shale resources of the Piceance Creek Basin between the Colorado and White Rivers, northwestern Colorado: U.S. Geol. Survey Bull. 1082–L, p. 835–891.
- 1964, Mineral fuels and associated resources—oil shale, in Mineral and water resources of Colorado: U.S. 88th Cong., 2d sess., Comm. Print, p. 67–73.
- 1969, Oil shale in the Green River Formation: U.S. Geol. Survey open-file rept., 13 p., 6 figs.
- 1972, Oil-shale assays on Grand Mesa, west-central Colorado: U.S. Geol. Survey open-file rept., 1 p., 1 fig.
- Donnell, J. R., and Austin, A. C., 1971, Potential strip-pable oil-shale resources of the Mahogany zone (Eocene), Cathedral Bluffs area, northwestern Colorado, in Geological Survey research 1971: U.S. Geol. Survey Prof. Paper 750–C, p. C13–C17.
- Donnell, J. R., Cashion, W. B., and Brown, J. H., Jr., 1953, Geology of the Cathedral Bluffs oil-shale area, Rio Blanco and Garfield Counties, Colorado: U.S. Geol. Survey Oil and Gas Inv. Map OM–134.
- Donnell, J. R., and Yeend, W. E., 1968a, Geologic map of the Grand Valley quadrangle, Garfield County, Colorado: U.S. Geol. Survey open-file map, scale 1:24,000.
- 1968b, Geologic map of the North Mamm Peak quadrangle, Garfield County, Colorado: U.S. Geol. Survey open-file map, scale 1:24,000.
- 1968c, Geologic map of the South Mamm Peak quadrangle, Garfield and Mesa Counties, Colorado: U.S. Geol. Survey open-file map, scale 1:24,000.
- 1968d, Geologic map of the Housetop Mountain quadrangle, Garfield and Mesa Counties, Colorado: U.S. Geol. Survey open-file map, scale 1:24,000.
- 1968e, Geologic map of the Hawxhurst Creek quadrangle, Garfield and Mesa Counties, Colorado: U.S. Geol. Survey open-file map, scale 1:24,000.
- Duncan, D. C., and Belser, Carl, 1950, Geology and oil-shale resources of the eastern part of the Piceance Creek Basin, Rio Blanco and Garfield Counties, Colorado: U.S. Geol. Survey Oil and Gas Inv. Map OM–119.
- Duncan, D. C., and Denson, N. M., 1949, Geology of Naval Oil Shale Reserves 1 and 3, Garfield County, Colorado: U.S. Geol. Survey Oil and Gas Inv. Prelim. Map 94.
- Duncan, D. C., and Swanson, V. E., 1965, Organic-rich shale of the United States and world land areas: U.S. Geol. Survey Circ. 523, 30 p.
- Dyni, J. R., Beck, P. C., and Mountjoy, Wayne, 1971, Nahcolite analyses of three drill cores from the saline facies of the Green River Formation in northwest Colorado: U.S. Geol. Survey open-file rept., 13 p. 1 fig.
- Dyni, J. R., Mountjoy, Wayne, Hauff, P. L., and Blackmon, P. D., 1971, Thermal method for quantitative determination of nahcolite in Colorado oil shale, in Geological Survey research 1971: U.S. Geol. Survey Prof. Paper 750–B, p. B19⁴–B198.
- Eldridge, G. H., 1896, The uintaite (gilsonite) deposits of Utah, in Walcott, C. D., U.S. Geol. Survey 17th Ann. Rept., pt. 1: p. 909–949.
- 1901, The asphalt and bituminous rock deposits of the United States, in Walcott, C. D., U.S. Geol. Survey 22d Ann. Rept., pt. 1, p. 209–452.
- Endlich, F. M., 1878, Report on the geology of the White River district: U.S. Geol. Geog. Survey Terr. (Hayden), 10th Ann. Rept., p. 66–158.
- Erdmann, C. E., 1934, The Book Cliffs coal field in Garfield and Mesa Counties, Colorado: U.S. Geol. Survey Bull. 851, 150 p. [p. 57–59] [1935].
- Fahey, J. J., 1962, Saline minerals of the Green River formation, with a section on X-ray powder data for saline minerals of the Green River formation, by M. E. Mrose: U.S. Geol. Survey Prof. Paper 405, 50 p.
- Fisher, D. J., Erdmann, C. E., and Reeside, J. B., Jr., 1960, Cretaceous and Tertiary formations of the Book Cliffs, Carbon, Emery, and Grand Counties, Utah, and Garfield and Mesa Counties, Colorado: U.S. Geol. Survey Prof. Paper 332, 80 p.
- Gale, H. S., 1908, Geology of the Rangely oil district, Rio Blanco County, Colorado, with a section on the water supply: U.S. Geol. Survey Bull. 350, 61 p.
- 1910, Coal fields of northwestern Colorado and northeastern Utah: U.S. Geol. Survey Bull. 415, 265 p.
- Griggs, R. L., 1968, Altered tuffaceous rocks of the Green River Formation in the Piceance Creek Basin, Colorado: U.S. Geol. Survey open-file rept., 38 p., 3 pls. 10 figs.
- Hague, Arnold, and Emmons, S. F., 1877, Green River Basin, chap. 2, in U.S. Geol. Explor. 40th Parallel Rept. (King), v. 2, 890 p. [p. 191–310].
- Hail, W. J., Jr., 1972, Preliminary geologic map of the Barcus Creek SE quadrangle, Rio Blanco County, Colorado: U.S. Geol. Survey Misc. Field Studies Map MF–347.
- 1973, Geologic map of the Smizer Gulch quadrangle, Rio Blanco County, Colorado: U.S. Geol. Survey Geol. Quad. Map GQ–1131. (In press.)
- Hansen, W. R., 1956, Geology of the Manila quadrangle, Utah and Wyoming: U.S. Geol. Survey Misc. Geol. Inv. Map I–156.
- 1965, Geology of the Flaming Gorge area, Utah–Colorado–Wyoming: U.S. Geol. Survey Prof. Paper 490, 196 p. [p. 114].
- 1972, Topographic map of Dinosaur National Monument, text on back, section on dinosaurs by G. Edward Lewis: U.S. Geol. Survey Map.
- Hayden, F. V., 1869, Preliminary field report [third annual] of the United States Geological Survey of the Territories, embracing Colorado and New

- Mexico: Washington [Repr. 1873], p. 101-251 [p. 190-191].
- 1870, From Green River Station, via Bridger's Pass to Cheyenne, Wyoming Territory, Chap. 6, in U.S. Geol. and Geog. Survey Terr. 4th Ann. Rept., 511 p. [p. 70-81] [1871].
- Holmes, C. N., Page, B. M., and Averitt, Paul, 1948, Geology of the bituminous sandstone deposits near Sunnyside, Carbon County, Utah: U.S. Geol. Survey Oil and Gas Inv. Prelim. Map 86.
- Hosterman, J. W., and Dyni, J. R., 1972, Clay mineralogy of the Green River Formation, Piceance Creek basin, Colorado—a preliminary study, in Geological Survey research 1972: U.S. Geol. Survey Prof. Paper 800-D, p. D159-D163 [1973].
- Hunt, C. B., 1956, Cenozoic geology of the Colorado Plateau: U.S. Geol. Survey Prof. Paper 279, 99 p. [p. 19-21].
- Knowlton, F. H., 1923, Revision of the flora of the Green River formation, with description of new species: U.S. Geol. Survey Prof. Paper 131-F, p. 133-182.
- Lesquereux, Leo, 1873, The lignitic formation and its fossil flora: U.S. Geol. Survey Terr. (Hayden), 6th Ann. Rept., p. 317-427 [p. 336-337].
- 1878, Contributions to the fossil flora of the western Territories, Part II, The Tertiary flora: U.S. Geol. Survey Terr. (Hayden), v. 7, 366 p.
- 1883, The Cretaceous and Tertiary floras: U.S. Geol. Survey Terr. (Hayden), v. 8, 283 p. [p. 127-220].
- Lindeman, H. B., 1954, Sodium carbonate brine and trona deposits in Sweetwater County, Wyoming: U.S. Geol. Survey Circ. 235, 10 p.
- Love, J. D., 1964, Uraniferous phosphatic lake beds of Eocene age in intermontane basins of Wyoming and Utah: U.S. Geol. Survey Prof. Paper 474-E, p. E1-E66.
- 1965?, Uraniferous zones in the Green River Formation, southwestern Wyoming, in Geologic investigations of radioactive deposits—semiannual progress report for June 1 to Nov. 30, 1965: U.S. Geol. Survey TEI-590, p. 263, issued by U.S. Atomic Energy Comm. Tech. Inf. Service, Oak Ridge, Tenn.
- Love, J. D., Weitz, J. L., and Hose, R. K., 1955, Geologic map of Wyoming: U.S. Geol. Survey, scale 1:500,000.
- Masursky, Harold, 1956, Trace elements in coal in the Red Desert, Wyoming, in Page and others: U.S. Geol. Prof. Paper 300, p. 439-444.
- 1962, Uranium-bearing coal in the eastern parts of the Red Desert area, Great Divide Basin, Sweetwater County, Wyoming: U.S. Geol. Survey Bull. 1099-B, 52 p. [p. 6].
- Masursky, Harold, and Pippingos, G. N., 1959, Uranium-bearing coal in the Red Desert area, Sweetwater County, Wyoming: U.S. Geol. Survey Bull. 1055-G, p. 181-215 [1960].
- McKay, E. J., 1971, Oil-shale beds in the Green River and Wasatch Formations in the Little Snake River area of northwestern Colorado, in Geological Survey research 1971: U.S. Geol. Survey Prof. Paper 750-D, p. D9-D12.
- Milton, Charles, and Meyrowitz, Robert, 1964, Ferroan northupite in the Green River Formation of Wyoming, in Geological Survey research 1964: U.S. Geol. Survey Prof. Paper 501-P, p. B66-B68.
- Mullens, M. C., and Roberts, A. E., 1972, Colorado, Utah, and Wyoming, in Selected annotated bibliography on asphalt-bearing rocks in the United States and Canada to 1970: U.S. Geol. Survey Bull. 1352, 218 p. [85-93, 142-169, 169-177].
- Noble, E. A., and Annes, E. C., Jr., 1957, Reconnaissance for uranium in the Uinta Basin of Colorado and Utah: U.S. Atomic Energy Comm. RME-94, 22 p., issued by the U.S. Atomic Energy Comm. Tech. Inf. Service, Oak Ridge, Tenn.
- Oriel, S. S., 1961, Tongues of the Wasatch and Green River formations, Fort Hill area, Wyoming, in Short papers in the geologic and hydrologic sciences: U.S. Geol. Survey Prof. Paper 424-B, p. B151-B152.
- 1963, Preliminary geologic map of the Fort Hill quadrangle, Lincoln County, Wyoming: U.S. Geol. Survey Oil and Gas Inv. Map OM-212.
- 1969, Geology of the Fort Hill quadrangle, Lincoln County, Wyoming: U.S. Geol. Survey Prof. Paper 594-M, 40 p.
- Oriel, S. S., and Tracey, J. I., Jr., 1970, Uppermost Cretaceous and Tertiary stratigraphy of Fossil basin, southwestern Wyoming: U.S. Geol. Survey Prof. Paper 635, 53 p.
- Page, L. R., Stocking, H. E., and Smith, H. D., compilers, 1956, Contributions to the geology of uranium and thorium by the United States Geological Survey and Atomic Energy Commission for the United Nations International Conference on Peaceful Uses of Atomic Energy, Geneva, Switzerland, 1955: U.S. Geol. Survey Prof. Paper 300, 739 p.
- Peale, A. C., 1876, Report [on valleys of Eagle, Grand and Gunnison rivers, Colo.]: U.S. Geol. and Geog. Survey Terr. (Hayden), 8th Ann. Rept., 1874, p. 73-180 [p. 148, 156-162].
- 1878, Geological report on the Grand River district: U.S. Geol. and Geog. Survey Terr. (Hayden), 10th Ann. Rept., p. 161-185 [p. 170-185].
- 1879, Report on the geology of the Green River district [Wyoming]: U.S. Geol. and Geog. Survey Terr. (Hayden), 11th Ann. Rept., p. 509-646.
- Pippingos, G. N., 1956, Uranium-bearing coal in the central part of the Great Divide Basin, Sweetwater County, Wyoming, in Page and others: U.S. Geol. Survey Prof. Paper 300, p. 433-438.
- 1961, Uranium-bearing coal in the central part of the Great Divide basin: U.S. Geol. Survey Bull. 1099-A, 104 p. [1962].
- Pitman, J. K., and Donnell, J. R., 1973, Potential shale-oil resources of a stratigraphic sequence above the Mahogany zone, Green River Formation, Piceance Creek Basin, Colorado: U.S. Geol. Survey Jour. Research, v. 1, no. 4, p. 467-473.
- Powell, J. W., 1876, Report on the geology of the

- eastern portion of the Uinta Mountains and a region of Country adjacent thereto: U.S. Geol. and Geog. Survey Terr. (Powell), 218 p. [p. 63-64].
- Privrasky, N. C., 1963, Geology of the Big Piney area, Sublette County, Wyoming: U.S. Geol. Survey Oil and Gas Inv. Map OM-205.
- Rapp, J. R., 1962, Roll in a sandstone lentil of the Green River Formation, in Geological Survey research 1962: U.S. Geol. Survey Prof. Paper 450-C, p. C85-C87.
- Ray, R. G., Kent, B. H., and Dane, C. H., 1956, Stratigraphy and photogeology of the southwestern part of the Uinta Basin, Duchesne and Uintah Counties, Utah: U.S. Geol. Survey Oil and Gas Inv. Map OM-171.
- Roehler, H. W., 1970, Nonopaque heavy minerals from sandstone of Eocene age in the Washakie basin, Wyoming, in Geological Survey research 1970: U.S. Geol. Survey Prof. Paper 700-D, p. D181-D187.
- 1972a, Zonal distribution of montmorillonite and zeolites in the Laney Shale Member of the Green River Formation in the Washakie basin, Wyoming, in Geological Survey research 1972: U.S. Geol. Survey Prof. Paper 800-B, p. B121-B124.
- 1972b, Geologic map of the Red Creek Ranch quadrangle, Wyoming, Utah, and Colorado: U.S. Geol. Survey Geol. Quad. Map GQ-1001.
- 1972c, Geologic map of Four J Rim quadrangle, Sweetwater County, Wyoming, and Moffat County, Colorado: U.S. Geol. Survey Geol. Quad. Map GQ-1002.
- 1972d, Geologic map of the Brushy Point quadrangle, Rio Blanco and Garfield Counties, Colorado: U.S. Geol. Survey Geol. Quad. Map GQ-1018.
- 1972e, Geologic map of the Razorback Ridge quadrangle, Rio Blanco and Garfield Counties, Colorado: U.S. Geol. Survey Geol. Quad. Map GQ-1019.
- 1973a, Geologic map of the Titsworth Gap quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Geol. Quad. Map GQ-1083. (In press.)
- 1973b, Geologic map of the Potter Mountain quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Geol. Quad. Map GQ-1082. (In press.)
- 1973c, Geologic map of the Erickson-Kent Ranch quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Geol. Quad. Map GQ-1056. (In press.)
- 1973d, Geologic map of the Henderson Ridge quadrangle, Garfield County, Colorado: U.S. Geol. Survey Geol. Quad. Map GQ-1113. (In press.)
- 1973e, Geologic map of the Calf Canyon quadrangle, Garfield County, Colorado: U.S. Geol. Survey Geol. Quad. Map GQ-1086. (In press.)
- 1973f, Geologic map of the Chicken Creek East quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Geol. Quad. Map GQ-1128. (In press.)
- 1973g, Stratigraphic divisions and geologic history of the Laney Member of the Green River Formation in the Washakie Basin in southwest Wyoming: U.S. Geol. Survey Bull. 1372-E. (In press.)
- 1973h, Stratigraphy of the Washakie Formation in the Washakie Basin, Wyoming: U.S. Geol. Survey Bull. 1369, 40 p.
- Rubey, W. W., Oriel, S. S., and Tracey, J. I., Jr., 1968, Preliminary geologic map of the Kemmerer quadrangle, Lincoln County, Wyoming: U.S. Geol. Survey open-file rept., one sheet, scale 1:48,000.
- Rubey, W. W., Tracey, J. I., Jr., and Oriel, S. S., 1968, Preliminary geologic map of the Sage quadrangle, Lincoln County, Wyoming: U.S. Geol. Survey open-file rept., one sheet, scale 1:48,000.
- Schultz, A. R., 1909, Deposits of sodium salts in Wyoming: U.S. Geol. Survey Bull. 430-I, pt. 2, p. 570-589 [p. 583-587].
- 1920, Oil possibilities in and around Baxter Basin, in the Rock Springs uplift, Sweetwater County, Wyoming: U.S. Geol. Survey Bull. 702, 107 p.
- Scudder, S. H., 1878, The fossil insects of the Green River shales: U.S. Geol. and Geog. Survey Terr. (Hayden), Bull. 4, p. 747-776.
- Sears, J. D., 1924, Geology and oil and gas prospects of a part of Moffat County, Colorado and southern Sweetwater County, Wyoming: U.S. Geol. Survey Bull. 751-G, p. 269-319 [p. 293-295].
- Sears, J. D., and Bradley, W. H., 1925, Relations of the Wasatch and Green River formations in northwestern Colorado and southern Wyoming with notes on oil shale in the Green River formation: U.S. Geol. Survey Prof. Paper 132-F, p. 93-107.
- Sheridan, D. M., Maxwell, C. H., and Collier, J. T., 1961, Geology of the Lost Creek schrockingerite deposits, Sweetwater County, Wyoming: U.S. Geol. Survey Bull. 1087-J, p. 391-478 [1962].
- Smith, G. I., Jones, C. L., Culbertson, W. C., Erickson, G. E., and Dyni, J. R., 1973, Evaporites and brines, in United States mineral resources: U.S. Geol. Survey Prof. Paper 820, p. 197-216.
- Spieker, E. M., 1946, Late Mesozoic and Early Cenozoic history of central Utah: U.S. Geol. Survey Prof. Paper 205-D, p. 117-161 [p. 160].
- Swanson, V. E., 1960, Oil yield and uranium content of black shales: U.S. Geol. Survey Prof. Paper 356-A, p. 1-44.
- Swanson, V. E., and Ging, T. G., 1972, Possible economic value of trona-leonardite mixtures, in Geological Survey research 1972: U.S. Geol. Survey Prof. Paper 800-D, p. D71-D74.
- Theobald, P. K., Schweinfurth, S. P., and Duncan, D. C., 1972, Energy resources of the United States: U.S. Geol. Survey Circ. 650, 27 p. [p. 25-26].
- Tschudy, R. H., 1965, Plant and miscellaneous microfossils from the Parachute Creek Member of the Green River Formation: U.S. Geol. Survey open-file rept., 2 p., 1 pl.
- U.S. Geological Survey, 1964, Mineralogy of tuff beds in Green River Formation, in Geological Survey research 1964: U.S. Geol. Survey Prof. Paper 501-A, 367 p. [p. A101].
- Veatch, A. C., 1907, Geography and geology of a portion of southwestern Wyoming, with special reference to coal and oil: U.S. Geol. Survey Prof. Paper 56, 178 p.

- Vine, J. D., and Prichard, G. E., 1954, Uranium in the Poison Basin area, Carbon County, Wyoming: U.S. Geol. Survey Circ. 344, 8 p. [p. 4].
- Vine, J. D., and Tourtelot, E. B., 1969, Geochemical investigations of some black shales and associated rocks: U.S. Geol. Survey Bull. 1314-A, 43 p. [p. 8, 33].
- 1970, Geochemistry of black shale deposits—a summary report: *Econ. Geology*, v. 65, p. 253-272.
- Waldron, F. R., Donnell, J. R., and Wright, J. C., 1951, Geology of the DeBeque oil-shale area, Garfield and Mesa Counties, Colorado: U.S. Geol. Survey Oil and Gas Inv. Map OM-114.
- Weir, J. E., 1971, Geohydrology of the area near WOSCO exploratory hole No. 1, Uintah County, Utah: U.S. Geol. Survey open-file rept., 30 p., 8 tables, 7 figs.
- Welder, G. E., 1968, Ground-water reconnaissance of the Green River basin, southwestern Wyoming: U.S. Geol. Survey Hydrol. Inv. Atlas HA-290.
- Welder, G. E., and McGreevy, L. J., 1966, Ground-water reconnaissance of the Great Divide and Washakie basins and some adjacent areas, southwestern Wyoming: U.S. Geol. Survey Hydrol. Inv. Atlas HA-219.
- White, C. A., 1878, Report on the geology of a portion of northwestern Colorado: U.S. Geol. and Geog. Survey Terr. (Hayden), 10th Ann. Rept., p. 1-60 [p. 35-37].
- Whittier, W. H., and Becker, R. C., 1962, Geologic maps and sections of the bituminous sandstone deposits in the P. R. Springs area, Grand and Uintah Counties, Utah: U.S. Geol. Survey open-file rept., 1 p.
- Winchester, D. E., 1917, Oil shale in northwestern Colorado and adjacent areas: U.S. Geol. Survey Bull. 641-F, p. 139-198.
- 1919, Oil shale of the Uinta Basin, northeastern Utah: U.S. Geol. Survey Bull. 691-B, p. 27-50.
- 1923, Oil shale of the Rocky Mountain region: U.S. Geol. Survey Bull. 729, 204 p. [p. 34, 104, 121].
- Woodruff, E. G., 1913, Geology and petroleum resources of the DeBeque oil field, Colorado: U.S. Geol. Survey Bull. 531-C, p. 54-68.
- Woodruff, E. G., and Day, D. T., 1915, Oil shale of northwestern Colorado and northeastern Utah: U.S. Geol. Survey Bull. 581-A, p. 1-21.
- Wyant, D. G., Sharp, W. N., and Sheridan, D. M., 1956, Reconnaissance study of uranium deposits in the Red Desert, Sweetwater County, Wyoming: U.S. Geol. Survey Bull. 1030-I, p. 237-308 [p. 241-242, 245].
- Yeend, W. E., and Donnell, J. R., 1968, Geologic map of the Rulison quadrangle, Garfield County, Colorado: U.S. Geol. Survey open-file map, scale 1:24,000.
- Zeller, H. D., and Stephens, E. V., 1964a, Geology of the NE¼ of the Essex Mountain quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-285.
- 1964b, Geology of the Pinnacles NW quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-286.
- 1964c, Geology of the NE¼ of Freighter Gap quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-288.
- 1964d, Geology of the NW¼ of Freighter Gap quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-289.
- 1964e, Geologic map of the Continental Peak quadrangle, Fremont and Sweetwater Counties, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-292.
- 1964f, Geologic map of the Dickie Springs quadrangle, Fremont and Sweetwater Counties, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-293.
- 1964g, Geologic map of the Pacific Springs quadrangle, Fremont and Sweetwater Counties, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-294.
- 1964h, Geologic map of the Hay Meadow Reservoir quadrangle, Sublette, Fremont, and Sweetwater Counties, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-295.
- 1964i, Geologic map of the Parting of the Ways quadrangle, Sublette and Sweetwater Counties, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-296.
- 1964j, Geologic map of the Tule Butte quadrangle, Sweetwater County, Wyoming: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-297.
- 1969, Geology of the Oregon Buttes area, Sweetwater, Sublette, and Fremont Counties, southwestern Wyoming: U.S. Geol. Survey Bull. 1256, 60 p.

REPORTS BY U.S. GEOLOGICAL SURVEY AUTHORS ON GEOLOGY OF THE GREEN RIVER FORMATION, COLORADO, UTAH, AND WYOMING, IN NON-U.S. GEOLOGICAL SURVEY PUBLICATIONS

- Bass, N. W., 1964, Relationship of crude oils to depositional environment of source rocks in the Uinta Basin, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 13th Ann. Field Conf.: p. 201-206.
- Bell, K. G., and Hunt, J. M., 1963, Native bitumens associated with oil shales, Chap. 8, in *Breger, I. A., ed., Organic geochemistry*: New York, Macmillan Co. (Internat. Ser. Mons. on Earth Sci., v. 16), p. 333-366.
- Bradley, W. H., 1924, Fossil caddice fly cases from the Green River Formation of Wyoming: *Am. Jour. Sci.*, 5th ser., v. 7, p. 310-312.
- 1925, A contribution to the origin of the Green River Formation and its oil shale: *Am. Assoc. Petroleum Geologists Bull.*, v. 9, no. 2, p. 247-262.
- 1926, Fossil rhizopods of the Green River oil shale [abs.]: *Geol. Soc. America Bull.*, v. 37, no. 1, p. 160.
- 1927, Tertiary and recent fresh water algae reefs [abs.]: *Washington Acad. Sci. Jour.*, v. 17,

- no. 9, p. 232-233.
- 1928, Zeolite beds in the Green River Formation: *Science*, v. 67, no. 1725, p. 73-75.
- 1929a, Varves and duration of the Eocene epoch [abs.]: *Geol. Soc. America Bull.*, v. 40, no. 1, p. 133.
- 1929b, Fresh water algae from the Green River Formation of Colorado: *Torrey Bot. Club Bull.*, v. 56, p. 421-428.
- 1935, Anticlines between Hiawatha gas field and Baggs, Wyoming: *Am. Assoc. Petroleum Geologists Bull.*, v. 19, no. 4, p. 537-543.
- 1936, The biography of an ancient American lake [Colorado-Utah]: *Sci. Monthly*, v. 42, p. 421-430; repr. in True, W. P., ed., *Smithsonian treasury of science*: v. 2, New York, Simon and Schuster, Inc., p. 422-439.
- 1948, Limnology and Eocene lakes of the Rocky Mountain region: *Geol. Soc. America Bull.*, v. 59, no. 7, p. 635-648.
- 1959, Revision of stratigraphic nomenclature of Green River Formation of Wyoming: *Am. Assoc. Petroleum Geologists Bull.*, v. 43, no. 5, p. 1072-1075.
- 1962, Chloroplast in *Spirogyra* from the Green River Formation of Wyoming: *Am. Jour. Sci.*, v. 260, p. 455-459.
- 1963, Paleolimnology, in Frey, D. G., ed. *Limnology in North America*: Madison, Wis., Univ. Wisconsin Press, p. 621-652.
- 1964a, Lazurite, talc, and chlorite in the Green River Formation of Wyoming: *Am. Mineralogist*, v. 49, p. 778-781.
- 1964b, Aquatic fungi from the Green River Formation of Wyoming: *Am. Jour. Sci.*, v. 262, no. 3, p. 413-416.
- 1966a, Paleolimnology of the trona beds in the Green River Formation of Wyoming, in *Symposium on salt*, 2d, v. 1, Geology, geochemistry, mining: Cleveland, Ohio, Northern Ohio Geol. Soc., Inc., p. 160-164.
- 1966b, Tropical lakes, copropel, and oil shale: *Geol. Soc. America Bull.*, v. 77, no. 12, p. 1333-1338.
- 1966c, A probable kerogen precursor [abs.]: *Geol. Soc. America Spec. Paper* 101, p. 24-25.
- 1967a, Two aquatic fungi (Chytridiales) of Eocene age from the Green River Formation of Wyoming: *Am. Jour. Botany*, v. 54, pt. 1, p. 577-582.
- 1967b, Precursors of oil shale, in *Drilling and world production*, World Petroleum Cong., 7th, Mexico 1967, Proc., v. 3: London, Elsevier Publishing Co., p. 695-697.
- 1970a, Green River oil shale—concept of origin extended: *Geol. Soc. America Bull.*, v. 81, no. 4, p. 985-1000.
- 1970b, Eocene algae and plant hairs from the Green River Formation of Wyoming: *Am. Jour. Botany*, v. 57, no. 7, p. 782-785.
- Bradley, W. H., and Beard, M. E., 1969, Mud Lake, Florida, its algae and alkaline brown water: *Limnology and Oceanography*, v. 14, no. 6, p. 889-897.
- Bradley, W. H., and Fahey, J. J., 1962, Occurrence of stevensite in the Green River Formation of Wyoming: *Am. Mineralogist*, v. 47, nos. 7-8, p. 996-998.
- Brobst, D. A., and Tucker, J. D., 1972, Analcime, its composition and relation to dawsonite in tuff and shale in the Green River Formation, Piceance Creek basin, Colorado [abs.]: *Geol. Soc. America Abs. with Programs*, v. 4, no. 6, p. 369-370.
- Cashion, W. B., 1957, Stratigraphic relations and oil shale of the Green River Formation in the eastern Uinta Basin, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 131-135.
- 1964a, Oil shale, in *Mineral and water resources of Utah*: *Utah Geol. and Mineralog. Survey Bull.* 73, p. 61-63.
- 1964b, Distribution and quality of the oil shale in the Green River Formation of the Uinta basin, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 13th Ann. Field Conf.: p. 209-212.
- Cashion, W. B., and Donnell, J. R., 1968, Oil shale and related deposits of Lake Uinta (Eocene), northwestern Colorado and northeastern Utah, U.S.A., in *United Nations, Symposium on the development and utilization of oil-shale resources*, sec. 1, Tallinn, Estonia, U.S.S.R.: 13 p. [Pub. as separate]
- Chao, E. C. T., Evans, H. T., Jr., Skinner, B. J., and Milton, Charles, 1961, Neighborite, NaMgF_3 , a new mineral from the Green River Formation, South Ouray, Utah: *Am. Mineralogist*, v. 46, nos. 3-4, p. 379-393.
- Coffin, D. L., Welder, F. A., Glanzman, R. K., and Dutton, X. W., 1968, Geohydrologic data from the Piceance Creek basin between the White and Colorado Rivers, northwestern Colorado: *Colorado Water Conserv. Board Ground-Water Ser. Circ.* 12, 38 p.
- Culbertson, W. C., 1964, Oil-shale resources and stratigraphy of the Green River Formation in Wyoming [abs.]: *Mtn. Geologist*, v. 1, no. 3, p. 181.
- 1965, Tongues of the Green River and Wasatch Formations in southeastern part of the Green River basin, Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 19th Ann. Field Conf.: p. 151-155.
- 1966, Trona in the Green River Basin of Wyoming [abs.]: *Mining Eng.*, v. 18, no. 12, p. 52.
- 1968, Geology and mineral resources of the Green River Formation, Wyoming, U.S.A., in *United Nations, Symposium on the development and utilization of oil-shale resources*, sec. 1, Tallinn, Estonia, U.S.S.R.: 13 p. [Pub. as separate]
- 1969a, Facies changes in the Eocene rocks in the southeastern part of the Green River basin, Wyoming, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 16th Ann. Field Conf.: p. 205-211.
- 1969b, Oil shale in the Green River Formation, Green River basin, Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 21st Ann. Field Conf.: p. 191-195 [Reprinted 1972, *Mtn. Geologist*, v. 9, nos. 2-3, p. 183-187]
- 1971, Stratigraphy of the trona deposits in the

- Green River Formation, southwest Wyoming: Wyoming Univ. Contr. Geology, v. 10, no. 1, p. 15-23.
- 1972a, Eocene depositional history of the Green River Basin, southwest Wyoming [abs.]: Geol. Soc. America Abs. with Programs, v. 4, no. 6, p. 373.
- 1972b, Trona and halite in Wilkins Peak Member of Green River Formation, Green River Basin, Wyoming [abs.]: Am. Assoc. Petroleum Geologists Bull. 56, no. 3, p. 612.
- 1972c, Road log from Rock Springs, Wyo., to Manilla, Utah, in *Mtn. Geologist*, v. 9, nos. 2-3: p. 103-109.
- Culbertson, W. C., Dyni, J. R., and Brobst, D. A., 1967, Eocene Green River Formation—multiple mineral resource [abs.]: Am. Assoc. Petroleum Geologists Bull., v. 51, no. 9, p. 1900.
- Dane, C. H., 1954, Stratigraphic and facies relationships of upper part of Green River formation and lower part of Uinta formation in Duchesne, Uintah, and Wasatch Counties, Utah: Am. Assoc. Petroleum Geologists Bull., v. 38, no. 3, p. 405-425.
- Denson, N. M., and Pipiringos, G. N., 1969, Stratigraphic implications of heavy-mineral studies of Paleocene and Eocene rocks of Wyoming, in *Symposium on Tertiary rocks of Wyoming*: Wyoming Geol. Assoc., Guidebook, 21st Ann. Field Conf., p. 9-18.
- Donnell, J. R., 1953, Columnar section of rocks exposed between Rifle and DeBeque Canyon, Colorado, in *Field Conference in northwestern Colorado, Rocky Mtn. Assoc. Geologists Field Trip Roadlog*: facing p. 16.
- 1957, At Piceance Creek [Colo.] 1,000 ft tests show new 30-gal. oil shale: *Oil and Gas Jour.*, v. 5, no. 29, p. 162.
- 1964, Geology and oil-shale resources of the Green River Formation: Colorado School Mines Quart., v. 59, no. 3, p. 153-163 [Reprinted 1965, *Mtn. Geologist*, v. 2, no. 3, p. 95-102.]
- Donnell, J. R., and Blair, R. W., Jr., 1970, Resource appraisal of three oil-shale zones in the Green River Formation, Piceance Creek basin, Colorado: Colorado School Mines Quart., v. 65, no. 4, p. 73-87.
- Donnell, J. R., Culbertson, W. C., and Cashion, W. B., 1967, Oil shale in the Green River Formation, in *Drilling and production*, World Petroleum Cong., 7th, Mexico 1967, Proc. v. 3: London, Elsevier Publishing Co., p. 699-702.
- Duncan, D. C., 1967, Geologic setting of oil-shale deposits and world prospects, in *Drilling and production*, World Petroleum Cong., 7th, Mexico 1967, Proc., v. 3: London, Elsevier Publishing Co., p. 659-667.
- Duncan, D. C., and Swanson, V. E., 1968, Oil shale in the United States, in *United Nations, Symposium on the development and utilization of oil-shale resources*, sec. 1, Tallinn, Estonia, U.S.S.R.: 8 p. [Pub. as separate]
- Dyni, J. R., 1969, Structure of the Green River Formation, northern part of Piceance Creek basin, Colorado: *Mtn. Geologist*, v. 6, no. 2, p. 57-66.
- Dyni, J. R., and Goodwin, J. C., 1972, AAPG field trip roadlog—Vernal, Utah to Rio Blanco, Colorado, in *Tertiary and Cretaceous resources of the Southern Rocky Mountains*: *Mtn. Geologist*, v. 9, nos. 2-3, p. 115-134.
- Dyni, J. R., and Hite, R. J., 1966, Distribution of extractable aluminum and sodium in a saline facies of the Green River Formation, northwest Colorado [abs.]: *Mining Eng.*, v. 18, no. 12, p. 45.
- 1968, Potential resources of dawsonite and nahcolite in the oil-shale deposits of the Green River Formation, northwest Colorado, U.S.A., in *United Nations, Symposium on the development and utilization of oil-shale resources*, sec. 1, Tallinn, Estonia, U.S.S.R.: 26 p. [Pub. as separate].
- Dyni, J. R., Hite, R. J., Raup, O. B., 1970, Lacustrine deposits of bromine-bearing halite, Green River Formation, northwestern Colorado, in *Symposium on salt*, 3d, Northern Ohio Geol. Soc., Cleveland, Ohio: p. 166-180.
- Fahey, J. J., 1939, Shortite, a new carbonate of sodium and calcium: *Am. Mineralogist*, v. 24, no. 8, p. 514-518.
- 1941, Bradleyite, a new mineral, sodium phosphate-magnesium carbonate (with X-ray analysis by George Tunnell): *Am. Mineralogist*, v. 26, no. 11, p. 646-650.
- 1947, Loughlinite, a new hydrous magnesium silicate [abs.]: *Geol. Soc. America Bull.*, v. 58, no. 12, pt. 2, p. 1178-1179.
- 1950, Searlesite from the Green River Formation of Wyoming: *Am. Mineralogist*, v. 35, nos. 11-12, p. 1014-1020.
- Fahey, J. J., Ross, Malcolm, and Axelrod, J. M., 1960, Loughlinite, a new hydrous sodium magnesium silicate: *Am. Mineralogist*, v. 45, nos. 3-4, p. 270-281.
- Fahey, J. J., and Yorks, K. P., 1963, Wegscheiderite ($\text{Na}_2\text{CO}_3 \cdot 3\text{NaHCO}_3$) a new saline mineral from the Green River Formation, Wyoming: *Am. Mineralogist*, v. 48, nos. 3-4, p. 400-403.
- Glass, J. J., 1947, Sodium bicarbonate (nahcolite) from Garfield County, Colorado [abs.]: *Am. Mineralogist*, v. 32, nos. 3-4, p. 201.
- Goodwin, J. H., 1973, Analcime and K-feldspar in tuffs of the Green River formation, Wyoming: *Am. Mineralogist* v. 58, nos. 1-2, p. 93-105.
- Hayes, P. T., and Santos, E. S., 1969, River runners guide to the canyons of the Green and Colorado Rivers, with emphasis on geologic features: Denver, Colo., Powell Soc., Ltd., 40 p. [p. 38-39].
- Hite, R. J., 1964, Salines, in *Mineral and water resources of Utah*: Utah Geol. and Mineralog. Survey Bull. 73, p. 206-215.
- 1972, Saline rocks, in *Geologic atlas of the Rocky Mountain region*: Denver, Colo., Rocky Mountain Assoc. Geologists, p. 318-321.
- Hite, R. J., and Dyni, J. R., 1967, Potential resources of dawsonite and nahcolite in the Piceance Creek basin, northwest Colorado, in *Symposium on oil*

- shale, 4th: Colorado School Mines Quart., v. 62, no. 3, p. 25-38.
- Holmes, C. N., and Page, B. M., 1956, Geology of the bituminous sandstone deposits near Sunnyside, Carbon County, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 7th Ann. Field Conf.: p. 171-177.
- Leopold, E. B., and MacGinitie, H. D., 1972, Development and affinities of Tertiary floras in the Rocky Mountains, in Graham, A., ed., *Floristics and paleofloristics of Asia and Eastern North America*: Amsterdam, Elsevier Publishing Co., p. 147-200.
- Love, J. D., and Milton, Charles, 1959, Uranium and phosphate in the Green River Formation of Wyoming [abs.]: *Geol. Soc. America Bull.*, v. 70, no. 12, pt. 2, p. 1640.
- Milton, Charles, 1957, Authigenic minerals of the Green River formation of the Uinta Basin, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 136-143.
- 1964, Mineralogy and geology of the Green River Formation of Colorado, Utah, and Wyoming [abs.]: *Tulsa Geol. Soc. Digest*, v. 32, p. 169.
- 1971, Authigenic minerals of the Green River Formation: *Wyoming Univ. Contr. Geology*, v. 10, no. 1, p. 57-63.
- Milton, Charles, Axelrod, J. M., and Grimaldi, F. S., 1954, New minerals reedmergnerite ($\text{NaO} \cdot \text{B}_2\text{O}_3 \cdot 6\text{SiO}_2$) and eitelite ($\text{Na}_2\text{O} \cdot \text{MgO} \cdot 2\text{CO}_2$), associated with leucosphenite, shortite, searlesite, and crocidolite in the Green River formation, Utah [abs.]: *Geol. Soc. America Bull.*, v. 65, no. 12, pt. 2, p. 1286.
- 1955, New mineral garrelsite ($\text{Ba}_{.65}\text{Ca}_{.35}\text{Mg}_{.08}$) $_4\text{H}_2\text{Si}_2\text{B}_4\text{O}_{20}$ from the Green River formation, Utah [abs.]: *Geol. Soc. America Bull.*, v. 66, no. 12, pt. 2, p. 1597.
- Milton, Charles, Axelrod, J. M., and Sherwood, A. M., 1954, New occurrence of leucosphenite in oil shale from Utah [abs.]: *Am. Mineralogist*, v. 39, nos. 3-4, p. 337.
- Milton, Charles, Chao, E. C. T., Axelrod, J. M., and Grimaldi, F. S., 1960, Reedmergnerite, NaBSi_3O_8 , the boron analogue of albite, from the Green River formation, Utah: *Am. Mineralogist*, v. 45, nos. 1-2, p. 180-199.
- Milton, Charles, Chao, E. C. T., Fahey, J. J., and Mrose, M. E., 1960, Silicate mineralogy of the Green River formation of Wyoming, Utah, and Colorado: *Internat. Geol. Cong.*, 21st, Copenhagen 1960, Rept., pt. 21, p. 171-184.
- Milton, Charles, and Eugster, H. P., 1959, Mineral assemblages of the Green River formation [Colorado-Utah-Wyo.], in Abelson, P. H., ed., *Researches in geochemistry*, v. 1: New York, John Wiley and Sons, p. 118-150.
- Milton, Charles, and Fahey, J. J., 1960a, Classification and association of the carbonate minerals of the Green River formation: *Am. Jour. Sci.*, v. 258-A, p. 242-246.
- 1960b, Green River mineralogy—a historical account, in *Overthrust belt of southwestern Wyoming and adjacent areas*, in *Wyoming Geol. Assoc. Guidebook*, 15th Ann. Field Conf.: p. 159-162.
- Milton, Charles, Ingram, Blanche, Clark, J. R., and Dwornik, E. J., 1965, Mckelveyite, a new hydrous sodium barium rare-earth uranium carbonate mineral from the Green River Formation, Wyoming: *Am. Mineralogist*, v. 50, nos. 5-6, p. 573-612.
- Milton, Charles, Mrose, M. E., Chao, E. C. T., and Fahey, J. J., 1959, Norsethite, $\text{BaMg}(\text{CO}_3)_2$, a new mineral from the Green River formation of Wyoming [abs.]: *Geol. Soc. America Bull.*, v. 70, no. 12, pt. 2, p. 1646.
- Milton, Charles, Mrose, M. E., Fahey, J. J., and Chao, E. C. T., 1958, Labuntsovite, from the trona mine, Sweetwater County, Wyoming [abs.]: *Geol. Soc. America Bull.*, v. 69, no. 12, pt. 2, p. 1614-1615.
- Mrose, M. E., Chao, E. C. T., Fahey, J. J., and Milton, Charles, 1961, Norsethite, $\text{BaMg}(\text{CO}_3)_2$, a new mineral from the Green River formation, Wyoming: *Am. Mineralogist*, v. 46, nos. 3-4, p. 420-429.
- Palacas, J. G., 1960, Geochemistry of carbohydrates [abs.]: *Dissert. Abs.*, v. 20, no. 10, p. 4072.
- Pabst, A., and Milton, Charles, 1972, Leucosphenite, and its occurrence in the Green River formation of Utah and Wyoming: *Am. Mineralogist*, v. 57, nos. 11-12, p. 1801-1822.
- Pipiringos, G. N., 1955a, Uranium-bearing coal in the central part of the Great Divide Basin, Sweetwater County, Wyoming, in *United Nations, Geology of uranium and thorium: Internat. Conf. Peaceful Uses Atomic Energy*, Geneva, Aug. 1955, Proc., v. 6, p. 484-488.
- 1955b, Tertiary rocks in the central part of the Great Divide basin, Sweetwater County, Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 10th Ann. Field Conf.: p. 100-104.
- Pipiringos, G. N., and Denson, N. M., 1970, The Battle Spring Formation in south-central Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 21st Ann. Field Conf., p. 161-168.
- Pitman, J. K., Donnell, J. R., Van Trump, George, and Roberts, Margaret, 1972, A general description of two computer programs for oil-shale resource appraisal of the Green River Formation: *Mtn. Geologist*, v. 9, no. 4, p. 393-398.
- Roehler, H. W., 1964, Sedimentary sections, Washakie and Green River Basins and Rock Springs uplift, in *Highway geology of Wyoming: Wyoming Geol. Assoc. [Casper, Wyo.]*, 361 p. [p. 290-292].
- 1965, Early Tertiary depositional environments in the Rock Springs uplift area, in *Wyoming Geol. Assoc. Guidebook*, 19th Ann. Field Conf.: p. 140-150.
- 1968, Redefinition of the Tipton Shale Member of the Green River Formation of Wyoming: *Am. Assoc. Petroleum Geologists Bull.*, v. 52, no. 11, pt. 1, p. 2249-2256.
- 1969, Stratigraphy of oil-shale deposits of Eocene rocks in the Washakie basin, Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 21st Ann. Field Conf.: p. 197-206.
- 1972, A review of Eocene stratigraphy in the

- Washakie Basin, Wyoming, in *Tertiary biostratigraphy of southern and western Wyoming*: Adelphi Univ. Field Conf. Guidebook, p. 3-19.
- Sheppard, R. A., 1971, Zeolites in sedimentary deposits of the United States—a review: *Am. Chem. Soc. Advances in Chemistry Ser. 101*, p. 279-310 [p. 285].
- Stadnichenko, Taisia, and White, David, 1926, Microthermal observations of some oil shales and other carbonaceous rocks: *Am. Assoc. Petroleum Geologists Bull.*, v. 10, no. 9, p. 860-876.
- Tracey, J. I., Jr., and Oriel, S. S., 1959, Uppermost Cretaceous and Lower Tertiary rocks of the Fossil basin, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 10th Ann. Field Conf.: p. 126-130.
- Vine, J. D., and Tourtelot, E. B., 1970, Geochemistry of black shale deposits—a summary report: *Econ. Geology*, v. 65, p. 253-272.
- Winchester, D. E., 1917, Oil shale in the United States: *Econ. Geology*, v. 12, p. 505-518.
- 1919, Contorted bituminous shale of Green River Formation in northwestern Colorado [abs.]: *Washington Acad. Sci. Jour.*, v. 9, no. 10, p. 295-296.
- SELECTED REPORTS BY NON-U.S. GEOLOGICAL SURVEY AUTHORS ON GEOLOGY OF THE GREEN RIVER FORMATION, COLORADO, UTAH, AND WYOMING**
- Abbott, W. O., 1957, Tertiary of the Uinta Basin [Utah], in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 102-109.
- Abbott, W. O., and Liscomb, R. L., 1956, Stratigraphy of the Book Cliffs in east-central Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 7th Ann. Field Conf.: p. 120-123.
- Abelson, P. H., Hoering, T. C., and Parker, P. L., 1964, Fatty acids in sedimentary rock, in Colombo, U., and Hobson, G. D., eds., *Advances in organic geochemistry*: New York, The Macmillan Co., p. 169-174.
- American Association of Petroleum Geologists, 1972, AAPG Field Trip Roadlog—Rawlins to Vernal, in *Tertiary and Cretaceous energy resources of the southern Rocky Mountains*: *Mtn. Geologist*, v. 9, nos. 2-3, p. 95-114.
- Anderman, G. G., 1955, Tertiary deformational history of a portion of the north flank of the Uinta Mountains in the vicinity of Manila, Utah, in *Wyoming Geol. Assoc. Guidebook*, 10th Ann. Field Conf.: p. 130-134.
- Anders, D. E., and Robinson, W. E., 1971, Cycloalkane constituents of the bitumen from Green River shale: *Geochim. et Cosmochim. Acta*, v. 35, no. 7, p. 661-678.
- Anderson, P. C., Gardner, P. M., Whitehead, E. V., Anders, D. E., and Robinson, W. E., 1969, The isolation of steranes from Green River oil shale: *Geochim. et Cosmochim. Acta*, v. 33, no. 10, p. 1304-1307.
- Andrew, S. G., 1965, The Rock Springs uplift, a history of mineral exploration and exploitation, in *Wyoming Geol. Assoc. Guidebook*, 19th Ann. Field Conf.: p. 231-233.
- Baer, J. L., 1967, Paleoenvironment of cyclic sediments in the lower Green River Formation in central Utah [abs.]: *Geol. Soc. America Spec. Paper* 115, p. 10-11.
- 1969, Paleocology of cyclic sediments of the lower Green River Formation, central Utah: *Brigham Young Univ. Geology Studies*, v. 16, pt. 1, p. 3-95.
- Barb, C. F., 1945, The origin of the hydrocarbons in the Uinta Basin: *Mines Mag.*, v. 35, no. 10, p. 555-557.
- Barb, C. F., and Ball, J. O., 1944, Hydrocarbons of the Uinta Basin of Utah and Colorado: *Colorado School Mines Quart.*, v. 39, no. 1, 115 p.
- Bardsley, S. R., 1968, Evaluating oil shale by log analysis: *United Nations, Symposium on the development and utilization of oil-shale resources*, sec. 1, Tallinn, Estonia, U.S.S.R.: 15 p. [Pub. as separate]
- Belser, Carl, 1949, Oil-shale resources of Colorado, Utah, and Wyoming: *Am. Inst. Mining Eng. Trans.*, v. 179, p. 78-82.
- 1951, Green River oil-shale reserves of northwestern Colorado: *U.S. Bur. Mines Rept. Inv.* 4769, 13 p.
- Bogert, J. R., 1963, Production begins at Stauffer's Big Island trona mine: *Mining World*, v. 25, no. 1, p. 12-15.
- Brodkorb, Pierce, 1970, An Eocene puffbird from Wyoming: *Wyoming Univ. Contr. Geology*, v. 9, no. 1, p. 13-15.
- Brower, F. M., and Graham, E. L., 1958, Some chemical reactions of Colorado oil shale: *Indus. and Eng. Chemistry*, v. 50, no. 7, p. 1059-1060.
- Brown, J. T., 1967, The "associated minerals" dilemma and the new Federal oil-shale policy [repr.]: *Rocky Mtn. Mineral Law Rev.*, v. 5, no. 1, p. 1-17.
- Brown, P. L., 1950, Occurrence and genesis of trona in Sweetwater and Uinta Counties, Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 5th Ann. Field Conf.: p. 136-137. [Also Wyoming Univ. thesis, 1950]
- Burke, J. J., 1935, Preliminary report on fossil mammals from the Green River formation in Utah: *Carnegie Mus. Annals*, v. 25, art. 3, p. 13-14.
- 1969, An antiacodont from the Green River Eocene of Utah: *Kirtlandia*, no. 5, 7 p.
- Burlingame, A. L., Haug, Patricia, Belsky, Theodore, and Calvin, Melvin, 1965, Occurrence of biogenic steranes and pentacyclic triterpanes in an Eocene shale (52 million years) and in an Early Precambrian shale (2.7 billion years)—a preliminary report: *Natl. Acad. Sci. Proc.*, v. 54, no. 5, p. 1406-1412.
- Burlingame, A. L., Haug, P. A., Schnoes, H. K., and Simoneit, B. R., 1969, Fatty acids derived from the Green River Formation oil shale by extractions and oxidations—a review, in *Advances in organic geochemistry 1968-Internat. Mtg.*, 4th,

- Amsterdam, 1968, Proc. Oxford, England, and New York, Pergamon Press, Internat. Ser. Mons. Earth Sci., V. 31, p. 85-129.
- Burlingame, A. L., and Simoneit, B. R., 1968a, Analysis of the mineral entrapped fatty acids isolated from the Green River Formation: *Nature*, v. 218, p. 252-256.
- 1968b, Isoprenoid fatty acids isolated from the kerogen matrix of the Green River Formation (Eocene): *Science*, v. 160, no. 3827, p. 531-533.
- Burroughs, E. H., and Gavin, M. J., 1921, Selected bibliography on oil shale: U.S. Bur. Mines Rept. Inv. 2277, 66 p.
- Byrd, W. D., 2d, 1967, Geology of the bituminous sandstone deposits, southeastern Uinta Basin, Uintah and Grand Counties, Utah: Utah Univ. unpub. M.S. thesis, 43 p.
- 1970, P. R. Spring oil-impregnated sandstone deposit, Uintah and Grand Counties, Utah: Utah Geol. and Mineralog. Survey Spec. Studies 31, 34 p.
- Cameron, R. J., 1969, A comparative study of oil shale, tar sands and coal as sources of oil: *Jour. Petroleum Technology*, v. 21, no. 3, p. 253.
- Carey, G. A., and Roberts, I. C., 1949, Dissertation on the history, occurrence, mining, and economics of gilsonite: Utah Univ. unpub. B.S. thesis, 89 p.
- Carlson, A. J., 1937, Inorganic environment in kerogen transformation: *California Univ. Pubs. Eng.*, v. 3, no. 6, 44 p.
- Carmon, E. P., and Bayes, F. S., 1961, Occurrences, properties and uses of some natural bitumens: U.S. Bur. Mines Circ. 7997, 41 p.
- Castro, E. J., 1962, A subsurface study of the Tipton Member of the Green River formation west of the Rock Springs uplift: Wyoming Univ. unpub. M.S. thesis, 66 p.
- Catacosinos, P. A., 1968, Upper Cretaceous-Lower Tertiary relations west of Raven Ridge, Uintah County, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 52, no. 2, p. 343-348.
- Chatfield, J., 1965, Petroleum geology of the Greater Red Wash area, Uintah County, Utah: *Mtn. Geologist*, v. 2, no. 3, p. 115-121.
- Chomnanti, S., and others, 1970, A study of an oil shale: *Fuel*, v. 49, p. 188-196.
- Clair, J. R., 1952, Ostracod zones as guides to the "fractured reservoir section" of the lower Green River formation, Uinta Basin, Utah [abs.]: *Am. Assoc. Petroleum Geologists Bull.*, v. 36, no. 5, p. 921.
- Cline, C. L., 1957, Stratigraphy of the Douglas Creek Member, Green River Formation, Piceance Creek Basin, Colorado: Brigham Young Univ. Geology Studies, v. 4, no. 3, 46 p.
- Cockrell, T. D. A., 1925, Plant and insect fossils from the Green River Eocene of Colorado: *U.S. Natl. Mus. Proc.*, v. 66, art. 19, p. 1-13.
- Cook, G. L., Jensen, H. B., and Dinneen, G. U., 1968, The composition of Green River shale oils, in United Nations, Symposium on the development and utilization of oil-shale resources, sec. 3, Tallinn, Estonia, U.S.S.R.: 23 p. [Pub. as separate]
- Covington, R. E., 1957, Bituminous sandstones of the Asphalt Ridge area, northeastern Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 172-175.
- 1964, Bituminous sandstones in the Uinta Basin, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 13th Ann. Field Conf.: p. 227-242.
- Crawford, A. L., 1949, Origin of gilsonite and related hydrocarbons of the Uinta Basin, Utah, in Hansen, G. H., and Bell, M. M., eds., *The oil and gas possibilities of Utah: Utah Geol. and Mineralog. Survey*, p. 235-260.
- Crawford, A. L., and Pruitt, R. G., 1963, Gilsonite and other bituminous substances of central Uintah County, Utah: *Utah Geol. and Mineralog. Survey Bull.* 54, p. 215-224 [p. 221-223].
- Cummins, J. J. and Robinson, W. E., 1964, Normal and isoprenoid hydrocarbons isolated from oil-shale bitumens: *Jour. Chem. and Eng. Data*, v. 9, no. 2, p. 304-307.
- 1972, Thermal degradation of Green River kerogen at 105° to 350° C: U.S. Bur. Mines Rept. Inv. 7620, 15 p.
- Current, A. M., 1953, A review of the geology and activities in the Uinta Basin: *Colorado School Mines Quart.*, v. 48, no. 3, 36 p.
- Curry, H. D., 1964, Oil content correlations of the Green River oil shales, Uinta and Piceance Creek Basins, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 13th Ann. Field Conf.: p. 169-172.
- Davis, C. A., 1915, On the fossil algae of the petroleum-yielding shales of the Green River formation [abs.]: *Science*, new ser., v. 41, no. 1059, p. 570.
- 1916, On the fossil algae of the petroleum-yielding shales of the Green River formation of Colorado and Utah: *Natl. Acad. Sci. Proc.*, v. 2, no. 3, p. 114-119.
- Davis, L. J., 1957, Geology of gilsonite, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 152-156.
- Davis, W. M., 1903, The fresh water Tertiaries at Green River, Wyoming [abs.]: *Science*, new ser., v. 17, no. 423, p. 220-221.
- Dawson, M. R., 1968, Middle Eocene rodents (Mammalia) from northeastern Utah: *Carnegie Mus. Annals*, v. 39, art. 20, p. 327-370.
- Deardorf, D. L., 1959, Stratigraphy and oil shales of the Green River Formation southwest of the Rock Springs uplift, Wyoming: Wyoming Univ. unpub. M.S. thesis, 98 p.
- 1963, Eocene salt in the Green River Basin, Wyoming, in Bersticker, A. C., ed., *Symposium on salt: Cleveland, Ohio, Northern Ohio Geol. Soc., Inc.*, p. 176-195.
- Deardorf, D. L., and Mannion, L. E., 1971, Wyoming trona deposits: Wyoming Univ., *Contr. Geology*, v. 10, no. 1, p. 25-37.
- DeBeque, G. R., 1920, Oil shales of DeBeque, Colorado: *Eng. and Mining Jour.*, v. 109, no. 5, p. 348-353.
- Decora, A. W., McDonald, F. R., and Cook, G. L., 1971,

- Using broad-line nuclear magnetic resonance spectrometry to estimate potential oil yields of oil shales: U.S. Bur. Mines Rept. Inv. 7523, 30 p.
- DeVoto, R. H., Stevens, D. N., and Bloom, D. N., 1970, Dawsonite and gibbsite in the Green River Formation: *Mines Mag.*, v. 60, no. 5, p. 17-21.
- Dinneen, G. U., Smith, J. W., Tisot, P. R., and Robinson, W. E., 1968, Constitution of Green River oil shale, in United Nations, Symposium on the development and utilization of oil-shale resources, sec. 2, Tallinn, Estonia, U.S.S.R.: 22 p. [Pub. as separate]
- Dineen, G. U., Stanfield, K. E., Cook, G. L., and Sohns, H. W., 1968, Developments in technology for Green River oil shale, in United Nations, Symposium on the development and utilization of oil shale resources, sec. 3, Tallinn, Estonia, U.S.S.R.: 20 p. [Pub. as separate]
- Djuricic, M., Murphy, R. C., Vitorovic, D., Biemann, K., 1971, Organic acids obtained by alkaline permanganate oxidation of kerogen from Green River (Colorado) shale: *Geochim. et Cosmochim. Acta*, v. 35, no. 12, p. 1201-1207.
- Donavan, J. H., 1950, Intertonguing of the Green River and Wasatch formations in part of Sublette and Lincoln Counties, Wyoming, in Wyoming Geol. Assoc. Guidebook, 5th Ann. Field Conf.: p. 59-67. [Also Wyoming Univ. unpub. thesis]
- Dougan, P. M., Hill, G. R., Reynolds, F. S., and Root, P. J., 1968, The feasibility of in situ retorting oil shale in the Piceance Creek Basin of northwestern Colorado, in United Nations, Symposium on the development and utilization of oil-shale resources, sec. 3, Tallinn, Estonia, U.S.S.R. 38 p. [Pub. as separate]
- Douglas, A. G., Blumer, M., Eglinton, Geoffrey, and Douraghi-Zadeh, K., 1970, Gas chromatographic-mass spectrometric characterization of naturally-occurring acyclic isoprenoid carboxylic acids [isoprenoid acids in the Green River (Eocene-lacustrine) and Serpiano (Triassic-marine) oil shales]: *Tetrahedron*, v. 27, p. 1071-1092.
- Douglas, A. G., Douraghi-Zadeh, K., Eglinton, Geoffrey, Maxwell, J. R., and Ramsay, J. N., 1970, Fatty acids in sediments including the Green River shale (Eocene) and Scottish torbanite (Carboniferous), in Hobson, D. B., and Speers, G. C., eds., *Advances in organic geochemistry, 1966*: New York, Pergamon Press, Inc., p. 315-334.
- Douglas, A. G., Eglinton, Geoffrey, and Henderson, W., 1970, Thermal alteration of the organic matter in sediments, in Hobson, G. D., and Speers, G. C., eds., *Advances in organic geochemistry, 1966*: New York, Pergamon Press, Inc., p. 369-388.
- Duncan, R. L., 1969, Energy resources of Rocky Mountain Region [abs.]: *Am. Assoc. Petroleum Geologists Bull.*, v. 53, no. 1, p. 211.
- Dunn, Hal, 1972, The Piceance basin and the Axial basin uplift, in *Geologic atlas of the Rocky Mountain region*: Denver, Colo., Rocky Mtn. Assoc. Geologists, p. 278-281.
- East, J. H., Jr., and Gardner, E. D., 1964, Oil-shale mining, Rifle, Colorado, 1944-56: U.S. Bur. Mines Bull. 611, 163 p.
- Ebens, R. J., 1965, Tower Sandstone lenses at Green River, Wyoming: *Wyoming Univ. Contr. Geology*, v. 4, no. 2, p. 75-79 [Also Wyoming Univ. unpub. thesis].
- Eglinton, Geoffrey, and Calvin, Melvin, 1967, Chemical fossils: *Sci American*, v. 216, no. 1, p. 32-43.
- Eglinton, Geoffrey, Douglas, A. G., Maxwell, J. R., Ramsay, J. N., and Stallberg-Stenbogen, S., 1966, Occurrence of isoprenoid fatty acids in the Green River Shale: *Science*, v. 153, no. 3740, p. 1133-1135.
- Eglinton, Geoffrey, Maxwell, J. R., Murphy, M. T. J., Henderson, W., and Douraghi-Zadeh, K., 1966, Hydrocarbons and fatty acids in algal shales and related materials [abs.], in abstracts for 1965: *Geol. Soc. America Spec. Paper* 101, p. 59-60.
- Erickson, B. R., 1967, Fossil bird tracks from Utah: *Mus. Observer*, v. 5, no. 1, p. 6-12.
- Ertl, Tell, 1947, Sodium bicarbonate (nahcolite) from Colorado oil shale: *Am. Mineralogist*, v. 32, no. 3-4, p. 117-120.
- , 1949, Oil-shale mining: *Am. Inst. Mining Eng. Trans.*, v. 179, p. 83-90.
- , 1955a, Colorado oil shale, its geology and economic significance: *Tulsa Geol. Soc. Digest*, v. 23, p. 98-106.
- , 1955b, Geology and economic significance of Green River oil shale of Piceance Creek basin [abs.]: *Am. Assoc. Petroleum Geologists Bull.*, v. 39, no. 2, p. 314-315.
- , 1967, Guides to prospecting for oil shales, in *Drilling and production, World Petroleum Cong.*, 7th, Mexico 1967, Proc., v. 3: London, Elsevier Publishing Co., p. 717-718.
- Estep, Patricia, Kovach, J. H., and Hiser, A. L., 1970, Characterization of carbonate minerals in oil shales and coals by infrared spectroscopy, in Friedel, R. A., ed., *Spectrometry of fuels*: New York, Plenum Press, 344 p. [p. 228-247].
- Eugster, H. P., 1971, Origin and deposition of trona: *Wyoming Univ. Contr. Geology*, v. 10, no. 1, p. 49-55.
- Eugster, H. P., and Surdam, R. C., 1971, Bedded cherts in the Green River Formation [abs.]: *Geol. Soc. American Abs. with Programs*, v. 3, no. 7, p. 559-560.
- Felts, W. M., 1947, Natural formation of petroleum-like hydrocarbons from "oil shales": *Science*, v. 106, no. 2714, p. 41.
- Ferris, B. J., 1948, Studies of soluble material in oil shales: *Mines Mag.*, v. 38, no. 9, p. 19-22.
- , 1950, Are oil shales natural source beds of petroleum?: *World Oil*, Pt. 1, v. 131, no. 3, p. 80, 82, 84, 86, 88; Pt. 2, v. 131, no. 5, p. 73-76, 78, 81.
- Fester, J. I., and Robinson, W. E., 1966, Oxygen functional groups in Green River oil-shale kerogen and trona acids, chap. 2, in *Coal Science*: Am. Chem. Soc. *Advances in Chemistry Ser.* 53, p. 22-30.
- Forsman, J. P., 1963, Geochemistry of kerogen, Chap. 5 in Breger, I. A., ed., *Organic geochemistry*: New

- York, Macmillan Co., (Internat. Ser. Mons. Earth Sci., v. 16), p. 148-182.
- Forsman, J. P., and Hunt, J. M., 1958, Insoluble organic matter (kerogen) in sedimentary rocks: *Geochim. et Cosmochim. Acta*, v. 15, no. 3, p. 170-182.
- Franks, A. J., and Goodier, B. D., 1922, Preliminary study of the organic matter of Colorado oil shales: *Colorado School Mines Quart.*, v. 17, no. 4, supp. A., 16 p.
- Frint, W. R., 1971, Processing of Wyoming trona: *Wyoming Univ. Contr. Geology*, v. 10, no. 1, p. 43-48.
- Frost, I. C., and Stanfield, K. E., 1950, Estimating oil yield of oil shale from its specific gravity: *Anal. Chemistry*, v. 22, no. 3, p. 491.
- Gallegos, E. J., 1971, Identification of new steranes, terpanes and branched paraffins in Green River shale by combined capillary gas chromatography and mass spectrometry: *Anal. Chemistry*, v. 43, no. 10, p. 1151-1160.
- Gardner, E. D., and Bell, C. N., 1942, Proposed methods and estimated costs of mining oil shale at Rulison, Colorado: *U.S. Bur. Mines Inf. Circ.* 7218, 59 p.
- Gavin, M. J., 1922, Oil Shale—an historical, technical, and economic study, State of Colorado cooperative oil-shale investigations: *U.S. Bur. Mines Bull.* 210, 201 p.
- Gavin, M. J., and Aydelotte, J. T., 1922, Solubility of oil shale in solvents for petroleum: *U.S. Bur. Mines Rept. Inv.* 2313, 4 p.
- Gavin, M. J., Hill, H. H., and Perdew, W. E., 1921, Notes on the oil-shale industry, with particular reference to the Rocky Mountain District: *U.S. Bur. Mines Rept. Inv.* 2256, 36 p.
- Gavin, M. J., and Sharp, L. H., 1920, Some physical and chemical data on Colorado oil shale: *U.S. Bur. Mines Rept. Inv.* 2152, 8 p.
- Gazin, C. L., 1959, Paleontological exploration and dating of the Early Tertiary deposits in basins adjacent to the Uinta Mountains [Utah-Wyoming-Colorado], in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 10th Ann. Field Conf.: p. 131-138.
- Gelpi, Emilio, Wszolek, P. C., Yang, Esther, and Burlingame, A. L., 1971, Milligram scale, automatic preparative gas-liquid chromatography of the steranes and triterpanes isolated from Green River Formation oil shale: *Anal. Chemistry*, v. 43, no. 7, p. 864-869.
- Goodwin, J. H., 1971a, Authigenesis of silicate minerals in tuffs of the Green River Formation: *Wyoming Univ. unpub. Ph.D. thesis*, 123 p.
- 1971b, Geochemical history of Lake Gosiute: *Wyoming Univ. Contr. Geology*, v. 10, no. 1, p. 9-13.
- Goodwin, J. H., Parker, R. B., Surdam, R. C., 1969, Authigenic silicates in the Tipton Member of the Green River Formation, Wyoming: *Geol. Soc. America Abs. with Programs*, 1969, pt. 7, p. 81-82.
- Goodwin, J. H., and Surdam, R. C., 1967, Zeolitization of tuffaceous rocks of the Green River Formation, Wyoming: *Science*, v. 157, p. 307-308.
- Guthrie, Boyd, 1938, Studies of certain properties of oil shale and shale oil: *U.S. Bur. Mines Bull.* 415, 159 p.
- Gwynn, J. R., 1971, Instrumental analysis of tars and their correlations in oil impregnated sandstone beds, Uintah and Grand Counties, Utah: *Utah Geol. and Mineralog. Survey Spec. Studies* 37, 64 p.
- Halbouty, M. T., 1968, Shale oil—Will it ever be a reality?, in *Fifth symposium on oil shale: Colorado School Mines Quart.*, v. 63, no. 4, p. 127-134.
- Harding, E. P., and Thordarson, William, 1926, Distribution of sulfur in oil shale: *Indus. and Eng. Chem.*, v. 18, no. 7, p. 731-733.
- Harrison, A. G., and Thode, H. G., 1958, Sulphur isotope abundance in hydrocarbons and source rocks of the Uinta Basin, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 42, no. 11, p. 2642-2649.
- Haug, Pat, Schnoes, H. K., and Burlingame, A. L., 1967, Isoprenoid and dicarboxylic acids from the Colorado Green River Shale [Eocene]: *Science*, v. 158, no. 3802, p. 772-773.
- 1971, Studies of the acidic components of the Colorado Green River Formation oil shale—mass spectrometric identification of the methyl esters of extractable acids: *Chem. Geology*, v. 7, no. 3, p. 213-236.
- Hay, R. L., 1964, Pattern of silicate authigenesis in the Green River Formation of Wyoming [abs.], in *Abstracts for 1963: Geol. Soc. America Spec. Paper* 82, p. 88.
- 1966, Zeolites and zeolitic reactions in sedimentary rocks: *Geol. Soc. America Spec. Paper* 85, 130 p. [p. 44-52].
- Heady, H. H., 1952, Differential thermal study of Colorado oil shale: *Am. Mineralogist*, v. 37, nos. 9-10, p. 804-811.
- Hendel, C. W., 1957, The Peters Point gas field [Utah], in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 193-201.
- Henderson, Junius, 1924, The origin of the Green River Formation: *Am. Assoc. Petroleum Geologists Bull.*, v. 8, no. 5, p. 662-668.
- High, L. R., Jr., and Picard, M. D., 1969, Sedimentary cycles in Green River Formation (Eocene)—modification of Walther's Law [abs.]: *Am. Assoc. Petroleum Geologists Bull.* 53, no. 3, p. 722-723.
- Hills, I. R., Whitehead, E. V., Anders, D. E., Cummins, J. J., and Robinson, W. E., 1966, An optically active triterpane, gammacerane in Greer River, Colorado, oil-shale bitumen: *Chem. Commun. for 1966*, no. 20, p. 752-754.
- Hintze, L. F. [compiler], 1963, Geologic map of southwestern Utah: *Utah Geol. and Mineralog. Survey*.
- Hintze, L. F., and Stokes, W. L. [compilers], 1964, Geologic map of southeastern Utah: *Utah Geol. and Mineralog. Survey*.
- Hoering, T. C., and Abelson, P. H., 1965, Fatty acids from the oxidation of kerogen: in *Carnegie Inst. Washington Year Book* 64, 1964-65, no. 1455, p. 218-223.
- Houghton, A. S., and Howe, W. W., 1967, Organic

- metal complexes in the Uinta Basin [with Spanish abs.], in *Drilling and production, World Petroleum Cong.*, 7th, Mexico 1967, Proc., v. 3: London, Elsevier Publishing Co., p. 703-705.
- Hubbard, A. S., and Fester, J. I., 1958, Hydrogenolysis of Colorado oil-shale kerogen: *Jour. Chem. and Eng. Data*, v. 3, no. 1, p. 147-152.
- Hunt, J. M., Stewart, Francis, and Dickey, P. A., 1954, Origin of the hydrocarbons of the Uinta Basin, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 38, no. 8, p. 1671-1698.
- Iida, Takeo, Yoshii, Eiichi, and Kitatsuji, Eitaro, 1966, Identification of normal paraffins, olefins, ketones and nitriles from Colorado oil shale: *Anal. Chemistry*, v. 38, no. 9, p. 1224-1227.
- Iijima, Azuma, and Hay, R. L., 1968, Analcime composition in tuffs of the Green River of Wyoming: *Am. Mineralogist*, v. 53, nos. 1-2, p. 184-200.
- Iovino, A. J., and Bradley, W. H., 1969, The role of larval Chironomidae in the production of lacustrine copropel in Mud Lake, Marion County, Florida: *Limnology and Oceanography*, v. 14, no. 6, p. 898-905.
- Jacob, A. F., 1969, Delta facies, Green River Formation, Carbon and Duchesne Counties, Utah [abs.]: *Geol. Soc. America Abs. with Programs*, 1969, pt. 5, p. 36-37.
- 1970, Delta facies of the Green River Formation (Eocene), Carbon and Duchesne Counties, Utah [abs.]: *Dissert. Abs. Internat.*, sec. B., Sci. and Eng., v. 30, no. 10, p. 4661B-4662B.
- Jaffé, F. C., 1962, Geology and mineralogy of the oil shales of the Green River formation, Colorado, Utah, Wyoming: *Colorado School Mines Mineral Industries Bull.*, v. 5, no. 3, 15 p.
- Jensen, H. B., Barnet, W. I., and Murphy, W. I. R., 1953, The thermal solution and hydrogenation of Green River oil shale: *U.S. Bur. Mines Bull.* 533, 42 p.
- Jepsen, G. L., 1966, Early Eocene bat from Wyoming: *Science*, v. 154, no. 3754, p. 1333-1339.
- 1967, Notable geobiologic moments: *Geotimes*, v. 12, no. 6, p. 16-18.
- Jones, D. J., 1957, Geosynclinal nature of the Uinta basin, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 30-34.
- Jones, J. C., 1923, Suggestive evidence on the origin of petroleum and oil shale: *Am. Assoc. Petroleum Geologists Bull.*, v. 7, no. 1, p. 67-72.
- Juhan, J. P., 1965, Stratigraphy of the Evacuation Creek Member (Green River Formation), Piceance Creek basin, northwestern Colorado: *Mtn. Geologist*, v. 2, no. 3, p. 123-128.
- Kaesler, R. L., and Taylor, R. S., 1971, Cluster analysis and ordination in paleoecology of Ostracoda from the Green River (Eocene) [with discussion], in *Paleoecology of ostracodes: Centre Recherches Pau Bull.*, v. 5, (supp.), p. 153-165.
- Kay, J. L., 1934, The Tertiary formations of the Uinta Basin, Utah: *Carnegie Mus. Annals*, v. 23, p. 357-372.
- 1957, The Eocene vertebrates of the Uinta Basin, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 110-114.
- Kemmerer, J. L., 1934, Gilsonite: Utah Univ., unpub. M.S. thesis, 61 p.
- Koesoemadinata, R. P., 1970, Stratigraphy and petroleum occurrences, Green River Formation, Red Wash field, Utah, pt. A: *Colorado School Mines Quart.*, v. 65, no. 1, 77 p.
- Kruse, H. O., 1954, Some Eocene dicotyledonous woods from Eden Valley, Wyoming: *Ohio Jour. Sci.*, v. 54, no. 4, p. 243-268.
- Kvenvolden, K. A., 1970, Evidence for transformations of normal fatty acids in sediments, in *Hobson, G. D., and Speers, G. C., eds., Advances in organic geochemistry*, 1966: New York, Pergamon Press, Inc., p. 335-336.
- Kvenvolden, K. A., and Peterson, E., 1969, Amino acid enantiomers in Green River Formation oil shale [abs.]: *Geol. Soc. America Abs. with Programs*, 1969, pt. 7, p. 132-133.
- Ladoo, R. B., 1920, The natural hydrocarbons, gilsonite, elaterite, wurtzilite, grahamite, ozocerite, and others: *U.S. Bur. Mines Rept. Inv.* 2121, 12 p.
- Lankford, J. D., and Guthrie, Boyd, 1949, Oil-shale processing: *Am. Inst. Mining Eng. Trans.*, v. 179, p. 91-102.
- LaRocque, Auréle, 1953, Molluscan faunas of the Eocene Colton and Green River formations [abs.]: *Geol. Soc. America Bull.*, v. 64, no. 12, pt. 2, p. 1447.
- 1956, Tertiary mollusks of central Utah: *Intermtn. Assoc. Petroleum Geologists Guidebook*, 7th Ann. Field Conf.: p. 140-146.
- Lawrence, J. C., 1963, Origin of the Wasatch Formation, Cumberland Gap area, Wyoming: *Wyoming Univ. Contr. Geology*, v. 2, no. 2, p. 151-158.
- 1965, Wasatch and Green River Formations of the southwestern part of the Green River basin, in *Wyoming Geol. Assoc. Guidebook*, 19th Ann. Field Conf.: p. 181-187. [Also Wyoming Univ. unpub. thesis]
- Leo, R. F., and Parker, P. L., 1966, Branched-chain fatty acids in sediments: *Science*, v. 152, no. 3722, p. 649-650.
- Linden, H. R., and Elliott, M. A., 1959, Hi-BTU gases from fluid fuels: *Am. Gas Jour.*, v. 186, no. 1, p. 34-38.
- Livingstone, Jennie, 1928, Organic constituents of oil shales and related rocks: *Colorado Univ. Studies*, v. 16, no. 2, p. 149-170.
- Lundberg, J. G., and Case, G. R., 1970, A new catfish from the Eocene Green River Formation, Wyoming: *Jour. Paleontology*, v. 44, no. 3, p. 451-457.
- Lunt, H. F., 1919, The oil shales of northwestern Colorado: *Colorado Bur. Mines Bull.*, no. 8, 59 p.
- MacGinitie, H. D., 1969, The Eocene Green River flora of northwestern Colorado and northeastern Utah: *California Univ. Pubs. Geol. Sci.*, v. 83, 203 p.
- MacLean, I., Eglinton, Geoffrey, Douraghi-Zadeh, K., Ackman, R. G., and Hooper, S. N., 1968, Correlation of stereoisomerism in present-day and geo-

- logically ancient isoprenoid fatty acids: *Nature* v. 218, no. 5146, p. 1019-1024.
- Maier, C. G., and Zimmerley, S. R., 1924, Chemical dynamics of the transformation of the organic matter to bitumen in oil shale: *Utah Univ. Bull.* 14, p. 62-81.
- Mannion, L. E., 1969, The trona deposits of southwest Wyoming, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 16th Ann. Field Conf.: p. 195-204.
- Mauger, R. L., 1972, A sulfur isotope study of bituminous sands from the Uinta Basin, Utah: *Internat. Geol. Cong.*, 24th, Montreal 1972, Proc., sec. 5, p. 19-27.
- Mauger, R. L., Kayser, R. B., and Gwynn, J. W., 1972, A sulfur isotope study of Uinta Basin hydrocarbons [abs.]: *Geol. Soc. America Abs. with Programs*, v. 4, no. 6, p. 393.
- McAuslan, E. R., 1971, Oil shales of Wyoming: *Wyoming Geol. Assoc. Earth Sci. Bull.*, v. 4, no. 4, p. 17-28.
- McDonald, R. E., 1972, Eocene and Paleocene rocks of the southern and central basins, in *Geologic atlas of the Rocky Mountain region*: Denver, Colo., Rocky Mountain Assoc. Geologists, p. 243-256.
- McGrew, P. O., 1950, Tertiary vertebrate fossils of the Green River basin, in *Wyoming Geol. Assoc. Guidebook*, 5th Ann. Field Conf.: p. 68-74.
- 1971a, Early and Middle Eocene faunas of the Green River Basin: *Wyoming Univ. Contr. Geology*, v. 10, no. 1, p. 65-68.
- 1971b, The Tertiary history of Wyoming, in *Symposium on Wyoming tectonics and their economic significance*: *Wyoming Geol. Assoc. Guidebook* no. 23, p. 29-331.
- McGrew, P. O., and Berman, J. E., 1955, Geology of the Tabernacle Butte area, Sublette County, Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 10th Ann. Field Conf.: p. 108-111.
- McKee, R. H., and Goodwin, R. T., 1923, A chemical examination of the organic matter in oil shales: *Colorado School Mines Quart.*, v. 18, no. 1, suppl. A, 41 p.
- Merriam, D. F., 1954, Tertiary geology of the Piceance basin, northwestern Colorado: *Compass*, v. 31, no. 3, p. 154-171.
- Morrow, Joe, 1957, Ozokerite at Soldier Summit, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 161-164.
- Miller, E. W., 1971, The mineral fuels, chap. 16, in *Smith, Guy-Harold [ed.], Conservation of natural resources*: New York, John Wiley and Sons, p. 401-448.
- Miller, J. R., 1950, Roosevelt field, Utah, in *Utah Geol. Soc. Guidebook to the geology of Utah*, no. 5: p. 147-151.
- Millison, Clark, 1968, Gas occurrence in Upper Cretaceous and Tertiary rocks of Piceance basin, Colorado, in *Natural gases of North America*: *Am. Assoc. Petroleum Geologists Mem.* 9, v. 1, p. 878-898.
- Mook, C. C., 1959, A new species of fossil crocodile of the genus *Leidyosuchus* from the Green River beds [Wyo.]: *Am. Mus. Novitates*, no. 1983, 6 p.
- Moore, F. E., 1950, Authigenic albite in the Green River oil shale: *Jour. Sed. Petrology*, v. 20, no. 4, p. 227-230.
- Moore, J. W., and Dunning, H. N., 1955, Interfacial activities and porphyrin contents of oil-shale extracts: *Indus. and Eng. Chemistry*, v. 47, no. 7, p. 1440-1444.
- Morris, W. J., 1955, Eocene stratigraphy of the Washakie basin, Wyoming and Colorado, pt. 1 [abs.]: *Dissert. Abs.*, v. 15, no. 3, p. 394.
- Moussa, M. T., 1968, Fossil tracks from the Green River Formation (Eocene) near Soldier Summit, Utah: *Jour. Paleontology*, v. 42, no. 6, p. 1433-1438.
- 1969, Green River Formation (Eocene) in Soldier Summit area, Utah: *Geol. Soc. America Bull.*, v. 80, no. 9, p. 1737-1748.
- 1970, Nematode fossil trails from the Green River Formation (Eocene) in the Uinta Basin, Utah: *Jour. Paleontology*, v. 44, no. 2, p. 304-307.
- Muessig, Siegfried, 1951, Eocene volcanism in central Utah: *Science*, v. 114, no. 2957, p. 234.
- Murphy, R. C., Djuricic, M. V., Markey, S. P., and Biemann, K., 1969, Acidic components of Green River shale identified by gas chromatography-mass spectrometry-computer system: *Science*, v. 165, p. 695-697.
- Murphy, M. T. J., McCormick, A., and Eglinton, Geoffrey, 1967, Perhydro- β -carotene in Green River Shale: *Science*, v. 157, no. 3792, p. 1040-1042.
- Murray, A. N., 1950, The gilsonite deposits of the Uinta Basin, Utah, in *Utah Geol. Soc. Guidebook to the geology of Utah*, no. 5: p. 115-118.
- Nace, R. L., 1936, Summary of the Late Cretaceous and early Tertiary stratigraphy of Wyoming: *Wyoming Geol. Survey Bull.* 26, p. 176-203.
- 1939, Geology of the northwest part of the Red Desert, Sweetwater and Fremont Counties, Wyoming: *Wyoming Geol. Survey Bull.* 27, p. 1-51.
- Naylor, W. V., 1957, The Roosevelt, Duchesne and County fields, Uintah County, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 188-190.
- Nielson, Irvin, 1969, The amazing Piceance mineral suite and its industrial potential for energy-oil-metals-chemicals: *Eng. and Mining Jour.*, v. 170, no. 1, p. 57-60.
- Nightingale, W. T., 1930, Geology of Vermilion Creek gas area in southwest Wyoming and northwest Colorado: *Am. Assoc. Petroleum Geologists Bull.*, v. 14, no. 8, p. 1013-1040 [p. 1025-1026].
- Osmond, J. C., 1957, Brennan Bottom oil field, Uintah County, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 185-187.
- Pabst, A., 1971, Pyrite of unusual habit simulating twinning from the Green River Formation of

- Wyoming: *Am. Mineralogist*, v. 56, nos. 1-2, p. 133-145.
- Parker, L. R., 1970, A titanotherium from the Eocene Green River Formation of Utah [abs.]: *Geol. Soc. America Abs. with Programs*, v. 2, no. 6, p. 400.
- Parker, R. B., and Surdam, R. C., 1971, A summary of authigenic silicates in the tuffaceous rocks of the Green River Formation: *Wyoming Univ. Contr. Geology*, v. 10, no. 1, p. 69-72.
- Perkins, P. L., 1970, Equitability and trophic levels in an Eocene fish population: *Lethaia*, v. 3, no. 3, p. 301-310.
- Picard, M. D., 1953, Marlstone—a misnomer as used in Uinta Basin, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 37, no. 5, p. 1075-1077.
- 1955, Subsurface stratigraphy and lithology of Green River Formation in Uinta Basin, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 39, no. 1, p. 75-102.
- 1957a, Criteria used for distinguishing lacustrine and fluvial sediments in Tertiary beds of Uinta Basin, Utah: *Jour. Sed. Petrology*, v. 27, no. 4, p. 373-377.
- 1957b, Green River and Lower Uinta Formations—subsurface stratigraphic changes in central and eastern Uinta basin, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 116-130.
- 1957c, Green shale facies, Lower Green River Formation, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 41, no. 10, p. 2323-2336.
- 1957d, Subsurface percentage of sandstone and siltstone in lower part of Green River Formation, central and eastern Uinta Basin, Utah [abs.]: *Geol. Soc. America Bull.*, v. 68, no. 12, pt. 2, p. 1869-1870.
- 1957e, Red Wash-Walker Hollow field, stratigraphic trap, eastern Uinta Basin, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 41, no. 5, p. 923-936.
- 1957f, The Red Wash-Walker Hollow field—a resume, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 8th Ann. Field Conf.: p. 182.
- 1959, Green River and lower Uinta Formation subsurface stratigraphy in western Uinta Basin, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 10th Ann. Field Conf.: p. 139-149.
- 1962, Source beds in Red Wash-Walker Hollow field, eastern Uinta basin, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 46, no. 5, p. 690-694.
- 1963, Duration of Eocene lake, Uinta Basin, Utah: *Geol. Soc. America Bull.*, v. 74, no. 1, p. 89-90.
- 1966, Oriented, linear-shrinkage cracks in Green River Formation (Eocene), Raven Ridge area, Uinta Basin, Utah: *Jour. Sed. Petrology*, v. 36, no. 4, p. 1050-1057.
- 1967, Paleocurrents and shoreline orientations in Green River Formation (Eocene), Raven Ridge and Red Wash areas, northeastern Uinta Basin, Utah: *Am. Assoc. Petroleum Geologists Bull.*, v. 51, no. 3, pt. 1, p. 383-392.
- 1971, Petrographic criteria for recognition of lacustrine and fluvial sandstone, P. R. Spring oil-impregnated sandstone area, southeast Uinta Basin, Utah: *Utah Geol. and Mineralog. Survey Spec. Studies* 36, 24 p.
- Picard, M. D., and High, L. R., Jr., 1967, Sedimentary cycles in the Green River Formation (Eocene), Uinta Basin, Utah: *Jour. Sed. Petrology*, v. 38, no. 2, p. 378-383.
- 1970, Sedimentology of oil-impregnated, lacustrine and fluvial sandstone, P. R. Spring area, southeast Uinta Basin, Utah: *Utah Geol. and Mineralog. Survey Spec. Studies* 38, 32 p.
- 1971, Oil-impregnated lacustrine and fluvial sandstone in Green River Formation (Eocene), southeastern Uinta Basin, Utah [abs.]: *Am. Assoc. Petroleum Geologists Bull.* v. 56, no. 2, p. 357.
- 1972, Paleoenvironmental reconstructions in an area of rapid facies change, Parachute Creek Member of Green River Formation (Eocene), Uinta Basin, Utah: *Geol. Soc. America Bull.*, v. 83, no. 9, p. 2689-2708.
- Porter, Livingstone, Jr., 1963, Stratigraphy and oil possibilities of the Green River Formation in the Uinta Basin, Utah, in *Oil and gas possibilities of Utah re-evaluated*: *Utah Geol. and Mineralog. Survey Bull.* 54, p. 193-198.
- Post, J. D., 1955, Geology of the east Washakie basin, in *Wyoming Geol. Assoc. Guidebook*, 10th Ann. Field Conf.: p. 182-185.
- Prien, C. H., 1960, Oil shale, chapter 10, in *Mineral resources of Colorado*, 1st sequel: Denver, Colorado Mineral Resources Board, p. 443-461.
- 1961, Pyrolysis of oil shale: *Indus. and Eng. Chemistry*, v. 53, p. 674-679.
- 1964, Current status of U.S. oil-shale technology: *Indus. and Eng. Chemistry*, v. 56, no. 9, p. 32-40.
- Pruitt, R. B., Jr., 1961, The mineral resources of Uintah Country: *Utah Geol. and Mineralog. Survey Bull.* 71, 101 p.
- Quigley, M. D., and Price, J. R., 1965, Green River oil-shale potential in Utah, in *Oil and gas possibilities of Utah, re-evaluated*: *Utah Geol. and Mineralog. Survey Bull.* 54, p. 207-214.
- Regis, A. J., and Sand, L. B., 1957, Mineral associations in the Green River Formation, Westvaco, Wyoming [abs.]: *Geol. Soc. America Bull.*, v. 68, no. 12, pt. 2, p. 1784.
- 1958, Natural cubic (β) silicon carbide [Wyo.] [abs.]: *Geol. Soc. America Bull.*, v. 69, no. 12, pt. 2, p. 1633.
- Reso, Anthony, 1965, The geology of Colorado oil shale and its economic potentialities [abs.]: *Houston Geol. Soc. Bull.*, v. 8, no. 1, p. 3-4.
- Ritzma, H. R., 1965, Piceance Creek sandstone, basal Green River sandstone tongue, northeast Piceance Creek basin, Colorado: *Mtn. Geologist*, v. 2, no. 3, p. 103-107.
- 1969, Petroleum potential of Utah [abs.]: *Am. Assoc. Petroleum Geologists Bull.*, v. 53, no. 1, p. 217-218.

- 1972a, Exploration and development of oil shale and oil-impregnated rock [abs.]: Am. Assoc. Petroleum Geologists Bull. 56, no. 3, p. 649-650.
- 1972b, The Uinta Basin, in *Geologic atlas of the Rocky Mountain region*: Denver, Colo., Rocky Mtn. Assoc. Geologists, p. 276-278.
- Ritzma, H. R., and Seelly, deB. K., 1969, Determination of oil shale potential, Green River Formation, Uinta Basin, northeast Utah: Utah Geol. and Mineralog. Survey Spec. Studies 26, 15 p.
- Roberts, P. K., 1964, Stratigraphy of the Green River Formation, Uinta Basin, Utah [abs.]: Dissert. Abs., v. 25, no. 4, p. 2450-2451.
- Robinson, Peter, 1966, Paleontology and geology of the Badwater Creek area, central Wyoming—Pt. 3, Late Eocene Apatemyidae (Mammalia; Insectivora) from the Badwater area: Carnegie Mus. Annals, v. 38, art. 15, p. 317-320.
- 1972, Tertiary history, in *Geologic atlas of the Rocky Mountain region*: Denver, Colo., Rocky Mtn. Assoc. Geologists, p. 233-242.
- Robinson, W. E., 1969, Kerogen of the Green River Formation, in Eglinton, Geoffrey, and Murphy, M. T. J., eds., *Organic geochemistry—methods and results*: New York, Springer-Verlag, p. 619-636.
- Robinson, W. E., and Cook, G. L., 1971, Compositional variations of the organic material of Green River oil shale—Colorado No. 1 core: U.S. Bur. Mines Rept. Inv. 7492, 32 p.
- Robinson, W. E., Cummins, J. J., and Dinneen, G. U., 1963, Alteration of paraffinic compounds in Green River oil shale after deposition [abs.], in *Abstracts for 1962*: Geol. Soc. America Spec. Paper 76, p. 138-139.
- 1965, Changes in Green River oil-shale paraffins with depth: *Geochim. et Cosmochim. Acta*, v. 29, p. 249-258.
- Robinson, W. E., Cummins, J. J., and Stanfield, K. E., 1956, Constitution of organic acids prepared from Colorado oil shale; based on *n* butyl esters: *Indus. and Eng. Chemistry*, v. 48, no. 7, p. 1134-1138.
- Robinson, W. E., and Dinneen, G. U., 1967, Constitutional aspects of oil-shale kerogen, in *Drilling and production*: World Petroleum Cong., 7th, Mexico 1967, Proc., v. 3, London, Elsevier Publishing Co., p. 669-680.
- Rogers, M. P., compiler, 1969, List of Bureau of Mines publications on oil shale and shale oil, 1917-1968: U.S. Bur. Mines Inf. Circ. 8429, 61 p.
- Sanborn, A. F., 1971, Possible future petroleum of Uinta and Piceance Basins and vicinity, northeast Utah and northwest Colorado, in *Future petroleum provinces in the United States, their geology and potential*, v. 1: Am. Assoc. Petroleum Geologists Mem. 15, p. 489-508.
- Sanborn, A. F., and Goodwin, J. C., 1965, Green River Formation at Raven Ridge, Uintah County, Utah: *Mtn. Geologist*, v. 2, no. 3, p. 109-114.
- Schaeffer, Bobb, and Mangus, Marlyn, 1965, Fossil lakes from the Eocene: *Natural History*, v. 74, no. 10, p. 10-21.
- Schmidt-Colerus, J. J., and Hollingshead, P. D., 1968, Investigations into the nature of dawsonite in the Green River formations, in *Fifth symposium on oil shale*: Colorado School Mines Quart., v. 63, no. 4, p. 143-167.
- Schnackenberg, W. D., and Prien, C. H., 1953, The effect of solvent properties in thermal decomposition of oil-shale kerogen: *Indus. and Eng. Chemistry*, v. 45, no. 2, p. 313-322.
- Schramm, E. F., 1920, Notes on the oil shales of southwestern Wyoming: Am. Assoc. Petroleum Geologists Bull., v. 4, no. 2, p. 195-208.
- Scott, H. W., and Smith, W. H., 1951, Molt stages of an Eocene fresh-water ostracode: *Jour. Paleontology*, v. 25, no. 3, p. 327-335.
- Sever, Judy, and Parker, P. L., 1969, Fatty alcohols (normal and isoprenoid) in sediments: *Science*, v. 164, no. 3883, p. 1052-1054.
- Shaw, R. J., 1947, Specific heat of Colorado oil shales: U.S. Bur. Mines Rept. Inv. 4151, 9 p.
- Simoneit, B. R., Schnoes, H. K., Haug, P., and Burlingame, A. L., 1970, Nitrogenous compounds of the Colorado Green River Formation oil shale—a preliminary analysis by mass spectrometry: *Nature*, v. 226, no. 5240, p. 75-76.
- 1971, High-resolution mass spectrometry of nitrogenous compounds of the Colorado Green River Formation oil shale: *Chem. Geology*, v. 7, no. 2, p. 123-141.
- Smith, J. W., 1956, Specific gravity-oil yield relationships of two Colorado oil-shale cores: *Indus. and Eng. Chemistry*, v. 48, no. 3, p. 441-444.
- 1958, Applicability of a specific gravity-oil yield relationship to the Green River oil shale: *Jour. Chem. and Eng. Data*, v. 3, no. 2, p. 306-310.
- 1961, Ultimate composition of organic material in Green River oil shale: U.S. Bur. Mines Rept. Inv. 5725, 16 p.
- 1963, Stratigraphic change in organic composition demonstrated by oil specific gravity-depth correlation in Tertiary Green River oil shales, Colorado: Am. Assoc. Petroleum Geologists Bull., v. 47, no. 5, p. 804-813.
- 1966, Conversion constants for Mahogany-zone oil shale: Am. Assoc. Petroleum Geologists Bull., v. 50, no. 1, p. 167-170.
- 1969a, Geochemistry of oil-shale genesis, Green River Formation, Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 21st Ann. Field Conf.: p. 185-190.
- 1969b, Theoretical relationship between density and yield for oil shales: U.S. Bur. Mines Rept. Inv. 7248, 14 p.
- Smith, J. W., and Harbaugh, J. W., 1966, Stratigraphic and geographic variation of shale-oil specific gravity from Colorado's Green River Formation: U.S. Bur. Mines Report Inv. 6883, 11 p.
- Smith, J. W., and Higby, L. W., 1960, Preparation of organic concentrate from Green River oil shale: *Anal. Chemistry*, v. 32, no. 12, p. 1718-1719.
- Smith, J. W., and Milton, Charles, 1966, Dawsonite in the Green River Formation of Colorado: *Econ. Geology*, v. 61, no. 6, p. 1029-1042.

- Smith, J. W., and Robb, W. A., 1966, Ankerite in the Green River Formation's Mahogany Zone: *Jour. Sed. Petrology*, v. 36, no. 2, p. 486-490.
- Smith, J. W., and Stanfield, K. E., 1964, Oil yields and properties of Green River oil shales in the Uinta Basin, Utah, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 13th Ann. Field Conf.: p. 213-221.
- Smith, J. W., and Stanfield, K. E., 1965, Oil shales of the Green River Formation in Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 19th Ann. Field Conf.: p. 167-170.
- Smith, J. W., Thomas, H. E., and Trudell, L. G., 1968, Geologic factors affecting density logs in oil shale, in *Soc. Prof. Well Log Analysts Logging Symposium*, 9th Ann., New Orleans, La., 1968, Trans.: Houston, Texas Soc. Prof. Well Log Analysts, p. P1-P17.
- Smith, J. W., and Trudell, L. G., 1968, Wyoming Corehole No. 1—a potential site for production of shale oil in place, in *Fifth symposium on oil shale: Colorado School Mines Quart.*, v. 63, no. 4, p. 55-69.
- Smith, J. W., Trudell, L. G., and Dana, G. E., 1968, Oil yields of Green River oil shale from Colorado Corehole No. 1: U.S. Bur. Mines Rept. Inv. 7071, 28 p.
- Smith, J. W., Trudell, L. G., and Stanfield, K. E., 1963, Comparison of oil yields from core and drill-cutting sampling of Green River oil shales: U.S. Bur. Mines Rept. Inv. 6299, 35 p.
- 1968, Characteristics of Green River Formation oil shales at Bureau of Mines Wyoming Corehole No. 1: U.S. Bur. Mines Rept. Inv. 7172, 92 p.
- Smith, J. W., and Young, N. B., 1969, Determination of dawsonite and nahcolite in Green River Formation oil shales: U.S. Bur. Mines Rept. Inv. 7286, 20 p.
- Smith, J. W., Young, N. B., and Lawlor, D. L., 1964, Direct determination of sulfur forms in Green River oil shale: *Anal. Chemistry*, v. 36, no. 3, p. 618-622.
- Snow, C. B., 1970, Stratigraphy of basal sandstones in the Green River Formation, northeast Piceance Basin, Rio Blanco County, Colorado: *Mtn. Geologist*, v. 7, no. 1, p. 3-32.
- Spieker, E. M., and Reeside, J. B., Jr., 1925, Cretaceous and Tertiary formations of the Wasatch Plateau, Utah: *Geol. Soc. America Bull.*, v. 36, p. 435-454 [p. 451].
- Stanfield, K. E., 1953, Estimating oil yield of lean oil shale: *Anal. Chemistry*, v. 25, no. 10, p. 1552-1553.
- Stanfield, K. E., and Frost, I. C., 1949, Method of assaying oil shale by a modified Fischer retort: U.S. Bur. Mines Rept. Inv. 4477, p. 1-13.
- Stanfield, K. E., Frost, I. C., McAuley, W. S., and Smith, H. N., 1951, Properties of Colorado oil shale: U.S. Bur. Mines Rept. Inv. 4825, 27 p.
- Stanfield, K. E., Rose, C. K., McAuley, W. S., and Tesch, W. J., 1954, Oil yields of sections of Green River oil shales in Colorado, Utah, and Wyoming, 1945-52: U.S. Bur. Mines Rept. Inv. 5081, 153 p.
- 1957, Oil yields of sections of Green River oil shale in Colorado, 1952-54: U.S. Bur. Mines Rept. Inv. 5321, 132 p. [Supp. Rept. Inv. 5081]
- Stanfield, K. E., Smith, J. W., Smith, H. N., and Robb, W. A., 1960, Oil yields of sections of Green River oil shale in Colorado, 1954-57: U.S. Bur. Mines Rept. Inv. 5614, 186 p.
- Stanfield, K. E., Smith, J. W., and Trudell, L. G., 1964, Oil yields of sections of Green River oil shale in Utah, 1952-62: U.S. Bur. Mines Rept. Inv. 6420, 217 p.
- Stanfield, K. E., Smith, J. W., and Trudell, L. G., 1967, Oil yields of sections of Green River oil shale in Colorado, 1957-63: U.S. Bur. Mines Rept. Inv. 7021, 284 p.
- Steele, R. J., 1971, The mining of Wyoming trona: *Wyoming Univ. Contr. Geology*, v. 10, no. 1, p. 39-41.
- Stokes, W. L. [compiler], 1963, Geologic map of northwestern Utah: Utah Geol. and Mineralog. Survey Map.
- Stokes, W. L., and Madsen, J. H., Jr. [compilers], 1961, Geologic map of northeastern Utah: Utah Geol. and Mineralog. Survey Map.
- Stuart, W. J., Jr., 1963, Stratigraphy of the Green River Formation west of the Rock Springs uplift, Sweetwater County, Wyoming: Wyoming Univ. unpub. M.S. thesis, Laramie, Wyo., 50 p.
- 1965, Stratigraphy of the Green River Formation, west of the Rock Springs uplift, in *Wyoming Geol. Assoc. Guidebook*, 19th Ann. Field Conf.: p. 159-166.
- Sugihara, J. M., and McGee, L. R., 1957, Porphyrins in gilsonite: *Jour. Organic Chemistry*, v. 22, p. 795.
- Surdam, R. C., 1972, Authigenic minerals in the tuffaceous rocks of the Green River Formation, Wyoming [abs.]: *Geol. Soc. America Abs. with Programs*, v. 4, no. 6, p. 413-414.
- Surdam, R. C., Eugster, H. P., Mariner, R. H., 1972, Magadi-type chert in Jurassic and Pliocene to Pleistocene rocks, Wyoming: *Geol. Soc. America Bull.*, v. 83, no. 8, p. 2261-2266 [p. 2262-2263].
- Surdam, R. C., and Parker, R. B., 1972, Authigenic aluminosilicates in the tuffaceous rocks of the Green River Formation: *Geol. Soc. America Bull.*, v. 83, no. 3, p. 689-700.
- Swain, F. M., 1956, Early Tertiary ostracode zones of Uinta Basin, in *Intermtn. Assoc. Petroleum Geologists Guidebook*, 7th Ann. Field Conf.: p. 125-139.
- 1964, Early Tertiary freshwater ostracoda from Colorado, Nevada, and Utah, and their stratigraphic distribution: *Jour. Paleontology*, v. 38, no. 2, p. 256-280.
- Tank, Ronald, 1969, Clay mineral composition of the Tipton Shale Member of the Green River Formation, Wyoming: *Jour. Sed. Petrology*, v. 39, p. 1593-1595.
- Textoris, D. A., 1963, Stratigraphy of the Green River Formation in the Bridger basin, Wyoming: *Ohio Jour. Sci.*, v. 63, no. 6, p. 241-258.
- Thiessen, Reinhardt, 1921, Origin and composition of

- certain oil shales: *Econ. Geology*, v. 16, no. 4-5, p. 289-300.
- Thomas, H. E., Carpenter, H. C., and Sterner, T. E., 1972, Hydraulic fracturing of Wyoming Green River oil shales—field experiments, phase 1: U.S. Bur. Mines Rept. Inv. 7596, 18 p.
- Thomas, H. E., and Smith, J. W., 1970, Caliper location of leached zones in Colorado oil shale: *Log Analyst*, v. 11, no. 4, p. 12-16.
- Thomas, D., and Lorenz, P. B., 1970, Use of centrifugal separation to investigate how kerogen is bound to the minerals in the oil shale: U.S. Bur. Mines Rept. Inv. 7378, 12 p.
- Thorne, H. M., Stanfield, K. E., Dinneen, G. U., and Murphy, W. I. R., 1962, Oil-shale technology, in United Nations Econ. Comm. Asia and Far East (ECAFE), Subcomm. Mineral Resources Devel., 2d Symposium on the development of the petroleum resources of Asia and the Far East—U.S. Contr.: Washington, D.C., U.S. Dept. Interior, p. 211-237.
- 1964, Oil shale technology; a review: U.S. Bur. Mines Inf. Circ. 8216, 24 p.
- Thorpe, M. R., 1938, Wyoming Eocene fishes in the Marsh Collection: *Am. Jour. Sci.*, 5th ser., v. 36, p. 279-295.
- Tihen, S. S., Carpenter, H. C., and Sohns, H. W., 1968, Thermal conductivity and thermal diffusivity of Green River oil shales, in Thermal conductivity, 7th Conf., Gaithersburg, Md., 1967, Proc.: U.S. Natl. Bur. Standards Spec. Pub. 302, p. 529-535.
- Tisot, P. R., 1967, Alterations in structure and physical properties of Green River oil shale by thermal treatment: *Jour. Chem. and Eng. Data*, v. 12, no. 3, p. 405-411.
- Tisot, P. R., and Murphy, W. I. R., 1960, Physiochemical properties of Green River oil shale—particle size and particle-size distribution of inorganic constituents: *Jour. Chem. and Eng. Data*, v. 5, no. 4, p. 558-562.
- 1963, Physical structure of Green River oil shale from Colorado: U.S. Bur. Mines Rept. Inv. 6184, 24 p.
- Tisot, P. R., and Sohns, H. W., 1971, Structural deformation of the Green River oil shale as it relates to in situ retorting: U.S. Bur. Mines Rept. Inv. 7576, 27 p.
- Tixier, M. P., and Curtis, M. R., 1967, Oil-shale yield predicted from well logs [with French and Spanish abs.], in *Drilling and production—World Petroleum Cong.*, 7th, Mexico 1967, Proc. v. 3: London, Elsevier Publishing Co., p. 713-715.
- Trager, E. A., 1924, Kerogen and its relation to the origin of oil: *Am. Assoc. Petroleum Geologists Bull.*, v. 8, no. 3, p. 301-311.
- Trudell, L. G., Beard, T. N., and Smith, J. W., 1970, Green River Formation lithology and oil-shale correlations in the Piceance Creek basin, Colorado: U.S. Bur. Mines Rept. Inv. 7357, 212 p.
- Trudell, L. G., Roehler, H. W., and Smith, J. W., 1973, Geology of Eocene rocks and oil yields of Green River oil shales on part of Kinney Rim, Washakie Basin, Wyoming: U.S. Bur. Mines Rept. Inv. (In press.)
- Tufford, G. L., 1964, A staining technique for differentially porous rocks: *Wyoming Univ. Contr. Geology*, v. 3, no. 2, p. 90-91.
- Untermann, G. E., and Untermann, B. R., 1964, Geology of Uintah County, Utah: *Utah Geol. and Mineralog. Survey Bull.* 72, 112 p. [p. 51-61].
- Van Tuyl, F. M., and Blackburn, C. O., 1925a, The effect of rock flowage on the kerogen of oil shale: *Am. Assoc. Petroleum Geologists Bull.*, v. 9, no. 1, p. 158-164.
- 1925b, The relation of oil shale to petroleum: *Am. Assoc. Petroleum Geologists Bull.*, v. 9, no. 8, p. 1127-1142.
- VanWest, F. P., 1972, Green River oil shale, in *Geologic atlas of the Rocky Mountain region*: Denver, Colo., Rocky Mountain Assoc. Geologists, p. 287-289.
- Varley, Thomas, 1922, Bureau of Mines investigates gold in oil shales and its possible recovery: U.S. Bur. Mines Rept. Inv. 2413, 10 p.
- Waters, B. T., Hutchinson, J. H., Savage, D. F., 1972, Early Eocene fossiliferous continental strata, northwest Washakie basin, Sweetwater County, Wyo. [abs.]: *Geol. Soc. America Abs. with Programs*, v. 4, no. 6, p. 420.
- Watkins, J. W., and Anderson, C. C., 1964, Potential of nuclear explosives for producing hydrocarbons from deposits of oil, natural gas, oil shale, and tar sands in the United States: U.S. Bur. Mines Inf. Circ. 8219, 17 p.
- Watkins, J. W., and Sohns, H. W., 1968, In situ retorting of oil shale, in United Nations, Symposium on the development and utilization of oil-shale resources, sec. 3 Tallinn, Estonia, U.S.S.R.: 24 p. [Pub. as separate]
- Wells, L. F., 1958, Petroleum occurrence in the Uinta basin, in Weeks, L. G., ed., *Habitat of oil—a symposium*: Am. Assoc. Petroleum Geologists, p. 344-365.
- West, R. M., 1969, Geology and vertebrate paleontology of the northeastern Green River basin, Wyoming, in *Wyoming Geol. Assoc. Guidebook*, 21st Ann. Field Conf.: p. 77-92 [Also Chicago Univ. Ph. D. thesis, 1968].
- Wetmore, Alexander, 1926, Fossil birds from the Green River deposits of eastern Utah: *Carnegie Mus. Annals*, v. 16, nos. 3-4, p. 391-402.
- Wiegman, R. W., 1964, Late Cretaceous and Early Tertiary stratigraphy of the Little Mountain area, Sweetwater County, Wyoming: Wyoming Univ. unpub. M.S. thesis, 53 p.
- Wiley, D. R., 1967, Petrology of bituminous sandstone in the Green River Formation, southeastern Uinta Basin, Utah: Utah Univ. unpub. M.S. thesis, 69 p.
- Williams, M. D., 1950, Tertiary stratigraphy of the Uinta basin, in *Utah Geol. Soc. Guidebook to the Geology of Utah*, no. 5, p. 102-114.
- Williamson, D. R., 1964, Oil shales—Pt. 3, The natures and origins of kerogens: *Colorado School Mines Mineral Industries Bull.*, v. 7, no. 5, 15 p.
- Wodehouse, R. P., 1933, Tertiary pollen—II, The oil

- shales of the Eocene Green River formation: Torrey Bot. Club Bull., v. 60, no. 7, p. 479-524.
- Wood, C. B., 1966, Stratigraphy and paleontology of the Bridger Formation, northeast of Opal, Lincoln Co., Wyoming: Wyoming Univ. M.S. thesis, 112 p.
- Wood, H. E., Jr., 1934, Revision of the Hyrachyidae: Am. Mus. Nat. History Bull., v. 67, art. 5, 295 p.
- Wood, H. E., Chaney, R. W., Clark, John, Colbert, E. H., Jepsen, G. L., Reeside, J. B., Jr., and Stock, Chester, 1941, Nomenclature and correlation of the North American continental Tertiary: Geol. Soc. America Bull., v. 52, no. 1, p. 1-48.
- Wood, R. E., and Ritzma, H. R., 1972, Analysis of oil extracted from oil-impregnated sandstone deposits in Utah: Utah Geol. and Mineralog. Survey Spec. Studies 39, 74 p.
- Young, N. B., and Smith, J. W., 1970, Dawsonite and nahcolite analysis of Green River Formation oil-shale sections, Piceance Creek Basin, Colorado: U.S. Bur. Mines Rept. Inv. 7445, 22 p.