DOE/METC/12594-12
Distribution Category UC-92

AN EASTERN GAS SHALES BIBLIOGRAPHY
SELECTED ANNOTATIONS

GAS, OIL, URANIUM, ETC. CITATIONS IN BITUMINOUS SHALES WORLDWIDE

Compiled by

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June 1980

Prepared for the

United States Department of Energy
Morgantown Energy Technology Center

Under Contract No. DE-AP21-79MC12594

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ABSTRACT

This bibliography contains 2,702 citations, most of which are annotated. They are arranged by author in numerical order with a geographical index following the listing. The work is international in scope and covers the early geological literature, continuing through 1979 with a few 1980 citations in Addendum II.

Addendum I contains a listing of the reports, well logs and symposiums of the Unconventional Gas Recovery Program (UGR) through August 1979. There is an author-subject index for these publications following the listing. The second part of Addendum I is a listing of the UGR maps which also has a subject-author index following the map listing.

Addendum II includes several important new titles on the Devonian shale as well as a few older citations which were not found until after the bibliography had been numbered and essentially completed. A geographic index for these citations follows this listing.

This bibliography has been funded 1978-1980 under the auspices of the Morgantown Energy Technology Center, U.S. Department of Energy, Morgantown, West Virginia.

PREFACE and ACKNOWLEDGEMENTS

The United States Department of Energy (DOE) is supporting many investigations aimed at solutions to the energy problem. Among them is a program called the Eastern Gas Shales Program (EGSP) intended to stimulate gas production from this extensive rock body. Personnel of industrial companies, research laboratories, research centers, geological surveys, both federal and state, and university researchers in 12 states (CA, DC, KY, NM, NY, NC, OH, PA, TN, VA, WA, WV) are involved in the Eastern Gas Shales Project.

Each of the EGSP investigators needs quick access to findings of the other investigators and to published data on the Devonian black shale.

To meet this need this comprehensive annotated bibliography was compiled by searching manual bibliographies and the GEOREF on line data base. It is international in scope and covers all aspects of the Devonian shales.

The reports, maps and well logs in the Morgantown Energy Technology Center's Unconventional Gas Recovery Program are listed in Addendum I. Addendum II includes several important new titles on the Devonian shale as well as a few hidden titles which were found after the bibliography had been numbered and essentially completed.

I wish to express my gratitude to Dr. Wm. H. Dennen, Chairman of the Geology Department, University of Kentucky and to the

following graduate research assistants: Rob Reeves, William Hopper, Pamela Rockwell, Tim Elam and Sandy Moore. Sean Lynch, undergraduate assistant has also contributed many hours to the bibliography.

I'd like to thank the Morgantown Energy Technology Center, U. S. Department of Energy, Morgantown, West Virginia for the funding of this project 1978-1980.

Vivian S. Hall

CONTENTS

	Page
Abstract	i
Preface and Acknowledgements	iii
Contents page	v
Introduction	vi
Bibliography	1
Geographical index	443
Addendum I UGR reports, well logs and symposiums	484
Author-subject index for UGR reports, logs and symposiums	504
UGR maps	517
Author-subject index for UGR maps	525
Addendum II	529
Geographic index for Addendum II	532

INTRODUCTION

The purpose of this bibliography is to provide access to published and unpublished data on Devonian shales for researchers, oil company personnel, consulting geologists, faculty and students.

The work is world wide in scope, however, English languages publications predominate. Some citations were not annotated because the publications were not available. Among the materials searched in order to compile this bibliography were:

A search on the GEOREF Data Base

U. S. Geological Survey
Publications of the Geological Survey,
1879-1961, 1964 457 pages
1962-1970, 1972 586 pages
1971 -- annuals
1979, Jan. - to date - monthly listings
Washington, Government Printing office

Bibliography of North American Geology, 1732-1970. This bibliography lists publications of the North American continent, Greenland, the West Indies and adjacent islands, Hawaii, and Guam. Washington, D. C. U. S. Gov't Printing Office.

Geological Society of America
Bibliography and Index of Geology Exclusive of North America: 1933-1968.

Bibliography and Index of Geology: 1969 - to date This tool covers all geoscience literature monthly with annual cumulative bibliography and subject indices. It replaces the Bibliography of North American Geology; Abstracts of North American Geology; and Geophysical Abstracts.

This work has 3 different sets of citations. The major section is the first one of 2,395 references, most of which have annotations arranged alphabetically in numerical order with a geographical index following the references. The second section

Addendum I is a listing of the Unconventional Gas Recovery Program publications (UGR). The reports, well logs and symposiums are listed first, followed by an author-subject index. The UGR maps are listed next and also have an author-subject index.

Addendum II includes several important new references on the Devonian as well as a few older ones which were missed earlier. This listing has a geographical index.

A BIBLIOGRAPHY OF GAS, OIL, URANIUM, ETC. CITATIONS IN BITUMINOUS SHALES, WORLDWIDE WITH SELECTED ANNOTATIONS

00001 Abel, J. F., Jr.; Hoskins, W. N.
Confined core pillar design for Colorado oil shale: Colo. Sch. Mines, Q., Vol. 71, No. 4 (Proceedings from Ninth oil shale symposium), p. 287-308, illus., incl. tables, 1976.
The authors discuss pillar design and how the physical properties of oil shale can vary according to oil content. They go on to state reasons why the confined core design is superior to other designs.

00002 Abelson, Philip H., ed.
Conversion of biochemicals to kerogen and n-paraffins, in Researches in geochemistry, Vol. 2, p. 63-89, illus., tables: New York, John Wiley and Sons, 1967.
Discusses the formation of kerogen in sediments, relating the chemicals found in living organisms with the hydrocarbons found in rocks and oils.

Abelson, P. H. See Hoering, T. C. 01022

00003 Abreu, S. Froes
Brazilian oil fields and oil shale reserves: Am. Assoc. Pet. Geol., Bull., Vol. 33, No. 9, p. 1590-1599, 6 figs., 1949.
Petroleum and oil shale reserves of Brazil are discussed. The most promising oil shale reserves occur in the Paraiba Valley and the Gondwanna series of southern Brazil with yields of from 23 to 25 gallons per ton. Some shales yield up to 50 gallons per ton but are not present in sufficient quantity to supply a large scale commercial operation.

Adam, H. See Scott, Donald W. 01871

Adams, J. A. S. See Pliler, R. 01651

00004 Adams, J. A. S.; Weaver, C. E.
Thorium-to-uranium ratios as indicators of sedimentary processes - example of concept of geochemical facies: Am. Assoc. Pet. Geol., Bull.; Vol. 42, p. 387-430, 1958.
The authors relate thorium-to-uranium ratios to sedimentary processes and depositional environment, showing that the above ratios are greater for oxidized

continental deposits than for marine deposits. The use of this ratio is shown in a cyclothem and several other sedimentary sequences, including limestones, dolomites, evaporites, shales, residual clays, and bauxite. Three major geochemical facies are discussed.

Adams, L. G. See Heady, H. H. 00995

00005 Adkinson, Henry M.
The oil shales of Utah and Colorado: Salt Lake M. Rv., Vol. 20, No. 8, p. 21-25, 1918.

Agapito, J. F. T. See Hardy, M. P. 00972

00006 Agrargitis, G.; Schermann, O.
Ueber Urananreicherung in kohliger substanze im Bereich der Mitterberge Kupferlagerstaette (Salzburg/Oesterreich) (Uranium concentration in carbonaceous matter in rocks of the Mitterberg copper deposits, Salzburg, Austria): Tschermaks Mineral. Petrogr. Mitt., Vol. 19, No. 2, p. 81-86 (incl. Eng. sum.), illus., 1973.
Associated with plants, metaanthracite, fine dispersion, no thorium, U, C, N, S.

Aitken, J. D. See McIlreath, I. A. 01535

00007 Akasegawa, Y.
On the oil shale deposits of Chin-fo-tang, Jehol province, South Manchuria Ry. Co.: Geol. Inst., Bull., No. 88, p. 30-34 (Japanese), 4 figs., 2 geol. maps, 1937.

00008 Akhmedzhanov, M. A.; Aripov, A. A.; Borisov, O. M.
Geotektonicheskiy faktor perspektivnosti Paleozoyskikh obrazovaniy na neft' i gaz (Geotectonic factors of oil and gas prospects in Paleozoic deposits): Geol. Nefti Gaza, No. 7, p. 37-42, illus., incl. sketch map. Soviet Central Asia, 1973.

Albrecht, P. See Greiner, A. C. 00922

Albrecht, P. See Spykerelle, C. 01986

Albrecht, P. See Vandenbroucke, M. 02232

00009 Alcock, Frederick James
Exploration of oil shales in the Albert mines area (New Brunswick): in summary of investigations on New Brunswick oil shales: Can. Dept. Mines and Resour., Pub. 825, p. 11-18, illus., 1948.

00010 Alcock, Frederick James
Exploration of oil shales in Taylor Village area (New Brunswick): in summary of investigations on New Brunswick oil shales: Can. Dept. Mines and Resour., Pub. 825, p. 8-10, illus., 1948.

00011 Alderson, V. C.
The oil shale industry. 175 p., 15 pls., New York, Frederick A. Stokes Co., 1920.

00012 Alderson, V. C.
Colorado oil shale: Colo. Sch. Mines, Q., Vol. 20, No. 2, 53 p., illus., 1925.
This is by far the better of the four papers by Alderson. Not only are the major Colorado oil shales discussed in detail, but methods for mining and refining are described in detail. Also, legal aspects of mine operation are discussed which may be of interest to the geologist.

00013 Alderson, V. C.
The oil shale industry: Colo. Sch. Mines, Q., Vol. 13, No. 2, p. 3-30, 1918.
The major oil shale deposits of the world are described. A case is put forth for development of Colorado shales from physical, chemical, and economical points.

00014 Alderson, V. C.
The oil shale industry: Colo. Sch. Mines Q., Vol. 14, No. 4, p. 3-15, 1919.
The 1919 article follows the 1918 article and says essentially the same things. This article does contain a detailed flow chart which illustrates the method of refining oil shale and the products which can be obtained.

00015 Alderson, V. C.
The oil shale of Kentucky: Colo. Sch. Mines, Q., Vol. 17, No. 4, p. 3-15, 10 figs., 1922.
Alderson describes the geology. location, extent and contents of the Devonian black shale of Kentucky. He further discusses what is being and what could be done in the future.

00016 Alderson, V. C.
Oil shale: Inst. Petrol. Technologists, Jour., Vol. 12, No. 57, p. 366-374, 1926.

Alekseyenka, V. D. See Gregor'yev, K. A. 00928

00017 Alexander, F. M.
The Chattanooga Black Shale - a possible future source of uranium. The Tennessee Conservationist, June: reprinted as Tenn. Div. Geol. Inf. Circ. 1, 1953.
A very general report explaining what black shale is and how it occurred. Written for the non-geologist.

Alexandresu, Gi See Papia, V. C. 01602

Algermissen, S. T. See Bardsley, Stanford R. 00113

Algermissen, S. T. See Bardsley, S. R. 00112

Allbright, C. S. See Dinneen, G. U. 00646

Allbright, C. S. See Jackson, L. P. 01088

00018 Allbright, C. S.; Van Meter, R. A.; Dinneen, G. U.
Analysis of crude shale oils; some Brazilian and U. S. A. oils: U. S. Bur. Mines, Rep. Invest. 5286, 28 p., 1956.
This report gives the results of analyzing three groups of crude shale oils by the Bureau of Mines procedure. Complete analysis of the oils are included in report form in the appendix.

00019 Allen, J. R. L.
Sedimentology of the Old Red Sandstone (Siluro-Devonian) in the Clee Hills area. Shropshire, England: Sediment. Geol., Vol. 12, No. 2, p. 73-167, illus., 1974.
Shales here are green silty types composed mainly of quartz, illite and chlorite with occasional kaolinite. Article deals primarily with Old Red Sandstones of the Shropshire area with no mention of oil.

00020 Allen, R. J.
Hydrocarbon significance of upper Palaeozoic sediments associated with the Koburra Trough, Galilee Basin: Aust. Pet. Explor. Assoc., Vol. 14, No. 1, p. 59-65, 1974.

Almasy, Felix See Hradil, Guido 01039

Alpern, B. See Blakquart, P. 00200

00021 Al'tgauzen, M. N.
Uran v asadochnykh porodakh (Uranium in sedimentary rocks): Akad. Nauk SSSR, Sib. Otd., Inst., Geol. Geofiz., Tr., No. 286 (Radioaktivnyye elementy v gornykh poradakh), p. 19-30, 1975.

Altschuld, K. See Donnelly, T. W. 00687

00022 Amato, R. V.
Geology of the Salem Quadrangle, Virginia: Va., Div. Miner. Resour., Rep. Invest., No. 37, 40 p., illus., 1974.
Brief mention of the Marcellus shale, a thin bedded, soft to fissil, gray and black shale. No mention of oil or kerogens.

00023 American Chemical Society
Shale oil, tar sands and related fuel sources: a symposium cosponsored by the Division of Fuel Chemistry and the Division of Petroleum Chemistry, Inc., at the 167th meeting of the American Chemical Society, Los Angeles, Calif., April 3-5, 1974. (1976).
Consists of 6 papers dealing with shale oil, tar sands and related fuel sources.

00024 American Petroleum Institute
Facts about oil: in Perspectives on energy; issues, ideas, and environmental dilemmas (Ruedisili, L. C., editor; et al), 2nd edition, New York, New York, Oxford Univ. Press. p. 140-166, illus., incl. sects. 1978.
Article is an abbreviated version of facts about oil prepared by the American Petroleum Institute in 1977. (From abstract)

00025 American Petrol. Institute Subcommittee
Determination of nitrogen in petroleum and shale oil: Anal. Chem., Vol. 24, p. 1806-1811, 1952.
This report describes the cooperative work of 20 laboratories who demonstrated that nitrogen in petroleum and shale oils may be determined by the Kjeldohl, Duman or ter Meulen methods.

00026 Amit, Ora
Organochemical evaluation of Gevar'am Shales (Lower Cretaceous) Israel, as possible oil source rock: Am. Assoc. Pet. Geol., Bull., Vol. 62, No. 5, p. 827-836, 5 figs., 2 tables, May 1978.
The degree of maturation of the organic material in the shales, evaluated from the study of vitrinite reflectance measurements and the organochemical characteristics of 13 core extracts, appears to increase from immature in the east to the stage of thermal generation of oil in the west, in response to an increase in burial depth. Analytical techniques and possible time of generation of the oil are also discussed.

Ampian, S. G. See Jackson, J. Jr. 01087

00027 Amsden, Thomas W.
Silurian and Devonian strata in Oklahoma, in Symposium - Silurian - Devonian rocks of Oklahoma and environs:

Tulsa Geol. Soc. Digest, Vol. 35, p. 25-34, illus., 1967.
Locates the devonian black shale within the stratigraphic column of the study area. Also describes the fossils and minerals present in the formation but with no mention of oil or kerogens.

00028 Amstutz, G. C.; Bernard, A. J. (eds.)
Ores in Sediments: Int. Union Geol. Sci. Ser. A, No. 3, Springer - Verlag, 1973.
A comprehensive discussion of ore deposits occurring in sedimentary rocks. Although no direct mention of black shale is made, certain sections may applicable to black shale chemistry.

00029 Anders, Donald E.
Cycloalkanes from Green River Oil Shale and their relationships to living organisms: Master of Sci. Thesis, Univ. of Wyo., Dec., 1970.

00030 Anders, D. E.; Robinson, W. E.
Geochemical aspects of the saturated hydrocarbon constituents of Green River Oil Shale-Colorado No. 1 Core: U. S. Bur. Mines Rep. Invest., No. 7737, 23 p., illus., 1973.
Methods, detailed analysis of soluble portion of 60 samples, changes in hydrocarbon content with depth, diagenesis, Eocene, Piceance Creek Basin, Colorado. Saturated hydrocarbons from 60 samples of 2300 ft. Green River Formation oil-shale core were analyzed by gas-liquid chromatography methods. The results showed evidence of maturation of the N-alkanes and the cyclic alkanes.

00031 Anders, D. E.; Doolittle, F. G.; Robinson, W. E.
Polar constituents isolated from Green River oil shale: Geochim. Cosmochim. Acta, Vol. 39, p. 1423-1430, 1975.
Anders interprets the mass spectrometric, i.r. adsorption, and NMR data for 22 compounds from a polar fraction of Green River shale, determining compositional types for the major constituents.

00032 Anders, D. E.; Doolittle, F. G.; Robinson, W. E.
Analysis of some aromatic hydrocarbons in a benzene-soluble bitumen from the Green River oil shale: Geochim Cosmochim. Acta, Vol. 37, No. 5, p. 1213-1228, illus., 1973.
Analytical data are given on the aromatic fraction of the total bituminous fraction. Carbon number range, empirical formulae and mass spectra are reported. (Organic geochemistry)

00033 Anders, D. E.; Robinson, W. E.
Cycloalkane constituents of the bitumen from Green River shale: Geochim. Cosmochim. Acta, Vol. 35, p. 661-678, 1971.
Fifty-two cyclic alkanes were analyzed by mass spectrometry. The cycloalkanes structurally resemble biologically derived isoprenoid lipids. The compounds appear to have originated from carotenoid pigments, steroidal plant debris, and pentacyclic triterpenoids.

00034 Anderson, C. C.
Petroleum reserves and oil-shale deposits: Producers Monthly, Vol. 23, p. 32-35, Sept., 1959.

00035 Anderson, C. C.
Underground nuclear explosions-awesome recovery promise: Pet. Eng., Vol. 31, No. 9, p. B28-B31, illus., Aug., 1959, slightly revised, Producers Monthly, Vol. 23, No. 11, p. 32-35, Sept., 1959.

Anderson, C. C. See Watkins, J. Wade 02287

Anderson, H. C. See Golumbic, Norma 00907

00036 Anderson, J. C.
Coal evaluation of the Bandanna Formation: Queensl. Govt. Min. J., Vol. 77, No. 895, p. 201-203, 1976.

Anderson J. See Nejib, U. R. 01549

00037 Anderson P. C.; Gardner, P. M.; Whiteheady, E. V.; et al.
The isolation of steranes from Green River oil shale: Geochim. Cosmochim. Acta, Vol. 33, No. 10, p. 1304-1307, illus., tables, 1969.
By comparing the spectra of isolated components with authentic standards, the C_{28} sterane was identified and the presence of the C_{27} and C_{29} steranes in Green River Oil Shale was confirmed.

Andia, Kh. See Kheynsalu, Yu 01182

00038 Andrichuk, J. M.
Stratigraphy and facies analysis of upper Devonian reefs in Ledue, Slettler and Redwater areas, Alberta: Am. Assoc. Pet. Geol., Bull., Vol. 42 (1), p. 1-93, 1958.
A detailed stratigraphic and petrologic study of the Cooking Lake formation in the Redwater, Ledue, and Sletter areas of Alberta, Canada where oil producing Devonian reefs occur. Black shales are present above the Cooking Lake Formation but are not discussed.

00039 Anessi, Thomas Joseph
Strength and consolidation properties of raw and stabilized Oklahoma Shales (abstr.): Disserst. Abs. Internat., See. B, Sci. and Eng., Vol. 31, No. 5, p. 2661B, 1970.

00040 Angelova, G.; Totsev, D.; Munkova, V.
Priroda i sustav no organichnata masa no bituminozni skali ot nyakoi nakhodishcha v Bulgariya (Nature and composition of the organic mass of bituminous rocks of some deposits in Bulgaria): Neft. Vuglishna Geol., Vol. 7, p. 53-60 (incl. Eng. sum.), illus., incl. tables, 1977.
The volatile yield, gross heating value, and moisture, ash, sulfur, and carbon dioxide contents of samples from five oil shale deposits in Bulgaria were found. Thermal gas separation was determined and oil yields catagorized.

00041 Anhaeusser, C. R.; Button, A.; Wolf, K. H.
A review of southern African stratiform ore deposits, their position in time and space in Handbook of stratibound and stratiform ore deposits: II. Regional studies and specific deposits: Vol. 5, Regional studies: Elsevier Publ. Co., New York, p. 257-319, 1976.
This chapter is concerned primarily with ore deposits of Southern Africa. There is a very brief reference to South African torbanites and oil shales on page 273 stating simply that they are indistinguishable from the Kerosene Shales of New South Wales in Australia, or the oil shales of Kentucky in the United States.

00042 Ananymous
Where is oil found and how did it get there?: Drill. Bit., Vol. 26, No. 10, p. 21-23, (special issue; energy information special), illus., 1977.

00043 Anonymous
Utah energy resource data: Utah Dep. Nat. Resour., Salt Lake City, Utah, 27 p., 1976.

00044 Anonymous
One hundred billions of barrels of shale oil and recoverable from shaded area on map: Shale Rev., Vol. 4, p. 11, sketch map, Denver, Colo., 1922.

00045 Anonymous
Oil shale technology; hearings before the Subcommittee on Energy of the committee on Science and Astronautics, U. S. House of Representatives, Ninety-third Congress, second session on H. R. 9693, May 8, 14, 30, 1974: No. 48: U. S. Congress, Wash., D. C., 528 p., 1974.

Antweiler, J. C. See Cottingham, P. L. 00532

00046 Applachian Geological Society
Devonian shales; a symposium by the Appalachian Geological Cosiety: Vol. 1, 1035. Charleston, W. Va. The Society, 44 pages mimiographed 1935.
Topics include: black Devonian shales; gas in Devonian shales; structure; porosity and reservoir facilities; origin and movement of material; methods for shooting and cleaning shale wells; computing capacities of shale wells.

Appleman, M. D. See Findley, J. E. 00795

00047 April. R. H.
Clay mineralogy and geochemistry of the East Berlin Formation, Newark Group, Connecticut and Massachusetts, (abstr.): Geol. Soc. Am., Abstr. Programs, Vol. 10, No. 2, p. 30, 1978.

00048 Arato, J.; Bella, L.
Results of technological and chemical analyses of the oil-shale of Pula and Gerce, (Transdanubia, Hungary): Hung. Magy. All. Foldt. Intez., Evi Jel., 1974, p. 287-300 (incl. Eng. sum.), 1976.
The composition of organic matter of the sapropelic sediments of Pula is roughly equivalent of that characteristic for oil shales. The sediments may be regarded as calcareous-clayey oil-shales. Bitumen yields of the Pula complex are about 6.6% while those of the Cerce series are about 4.3%.

Aref'yen, N. A. See Tverdova, R. A. 02141

00049 Arendt, J. W. (Project manager); Union Carbide, Oak Ridge Gaseous Diffusion Plant
National Uranium Resource Evaluation Program; Hydrogeochemical and stream sediment survey in central United States; second quarter FY 1976, October 1, 1975 through December 31, 1975, p. 67, illus., 1976. (Rep. No. GJBX-31, Part 3)(Rep. No. KTL524) available from: U. S. Atomic Energy Comm., Washington, D. C., United States.

00050 Arendt, J. W. (Project Manager); Union Carbide, Oak Ridge Gaseous Diffusion Plant
National Uranium Resource Evaluation Program; Hydrogeochemical and stream sediment survey in central United States, first quarter FY 1976, July 1, 1975, through September 30, 1975: p. 47, illus., 1975. (Rep. No. GJBX-30, Part 2) available from: U. S. Atomic Energy Comm., Washington, D. C., United States.

Aripov, A. A. See Akhmedzhanov, M. A. 00008

00052 Armands, Goesta
Geochemical studies of uranium, molybdenum and vanadium in a Swedish alum shale: Stockh. Contrib. Geol., Vol. 27, No. 1, p. 1-148, illus. (Incl. sketch map), 1972.
113 samples from drill cores of black alum shale from the Middle and Upper Cambrian were analyzed for trace elements using X-ray fluorescence methods. Calculated norms were based on combined X-ray diffraction and chemical data. (From abstract)

00053 Armon, W. J.; Ress, O. W.
Chemical evaluation of Illinois oil shales: Ill. Geol. Surv., Circ. 307, 22 p., 1960.
This is a discussion of the chemical and physical properties of four Illinois black shales and one limestone. The reported results yield information on characteristics of crude oils and gases from comparison of shales and retorted products.

Armon, W. J. See Lamar, J. E. 01264

00054 Arnold. C. A.
Petrified wood in the New Albany shale: Science (new ser.), Vol. 70, p. 581-582, 1929.
This 1929 article discusses the various occurrences of petrified wood (callixylon) in the New Albany shale.

00055 Arnold, G. O.; Henderson, R. A.
Lower Palaeozoic history of the southwestern Broken River Province, North Queensland: Geol. Soc. Aust., J., Vol. 23, No. 1, p. 73-93, 1976.

00056 Arnold, Lionel K.
Destructive distillation products of certain Iowa carbonaceous shales: Iowa Acad. Sci. Proc. 1962, Vol. 69, p. 379-383, tables, 1963.

00057 Arrhenius, G.
Shale-oil production in Sweden by in situ pyrolysis and by aboveground retorting: environmental restoration, in Identification of research and development priorities and of costing problems associated with implementation of it situ recovery of shale oil: Rpt. No. NSF-RA-N-75-001, p. 302-311, 1975.

Arrhenius, G. See Revelle, R. 01727

00058 Arthur, M. A.; Fischer A. G.; Schlanger, S. O.
Paleoenvironments of early Cretaceous "Black Shale" deposition: Geol. Soc. Am., Abstr. Programs. Vol. 10, No. 7, p. 361, 1978.
Two major "ocean anoxic events" can be recognized during which organic-rich facies are best developed and most widespread, one in the Aptian-Middle Albian and another in the Cenomanian-Early Turonian. Rhythmic bedding is typical of black shale sequences suggesting renewal of oxygen and successive anoxic conditions. Burrowing infaunas return rapidly following renewal of oxygen.

00059 Ash, Henry O.
Federal oil shale leasing and administration: Rocky Mt. Assoc. Geol., Field Conf., Guide b., No. 25 (Guides to the energy resource of the Piceance Creek Basin, Colo.), p. 185-191, sketch map, 1974.
A history of oil shale leasing requirements, rules and regulations from 1920 through 1974.

00060 Ash, J. L.; Stone, R. B.; Craig, W. E.; et al.
Technical and economic study of the modified in situ process for oil shale: Vol. 1, Rept. No. PB-260-547/5WN, 344 p., NTIS, Springfield, Va., 1976.

00061 Ash, J. L.; Stone, R. B.; Craig, W. E.; et al.
Technical and economic study of the modified in situ process for oil shale: Vol. 2, Rept. No. PB-260-548/3WN, 373 p., NTIS, Springfield, Va., 1976.

00062 Ashley, G. H.
Oil resources of black shales of the eastern United States: U. S. Geol. Surv., Bull. 641, p. 311-324; (abstr.) Wash. Acad. Sci., J., Vol. 7, p. 564-565, 1917.
Reconnaissance investigation of oil shales of the eastern United States, including study of samples from Ohio, Indiana, and Kentucky (after Hoover, 1960).

00063 Asiskulova, O. A.; Basitova, S. M.; Zasorina Ye. F.
Raspredeleniye rangia i molibdena a organicheskom vashshestve goryuchikh slantsev (The distribution of rhenium and molybdenum in oil shales): Akad. Nauk Tadzh. SSSR, Dol.; Vol. 17, No. 6, p. 20-22, (incl. Tadzhikistan sum.), tables, 1974.

Aswathana rayana, U. See Murty, P. S. M. 01504

00064 Atalla, L. T.; Lima, F. W.
Determination of uranium in thorium matrixes by epithermal neutron activation analysis: J. Radioanal. Chem., Vol. 20 No. 2, p. 607-618, illus. (incl. tables), 1974.

00065 Atherton, Elwood; Collinson, C. W.; Lineback, J. A.
Mississippian System: in Willman, H. B., et al., Handbook of Illinois Stratigraphy: Ill., Geol. Surv., Bull. 95, p. 123-163, 1975.
This is a comprehensive work on Mississippian stratigraphy in the Illinois Basin. The Mississippian sequence is up to 3200 ft. thick there and provides an excellent section of the Kinderhookian, Valmeyeran, and Chesterian series. A good reference.

Atherton, Elwood, See Collinson, C. W. 00472

Atherton, Elwood, See Willman, H. B. 02343

Atwood, Mark T. See Goodfellow, Lawrence 00908

Atwood, Mark T. See Kilburn, Paul D. 01184

Atwood, M. T. See Smith, J. W. 01929

Aurand, Harry A. See Baster, R. E. 00145

00066 Austin, C. R.
Surface clays and shales of Ohio: Ohio State Univ. Expt. sta., Bull. 81, 53 p., 1934.
Preliminary report on the physical tests and properties, from a ceramic view, of the Devonian-Mississippian shales (Hoover, 1960).

Austin, C. R. See Lamborn, R. E. 01266

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Surface and shallow oil-impregnated rocks and shallow oil fields in the United States: U. S. Bur. of Mines Monograph 12, 375 p., 40 figs., 1965. Results of 1964 survey conducted by Ball Associates, in behalf of the Joint Committee of Petroleum-Impregnated Rocks of the Interstate Oil Compact Commission and the Bureau of Mines and Geological Survey, U. S. Dept. of the Interior.
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Composition of shale oil: Presented before Ind. Bureau of Mines Oil-Shale Conf., Wyo., Aug. 1954. Pub. in Minutes of Conf., U. S. Bur. of Mines Administrative Pub.

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Authors were most interested in coals and carbonaceous rocks of the Dakota Formation but some older and younger rocks were also sampled for uranium content. Areas sampled were on the Los Vegas Plateau and Canadian Escarpment in Harding and San Miguel Counties, northeastern New Mexico.

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Simulated dewatering requirements at an oil shale surface mine, Piceance Creek Basin Colorado: Colo. Sch. Mines, Miner. Ind., Bull., Vol. 21, No. 2, 11 p., tables, sketch maps, 1978.
A model is presented for hydrology simulation in the Piceance Creek basin that is similar to Sun Company's Beta model. Three dewatering cases were outlines using this model.

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Resource appraisal and preliminary planning for surface mining of oil shale, Piceance Creek basin, Colorado: Colo. Sch. Mines, Q., Vol. 71, No. 4, (Proceedings at Ninth oil shale symposium), p. 257-285, illus. (incl. tables, geol. sketch map), 1976.
A good reference for anyone thinking about stripping black shale. Resource evaluation, best location, ground water supplies, environmental considerations,

and cost of operation are considered here. Although this paper applies to the Piceance Basin of Colorado, consideration would be valid for any other black shale areas.

Baranov, G. M. See Brigor'yev, K. A. 00928

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Hydrocarbons in the Uinta Basin of Utah and Colorado; Review of geol. and fieldwork by C. F. Barb; Survey of bitumin alalysis and extraction methods by J. O. Ball: Colo. Sch. Mines, Q., Vol. 39, No. 1, 115 p., 2 pls., 19 figs., incl. index geol. sk. maps, 26 tables, Jan. 1944.
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Les hydrocarbons naturels dans les departments du lot et de la Dordogne: Ann. Mines s. 14, T. 3, Iv. 4, p. 77-87, 1 fig., 1943. (Jurassic oil shale in Dordogne, France)

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Evaluating oil shale by log analysis: Jour. Pet. Tech., Vol. 15, No. 1, p. 81-84, illus., 1963; reprinted, World Oil, Vol. 161, No. 2, p. 94-97, illus., 1965.
This paper deals with a study conducted on the Green River Formation oil shale in which the application on induction, sonic and nuclear well logs to oil-shale evaluation was tested and proved. (From intro.) Includes figures.

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Evaluation of oil shale by log analysis (abstr.): Jour. Pet. Tech., Vol. 14, No. 9, p. 997, 1962.
The application of induction, sonic and radioactive well logs to oil shale evaluation was tested and proved in a study conducted of Green River Formation oil shale in Uintah County, Utah. The physical and chemical properties of an oil shale section, were used to evaluate the response of various logs. (From Abstract)

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In determining the biogenic origin of coal-like sediments from Pre-cambrian (Huronian) rocks, organic compounds have been obtained by acid-alkali extractions. Black shales associated with Gunflint Formation are devoid of extractions. Studies continue.

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Uranium in shales: Univ. Sheffield Geol. Soc. J., Vol. 3, No. 1, p. 1-5 (Great Britian and elsewhere), 1958.

00116 Barker, L. K.; Cottingham, P. L.
Refining improvements of shale-oil naphtha: U. S. Bur. of Mines Rep. Invest. 7740, 15 p., 1973.
The purpose of this research was to determine whether any improvements would be made by applying a catalytic reforming process to hydrogenated shale-oil naphtha. Results indicated improvement by the increase of octane.

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Catalytic reforming of hydrogenated shale-oil naphtha: A. C. S. reprints, Div. Fuel Chem., Vol. 16, No. 1, p. 97-111, 1972. See also I. & E. C. Prod. Res. and Develop., Vol. 11, p. 399-404, Dec. 1972.
The purpose of this research was to evaluate naphtha from hydrogenated crude shale oil as a feedstock for established reforming processes. Results indicate that a higher temperature could have produced a higher yield-octane number. (From Author's Abstract)

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Producing SNG by hydrogasifying in situ crude shale oil: U. S. Bur. of Mines Rep. Invest. 8011, 37 p., 1975.
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of temperature and pressure on the yield and composition of gas which could be obtained from an in situ crude shale oil and find out what effect extended operating times would have on gasification. (From intro.) Contains many tables.

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La pyrogenation des schistes bitunineux du Jura franceomtois: Acad. Sci. Paris, C. R. t. 197, No. 16, p. 850-852, O 16'33, Oil shales of Burgundy, France.

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The future supply of nature-made petroleum and gas, Meyer, R. F., editor, in the future supply of nature-made petroleum and gas; technical reports, p. 23-40, table, charts, Pergamon Press, 1977. Reserves, exploration, economics.

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Bibliography of investment and operating costs for chemical and petroleum plants: U. S. Bur. of Mines, Inform. Circ. 7516, 53 p., 1949.
This bibliography was prepared as an aid in making cost estimates for processes for the petroleum refining and chemical industries. The main purpose was to provide a listing of sources of information.

Barnet, W. I. See Jensen, H. B. 01114

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Notes on Illinois bituminous shales, including results of their experimental distillation: Ill. Geol. Surv. Bull. 38, p. 441-460; Geol. Surv. Extract Bull. 38 F, 20 p., 1922.
Includes some data on New Albany equivalents from southern Illinois.

Bartashevich, O. V. See Voytov, G. J. 02265

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Concentration and distribution of rhenium and molybdenum in the oil shales of middle Asia: Geochim. Int., Vol. 11,

No. 2, p. 743-747, tables, 1974.
Extraction of rhenium and molybdenum from Tertiary oil shales of Central Asia using solutions of hydrochloric, oxalic, and tartaric acids.

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Konsentratsiya i raspredeleniya reniye i molibdena v goryuchikh slantsakh sredney Asii (Concentration and distribution of rhenium and molybednum in the oil shales of middle Asia): Geokhim. (Akad. Nauk SSSR), No. 7, p. 1077-1081 (incl. Eng. sum.), tables, 1974.

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Basitova, S. M. See Azizkulova, O. A. 00071

00125 Baskerville, Charles
Oil shales of Canada: Int. Congr. Applied Chem., 7th, London, 1909, Sec. IV A 1:22-31 (1910).

Bass, N. Wood See Leatherock, Constance 01294

00126 Bass, Yu. B.; Galaka, A. I.; Grabovskiy, V. K.; et al.
Slantsenoshost paleogena (Paleogene oil shales): in Prognoz goryuchikh slantsev Yevropeyskoy chasti SSSR (Kotlukov, V. A., editor, et al.) p. 41-57, Izd. Akad. Nauk SSSR, Tallin, Union of Soviet Socialist Republics, 1974.

00127 Bassett, C. G.
The stratigraphy of the Devonian Formations of the Alto Pass quadrangle, Illinois: (in Survey open-file reports), 36 p., 1924.
Brief consideration of Mountain Glen shale-lithology, fauna, correlation chart, aerial geology map of Devonian formations.

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The Devonian strata of the Alto pass quadrangle: Ill. Acad. Sci. Trans., Vol. 18, p. 360-368, 1925.
Brief descritpion of lithologic character and outcrop of the Mountain Glen shale in the Alto Pass quadrangle, tentative correlation with upper part of New Albany and Chattanooga shales.

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The Waverlyan period of Tennessee: U. S. National Museum Proceedings, Vol. 41, p. 209-224, 1911.
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Bedford, Berea, and Sunbury of Ohio. Includes correlation chart (Hoover, 1960).

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Distillation tests of oil shale from the Phosphoria Formation of southwestern Montana: U. S. Geol. Surv., Prof. Pap., No. 800-C, p. C161-164, sketch map, 1972.
Results indicate oil shale too lean to be of economic value in the forseeable future.

Bates, T. F. See Weaver, C. E. 02290

00131 Bates, Thomas F.; Wright, H. D.; Strahl, E. O.
An investigation of the mineralogy, petrography and paleobotany of uranium-bearing shales and lignites (Scope A - Shales), quarterly progress report, period of April 1 - June 30, 1956 (Appendix: A study of trace element distribution in Chattanooga shale (thesis), by Robert L. O'Neil): U. S. Atomic Energy Comm., NYO-7414, 75 p. (dep., mc; $18.75, LC)(prepared by Pennsylvania State College), 1956.
The trace elements in 61 samples from the upper Devonian Chattanooga Shale and 42 samples from seven shales of Ordovician, Devonian, and Penn. age were determined spectrochemically. (From abstract) Statistical analysis of the data obtained from these samples was done.

00132 Bates, Thomas F.; Wright, H. D.; Camilli, E.
An investigation of mineralogy...shales, quarterly progress report, period of April 1, 1953, to June 30, 1953: U. S. Atomic Energy Comm. NYO-3365, 35 p., (dep., mc; $8.75, LC)(prepared by Pennsylvania State College), 1953.
X-ray analysis showed the main constituents of 12 samples of the Chattanooga bentonite to be quartz, kaolinite, and mica. A number of experiments were carried out to calibrate the fluorimeter and to standardize a working procedure.

00133 Bates, Thomas F.; Wright, H. D.; Weaver, C. E.
An investigation of the mineralogy and petrography of uranium-bearing shales, quarterly progress report for period April 1 - June 30, 1952: U. S. Atomic Energy Comm. NYO-3358, 23 p., (dep., mc)(prepared by Pennsylvania State College), 1952.
This report says that work on the clay mineralogy o the Chattanooga bentonite has been essentially completed. The 2:1 clay minerals appear to be the result of leaching and lydration of muscovite.
A 1:1 kaolin clay is apparently the result of alteration of volcanic glass and muscovite.

00134 Bates, Thomas F.; Strahl, Erwin; O'Neil, Robert
An investigation of the mineralogy and petrography of uranium-bearing shales - - Analyses of shale samples: U. S. Atomic Energy Comm. NYO-7909, 91 p. (dep.; $22.75, LC)(prepared by Pennsylvania State University), 1958.
Analyses of 1,135 shale samples from 29 drill cores of 9 formations. Samples were checked for; total Fe, free Fe, CO_3=carbon, total C, total SiO_4, U, organics, and trace elements. Samples were taken from the Chattanooga, Ohio, Woodford, Kansas, St. Hippolyte, Swedish Alum, and selected German shales.

00135 Bates, Thomas F.; Strahl, Erwin, O.
Mineralogy, petrography and radioactivity of representative samples of Chattanooga shale: Geol. Soc. Am. Bull., Vol. 68, p. 1305-1313, 1957.
X-ray diffraction, light and electron microscopy, and nuclear track studies are used to separate mineral from organic components. Alpha track studies of emulsion covered thin sections show no uranium mineral to be present. Rather, 70 percent of uranium atoms are randomly distributed throughout the fine grained matrix and 25 percent are concentrated in organicpyrite-clay complexes.

00136 Battelle Memorial Institute
Quarterly report for the period December 15, 1948, to March 15, 1949: U. S. Atomic Energy Conn. BMI-JDS-175, 188 p. (dep.; $29.50, LC), 1949.
Progress is reported on the recovery of U from domestic shales. Included is a discussion covering fuel values of shales.

00137 Baturin, G. N.
Uran v sovremennom morskom osadochrom tsikle (Uranium in the recent sedimentary cycle): Geokim. (Akad. Nauk SSSR), No. 10, p. 1529-1536 (incl. Eng. sum.), illus., 1973.

00138 Baturin, G. N.
O sootnoshenii srednikh konsentratsiy urana i organicheskogo veschestva v sovremennykh morskikh i okeanskikh osadkakh (Ratios of average concentrations of uranium and organic material in present-day marine and oceanic sediments): Akad. Nauk SSSR, Dokl., Vol. 207, No. 1, p. 186-189, 1972.

00139 Baturin, G. N.; Kichenov, A. V.
Soderzhaniye urana v okeanskikh fosforitakh (Uranium content in marine phosphorites): Litol. Palex. Iskop., No. 1, p. 130-138, sketch map, 1973.

Bauer, A. D. See Horne, J. W. 01030

Bauer, A. D. See Finley, W. L. 00796

00140 Bauer, C. B.; Wood, W. J.; Fleece, J. B.
The government; the computer, and oil shale (abs.): Am. Assoc. Pet. Geol., Soc. Econ. Paleontol. Mineral, Annu. Mtg. Abstr., Vol. 2, p. 2, 1975.
Abstract of the U. S. G. S. program designed to provide acreage evaluations and basic yield calculations for the Piceance Basin of Northwestern Colorado. Yield estimated of from 10-30 gallons/ton (depending on location) were cited. A series of contour maps in terms of gallons/ton and barrels/acre was another outcome of the program.

00141 Baukov, S. S.
Geotektonicheskie usloviya slantsenskopleniya: Eesti NSV Teaduste Akad., Geol. Inst., Uurimused (Akad. Nauk Eston. SSSR, Inst. Geol., Tr.) 1, p. 95-104, illus., 1956. Ordovician and Jurassic oil shales.

00142 Baukov, S. S.; Kotlukov, V. A.
The formation of combustible shales; methods of study and a genetic classification: Izd Balgus, Tallin, 160 p., 1973.

Baukov, S. S. See Kotlukov, V. A. 01236

00143 Baxter, J. W.; Desborough, G. A.
A real geology of the Illinois fluorspar district. Pt. 2, Karbers Ridge and Rosiclare quadrangles: Ill. Geol. Surv. Circ. 385, 40 p., 1965.
Mentions New Albany Group - outcrop area, lithology, composition, thickness. Geologic quadrangle map.

00144 Baxter, R. A.; Buell, Arthur Whitcomb
Colorado oil shale, past, present, future: Miners Mag., Vol. 34, No. 9, p. 493-494, illus., 1964.

00145 Baxter, R. E.; Aurand, Harry A.
Oil shales of the Rocky Mountain area (abs.): Am. Assoc. Pet. Geol. Bull., Vol. 26, No. 3, p. 906, May 1942.
An abstract which simply states that not much is known about retorting of shales on a commercial scale.

Baxter, J. W. See Cluff, R. M. 00450

Bayliss, G. S. See McIver, R. D. 01537

00146 Bayliss, P.; Levinson, A. A.
Clay-mineralogy and boron determinations of the shales

from the Reindeer Well, Mackenzie River delta, N. W. T., Canada: Bull. Can. Pet. Geol., Vol. 18, No. 1, p. 80-83, illus., 1970.
Study of the clay minerals in shales of the Reindeer D-27 well, Mackenzie River delta. The major clay minerals are kaolin and illite. Maximum oil potential occurs around 5,000 ft. where temperature-dependent transformations convert montmorillonite into chlorite. The article does not state whether or not oil actually occurs.

Bayliss, P. See Hitchon, B. 01015

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Uranium silicates in hydrothermal uranium mineralization: Geochem. Int., Vol. 11, No. 6, p. 1162-1170, illus. (incl. tables), 1974.
Experimental data which indicates that secondary uranium minerals may form in the hydrothermal process together with U^4 + oxide and silicates. From investigation of the system UO_2 - SiO_2 - Na_2O - HCL - H_2O.

Beard, M. E. See Bradley, W. H. 00241

Beard, Tom See Dole, Hollis 00669

Beard, T. N. See Smith, J. W. 01930

Beard, Thomas N. See Trudell, L. G. 02131

Beard, Thomas See Trudell, L. G. 02132

00148 Beard, Thomas N.; Tait, Donald B.; Smith, John Ward
Nalcolite and dawsonite resources in the Green River Formation, Piceance Creek Basin, Colorado, in Guidebook to the energy resource of Piceance Creek Basin, Colo.: Rocky Mt. Assoc. Geol., Field Conf., Guideb., No. 25, p. 101-109, illus. (incl. tables, sketch maps), 1974.
The authors have evaluated the resources of nalcolite and dawsonite in the lower part of the Parachute Creek Member of the Green River Formation. Maps showing thickness, average content and isoreserves are included.

00149 Bearse, A. E.
Recovery of uranium from shales: Battelle Memorial Institute. Contract No. 30-1-Gen-202. BMI-JDS-194, 1949.
Summary of work done between March 1949 to June 1949. Leaching studies continued. Most important variables: sulfuric acid concentration, time and temperature. Research on anion exchange resin was initiated.

00150 Bearse, A. E.; Bevine, R. F.; Ewing, R. A.
Recovery of uranium from shales: U. S. Atomic Energy Comm. BMI-JDS-130, 91 p. (dep.; $22.75, LC)(prepared by Battelle Memorial Institute), 1948.
Summary of work between Jan. 1948 - June 1948. Eighty percent extraction achieved by previous methods are too costly. Further research is concentrated on finding more economical method to achieve optimum efficiency. Samples used contained from .006 - .008 percent of uranium. This work concerned mainly with utilizing high sulphur content (5 - 7 percent) as means of solubilizing uranium present. Achieved 70 percent extraction.

00151 Bearse, A. E.; Ewing, R. A.; Calvert, S.
Recovery of uranium from shales: U. S. Atomic Energy Comm. BMI-JDS-175, Battelle Memorial Institute, Columbus, Ohio, 118 p., 1949.
Summary of work during the period December 1948 - March 1949. Roasting operations were increased by the use of rotary kiln. Study was directed towards roasting time and temperatures with the indication that maximum temperature improves the ratios of contaminants to uranium in leach liquors. Time, however, was found to be of minor significance. Caustic soda and other carbonates showed promise in removal of contaminants from uranium precipitate.

00152 Bearse, A. E.; Ewing, R. A.; Calvert, S.
Recovery of uranium from shales: U. S. Atomic Energy Comm. BMI-JDS-156, 67 p. (dep.; $16.75, LC)(prepared by Battelle Memorial Institute), 1948.
Summary of work done between September, 1948 and December, 1948. This report shows uranium extractions in the 60 - 70 percent range are possible by acid leaching at room temperature after roasting in a Herreshoff type of single hearth roaster. The importance of roasting conditions in further realized.

00153 Bearse, A. E.; Calvert, S.; Cichock, C. G.
Recovery of uranium from shales: U. S. Atomic Energy Comm. BMI-JDS-141, 41 p. (dep.; $10.25, LC)(prepared by Bettelle Memorial Institute), 1948.
Summary of work between June 1948 - September 1948. Leaching studies are directed toward the use of dilute H_2SO_4 and countercurrent operation. Seventy percent extraction was achieved with roasted shale. Roasting conditions are important, and studied in both muffle furnace and horizontal rotating tube furnace.

00154 Bearse, A. E.; Chocholak, J.; Devine, R. F.
Recovery of uranium from shales: U. S. Atomic Energy Comm. BMI-JDS-101, 21 p. (dep.; $5.25, LC)(prepared by Battelle Memorial Institute), 1948.
Summary of work between September, 1946 to January, 1948. Acid leaching of shale has given 80 percent extraction. HNO_3 more favorable than H_2SO_4 or HCL. Better results from raw shale that retorted shale. Samples used contained .006 - .011 percent uranium.

00155 Bearse, A. E.; Ewing, R. A.; Devine, R. F.
Recovery of uranium from shales, quarterly progress report March 15, to June 15, 1949: U. S. Atomic Energy Conn. BMI-JDS-194, 130 p. (dep.; $32.50, LC) (prepared by Battelle Memorial Institute), 1949.
Summary of developments in uranium recovery from Chattanooga shales containing from .008 to .01 percent uranium. Anion-exchange resins were found to effectively remove uranium from sulphuric acid leach solutions. A furthur simplification may be accomplished by omitting the roasting step and and substituting leaching under more vigorous conditions, permitting the utilization of highly contaminated leach solutions.

Bearse, A. E. See Ewing, Robert A. 00768

00156 Beasley, A. W.
The petrography of some Queensland oil shales: Queensl. Mus., Mem. Vol. 12, Pt. 3, p. 124-133, 2 figs., 1 pl., 1945.

00157 Bebout, C. G.; Loucks, R. G.
Geopressured geothermal prospects in Frio Formation of Texas Gulf Coast; ideal versus models. (abs.): Vol. 60, No. 9, AAPG and SEPM Gulf Coast sections annual meeting, p. 1606-1607, 1976.
The Bureau of Economic Geology, Univ. of Texas, at Austin, is searching for geopressured, geothermal prospects in sandstone and shale along the Texas Gulf Coast. Three geothermal prospects are identified in the Frio Formation and represent the models.

00158 Beck, Paul
Vorweisung bitumino ser Schiefer aus dem Kandertal (abs.): Schweizer Maturf. Ges., Verh. 121 (Bâle), p. 130, 1941. Tertiary oil shale in Switzerland.

00159 Becker, L. E.; Deoste, J. B.
General sedimentologic history of late Silurian and early Devonian events in southwestern Indiana (abs.): Am. Assoc. Pet. Geol., Bull., Vol. 60, No. 9 (Basin and arch relations of east-central United States),

p. 1618, 1976.
The general sedimentologic history of late Silurian and early Devonian events in southwestern Indiana. The finished paper could be interesting.

Becker, L. E. See Collinson, C. W. 00473

00160 Becraft, G. E.
Uranium in carbonaceous rocks in the Townsend and Helena valleys, Montana: U. S. Geol. Surv., Bull. 1046-G, p. 149-164 (out of print, but available through libraries), 1958.
Description of uranium occurence in the Helena and Townsend valleys of Montana. It is suggested the uranium was leached from bentonites and bentonized tuffs and concentrated in carbonaceous shales and lignites. As of 1958 the deposits were not commercial.

00161 Beers and Heroy, firm, Dallas Tex.
The radioactivity of black shales: U. S. Atomic Energy Comm. Pub. RMO-865, 1951.

00162 Beers, R. F.
Radioactivity and organic content of some Paleozoic shales: Am. Assoc. Pet. Geol. Bull., Vol. 29, p. 1-22, 1945.
Black shales containing up to 16 percent organic matter have been found to contain high concentrations of uranium, thorium, and potassium (K40). Excellent correlations exist between uranium-thorium ratio, and carbon content in individual shale formations (Hoover, 1960).

00163 Beers, R. F.; Goodman, Clark
Distribution of radioactivity in ancient sediments: Geol. Soc. Am. Bull., Vol. 55, p. 1229-;259, 1944.
The authors relate high Thorium/Uranium to potential petroleum source beds. It is suggested that uranium content, total alpha activity, total beta activity and Th/Ur could be indices of potential petroleum source beds. Beta-ray counters described in the text were used to measure potassium, thorium, and uranium in various sediments.

00164 Behling, M. C.
Computer techniques employed in Eastern Gas Shales Project: Mountain State Geol., No. 1, p. 17, illus., 1977.

00165 Beltskaya, S. N.; Syrova, G. M.
Novyy metod diagnostiki sostoyaniya migratsionnykh protsessov i opredeleniya pirody rasseyannykh bit-

umoidov osadochnyk porod (A new method of identifying the components of migration processes and the determination of the natural distribumins in sedimentary rocks): in Organicheskoye veshchestvo sovremennykh i iskopayemkh osadkov i metody yego izucheniya (Vassoyevich, N. B., editor), p. 242-252, illus. (incl. tables), Izd. Nauka, Moscow, Union of Soviet Socialist Republics, 1974.

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Natural gas in Eastern Interior coal basin, in Geology of Natural gas: Am. Assoc. Pet. Geol., p. 813-842, 1935.
Brief mention of New Albany shale - correlated in part with Sweetland Creek, Grassy Creek, and Chattanooga shales. Includes cross-section, structure map of Illinois Basin on base of New Albany.

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Oil reserves and possibilities in Illinois: Ill. State Geol. Surv., Ill. Pet. 72, 12 p., 1955.
Structure contour map on the base of the New Albany shale for central and southern Illinois.

00168 Bell, A. H.
Possible producing strata below the McClasky in Illinois: Oil and Gas J., Vol. 37, No. 5, p. 30-31: Ill. State Geol. Surv., Circ. 38, 4 p., 1938.
Brief mentions of New Albany shale. Structure map of Illinois Basin on base of New Albany. New Albany appears in generalized stratigraphic columns and a NE-SW cross-section across Illinois Basin.

00169 Bell, A. H.
Subsurface structure of the base of the Kinder-hook-New Albany shale in central and southern Illinois: Ill. State Geol. Surv. Rept. Invest. 92, 13 p., 1943.
Includes structure map for much of Illinois on base of New Albany shale.

Bell, A. H. See Swann, D. H. 02046

Bell, A. H. See Bond, D. C. 00212

Bell, A. H. See Illinois Geological Survey 01066

Bell, A. H. See Illinois Geological Survey 01065

Bell, A. H. See Moulton, G. F. 01483

Bell, A. H. See Willman, J. B. 02344

Bell, A. H. See William, H. B. 02336

Bell, C. N. See Gardner, E. D. 00851

00170 Bell. Harold Sill
Oil shales and shale oils: New York, D. Van Nostrand Co., illus., 1948.

00171 Bell, Kenneth G.
Uranium and other trace elements in petroleums and rock asphalts: U. S. G. S. Prof. paper 356-B, p. 45-65, diagrs., tables, 1960.
Comparison of the amounts of uranium in the crude oils, petroleums, and rock asphalts from 498 samples in the U. S. is made, citing especially high or low amounts detected. Source and mode of occurence of uranium in these materials from many localities is noted. Possible derivation of uranium from these sources is mentioned. Throughout the article, reference is made to oil fields in the midwest and west.

00172 Bell, Kenneth G.; Hunt, John M.
Native bitumens associated with oil shales, Chpt. 8 in Organic Geochemistry: New York, MacMillan Co. (Int. Ser. Mons. Earth Sci., Vol. 16), p. 333-366, illus., 1963.

00173 Bell, Kenneth G.; Goodman, Clark; Whitehead, W. L.
Radioactivity of sedimentary rocks and associated petroleum: Am. Assoc. Pet. Geol. Bull., Vol. 24, p. 1529-1547, 1940.
The role of radioactivity in the genesis of petroleum. Determinations of radioactivity were made on 21 sedimentary rocks and 7 crude oils. Bell concludes that pressure and temperature are probably more important, but much work remains to be done on the role of radioactivity.

Bella, L. See Arato, J. 00048

00174 Belser, Carl
Oil shale resources of Colorado, Utah and Wyoming: A. I. M. E. Tech. Pub. 2358, Pet. Tech., Vol. 11, No. 3, 11 p., 6 figs. incl. index, geol. maps, May 1948.
This paper summarizes the data on the oil-shale deposits of western Colorado, Utah and Wyoming. It also contains a revised estimate of the grade and tonnage of minable thickness of oil. Shale of western Colorado. (From Abstract)

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Green River oil shale reserves of northwestern Colorado: U. S. Bur. of Mines Rept. Invest. 4769, 13 p., illus., Feb. 1951.
This report is the first of a series which deal with the oil shales of the Green River formations, Northwestern Colorado, which are an important natural resources for the production of synthetic liquid fuels.

Contains many illustrations.

00176 Belser, Carl
Apparatus for producing oil from oil shale in situ: U. S. Patent 2,725,939, Dec. 6, 1955.

Belser, Carl See Duncan, D. C. 00711

00177 Belyanian, Yu. I.; Kaninskiy, U. S.; Proskuryakov, V. A.
Polucheniye malozol'nogo kerogena iz goryuchikh slantsev (The extraction of low-ash kerogen from oil shale): in Razrabetka i ispol'zovaniye zapasov goryuchikh slantsev, p. 150-155, Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

00178 Belyea, Helen R.; et al.
Upper Devonian, Chpt. 6 in Geological history of western Canada: Calgary, Albstrs, Alberta Soc, Pet. Geol., p. 60-88, illus., tables, 1966.

00179 Benson, R. H.; Collinson, C. W.
Three ostracode faunas from Lower and Middle Mississippian strata in southern Illinois: Ill. Geol. Surv. Circ. 225, 26 p., 1958.
Brief mentions of Grassy Creek and Hannibal shales as New Albany equivalents. Section descriptions include black shales.

00180 Bentley, C. B.
Mineral fuel resources - Oil shale, in mineral and water resources of Montana: U. S. Cong., 88th, 1st Sess., Comm. Print, p. 45-46, geol. map, 1963.

00181 Berendsen, P.; Nodine-Zeller, D. E.
Radiolarian-sponge-bearing phosphate nodules from Pennsylvanian black shales, southeastern Kansas (abs.): Geol. Soc. Am., Abstr. Programs, Vol. 10, No. 1, p. 1-2, 1978 (The Geological Society of America, Southcentral Section, 12th annual meeting, Tulsa, Okla., March 6-7, 1978).
Survey by the university of Kansas on phosphatic nodules from black shales. Analysis showed phosphate (up to 30 wt. percent), uranium (up to 300 ppm), and minor elements. This black shale, thought to have accumulated under anoxic conditions, is believed to mark maximum marine transgression.

00182 Berg, R. R.
Deformation of Mesozoic shales at Hamilton Dome, Bighorn, Wyoming: Am. Assoc. Pet. Geol., Bull., Vol. 60, No. 9, p. 1425-1433, 1976.
Description of diastrophic displacement of rocks along the Hamilton Dome oil field anticline. Based on fold

geometry, a significant volume of Paleozoic rocks and Mesozoic shales is thought to be present beneath the anticline. Mesozoic shales may be deformed by plastic flow and/or lost from the anticlinal flank by transfer to the adjacent syncline.

00183 Berg, R. R.; Powell, R. R.
Density-flow origin for Frio reservoir sandstones, Nine Mile Point Field, Aransas County, Texas: Gulf Coast Assoc. Geol. Soc., Trans., No. 26, p. 310-319, 1976.
Article concerned primarily with Upper Frio Sandstones which are reservoirs for natural gas. Only passing reference to interbedded sandy shales.

00184 Bergstorm, Robert E.; Shimp, Neil F.
Geological and geochemical studies of the New Albany Group in Illinois (Devonian black shale) to evaluate its characteristics as a source of hydrocarbons: University of Illinois/Ill. State Geol. Surv., Annual Rept., September 30, 1977.

00185 Berklund, Curt
Managing the public lands for minerals-energy in Pacific Southwest Energy and Minerals Conference: U. S. Bur. Land Manage., p. 5-10, 1974.

Bernard, A. J. See Amstutz, G. C. 00028

00186 Bernat, M.
Les istopes de l'uranium et du thorium et los terres rare dans l'environment marin (Uranium and thorium, and rara earth isotopes in the marine environment): Fr. Off. Rech. Sci. Tech. Outre-Mer, Cah., Sor. Geol., Vol. 7, No. 1, p. 65-85 (incl. English, Russian sum.), illus. (incl. tables, sketch maps), 1975.

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Reconnaissance for uraniferous rocks in northwestern Colorado, southwestern Wyoming and northeastern Utah: U. S. Atomic Energy Comm. TEI-308-A, 41 p., (dep.; $10.25, LC)(prepared by U. S. Geological Survey), 1952.
Reconnaissance in the Green River and Uinta Basin of Wyoming and Utah and done and no deposits commercially exploitable under present conditions were found. Maps were made and samples taken at the Skull Creek carnotite deposits in Moffat County, Colo.

Beroni, Ernest P. See Gott, Garland B. 00916

Beroni, E. P. See Gott, G. B. 00914

Berry, K. L. See Ruark, J. R. 01793

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Great Basin Devonian western assemblage rocks: Geol. Soc. Am., Abstr. Programs Vol. 9, No. 7, p. 895-896, 1977, (The Geological Society of America, 90th annual meeting, Seattle, Wash., No. 7-9, 1977).
This is a discussion of the three generalized types of Great Basin Devonian western assemblage rocks.

00189 Beskrovnyy, N. S.; Yermakova, U. N.; Taliyeu, S. D.
Bitumoidy neftesaderzhashchikh gravelitov i glin v Uzonskoy gidrotermal'noy sisteme (Bitumens from the oil-bearing gritstones and clays in the Uzon hydrothermal system): in Gidrotermal'nyye mineraloobrazuyyshchiye rastvory oblastey aktivnogo vulkanizma (Naboko, S. I., editor) p. 135-143, illus., Izd. Nauka, Sib. Otd. Novosibirsk, Union of Soviet Socialist Republics, 1974.

00190 Bestougeff, M. Combaz, A.
Action d'H#SUB'Z#BASE'S et de D surguleques substances organiques actuelles et fossiles (The action of H#SUB'-A#BASE'S and S on some present-day and fossil organic substances), in Advances in organic geochemistry 1973, Int. Mtg. Org. Geochim., Programme Abstr., No. 6, p. 747-759, illus. (incl. tables), 1974.

00191 Bettis, F.
Gas detection in sands of high silt-clay content in the Cook Inlet area: Soc. Prof. Well Log Analy., Annu. Logging Symp., No. 17, 13 p., 1976.
Gas may be detected in some shaly formations using certain quick-look techniques. Log examples of these are presented in this paper. (From abstract)

Bhattiacharyya, K. K. See Rejaram, V. 01697

Bicke, W. E. See Dinneen, G. U. 00658

Bieberman, R. A. See Kottlowski, F. E. 01239

Bigg-Wither, A. L. See Mayne, S. J. 01414

Bills, J. B. See Hoskins, W. N. 01035

Biscar, J. P. See Miknis, F. P. 01435

Biscar, J. P. See Miknis, F. P. 01434

Biscar, J. P. See Miknis, F. P. 01433

00192 Bishop, William F.
Petrology of upper Smackover Limestone in North Haynesville Field. Claiborne Parish, La. Jurassic of the Gulf Coast II,

Local Stratigraphy and Deposition: Am. Assoc. Pet. Geol., Repr. Ser., No. 13, p. 110-146, 1974.
Reconstruction of the environment of deposition of the Upper Smackover carbonate rocks (Late Jurassic). The study interval includes the oolitic and pelletoid reservoir which contains about 16 million bbl of oil in place. The Smackover transition facies is gradational into the overlying Suchner shale and includes a shaly subfacies.

00193 Bitterli, P.
Bituminous Posidonien schiefer (lias epsilon) of Mont Terri, Jura Mtsn.: Ver. Schweiz. Pet. - Geol. u. - Ing., B, Vol. 26, No. 71, p. 41-48, illus., 1960.

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On the classification of bituminous rocks from Western Europe (with discussion): World Pet. Cong., 6th, Frankfurt am Main, Pr. Sec. 1, p. 155-165 (incl. Fr. sum.), illus. (incl. sketch map), 1964.
An investigation of a wide variety of primary bituminous rock types to obtain comprehensive information of lithological composition; nature and origin of the bituminous material; stratigraphic position and regional distribution; depositional environment; and their role as oil source rocks.

00195 Bitz, Mary Carol; Nagy, Bartholomew
Method for structural studies of coal and kerogen (abs.): Geol. Soc. Am. Spec. Paper 87, p. 13, 1966.
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Petroleum and oil shale in Kentucky: Compass, Vol. 16, No. 4, p. 172-173, May, 1936.

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Depositional history and geochemical composition of lower Palaeozoic epicontinental sediments from the Oslo Region: Norg. Geol. Unders., No. 305, 81 p., 1974.
A sedimentological and geochemical description of the Lower Paleozoic sediments of the Oslo Region. Sr. and dolomite are present in the marly shales. Shales above the Ceratopyge limestone contain chlorite and illite with low carbon and sulphur content.

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Blair, R. W., Jr. See Donnell, John R. 00679

Blair, R. W., Jr. See Donnell, J. R. 00680

00198 Blake, V. N.
A paper on the Chattanooga black shale: MA thesis Vanderbilt Univ., 1910.

Blakely, J. P. See Grimes, W. R. 00932

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Outlook for developments in the solid mineral fuels: Am. Inst. Prof. Geol., Calif. Sect., Annu., Proc., No. 9, p. 16-25, 1973.

00200 Blanquart, P.; Meriaux, E.; Alpern, B.
Comparative study of the reflectance values in seams, inlets, beds, veinlets, stringers and grains of dispersed organic matter of sediments in the Nord region and Pas-de-Calis coal basin: C. N. R. S., Paric, p. 27-39, 1975.

Blatchlay, R. S. See Savage, T. E. 01826

00201 Blatx, Elmer H., Jr.
A Reconnaissance for uranium in carbonaceous rocks in southwestern Colorado and parts of New Mexico: U. S. Dept. of the Interior Preliminary Rept. TEM-915; Geol. Surv. Wash., D. C., 52 p., maps, Feb. 1955.
Coal and carbonaceous shale of the Dakota formation (Cretaceous) were examined for radioactivity. Weak radioactivity was detected but no deposits of economic importance discovered. The highest radioactivity was detected in black shale, siltstone, and sandstone of the Paradox member of the Hermosa formation (Pennsylvanian).

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The mobilization and fixation of molybdenum, vanadium, and uranium by decomposing plant matter (with discussion): J. Soil Sci., Vol. 24, No. 3, p. 368-379, illus., 1973.

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Producing characteristics of lower Morrow Sandstone in southern Ellis County, Oklahoma: Am. Assoc. Pet. Geol., Bull., Vol. 60, No. 2, AAPG Mid-Continent Section meeting, p. 318, 1976.
Brief abstract stating that drilling activity has increased in the lower Morrow formation (a thick sequence of linticular sand and shale deposited in a

cyclic transgressive-regressive sequence). The formation exhibits excellent reservoir characteristics.

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Uranium, thorium, potassium, and carbon in some black shales from the South Wales coal field: Geochim. Cosmochim. Acta, Vol. 28, p. 1177-1185, 1964.
Black shales from the South Wales coal field and analysed for uranium, thorium are 4.0 and 12.3 pp, respectively.

00205 Bloxam, T. W.
Organic geochemistry of some carboniferous shales from the South Wales coal field: G. B. Inst. Geol. Sci., Rep., No. 71-5, 6 p., (incl. Fr., Ger. sum.), illus., 1971.
Types, distribution, relationships to paleoenvironment, extractable organic materials from 63 shales, G. subcrenatum horizon.

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High molecular weight fossil porphyrins - Evidence for monomeric and dimeric tetraphyrroles of about 1100 molecular weight: Inst. Pet. J., Vol. 56, NO. 548, p. 99-106, tables, 1970: reprinted in Woods Hole Oceanographic Inst. Ref. No. 70-27, 6 p., tables, 1970.

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Selwyn Basin: Yukon and District of Mackenzie: Can., Geol. Surv., Paper No. 76-1A, Report of activities, Part A, p. 131-132, 1976.
Black shales studied comprise 2 main groups: 1) a lower group of early Ordovician to middle Devonian age consisting of carbonaceous shale, shaly limestone, minor argillaceous calcarenite and chert; and 2) an upper informal 'Black Clastic' group. Barite, lead and zinc occur in this group. Highest radioactivity comes from red shales of the 'Grit' unit and syenitic intrusive rocks of the Rogue Range. Tuffaceous rocks anomalous in U_3O_8 are associated with copper deposits in unite H_0 of Norris, 1974.

Boade, R. R. See Reed, R. P. 01709

Bobrov, V. A. See Gavshin, V. M. 00879

Bobrov, V. A. See Gavshin, V. M. 00878

00208 Bodholt, F.
Relation of shale petrology to variations in physical properties of elastic sediment across the Montana

Disturbed Belt: Ph. D. Dissertation, Montana, 1976.
P-wave velocities average 1.5 km/sec east of the disturbed belt, 2.5 km/sec adjacent to the Sawtooth range, and 2.2-2.3 km/sec west of the disturbed belt. Earth resistivity increases from east to west toward the mountain front.

Boetez, Cornelia See Filipecu, M. G. 00794

00209 Boething, F. C., Jr.
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Article concerned primarily with Lower Cretaceous Viking Sandstone with passing reference to interbedded shales. Original proven reserves for the Viking are about 8.5 trillion cu ft of gas and 850 million bbl. oil.

00210 Boething, F. C., Jr.
Typical Viking sequence; a marine sand enclosed with marine shales: Oil Gas J., Vol. 75, No. 13, p. 172, 174, 176, illus. (Viking Sandstone, Ablerta; Part 2), 1977.
Detailed description of typical Viking sequence (marine sand enclosed within marine shales). Includes photographs of coredrillings. The author reconstructs the paleoenvironment, paleogeography, and ancient flora and fauna of the region.

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Petroleum-where it came from-where it is found, How it got there, in Kentucky Oil and Gas Assoc., 30th-31st Ann. Mtgs., 1966-1967, Proc. Tech. Sess.: Ky. Geol. Surv., Ser. 10, spec. Pub. 15, p. 26-29, table, 1968.
This is a discussion of the origin, migration, maturation and accumulation of petroleum.

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Gas in Illinois Basin: in Natural Gases of North America; Part 3, Natural gases in rocks of Paleozoic Age: Am. Assoc. Pet. Geol., Mem., No. 9, Vol. 2, p. 1746-1753, illus., 1968.
A general description of gas production in the Illinois Basin. Producing locations and volume produced.

00213 Bond, H. E.
Synthetic fuel resources: Am. Assoc. Pet. Geol. Bull., Vol. 59, No. 4, p. 711-714, 1975.
The author gives a very basic general description of what oil shale is, how it forms, and its geographic distribution. A brief history of commercial development

and exploitation is outlined and the Colony Development Group/Atlantic Richfield recovery project is discussed in terms of mining technique, expenditure, production and profits. Bond also discusses briefly the outlook for oil shale exploitation and developmental problems involved.

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Synthetic fuel resources: Am. Assoc. Pet. Geol., Soc., Econ. Paleontol. Mineral, Ann. Mtg. Abstr., Vol. 1, p. 10, 1974.

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Boner, Dzh. Ye See Schmidt-Kollerus, Dzh. Dzh. 01843

Bonome, F. See Schmidt-Collerus, J. J. 01841

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Shales as a repository for radioactive waste; the evidence from Oklo.: Environ. Geol., Vol. 1, No. 5, p. 255-259, 1976.
Study of the 1.8 billion-year-oil "fossil nuclear reactor" zones at the Oklo Mine in the Republic of Gabon shows that many of the elements produced by fission have been almost completely retained in shale infilled into a fracture system in organo-argillaceous sandstone. Shale, in geographically stable areas, is considered here for radioactive waste disposal.

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Geology of the Dongola quadrangle: Master's thesis, 1922 (unpub.), U. of Chicago, 53 p. (in Survey Open - File Reports), 1921.
Brief mention of Mountain Glen shale lithology. Suggested correlation with Chattanooga and Ohio shales.

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Report of a geological survey of Clark and Floyd Counties, Indiana: Indiana Geol. Surv., Ann. Rept. 5, p. 134-189, 1874

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Recursos minerales de la Republica Argentina: III, Combustibles sólidas minerales: Inst. Noc. Inves. Cienc. Nat., Buenos Aires, Rev., Cienc. Geol. T. 5, 665 p., illus. (incl. geol. sk. maps), 1956.

Borisov, O. M. See Akhmedzhanov, M. A. 00008

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Uran v usazenych horninach (Uranium in sedimentary rocks): Cas. Min. Geol., Vol. 18, No. 2, p. 199-208, illus., 1973.

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Summary report of the project "Mineralogy of the Chattanooga shale." U. S. G. S. Trace elements memorandum report 474. For official use only.

Boucot, A. J. See Dinnison, John M. 00621

Boughton, E. M. See Cowles, J. O. 00542

Boulmier, J. L. See Oberlin, A. 01576

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The impact of energy development on water resources in arid lands: Ariz. Univ., Off. Arid Lands Stud., Arid Lands Resour. Inf. Pap., No. 6, 278 p., 1975.
Very sketchy discussion of water needs for a shale extraction operation. Cites rough estimate of 2-3 barrels water per 1 barrel oil for mining, retorting, revegetating spent shale and human consumption. Remainder of discussion deals with the problem of shale waste disposal but no satisfactory solutions are offered.

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Phosphatic oil shale near Dell and Dillon, Beaverhead County, Montana: U. S. Geol. Surv., Bull. 661-I, p. 315-328, 1918.
Stratigraphy, structure, occurence, properties, and distribution of phosphatic oil shale at two locations in Beaverhead County, Montana.

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Further studies of Ohio coals and oil shales; pt. III, Ohio shales; Ohio shales and cannel coals: Ohio State Univ. Studies, Eng. Ser., Vol. 20, No. 1 and Eng. Expt. Sta. Bull. 143.
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00224 Bowerman, J. N.; Coffman, R. C.
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Preliminary reports on uranium in Hardin County, Illinois: Ill. Geol. Surv. Circ. 200, 21 p., 1955.
Data on uranium content of samples from New Albany Shale at Hicks Dome. Includes tabulated analyses.

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A contribution to the origin of the Green River Formation and its oil shale: Am. Assoc. Pet. Geol., Bull., Vol. 9, No. 2, p. 247-262, 410, March-Apr., 1925.
A summary of what Bradley has discovered about the Green River Formation since field work began. Suggested environmental interpretation.

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Geology of the Green River Formation and associated Eocene rocks in Southwestern Wyoming and adjacent parts of Colorado and Utah: U. S. Geol. Surv. Prof. Paper 496-A, p. A81-A86, illus., tables, geol. maps, 1964.
Detailed report on the geology of the Green River and Washakic Basins. Assembled from contributions over a forty year period. Read this!

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Green River oil shale-concept of origin extended, an interdisciplinary problem being attacked from both ends: Geol. Soc. Am. Bull., Vol. 81, No. 4, p. 985-1000, illus., tables, 1970.
Biologic progenitors of the oil shale were microorganisms, microscopic algae and nonalcustrine pollens and waxy spores in shallow lake environments. This organic material consists of a bitumen fraction, an inert fraction, and kerogen. Good description of the shale and how it formed.

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An interpretation of the Green River Formation and its oil shale: Washington, Acad. Sci., J., Vol. 16, No. 3, p. 74-75, Feb. 4, 1926.

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An oil shale and its microorganisms from the Fuson Formation of Wyoming: Am. J. Sci., 5th Ser., Vol. 8, p. 228-234, 4 figs., September, 1924.
Epipolaia corymbus is identified and compared with the living genus Botrycoccus. Also noted that preservation is better in the Fuson than the Green River.

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Origin and microfossils of the Green River Formation of Colorado and Utah: U. S. Geol. Surv. Prof. Paper 168, 58 p., incl. maps, tables, diag., 1931.
Geological aspects of the Green River Formation are discussed at length. Topics covered include structure, stratigraphy, lithology, topography, and origin. Oil shales in this formation are also discussed in terms of occurence, structure, minerology, and especially microfossils. No discussion of economic importance is included.

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Shorephases of the Green River Formation in northwestern Sweetwater County, Wyoming: U. S. Geol. Surv. Prof. Paper 140, p. 121-131, 2 figs., 5 pls. (incl. map), Feb. 13, 1026.
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Tropical lakes, copropel, and oil shale: Geol. Soc. Am., Bull., Vol. 77, No. 12, p. 1333-1337, illus., table, 1966.
Bradley located a present day, fresh water lake which could be modern analogue to Green River sedimentation. Organic decomposition to hydrocarbons is discussed.

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Mud Lake, Florida; its algae and alkalines brown water: Limnology and Oceanography, Vol. 14, No. 6, p. 889-897, illus., table, 1969.

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Mechanical design in oil-shale retorting plants: Trans. ASME, Vol. 75, p. 441-451, 1953.
Retorting and the latest (in 1955) design developments of retorting equipment for oil shale are discussed in this paper.

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Devonian of northeastern Missouri: Ill. Geol. Surv. Bull. 68, p. 174-181, 1944.
Brief discussion of Grassy Creek Shale-lithology, thickness, correlations. Generalized columnar sections, cross-sections.

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Notes on the Ohio shales and their faunas: Univ. of Missouri Bull., Sci. Ser., Vol. 2, No. 2, p. 23-32, pl., 1911.
A study of invertebrate and vertebrate fossil faunas from Devonian black shales in north-central Ohio. There was some mention of stratigraphy in describing the twelve fossil horizons author collected from. There was no mention of oil or gas.

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Conodonts from the Grassy Creek Shale of Missouri: Univ. of Missouri Studies, Vol. 8, No. 3, p. 161-259, 1934.
Mostly systematic paleontology of conodonts, but includes discussion of Grassy Creek age and correlations. Generalized stratigraphic sections and descriptions.

00247 Branson, F. A.; Miller. R. F.; McQueen, I. S.
Plant communities and associated soil and water factors of shale-derived soils in northeastern Montana: Ecology, Vol. 51, No. 3, p. 391-407, illus., 1974.

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Evaluating slope stability in jointed rocks; in 12th Ann. Eng. Geol. and Soils Engineering Symp., p. 49-57, illus., 1974.

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High-temperature shale oil; production and utilization: Ind. Eng. Chem., Vol. 44, p. 2641-2647, 1952.
The study was directed at determining the effects of temperature on the quantity and quality of liquid and gaseous products obtained from the experiments.

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Usefulness of ostracodes in correlation Middle and Upper Devonian rock sequences in western Canada: Geol. Soc. Am., Abstr. Programs, Vol. 9, No. 7, p. 909-910, 1977. (The Geological Society of America, 90th annual meeting, Seattle, Wash., No. 7-9, 1977).
Ostracodes are useful in regional correlations in Canada, determining facies relationships reconstructing the geologic history of the Norman Wells reef complex, and in discussing the Middle-Upper Devonian boundary in the Northwest Territories.

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Chemical and structural relationship of lignin to humic substances: Fuel, Vol. 30, No. 9, p. 204-208, illus., London, Sept. 1951: Nova Scotia Dept. Mines, Conf. on the origin and constitution of coal, June 1950, Crystal Cliffs, p. 111-119, illus. (1951?): reprinted, slightly revised, Cong. Av. Etudes de Stratigraphic et de Geologie du Carbonifere, 3e, Heerlen, June 25-30, 1951, Compte Rendu, Tome 1, p. 61-64, illus., Maer stricht, 1952.

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Effects of destructive distillation on the uranium associated with selected naturally occuring carbonaceous substances: U. S. G. S. Trace Elem. Inv. Rept. 338, 11 p., tables, 1953. For official use only.

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Germanium and uranium in coalified wood from Upper Devonian black shale: U. S. G. S. Trace Elem. Inv. Rept. 496, 12 p., tables, 1954. For official use only.

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Radioactive equilibrium in ancient marine sediments: Geochim. Cosmochim. Acta, Vol. 8, p. 63-73, 1955.
Radioactive equilibrium in eight marine sedimentary formations has been studied by means of direct determinations of uranium, radium, and thorium.

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The role of organic matter in the accumulation of uranium; the organic geochemistry of the coal-uranium association with discussion; in Formation of Uranium Ore Deposits (see Nininger, R. D.); Chemical and physical mechanisms in the formation of uranium mineralization, geochronology, isotope geology and mineralogy: I. A. E. A., Proc. Ser., No. STI/PUB/374, p. 99-124, illus., 1974.
Geochemical studies were carried out on 64 specimens of coalified logs from Traissic and Jurassic uranium-bearing sediments of the Colorado Plateau and from Paleocene and Eocene sediments of Wyoming. (From abstract) This work has led to a generalization of principals underlying the association of uranium with coal. (Author)

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Kerogen in the Chattanooga Shale: Sci., Vol. 137, p. 221-224, 1962.
The study reported here of the origin and composition of Chattanooga shale suggest why these shales are not source beds for petroleum. Includes tables of results and a sketch map of the area.

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Geochemistry of uranium-bearing carbonaceous rocks: U. S. Atomic Energy Comm. TEI-540, p. 183-190 (dep.; $6, National Technical Information Service)(NTIS, U. S. Dept. of Commerce, Springfield, Virginia 22161)(prepared by U. S. Geological Survey). 1955.
Data collected during research supports the conclusion that the uranium in the Chattanooga Shale is present as a colloidal phase disseminated through the matrix as organic matter (Hoover, 1960).

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Geochemical interrelationships among fossil fuels, marsh, and landfill gas in The future supply of nature-made petroleum and gas; Technical Reports: Pergamon Press, New York, N. Y., p. 913-918, 1977.

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Effects of destructive distillation on the uranium associated with selected naturally occuring carbonaceous substances: Sci., Vol. 120, p. 310-312, 1954.
A number of carbonaceous substances were subjected to dry distillation in small-shale glass apparatus. Experimental results were evaluated on the basin of material balances. Includes tables of results.

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Germanium and uranium in coalified wood from Upper Devonian black shale (Tennessee-Ohio): Geochim. Cosmochim. Acta, Vol. 7, p. 287-293, 1955.
Some samples of the Cleveland Shale coalified wood show enough detail to be identified with the gerus Callizylon. The germanium is believed to have been part of the element constituents of the living wood. The wood probably absorbed uranium with the formation of organi-uranium compounds after replacement of the wood in the sediments. Tables give quantitative information on the component wood, ash, etc. (Hoover, 1960).

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Geochemistry of kerogen from the Sharon Springs Member of the Pierre shale (abs.): Geol. Soc. Am. Bull., Vol. 71, No. 12, Pt. 2, p. 1822-1833, 1960.
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Environmental impact of large scale development of coal and oil shale: Am. Astronaut. Soc., Publ., Sci, Technol., Vol. 35, (Energy delta; supply vs. demand), p. 273-282, 1975.

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Les schistes bitumineus francais (French oil shale): Ann. Mines (Paris), Vol. 184, No. 4, p. 97-114 (incl. Eng. sum.), illus., incl. maps, tables, 1978.

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Gradual species replacement in the Mahantango Shales (Middle Devonian , Central Penn.): Geol. Soc. Am. Abstr.

Programs, 1978 Annual Mtg. Vol. 10, No. 7, p. 371, 1978.
Within a 7 meter interval a gradual progradational event successively replaced Devonochonetes by Mucrospirifer and Cypricardella; Mucrospirifer and Paracyclas; and finally be Paracyclas which then abruptly terminated. This analysis emphasizes the futility of assigning any isolated sample to a paleocommunity though community-type studies of coevolving populations is more promising.

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Trip G - A selected Middle Devonian (Hamilton) fossil locality reference selection: Guidebook - 46th Ann. Mtg., N. Y. Geol. Assoc., p. G11-G15, 1974

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Contacts of the Windom Member (Moscow Formation) in Erie County, New York, in Guidebook, 46th Ann. Mtg., N. Y. Assoc., C1-C22, 1974.

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Bibliography of petroleum and allied substances 1922-1923: U. S. Bur. of Mines Bull. 290, 667 p., 1929.
Brief bibliography including noteworthy writings from both the U. S. and foreign countries.

Broadhead, R. L. See Kinney, C. R. 01193

Broadhead, R. L. See Kinney, C. R. 01194

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Biostratigraphy and paleoecology of the Floyd Shale, Upper Mississippian, northwest Georgia: Master's, Texas (Austin), 1975.

Brobst, D. A. See Culbertson, J. K. 00559

Brodie, E. C. See Van Meter, Robin 02237

Browman, W. M. See Kilburn, Paul D. 01184

00270 Brongersma-Sanders, Margaretha
Mass mortality in the sea, Ch. 29 of Hedgpeth, J. W., (ed.)

Ecology: Geol. Soc. Am. Mem. 67, p. 941-1010, illus., Dec. 30, 1957.

A survey of mass mortality in the sea and in the land waters and the causes, a significance to paleontology. Also a discussion of mass mortality occuring in regions where future deposits of phosphorite and highly bituminous rocks are developing. Causes: volcanism, earth and seaquakes, salinity, temperature, waterbloom, H_2S, stranding, storms, etc. Plus an appendix of documented mass mortalities.

00271 Brookins, D. G.
Favorable criteria for radioactive-waste-disposal sites in shales based on geologic, geochemical, and theroretical study of Oklo uranium mine, Gabon: Am. Assoc. Pet. Geol., Bull., Vol. 61, No. 5, p. 771, 1977, (abs.)(annual meeting, Washington, D. C., June 12-16, 1977).

Oklo data support the feasibilitly of radioactive-waste disposal in tectonically favorable shale sites with an outside packing of high CEC K-bentonite and sulfate. The 1.8 billion-year-old fissionogenic elements from the reaction have been retained in the shale or only locally redistributed.

00272 Brookins, D. G.
Shale as a repository for radioactive waste; the evidence from Oklo.: Environ. Geol.; Vol. 1, No. 5, p. 255-259, 14 Ref. table, 1976.

The author points out the apparently desirable qualities of a highly mineralized shale as a repository for radioactive waste disposal. He discusses a study of the 1.8 billion-year-old "fossil nuclear reactor" zones at the Oklo Mine, in the Republic of Gabon. Includes abstract.

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Rb-Sr isotopic age of Eskridge Shale (Lower Permian), eastern Kansas: Sed. Geology, Vol. 4, No. 2, p. 103-115, illus., tables, 1970.

Good description of methods and procedures for Rb-Sr age determinations. Samples of Eskridge Shale with 87 Rb-86 Sr ratios less than 1 define a least-squares isochron of 300±4 million years mazimum age, using 50 billion years as a half life of 87 Rb. (There is some controversy as to whether the half life is 47 b. y. or 50 b. y.). The base of the Eskridge Shale lies approzimately 280 feet above the Pennsylvanian-Permian boundary which is dated at 270-280 million years (?).

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Recovering vanadium from dolomitic Nevada shale: U. S. Bur. of Mines, Rept. Invest., No. 7932, 20 p., 1974.
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The North LaWard shale diapir: South Texas Geol. Soc. Bull., Vol. 6, No. 19, p. 6-19, illus., 1966.

00276 Brooner, Frank I., Jr.
Shale diapirs of the Lower Texas Gulf Coast as typified by the North LaWard diapir: Corpus Christ. Geol. Soc. Bull., Vol. 10, No. 6, p. 6-10, 14-24, illus., 1970.
Detailed description of the North LaWard diapir. A necessary condition for the formation of a shale diapir is the presence of a thick deep-water marine shale with plastic flowage characteristics. Diapirs may form at varied depth ranges, and may or may not have associated faults. As a general rule, diapirs that piere the Frio sediments are less attractive oil exploration targets that the deep-seated non-piercement types.

00277 Brooner, Frank I., Jr.
Shale diapirs of the Lower Texas Gulf Coast as typified by the North LaWard diapir: Gulf Coast Assoc. Geol. Soc. Trans., Vol. 17, p. 126-134, illus., 1967.
Detailed description of the North LaWard diapir. A necessary condition for the formation of a shale diapir is the presence of a thick deep-water marine shale with plastic flowage characteristics. Diapirs may form at varied depth ranges, and may or may not have associated faults. As a general rule, diapirs that pierce the Frio sediments are less attractive oil exploration targets that the deep-seated nonpiercement types.

00278 Brown, Andrew
Notes of Eastern oil shale drilling: U. S. G. S. Trace Elem. Mem. Rep. 333, 1952. For official use only.

00279 Brown, Andrew
Experimental drilling in Chattanooga shale: U. S. G. S. Trace elements Mem. Report 363, 1958.

00280 Brown, Andrew
Uranium in the Chattanooga shale of eastern Tennessee: U. S. Geol. Surv. Prof. Paper 300, p. 457-462 (out of

print, but available through libraries), 1956.
Chattanooga shale (especially in the Eastern Highland Rim in Tennessee), contains in places sufficient uranium to make it a potential low-grade ore. The Gassaway member, ranging in thickness from 13.4-18.5 feet, is the most promising containing from 0.005-0.008 per cent uranium. The form in which the uranium occurs is not yet known.

Brown, Andrew See Breger, Irving A. 00256

Brown, B. C. See Wright, F. D. 02376

00281 Brown, B. C.; Wright, F. D.; Ballinger, H. J.
Some innovations in equipment for scaling high roofs and mine walls: U. S. Bur. of Mines Rept. of Invest. 4739, 11 p., 1950.
Describes new and unique equipment developed by the Bureau of Mines for placing men in position to scale loose rock from walls, pillars, and roofs of underground mines. (From abstract)

00282 Brown, Dennis; Earnshaw, D. G.; McDonald, F. R.
Gas-liquid chromatographic separation and spectrometric identification of nitrogen bases in hydrocracked shale oil naphtha: Anal. Chem., Vol. 42, No. 2, p. 146-151, illus., tables, 1970.
A tar lease concentrate from a hydrocracked shale oil naphtha was separated by gas-liquid partition chromatography using nonpolar and polar columns. This analysis is valuable for determining the nature of a material which could become a by-product of shale and refining.

00283 Brown, J. C.; Dey, A. K.
The mineral and nuclear fuels of the Indian subcontinent and Burma; a guide to the study of coal, oil, natural gas, uranium and thorium resources of the area: p. 517, illus. (incl. tables, sect.; geol. maps), Oxford Univ. Press, Delhi, India, 1975.
Appendix 1 gives a general description of oil shales and a more detailed description of Tertiary shales in depositional basins of lower Burma. The freshwater deposits consist of a lower division of sands and boulder beds and an upper one of shales and oil shales.

Brown, J. F. See Cottingham, P. L. 00539

Brown, J. F. See Tihen, S. S. 0210;

Brown, J. H., Jr. See Cashion, W. B. 00387

Brown, J. H., Jr. See Donnell, J. R. 00681

00284 Brown, Jon T.
The associated minerals dilemma and the new federal oil shale policy: Rocky Mt. Mineral Law Rev., Vol. 5, No. 1, p. 1-17, reprinted, 1967.

00285 Brown, J. W.; Repsher, R. C.
Detection of rubble zones in oil shale by the electrical resistivity technique: U. S. Bur. of Mines Rept. of Invest. 7674, 17 p., 1972.
Electrical resistivity studies were conducted at three sites in Wyoming in an effort to find underground rubble zones in oil shale and determine size and resistivity contrast.

00286 Brown, K. B.; Grimes, W. R.; Susano, C. D.
Progress report on shale studies, August 1948: U. S. Atomic Energy Comm. Y-235, 33 p. (dep., mc; $8.25, LC) (prepared by Carbide and Carbon Chemicals Corp.), 1948.

00287 Brown, K. B.; Grimes, W. R.; Susano, C. D.
Progress report on shale studies for the month of September 1948: U. S. Atomic Energy Comm. Y-279, 24 p. (dep., mc; $7.20, LC)(prepared by Carbide and Carbon Chemicals Corp.), 1948.
Experiments are reported on the recovery of U from oil shale by H_2O leaching of the roasted ores. Techniques for the precipitation of hexavalent U from oil shales batches are discussed. (From abstract)

00288 Brown, K. B.; Grimes, W. R.; Susano, C. D.
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A study was made of U recovery from oil shale including cascade waste leaching of roasted ore, leaching of burned shale, and analytical development and recovery of U from leach solutions. (From abstract)

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Regards Chattanooga Shale as Late Devonian, though the oldest beds of the formation could be late Middle Devonian. Maury Shale is Mississippian (Kinderhook and possible Osage)(Hoover, 1960).

00984 Hassan, M.
The use of radioelements in diagenetical studies of shale and carbonate sediments: in Petrographie de la matiete organique des sediments, relations avec la paleotemperature et le potentiel petrolier, p. 173-186 (incl. French sum.), illus., C. N. R. S., Paris, France, 1975.
Shale and carbonate samples from Europe and Africa were studied to determine diagenetic changes affecting geochemistry of the sediment. Mobility and association of three naturally radioactive elements (uranium, thorium, and potassium) is examined.

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Stratigraphic distribution of Devonian Harrell Shale fauna: Geol. Soc. of Am. Abs. Programs. 1978 Ann. Mtg. Vol. 10, No. 7, p. 417, 1978.
Analysis of the relationship between faunal distribution and lithic subdisivions of the Harrell Shale definite stratigraphic control of the Harrell fauna. Results of study are interpreted to represent faunal reaction to increased silt and shallowing of waters as the Brallier silts and muds prograded westward.

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Relation of type Millboro Shale in Virginia to Romney Group (Devonian) of West Virginia and Maryland (abs.): Geol. Soc. Am. Spec. Paper 115, p. 476-477, 1968.
An attempt at stratigraphic correlation of the Millboro shale, a black shale, to sections west and northwest of its Virginia type locality. Classification of names given to formations of the area.

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Stratigraphy of the Carlisle Shale (Upper Cretaceous) in Kansas: Kansas State Geol. Surv. Bull., Vol. 56, 155 p., 1962.
Comprehensive stratigraphy plus reconstruction of depositional environment and paleogeography. The Carlisle and its equivalents (Colorado, Cody, Benton and Mancos) are believed to represent the regressive half of the first major late Cretaceous cycle in the Western Interior region. Useful as a model.

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Stratigraphy of the Graneros Shale (Upper Cretaceous) in central Kansas: Kansas State Geol. Surv. Bull., Vol. 178, 83 p., 1965.
A careful, fully integrated and comprehensive

stratigraphic study of a thin (70m), but very widespread, shale extending from Arizona to southern Canada and beyond. Discussion of its paleontology, tracks and trails, petrology, paleoecology and provenance plus paleogeography all nicely summarized in ten conclusions. More shales need to be studied in this manner. Compare with Davis (1970), Pelzer (1966), and Gill, et al. (1972).

Haug, Patricia A. See Burlingame, A. L. 00309

Haug, P. See Simoneit, B. R. 01897

00989 Haug, Pat; Schnoes, H. K.; Burlingame, A. L.
Isoprenoid and dicarboxylic acids isolated from Colorado Green River shale (Eocene): Science, Vol. 158, No. 3802, p. 772-773, illus., 1967.
Reported is isolation of the C_9 and C_{10} isporenoid carboxylic acids, the C_{12} to $C_{18}2$, W-dicarboxylic acids, and 2-methyl 1, n-dicarboxylic acids for organic extract of the Colo. Green River Shale. (From abstract)

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Devonian Shale Gas in west Virginia: Dallas, Am. Pet. Inst. Div. of Production, 1958. 4 p., map, table. Paper 826-29-G. For presentation at Spring mtg. of Eastern Dist., A. P. I. Div. of Div. of Production, Columbus, Ohio, May 7-9, 1958.

Haum, John D. See Murray, Keith D. 01501

00991 Hawkes, H. E.
Exploration geochemistry bibliography, period January 1972 to December 1975; Assoc. of Exploration Geochemists, Spec. Vol., No. 5, 1975.

00992 Hawley, James E.
Generation of oil in rocks by shearing pressures; I, The problems - methods of determining the soluble organic content of oil shales: Am. Assoc. Pet. Geol. Bull., Vol. 13, No. 2, p. 303-328, 1 figs., April 1929; II, Effects of shearing pressures on oil shales and oil bearing rocks: Am. Assoc. Pet. Geol. Bull., Vol. 13, No. 4, p. 329-365, 8 figs., April 1929; III, Further effects of high shearing pressures on oil shales: Am. Assoc. Pet. Geol. Bull., Vol. 14, No. 4, p. 451-481, 3 figs., April 1930.
Hawley-Part 1
Description of tests to determine the soluble organic content of oil shales. Also gives results of tests on oxidation of organic matter in oil shales, and

extraction of oil shales from Colorado.
Hawley-Part 2
Oil shales from Colorado, Kentucky, and other locales subjected to high shearing pressures of varying intensity to determine if this had any effect on oil yield. Tests described and results presented in tables. There was some mention of testing apparatus.
Hawley-Part 3
Test results, procedure, and description similar to those of Parts 1 and 2, but Indiana oil shale and Kentucky cannel coal also tested. Results conclude shearing pressure tests all failed to generate oil, but show that more soluble organic matter may be extracted from sheared than unsheared specimens.

Haworth, G. R. See Zambas, P. G. 02390

00993 Haynes, Donald D.; Hackman, R. J.
Geology, structure, and uranium deposits of the Marble Canyon Quadrangel (1° 2°), Arizona: U. S. Geol. Surv. Misc. Invest. Map I-1003, 1978.
Geologic map of Marble Canyon section, northeastern Arizona. Section is 1°2°. Brief description of exposed formations on Sheet 2.

Hazek, N. M. T. See Shazly, E. M. 01885

Heacock, R. L. See Hood, A. 01025

00994 Heady, H. H.
Differential thermal study of Colorado oil shale: Am. Mineral., Vol. 37, p. 804-811, 1952.
This investigation concerns an application of differential thermal analysis to Colorado oil shale. Its purpose was to determine in any mineral constituents, espec. clays, could be identified in the oil shale and to determine the types of thermal reactions taking place during pyrolyses of the organic constituent of the shale. (From abstract)

Heady, H. H. See Hubbard, A. B. 01046

Heady, H. H. See Jacobson, I. A. 01100

Heady, H. H. See Robinson, W. E. 01762

Heady, H. H. See Smith, H. N. 01913

00995 Heady, H. H.; Adams, L. G.; Dinneen, G. U.
Composition of naphtha from hydrogenation of gas-combustion

shale oil: U. S. Bur. of Mines Rept. of Invest. 5662, 12 p., 1960.
This report describes the composition of a naptha produced by retorting of Colorado oil shale. Paraffins, cycloparaffins, aromatics, and olefins were identified from analyses of 105 narrow-boiling distillation fractions. Character of these major groups is cited.

00996 Heald, D. C.; Ayres, Eugene
Our reserves of coal and shale, in Our Oil Resources, Fanning, ed., p. 157-209, 3 figs., index maps, 1945.
The oil shale resource locations, richness, reserves, and availability are discussed. Yields of oil shale, production costs, initial investments, and manpower have to do with the economics of development.

Heald, M. T. See Donaldson, A. C. 00671

00997 Heckel, P. H.
Origin of phosphatic black shale facies in Pennsylvanian cyclothems of midcontinent North America: Am. Assoc. Pet. Geol., Bull., Vol. 61, No. 7, p. 1045-1068, 1977.
Cyclothems are the reasons for Upper Penn. facies. Phosphatic black shale explained by the fact that oceance were deep enough to develop thermoclines. This prevented oxidation. Continental and regional depositional models are presented, as well as paleontological data.

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Mud and methane: in Geological Principles of World Oil Occurrence: Natl. Conf. Earth Sci., (Pap.)(Alberta Univ.), Vol. 1974, p. 61-69, 1975.

00999 Hedberg, Hollis D.
Relation of methane generation to uncompacted shales, shale diapirs, and mud volcanoes: Am. Assoc. Pet. Geol., Bull., Vol. 58, No. 4, p. 661-673, illus., 1974.
Discusses how and why through biochemical processes organic matter can be broken down in to methane. Illustrates how this methane can become trapped in normal sedimentation processes. Relates this situation in shale diapirs and mud volcanoes to petroleum exploration.

01000 Hedling, William G.; Folley, John D., Jr.
Standardization of continuous minor control configurations: U. S. Bur. of Mines OFR-25-72, 24 p. ($3, NTIS), 1972.
From compiled data, a tentative standardized continous minor control configuration was designed with applicable principles and guidelines of human engineering factors.

01001 Heling, D.
Micro-fabrics of shales and their rearrangement by compaction: Sedimentology, Vol. 15, p. 247-260, 1970.
The best paper to date on shale fabric. Grain-size distribution, total porosity, pore-size distribution, (by mercury porosimetry) and specific surface area (by BET sorptometry) were measured. Down to 1000m, these properties are controlled only by compaction, but below this zone recrystallization effects become important.

Heller, S. See Bil-Av, E. 00893

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Informe geologico sobre el terciaro con esquitos nituminosos en la region del curso superior del rio Queuco (prov. Bio-Bio, departmento de la Laja): Bol. Mines y Petrol., Santiago de Chile, t. 5, No. 48, p. 311-328, 2 figs., Jl'35. Tertiary oil shales near Queco River.

Henderson, J. W. See Swann, D. H. 02047

Henderson, R. A. See Arnold, G. O. 00055

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Oil shale processing methods: in Oil shale symposium, 7th Proceedings, Colo. Sch. Mines, Q., Vol. 69, No. 2, p. 45-69, illus. (incl. sketch map), 1974.
Rough description of different oil shale processing methods, including Fischer Assay, NTU method, gas combustion method, Union oil process, TOSCO 2 process, Lurgi-Ruhrgas process, Paraho demonstration project, and Petrosix process. Tables, pictures, and diagrams for these processes are shown.

01004 Henderickson, Thomas A.
Synthetic fuels data handbook: Cameron Eng. Inc., 308 p., illus., Denver, Colorado, 1975.

01005 Hendron, A. J., Jr.; Mesri, G.; Camlde, J. C.
Compressibility characteristics of shales measured by laboratory and in situ tests, in Determination of the in Situ Modulus of Deformation of Rock (Symposium, ASTM, Winter Mtg., Denver, Colo., 1969): Am. Soc. Testing and Materials Spec. Tech. Pub. 477, p. 137-153, illus., table, 1970.

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Facteurs controlant la distribution des éléments dans les shales uranifères du bassin Permien de Lodeve

(Herault), France, in Athens, Greece 6-10 May 1974: Internat. Atomic Energy Agency STI/PUB/374, p. 359-380, with discussion ($38, UNIPUB, Inc., P. O. Box 433, Murray Hill Station, New York, N. Y. 10016)(English abstract), 1974.

Petrographic, chemical, and minerological studies on one hundred samples determine the composition of this bituminous "pelite". Fundamental geologic processes, a heavy metal anomaly, presence of fine organic matter, and low temperature formation of recent minerals leads to reconstruction of the sedimentation medium and paleogeographic environment. Environs of higher uranium deposition outlined.

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Radioactive mineral resources of South Carolina: South Carolina Div. Geol. Misc. Rept. MR-4, 4 p., illus., 1969.

Hess, Frank D. See Marx, Paul C. 01400

01008 Hess, Reinhard
Turbiditic and non-turbiditic mudstone of Cretaceous Flysch Sections of the East Alps and other basins.: Sedimentology, Vol. 22, p. 387-416, 1975.

Comprehensive criteria in Table 3 to differentiate between turbidite and non-turbidits mudstones in Mesozoic and Cenozoic turbidite basins. Significant because many thick basinal shales are associated with distal turbidities. To what extent can these and related criteria be applied to differentiate subenvironments of mudstones in non-turbidite basins?

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Pizarras bituminosas de la sierra de Bodes, provincia de Oviedo: Spain, Inst. Geol. y Min., Notas y Com., No. 12, p. 169-175, illus. (incl. geol. sketch map), 1944. Cretaceous oil shale in Spain.

01010 Hickman, R. C.; Lynch, V. J.
Chattanooga Shale investigations: U. S. Bur. of Mines RI-6932, 55 p. (free, Publications Distribution Brand, U. S. Bureau of Mines - USBM), 4800 Forbes Avenue, Pittsburg, Pennsylvania 15213), 1967.

Investigations were conducted on the Chattanooga Shale in Tennessee to determine if it is a potential source of uranium or oil. Core drillings from 72 holes proved the resources are not now economically comparable to those in western states. Complete data on each hole is given.

Hicks, W. G. See Musgrave, A. W. 01505

Higa, J. A. See Kim, K. E. 01187

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Remarks on the uranium contents of some black shales and phosphates from Kesseir and Safage: Egyptian Acad. Sciences Proc., Vol. 11, p. 63-66, 1955.

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Oil from shale: Proc. World Power Conf., London, Vol. 1, p. 753-762, Sept. 24-Oct. 6, 1928.

01013 Hill, Harry H.
Shale and the production of oil from shale: Fuel Conference (World Power Conference, London, 1928), Trans., Vol. 1, p. 753-762, 1929.

Hill, H. H. See Gavin, M. J. 00874

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An optically active triterpane, gammacerane in Green River, Colorado oil shale bitumen: Chem. Comm. (London), No. 20, p. 752-754, Oct. 19, 1966.
These experimental results confirm the identity of the hydrocarbon Kr 62-148 as gammacerane in Green River, Colorado oil shale bitumen.

Hiser, A. L. See Estep, Patricia, A. 00765

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Formation of ralstonite during low-temperature acid digestion of shales: Can. Mineral., Vol. 14, Part 3, p. 39;-392, 1976, Alberta Res. Counc.; Contrib. No. 772.
Discussion of treatment of shales containing kerogen from western Canada with acid that yields ralstonite. This is determined from X-ray diffraction and infrared spectral analysis. Methods of other workers in producing ralstonite are cited.

01016 Hite, Robert J.; Dyni, John R.
Potantial resources of dawsonite and nahcolite in the Piceance Creek Basin, northwest Colorado, in Symposium on Oil Shale, 4th: Colo. Sch. Mines, Q., Vol. 62, No. 3, p. 25-38, illus., 1967.
Areas of Green River Formation in Piceance Creek Basin that contain two potential economic by-products of oil shale in the area are discussed. Stratigraphy and geochemistry of the area are presented. Economics of mining dawsonite and nahcolite are outlined.

Hiteschue, R. W. See Clarke, E. L.

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Hydrocarbon veindikes and oil shales: Eng. and Mining J. -Press, Vol. 119, No. 16, p. 653, April 18, 1925.
This 1925 letter to the editor discusses the origin of hydrocarbon veindikes and oil shales.

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Biostratigraphy of the Late Devonian black shales on the cratonal margin of the Appalachian Geosyncline: Ph. D. theses, Boston Univ., 211 p.: Abs. No. 76-21, 285, Diss. Abs. Int., Sect. B, Vol. 37, p. 1150-B, Spet. 1976.
Paleoenvironmental analysis, faunal lists. Correlation with Eurpoean Standard Section. Black shale lithosome considered time-transgressive; Devonian-Mississippian boundary higher in shales to east than in shales to west.

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Advanced stimulation systems applied to massive hydraulic fracturing; techniques and results: in The future supply of naturemade petroleum and gas; technical reports (Meyer, R. F.; editor), p. 723-729, illus., Pergamon Press, New York, N. Y., U. S. 1977.

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The role of porphyrins in the goechemistry of petroleum with French abs., in Petroleum industry - General problems - World Petroleum Cong., 7th Mexico, 1967, Proc. Vol. 9: London, Elsevier Publishing Co., p. 117-128, illus., tables, 1967.

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The extractable organic matter in Precambrian rocks and the problem of contamination: in Geochemistry and the Origin of Life, Vol. 14, p. 297-300, illus., (incl. table), Dowden, Hutchison & Ross, Inc., Stroudsburg, Pa., United States, 1974, Reprint from Carnegie Inst. Washington, Yearbook 64, 1965.

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Saturated fatty acids from the oxidation of kerogen (abs.): Geol. Soc. Am. Spec Paper 101, p. 96, 1968.
Tests conducted on kerogan from recent to Precambrian age, including Freen River shale samples. Yields of carbon in saturated fatty acids were given.

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Oil shale in Virginia (abs.): Geol. Soc. Am. Bull., Vol. 49, No. 12, pt. 2, p. 1950-1951, December 1, 1938.
Discussion of oil shale in the Romney Formation, which is unusually due to structural and metamorphic charac-

teristics. Little or no economic importance is given to this shale, but it could be connected to neighboring oil and gas deposits.

Holden, W. F. See Carlson, E. H. 00355

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Some detailed sections of the New Albany Shale near North Vernon, Indiana: Cincinnati, Univ. of Cincinnati, 78 p., 15 pls., 14 figs., 1953.

Holland, H. D. See Rick, R. A. 01732

Hollingshead, R. D. See Nevens, Thomas D. 01556

Holloway, L. R. See Hitchon, B. 01015

Holmes, M. See Chancellor, R. E. 00406

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Organic metamorphism and generation of petoleum: Am. Assoc. Pet. Geol., Bull., Vol. 59, No. 6, p. 986-996, 1975.
Discusses the 'Level of Organic Metamorphism Scale,' which measures the extent of thermal metamorphism or organic matter buried in sediments. Relates temperature and time to LOM in petroleum and gas gormation. Depths of two wells versus the maturity and LOM show how zones of hydrocarbon formation can be predicted. One well analysed was in Piceance Creek Basin in Colo.

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Oil shale in a producing oil field in California: U. S. Geol. Surv. Prof. Paper 154, p. 171-173, 1 pls., March 20, 1929 .
General account of oil shale taken from cores at south end of San Joaquin Valley, Cal. Richness and microscopic examination are summarized. Stratigraphic relations of oil shale to nearby oil producing zones are presented.

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Devonian - Mississippian shale sequence in Ohio: Ohio Div. of Geol. Surv., Inform. Circ., No. 27, 154 p., 3 pls., 1960.
Extensive study of Devonian-Mississippian shales in Ohio. Discusses stratigraphy, paleoecology, paleogeography, structure, sedimentary structures, geochemistry, and economic geology. Includes

generalized stratigraphic column, cross-section, structure maps, isopach maps. Extensive annotated bibliography of Ohio black shales and correlative units.

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The coal and oil shale research programs of the U. S. Geol. Surv.: Explor. Econ. Pet. Ind., Vol. 13 (New ideas, new methods, new developments), p. 159-174, 1975.

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Correlation of subsurface Devonian of Sandoval Pool. Marion County, Illinois, with Devonian outcrop of southwestern Illinois: Am. Assoc. Pet. Geol. Bull., Vol. 28, No. 10, p. 1528-1542, 1944.
Brief mention of New Albany Shale (considered Mississippian). Generalized stratigraphic sections.

Hopkins, C. B. See Carpenter, H. C. 00365

Hopkins, C. B., Jr., See Frost, C. M. 00831

Hopkins, M. E. See Ostrom, M. E. 01595

Horne, J. W. See Finley, W. L. 00797

Horne, J. W. See Tisot, P. R. 02108

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Comparison of oils derived from coal and from oil shale: U. S. Bur. of Mines, Rept. of Invest. 2832, 34 p., 1927.
Properties and yields of oil shale, lignite, and sub-bituminous coal were compared to see if their yeild of crude oil and tar was different from typical oil shales, and the yield of naptha would be suitable for use in motor fuels. The coals were subjected to conditions similar to those of oil shale retorting. Complete locations of the samples and results of experiments are given.

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Apparatus for determination of hydrogen sulfide in gases: U. S. Bur. of Mines Rept. of Invest. 3135, 6 p., 1931.
"This paper deals with the apparatus and method used in determining the amount of hydrogen sulfide evolved in the laboratory experimental cracking stills." (author) The gas is extracted after the cracking of crude shale oil.

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Recovery of waxes from shale oil: U. S. Patent 2,642, 380, June 16, 1953.
The patent is a method for recovery of paraffinic and olefinic waxes of high melting point from the oil of oil shale. Flow diagram for the process is shown. (Note: See Klosky for all oil shale patents through 1959.)

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The oil shale industry (northwestern Colorado): M. Sc. Press, Vol. 116, p. 509-516, 1918.

Hoskins, J. H. See Cross, A. T. 00550

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Petrifaction flora of the Devonian - Mississippian black shale: The Paleobotanist (Birbal Sahni Memorial volume), Vol. 1, p. 215-238, 1951.
An analysis of the longer ranging components of the petrification flora occurring in the upper part of the New Albany-Ohio black shale of East-central interior region of the United States. Clarifies the general character of the flora and determines the possible stratigraphic significance (Hoover, 1960).

Hoskins, W. N. See Abel, J. F. 00001

01035 Hoskins, W. N.; Upadhyay, R. P.; Bills, J. B.; et al.
A technical and economic study of candidate underground mining systems for deep, thick oil shale deposits: Colo. Sch. Mines, Q., Vol. 71, No. 4, (Proceedings of the Ninth Oil Shale symposium), p. 199-234, illus. (incl. table, sketch map), 1976.
Results of first phase of study of Cameron Engineering of technical and economic feasibility of mining Colorado oil shales. Short descriptions of resources, hydrology, geology, and physical properties of the Green River shales in this basin. Outlines and illustrates four mining methods recommended to the U. S. Bureau of Mines.

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Oil shale research: Mines Mag., Vol. 56, No. 1, p. 10-20, illus., 1966.
This article deals with research conducted on Colorado oil shale in the Green River Formation being done by the Colorado School of Mines. The subjects being studied are: 1) oil shale assaying, 2) organic metal complexes in oil shale, 3) continuous oil shale retorting. (From p. 10) Includes illustrations.

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Organic metal complexes in the Uinta Basin (with Spanish abs.), in Drilling and production - World Petroleum Cong., 7th, Mexico, 1967, Proc., Vol. 3: London, Elsevier Publishing Co., p. 703-705, tables, 1967.

Howe, W. Warren See Houghton, A. Sherrill 01037

Hower, J. See Perry, E. 01629

Hoyer, W. A. See Kern, J. W. 01170

01038 Hradil, Guido
Die olschiefer Tirols: Ieipzig, J. A. Barth, 121 p., 1930.

Hradil, Guido See Dhéré, Charles 00636

01039 Hradi, Guido (and Felix Almasy)
Ueber den chemischen Bestand des Oelschiefer bitumens von Meride im Kanton Tessin: Schweizer. Miner. U. Petrogr. Mitt. Bd. 18, p. 451-459, 4 figs., 1 pls., 1938. Chemistry of oil shales of Meride, Ticino, Switzerland.

Hryniewiecka, Anna See Backleda, Tadeusz 00072

01040 Hubbard, Arnold B.
Automated modified Fischer retorts for assaying oil shale and bituminous materials: Bur. of Mines Rept. of Invest. 6676, U. S. Dept. of the Interior. Bur. of Mines, 19 p., illus., 1965.
This report describes an improved and more efficient procedure devised by the Bureau of Mines for assaying large numbers of oil shale samples and other bituminous materials by the modified Fischer retort method. The standard Fischer assay method was automated by automatically controlling the heating cycles of a battery of 12 electric heaters with electronic controllers and programmers. The condensers were cooled with a modified automatically controlled refrigeration bath. Includes numerous photographs, sketchs and diagrams of the 12 retort units. necessary control instruments, and refrigeration bath.

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Method of reclaiming waste water from oil-shale processing: A. C. S. Preprints, Div. Fuel Chem., Vol. 15, No. 1, p. 21-24, 1971.
Described in this paper is a procedure for reclaiming the waste water from oil-shale processing. This procedure successively removes the components stepwise to allow the effluent from any step to be converted for plant use in cases where further surification may not be needed.

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Oil shale assay method for product balance studies: Fuel, Vol. 41, No. 1, p. 49-54, illus., tables, 1962.
Describes the advantages of refined assay method for product balance studies materials, developed to assist in the evaulation of the large oil-shale deposits of Colorado, Utah, and Wyoming. (From abstract)

Hubbard, Arnold B. See Robinson, W. E. 01763

Hubbard, A. B. See Robinson, W. E. 01762

01043 Hubbard, A. B.; Fester, J. I.
Hydrogenolysis of Colorado oil-shale kerogen: Chem. Eng. Data Series, Vol. 3, No. 1, p. 147-152, 1958.
This report describes the procedure used by the U. S. Bur. of Mines to degrade Colorado oil-shale kerogen into hydrogenolysis products, the yields of the soluble fractions obtained, and some of the products. (From intro.)

01044 Hubbard, A. B.; Fester, J. I.
A hydrogenolysis study of kerogen in Colorado oil shale: U. S. Bur. of Mines Rept. of Invest. 5458, 26 p., 1959.
This hydrogenolysis study gives information on the components of kerogen in Colorado oil shale and identifies and determines properties of the products. Physical and chemical procedures are described, and results and conclusions showed almost all of the kerogen could be converted to gas and soluble products by hydrogenolysis at temperature below normal retorting temperatures.

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A thermal decomposition study of Colorado oil shale: U. S. Bur. of Mines Rept. of Invest. 4744, 24 p., 1950.
This article studies the thermal decomposition of the kerogen in three Colorado oil shales to gas, oil, and bitumen. Determination of specific reaction rates leads to an understanding of amount of decompostiion in a certain time with a given temperature range.

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Method of concentrating kerogen in Colorado oil shale by treatment with acetic acid and gravity separation: U. S. Bur. of Mines Rept. of Invest. 4872, 8 p., 1952.
"This report describes a method of concentrating the insoluble organic material (kerogen) in a rich Colorado oil shale without any apparent alteration of its original chemical form" (Author). Treatment

involved using acetic acid to remove carbonates and a centrifuge to effect mechanical separation. Other methods of isolation are cited, and procedure, results of tests, and photomicrographs of fossils are presented.

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Determination of asphaltenes, oils and resins in asphalt: Anal. Chem., Vol. 20, p. 460-465, 1948.
A method is described for the quantitative determination of the 3 groups of constituents in petroleum and native asphalts. (From Author's Abstract) Includes many diagrams, figures, and tables.

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Andyrous alumina as adsorbent in constituent analysis of asphalt: Anal. Chem., Vol. 24, p. 1490-1491, 1952.
This work shows that, although a blend of alumina can be prepared that has similar adsorption characteristics to another alumina in analyses of a given asphalt, they may show different adsorption characteristics in analyses of a different asphalt type.

01049 Hubbert, M. K.; Willis, D. G.
Mechanics of hydraulic fracturing: Transactions of the Society of Petroleum Engineering AIME, Vol. 210, p. 153-168, 1957.
The fracturing of rocks by means of pressure applied in boreholes is examined theoretically. Includes explanation of techniques used, figures and illustrations.

01050 Hubscher, Jakob
Untersuchung sergebnisse uber die Olschiefer im Kanton Schaffhouson: Naturf. Ges. Schaffhausen, Mitt. Bd. 22, p. 153-160, 1948. Jurassic oil shale in Switzerland.

01051 Huc, A. Y.
Mise en evidence de provinces geochimiques dans les schistes bitumineux du Toarcian de l'est du bassin de Paris; Etude de la fraction organique soluble (Geochemical provinces revealed in Toarcien oil shales in the eastern Paris Basin; analysis of the soluble organic fraction): Inst. Fr. Pet., Rev., Vol. 31, No. 6, p. 933-953, illus. (incl. table, Geol. Sketch maps), 1976.

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Conodonts from the New Albany Shale of Indiana; Bull. Am. Paleo., Vol. 21, No. 72, 136 p., 13 pls., 2 figs., 1934.
Based on conodonts, New Albany Shale considered Devonian-Mississippian. Callixylon newberryi and

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Marine fossils from the top of the New Albany Shale of Indiana: Am. J. Sci., ser. 5, Vol. 25, p. 303-314, 1933.
Considers entire New Albany Shale Devonian based on brachiopods and gastropods. Some statements regarding regional correlation.

Huffman, C., Jr. See Descorouth, G. A. 00630

Huggins, C. W. See Jackson, J., Jr. 01087

01054 Huggins, Charles W.; Green, Thomas E.
Thermal decomposition of dawsonite: Am. Mineral., Vol. 58, p. 548-550, 1973.
X-ray diffraction, infrared spectroscopy, and thermal methods of analysis were used to resolve conflicting statements in the literature on the thermal decomposition of dawsonite. (From abstract)

01055 Huggins, Charles W.; Green, T. E.; Turner, T. L.
Evaluation of methods for determining nahcolite and dawsonite in oil shales: U. S. Bur. of Mines Rept. Invest. 7781, 21 p., 1973.
In this paper, the Bureau of Mines compared X-ray diffraction, infrared specteoscopy, thermal methods, and the Smith and Young method in determining the nahcolite and dawsonite content in oil shales. Methods are described and results of tests conducted by the Bureau of Mines are presented. A conclusion was reached by deciding the best methods of measuring content of the two minerals from Colorado, Wyoming, African and synthetic samples.

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Liquid fuels from oil shale: Ind. Eng. Chem., Vol. 43, p. 2-15, 1951.
This 1951 article describes oil shale, the history of shale oil recovery, the demonstration plant at Rifle, Colo. as well as the cruching, retorting and refining of shale oil. Includes diagrams, tables and graphs.

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Brief mentions of Grassy Creek and Sweetland Creek Shale; Shown in generalized columnar section, cross sections.

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Hunt, John M. See Bell, Kenneth G. 00172

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Gas development, production, and estimated ultimate recovery of Devonian shale in eastern Kentucky: Kentucky Geol. Surv., ser. 10, Spec. Publ. 8, p. 21-29, 1964.
General veiw of development oil gas production in the Eastern Kentucky (Big Sandy and Ashland) gas fields. Petrographic analyses of components of black shale are given. Also discusses lithology and stratigraphic relations of area.

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Short articles separately written on stratigraphy of each state along a rough line from Oklahoma to Saskatchewa. Lithologies are briefly mentioned. There is little discussion of black shale sequences.

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Uranium in some rocks of Pennsylvania age in Oklahoma, Kansas and Missouri: U. S. Geol. Surv. Bull. 1147-B, p. B1-B82 (out of print, but available through libraries), 1962.
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given. The black shale studied included both phosphatic and carbonaceous varieties.

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Ilic, B. See Vitorovic, D. 02259

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01064 Illinois State Geological Survey
Background materials for Symposium of Future Petroleum Potential of NPC REgion 9 (Illinois Basin, Cincinnati Arch, and Northern Part of Mississippian Embayment), 1971.

01065 Illinois Geological Survey - A. H. Bell
Oil resources and possibilities in Illinois: Ill. Geol. Surv., Ill. Pet. 72, 12 p., 1955.
Brief discussion of the Illinois oil industry, its present status, and the future outlook. Isopach map of the New Albany "black" shale, and state maps of oil and gas production and possibilities are diagrammed.

01066 Illinois Geological Survey - A. H. Bell
Subsurface structure of the Kinderhook New Albany Shale in central and southern Illinois: Ill. Geol. Surv. Rept. of Invest. 92, 13 p., 1943.
Principle structural features in Illinois, (anticlines, monoclines, atc.), are related to the Illinois Basin-Eastern Interior Basin area. Discusses relationship of oil production to structures in these basins. Geologic column for southern Illinois is presented.

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Series of papers presented by distinguished authorities dealing with the Devonian stratigraphic units of Illinois and surrounding states (Hoover, 1960).

01068 Institute of Gas Technology
Eastern oil shale, a new resource for clean fuels: Chicago, Ill., Institute of Gas Technology, 20 p., 1977.

01069 International Atomic Energy Agency
Comparative assessment of effectiveness of exploration methods; I. A. E. A., Panel Proc. Ser., p. 293-296, 1973.
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01070 International Atomic Energy Agency
Exploration costs: in Uranium Exploration Methods; Panel Reports, I. A. E. A., Panel Proc. Ser., p. 297-299, 1973.

01071 International Atomic Energy Agency
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01075 International Atomic Energy Agency
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01077 International Atomic Energy Agency
Prospects for uranium in apparently unpromising environments: in Uranium Exploration Methods; Panel reports, I. A. E. A., Panel Proc. Ser., p. 305-306, 1973.

01078 International Atomic Energy Agency
Survey of present methods: in Uranium Exploration Methods, Panel Proc. Ser., p. 257-291, illus., 1973.
Applications, advantages and limitations of existing methods and techniques in uranium exploration, taking into account geological environment, topography, climate, temperature, and cost.

01079 International Symposium on Hydrocarbon Exploration, Drilling, and Production Techniques, Paris, 1975.
Etat acteul et avenir de l'industrie petroliere d'extraction: exploses presentes lors de le jounrnee d'iuverture ey la seance de cloture/Colloque international sur les techniques d'exploration et d'exploitation des hydrocarbures. Paris, 10-12 Decembee 1975; (organise par 1;) Association de recherche sur les techniques de'exploitation du petrole, Comite d'etudes petrolieres marines. Paris: Editions Techniq, 1976, p. 187-258, illus., dist. in U. S. A. by S. M. P. F. Corp., New York.

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transfert, evacuation: Colloque international sur les techniques e'dxploration et d'exploitation des hydrocarbures, Paris, 10-12 December 1975. Association de recherche sur les techniques d'exploitation du petrole, Comite d'etudes petrolieres marine. Paris: Technip, c1976, 150 p., illus., dist. in U. S. A. by S. M. P. E. Corp., New York.

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Thermal alteration of young kerogen in relation to petroleum genesis: Nature, Vol. 264, No. 5584, p. 347-349, illus., 1976.

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Distribution of copper in sedimentary rocks of the oil bearing regions of Azerbaijan: Comptes Rendus (Doklady) de l'VRSS, Vol. 51, p. 43-46, 1946.
No relation between copper and carbon in rocks. Highest soil copper in red and yellow soils. Upper soil horizons higher in copper than lower. Soils and rocks have about the same copper. Quotes Arkhangeisky and Rozhkova saying that in bituminous shales there is a direct relationship between Cu. and C.

Itkina, Ye. S. See Gulyayeva, L. A. 00936

Ivanov, G. F. See Zefirov, A. P. 02391

Ivanov, V. V. See Poplavko, E. M. 01663

Ivanov, V. V. See Poplavko, Ye. M. 01664

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Hydrocarbons; energy crisis spotlights all fuel sources: Eng. Min. J., Vol. 175, No. 3, (105th annual review and outlook for mineral commodities; 1973-1974), p. 90-91, tables, 1974.

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Synthesis and characterization of dawsonite: U. S. Bur. of Mines Rept. of Invest. 7664, 14 p., 1972.
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Semimicro procedures for the determination of hydrocarbon types in shale-oil distillates: Anal. Chem., Vol. 46, No. 4, p. 604-607, April 1974.
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Kerogen constituents: Reduced chlorophyllin as a model for the precursors of nitrogenous compounds in shale oil: A. C. S. Preprints, Div. of Fuel Chem., Vol. 20 No. 2, p. 147-153, 1975. Also, 169th National Meeting, A. C. S., Philadelphia, PA, Apr. 6-11, 1975.
To elucidate the origin of nitrogenous compounds in shale oil, chlorophyllin, a plant pigment extract, and its reduced products were pyrolyzed. The types of nitrogen compounds in reduced-chlorophyllin pyrolysate were compared with the types in a light distillate. (From abstract)

01090 Jackson, L. P.; Decora, A. W.
Thermal reactions of shale-oil components: Plant pigments as probably precursors of nitrogenous compounds in shale oil: U. S. Bur. of Mines Rept. of Invest. 8081, 22 p., 1975.
Chlorophyllins were reduced and pyrolyzed to show if they had any relation to the nitrogen compounds found in the products of oil shale pyrolysis. Characterization of products of both chlorophyllin tests and oil shale distillates are shown. Results showed the reduced chlorophyllin represents a good model of shale kerogen.

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Characteristics and possible roles of various waters significant to in situ oil-shale processing: Colo. Sch. Mines, Q., Vol. 70, p. 105-134, Oct. 1975.
A study of water occurring as a result of retorting, and natural waters significant to oil shale processing, in the environment. Water quality and elemental analysis of samples from the Rock Springs in situ retorting area. Natural groundwaters in northern Green River Basin examined.

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Thermal decomposition of organic nitrogen and sulfur compounds: U. S. Bur. of Mines Inform. Circ. 7947, 99 p., 1960.
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Jacobson, I. A., Jr. See Burwell, Edward L. 00322

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01097 Jacobson, I. A.; Decora, A. W.; Cook, G. L. Retorting indexes for oil-shale pryolysis for ethylene-ethane ratios: A. C. S. Preprints, Div. of Fuel Chem., Vol. 19, No. 2, p. 183-191, 1974.

In a closely-controlled laboratory retorting system for oil shale, a relationship was developed between the temperature in the retort and the weight ratio of ethylene to ethane in the gases produced. (From abstract) A number, called the retorting index was defined from this relationship.

01098 Jacobson, I. A., Jr.; Decora, A. W.; Cook, G. L. Retorting indexes for oil shale pyrolyses from ethylene/ethane ratios of product gases: in Science and Technology of oil shale (Yen, T. F. editor), p. 103-114, tables, Ann Arbor Sci. Publ. Inc. Ann Arbor, Mich., United States, 1976. See also U. S. Bur. of Mines Rept. of Invest. 7921, 22 p., 1974.

Laboratory pyrolysis tests conducted on oil shales from three states are discussed. A parameter is developed for the comparison or control of the retorting process that is dependent on temperature. Application of this parameter to different types of retorts is explained.

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study of the thermal reactions of compounds occurring in shale oil. 1-n-butylpyrrole was selected to obtain information on the thermal reactions of other alkylpyrroles.

01102 Jacobson, I. A., Jr.; Jensen, H. B.
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Thermal reactions of shale-oil components; methylpyrroles, butylpyrroles, and isopropoylpyrroles: U. S. Bur. of Mines Rept. of Invest. 6720, 60 p., 1966.
This paper involves the organic chemistry of nitrogen compounds of thermal reactions of 1-methylpyrrole, 1-butylpyrrole and 1-isopropylpyrrole were conducted.

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Oil shale - Pt. 1, Nomenclature, uses, reserves and production: Colorado Sch. Mines Mineral Industries Bull., Vol. 5, No. 2, 11 p., illus., tables, 1962.

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Uses of water in the oil-shale industry, with particular reference to engineering and sanitary requirements, with a chapter on the sanitation of oil-shale camps by A. L. Murray: U. S. Bur. of Mines Tech. Paper 324, 57 p., 1923.
Scottish mining, retorting, and refining are discussed with reference to use of water. Power and water requirements for selected American coal mines and oil refeineries are outlined. Water recovery from shales and types of purification of natural water in shale regions are discussed. The relations of domestic water supply to the oil shale mines are anlaysed and national and state regulations of water use and treatment are summarized.

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Shale deposits of the United States rich in oil. Oil Gas J., Vol. 18, Nov. 7, 1919, p. 58, 60, 62-64.
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A Balaton-felvideken es a Kemenshaton felkutrtott gelsopannoniai olajpalaelofordulas fold tau; Viszonyai (The geology of the upper Pannonian oil shale deposit in the Beleton Highland and Kemeneshat, Bunantal, Hungary): Hung., Foelt. Intex., Evi Jef., Vol. 1974, p. 193-219 (incl. Eng. sum.), illus. (incl. sects., strat. col, geol. sketch maps), 1976.
Discussion of the geology of an area where a bright green oil shale was found in a volcanic sequence. Stratigraphic relations and paleontologic data are presented to prove that this material is much older that Pleistocene age. No mention of economic importance was made regarding this relatively thin layer.

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Age and distribution of the Late Devonian Sweetland Creek Shale in western Illinois: B. S. thesis (unpub.), Univ. of Illinois, 1965.
Considers distribution, thickness, lithology, stratigraphic relations, conodont biostratigraphy. Includes isopach map, cross-section, lists of wells and cross-sections.

01109 James, Gerard W.
Stratigraphic geochemistry of a Pennsylvanian black shale (Excello) in the mid-continent and Illinois basin (abs.): Dissert. Abs. Internat., Sec. B, Sci. and Eng., Vol. 31, No. 6, p. 3481, 1970.

James, G. W. See Collinson, C. W. 00473

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Organic geochemistry of a Pennsylvanian black shale (Excello) in the Midcontinent and the Illinois Basin: in Short papers on research in 1971, Kansas Geol. Surv., Bull., No. 204, Part 1, p. 3-10, illus. (incl. sketch maps), 1972. In Midcontinent: more extractable hydrocarbons and less organic carbon, diagensis.
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Isolation and identification of pyrrole and 2-methlopyrrole from shale oil: J. Am. Chem. Soc., Vol. 73, p. 4040-4041, 1951.
Pyrrole and 2-methylpyrrole, were isolated and identified from an oil prepared from Colorado oil shale. Includes explanation of experimental procedure.

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Potential natural gas resources in the Devonian shales of Ohio; Ohio Div. of Geological Surv., Geol. Note No. 3, 12 p., 1976.
Stratigraphy, thickness of Devonian shales are discussed. Isopach maps of state are shown. Major radioactive zones of the Devonian shales are examined, along with gas production of the Devonian shale sequence. Related eastern Kentucky gas fields, which are also derived from Devonian shales.

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A literature review of interaction of oxidized uranium species and uranium compleses with soluble organic matter: U. S. G. S. Open-File Report No. 78-179, 21 p., illus., 1978. Available from U. S. G. S. Open-Fiel Rept. Serv. Sect., Br. Distrib., Denver, Colo.

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Jensen, H. B. See Duvall, J. J. 00721

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Jensen, H. B. See Frost, C. M. 00835

Jensen, H. B. See Frost, C. M. 00838

Jensen, H. B. See Frost, C. M. 00836

Jensen, H. B. See Frost, C. M. 00839

Jensen, H. B. See Jackson, L. P. 01088

Jensen, H. B. See Jacobson, I. A. 01101

Jensen, H. B. See Jacobson, I. A. 01102

Jensen, H. B. See Jacobson, I. A. 01103

Jensen, H. B. See Lessley, G. E. 01307

Jensen, H. B. See Morandi, J. R. 01470

Jensen, H. B. See Morandi, J. R. 01469

Jensen, H. B. See Poulson, R. E. 01671

Jensen, H. B. See Poulson, R. E. 01672

Jensen, H. B. See Poulson, R. E. 01669

Jensen, H. B. See Poulson, R. E. 01670

Jensen, H. B. See Poulson, R. E. 01668

Jensen, H. B. See Silver, H. F. 01895

Jensen, H. B. See Silver, H. F. 01894

Jensen, H. B. See Smith, E. B. 01912

Jensen, H. B. See Tihen, S. S. 02101

01114 Jensen, H. B.; Barnet, W. I.; Murphy, W. I. R.
Thermal solution and hydroganation of oil shale: U. S. Bur. of Mines Bull. 533, 42 p., 1953.
Thermal solution process was examined in depth with three units: a small batch autoclave, a seimcontinous unit, and a large continous unit. Results of experiments are presented and advantages and disadvantages weighed against a normal retort. A 159 source bibliography with abstracts on thermal solution process is cited at the end.

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Characterization of the saturates and olefins in shale-oil gas oil: A. C. S. Preprints, Div. of Pet. Chem., Vol. 13, No. 2, p. F98-F110, 1968.
Spectral and chemical methods were used to characterize the saturate and olefinic compounds in a Green River shale oil gas oil. The saturates comprise 16% of the gas oil and were shown to be 50% n-paraffins, 40% branched paraffins, and 10% cyclic naphthenes. (From abstract)

01116 Jensen, H. B.; Poulson, R. E.; Cook, G. L.
Characterization of a shale oil produced by in situ retorting: A. C. S. Preprints, Div. Fuel Chem., Vol. 15, No. 1, p. 113-121, 1971.
This paper reports on the chatacter of two oils produced by in situ combustion experiments. These oils will be compared with oils produced in experimental aboveground retorts that retort mine-run shale and with an oil produced in a commercial type aboveground retort that retorts crushed and screened shale of less than 4-inch size. (From Abstract)

01117 Jensen, James B.
Commerical and engineering aspects of the new oil shale industry of the western slope: Salt Lake City, Century Printing Co., 46 p., 1921.

01118 Jensen, J. B.
The aspect of petro-shales of the western slope (Colorado, Utah, and Wyoming): Am. Mining Congr., 23rd. Ann. Convention, Rept. of Proc; p. 532-550, 1921.

01119 Jillson, Willard Rouse
The geology of the oil shales of the eastern United States: 14th Internat. Geol. Congress, Spain, 1926, Compte Rendu fasc. 4, p. 2045-2052, 1928 (1929).
The decline in U. S. oil production is summarized. Stratigraphy and structure of eastern U. S. oil shales is presented. Oil and gas richness in the shale, along with total oil and gas reserves are discussed.

Johaus, R. T. See Miller, J. S. 01442

Johns, Earl See Fons, Llody 00814

Johnson, D. R. See Smith, J. W. 01937

Johnson, Donald R. See Smith, J. W. 01936

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Gaylussite: Thermal properties by simultaneous thermal analysis: Am. Mineral, Vol. 58, p. 778-784, 1973.
This paper briefly reviews the history of gaylussite and presents new data on the thermal properties of natural and synthetic gaylussite. (From intro.)

01121 Johnson, Donald R.; Smith, J. W.
Bureau of Mines apparatus for thermal analysis: simultaneous DTA-TG-EGA for oil shale and solid fuels: U. S. Bur. of Mines Rept. of Invest. 7429, 17 p., 1970.
This report describes an apparatus that can simultaneously to differental thermal analyses, thermogravimetric analyses, and evolved gas analyses. Explanation is made of how the apparatus works, and results of testing of two samples, nahcolite and a synthetic calcium compound are given. It was hoped that this may aid in finding complete knowledge of the thermal properties of oil shale.

01122 Johnson, D. R.; Smith, J. W.
Glass filter paper suspension of precipitates for liquid scintillation counting: Anal. Chem., Vol. 35, No. 12, p. 1991-1992, 1963.
This paper describes preparation method for scintillation counting. The most important features of this technique are the speed of preparation and elimination of sample handling steps.

01123 Johnson, Donald R., Smith, S. W.; Robb, W. A.
Thermal characteristics of shortite: U. S. Bur. of Mines Rept. of Invest. 7862, 9 p., 1974.

01124 Johnson, D. R.; Young, N. B.; Smith, J. W.
Thermal analysis on oil shale; determination of potential oil yields and dawsonite, nahcoline and nordstrandite content: Rept. No. LER C/RI-77/6, availabel from NTIS, Springfield, Va. 18 p., illus. (incl. tables), 1977.

01125 Johnson, Donald R.; Young, N. B. Robb, W. A.
Thermal characteristics of analcime and its effect on heat requirements for oil-shale retorting: Field, Vol. 54, p. 249-252, Oct. 1975.
This paper presents the determined thermal properties of a Green River Formation analcime from 25 to 600°C and discusses the possible effects of analcime on oil-shale processing. (From p. 249)

01126 Johnson, Gerald W.
Mineral resource development by the use of nuclear explosives: in Colo. Sch. Mines, 3rd symposium on rock mechanics: Colo. Sch. Mines, Q., Vol. 54, NO. 3, p. 319-331, illus., July, 1950.
Explosion sequence and cratering effects of nuclear blasts are discussed, along with a table outlining results of experimental nuclear tests. Application of nuclear explosions to recovery of oil shales, tar sands, and low grade ores are briefly outlined.

Johnson, Harry R. See Decora, Andrew 00611

Johnson, Henry S., Jr. See Xeron, S. Duncan, Jr. 01007

Johnson, R. D. See Nelson, S. J. 01552

01127 Jones, C. A.
A classification of uranium deposits in sedimentary rocks: in a preliminary classification of uranium deposits (Mickle, D. G., ed.), p. 1-15, illus., 1978. (Rept. No. GJBX-63(78)). Available from U. S. Dept. of Energy, Grand Junction office, Grand Junction, Colo.

01128 Jones, Daphne L.; Knauth, L. Paul
Oxygen isotopic evidence relevant to the origin of the Arkansas novaculite: Geol. Soc. of Am. Abs. Programs. 1978 Ann. Mtg. Vol. 10, No. 7, p. 430, 1978.
Outcrops of the Novaculite in Oklahoma are distinctly richer in 0 than are outcrops in Arkansas. The 0 -

rich western samples reveal well preserved early diagenetic textures while eastern localities localities display no evidence of such. Shallow deposition occurred in western areas with chert crystallization at lower isotopic temperatures than in the deeper eastern waters.

01129 Jones, J. B., Jr.
Gas-combustion retorting process: Presented before Ind. Bur. of Mines Oil-Shale Conf., Univ. Wyo. Summer Science Camp, Laramie, Wyo., Aug. 1954. Pub. in Minutes of Conf., U. S. Bur. of Mines Administrative Pub.

Jones, J. B. See Reeves, A. A. 01711

01130 Jones, J. C.
Suggestive evidence on the origin of petroleum and oil shale: Am. Assoc. Pet. Geol. Bull., Vol. 7, No. 1, p. 67-72, Jan. - Feb., 1923.
Description of a modern environment in Lake Lahanton, western Nevada. Suggests that, given enough time, consolidation of algae and sand deposits in this lake would yield oil shales. Relationships of origins of coal, oil, and oil shales are discussed.

01131 Jones, M. J. (ed.)
Geology, mining and extractive processing of uranium. An internat. symposium cosponsored by the Inst. of mining and metallurgy and the Commission of the European Communities, London, 1977.
Discussion of some worldwide uranium deposits and the rocks they are found in. Some methods of extraction used worldwide are presented. New exploration techniques and global reserves regarding uranium are cited.

01132 Jones, M. L.; Dennison, J. B.
Oriented fossils as paleocurrent indicators in Paleozoic lutites of southern Appalachians: J. Sed. Pet. Vol. 40, No. 2, p. 642-649, illus., 1970.
Paleocurrent study of a shale. First advocated by Ruedemann in the 1890's, this technique has very rarely been used in the regional analysis of a shale sequence. Includes consideration of paleocurrents in Chattanooga shale in northeastern Tennessee.

01133 Jukkola, E. E.
Thermal decomposition rates of carbonates in Green River oil shale: Ind. Eng. Chem., Vol. 45, p. 2711-2714, 1953.
Data on the extent and rate of the decomposition of the carbonates in 30-gallon-per-ton Green River oil shale, at various temperatures are essential in the

operations of retort for producing shale oil economically and are the subject of this papers. (From Abstract)

Jukkola, E. E. See Sohns, H. W. 01973

Jukkola, E. E. See Sohns, H. W. 01972

01134 Jung, Jean
Sur la presence de bogheads a Pila dans le bassin houiller du Reyran (Var): Soc. Geol. France C. R. Seances f. 12, p. 173-174, JE-21'37. Oil shales of the Reyran Basin, France.

01135 Kaarik, Kaljo
Determination of uranium, especially in shale and kolm: Helsinki, 1965. Reprinted from Suomen Kemistileti B 29 (1956) 1-2, 2 p.,

Kabrakchieva, M. See Vuchev, V. 02267

01136 Kaganovich, I. Z.; Tenno, K. L.
Ekonomikomatematicheskoye issledovaniye perspektiv energeticheskoye i teckhnologic heskogo ispol'zovaniya slantsa (Economic & mathematical studies on the possibilities of energy and technological development of shale): in Razrabotak i ispol'zovaniye zapasov goryuchikh slantsev (Baum, V.; chairperson), p. 592-597, Izd. Valgus, Tallin Union of Soviet Socialist Republics, 1970.

01137 Kahn, J. S.
A proposal for an AEC in situ oil shale program, in Identification of research and development priorities and of costing problems associated with implementation of in situ recovery of shale oil: Rept. No. NSF-RA-N-75-001, p. 237-250, 1975.

Kaike, T. See Igo, H. 01062

01138 Kaikow, J.
Oil shales and tar sands in North America: in 21st International Geographic Congress, selected papers; Vol. 2, Economic geography, p. 164-166, Nat'l. Comm. Geogr., Calentta, India, 1970.

01139 Kaiser, W. R.
Delta cycles in the Middle Devonian of central Pennsylvania (abs.): Diss. Abstr. Int. Vol. 38, No. 11, p. 5349B, 1973.

01140 Kalcevic, V.; Lankford, J. D.
Pilot-plant operation of gas-flow oil-shale retort: U. S. Bur. of Mines Rept. of Invest. 5507, 34 p., 1959. Summarized is the operation of the gas-flow retort

at the Bureau of Mines Rifle, Colo., plant, which used Mahogany Zone Green River shale. Oil yields, heat requirements, and properties of the recovered shale are given. Many figures compare variable factors such as heat flow, temperature, bed thickness versus oil yield and gas yield.

01141 Kaliuin, S. K.; Ponomarev, P. A.; Faya, E.
O Soderzhanii renya u nekoterykh geryuchikh slantsakh Kazakhstana (Rhenium content of some oil shales in Kazakhstana): Akad. Nauk Kaz. SSSR, Izd., Ser. Geol., No. 6, p. 40-50, illus. (incl. tables), 1974.

01142 Kalliokoski, J.
Uranium and thorium occurrences in Precambrian rocks, Upper Peninsula of Michigan and northern Wisconsin, with thought on other possible settings: Rept. No. GJBX-48, 294 p., 1976.

01143 Kamenov, B.; Panov, G.; Grigorov, G.
Geolozkha kharakteristika na bituminoznite skali ot nakhodishchata Krasova, Gurkova I Borov Dol (Geological characteristics of the bituminous rocks of the Krasava, Gurkovo and Borov Dol deposits): Neft. Vuglishchna Geol. Vol. 7, p. 5-15, (incl. Eng. sum.), tables, maps, 1977.
This article describes the Krassava, Gurkovo, and Borov Dol deposits as Paleogene molassoidal-caustobiolithic formations that are structurally superimposed on the Srednogorie tectonic zone. Attitude and composition of the three deposits are briefly described, and organic matter is said to have a sapropelic composition. Association of these bituminous rocks with coal deposits is mentioned.

Kandiner, H. J. See Clarke, E. L. 00441

Kandrat'yev, V. P. See Gerber, M. I. 00889

Kaininskiy, V. S. See Belyanin, Yu. I. 00177

01144 Kantsler, A. J.; Cook, A. C.; Smith, C. G.
Rank variation, calculated paleotemperatures in understanding oil, gas occurrence: Oil and Gas J., Vol. 76, No. 47, p. 196-205, Nov. 20, 1978.
Regional variation in thermal maturity of the organic material in eastern gas shales affects the amount and kind of hydrocarbons generated in the formations. Article discusses organic maturation with regard to Tertiary rocks in Australia.

Kaplan, I. R. See Ishiwatari, R. 01084

Kaplan, I. R. See Ishiwatari, R. 01083

Karalova, Z. K. See Nemodruk, A. A. 01554

Karasik, T. G. See Poplavko, Ye. Mu. 01664

01145 Karpov, A. F.; Kyabbi, M. E.
National reserves and raw materials of combustible shale mining industry of USSR: Int. Geol. Review, Vol. 13, No. 5, p. 641-643, 1971.
Total reserves of the U. S. S. R. in their 80 known deposits of combustible shales are summarized. Thickness and grades of six of the most important deposits are discussed. Production of the fifteen presently operating shale mines and plans for industry expansion are discussed.

Karpova, I. P. See Petrova, Yu. N. 01638

01146 Karrick, L. C.
Effects of temperature and time of reaction in distilling oil shales on the yields or properties of crude oils: U. S. Bur. of Mines Rept. of Invest. 2456, 8 p., 1923. See also Petrol. World (london), Vol. 20, p. 187, 191, May 1923; Petrol. Times, Vol. 9, p. 751-752, 1923; Petrol. Times, Vol. 10, p. 367-368, 1923; Oil News, Vol. 11, p. 32-33, 38, Apr. 5, 1923; Railroad Red Book, Vol. 30, p. 695, 698, 759-762, 1923; Oil Field Eng., Vol. 25, p. 156, 158-159, 164, July 1923; Min. Cong. J., Vol. 9, p. 252, July 1923.
This July 1923 article discusses experiments in the distillation of oil shale and the results obtained.

01147 Karrick, Lewis C.
Manual of testing methods for oil shale and shale oil: U. S. Bur. of Mines Bull. No. 249, 70 p., illus., incl. tables, diagrs., 1926.
Theoretical considerations of retorting and operation of a retort are discussed. Collection of products through condensation and scrubbing are qualitatively discussed. The second half of the article shows testing techniques for determination of dust, specific gravity of the oil, melting points, per cent unsaturated fractions, viscosity, and carbon residue. Analysis of components of gases and their values are also shown.

01148 Karrick, L. C.
Some factors affecting products from destructive distillation of oil shales: U. S. Bur. of Mines Rept. of Invest. 2324, 5 p., 1922. See also Chem. Age, Vol. 30, p. 112-114, Mar. 1922.
What actually happens to the character of oil shale,

its continuents, and its structure are explained as the effects of thermal action. Low and high heating rates are said to give differing products, and explanation is given why there are differing products after the destructuve distillation of kerogen.

Karrick, L. C. See Gavin, M. J. 00875

01149 Karrick, L. C.; Gould, Douglas
The extraction apparatus and extract-recovery and solvent regenerative devices: J. Franklin Inst., Vol. 194, p. 537-540, 1922.

01150 Karrick, L. C.; Parry, V. F.
A melting point guide for petrolatums, shale oils, and shale-oil distillates: Ind. Eng. Chem., Vol. 15, p. 600-602, 1923.
The testing of oil shales requires a simple, accurate, and rapidly operated melting - pt. determination method. (From Intro.) This 1923 article describes that apparatus and method.

Kasameyor, P. See Davis, D. 00587

01151 Katell, Sidney
Oil shale as a potential source of liquid fuels (abs.): Min. Eng., Vol. 20, No. 12, p. 56, 1968.
The economics of a system using oil shale in the production of liquid fuels is examined in this paper. Included are mining, retorting, and refining to produce the salable product. (From abstract)

01152 Katell, Sidney
Oil shale as a potential source of liquid fuels: Proc. Council of Economics, A. I. M. E., p. 147-155, 1969.

01153 Katell, Sidney; Stone, Reid; Wellman, Paul
Oil shale; a clean energy source: in Oil Shale Symposium 7th, Proceeding, Colo. Sch. Mines, Q., Vol. 69, No. 2, p. 1-19, illus., 1974.
This paper focuses on the industrial activites and responsibilities of a potential developer of oil shales. Study estimates concern a 50,000 barrel-a-day plant. Rough summarization of plans for the mining, crushing and screening, briquetting, and retorting plants, H_2S removal from retort gas, solid waste disposal, and refining are considered. Capital and operating costs with a financial analysis are estimated.

01154 Katell, Sidney; Wellman, Paul
An economic analysis of oil shale operations featuring gas combustion retorting: U. S. Bur. of Mines Tech. Prog. Rept. 81, 18 p., 1974.
This report is involved with economics of producing semirefined shale oil from oil shale. Summarized are plans involving mining, crushing and screening, briquetting, retorting, and solid waste disposal of oil shale. Capital investment, operating cost, and financial analyses are presented for both 50,000 barrel-a-day and 100,000 barrel-a-day plants.

01155 Katell, S.; Wellman, P.
Mining and conversion of oil shale in a gas combustion retort: U. S. Bur. of Mines, Tech. Prog. Rept. No. 44, 11 p., 1971.
An economic analysis for one proposed system of production of synthetic crude oil from oil shale is presented. Summaries of mining plans, crushing and screening plants, briquetting and retorting plants, and the refinery are shown and a block diagram relates the processes. Capital investment, operating cost, and financial analyses show the economics for 30 gal/ton oil shale.

01156 Kauffman, E. G.
Benthic communities in black shales of an "anaerobic" Jurassic basin: The Posidonienschiefer (abs.): J. Paleontol., Vol. 51, No. 2, Suppl., Part III, p. 16-17, 1977.
The German Liassic "Posidonienschiefer" is noted fro exceptional preservation of complete organisms. Bulk sampling from 1 cm intervals throughout the unit indicate the presence of low diversity benthic communites at many levels. Comparsion with other Mesozoic black shales reveals similar benthic community structure.

01157 Kaufman, David Zachary
Water for Project Independence; Water Spectrum, Vol. 6, No. 4, p. 11-20, illus., 1974.

01158 Kaya, Orhan
The Devonian and Lower Carboniferous stratigraphy of the Istinye, Bostanci, and Buyukada subareas: in Paleozoic of Istanbul, Ege Univ., Fen Fak., Kitaplar Serisi, Jeol., No. 40, p. 1-35 (incl. Ger., Turk sum.), 1973.

01159 Keele, Joseph
Clay and shale deposits of the western provinces (Part V): Ottawa, GPB, 83, 74 p. wraps. Canada, Geol. Survey Memoir 65-66, 1915.

01160 Keele, Joseph
Preliminary report on the clay and shale deposits of the province of Quebec: Canada Geol. Surv. Memoir 64, Geol. Ser. No. 52, 280 p., illus., plates, maps, diagrs., 1915.

Keele, Joseph See Ries, Heinrich 01735

Keele, Joseph See Ries, Heinrich 01736

01161 Keeley, James Chestern
A geologic study of the Chattanooga shale (Devonian) in the Elkmont Quadrangel (Limestone County), Alabama: Master's Thesis, Alabama, 1969.

01162 Kehn, T. M.
Selected annotated bibliography of the geology of uranium-bearing coal and carbonaceous shale in the United States: U. S. Geol. Surv., Bull., No. 1059-A, 1957.
A bibliography with abstracts of 56 references to uranium in coals and carbonaceous shales.

01163 Kehn, T. M.
Uranium in the Chattanooga shale, Youngs Bend area, Eastern Highland Rim, Tennessee: U. S. Atomic Energy Comm. TEI-528-A, 60 p. (dep.; $15, LC)(prepared by U. S. Geol. Surv.), 1955.
This article discusses a drilling program whose purposes were to determines the continuity of grade and thickness of the shale, determine uranium reserves, and obtain structural and stratigraphic information. The accomplishment of these objectives is presented, and sites suitable to mining are cited. Logs of the cores show uranium rich intervals.

Kehn, Thomas M. See Swanson, V. E. 02053

01164 Kehrer, P.
Energie-Ressource der Erde-Grenzen aus geowissen schaftlicher Sicht (Energy resources of the earth from a geologic point of view): Geol. Rundsch. Vol. 66, No. 3, p. 697-711 (incl. Eng., French, Russian sum.), illus., 1977. Geowissen-schaften und die Aukunft des Menschen.
A few results of a study about the future energy-supply of the world by the Federal Institute for Geosciences and Natural Resources are discussed. (From Abstract)

01165 Keighin, C. W.
Resource appraisal of oil shale in the Green River Formation, Piceance Creek Basin, Colorado: Colo. Sch. Mines, Q., Vol. 79, No. 3, (Proceedings from the

eighth oil shale symposium), p. 57-68, illus. (incl. tables, sketch maps), 1975.
Oil shale resource potential of seven zones in the Parachute Creek member was evaluated. Fischer assay data on 230 cores were run through a computer to yield results. Isopach and isoresource maps are given.

Keith, M. L. See Degins, E. T. 00612

Kelley, R. E. See Carpenter, H. Cl. 00365

01166 Kentucky Geological Survey
Geology of the oil shales of the eastern United States: KGS Ser. 6, Vol. 30, p. 274-288, maps, diagrs., 1928.
Stratigraphy of the black shales of the Eastern U. S., mostly concerned with black shales in Kentucky. Structural geology and economics are briefly discussed.

01167 Kentucky Geological Survey
The Sixth Geological survey. An administrative report of the several mineral resources and general geological investigations undertaken and completed in Kentucky during the biennal period 1920-1921: Ky. Geol. Surv. Ser. 6, Vol. 6, illus., maps, tables, plates, 1921.
Contains chapter "Retorting methods as applied to Kentucky oil shales." Discusses many processes to retort oil shales, including the Scotch process and one developed at Univ. Ky.

01168 Kepferle, Roy C.
Uranium in the Sharon Springs member of the Pierre Shale in South Dakota and northeastern Nebraska: U. S. Geol. Surv. Bull. 1046-R, p. 577-604 (out of print), 1959.
Uranium content in cored shales and exposures and water flowing through this shale are measured. Lithology and stratigraphy of area are discussed. Chemical and spectrographic analyses for trace metal content wer measured and relationships between them examined.

01169 Kepferle, Roy C.
Uranium in the Sharon Springs member of the Pierre Shale in South Dakota and northeastern Nebraska: U. S. Geol. Surv. Trace Elem. Inv. Rept. 587, 47 p., maps, diagrs., tables, 1956. For official use only.

Kepferle, R. C. See Provo, Linda J. 01683

Kerakova, Ye. See Vychez, V. 02268

01170 Kern, J. W.; Hoyer, W. A.; Spann, M. M.
Low porosity gas sand analysis using cation exchange and dielectric constant data: Soc. Prof. Well Log Anal., Ann. Logging Symp., Tans., No. 17 17 p., 1976.
Core sample and well-log data from tight gas-sand reservoirs were used to calculate in-situ formation water saturations, (From author's abstract). The objectives of this study were: 1) to measure the electrical effects of shaliness on a sample of rocks from a specific type of reservoir, and to apply the results in estimating water saturations 2) to determine which log parameters quantified the independently measured shaliness effects. (From p. 2).

01171 Kerr, J. W.
Stratigraphy of Central and Eastern Ellesmere Island, Aretic Canada, Part III. Upper Ordovician (Richmondian). Silurian and Devonian: Can., Geol. Surv., Bull., No. 260, 55 p. (incl. French sum.), illus. (incl. chart, sect., geol. sketch map), 1976.
This paper presents the final depositional phase of the Franklinian Miogeosyncline. Westward, the carbonates grade upward to graptolite shale of the Cape Phillips Formation and then to fine-grained, deep-water clastics of the Imina Formation. Major bodies of carbonate strata occur partly or completely isolated in the shale belt.

Kerr, Paul F. See Davidson, Donald M., Jr. 00586

01172 Kerr, R. D.; McTernan, W. F.
An environmental reconnaissance study for Sweetwater County in situ oil-shale research: Univ. of Wyo., Water Resources Res. Inst., 140 p., July 31, 1975.

01173 Kerr, T. H.
Some studies of Ohio coals, shales and oils: Ohio State Univ. Eng. Expt. Sta. Bull. 133, p. 32-44, 1948.

01174 Keshn, V. B.; Donnel, Dzh. R.
Zalezhi goryuchikh slantsa u ozera Uinta, Oil shale of the Uinta Basin: in Razrabotka i ispol'zovaniye zapasov goryuchikh slantsev (Baum V.; chairperson), p. 74-76, sect., sketch map, Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

Kesling, R. V. See Ehleis, G. M. 00736

01175 Kettenbrink, Edwin C.
Depositional history of the Devonian Cedar Valley Formation, east-central Iowa: Am. Assoc. Pet. Geol.,

Soc. Econ. Paleontol, Mineral., Ann. Mtg. Abs., Vol. 1, p. 53, 1974.

01176 Keyes, C. R.
Age of the Chattanooga black shales: Pan.-Am. Geologist, Vol. 70, p. 344-366, 1938.
Suggests that the "Black Shales" may not be a stratigraphic formation. They may be an oil oil-gathering zone, now almost dried up, which crosses the bedding indiscriminately, but which, when originally deposited, was paralled with an oil erosion surface. In such case there would be great difficulty in working out any sort of nomenclature (Hoover, 1960).

01177 Keyes, C. R.
Louisville vs. New Albany black shales in Illinois and Indiana: Pan-Am Geol., Vol. 79, No. 1, p. 69-70, 1942.
Considers the name Louisville Shale to have precedence over the names New Albany, Chattanooga, Grassy Creek, etc. "New Albany is no more."

01178 Keyes, C. R.
Serial subdivision of the early Carbonic succession in the continental interior: Iowa Acad. Sci., Proc., Vol. 21, p. 189-193, 1914.
Upper Devonian shales shown in correlation chart for states of midcontent.

01179 Keyes, C. R.
Some geological formations of the Cap-au-Gres Uplift: Iowa Acad. Soc. Prov., Vol. 5, p. 58-63, 1898.
Brief consideration of Crassy Creek Shale - lithology, thickness, outcrop areas.

01180 Keyes, C. R.
Some provincial and local phases of the general geologic section of Iowa: Iowa Acad. Soc. Proc., Vol. 19, p. 147-151, 1912.

01181 Keyes, C. R.
Terranal affinites of original Chouteau Limestone: Iowa Acad. Sci. Proc., Vol. 23, p. 113-118, 1916.
Brief mention of Grassy Creek and Saverton Shales, which are said to disappear from the section to the west in Missouri. Includes cross-section.

01182 Keyn, R. F.
Piroda i stroyeniye kurongita (The nature and structure of coorongite): in Razrbotka i ispol'zovamoue zapaospv goryuchikh slantsev, p. 195-201, illus. (incl. table), Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

01183 Kheynsalu, Yu.; Andra, Kh.
Jointing in the Estonian oil shale basin and the geophysical methods for its study: Izd. Valgus, Tallin, 116 p., 1975.

Khiggins, C. Kh. See Koffer, G. F. 01219

Khill, Dzh. R. See Dugan, P. M. 00704

01184 Kilburn, Paul D.; Atwood, Mark T.; Broman, W. M.
Oil shale development in Colorado; processing technology and environmental impact: Rocky Mt. Assoc. Geol., Field Conf., Guideb., No. 25, Guideb. to the energy resour. of the Piceance Creek Basin, Colo., p. 151-164, 1974.
Several shale retorting processes either now available or in large-scale field testing. Description of seven of these are made. Environmental concerns of air and water quality, hydrology, surface disposal, revegatation, and ecology are cited.

01185 Kilburn, P. D.; Legatski, M. W.
An environmental program for a commercial shale oil complex: Ann. Miner. Symp., Proc., No. 17, p. 19-31, 1974.

01186 Kilburn, P. D.; Thames, J. L.
The implications of oil shale development, in Reclamation and Use of Disturbed Land in the Southwest: Univ. Ariz. Press, Tucson, Ariz., p. 135-155, 1977.

Killelea, J. R. See Pollara, F. Z. 01658

Killelea, J. R. See Drabkin, M. L. 00698

01187 Kim, K. E.; Higa, J. A.; Yen, T. F.
Sulfur recovery by desulfovbrio in a biochemical method of oil shale production; in Science and Technology of oil shale (Yen, T. F., ed.), p. 157-162, illus., Ann Arbor Sci. Publ. Inc., Ann Arbor, Mich., United States, 1976.
Discussion of experiments using two bacteria, one to generate sulfuric acid to dissolve oil shales' mineral matrix, and the other to reduce sulfur to the element after the process was completed. This method was tested on 40 gallon/ton Green River shale. The feasibility was examined.

01188 Kimble, B. J.; Maxwell, J. R.; Eglington, G.; et al.
Tri-and tetraterpenoid hydrocarbons in the Messel oil shale: Geochim. Cosmochim. Acta, Vol. 38, No. 7, p. 1165-1181, illus. (incl. tables), 1974.
An examination of the high molecular weight constituents

of the Messel Oil Shale (European) leads to a list of isolated hydrocarbons. A comparison of certain hydrocarbons with those of Green River shale show the difference in organisms contributing to the sediments, despite the sameness in age.

01189 Kindle, E. M.
The Devonian fossils and stratigraphy of Indiana: Ind. Dept. Geol. and Nat. Resources, Ann. Rept. 25, p. 529-758, 773-775, 33 pls., 1901.
Discussion of New Albany Shale - lithology, thickness, outcrop areas, paleontology. Includes section descriptions.

01190 Kindle, E. M.
The Devonian and Lower Carboniferous faunas of southern Indiana and Central Kentucky: Bull. Am. Paleo., Vol. 3, No. 12, 111 p., 1899.
Brief consideration of New Albany Shale - lithology, thickness, paleontology, correlation. Includes section descriptions.

01191 King, Lewis H.
The origin of Albert Mines oil shale (New Brunswich) and its associated albertite: Canada Dept. Mines and Tech. Surv. Mines Br. Research Rept. R115, 24 p., illus., 1963.

01192 Kinney, C. R.
An investigation of the chemical nature of the organic matter of uraniferous shales, first annual report, January 1, 1953 to December 31, 1953: U. S. Atomic Energy Comm. NYO-6086, 19 p., (dep.)(prepared by Pennsylvania State College), 1953.
Reported is the progress made toward finding optimum conditions to alkali-soluble products. The results suggest that the U of this shale is present in several different chemicl combinations. (auth)

Kinney, C. R. See Schwartz, Donald 01866

01193 Kinney, C. R.; Broadhead, R. L.; Leonard, J. T.
An investigation of the chemical shales, annual report covering the period January 1 to December 31, 1956: U. S. Atomic Energy Comm. NYO-6675, 36 p. (dep., mc; $9, LC) (prepared by Pennsylvania State University), 1957.
Semiannual report NYO-6674 contains work completed from Oct. 1, 1955 to March 31, 1956 and is an integral part of this report. (From abstract)

01194 Kinney, C. R.; Broadhead, R. L.; Leonard, J. T.
An investigation of the chemical shales, semiannual report covering the period October 1, 1956 to March 31,

1957: U. S. Atomic Energy Comm. NYO-6676, 30 p., (dep., mc)(prepared by Pennsylvania State Univeristy), 1957.

Continuation of work on air oxidation, ozonization, and solvent extraction. The work on solvent extraction has led to a study of chemical reactions of the organic matter in situ. (Auth)

01195 Kinney, C. R.; Leonard, J. T.; Chen. J. P.
An investigation of the chemical ... shales, semiannual report, October 1, 1957 to March 31, 1958: U. S. Atomic Energy Comm. NYO-6678, 25 p., (dep.)(prepared by Pennsylvania State University), 1958.

Described in this report are the results thus far in studies on ozonization, solvent extraction, and chemical properties of the organic matter of uraniferous shales.

01196 Kinney, I. W., Jr.; Cook, G. L.
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A century of oil-shale patents (1845-1945): Chem., Eng. News, Vol. 24, p. 2342-2344, 1946.
This 1946 paper presents some interesting facts concerning oil-shale patents (1845-1945).

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Patents involving functions from distillation and fractionation of shale oil to separation and recovery of products are given. U. S. patents, other English language patents, and European language patents are shown with a short description of function and procedure. Diagrams are shown for some.

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Index of oil-shale and shale-oil patents, 1946-56; a supplement to Bulletins 467 and 468 (in three parts), I. U. S. Patents; II. United Kingdom patents: U. S. Bur. of Mines Bull. 574, I. 134 p., 1958; II. 75 p., 1958.
300 patents issued in the U. S. and 180 issued in the U. K. are abstracted. Diagrams are shown for a few of the processes. The patents relate to retorting (and underground distilling), refining, and utilization of oil shale and its products. The largest single group related to fluidized handling of shale.

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Percha Shale. Differing shale facies are discussed, with the middle "black" shale facies being sandwiched by a siltstone and shale facies and a green fossiliferous shalefacies. Paleoenvironment and sedimentary strucutres are discussed.

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"Outcrops of black shale in the lower part of the Pierre Formation of Cretaceous age were examined and sampled in four general areas in western Kansas and eastern Colorado." Exposures of the Sharon Springs member are shown on the map. Tuffaceous and carbonaceous rock sample results are also cited.

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Black shale investigations; western Kansas and eastern Colorado: (Title unavailable; See coden), No. 540, p. 159, 1955. U. S. G. S. Trace Elem, Invest. Rept. 540.
In this one paragraph section, a suggestion is made of beds in the Pierre Shale and Niobrara Formation which are more radioactive. The sequence of radio-acitve beds were detected form surface and gamma-ray log data.

01270 Landis, Edwin Robert
Midcontinent Devonian shale, Kansas: (Title unavailable; See coden), No. 590, p. 249-252, sketch map, 1955. U. S. G. S. Trace Elem. Invest. Rept. 590.
This brief article studies Chattanooga Shale in subsurface eastern Kansas by use of radioactive logs. These logs are presented, and the most highly radioactive zones are noted.

01271 Landis, Edwin Robert
Radioactivity and uranium content of Devonian and Mississippian black shales in the Central midcontinent area: (Title unavailable; See coden), No. 740, p. 202-208, illus., 1958. U. S. G. S. Trace Elem. Invest. Rept. 740.
Chattanooga Shale, Woodford Shale, and Arkansas novaculite were sampled from 52 localities. Uranium, equivalent uranium, and other trace elements were measured spectographically. Also for the 261 samples modal, median, and mean values were calculated for the uranium content. Exceptionally high U values were noted, and a few samples were anlysed for organic carbon content.

01272 Landis, Edwin R.
Radioactivity and uranium content of the Sharon Springs member of the Pierre Shale and associated rocks in western Kansas and eastern Colorado: U. S. G. S. Trace Elem. Invest. Rept. 573, 38 p., maps, diagrs., tables, 1955. For official use only.

01273 Landis, Edwin Robert
Radioactivity and uranium content, Sharon Springs Member of the Pierre Shale, Kansas and Colorado: U. S. Geol. Surv. Bull. 1046-L, p. 229-319, (out of print but available through libraries), 1959.
Percent uranium of certain beds is developed by gamma ray and neutron logs. Stratigraphy of the area, and origin of the uranium deposits are discussed. Analysis of other metals and trace elements conducted, along with study of possible epigenetic uranium deposits.

01274 Landis, Edwin Robert
Uranium and other trace elements in Devonian and Mississippian black shales in the central midcontinent area: U. S. Geol. Surv. Bull. 1107-E, p. 289-336 (out of print), 1962.
Examines three marine black shales, the Woodford and Chattanooga shales, and the Arkansas novaculite. Range of study includes Arkansas, Missouri, Oklahoma, and Kansas. 120 samples, mostly Chattanooga shale, were measured for uranium content. Some samples analysed for organic carbon content, oil yield, and relations with these to uranium content. Trace elements were also measured.

01275 Landis, Edwin R.
Uranium and other trace elements in Devonian and Mississippian black shales in the Central midcontinent area: U. S. G. S. Trace Elemm Invest. Rept. 726, 5 p., 1958. For official use only.

Landis, Edwin R. See Swanson, Vernon E. 02052

01276 Landsberg, Helmut
Radioactivity tests of rock samples for the correlation of sedimentary horizons: Am. Inst. of Min. and Met. Engrs. Tech. Pub. 1103. Class L, Geophysical methods of exploration, No. 68, 9 p., tables, diagrs., 1939.

01277 Lankford, J., Jr.
Dynamic strength of oil shale: Soc. Pet Eng. AIME, Trans. Vol. 261, variously paginated, 1976.
The principle goal of this study was to investigate the strain-rate dependence of strength and ductility for oil shale to predict the strength levels required for fracture under dynamic loading. (From Intro.) Includes figures and tables of results obtained.

01278 Lankford, J.
Study of effect of strain rates, pressure and kerogen content upon failure strength of oil shale (abs.):

Geol. Soc. Am., Abs. Programs, Vol. 7, No. 2, (South-Central Section, 9th Annual Meeting), p. 181, 1975.
Discusses testing of strengths of oil shales with kerogen contents of from 11 to 45 barrels per ton of shale. Tests simulated in situ methods of mining where overburden pressure is great. Stresses, strains, strenghts, and pressures were measured.

Lankford, J. D. See Burgh, E. E. 00306

Lankford, J. D. See Kalcevic, V. 01140

01279 Lankford, J. D.; Ellis, C. F.
Shale oil refining: Ind. Eng. Chem., Vol. 43, p. 27-32, 1951.
Thermal cracking and chemical treatment processes were carried out on a demonstration plant scale, as an approach to the study of the refining of Colorado crude shale oil. This is the first exploratory study on this scale made on crude oil from Colorado oil shale. (From abstract)

01280 Lankford, J. D.; Guthrie, Boyd
Oil-shale processing: A. I. M. E. Tech. Publ. No. 2360, Petrol. Tech. Vol. 11, 12 p., May 1948.
This is a progress report on the oil shale and shale-oil processing research program at the U. S. Bur. of Mines Oil-Shale Demonstration Plant near Rifle, Colorado. The crushing plant and the two 40-ton N-T-U retorts are described in detail.

01281 Lankford, J. D.; Morris, Boyd
Refining of Colorado shale oil - a review of work by the U. S. Bur. of Mines: Chap. in Conf. on Oil Shale and Cannel Coal. Oil Shale and Cannel Coal, Proc., Vol. 2, Inst. of Petrol., London, p. 500-532, 1951.

01282 Lankford, J. D.; Trotter, F. J.; Taylor, F. W.
Solids level control: U. S. Patent 2,620,933, 1952.
The patent concerns a device for maintaining a predetermined level of particulate solid material in a container comprising a piston. Rough diagrams of the device are shown. (Note: See Klosky for all oil shale patents through 1959).

Lantz, F. J. See Maher, J. C. 01376

01283 Laput, V. A.; Garmasheva, L. F.
Raspredeleniye organicheskogo veshchestva v Devonskikh i verkhneproterozoyskikh otlozheniyakh orshanskoy

Upper Proterozoic deposits of the Orshanskiy Basin): Akad. Nauk SSSR, Dokl., Vol. 218, N-. 1, p. 59-62, illus., 1974.

01284 Laput, V. A.; Rodiko, N. S.; Dmitriyeva, L. P.
Izucheniye ostatochnogo organicheskogo veshestva paleozoyskikh i verkhneproterozoyskikh otlozheniy Orshcnskoy vpadiny (Investigating residual organic matter of upper Proterozoic and Paleozoic sedimentary rocks in the Orsha Basin): Akad. Nauk SSSR, Dokl., Vol. 18, No. 10, p. 925-926, table, 1974.

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Barcue Creek Corehole No. 1 Data. Open File Report No. 15-69. Open File at Bureau of Mines libraries at Denver, Colo., and Laramie, Wyo.: and the U. S. Geol. Surv. Public Inquiry Office, Denver, Colo. NO PUBLIC DISTRIBUTION.

Larkin, E. D. See Oparysheva, L. G. 01585

01286 Larsson, A.
Uranium and radium in Kolm: Stockholm, Svensk Kem. Tidskr., Vol. 31, p. 63-70 (in Swedish), 1919.

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Energy prospects in the Netherlands. (Delfl Progress) Report. General Issue, p. 1-24, 1976.

Laub, D. E. See Tschanz, C. M. 02135

Lawlor, D. L. See Robinson, W. E. 01764

Lawlor, D. L. See Robinson, W. E. 01765

Lawlor, D. L. See Robinson, W. E. 01766

Lawlor, Dale L. See Smith, John Ward 01954

01288 Lawlor, D. L.; Fester, J. I.; Robinson, W. E.
Pyrite removal from oil-shale concentrates using lithium aluminum hydrite: Fuel, Vol. 42, p. 239-244, 1963.
This 1963 article describes a technique, developed by the Bur. of Mines, for removing pyrite from oil-shale concentrates. Concentrates obtained by this technique would be useful in kerogen structural studies. (From abstract)

01289 Lawlor, D. L.; Robinson, W. E.
Fatty acids in Green River Formation oil shale: A. C. S. Prepirnts, Div. of Petrol. Chem., Vol. 10, No. 1, p. 5-7, March 1965.

01290 Lawlor, D. L.; Robinson, W. E.
Fatty acids and n-alkanes in Green River oil shale: Changes with depth: A. C. S. Preprints, Div. of Fuel Chem., Fol. II, No. 2, Part 2, p. 480-486, April 1967.
This paper discusses the changes with depth for fatty acids extracted from Green River Formation oil shale. These changes were compared to the already reported n-alkane changes. (From Abstract)

02191 Lawlor, D, L.; et al.
Pyrite removal for oil-shale concentrates using lithium aluminum hydride: A. C. S. Preprints, Div. of Fuel Chem., Vol. 1, p. 156-159, Sept. 1961.

01292 Lawlor, John M.; Murphy, M. T. J.; Chapman, R. W.
Hydrocarbons isolated from shales of the East Berlin Formation, Connecticut (abs.): Geol. Soc. Am. Spec. Paper 115, p. 128-129, 1968.
Hydrocarbons in black, red, and grey shales of this Traissic formation were studied. Extraction methods using benzene-methanol mixtures removed the soluble hydrocarbons. Components were identified by chromatography, ultraviolet and infrared spectroscopy, and mass spectrometry. Grey shale had most hydrocarb.

01293 Lease, L. W.; et al.
Uranium favorability of Tertiary sediments in the northern Green River Basin and Hoback Basin, Wyoming: Bendex Field Eng. Corp. Rep. No. GJBS-64 (77), 92 p., illus., incl. tables, sketch map, 1977.

01294 Leatherock, Constance; Bass, N. Wood
Chattanooga Shales in Osage County, Okla., and adjacent areas: Am. Assoc. Pet. Geol. Bull., Vol. 20, No. 1, p. 91-101, 5 figs., incl. sketch map, Jan., 1936.
Discussion of the Chattanooga shale in this area and its stratigraphic relations to a basal sand and an overlying shale. An intertonguing gray shale is also studied. Microscopic studies of well cuttings and petrographic thin sections prove the absence of the Chattanooga in at least one large area.

Leclair, G. See Cameron, A. R. 00337

01295 Lecomte, P.; Willemyns, P.; Martin, H.
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Discovery of oil shale beds at southwest coast of Korea (abs.): Pac. Sci. Congr., Rec. Proc., No. 13, Vol. 1, p. 153-154, 1975.

01297 Lee, Kwang K.; Smith, J. W.
Paleolimnology and oil-shale genesis in Green River Formation, Colorado: Wasserwertschaft und Gewinnumg Fossiler Energietrager Intl. Symp. Dusseldorf, Bundesrepublik Deutschland, Paper 15, 17 p., Sept. 1976.

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Nature of clay-kerogen associations in the oil shales from the Washakie Basin of the Green River Formation (Wyoming): Master's Texas Tech: Lubback, 1975.

Leeuw, J. W. See Vander Berg, M. L. J. 02234

Legatski, M. W. See Kilburn, P. D. 01185

01299 Lekas, M. A.; Gray, B. G.; Caprenter, H. C.
The Bronco Oil Shale Study. Part I. The feasibility of using nuclear explosives in the production of shale oil. Project Bronco. PNE 1400, p. 1-21. Available from: Clearinghouse for Federal Scientific and Technical Information, National Bureau of Standards, U. S. Dept. of Commerce, Springfield, Virginia, 22151. Price: $3.00.
This article "... examines the feasibility of using deeply buried underground nuclear explosions to break oil shale deposits for in situ retorting, and recommends that a nuclear explosion experiment be designed to test the concept." (Authors) Oil shales are described as an energy source and the sequence of events in the experiment is outlined.

01300 Lekas, M. A.; Carpenter, H. C.
Fracturing oil shale with nuclear explosives for in-situ retorting: Colo. Sch. Mines, Q., Vol. 60, No. 3, p. 7-28, illus., tables, discussion, p. 29-30, 1965.
This paper is divided into three sections. The first discusses the processes and effects of fracturing oil shale with nuclear explosives. In situ retorting of the oil shale by the nuclear method and by the Ntu method are studied. The last part is a question and answer discussion with one of the authors.

01301 Lemcke, K.
Oelschifer im Meteoritenkrater des Noerdlinger Rieses (Oil shales in the Noerdlinger Ries meteorite crater): Ver. Schweiz. Pet. - Geol. Ing., Bull., Vol. 44, No. 106, p. 1-12 (incl. Eng. sum.), illus. (incl. sects., maps), 1978.

01302 Leonard, Joseph T.
Ozonolysis of the Chattanooga black shale (with a brief progress report by C. R. Kinney, J. T. Leonard, and others) annual report, January 1, 1958, to December 31, 1958: U. S. Atomic Energy Comm. NYO-6679, 135 p. (dep.; $6, NTIS)(prepared by the Pennsylvania State University), 1958.

Leonard, J. T. See Kinney, C. R. 01193

Leonard, J. T. See Kinney, C. R. 01194

Leonard, J. T. See Kinney, C. R. 01195

01303 Leplat P.; Noel, R.; Paulet, J.
Comparaison de la diagenese organique de roches a kerogene et de la compaction des argiles en fonction de l' enfouissenent (Comparison of organic diagenesis and compaction of clay as a function of burial depth); in Petrographie de la matiere organique des sediments, relations avec la paleotemperature et le potentiel petrolier (Alpern, V., editor), p. 127-152 (incl. Eng. sum.), illus. (incl. tables), C. N. R. S., Paris, France, 1975.
Suggests diagenesis is a function of depth. Through techniques of pyrolysis, reflectance, electron spin resistance, gas chromatography, the state of diagenesis of kerogen can be determined. Through the examination of clay compaction diagrams of the three coreholes, estimates of presence, though not in accumulated pools, of petroleum are given.

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Economic geology of Australia and Papua, New Guinea; 3, Petroleum: Australia, Inst. Min. Metall., Monogr. Ser., No. 7, 541 p., 1976.

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Kriterii parageneticheskogo oglozheniya uranonosnykh bitumov i urania po geologicheskim i eksperimental'nym dannym (Criteria of the paragenetic deposition of uranium-bearing bituments and uranium bases on field and experimental data): in Rudoobrazovaniye i metallogeniya, p. 116-182, Akad. Nauk, Ukr., SSR, Inst. Geokim. Fiz. Miner., Kiev, 1971.

01306 Lessley, George E.
Kinetic study of the non-catalytic hydrogenation of shale gas oil: Master of Science Thesis, Univ. of Wyo., 135 p., July 1968.

01307 Lessley, G. E.; Silver, H. F.; Jensen, H. B.
Thermal cracking of shale gas oil under a hydrogen

atmosphere: A. C. S. Preprints, Div. of Petrol. Chem., Vol. 15, No. 4, p. A84-A92, 1970.
The results obtained in this work show that the rate at which shale gas oil cracks at constant temperature under hydrogen, pressure, decreases as the extent of cracking conversion increases. (From Abstract)

Letushova, I. A. See Ginzburg, A. I. 00897

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Neutron activation analysis of seven trace elements in some selected samples of New Albany Shale (Abs.); in Southeastern Section, 23rd Atlanta Meeting, Geol. Soc. Am., Abstr., Vol. 6, No. 4, p. 376, 1974.
21 samples of New Albany shale from five Kentucky counties were analysed by neutron activation for seven trace elements. The range of element content in parts per million and the arithmetic mean are given. The author reports that minor variations in element content are similar to those of other investigations.

01309 Leung, Samuel S.; Sanders, Thomas
A geochemical study of the New Albany Shale in Kentucky (abs.): in Southeastern Section, Geol. Soc. Am. Abs., Vol. 5, No. 5, p. 413, 1973.
259 samples of New Albany shale from 25 Kentucky counties were analysed for twelve trace elements, some by neutron activation and some by X-ray flourescence. Authors report the lack of regional variation and the similarity of their findings to other trace element studies of the area.

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Geochemical studies of the alum-silica shales of Thuringia: Arch. Lagerstattenforsch, Vol. 82, p. 1-45, 1951.
120 shale samples for Cu, Ni, Co, Zn, V, Mo, Cr, Zr, Ti, Y, La, Pb, Av V 700; Mo 250; No 60; Cr 30 ppm. V Mo, Cr parallel Carbonrich fraction separated and abnormal enriched Au, Mo, Ni; low in V. Clay rich fraction enriched in V, Ti, Mo, and Cr.

01311 Leventhal, Joel S.
Sources of organic matter in Devonian black shales: Geol. Soc. of Am. Abs. Programs. 1978 Annual Mtg. Vol. 10, No. 7, p. 444, 1978.
Kerogens from black shales of the central Great Basin are derived predominantly from marine organims such as Tasmanites and yield n-alkanes and alkanes upon pyrolosis. The Chattanooga and associated shales of the Appalachian Basin contain both marine and terrestial (Vitrinite) components and yield mainly substituted aromatics.

01312 Leventhal, J. S.
Stepwise pyrolysis-gas chromatography of Kerogen in sedimentary rocks: Chem. Geol., Vol. 18, No. 1, p. 5-20, 1976.
Description of testing of carbonaceous matter by stepwise pyrolysis-gas chromatography methods. The molecular sizes (C-chain length) of kerogens were determined and chromatograms were compared. Rocks tested included Green River, Antrim, Kupferletten, Monterey, Pierre, and Romney.

Leventhal, J. S. See Jennings, J. K. 01113

01313 Levin, A. S.
Secondary alterations in oil shales of the Leningradskoye Deposit: Int. Geol. Rev., Vol. 19, No. 10, p. 1225-1229, 1977.
Discusses epigenetic changes in the oil shales of the Leningradskoye deposit. Composition of the geochemical zones is studied, and changes in composition are measured.

Levine, N. See Pollara, F. Z. 01658

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Recovery of uranium from Chattanooga shale, progress report, September 1953: U. S. Atomic Energy Comm. RMO-4000, 44 p. (dep.; $11, LC)(prepared by Columbia University), 1953.
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Levinson, A. A. See Bayliss, P. 00146

01315 Lewis, A. E.
Nuclear in situ recovery of oil from oil shale: in Peaceful nuclear explosions IV, p. 153-207, (incl. French, Russian, Spanish sum.) illus. (incl. tables, sketch maps), IAEA, Vienna, Austria, (IAEA-TC-1-412), with discussion, 1975.

01316 Lewis, Authur E.
The outlook for shale oil: Am. Astronaut. Soc. Publ., Sci. Technol., Vol. 35 (Energy delta; supply vs. demand), p. 241-259, illus., (incl. tables, sketch maps), 1975.

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The outlook for shale oil, in Identification of Research and Development Priorities and of Costing Problems Associated with Implementation of in Situ Reocvery of Shale Oil: Rept. No. NSF-RA-N-75-001, p. 218-236, 1975.

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The mineral industry of Utah: Univ. of Utah Bull., Vol. 10, No. 11, 208 p., Dec. 1919.

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Paleoenvironments of northern Ohio formations are discussed. Deltaic and channel sequences are studied, and mention of the Cleveland black shale is made.

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Study of a single unit within a thick shale sequence. Isopach maps show marked pinching and swelling along strike that may be related to positions of turbidite fans to the east, coming from the Catskill Delta. Interprets depositional environment. Includes E-log cross-sections, isopach map, etc.

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Effects of weathering on organic matter in shales: Geochim. Cosmochim. Acta, Vol. 37, No. 1, p. 113-120, illus., 1973.
Near surface three-meter intervals, upper Cretaceous shale, semi-arid climate, changes in organic carbons, soluble and insoluble organic matter, Utah.

01322 Licari, Gerald; Cloud, P. E., Jr.
Eucaryotic nannofossils in kerogens from the pre-Paleozoic Windermere Series of Alberta (abs.): Geol. Soc. Am. Spec. Paper 121, p. 174-175, 1969.
Discusses the microbiota of kerogen from shales of the Hector Formation in Alberta. The fossils, which appear to be planktonic green algae, are discussed briefly in terms of shape and size. Their relationship to dependent heterotrophic organisms is suggested.

01323 Lightbur, Ken
Mountains of oil; oil shale, Colorado: Eng. Bull., Vol. 27, No. 9, p. 4-5, illus.

Liktionov, V. P. See Orlova, V. S. 01587

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Subsurface geology of Barry County, Michigan: Mich., Geol. Surv. Div., Rep. Invest., No. 15, 36 p., illus., 1974.
This report is a subsurface investigation of rock strata underlying Barry County aimed at providing basic and general geologic data. The author's intent is

to provide mechanical log correlation sections, structure maps and other helpful data.

Lima, F. W. See Atalla, L. T. 00064

01325 Linden, Kh. R.; Tsaros, Ch. L.; Fel'dkirkner, Kh. L; et al.
Dytovoy gas is goryuchikh slantsev (Natural gas from oil shale): in Razrabotka i ispol'zovaniye zapasov goryuchikh slantsev (Baum, V., chairperson), p. 311-326, illus. (incl. tables), Izd. Valgus, Tallin, Union of Soveit Socialist Republics, 1974.

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Rundle oil shale deposit, Queensland, Australia (abs.): Am. Assoc. Pet. Geol., Bull., Vol. 61, No. 5, p. 809, 1977.
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Some aspects of the geology of the Rundle oil-shale deposit, Queensland: APEA J. (Aust. Pet. Explor. Assoc.), Vol. 16, Part 1, p. 165-172, illus. 1976.

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Stratigraphy and depositional environment of the New Albany Shale (Upper Devonian and Lower Mississippian) in Indiana: Ph. D. Thesis (unpub.), Indiana Univ., 136 p., 10 pls., 20 figs., 2 tables, 1964.
Lithologic subdivisions and environmental conditions based on surface sections, subsurface logs, and cores. Correlations with equivalent units in surrounding states. Deoxygenated marine environment of deposition is postulated. Includes photomicrographys, cross-sections, isopach maps, descriptions of measured sections.

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Stratigraphy of the New Albany Shale of Indiana: Ind. Geol. Surv. Bull. 4, 73 p., 1970.
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01330 Lineback, J. A.
Stratigraphy of the New Albany Shale in southeastern Indiana (abs.): Geol. Soc. Am. Spec. Paper 76, p. 102-103, 1963.
Describes stratigraphic succession, considers age from early Late Devonian to Kinderhookian, comments of depositional environment.

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Subdivisions and depositional environments of the New Albany Shale (Devonian-Mississippian) in Indiana: Am. Assoc. Pet. Geol., Bull., Vol. 52, No. 7, p. 1291-1303, illus., 1968.
Considers lithology, subdivision, correlations distribution, depositional environment. Includes maps of shale color, isopachs, section descriptions, etc.

Lineback, J. A. See Atherton, Elwood 00065

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The relations of peat to oil shale: Am. Peat Soc., J., Vol. 18, No. 2, p. 45-49, Apr., 1925.

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Petroleum and oil-shale research of the Bureau of Mines, fiscal year 1969: U. S. Bur. of Mines, Inf. Circ., No. 8525, 117 p., illus. (incl. sketch map), 1971.
p. 66-80: Objectivies and accomplishments of a variety of Bureau of Mines projects concerning oil shale and kerogen are noted. Most of the projects have to do with characteristics of oil shale products, reactions of shale oil components, and constitution of oil shale.

Linville, B. See Chancellor, R. E. 00407

Linville, Bill See Spencer, John D. 01985

Linville, Bill See Spencer, John D. 01984

01334 Linville, Bill; Spencer, John D.
Bureau of Mines Energy Program, 1972: U. S. Bur. of Mines Inform. Circ. 8612, 107 p., 1973.
A wide variety of Bureau of Mines projects concerning oil shale are briefly summarized. These included evaluating in situ fracturing systems in Colorado and Wyoming, control and management of oil shale wastes, method for estimation of nahcolite, and NMR method for quick assay of oil shales, and new methods for determining characteristics of shale oils.

01335 Linville, B.; Spencer, J. D.
Review of Bureau of Mines Energy Program, 1970: U. S. Bur. of Mines, Inf. Circ. No. 8526, 111 p., 1971.
A wide variety of Bureau of Mines projects concerning oil shale are briefly summarized. Among these topics are fracturing and in situ research conducted at Rock Springs, Wyoming, control and management of oil shale wastes, and characteristics of oil shales and shale oils.

01336 Linville, B.; U. S. Bureau of Mines
Petroleum and oil-shale research of the Bureau of Mines, fiscal years 1967-1968: U. S. Bur. of Mines, Inf. Circ., No. 8448, 162 p., illus. incl. table, 1970.
Production, utilization, conservation. 11 oil shale research projects of the Bureau of Mines active in fiscal 1967-1968 are summarized. Among topics discussed are: use of nuclear explosives in processing oil shale; evaluation of research at Anvil Point, Colo., shale oil conversion; characteristics of oil shale products; spectroscopic analyses, shale oil components and reactions; and constitution and bonding of kerogen.

01337 Liquornik, M.
Extraction of uranium from Un-Barek oil shale: Israel Research Council Bull., Vol. 10C, p. 171-176, 1962.

01338 Lishmund, S. R.
Oil shale; The mineral industry of New South Wales, No. 30, 80 p., illus. (incl. geol. maps), 1974.

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Favorable geological environments for uranium prospecting, in Guidelines to Prospecting, a symposium: Canadian Mining J., Vol. 89, No. 5, p. 51-54, illus., tables, 1968.
This paper covers the highlights of the subject of favorable geological environments for uranium prospecting. Gives a simplified classification of uranium deposits and their characteristics. Includes figures.

Liu, J. H. See Cole, R. D. 00462

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Oil shale; a roadblock and a solution: in Oil Shale Symposium, 7th, Proceedings, Colo. Schm. Mines, Q., Vol. 69, No. 2, p. 185-203, illus. (incl. sketch map), 1974.
Discusses the roadblock that oil shale of the west Colorado area connot be mined using conventional concepts of mine layout and mine development. The solution is that federal, state, and local governments must coordinate with industry to bring about successful development. Many models of mining methods are presented.

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Oil shale; a solution to the roadblock: Eng. Min. J., Vol. 175, No. 6, p. 109-117, 1974.

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Organic constituents of oil shales and related rocks: Colorado, Univ. studies, Vol. 16, No. 2, p. 149-170, 3 pls., April. 1928.

01343 Livingstone, Jennie
Organic Constituents of oil shales and related rocks; Garfield County Coloardo: Master's, Colorado, 1927.

01344 Lockett, Robert
Production of gas in northern Cincinnati Arch province: in Natural gases of North America; Part 3, Natural gases in Rocks of Paleozoic Age, Am. Assoc. Pet. Geol., Mem., No. 7, Vol. 2, p. 1716-1745, illus., 1968.
Discusses history of gas production on the flanks of the Cincinnati Arch in Kentucky, Ohio, Indiana, and West Virginia. Structure and stratigraphy are discussed, and reservoirs and classified in order of age of host rock. Also mentions gas storage projects.

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The mineral fuel resources of Indiana: Indiana Dept. Conserv., 11th Ann. Rept., p. 27-37, 1929.

01346 Logomerac, U. G.
The extraction of uranium from Sconza shales (Yugoslavia): United Nations, Internat. Conf. on the Peaceful Uses of Atomic Energy, 1st, proc., Vol. 8, p. 111-115, 1956.
This paper attempts to examine the problems of leaching bituminous shales with uranium content of average 136 gm per ton of ore and to describe the data of leaching, precipitation scheme and techniques, as well as extraction. (From Conclusion).

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Lombard, D. B. See Carpenter, H. C. 00366

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The Bronco Oil Shale Study. Part II. A design for project Bronco, an experiment for nuclear fracturing and in-situ retorting of oil shale. Project Bronco. PNE 1400, p. 22-45. Available from: Clearinghouse for Federal Scientific and Technical Information, National Bureau of Standards, U. S. Dept. of Commerce, Springfield, Virginia, 22151. Price: $3.00.
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Basic features of a plan to break shale for in situ retorting by the use of nucelar explosives is discussed. Includes diagrams.

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Longchambon, Henri See Longchambon, Louis 01351

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Radioactive tracer pulse method of evaluating fracturing of underground oil shale formations: U. S. Bur. of Mines, Rept. of Invest., No. 7791, 33 p., 1973.
A Bureau of Mines feasibility study on the use of tracer pulses to assess the degree of fracturing

in an underground formation consisted of three phases: 1-a laboratory study using sand packs and open tubes, 2-a test on a retort, and 3-a field test on underground fractured shale. Measurements of void space, flow channel size, dispersion, counting systems, pulse size, and statistical analyses are given for these systems.

Lorenz, Phillip B. See thomas, Rex D. 02083

Loucks, R. G. See Bebout, D. G. 00157

Love, A. H. See Claypool, G. E. 00444

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Four low grade uraniferous zones in the Laney Shale tongue were examined and sampled along a 90 mile distance. Lithology and thickness of the zones is mentioned with detected U content given for each.

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This is a very comprehensive paper on development and operation of gas-flow combustion retorts. "Effects of process variables, results of gas and shale distribution studies, tests on shale particle size, and other details of experimental programs are discussed,..." (Author) Problems of the retorting process are noted as well. "Tabulations of the retorting test data and detailed oil recovery flow diagrams for the 6-, 25-, and 150-ton-per-day retorts, and drawings relating to retorting equipment are given." (Author)

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Fracturing oil shale with electricity: Colo. Sch. of Mines Q., Vol. 62, No. 3, p. 46-61, July 1967.
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Meriaux, E. See Blanquart, P. 00200

01422 Merrill, R. H.
Design of underground mine openings, oil-shale mine, Rifle, Colorado: U. S. Bur. of Mines Rept. of Invest. 5089, 56 p., 1954.
"This report contains a summary of the various studies made to determine the structural design of the production mine area of the oil shale min, Rifle, Colo." (Author) Mining concerns such as maximum safe roof span, optimum extraction ratio, and pillar size were studied and answers were found from theoretical calculations and model studies. Geologic structure of the deposit, physical properties of the oil shale, and magnitude and distribution of stress around proposed underground operings are discussed. Roof sagging with time was measured and a mechanism for this was cited.

01423 Mesolella, Kenneth J.
Paleogeography of some Silurain and Devonian reef trends, Central Appalachian Basin: Am. Assoc. Pet. Geol., Bull. Vol. 62, No. 9, p. 1607-1644, 1978.
Paleogeography of the "Carniferous" limestone which directly underlies the Eastern Gas Shales of Kentucky. Its variable internal stratigraphy warns of tectonism which influenced the stratigraphy of the shales.

Mesri, G. See Hendron, A. J., Jr. 01005

01424 Metz, William D.
A huge resource of low-grade fuel: Science (AAAS), Vol. 184, No. 4143, p. 1271-1272, 1274-1275, sketch map, 1974.
Discusses the potential possibilities of using oil shale as a low-grade fuel. Environmental factors are also discussed.

01425 Metz, William D.
Oil shale; a huge resource of low-grade fuel: in Energy; use, conservation and supply (Abelson, Phillip H., ed.), p. 71-73, sketch map, Am. Assoc. Adv. Sci., Washington, D. C., United States, 1974.

Meyer, F. F. See Meyer, R. F. 01429

Meyer, F. A. See Cook, G. L. 00517

01426 Meyer, R. F.
The future supply of nature-made petroleum and gas: technical reports: and international conference sponsored by the United Nations Institute for Training and REsearch and the International Institute for Applied Systems Analysis and the first UNITAR conference on energy and future and the Second IIASA conference on energy resources, July 5-16, 1976, Schloss Laxenburg, Laxenburg, Austria: Pergamon Press, New York, N. Y., 1046 p., 1977.

01427 Meyer, R. F.
U. S. Department of the Interior energy data fiels: Geol. Soc. Am. Abs. Programs, Vol. 6, No. 7, p. 868, 1974.
Discusses energy-related data files maintained in the Bureau of Mines and the U. S. G. S. Oil shales are mentioned as part of the material covered in the files.

Meyer, R. F. See Breger, I. D. 00258

Meyer, R. F. See Koepf, E. H. 01217

01428 Meyer, Richard F.; Edgerton, Curt D., Jr.
Petroleum and natural gas, in Mineral Resources of the Appalachian Region: U. S. Geol. Surv. Prof. Paper 580, p. 145-163, illus., tables, 1968.
Describes histories of petroleum and gas industries in Appalachian region. Refining, current producing areas, stratigraphy, exploration and potential also cited.

01429 Meyer, R. F.; Meyer, F. F.
The resource potential of gas in tight formations, in The Future Supply of Nature-made Petroleum and Gas: technical reports: Pergamon Press, New York, N. Y., p. 645-656, 1977.

Meyer, W. C. See Shanks, W. C. 01881

01430 Meyer, W. C.; Yen, T. F.
Modification of the mineral matrix of the Green River oil shale by bioleaching: in Science and Technology of Oil Shale (Yen, T. F., ed.), p. 19-33, illus. (incl. tables), Ann Arbor Sci. Publ. Inc., Ann Arbor, Mich., United States, 1976.
Discusses how sulfuric acid generated by Thiobacillus can dissolve up to 40% of mineral matrix of oil shale. Rock mineralogy and pitting effects of acid are discussed. Benefits in oil shale processing due to bioleaching are cited.

01431 Meyer, W. C.; Yen, T. F.
Solution of silica in Green River oil shales in Shale Oil, Tar Sands, and Related Fuel Sources (Yen, T. F., ed.), No. 151, p. 92-97, illus. (incl. table), Am. Chem. Soc., Washington, D. C., United States, 1976.
Organic solvent systems using pyridine, gunoline or water, and potassium hydroxide were examined to determine their effectiveness in dissolving silica, thereby liberating trapped organics. (From Abstract) Discussion of results obtained and method method used.

Meyrowitz, R. See Breger, I. A. 00259

01432 Middleton, J. A.
Conversion of oil shale: Oreg., Dep. Geol. Miner. Ind., Misc. Paper, No. 18 (The citizens' forum on potential future energy sources), p. 51-56, 1975.
Discusses why we have an energy problem, and what options we have to combat it. A review of recent U. S. oil shale history is given. Reveals goals of Colony Development in oil shale future.

Miknis, F. P. See Cook, G. L. 00518

01433 Miknis, F. P.; Biscar, J. Y.
High temperature laser-induced reactions between sulfur and hydrocarbons: High Temp. Sci., Vol. 4, p. 48-49, Jan. 1972.
Reported are high-temperature, laser-induced reactions between solid sulfur and hydrocarbon gases. (From abstract)

01434 Miknis, F. P.; Biscar, J. P.
Q-Switched laser-induced reactions of thiacyclobutane and thiacyclopentane with oxygen: J. of Phys. Chem., Vol. 75, No. 5, p. 725-726, 1971.
Reported are the results of some investigations of the chemical reactions occurring during laser-induced gas breakdown of sulfur compounds in the presence of oxygen. (From p. 25)

01435 Miknis, F. P.; Biscar, J. P.
Q-Switched laser-induced reactions of thiophene with oxygen: High Temperature Science, Vol. 4, No. 6, p. 478-480, 1971.
Reported are the results of investigation of chemical reactions initiated by laser-induced gas breakdown of thiophene in oxygen. (From p. 478)

01436 Miknis, F. P.; Decora, A. W.
Pulsed NMR examination of oil shales, estimation of potential oil yields: A. C. S. Preprints, Div. of Fuel Chem., Vol. 19, No. 2, p. 86-93, 1974. Also: 167th ACS National Meeting, Los Angeles, CA Mar. 31-Apr. 5, 1974. (abs.)
This is a continuation of a study at the Laramie Energy Research Center, on wideline nuclear magnetic resonance (NMR) techniques for evaulation of oil-shale deposits. In this study, the techniques of pulsed NMR were applied.

01437 Miknis, F. P.; Decora, A. W.; Cook, G. L.
Pulsed NMR examination of oil shales; estimation of potential oil yields: in Science and Technology of oil shale (Yen, T. F., ed.), p. 35-45, illus. (incl. tables), Ann Arbor Sci. Publ. Inc., Ann Arbor, Mich., United States, 1976.
Results of pulsed NMR assays on oil shale samples from two cores of Green River shale. Experimental procedures and theoretical considerations are used in measuring the oil yields.

01438 Miknis, F. P.; Decora, A. W.; Cook, G. L.
Pulsed nuclear magnetic resonance studies of oil shales; estimation of potential oil yields: U. S. Bureau of

Mines Rept. of Invest. No. 7984, 45 p., illus. incl. tables, 1974.

This article examines the potential application of nuclear magnetic resonance (NMR) is rapid evaulation of oil shale deposits. Theoretical considerations are first presented. In experiments, samples from the Mahogany Zone of the Green River formation were studied for oil yield by both the Fischer assay and NMR methods, and the methods were compared. Effect of inorganic proton interferences is measured and advantages of the NMR method are cited.

01439 Milici, R. C.
(In preparation), Oil and gas data from Paleozoic rocks of the Appalachian basin: The relationship of regional structures to producing areas in the Appalachian basin: U. S. Geol. Surv. Misc. Inv. Map I-917-G, est. 1980.

01440 Miller, A. K.; Youngguist, W.
Conodonts from the type section of the Sweetland Creek Shale in Iowa: J. Paleo., Vol. 21, p. 501-517, pls. 72-75, 1947.

Systematic paper on the Sweetland Creek Shale with references to those species common to the Ohio Shale and especially the Ogentangey Shale of Ohio (Hoover, 1960).

01441 Miller, G. A.
Environmental hydrologic baseline program, federal prototype oil shale leases, Piceance Creek and Uinta basin, Colorado and Utah: Eos (Am. Geophys. Union, Trans:) Vol. 57, No. 12, p. 915, 1976.

Discusses monitoring of inorganic, organic and biochemical parameters. Ground water from deep and shallow wells, springs, runoff water tested for analysis of the dissolved solids and ions. Monitoring of these parameters will be conducted during development of the oil shale industry.

Miller, J. S. See Campbell, G. G. 00346

01442 Miller, J. S.; Johaua, R. T.
Fracturing oil shale with explosives for in situ recovery: in Shale oil, tar sands and related fuel sources (Yen, T. F., ed.), No. 151, p. 98-11, illus. (incl. tables, sketch maps), Am. Chem., Soc., Washington, D. C., United States, 1976.

This study is a research effort to evaluate results of detonation sheetlike layers of explosive to increase flow capacity in confined rock formations. (From p. 98) Describes procedure used and gives tables of results obtained.

01443 Miller, J. S.; Nicholis, H. R.
Methods and evaluation of explosive fracturing in oil shale: U. S. Bur. of Mines Rept. of Invest. 7729, 22 p., 1973.
This article discusses explosive fracturing of Green River oil shale in Wyoming to increase permeability. Three methods of fracturing using dynamite, TNT, and a liquid chemical explosive were used. Seven methods were used to evaluate the extent of fracturing in the fragmented zone.

01444 Miller, J. S.; Walker, C. J.; Eakin, J. L.
Fracutring oil shale with explosives for in situ oil recovery: U. S. Bur. of Mines Rept. of Invest. 7874, 100 p., 1974.
Surface and near surface explosive fracturing techniques were first tested, with a description of testing and results given. Field explosive fracturing tests were then conducted at seven oil shale sites near Rock Springs, Wyoming. Discussion of the field investigations and seven evaluation methods are described, including gamma ray and caliper logs, air flow tests, and seismic delineation.

01445 Miller, Micheal L.; Ettensohn, Frank R.
A preliminary microscopic examination of Devonian and Lower Mississippian black shales in east-central Kentucky: Geol. Soc. Am., Abs. Series, Southeastern Section 27th Annual Mtg., Vol. 10, No. 4, 1978.
Discusses the examination of black organic-rich Ohio, Sunbury, New Albany, and Chattanooga shales. Five major microfacies and names of major organic and inorganic constituents are recognized using reflected light, transmitted light, cathodoluminescence, and X-ray diffraction techniques.

01446 Miller, Molly Fritz
Ethology and ecology and some Devonian shallow water Zoophcos and possible implications for trace fossil evolution: Geol. Soc. of Am. Abs. with Programs. 1978 Ann. Mtg., Vol. 10, No. 7, p. 457, 1978.
Devonian Zoophycos-producing animals differ from post Paleozoic in habitat (shallow vs. deep water and fine vs. coarse sediment) and in morphology. some Tertiary abyssal trace fossils may have been derived by immigration and subsequent adaptation of shelf burrowers.

01447 Miller, Peter, Jr.
A test of the Ohio shale for yield of oil: B. S. thesis (unpub.), Ohio State Univ., 23 p., 1944.
Presents a series of quantitatives assays for oil

content. Main purpose of thesis was to develop the best extraction method to obtain optimum oil yield. (Hoover, 1960)

01448 Miller, R. C.
Analysis of sandstones in the Dowelltown Member of the Chattanooga Shale, Macon County, Tennesse and vicinity: Compass, Vol. 47, No. 2, p. 84-98, tables, 1970.
Includes isopach, isolith, sandstone percentage, and other maps for Macon County, Includes data tables.

Miller, R. C. See Wise, R. L. 02360

Mills, G. Alex See Watkins, J. Wade 02288

Mills, T. See Moore, R. 01467

01449 Milton, C.
Mineralogy of the Green River Formation of Colorado, Utah and Wyoming; Int. Geol. Congr. Abs. Congr. Geol. Int. Resumes, No. 25, Vol. 2, Sect. 14, Mineralogy, p. 581-582, 1976.
Minerals and mineral groups of the Piceance Basin, Uinta Basin, and green River Basin are discussed. Conditions of sedimentation, which are uncertain, were discussed.

01450 Milton, C.
Mineralogy of the Green River Formation: Mineral. Rec., Vol. 8, No. 5, p. 368-379, 1977.

Milton, Charles See Smith, J. W. 01939

01451 Milton, Charles E.; Connant, L. C.; Swanson, V. E.
Sub-Chattanooga residuum in Tennessee and Kentucky: Geol. Soc. Am. Bull., Vol. 66, p. 805-810, 1955.
Discusses leaching of the Ohio Black Shale and a gray to brown clayey limestone underneath it that is leached by sulfuric acid from pyrite in the layers above. Petrography and chemical composition of the leached zone are described and illustrated by photomicrographs. Components of the leached zone are given.

01452 Milton, Charles; Swornik, E. J.; Finkelman, R. B.
Nordstrandite, Al(OH) 3, from the Green River Formation in Rio Blanco County, Colorado: Am. Mineral, Vol. 60, No. 3-4, p. 285-291, 1975.
Occurrences of this mineral and its association with other minerals is discussed. X-ray diffraction data, chemical analyses and thermal behavior are illustrated. Methods of synthesis of this and related minerals are presented.

01453 Mines Magazine
Oil shale research concluded: Mines Mag., Vol. 58, No. 3, p. 9, 1968.
This article summarizes the work done on oil shale research conducted at the Anvil Points research facility near Rifle, Colorado by the Colorado School of Mines Research Foundation, Inc.

01454 Mining, Engineering
Uranium-sword or plowshares: Min. Eng. J., Vol. 3, p. 762-766, 1951.
Reports that the Chattanooga Shale of Tennesse-Kentucky contains about 0.008 percent U_3O_8 (Hoover, 1960).

01455 Minster, R. A.; Martel, R. A.; Harak, A. E.
Some observations of retorting phenomena in shale blocks: Laramie Energy Research Center/Rept. of Invest. - 76/8, 22 p., 1976.

01456 Misaqi, F. Leo
Solid hydrocarbons: Subsection 4.57E in S. M. E. Mining Engineering Handbook, ed. by A. B. Cummins and I. S. Given, Soc. of Mining Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., New York, Vol. 1, p. 4-38 - 4-39, 1973.
Described is the composition of oil shales and a classification on the basis of organic components is given.

01457 Mitchell, F. J.
Radioactivity survey in eastern West Virginia: W. Va. Geol. Surv. Rept. of Invest. No. 21, 12 p., illus., tables, 1961.
Instrumentation and field methods were outlined and a simplified explanation of radiation was given. Tables are presented denoting microroentgens measured in different lothologies, formations, and systems of rock. Chemical analyses for U_3O_8 are also shown. Uranium content in a few samples of igneous rocks are given.

01458 Mitchell, G. E.
Billions of barrels of oil locked up in rocks: National Geographic Mag., Vol. 33, p. 195-205, 1918.

Mitchell, L. E. See Sohns, H. W. 01975

01459 Mo, Tin; Suttle, Andrew D.; Sockett, William M.
Uranium concentrations in marine sediments: Geochim. Cosmochim. Acta, Vol. 37, No. 1, p. 35-51, illus. (incl. sketch map), 1973.
Global, relations with organic carbon, calcium in

manganese nodules, mode of enrichment in nearshore environments via anoxid pathway, redeposition in deep sea.

01460 Modzeleski, Vincent; MacLeod, W. D.; Nagy, B.
Analysis of hydrocarbons from the Little Osage Shale in Kansas by combined capillary column gas chromatography and mass spectrometry (abs.): Geol. Soc. Am. Spec. Paper 115, p. 153, 1968.
Discusses chemical extraction of organic portion of one sample of Little Osage Shale. Method of separation of n-alkanes from branched and cycloalkanes by gas column chromatography and mass spectrometry is presented.

01461 Montgomery, Edwin H.
The white rock that burns-Oil shale on the national land reserve: Out Public Lands, Vol. 10, No. 4, p. 5-7, 14-15, illus., 1961.

01462 Moore, C. A.
U. S. Federal Power Comm., Washington, D. C., p. 179-236, 1973.

Moore, C. B. See Jackson, T. A. 01092

Moore, George W. See Vine, J. D. 02253

Moore, Geroge W. See Vine, James David 02254

01463 Moore, George W.; Stephens, J. G.
Reconnaisance for uranium-bearing carbonaceous rocks in California and adjacent parts of Oregon and Nevada: U. S. G. S. Trace Elem. Invest. Rept. 337, 19 p., map, diagrs., tables, 1953. For official use only.

01464 Moore, J. W.; Dunning, H. N.
Interfacial activities and porphyrin contents of oil-shale extracts: Ind. Eng. Chem., Vol. 47, p. 1440-1444, 1955.
A Colorado oil-shale sample was extracted with solvents of increasing polarity. The interfacial activities and the porphyrin, nitrogen, and metal contents on the extracts were determined. (From p. 1440) Includes description of experimental procedure, tables of results and discussion of the conclusions made.

01465 Moore, L. R.
Cannel coals, bogheads, and oil shales: in Coal and Coal bearing strata (D. Murchinson: T. S. Wastall, ed.), p. 19-29, illus., Am. Elsevier Publ. Co., New York, 1968.
Cannel coals and boghead coals are members of the products of peat swamps. Reference is made to the

petrographic characters of these coals. Several aspects of the Scottish oil shales are illustrated.

01466 Moore, R. C.
Early Mississippian formations of Missouri: Mo. Bur. Geol. and Mines, Ser. 2, Vol. 21. 283 p., 1929.
Discusses Grassy Creek and Saverton Shales in northeastern Missouri and adjacent Illinois - distribution, thickness, lithology, paleontology, correlation. Includes correlation chart, section descriptions.

01467 Moore, R.; Mills, T.
An environmental guide to Western surface mining; Part One, Federal leasable and locatable mineral regulations: Rept. NO. FWX/OBS-77/20, 70 p., illus., 1977.

01468 Moore, R. T.; McCutchan, P.; Young, D. A.
Basic nitrogen determination by titration with perchloric acid: Anal. Chem., Vol. 23, p. 1639-1641, 1951.
The paper describes the investigation of the interference of the oxygen and sulfur compounds that are presented in shale oil. It also establishes a definition of basic vs. nonbasic nitrogen as applied to shale oil and petroleum. (From Intro.)

Morandi, J. R. See Jensen, H. B. 01115

01469 Morandi, J. R.; Jensen, H. B.
Homogenous catalytic deuteration of olefinic double bonds: J. Org. Chem., Vol. 34, p. 1889-1891, June 1969.
The specific deuteration of olefins using tris rhodium (I) chloride (A) as a homogenous catalyst has been investigated. (From abstract) Mass spectrometry was used to determine deuterium location in the alkanes formed.

01470 Morandi, J. R.; Jensen, H. B.
Comparison by porphyrins from shale oil, oil shale, and petroleum by adsorption and mass psectroscopy: J. Chem. Eng. Data, Vol. 11, No. 1, p. 81-88, 1966.
This work was undertaken to isolate porphyrins from shale oil and to compare them with porphyrins from oil shale and petroleum. (From Abstract) Mass and adsorption spectroscopy were used to characterize these poryphrine extracted by a hydrogen bromide-acetic acid solution. Included tables of results.

01471 Morandi, J. R.; Poulson, R. E.
Nitrogen types in light distillates from aboveground and in situ combustion produced shale oil: A. C. S. Preprints, Div. of Fuel Chem., Vol. 20, No. 2, p. 162-174, 1975. Also, 169th A. C. S. National Meeting, Philadephia, PA Apr. 6-11, 1975. (Abs.)
Chemical types of nitrogen in light distillate fraction from combustion-retorting crude shale oil and in-situ oil. (From Abstract) Includes an explanation of results obtained.

01472 Morandi, J. R.; et al.
A method of identifying and determining positional, normal-olefin isomers: Tabloid newspaper form of abstract of papers presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Ind., Cleveland, Ohio, Paper 169, p. 170, March 6-10, 1972.

01473 Morgan, G. B.
Wyoming oil shales: Am. Mining Congr., 23rd. Ann. Convention, Rept. of Proc. p. 529-531, 1921.

01474 Morrell, Roger G.; Unger, Harold F.
Drilling machines, surface: in Cummings, A. B. and Griven, I. A. (ed.), SME Mining Engineering Handbook: Soc. Min. Engr. AIME, Vol. 1, p. 11-24, 25-56 (drilling in open-pit, quarry and stripping operations), 1973.
This is a discussion of surface drilling machines-limited to primary blasthole drilling as practiced in open-pit, quarry and stripping operations. (From p. 11-24)

Morris, Boyd See Lankford, J. D. 01281

01475 Morris, Boyd, Cameron, R. J.
Thermal processing and chemical treating of Colorado shale oil: Presented before Ind. Bur. of Mines Oil-Shale Conf., Univ. Wyo. Summer Science Camp, Laramie, Wyo., Aug. 1954. Pub. in Minutes of Conf., U. S. Bur. of Mines Administrative Pub.

01476 Morris, C. E.
Elastic constants of oil shale: in Explosivly Produced Fracture of Oil Shale; October-December, 1977 (Carter, W. J. compiler), Los Almaos Sci. Lab., Rept. No. 7164, p. 21-28, illus., incl. table, 1978. Available from NTIS, Springfield Va.

Morris, C. See Rose, C. K. 01783

01477 Morris, H. B.; Gilbert, D. L.
Experimental shale-oil refinery: Petrol. Eng., Vol. 21, p. C26, 28, 30-32, Aug. 1949. See also World Petrol.,

Vol. 20, p. 46-49, June 1949.
Describes operation of the experimental oil shale refinery at Rifle, Colorado. Step-by-step processing of oil is outlined.

Morris, J. C. See Cook, G. L. 00518

01478 Morris, S. Conway
Middle Cambrian Polychaetes from the Burgess Shale of British Columbia: Philosophical Transactions of the Royal Society, Series B. Vol. 285, No. 1007, 1979.

01479 Morrision, M.
Examination of Barigan and Wollar deposits of oil shale; (and Kenny, E. J.), Marangaroo oil shale; (and Kenny, E. J.), Oil shale, Warlands Creek, Murrurundi district: New South Wales, Dept. of Mines, Ann. Rept. 1935, p. 78-79, 86-87, Je 10' 36.

01480 Morse, J. G.
Oil shale, in Colorado energy resources handbook: Colo. Sch. Mines, Vol. 2, 68 p., illus., tables, sketch maps, 1976.

Morse, J. W. See Rhoads, D. C. 01729

01481 Morse, W. C.; Forreste, A. F.
Preliminary report on the Waverlian formations of east-central Kentucky and their economic values: Kentucky Geol. Surv. Bull. 16, 76 p., 1912.
Black shale sequence in Kentucky compared to that of Ohio. Possible economic values considered. Includes section descriptions.

Motorina, Z. M. See Sokolova, W. T. 01976

Mougne, Marcel M. See Fons, Lloyd 00814

01482 Moulton, G. E.
Areas for further prospecting near the Martinsville pool. Clark County: Ill. Petrol. 4, p. 1-5, 1926.
Includes structure map on Sweetland Creek Shale.

01483 Moulton, G. R.; Bell, A. H.
Three typical oil fields of the Illinois region: in Structure of Typical Am. Oil Fields, 1. 2: Am. Assoc. Pet. Geol., p. 115-141, 1929.
Subusrface strucutre of Martinsville pool contoured on base of Sweetland Creek Shale.

01484 Mouret, P.; Pottier,; Soudan P.
Application of alkaline leaching to the extraction of uranium from shale of the Vosges: United Nations Internat. Conf. on the Peaceful Uses of Atomic Energy,

2nd, Proc., Vol. 3, p. 356-362, 1958.
The alkaline process has been studied in the lab. to determine the conditions for the 3 principal operation it involves: leaching, separation of the barren solids from the liquor, and extraction of the uranium. (From p. 357) Includes tables of results.

01485 Moussavi, M.; Yen, T. F.; Yen, T. F. (ed.)
Environmental improvements by oil shale leaching, in Science and Technology of Oil Shale: Ann Arbor Sci. Publ. Inc., Ann Arbor, Mich., p. 205-220, 1976.
Summary of nature of nitrogen, trace metal, and sulfur compounds-which are leading environmental obstacles to oil shale mining and processing. Problems of oil shale mining and processing due to waste disposal are discussed. Methods for leaching some of the mineral matrix is presented.

01486 Moussavi, M.; Young, D. K.; Yen, T. F.
Rate of dissolution of carbonate mineral matrix in oil shale by dilute acids: in Shale oil, tar sands, and related fuel sources (Yen, T. F., editor), No. 151, p. 48-54, illus. (incl. table), Am. Chem. Soc., Washington, D. C., United States, 1976.
This study reveals certain inner nature of the oil shale aggregate by analyzing the kinetic data obtained from disaggregation of carbonate part. (From p. 49) Experimental procedure used is described.

01487 Muhlen, Lwo von sur
Die olschiefer des europaischen Russlands: Leipzig u. Berlin, B. G. Teubner, 31 p., illus., map, tables, 1921.

Mulder, G. J. See Van der Berg, M. L. J. 02234

01488 Mulheirn, L. F.; Ryback, G.
Stereochemistry of some steranes from geological sources: Nature, Vol. 256, No. 5515, p. 301-302, illus., 1975.
Reported in this paper are the preliminary results of the application of optical retary dispersion (ORD) and high-resolution proton magnetic resonance (PRM) spectroscopy to steranes from 2 crude oils and from Green River Shale.

01489 Mull, J. B.
American oil-shale developments: J. Petrol. Tech., Vol. 2, No. 5, Sec. 1, p. 14-16, May 1950.
This 1950 article discusses the progress made in the development of the oil-shale industry. Describes the geology of the Piceance Creek Basin and discusses the refining techniques used at the oil-shale demonstration plant near Rifle, Colorado.

01490 Muller-Vonmoss, M.; Back, R.
Thermoanalytic-mass spectrochemical investigation of an oil shale containing dawsonite: in Thermal analysis; Vol. 2, Inorganic material and physical chemistry (R. F. Schwenter, Jr. and Paul D. Garn, editors); Internat. Conf. thermal Analysis, 2nd, Worcester, Mass., 1966. Proc., p. 1229-1238, Acad. Press, New York, 1969.

Munkova, V. See Angelova, G. 00040

01491 Munson, D. E.; Young, E. G.
Application of a rate dependent model to stress wave propagation in oil shale: Eos (Am. Geophys. Union, Trans.), Vol. 57, No. 12, p. 1009, 1976.
Analyses how kerogen and kerogen-free samples behave when subject to stress. Notes differences in the testing of kerogen and kerogen-free shale.

Murphy, M. T. J. (Sister) See Eglinton, G. 00735

Murphy, M. T. J. See Lawlor, John Mary 01292

01492 Murphy, Mary T. J.; McCormic, A.; Eglinton, G.
Perhydro-β-carotene in the Green River shale: Science, Vol. 157, No. 3792, p. 1040-1042, illus., 1967.
Several triterpenes and the tetraterpene perhydro-β-carotene have been identified in the branched-cyclic hydrocarbon fraction of this Eocene shale. The analytical procedure included thiourea adduction plus gas chromatography and mass spectrometry. (From abstract)

01493 Murphy, Robert C.; Djuricic, M. V.; Markey, S. P.
Acidic components of Green River shale identified by a gas chromatography-mass spectrometry-computer system: Science, Vol. 165, No. 3894, p. 695-697, illus., table, 1969.
The extractable acidic components of Green River Shale were characterized by the combined uses of gas chromatography and mass spectrometry.

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In-situ shale-oil production problems: Univ. Calif. Radiaction Lab. (Livermore, Calif.) and San Francisco Operations Office, U. S. Atomic Energy Comm., Plowshare. Ser. UCRL-5678, Part IV, p. 80-101, 1960.

01495 Murphy, W. I. R.
Retorting research: Presented before Ind. Bur. of Mines Oil-Shale Conf., Univ. of Wyo. Summer Science Camp, Laramie, Wyo., Aug. 1954. Publ in Minutes of Conf., U. S. Bur. of Mines Administrative Pub.

Murphy, W. I. R. See Jensen, H. B. 01114

Murphy, W. I. R. See Sohns, H. W. 01972

Murphy, W. I. R. See Throne, H. M. 02093

Murphy, W. I. R. See Throne, H. M. 02092

Murphy, W. I. R. See Thorne, H. M. 02094

Murphy, W. I. R. See Tisot, P. R. 02111

Murphy, W. I. R. See Tisot, P. R. 02110

Murphy, W. I. R. See Tisot, P. R. 02109

01496 Murray, A. L.
Sanitation in planning and developing oil-shale camps: U. S. Bur. of Mines Rept. of Invest. 2265, 7 p., 1921.
General information on selection and planning of town or camp site is presented, with considerations of water supply, soil, drainage, and environment. Sewage and waste disposal and housing planning are mentioned, and economic relations of sanitation to industry, such as preventable time loss due to illness, are discussed.

01497 Murray, D. K.
Comparisons of environmental effects of convertional and in situ mining of oil shale, a state viewpoint: or, energy and the environment, together we can work it out, in Identification of Research and Development Priorities and of Costing Problems Associated with Implementation of it situ Recvoery of Shale Oil: Rept. No. NSF-RA-N-75-001, p. 267-278, 1975.

01498 Murray, D. K.
Energy resource development map of Colorado: Colo. Geol. Surv., May Ser. No. 6, sheetp., 1976.

Murray, D. K. See Newman, K. R. 01563

01499 Murray, Keith D.
Estimated shale oil reserves, federal oil shale leases, Colorado tracts C-a, C-b: Rocky Mtn. Assoc. Geol., Field Conf., Guideb. No. 25, (Guideb. to the energy resour. of the Piceance Creek Basin, Colo.), p. 131-134, illus., 1974.
Estimates of reserves in these two tracts are shown by calculations and a conversion chart. Room and pillar method of mining of lands suitable after the final environmental impact statement are criterion for the estimates. Comparison of reserves with those in Wyo. and Utah is shown.

01500 Murray, Keith D.
Power requirements for an oil shale industry: Rocky Mt. Assoc. Geol., Field Conf., Guidebook, No. 25 (Guideb. to energy resour. of the Piceance Creek Basin, Colo.), p. 181-184, 1974.
Natural gas and electrical requirements for a shale oil plant are hypothesized. Energy need studies estimated from federal, state, and private investigations are presented. Water requirements of the Piceance Creek Basin are also considered.

01501 Murray, Keith D.; Haun, John D.
Introduction to the geology of the Piceance Creek Basin and vicinity, northwestern Colo.: Rocky Mt. Assoc. Geol., Field Conf., Guideb. No. 25, Guideb. to the energy resour. of the Piceance Creek Basin, Colo., p. 29-39, 1974.
Paleogeography outlined from Cambrian through Quaternary. Briefly summarizes resources, including oil shale, oil and gas, coal, and uranium. Tectonic, isopach, and formation distribution maps are shown.

01502 Murray, R. G.
Comparison of aboveground and in situ retorting costs in Identification of Research and Development Priorities and of Costing Problems Associated with Implementation of in situ Recovery of Shale Oil: Rept. No. ASF-RA-N-75-001, p. 279, 291, 1975.

01503 Murri, W. J.; Tokhein, R. E.; Shockey, D. A.; et al.
Computer simulation of fracture damage in small scale borehole experiments in oil shale: in Energy Resources and Excavation Technology, Vol. 1, p. 5B4-1 to 5B404. Proceedings of the 18th U. S. Symposium on Rock Mechanices, held at Keystone, Colo., June 22-24, 1977.
Described results of experiments where an explosive is placed in a hole drilled along the axis of a cylinder of oil shale and detonated twice. Damage and crack patterns were observed, computer simulations of this experiment have been initiated.

01504 Murty, P. S. M.; Aswathana rayana, U.; Mahadevan, C.
Geochemistry of the siliceous black shales at Nagarjunasagar damsite, India: Econ. Geology, Vol. 58, p. 614-616, 1962.
Comprehensive stuides have been made on the Precambrian black shales exposed at the Nagarjunasager damsite, to investigate the possibility of their being uraniferous and to examine the conditions under which uranium might have been concentrated in thie shale. (From abstract)

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Outlining shale masses by geophysical methods, in Diapirism and diapirs - A symposium: Am. Assoc. Pet.

Geol. Mem. 8, p. 122-136, illus., 1968.
Discusses physical and geophysical properties of a shale mass. Discusses how they may be outlined in sub-surface and may trap oil pools. Gravity anomaly maps and study of an offshore area of Louisiana tie into shale and salt dome studies.

01506 Musser, W. N.; Humphrey, J. H.
In situ combutsion of Michigan oil shale; current field studies: Intersoc. Energy Convers. Eng. Cong., Proc., No. 11, Volume 1, p. 341-348, 1976.

Myasoyedov, B. F. See Nemodruk, A. A. 01554

01507 Myers, R. C.
Stratigraphy of the Fronties Formation (Upper Cretaceous), Kemmerer aea, Lincoln County, Wyoming: Master's Colorado School of Mines, Golden, Colo., unpaginated p., 1977.

01508 Mylius, L. A.
Oil and gas development and possibilities in east-central Illinois (Clark, Coles, Douglas, Edgar, and parts of adjoining counties): Ill. Geol. Surv. Bull. 54, 205 p., 1927.
Discussion of Sweetland Creek Shale - Thickness, lithologic character. Includes chemical analysis and determinations of oil content. Cross-sections, columnar sections, well data, structure maps.

01509 Myung, John I.
Fracture investigation of the Devonian Shale using geophysical well logging techniques: Morgantown, W. Va., Morgantown Energy Tech. Cent., Unconventional Gas Recovery Program, Doe. 039, 26 p., March, 1976. (WVGES)
Conventional well logs and interpretation methods do not provide sufficient information to evulate the production gas zones of the Devonian Shale in the Appalachian area. With this in mind, an approach to locating and evulating the fractures and showing evidence of the source beds has been formulated. (From p. 1)

01510 McAllister, A. L.
Price, technology and ore reserves: Elsevier Sci. Publ. Co., Amsterdam, Netherlands, 1976. In World mineral supplies; assesment and perspective, p. 37-63, illus. (incl. tables).

McAuley, W. S. See Stanfield, K. E. 02000

01511 McAuslan, E. R.
In the Niobara (Wyo. - Colo.) oil may yield to special methods: Oil and Gas J., Vol. 57, No. 38, p. 158-166, incl. ads., illus., Sept. 14, 1959.
Discusses the oil in fractured shale, which are liquid

hydrocarbons, and also organics, in the shales themselves, which upon retorting yield one-third as much shale oil as Green river shales. Some regional stratigraphy is outlined, noting unconventional methods may be needed to detect oil and gas. Author basically talks of oil and gas possibilities and production.

01512 McCamis, J. G.
The Carboniferous Basin; land and gulf: Can. Min. Metall. Bull., Vol. 66, No. 740, p. 51-57, 1973.
This paper discusses the likely sources of hydrocarbon in the maritime Carboniferous Basin. The regional setting, stratigraphy, and structure of the Basin are described.

01513 McCamis, John G.; Griffith, Lawrence S.
Middle Devonian facies relationships, Zama area, Alberta: Can. Soc. Pet. Geol., Rept. Ser., No. 1, p. 1-34, 1975.

01514 McCarthy, H. E.; Cha, C. Y.
Oxy modified in situ process development and update: Colo. Sch. Mines, Q., Vol. 71. No. 4, Proceedings, of the Ninth oil shale symposium, p. 85-100, 1976.
Describes and presents model of Occidental Petroleum's in situ process for fracturing of oil shale. Discusses their field development work, including results from three small in situ retorts at Laramie Research Center.

01515 McCaslin, J. C.
Pennsylvania's Devonian shale gets new look: Oil Gas J., Vol. 76, No. 28, p. 175, sketch maps, 1978.
Rising natural gas prices plus the need for more gas supplies have renewed interest in the Devonian organic-rich black shales of Pennsylvania. The Penn. Geological Survey, the Department of Energy and commerical companies are conducting studies of the natural gas potential of the area. Better technology for inducing and enhancing fracture systems will have a significant effect on this important resource.

McCormick, A. See Murphy, Mary T. J. 01492

01516 McCoy, A. W.
Soluble material in oil shale: Am. Assoc. Pet. Geol., Bull., Vol. 9, No. 6, p. 1025, September, 1925.
Effects of grinding and leaching of materials in samples of oil shale before and after compression is described.

McCutchan, P. See Moore, R. T. 01468

McCutchan, P. See Lake, G. R. 01261

01517 McCutcheon, Roberta L.; Susano, C. D.
A statistical analysis of factors affecting the fluorimetric determination of uranium on oil shale: U. S. Atomic Energy Comm. Y-414, 19 p., (dep., mc; $5.70, LC)(prepared by Carbide and Carbon Chemicals Corp.), 1949.

01518 McDermott, John
Liquid fuels from oil, shale and tar sand. Park Ridge, N. J., Norges-Data Corp., 276 p., 1972.

01519 McDonald, A.; Fritsch, A. J.
Shale oil; and environmental critique: Cent. Sci. Public Interest, CSPI Oil Ser., No. 3, 62 p., 1974.

01520 McDonald, F. D.
Identification of v-Valerolactone in waste water from an oil-shale in situ retort: U. S. Bur. of Mines, Rept. of Invest. 7918, 8 p., 1974.
This article shows the results of infrared, nuclear magnetic resonance, and mass spectrometry techniques used by the Bureau of Mines in identification of this compound from waste water. The water was examined to determine what materials were present and if any had potential for economic recovery. Isolation of the compound and results of testing are discussed and illustrated.

McDonald, F. R. See Brown, Dennis 00282

McDonald, F. R. See Decora, A. W. 00609

01521 McDonald, F. R.; Cook, G. L.
Infrared vibrations of benzene rings in condensed thiophenes: U. S. Bur. of Mines Rept. of Invest. 6911, 25 p., 1967.
Infrared spectra of condensed thiophenes, which may occur in shale oil are disucssed and vibrational bands of the spectra are correlated with known benzene spectra.

01522 McDonald, F. R.; Cook, G. L.
A method of obtaining ultraviolet and visible spectra of insoluble materials. Use of a low-molecular-weight polyethylene as a matrix material: U. S. Bur. of Mines Rept. of Invest. 6439, 10 p., 10 figs., 1964.
This report discusses the use of low-molecular weight polyethylene as a dispersion medium in order to obtain ultraviolet and visible spectra. Experimental procedure and results and discussions of tests are given. Spectrum of the polymer from a shale-oil naptha and a shale oil asphaltene are shown.

01523 McDonald, F. R.; Cook, G. L.
The use of low-molecular-weight polythylene in ultraviolet spectroscopy: Applied Spectroscopy, Vol. 15, p. 110-112, 1961.
The ultraviolet spectra of high-molecular-weight materials were obtained by dispersing them in polyethlene. The spectra of reference compounds, asphaltenes and polymers are given.

01524 McDonald. F. R.; Decora, A. W.; Cook, G. L.
The proton nuclear magnetic resonance spectra of pyridines: U. S. Bur. of Mines Bull. 657, 62 p., 1971.
Identification of pyridine compounds found in shale oil naptha was demonstrated by the use of proton-NMR spectra. Proton NMR spectra of 32 pyridines in two solvents, CCl_4 and benzene-d_6 are illustrated Chemical and differential shifts of parts of the pyridines was discussed.

01525 McDonald. F. R.; Decora, A. W.; Cook, G. L.
Qualitative applications of the NMR spectra of alkylpyridines: Part I. Chemical shifts of the ring protons: Applied Spectroscopy, Vol. 22, No. 4, p. 325-329, July-Aug. 1968.
Reported are the chemical shifts of the ring protons in CCl_4 and C_6H_6 solution and the differential shift of the protons in these two solvents. (From abstract) Includes tables of results.

01526 McDonald, F. R.; Decora, A. W.; Cook, G. L.
Qualitative applications of the NMR spectra of alkylpyridines; Part II. Chemical shifts of the protons of the alkyl substituents: Applied Spectroscopy, Vol. 22, No. 4, p. 329-336, July-Aug. 1968.
This is part of a study on the NMR spectra of pyridines, examined were the NMR spectra of 32 pyridines, in two differnet solvents. Included are the chemical shifts for alkyl-group protons.

01527 McFarlan, A. D.
Geology of Kentucky: Lexington, Ky., Kentucky Univ. 531 p., 1943.
Considers the stratigraphy and paleontology of the Devonian-Mississippian shale as represented in Kentucky (Hoover, 1960).

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Boyle-Duffin-Ohio Shale relationships: Kentucky Geol. Surv. Bull. 10, p. 1-24.
Though the black shales are normally regarded as in an unconformable relation with the underlying formations, these authors appear to be able to demonstrate facies relations with the underlying carbonates (Hoover, 1960).

01529 McFayden, W. T.
Oil from oil-shales and tar sands: Commonwealth Mining Met. Congr., 8th, Publ. Vol. 5, Proc. (Petrol.), p. 222-223, illus. (incl. geol. sketch map), 1966.

01530 McGee, Dean A.
Diversification of energy: Explor. Econ. Pet. Ind., Vol. 7, p. 1-17, 1969.

01531 McGill, P.
The stratigraphy and structure of the Vendom Fiord area: Bull. Can. Pet. Geol., Vol. 22, No. 4, p. 361-386, 1974.
Discusses stratigraphy and paleogeography from Early Ordovician to Late Devonian of area. Mentions a black bituminous shale (Read Bay Formation) of Silurian age, and a thick sequence of black shales lying above it.

01532 McGrain, P.
Tar sands (rock asphalt) of Kentucky; a review: Ky. Geol. Surv., Rept. Invest., No. 19, p. 16, illus. (incl. sketch map), 1976.
Deals with location and reserves of tar sands (or asphaltic rock) by counties. Suggests they could be used as raw energy source though primarily used in paving in the past. Western Kentucky reserves have 500 million tons of strippable tar sands, with equivalent bitumen content of 10-15 gallons per ton.

01533 McGregor, D. J.
Stratigraphic analysis of Upper Devonian and Mississippian rocks in Michigan basin: Am. Assoc. Pet. Geol. Bull., Vol. 38, p. 2325-2356, 17 figs., 1954.
Quantitative consideration of the shale sequence as represented in eastern Michigan, using isopach and lithofacies maps to serve as basis for interpreting tectonic and environmental conditions and sedimentation processes. Conclude that tectonic of the depositional area are a very important factor in controlling sedimentary facies (Hoover, 1960).

01534 McGrew, P. O.
Taphonomy of Eocene fish from Fossil Basin. Fieldiana; Geol., Vol. 33, No. 14, p. 257-270, 1975.
Discribes the collecting of fossil fish from the Green River Formation shales in southwestern Wyoming. Many photographs and radiophotographs of fish skeletal and scale parts are pictured. Paleoenvironment and theory presented discussing the conditions for occurrence of the fish.

McGuire, W. H. See Weaver, O. D. 02292

01535 McIlreath, I. A.; Aitken, J. D.
The formation and subsequent preservation of the Burgess Shale and other nearby remarkable faunas due to the effects of the middle Cambrian Catherdral Escarpment (abs.): J. Paleontal., Vol. 51, No. 2, Suppl., Part III, p. 18-19, 1977.
Fauna and flora of the Middle Cambrian, Bathyuriscus, Elrathiana zone, accumulated in the Stephen-Field basinal embayment of a platform shelf edge reef, the Catherdral Escarpment. Fossil abundance decreases downward. The escarpment acted as a butress deflecting thrust-faulting and protected them from structural deformation.

01536 McIver, Richard D.
Composition of kerogen - Clue to its role in the origin of petroleum (with French abs.), in Origin of oil, geology and geophysics - World Petroleum Cong., 7th, Mexico, 1967, Proc., Vol. 2: London, Elsevier Publishin Co., p. 25-36, illus., tables, 1967.
Analysis of 60 shale samples from mostly North American localities proves the complexity of kerogen contained in them. Simulated maturation of the kerogen yielded products differing even in the same formation.

01537 McIver, R. D.; Martin, S. J.; Bayliss, G. S.
Organic geochemistry of gas-bearing shales, U. S. Eastern Interior Basin (abs.): Am. Assoc. Pet. Geol., Bull., Vol. 62, No. 6, p. 1092, 1978. AAPG-SEP, annual meeting; late abstracts.
Studies show shale gas has its source and is retained in organic-rich zones deposited in restricted marine environments. There are two chemically-distinct facies associated with restructed marine environments and a third associated with nonmarine sediment.

McKay, E. J. See Sharp, William W. 01883

01538 McKee, Ralph H.; Ells, S. C.; Goodwin, R. T.
Shale oil: New York, Chemical Catalog Co. 326 p., illus., tables, 1925.
A general view of overall oil shale picture, with articles on origin, location, refining, components, industry, and economic considerations of oil shale or shale oil. Presented in twelve articles by different authors.

01539 McKee, Ralph H.; Goodwin, R. T.
A chemical examination of the organic matter of oil shales: Coloado School of Mines Q., Vol. 18, No. 1, Supplement A, 41 p., 13 figs., Jan. 1923.
Definintion and origin of oil shales is presented. Thermal decomposition of their organic content by

pyrolysis was tested. The effect of a variety of solvents on a variety of shales (North American) was preorted. Microphotographs of thin sections show constituents orientation and lamination.

01540 McKelvey, Vincent E.
Uranium in the Upper Cambrian black shale of Sweden: U. S. Geol. Surv. Trace Elem. Invest. Rept. 495, 19 p., maps, diagrs., 1955. For official use only.

01541 McKelvey, V. E.; Duncan, D. C.
United States and world resources of energy, in Symposium on Development of Petroleum Resrouces of Asic and the Far East, 3rd, Proc., Vol. 2, pts. 2D-2E: U. N. ECAFE Mineral Resources Devel. Ser. No. 26, Vol. 2, p. 9-16, tables, 1967.
Classification of energy reserves is given. Fossil fuel, nuclear fuel (thorium, uranium, lithium) reserves are estimated in the U. S. and worldwide. Brief summaries of estimates of U. S. reserves of rich and lean grade oil shales is given.

01542 McKelvey, V. E.; Nelson, J. M.
Characteristics of marine uranium-bearing sedimentation rocks: Econ. Geol., Vol. 45, p. 35-53, 1950.
Study of marine black shales which are uranium-bearing. These rocks are rich in organic matter and sulfides, and the best are pre-Mosozoic. The uranium is considered syngetetic in origin (after Hoover, 1960).

McKeown, F. A. See Beroni, E. P. 00187

McKeown, F. A. See Sharp, William N. 01883

01543 McKirdy, D. M.; Powell, T. G.
Metamorphic alteration of carbon isotopis compostion in ancient sedimentary organic matter; new evidence from Australia and South Africe: Geology (Boulder), Vol. 2, No. 12, p. 591-595, illus., 1974.
Discusses effect of thermal alteration of organic matter on isotopes of carbon. Theory presented for heavy reduced carbon occurring in very old rocks from South Africa.

McKyes, Edward See Quigley, Robert M. 01694

McKyes, Edward See Quigley, Robert M. 01693

McLaughlin, R. E. See Reaugh, A. B. 01707

McTernan, W. F. See Kerr, R. D. 01172

McVicker, L. D. See Bradbury, J. C. 00231

Nagy, B. See Modzeleski, Vincent 01460

Nagy, Bartholomew see Bitz, Mary Carol 00195

Nagy, Belane See Razavoelgyi, J. 01705

01544 Nagy, L.
A dunantuil olajpala-kutato furasok retegsoranak palinologia; vizsgalata (Palynological investigation of Dunatul oil shale exploratory bare-holes): Hung., Foeldt. Intez., Evi Jel., Vol. 1974, p. 247-261, (incl. English sum.), Charts, plates, 1976.
Pollen, spores, Botryo-Coccus, brannii, on oil-forming algae.

01545 Narayan, Kailash
Effect of palladium catalyst on hydrogenation of shale oil: Master of Science Thesis, Univ. of Wyo., 77 p., Sept. 1968.

01546 Narten, Perry F.; Crawford, J. E.; Butler, A. D.
Summary review of analytical data pertaining to uranium content of radioactivity of domestic shales: U. S. Geol. Surv. Trace Elem. Mem. Rept. 240, 13 p., tables, 1950.

Neal, D. W. See Patchen, D. G. 01610

01547 Nechaeva, N. B.
Investigation of the process of methane formation by microorganisms from the cores of the gas- and petroleum-bearing strata of the second Baku: Microbiologia, Vol. 24, No. 1, p. 3-13, 1955, Translation RS-285, Assoc. Tech. Services, P. O. Box 27, E. Orange, N. J.
Methane - producing bacteria were detected in core samples. These bacteria are identical with methanobacterium formicum Schnelleu in its ability to utilize formic acid salts of methane production and in its ability to -- CH^4 from CO_2+H_2.

01548 Neglia, S.
Migration of Fluids, in Sedimentary Basin, Am. Assoc. Pet. Geol., Bull., Vol. 63, No. 4, April, p. 573-597, 1979.
This paper discusses the basic mechanisms governing the migration of water and hydrocarbons in sedimentary basins which are related to basinal structural history, rock properties, compaction, and temperature regime, which are themselves interdependent. (From abstract). Includes figures and tables of results obtained.

01549 Nejib, U. R.; Anderson, J.
Magnetic characteristics of multi-colored shales from northeastern Pennsylvania: Pa. Acad. Sci., Proc., No. 46, p. 123-126, illus. (incl. sketch map), 1972.

01550 Nelson, B. W.
Pre-Berea mineralogy and stratigraphy: Ph. D. thesis (unpub.), Univ. of Illinois, 104 p., 1955.
Develops new facies concepts and sedimentation history of the Ohio and Bedford Shales, based on clay mineralogical laboratory and field investigation (Hoover, 1960).

01551 Nelson, John M.
Radioactivity of asphaltities, coals, and shales in Tennessee, Kentucky, West Virginia, and Pennsylvania: U. S. Geol. Surv. Trace Elem. Invest. Rept. 32, 22 p., maps, tables, 1948.

Nelson, J. M. See McKelvey, V. E. 01542

01552 Nelson, S. J.; Johnson, R. D.
Geology of Hudson Bay basin: Bull. Canadian Petroleum Geology, Vol. 14, No. 4, p. 520-578, illus., 1966.
Primarily deals with stratigraphy, lithology, and structure of the region. Includes brief description of the Long Rapids Formation, which contains a Devonian greenish to blackish sometimes bituminous shale. Spore and invertebrate rossils are mentioned.

01553 Nemcek, David Francis
A paleo-environmental study of two localities in the Wanakah shale (Middle Devonian)(Western New York), Master's, New York; Buffalo, 1971.

01554 Nemodruk, A. A.; Myasoyedov, B. F.; Karalova, Z. K.
Perspektivy methody apredeleniya malykh kolichestv urana i toriya v pordalch i mineralakh i perspektivy ikh razuitiya (Present methods of determining small amounts of uranium and thorium in rocks and minerals and their perspectives on developmint): Akad. Nauk SSSR, Sib. Otd. Inst. Geol. Geotiz., Tr., No. 286 (Radioaktivnyye elementy v gornykh perodakh), p. 245-256, table, 1975.

01555 Neubronner, Karl
Bietrage zur kenntnis des schieferols aus Wurttemberg: Stuuttgart, Druck von A. Remppis, 95 p., diagrs., 1921.

01556 Nevens, Thomas D.; Culbertson, William J.; Hollingshead, R. D.
Disposal and uses of oil shale ash: Open File Rept. No. 32-74, 90 p., 1970. Available for reference during

working hours at Bureau of Mines libraries in Denver, Colo., Salt Lake City, Utah, and at the Central Library, U. S. Dept. of the Interior, Washington, C. D.

The purpose of this study was to determine some of the properties of waste shale ash. Studies dealing with a variety of Piceance Creek Shales retorted and burned for various times and temperatures were made. (From abstract)

01557 Newberry, J. S.
The general geological relations and structures of Ohio: Ohio Geol. Surv., Vol. 1, ot. 1, p. 1-167, et al., 1873.

Discusses relationship of the black shales to the structural studies of Ohio. Considers the shale series in the various county reports (Hoover, 1960).

01558 Newberry, J. S.
On the origin of carbonaceous matter in bituminous shales: Annual of New York Acad. Sci., Vol. 2, p. 358-369, 1883.

01559 Newberry, J. S.
Report of the Geological Survey of Ohio; Geology: Ohi Geol. Surv., Vol. 2, pt. 1, 701 p., et al., 1874.

Concerns age and correlations of the Devonian-Mississippian shale sequence. Discusses sequence by counties in which they crop out (after Hoover, 1960).

01560 Newberry, J. S.
Report of the Geological Survey of Ohio; Geology: Ohio Geol. Surv., Vol. 3, pt. 1, 965 p., General geology by counties, et al., 1878.

Includes maps, columnar sections, data tables, etc.

01561 Newberry, J. S.
The rock oils of Ohio: Ohio State Board Agriculture, 14th Ann. Rept., p. 605-618, Advance sheet, 16 p., 1859. Utilization of the black shale, 1869.

01562 Newman, K. R.
Part 2; Energy resources of northwestern Colorado; a summary of some recent developments and geological research: in Studies in Colorado field geology (Epis, R. C. ed., et al.), Colorado Sch. of Mines, Prof. Contrib., No. 8, p. 453-455, 1976. GSA and associated societies, annual meeting.

Oil, gas, coal, oil shale, uranium resources are briefly mentioned. Oil shale development projects and experiments being conducted are cited, along with a project whose purpose is to mine soda ash,

nahcolite, and dawsonite as well as extract shale oil. Recent geologic interpretations of the depositional environments involved in the genesis of the formation are mentioned.

01563 Newman, K. R.; Murray, D. K.
Part 1; Energy resources of northwestern Colorado: in Studies in Colorado field geology (Epis, R. C. ed. et al.), Colorado School of Mines, Prof. Contrib., No. 8, p. 446-452, sketch map, 1978. GSA and associated societies, annual meeting.
Road logs for three days are given. Major topics included: the Cretaceous, Paleocene, and Eocene section of the Mesaverde Formation; the Wasatch Formation; oil shale of the Green River Formation in the Piceance Creek basin, oil and gas in the Piceance basin, coal in the Mesaverde Group and coal near Craig and Hayden, Colo.

01564 Newton, V. C., Jr.
Oil shale, in Mineral and water resources of Oregon: U. S. Cong., 90th, 2nd sess., Senate Comm. Interior and Insular Affairs, Comm. Print, p. 278-280, table, 1969.

Neymushev, M. V. See Danchev, V. I. 00583

Nicaise, G. See Durand, B. 00719

Nicholas, E. See Mayne, S. J. 01414

Nicholis, H. R. See Miller, J. S. 01443

01565 Nichols, R. A. H.
Petrology and economic geology of the Upper Devonian Birdbear Formation in southeastern Saskatchewan: Saskatchewan Dept. Mineral Resources Dept. 125, 94 p., illus., table, 1970.

Nickerson, L. G. See Cottingham, P. L. 00537

01566 Niklas, K. J.
Organic chemistry of Protoslaviana (Foerstia) from the Chattanooga and New Albany shales: Rev. Palaeobot. Palynol., Vol. 22, No. 4, p. 265-279, illus. (incl. tables), 1976.
Chemical analysis of Protoslaviana, a thalloid alga from the Chattanooga and New Albany Shale is studied. Other organics isolated from the shale are correlated. Methods, results, and discussion of testing is presented.

01567 Nixon, Hershell H.; Nixon, Joan Lowery; illus. by Jean Zallinger
Oil and gas; from fossils to fuels: 1st ed. New York, Harcourt, Brace, Jovanovick, 1977 (A Let Me Read Book).

Nixon, Joan Lowery See Nixon, Hershell H. 01567

01568 Nixon, R. P.
Oil source beds in Cretaceous Mowry Shale of Northwestern Interior United States: Am. Assoc. Pet. Geol., Bull., Vol. 57, No. 1. p. 136-157, illus. (incl. sketch maps), 1973.
Organic geochemical analyses, stratigraphy, source beds, depositional history, diagenesis, migration, mechanism applications.

01569 Noble, E. A.
Uranium in coal: in Mineral and water resources of North Dakota, N. D. Geol. Surv., Bull., No. 63, p. 80-85, sketch map, 1973.
Gives a short discussion of the recent history of uranium exploration in the United States and shows the location of uranium in lignite coals of North Dakota.

Nodine-Zeller, D. E. See Berendsen, P. 00181

Noel, R. See Leplat, P. 01303

01570 North, Frank K.
A sane look at U. S. Gas resource: in Special reports, p. 113-156, U. S. Federal Power Comm., Washington, D. C., United States, 1973.

01571 North, W. G.
The Middle Devonian strata of southern Illinois: Ill. Geol. Surv. Circ. 441, 45 p., 1969b.
Published version of North (1969a); see annotation 01572.

01572 North, W. G.
The stratigraphy of the formation at and beneath the Middle-Upper Devonian boundary in Southern Illinois: Ph. D. thesis, 88 p. (in Survey open-file reports), 1969a.
Discusses Blocher Shale and Sweetland Creek Shales in southern Illinois - distribution, thickness, lithology, geophysical characteristics, stratigraphic relations. Includes correlation chart, isopach maps black shale percentage map, E-log cross-sections, list of wells.

01573 Nosow, Edward; Statler, A. T.; Van Den Berg, Jacob; Carpenter, G. L.
Developments in east-central states in 1975: Am. Assoc. Pet. Geol., Bull., Vol. 60, No. 8, p. 1222-1233, 1976.
Primarily deals with facts and figures of new oil

wells drilled in Ky., Ill., Ind., and Tenn. Gas production in Ky. in 1975 is summarized. Maps show new drilling locations in the four states.

Nosov, V. D. See Zefirov, A. P. 02391

19574 Nowak, Jadwiga Martyna
Zwiazki porfirynowe niklu i wanadu jako wskaznik warunkow srodowiskowych przy powstawaniu i zachowaniu bituminow i rop w skale. (Nickel-vanadium prophyrins as an indicator of environmental conditions during the formation and preservation of bitumens and crude oils in rocks): Przegl. Geol., Vol. 19, No. 6, p. 289-292 (incl. Eng. Russ. sum.), illus., 1971.
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A mean porosity of 2.5% was determined for the entire unit. Pyritic material is the most important single parameter governing porosity. Gas productivity is greatest in the Lower Huron which is characterized by wispy streaks of pyrite, silt, and organic material in an illite-quartz matrix.

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Electron microscope investigation of the structure of naturally and artifically metamorphosed kerogen: Geochim. Cosmochim. Acta, Vol. 38, No. 4, p. 647-650, illus. (incl. plate), 1974.
High resolution electron microscopy techniques are used on samples of organic materials altered during burial and altered artificially. Results show the kerogens formed from stacks of two aromatic layers. The 30 shale samples tested were Toarcian shales from the Paris Basin, Silurian Sahara, and Permo-Triassic Spitzberg shales.

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Oil shale mine, Rifle, Colorado: a review of design factors: U. S. Bur. of Mines Rept. of Invest. 5429, 13 p., 1958.
Three roof falls that occurred in underground rooms at the Rifle, Colo., oil shale mine are described. Mine development through the years 1945-1956 is discussed,

and layouts of the mine are presented. Evaluation of the mining method used and factors that may lead to improved mine design in the future are given.

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Electron microscope study of black shale fabric: Naturwissenschaften, Vol. 55, No. 10, p. 490-491, illus., 1968.

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O'Brien, S. M. See Prats, M. 01675

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European shale-treating practice: U. S. Bur. of Mines Inform. Circ. 7348, 70 p., 22 figs., 1946.
This circular describes studies made in Europe and other foreign countries in production of motor fuel and lubricating oil from oil shale. (From abstract)

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Irreversible contamination of Precambrian kerogen by ^{14}C-labeled organic compounds: Precambrian Res., Vol. 4, p. 221-227, 1977.
Kerogen isolated from microfossiliferous stromatolic chart; Australia.

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Ohio, an empire within an empire: Columbus, Ohio, F. J. Heer Printing Co., 214 p., 1950.
Gives historical account of the use of the Ohio Shale for distillation of kerosene and discusses future potentials of Ohio Shale as an oil shale (Hoover, 1969).

01582 Oil and Gas Journal
Shale oil-Pt. 2, Geology: Oil and Gas J., Vol. 62, No. 10, p. 66-67, illus., 1964.
Discusses the conditions of lake deposition for the Green River shales. Appearance and texture of the shale is cited. An isopach map is illustrated and the richest zones of oil shale are mentioned.

Okuno, T. See Suginhora, M. 02038

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Olhoeft, G. R. See Campbell, D. L. 00343

01583 Olinger, B.
Oil shales under dynamic stress: in Explosivly Produced Fracture of Oil Shale; April-June 1977 (Carter, W. J. compiler), Los Alamos Sci. Lab. Rept. No. 6901, p. 8-31,

illus., incl. table, 1978. Available from NTIS, Springfield, Va.

Olivercrona, J. A. See Soong, R. 01977

Olsen, G. See Bugle, R. C. 00302

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01584 O'Neil, Robert L.
Analytical procedures applicable to finegrained sedimentary rocks: J. Sed. Petrology, Vol. 29, No. 2, p. 267-280, 1959.
Analysis of shale and lignite samples by various chemical procedures show certain methods best suited in evaluation of trace elements. Limits of precision and accuracy vary with complex nature of sediment and methods used.

O'Neil, Robert See Bates, Thomas F. 00134

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01585 Oparysheva, L. G.; Shmariovich, Ye. M.; Larkin, E. D.; et al.
Osobennosti uranovoy mineralizatsii zalegayuschchey v porodakh osadochnogo chekhla i grantiakh fundmenta (Characteristic uranium mineralization that occurs in sedimentary cover and basement granites): Akad. Nauk SSSR, Izd., Ser. Geol., No. 7, p. 32-44, illus. (incl. geol. sketch maps), 1973. The Tsentral'ny uranium ore deposits of the USSR as the example.

01586 Orlov, N. A.; Kurbatov, L. M.
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01587 Orlova, V. S.; Zhuze, T. P.; Liktionov, V. P.
Opredeleniye legkikh uglevodorodov v bitumoidakh osadochnykh porod (Determination of light hydrocarbons in the bitumens of sedimentary rocks): Geol. Nefti Gaza, No. 4, p. 44-48, illus., 1975.

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01588 Orr, R. W.
Condonts from the Devonian Lingle and Alto Formations of southern Illinois: Ill. Geol. Surv. Circ. 361, 28 p., 1964.
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Extractable organic matter, hydrocarbon content and other properties of marine sediments from cores drilled in basins off southern California. Chromatographic separations determined certain fractions present. Average potential petroleum yield much higher that eventual recovery from L. A. Basin.

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First annual report of the Geological Survey of Ohio (3rd organization): Columbus, Ohio, The Westbote Co., State printers, 1890.
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Preliminary report upon petroleum and inflammable gas: Ohio Geol. Surv., 76 p., 2 maps (abs.): Am. J. Sci., ser. 3, Vol. 32, p. 241; 1887, reprinted for the author with supplement, 200 p.; 1888, (abs.): Am. Geol., Vol. 1, p. 62-63, 1886.
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A source of the bituminous matter of the black shales of Ohio: Am. Assoc. Adv. Sci. Proc., Vol. 31, p. 373-384, 1883.

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Ostrom, M. E. See Bradbury, J. C. 00231

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Uranium in Illinois black shales: Illinois State Geol. Surv. Circ. 203, 15 p. (free, Illinois State Geol. Survey, 121 Natural Resources Building, Urbana, Illinois 61801), 1955.
Lists uranium percentages for 175 dark gray and black shale samples from Illinois. New Albany Shale and equivalents included in study.

01596 Overbey, W. K., Jr.
Eastern Gas Shales Project: Mtn. State Geol., No. 1, p. 2-3, table, 1977.

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Resistivity logging from shale slurries, in SPWLA Logging Symposium, 11th Ann., Los Angeles, Calif., 1970, Trans.
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On the geology of the Western States of North America: London Geol. Soc. Quart. J., Vol. 2, p. 452-477, 1846.

01599 Ozerov, I. M.; Polozov, V. Ya.
Osnovy promyshlennoy klassifikatsii goryuchikh slantsev (Basin problems in classifying oil shale): in Razrabotka i ispol'zovaniye zapasov goryuchik slantsev (Baum, V., chairperson), p. 161-171, tables, Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

01600 Ozeroy, I. M.; Yaukhuta, G. V.; Burkov, Yu. K.; et al.
Metody izucheniya slantsevosnykh formatsiy (Methods of studying the formation of combustible shales): in Formatsii goryuchikh slantsev; methody izucheniya i geneticheskaya kassitikatsiya, p. 89-140, illus. (incl. tables, strat. cols.), Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1973.

01601 Pacminex Property Limited
Oil shale deposits of the North Eromanga Basin: Australia Inst. Min. Metall., Monogr. Ser., No. 7 (Economic geology of Australia and Papua New Buinea; 3, Petroleum), p. 517-518, 1976.

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Sur la compesition chemique et mineralogique de la formation des "Schiestes noirs" de la vallee de la Bistrita et de la vallee de la Moldova (The chemical and mineralogical composition of the black shales from Bistrita and Moldova valleys.): Rom., Inst. Geol. Geofiz., Stnd. Teh. Econ., Ser. I, No. 13, p. 71-80 (incl. English sum.), illus. (incl. tables), 1975. Prima conterinta nationala pentru argile.

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Lateral variations of clay mineral assemblages in modern and ancient sediments: in Proceedings, Internat. Clay Conf., Jerusalem, Israel, Vol. 1, p. 135-145, 1966.
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Parizek, E. J. See Conveney, R. M. 00541

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The present position of thw world's oil-shale industry: Dunedin, New Zealand, Otago Univ., 10 p., tables, 1923.

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Remote sensing for western coal and oil shale development planning and environmental analysis: in Remote Sensing; Energy-related studies, p. 171-187, illus. (incl. sketch maps), Hemisphere Publ. Corp., Washington, D. C., United States, 1975.

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Geology and natural gas potential of West Virginia's Devonian shale (abs.): Geol. Soc. Am., Abs. Programs, Vol. 8, No. 2, p. 242-243, 1976.
Discusses the six Upper and Middle Devonian shale formations and describes gas production from them in the north-central and south-western portions of the state. Suggests gas accumulation is controlled by natural fracture. Notes the shales have increased in importance as a gas supply, and author cites the high success ratio of wells and the good quality of the gas.

01609 Patchen, D. G.
Subusrface stratigraphy and gas production in the Devonian shales of West Virginia: MERC/-CR-77/5, ERDA, Morgantown, W. Va., 35 p., 1977.
Stratigraphy of the four zones of Devonian shales in the north-central and the five zones in the south-western part of the state are discussed. Natural gas production in the shales, especially the brown shales group, along with density, gamma ray, and drillers logs are characterized.

01610 Patchen, D. G.; Schwietering, J. F.; Neal, D. W.
Subsurface correlation of black Middle and Upper Devonian shales in West Virginia: Geol. Soc. of Am. Abs. Programs. 19/8 Ann. Mtg., Vol. 10, No. 7, p. 468, 1978.
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01611 Patchen, Douglas G.; Woodfork, Larry D.
Oil and gas developments in West Virginia, 1970-1971: W. Va. Geol. Econ. Surv., Miner. Resour. Ser., No. 2, 42 p., sketch, maps, 1973.
Comprehensive summary of seismic exploration, test drilling, oil and gas fields, production reserves, well-logging data, exploration outlook.

01612 Patterson, Elmer D.
Radioactive coal and shale of Pennsylvanian and Permian age in northern West Virginia: U. S. Atomic Energy Comm. TEI-494, 17 p. (dep.; $5.10, LC)(prepared by U. S. Geol. Surv.).
Carbonaceous shales and coals of Pennsylvanian

and Permian age were sampled at 16 localities for equivalent uranium content. The results of the tests are shown, though none of the coals of shales exhibitied strong radioactivity. Stratigraphy of the area is shown.

01613 Patterson, Elmer D.
Radioactivity of some coals and shales in southern Illinois: U. S. Geol. Surv. Trace Elem. invest. Rept. 466, 23 p., map, tables, 1954.
Black, hard, sheety roof shales of several coal beds along with channel samples of coal beds were sampled for uranium. Pennsylvanian stratigraphy of the coal and shale beds is presented. Localities, lithology, thickness, and uranium content for the sampled strata are given.

Paulet, J. See Leplat, P. 01303

01614 Payne, J. N.
Subsurface geology of the Iowa (Lower Mississippian) Series in Illinois: Am. Assoc. Petrol. Geol. Bull., Vol. 24, No. 2, p. 225-235; Ill. Geol. Surv. Rept. of Invest. 61, p. 225-236: disc., L. K. Lee, p. 236, 1940.
This is a discussion of the Lower Mississippian series in Illinois: Describes the composition, stratigraphy and structure of individual members.

Peake, E. See Hodgson, G. W. 01020

01615 Pearson, D. B.; Dow, W. G.
Relation of oil shale generation to kerogen maturation (abs.): Geol. Soc. Am., Abs. Programs, Vol. 8, No. 1, p. 57-58, 1976.
Generation of petroleum from reactions of organic matter in sediments is discussed. Ratios of benzene soluble extracts to the organic carbon yields a continuous profile showing where petroleum begins to form. Generation is shown to be a function of thermal energy rather than catalysis.

01616 Peattie, Roderick
Geography of Ohio: Ohio Geol. Surv. Bull. 27, 137 p., 1923.
Refers to the economic utilization of the Devonian-Mississippian shale sequence in the ceramic and mineral-water industries (Hoover, 1960).

01617 Pederson, John A. (ed.)
Future energy outlook: Colo. sch. Mines, Q., Vol. 68, No. 2, 206 p., illus. (incl. sketch maps), 1973.
Compilation of papers presented at the AAPG Fuels

Symposium (1968, Oklahoma City) and the AAPG Mineral Economics Symposium (1972, Denver).
18 articles are presented concerning coal, gas oil, oil shale, and uranium as energy sources. Articles were divided into three sections: mining and mineral policy, exploration and development, and future energy outlook. Two articles have to do specifically with future and development of oil shales.

01618 Pelipetz, M. G.; Wolfson, M. L.; Ginsberg, H.
High-pressure hydrogenation of crude shale oil: Chem. Eng. Progress, Vol. 48, p. 353-356, 1952.
Crude shale oil, obtained by retorting of Colorado oil shale in a gas-flow retort, was hydrogenated over several solid catalysts in a continuous high-pressure unit on a once through basis. (From abstract) Includes figures and tables of results.

01619 Pelzer, E. E.
Mineralogy, geochemistry and stratigraphy of the Besa River Shale, British Columbia: Can. Petrol. Geol. Bull., Vol. 14, p. 135-145, 1966.
A thick 320 to 2400m, shelf-to-basin section of a Devonian-Mississippian black shale is examined with the X-ray and resulting mineralogical variations related to provenance. Maps and cross-sections also used to infer such an origin. See also Conant and Swanson (1961).

01620 Pendse, Arvind P.
Techniques for the determination of nitrogen compounds in shale gas oil: Master of Science Thesis, Univ. of Wyo. 71 p., Nov. 1971.

Pen'kev, V. F. See Uspenskiy, V. D. 02228

01621 Penner, S. S. (organizer)
Identification of research and development priorities and of costing problems associated with implementation of in situ recovery of shale oil: 372 p., illus. (incl. tables), 1975. (Rept. No. NSF-FA-N-75001), Available from: Natl. Sci. Found., RANN Doc. Cent., Wash. D. C. U. S.
This book was the summarization of a workshop whose purpose was the identification of critical problem areas hindering in situ shale oil recovery techniques. Discussions conducted by four panels at the workshop (fracture, retorting, environmental impact, and economics), including their recommendations for research, are given. Nine papers covering various current in situ concerns are also presented.

01622 Pennsylvania State College
An investigation of the mineralogy and petrography of uranium-bearing shales, second progress report, period October 1, 1951-January 1, 1952: U. S. Atomic Energy Comm. AECU-1942, 10 p., (dep., mc), n. d.
X-ray and microscopic examinations were made of samples of Chattanooga Shale, Jaury Shale, and Brassfield shale collected in Tenn. (From Abstract) The heavy minerals were separated from the samples and subdivided with a Frantz Isodynamic magnetic separator. (Auth.)

01623 Pennsylvania State University
An investigation of mineralogy, ... lignites (Scope A-Shales), fifth annual report, April 1, 1955, to March 31, 1956: U. s. Atomic Energy Comm. NYO-7411, 113 p. (dep.), 1956.
Qualitative and semi-quantitative mineralogical and chemical analyses were made of 205 Chattanooga shale samples and 130 samples of shale from Penn., New Mexico, France, and Sweden. The Chattanooga samples came from nine drill cores representing the area from Northern Tenn. to Central Ala. (From abstract)

01624 Pennsylvania State University
An investigation of the mineralogy and petrography of uranium-bearing shales, final report: U. S. Atomic Energy Comm. NYO-9605, 53 p. (dep., mc; $5.45, NTIS), 1961.
Shales studied include the Alum shales of Sweden, Chattanooga Shale, Ohio Shale, Woodford Shale, St. Hipployte of France, Kupferschiefer of Germany, and Carboniferous shales from Kansas. Four methods of study were employed: 1-microscopic study of thin sections and polished surfaces and associated alpha and fission fragment nuclear trace plates; 2-X-ray studies of two types-diffraction for mineral investigations, and fluorescene for iron content; 3-wet chemical analyses for silicates, iron, total C, CO_2, and U; 4-spectroscopy emission for metals and NMR.

01625 Penrose, R. A. F., Jr.
Manganese, its use, ores, and deposits: Arkansas Geol. Surv. Ann. Rept. 1890, 642 p., 1891.

Perdew, W. E. See Gavin, M. J. 00874

01626 Pererva, V. M.
O neftegazonosnosti mezozoyskikh otlovheniy severnogo skiona Severo-Zapadnogo Kavkaza (Oil and gas content of Mesozoic sedimentary rocks on the Northern slope of the northwestern Caucasus): Geol. Neft; Gaza, No. 5, p. 32-35, 1975.

Pering, Katherine See Ponnamperuma, Cyril 01659

01627 Pernikov, M. S.; Zagidullina, F. G.
Ostenka neftenosnosti devonskikh otlozheniy Bashkifkogo Priural'ya (Estimate of petroleum content in Devonian deposits in the Bashkirian Urals): Geol. Nefti Gaza, No. 5, p. 31-34, illus. (incl. sketch maps), 1970.

01628 Perrini, E. M.
Oil from shale and tar sands: in the Colloection Chemical Technology Review, No. 51, p, 307, illus. (incl. tables), Noyes Data Corp., Park Ridge, N. J., United States, 1975.
The first section of the book is concerned with oil shale, and refining processes. Many summaries of patented steps are presented.

01629 Perry, E.; Hower, J.
Burial diagenesis in Gulf Coast pelitic sediments: Clay and Clay Minerals, Vol. 18, p. 165-177, 1970.
Vertical profiles from deep-wells in the Gulf Coast show that the major diagenetic change in clay minerals is the conversion of mixed layer illite/smectite to illite accompanied by incorporation of K^+. A major landmark is the diagenetic, burial history of clay minerals comparable to studies of clay mineral distribution in the world ocean by Griffin, et al., (1968), and Rateez, et. al. (1969).

Perry, W. J., Jr. See DeWitt, Wallace 00635

Pesold, W. F. See Levine, N. M. 01314

01630 Peters, Walter G.
A paleoecological study of Pennsylvanian black shales using radiographic and photographic techniques: Master's, Northern Illinois Univ., 1970.

01631 Petersen, Lee Edward
Ostrocodes and stratigraphy of the Birdsong Formation (Devonian) of Western tennessee: Master's, Arizona State, 1972.

Petersen, M. R. See Fruchter, J. S. 00841

Petersen, U. See Rich, R. A. 01732

01632 Peterson, A.
Ranstad - a new uranium-processing plant, in Processing of low-grade uranium ores, proceedings of a panel held in Vienna, 27 June - 1 July 1966: Internat. Atomic

Energy Agency STI-PUB-146, p. 193-209, 1967.
"Decisions concerning erection and operations of the Ranstad Mill...are outlined. The geological conditions and the planning of the mining system, plant location, and the factory are described. Processes and equipment of the plant,...capacity to treat 850,000 tons of Alum shale per year, are discussed. The operational experience is also reviewed. The economy of uranium production at Ranstad is discussed and some development possibilities are indicated." (Author's abstract)

01633 Peterson, A.
Status report from Sweden, in Processing of Low-grade uranium ores, proceedings of a panel held in Vienna, 27 June - 1 July 1966: Internat. Atomic Energy Agency STI/PUB/146, p. 41-48, 1967.
"A brief but comprehensive summary of uranium production in Sweden is given, including details on the location and composition of uranium ores, mining methods, the separation processes used, the treatment of process wastes, and the costs of uranium processing." (Author's abstract)

01634 Peterson, Carl R.
Mechanized mining and in situ retorting of oil shale: in Energy Resources and Excavation Technology, Vol. 1, Session 5B, p. 5B1-1 to 5B1-5. Proceedings of the 18th U. S. Symposium on Rock Mechanics, held at Keystone, Colo., June 22-24, 1977.
Discusses new excavating methods that may be employed in oil shale mining. Suggests an opportunity for more mechanized mining exists with oil shale. Two in situ mining methods that could use new technology are discussed.

Peterson, G. R. See Grimes, W. R. 00932

01635 Petrascheck, W. E.; Schubert, H.; Vohryzka, K.
Uber uranhaltige kohlen and Kohlenschiefur in Oesterreich: Hue Henmaenische Monatshefle, Vol. 104, No. 1, p. 1-8 (Austraian uranium-bearing coal and oil shale).

01636 Petrick, A. J.
A contribution to the study of South African oil shales: Chem., Met. and Min. Soc. Soc. Africa, J., Vol. 37, No. 6, p. 209-288, 17 figs., 5 pls., D'36.

01637 Petrov, A. P.
Perspektivy razvitiya promyshlennosti goryuchikh slantsev v SSSR (Possibilities for the industrial development of

oil shale in the USSR): in Razrabotka i ispol'zovaniye sapasov goryuchikh slantsev (Baum V.; chairperson), p. 93-98, table, Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

01638 Petrova, Yu. N.; Karpova, I. P.
Chemical composition of hydrocarbons in the dispersed organic matter of sedimentary rocks: Doklady Akad. Nauk SSSR, Vol. 96, No. 2, p. 331-334, 1954. Trans. RJ-289, Assoc. Tech. Services.
Hydrocarbons in the dispersed organic matter similar to those present in crude oils.

Pfendt, Petar See Vitotavic, Dragomir 02261

01639 Philbrick, Shailer S.
Classification and identification of shales -- Discussion (of paper 5560 by L. S. Underwood, 1967): Am. Soc. Civil Engineers Proc., Vol. 95, paper 6324, J. Soil Mechanics and Found. Div., No. SM1, p. 348-349, 1969.
Shale should be approached during classification as a rock which has properties and characteristics related to its site or place of occurrence. (From p. 348). This article discusses the "soil-like" versus "rock-like" difference found in shales.

01640 Philip, R. P.; Brown, S.; Calvin, M.
Pyrolysis experiments on kerogen-precursors isolated from recently deposited algal oozes (abs.): Geol. Soc. Am., Abs. Programs, Vol. 7, No. 7, p. 1228, 1975.
Studies of recently deposited algal oozes to determine the kerogen-like material constituents are summarized. Samples collected from marshy environments at Baja California were acid treated to remove carbonates and silicates. After being subjected to pyrolysis, components were identified. Authors suggest modern oozes can be used in determining the structure of kerogens in ancient shales. (See Philp, Int. Geol. Cong.)

01641 Philip, R. P.; Calvin, M.
Kerogen structures in recently deposited algal mats at Laguna Mormona, Baja, California; a model system for the determination of kerogen structures in ancient sediments: in Environmental Biogeochemistry; Vol. 1, Carbon, nitrogen, phosphorus, sulfur and selenium cycles (Neiagu, J. O., ed.), p. 131-148, illus. (incl. tables), Ann Arbor Sci. Publ., Inc., Ann Arbor, Mich., United States, 1976.

01642 Philip, R. P.; Calvin, M.; Brown, S.; et al.
Organic geochemical studies on kerogen precursors present in recently deposited algal mats and oozes

(abs.): Int. Geol. Congr. Geol. Int., Resumes, No. 25, Vol. 1, (Section 5, Fossil fuel, genetic relations of hydrocarbons), p. 253, 1976.

The abundance of kerogen in the earths crust, problems in determining the origin and structure are mentioned. Suggests a new approach by examining insoluble organic residues from modern algal oozes. Components, determined by mass spectrometry and gas chromatography are discussed and related to kerogens obtained from ancient rocks.

01643 Philippi, G. T.
The influence of marine and terrestrial source material on the composition of petroleum: Geochim. Cosmochim. Acta, Vol. 38, No. 6, p. 947-966, illus., (incl. tables), 1974.

The components of oil whose source bed was rich in terrestrial organic matter is compared to those not rich in terrestrial matter. Different oils from source beds including California Miocene shales and Green River Eocene shales are compared. Origin of normal paraffins in petroleum are discussed. (Article has to do with petroleum more than kerogen in the oil shales.)

Phillips, J. E. See Watkins, J. Wade 02288

01644 Phillips, T. E.
A survey of potential methods for resource recovery from black water of the Upper Green River Basin: Master of Science Thesis, Univ. of Wyo., 1976.

Picard, M. D. See Cole, R. D. 00460

01645 Picard, M. Dane; Thompson, William D.; Williamson, Charles Ross
Petrology, geochemistry and stratigraphy of the Green River Formation (Eocene), Uinta Basin, Utah: Utah Geol. Mineral Surv., Bull., No. 100, 52 p., illus. (incl. sketch maps), 1973.

The black shale facies is divided into four lacustrine and one fluvial unit on the basis of lithology and electric log characteristics. Petrology of the sandstones, siltstones, and carbonates are studied. The geochemistry of five micrites and one algal biomicrite are compared with four silty micrite and four silty oil shales. Trace elements and oil and gas production also mentioned.

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p. 1387, 1977.
Lithology and stratigraphy of the White River-Gray Hills area in the northern part of the Piceance Creek Basin are discussed. Measured reserves of 20 gal./ton or greater oil shale are given. Structure and geography also cited.

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Preliminary thorium daughter contour map and profiles at the Hicks Dome area, Hardin County, Illinois: U. S. Geol. Surv. Open-File Rept. 74-157, 9 p., 1974.
Purpose of investigation was to locate outcrops of thorium-rich breccias which might have associated mineralization. Black shales (presumable Chattanooga Shale) included in study.

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Potential shale oil resources of a stratigraphic sequence above the Mahogany zone, Green River Piceance Creek Basin, Colorado: J. Res. U. S. Geol. Surv., Vol. 1, No, 4, p. 467-473, illus. (incl. sketch maps), 1973.
Oil resources of the four units of rock in the Parachute Creek Member of the Green River Formation that lie above the Mahogany (the richest) zone were measured. Many isopach maps of the four units were drawn, using graphs from assayed cores, and from electric, gamma ray neutron, gamma ray density, and sonic logs of exploratory wells. Suggests areas where surface mining may be used to recover the oil shale.

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V. A., ed.; et al.), p. 60-65, table, Izd. Akad. Nauk SSSR, Tallin, Union of Soviet Socialist Republics, 1974.

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Radiometric and chemical means are used to measure the radioactive content of this dark gray carbonaceous Cretaceous shale. Comparative ratios of the three elements in the 131 samples taken from 16 localities are presented.

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Distribution of the natural radioactive elements, uranium, throium, and potassium in the Mesozoic-Cenozoic rocks of the West Siberian platform is described. The uranium-bearing bituminous argillites of the Bazenovsk formation of the Volga state, ... are described in some detail. The content of NRE is comparable to their average contents in analyogous rocks of some other regions. (Author's abstract)

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Three methods of uranium recovery were tested on shale from the three most uraniferous zones of Chattanooga Shale. These methods were: batch leaching with sulfuric acid, counter-current leaching with sulfuric acid, and leaching under oxygen pressure. Uranium extraction percentage was compared with variables of time, temperature, particle size, and acid concentration. Recovery of uranium from leach liquors by ion exchange and solvent extraction are discussed.

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Savannah River Laboratory hydrogeochemical and stream sediment reconnaissance; Raw data release II, Orientation studies in Alabama; National Uranium Resource Evaluation Program: variously paginated, illus. (incl. tables; maps), 1976. (Rept. No. GJBS-46)(Rept. N. DPST-76-141-2) available from U. S. Energy Res. and Dev. Adm., Washington, D. C., United States.

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Steps of the method are given and diagram of the retort is shown.

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An economic study of the New Albany shale: U. S. Bur. of Mines Rept. of Invest. 2466, 19 p., 1923.
Discusses location of deposit, transportation facilities, quarrying methods, blasting practices, and retorting data. (From abstract)

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New Albany oil shale of Indiana-Eng. and Min. J., Vol. 114, No. 13, p. 554, Sept. 23, 1922.
Includes description of the New Albany oil shale of Indiana and a discussion of possible future commercial uses.

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The New Albany shale of Indiana: U. S. Bur. of Mines Rept. of Invest. 2390, 8 p., 1922.
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Oil shales of Indiana: Eng. and Mining J., Vol. 110, No. 20, p. 954-955, Nov. 13, 1920.
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Chemical and mineralogic changes in shales are due to biologic developments as well as an increase in the degree of diagenesis. Increase of strontium and decrease of rubidium is partly due to both plant and animal action, although Rb decrease is slight. Samples are world-wide and Early Precambrian to Oligocene.

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Evolution and ecologic signifigance of oxygen deficient marine basins: Lethaia, Vol. 4, p. 413-428, 1971.
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Exploration and development of oil shale and oil-impregnated rocks, 1970-75: in Future energy outlook, Colo. Sch. Mines, Q., Vol. 68, No. 2, p. 81-84, 1973.
Reserves of the three states (Colo., Wyo., Utah) oil shales are presented. Recent developments in mobilizing the oil shale industry are discussed, along with ownership of the lands and production estimates. Location, status of development, and exploitation technology of tar sands are mentioned.

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environment of the Green River Formation is studied and compared to underlying and overlying formations.

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Mineral profile of the Green River Formation Oil shales at Colorado Corehole No. 1: Rocky Mtn. Assoc. of Geol. Guideb. to the Energy Resources of the Piceance Creek Basin, Colorad. 25th Field Conf., p. 91-100, 1974
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Kerogen of the Green River Formation: in Organic geochemistry; methods and results (G. Eglington; M. T. J. Murphy; editors), p. 619-637, illus. (incl. sketch map), Springer-Verlag, New York-Heidelberg-Berlin, 1969.

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Origin and characteristics of Green River oil shale: in Oil shale (Yen, T. F.; editor; et al.), No. 5, p. 61-79, illus. (incl. table), Elsevier Sci. Publ. Co., Amsterdam, Netherlands, 1976.

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Compositional variations of the organic material of Green River oil shale - Colorado No. 1 core: U. S. Bur. of Mines Rept. of Invest. 7492, 32 p., 1971.
Differences in the structure of soluble and normally insoluble organic material are studied in samples from a 2300 foot core that penetrates the Green River Formation. Comparisons are made from fractionation, C and H analyses, volatile and carbon residue determination, oxidation rates, and infrared analysis. Depth dependent and non-depth dependent changes in structure were noted. Experimental procedure and discussion of results is presented. Parameters, measuring differences show deviation of each sample from the average for all samples. (See also Robinson-RI-8017).

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Differences in the structure of organic material in samples from a 1200 foot core drilled through Green River Formation are shown. Comparisons are made through fractionation, C and H analyses, volatile and carbon residue determination, oxidation rates, and infrared analyses.

01755 Robinson, W. E.; Cook, G. L.
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Differences in the structure of organic material in samples from a 3000 foot core penetrating the Green River Formation in Utah are studied. Comparisons are made through fractionation, C and H analyses, volatile and carbon residue determination, oxidation rates, and infrared analysis. (See Robinson-RI-7492) Comparison is also made of Green River cores drilled in Wyoming and Colorado.

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Compositions of low-temperature thermal extracts from Colorado oil shale: J. Chem. Eng. Data, Vol. 5, p. 74-80, 1960.
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An oil shale conversion process using carbon monoxide and water: Laramie Energy Reserach Center/Technical Progress Report - 75/1, 14 p., Aug. 1975.

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Alteration of paraffinic compounds in Green River oil shale after deposition (abs.): Geol. Soc. Am. Spec. Paper 76, p. 139, 1964.
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This paper describes a study of the constitution of organic acids degraded from Colorado oil shale by oxidation with alkaline potassium permanganate. (From p. 1134) Includes description of experimental procedure and tables of results obtained.

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Constitutional aspects of oil-shale kerogen (with Fr. and Span. abs.): in Drilling and Production. World Petroleum Congr., 7th, Mexico, 1967, Proc., Vol. 3: London, Elsevier Publ. Co., p. 669-680, illus., tables, 1967.

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Alkaline permanganate oxidation of oil-shale kerogen: Ind. Eng. Chem., Vol. 45, p. 788-791, 1953.
Investigated was the nature of the products obtained by oxidation of Colorado oil shale. This study was done to get information about the chemical structure of Colorado oil shale kerogen. Includes tables and graphs.

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Study of preheating Colorado oil shale: U. S. Bur. of Mines Rept. of Invest. 4787, 13 p., 1951.
This article describes a laboratory study which determined if waste retort gases that dried and preheated oil shale had any effect on the oil yield of that shale. Apparatus, procedure, and results of experimentation are given. This study showed the decrease in oil yield and the increase in water yield resulting from oxidation of kerogen.

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Constitution of hydrocarbon-like materials derived from kerogen oxidation products: A. C. S. Preprints, Div. of Gas and Fuel Chem., Vol. 2, p. 37-47, Sept. 1960.
The organic acids in a Colorado oil-shale oxidation product were identified by reducing the acids to hydrocarbons and fractionating them. (From abstract)

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Constitution of hydrocarbon-like materials derived from kerogen-oxidation products: Fuel, Vol. 40, p. 375-388, 1961.
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Oxidation of Colorado oil shale: U. S. Bur. of Mines Rept. of Invest. 6166, 33 p., illus., tables, 1963.
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Constitution of oil-shale kerogen bibliography, abstracts, and notes: U. S. Bur. of Mines Inform. Circ. 7968, 79 p., 1960.
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An unusual dolomitic basal facies of the Chattanooga Shale in the Flynn Creek structure, Tennessee (abs.): Am. Mineral., Vol. 51, No. 1-2, p. 270, 1966.
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Sedimentary environments of the Java Group (Upper Devonian); a three dimensional study: Doctoral, 1976, Rochester, Diss. Abs. Int., Vol. 37, No. 1, p. 1298, 1976.
Three major black shales, the Pipe Creek, the Pipe Creek-2, and the Dunkirk, are recognized in outcrops and in both gamma-ray and lithologic well logs from a study area covering 6400 sq. miles in western New York and northern Pennsylvania. The correlation of these black shales results in a revision of the existing stratigraphy and provides a natural 3-D framework for analyzing portions of the Java Group. (From Abstract)

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Redefinition of Tipton Shale Member of Green River Formation of Wyoming: Am. Assoc. Pet. Geol. Bull., Vol. 52, No. 11, pt. 1, p. 2249-2256, illus., 1968.
Stratigraphy and lithology of the Tipton Shale and related members of the Green River and Wasatch Formations are correlated through well logs. Suggests a part of the Wilkins Peak Member in Green River Basin by assigned to the Tipton Shale Member.

01771 Roehler, Henry W.
Stratigraphy of oil-shale deposits of Eocene rocks in the Wasakie Basin, Wyoming, in Symposium on Tertiary rocks of Wyoming - Wyoming Geol. Assoc., 21st Field Conf., 1969, Guidebook: Casper, Wyo., Pet. Inf., p. 197-206, illus., 1969.
Describes stratigraphy of members and tongues of the Green River and Wasatch Formations. Oil shale deposits in the basin are mentioned in the Haney Shale Member. Samples from six oil shale benches have shown yields of 10-30 gal oil/ton shale.

Roehler, H. W. See Trudell, L. G. 02133

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Preliminary stratigraphic cross section showing radioactive zones of the Devonian Black Shales in eastern Ohio and West-central Pennsylvania: U. S. Geol. Surv. Oil and Gas Invest. Chart OC-82, U. S. Geol. Surv., 1978.
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Possibilities of the oil-shale industry: Eng. and Mining J., Vol. 108, p. 572-576, 3 figs., October 4, 1919.
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A bibliography-Bureau of Mines publications dealing with oil shale and shale oil, 1917-1970: U. S. Bur. of Mines, Laramie Energy Res. Cent., 38 p., Laramie, Wyoming, 1970.

01776 Rogers, Marianna P.
A bibliography of Bur. of Mines publications dealing with oil shale and shale oil, 1917-1974, OSRD 59, 44 p., Dec. 1974. (OUT OF PRINT)

01777 Rogers, M. P.
List of Bureau of Mines publications on oil shale and shale oil, 1917-1968: U. S. Bur. of Mines, Inf. Circ., No. 8429, 61 p., 1969.
430 references to articles in Bulletins, Technical Papers, Monographs, Annual Reports, Information Circulars & Mineral Yearbooks on oil shale and shale oil are listed, and 1-2 sentence annotation is given. A list of libraries receiving periodical reports and statistical releases of Bureau of Mines publications is presented.

01778 Rogers, M. P.; Rinehart, M. (compliers)
A bibliography of publications dealing with oil shale and shale oil from the U. S. Bureau of Mines, 1917-1974, and the ERDA Laramie Energy Research Center 1975-1976: 51 p., (Rept. No. LERC/R1-77/7). Laramie Energy Res., Cen., Laramie, Wyo. Available from NTIS, Springfield, Va.

01779 Rohrer, W. L.; Smith, J. W.
Tatman Formation: Wyoming Geol. Assoc. Guidebook, p. 49-54, 1969.
A study of the Eocene Tatman Formation in the Big Horn Basin shows the lithology, mineral constituents and location. Fischer assay retort tests show the oil and gas yields to be low. Compares Tatman shales to Green River shales and New Albany shales of Kentucky.

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01780 Rold, John W.
Research on environmental problems of oil shale development; an example of federal, state and industry cooperation: Rocky Mt. Assoc. Geol., Field Conf. Guideb., No. 25, (Guideb. to the energy resour. of the Piceance Creek Basin, Colo.), p. 165-170, illus., 1974.
The state of Colorado was convinced that large-scale development of oil shale in the Piceance Creek Basin should be evaluated and controlled to avoid environmental damage. The author gives the history and implementation of the effort and discusses the cooperation between state, federal and the private sector.

01781 Rominger, C.
Black shales of Michigan: Michigan Geological Survey, Vol. 3, p. 63-67, 1873-1876.
Character of the black shale group that is equivalent chronologically but not paleontologically to the black shales of Ohio and the Genesee shales of New York. Outcrop location and composition are discussed.

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01782 Rose, C. K.; Utter, S.
Cutting action of rotary bits in oil shale: U. S.

Bur. of Mines Rept. of Invest. 5174, 24 p., 1955.
"The experimental procedures and the rotary drill test equipment are described. Theories of rock drillability, rotary bit cutting action, and bit design are presented and discussed. The actions of various bit designs are analysed and compared with the observed results...A cost estimate is made for drilling Colorado oil shale." (Author's abstract)

01783 Rose, C. K.; Utter, S. Morris, C.
A hydraulic-powered platform for scaling high backs and walls: U. S. Bur. of Mines Rept. of Invest. 5074, 4 p., 1954.
This article describes the functioning of a hydraulic scaling rig to remove loose rock in an oil shale mine. Design and movement of the rig and its platform are discussed and illustrated. Advantages of the platform are cited.

Rosenzweig, Abraham, See Grener, John W. 00918

01784 Rosewarne, Pearce V.; Chantler, Howard M.; Swinnerton, Aylmer A.
Analyses of Canadian crude oils, naphthas, shale oil, and bitumin: Canadian Dept. of Mines-Mines Branch. T. P. No. 765, 21 p., incl. maps, illus., diagr., 1936.

01785 Rosholt, John N.
Uranium in sediments: U. S. Geol. Surv. Reports-Open File series, No. 677, 211 p., diagrs., tables, Washington, 1963.

01786 Ross, C. A.
Geology of the Paducah and Smithland Quadrangles in Illinois: Ill. Geol. Survey Circ. 360, 32 p., 1964.
Brief mention of New Albany Group in terms of age (Middle-Late Devonian), lithology, electrical resistivity. Generalized columnar section, well record.

01787 Ross, Virginia F.
Autoradiographic study of marine shales: Econ. Geology, Vol. 47, p. 783-793; discussion by D. McConnell: 1953, Vol. 48, p. 147-148 (radioactivity in U. S. and Swedish shales 1952).
The purpose of this investigation was to determine the location of the naturally occurring radioactive elements, the alpha-particle emitting members of the uranium and thorium series, with respect to the organic and inorganic constituents of the shales.

01788 Ross, W. D.
Gas-productive areas in Western Kentucky: in Natural Gases of North America; Part 3, Natural gases in rocks of Paleozoic Age, Amer. Assoc. Pet. Geol., Mem., No. 9, Vol. 2, p. 1759-1760, 1968.
Gas production up to 1962 and recent discoveries are mentioned. New Albany Shale and Mississippian limestones are the source rocks.

01789 Roth, Ernest E.
Natural gases of the Appalachian Basin: in natural gases of North America; Part 3, Natural gases in rocks of Paleozoic Age, Amer. Assoc. Pet. Geol., mem., No. 9, Vol. 2, p. 1702-1715, illus., 1968.
History of gas production in the Appalachian area, and suggestion of reserves are mentioned. Source of the gases, including Devonian black shale are mentioned, along with structure and stratigraphy of the basin. Composition of the natural gas and inert gases are discussed.

01790 Rountree, R.
Present and future price increases keep Piceance Basin area activity high: West. Oil Rep., Vol. 34, No. 8, p. 29-33, illus. (incl. sketch maps), 1977. (Colorado, Douglasard).

01791 Rousseau, H. H.
The naval oil shale reserves: Min. Congr. J., No. 3, p. 106-108, Washington, 1925.
This 1925 article discusses the Navy's interest, in the development of the oil shale industry. The future petroleum supply and its bearing upon future security are also discussed. (From p. 106).

01792 Rozhkova, E. F.; Rasumnaya, E. G.; Serebryakova, M. B.
The role of sorption in the process of uranium concentration in sedimentary rocks: United Nations Second Internat. Conf. on the Peaceful Uses of Atomic Energy, Proc., Vol. 2, p. 420-431, 1958.
Samples of natural and synthetic substances were examined for U, Mo, and V contents. Factors affecting the accumulation of uranium in natural substances and conditions are outlined. These factors include Ph, U concentration, and salt concentration. Character of bonding and association of U with phosphorite, ferric hydroxides, and calcium phosphate in natural substances is discussed.

Ruark, J. R. See Guthrie, Boyd 00949

Ruark, J. R. See Matzick, A. 01409

Ruark, J. R. See Matzick, A. 01410

Ruark, J. R. See Matzick, A. 01408

Ruark, J. R. See Wells, W. E. 02313

01793 Ruark, J. E.; Berry, K. L.; Guthrie, B.
Description and operation of the N-T-U retort on Colorado oil shale: U. S. Bur. of Mines Rept. of Invest. 5279, 26 p., 1956.
Described are operations of two 40-ton NTU (Nevada-Texas-Utah) retorts at a Bureau of Mines demonstration plant. The plant was used to investigate process variables such as air rate, recycle gas rate, and shale particle size and grade. Problems encountered in preliminary operations are cited.

01794 Ruark, J. R.; Sohns, H. W.; Carpenter, H. C.
Gas combustion retorting of oil shale under Anvil Points Lease agreement; Stage I: U. S. Bur. of Mines Rept. of Invest. 7303, 109 p., 1969.
Results of experimental programs funded by the Colorado School of Mines Research Foundation and six oil companies showed air-gas distributor development and results of gas and shale distribution in a gas-combustion retort. Modification and operations of retort numbers 1 and 2 and a description of the gas-combustion process is given. The appendix summarizes data for the runs of the two retorts for the period Stage 1 operated.

01795 Ruark, J. E.; Sohns, H. W.; Carpenter, H. C.
Gas combustion retorting of oil shale under Anvil Points lease agreement: Stage II: U. S. Bur. of Mines Rept. of Invest. 7540, 74 p., 1971.
Results of the Colorado School of Mines Research Foundation and six oil compaines, which examined gas combustion retort modification and effects of shale quality and particle size, are presented. Runs were made on the 6-, 25-, and 150-ton per day retorts. Demonstration runs to test modification are described. Data for each run the 17-month Stage 2 operated are summarized.

01796 Rubarts, W. E.
The Boyle-Duffin-New Albany Relationships (Devonian) in northern Casey and Western Lincoln Counties (Kentucky): M. S. Thesis (unpubl.), Kentucky Univ., 1959.

01797 Rubey, W. W.
Origin of the siliceous Mowry Shale of the Black Hills region: U. S. Geol. Surv. Prof. Paper 154-D, p. 153-170, 3 pls., 1929.
Discusses origin of silica in Mowry Shale. Good analytical study which could serve as basis for

similar study of Devonian-Mississippian shale sequence (after Hoover, 1960).

Ruby, S. See Levine, N. M. 01314

Rundrum, M. See Blumer, M. 00206

Rue, H. P. See Kraemer, A. J. 01248

01798 Ruedemann, R.
Conditions of black shale accumulation and general conclusions: Geol. Soc. Am. Mem. 2, p. 43-64, 1934.
Concerned specifically with graptolite-containing shales. Summarizes prevailing interpretations of black shale deposition. The non-calcareous black shale fauna is very unlike that of the limestones and calcareous shales which are found in the same area (after Hoover, 1960).

01799 Ruedemann, R.
Ecology of black mud shales of eastern New York: J. Paleo., Vol. 9, p. 79-91, 1935.
Reviews conditions for deposition of black shale. Considers oxygen supply, organic accumulation, and water depth (after Hoover, 1960).

01800 Runnels, Russell T.
Oil shale in Kansas: Kansas State Geol. Surv. Bull. 96, pt. 3, p. 157-184, illus., Mar. 15, 1952.
37 shale samples were tested for oil yield and reserves with five gal/ton shale were estimated. Stratigraphic occurrence of the oil shale and uses for it are suggested. Laboratory procedures included distillation assays, petographic examination, and calorimeter tests measuring gross heating value.

01801 Runnels, Russell T.; Schleicher, J. A.; VanNortwick, H. S.
Composition of some uranium-bearing phosphate nodules from Kansas shales: Kansas State Geol. Survey Bull. 102, pt. 3, p. 93-104, ($1, Kansas Geological Survey, 1930, Avenue A, Campus West, The University of Kansas, Lawrence, Kansas 66044), 1953.
"Detailed analyses of uranium-bearing phosphate nodules from 11 localities in eastern Kansas are reported." Seven Pennsylvanian shales were sampled, and graphs showing relationships between phosphate content and other constituents, including uranium, are presented.

01802 Russell, P. L.
Oil shale research; a breif history: Colo. Sch. Mines, Q., Vol. 71, No. 4 (Proceedings of the Ninth oil shale

symposium), p. 173-176, 1976.
This article presents a brief chronological listing of some dates and events that represent milestones in man's association with oil shale. It is concerned mainly with the Colorado deposits.

Russell, P. L. See Williams, Frank E. 02337

01803 Russell, William Low
Relation of radioactivity, organic content, and sedimentation: Am. Assoc. Pet. Geol. Bull., Vol. 29, No. 10, p. 1470-1493, Oct. 1945.
510 samples were analysed for the relation of radioactivity to organic content, based on different types of odors given off. Constituents such as sand and silt and limestone are measured. Marine oil shales are shown to be associated with exceptionally high radioacitivty, A comparison of radioactivities of igneous and sedimentary rocks is discussed.

01804 Russell, William L.
Some characteristics of organic content of rocks: Am. Assoc. Pet. Geol., Bull., Vol. 18, p. 1103-1125, 1934.
550 samples of limestone and shale distilled in a closed tube were studied for their organic material. More than 200 of the samples were from Miss., Penn., and Org. strata in Kentucky. A description of types of organic matter.

01805 Ryan, J. P.
Reconnaissance of phosphate-rock deposits in Arkansas, Kansas, Oklahoma, and Texas: U. S. Bur. of Mines Rept. of Invest. 5222, 8 p., 1956.
Phosphate rock deposits in these states are briefly summarized and precious production of phosphate in these states is discussed. Black shales in these states are noted to be phosphate-bearing, but the author doubts they will be commercially developed under present economic conditions. A table containing data on P_2O_5, U, and equivalent U contents in black shales from Oklahoma, Kansas, and Arkansas is presented.

Ryan, W. M. See Bagnall, W. D. 00077

Ryback, G. See Mulheirn, L. J. 01488

01806 Ryback, Ladislaus; Grauert, Borwin; Labhart, Toni
Nondestructive determination of uranium and thorium in accessory minerals by gamma ray spectrometry: Beitr. Geol. Schweiz, Kleinere Mitt., No. 48, 7 p., illus., 1970 (reprint).

01807 Sachett, William M.; Poag, C. Wylie; Eadie, Brian J.
Kerogen recycling in the Ross Sea, Antarctica: Science (AAAS), Vol. 185, No. 4156, p. 1045-1047, illus., 1974.
Reported is a study of the amounts and isotopic composition of the organic carbon in sediments of the Ross Sea, Antartica. Includes table of results.

Sachreiter, D. K. See Fernanadez, S. M. 00781

01808 Sakamoto, T.
Geology of the oil shale deposits of the Lo-Tzu-Kon district, Chien-Tao province: South Manchuria Ry. Co., Geol. Inst., B. No. 88, p. 62-63 (Japanese), MR 1'37.

01809 Sakamoto, Takao
Oil shale of Tung-ning: Translation prepared by U. S. Army, Tokoyo, Japan. Corps of Engineers, Far East Pacific Surveys, Rept. No. 293, 1958.

01810 Sakharova, A. A.
Slantseproyavleniye rannemelovogo vezrosta (Rotmistrovskoyo slantseproyavleniya)(Oil shale of the early Cretaceous age; the Rotmistrovka Beds): in Prognoz goryuchikh slantsev Yevropeyskoy chasti SSSR (Kotlukov, V. A., editor; et al.), p. 38-39, Izd. Akad. Nauk, ESSR, Tallin, Union of Soviet Socialist Republics, 1974.

Salsan, M. See Kita-Badak, M. 01201

Saltsman, Robert D. See Whitehead, Kenneth L. 02328

Samarin, M. A. See Konivets, V. I. 01226

01811 Sandberg, Charles A.; Poole, Forrest G.
Conodont biostratigraphy and age of West Range Limestone and Pilot Shale at Bactrain Mountain, Pahranagat Range, Nevada (abs.): Geol. Soc. America Abs. Programs, Vol. 2, No. 2, p. 139, 1970.
A paleontological sutdy of conodont and brachiopod faunas in Late Devonian and Early Mississippian strata in this organic shale.

01812 Sandberg, C. A.; Poole, F. G.
Petroleum source beds in Pilot Shale of eastern Great Basin (abs.): in Rocky Mountain Sections, AAPG and SEPM Ann. Mtg., Rocky Mountain energy resources, discovery and development, Am. Assoc. Pet. Geol., Bull., Vol. 59, No. 5, p. 921-922, 1975.
Suggest Upper Devonian portion of Pilot Shale in eastern Nevada and western Utah are large and

rich enough to be considered a source for petroleum generation. Temperatures the source beds have undergone are estimated from conodont color alteration.

Sanders, Thomas See Leung, Samuel S. 01309

01813 SanFilippo, George P.; Watts, R. J.
Oil recovery by carbon dioxide injection: Fossil Energy Oct. - Dec. 1978.
This is the 38th report on the progress of the Rock Creek carbon dioxide project in Riane County, West Virginia. (From Intro.) This project will demonstrate the feasibility of micsible carbon dioxide oil recovery in the Rock Creek Big Injun Field. (From Intro.)

Sans, G. V. See Uotkins, Dzh. U. 02224

01814 Sato, S.
Organo-geochemical study of kerogen of sedimentary rocks in Japan: Tohoku Univ., Sci. Rept., Ser. 3, Vol. 13, No. 2, p. 85-113, illus., (incl. tables, sketch map), 1976.
The kerogens in 70 samples from Japanese rocks were isolated and analyzed for evaluating the koergen as a potential source for oil formation. Analyses determined composition, oxidation, electron spin resonance, and X-ray diffraction of the Late Paleozoic and Mesozoic rocks. Comparisons of oil shales, coaly oil shales, and coals were made.

01815 Satterfield, I. R.
Bedrock geology of the Cobden quadrangle: M. S. thesis (unpubl.), Southern Illinois Uinv., 159 p., 1 table, 11 figs., 1 pl. (in Survey open-file reports), 1965.
Considers Grassy Creek Shale - lithology, outcrop, correlation, thickness, stratigraphic relations. Includes section descriptions, generalized columnar section, E-logs, bedrock geology map.

01816 Satterthwait, D. F.
Paleo-environmental implications of the Burgess Shale flora (abs.): J. Paleontol, Vol. 51, No. 2, Suppl., Part III, p. 24, 1977.
Notes 21 species of algae have been preserved as carbonaceous films on dark shale of Cambrian age. A classification system for fossil aglae is presented. Suggests since modern correlations exist between algae morphotypes and littoral zonation, this assumption can be applied to the Burgess Shale flora.

01817 Sauer, Adolf; VonderBurchard, E.; Schmidt, O.
Die verwerfung des olschiefers: Stuttgart, Konrad Wittwer, 31 p., illus., 1920.

01818 Savage, John W.
Oil shale and Western Colorado: Rocky Mt. Assoc. Geol., Field Conf., Guideb., No. 25 (Guideb. to the energy resour. of the Piceance Creek Basin, Colo.), p. 17-19, illus., 1974.
This very brief article touches on the history of oil shale, both in research and leasing of land in the 20th Century.

01819 Savage, T. E.
Comparison of the Devonian rocks of Illinois and Missouri: J. Geol., Vol. 33, No. 5, p. 550-558, 1925.
Brief mentions of Mountain Glen, Sweetland Creek, and Grassy Creek Shales. First of these is considered Upper Devonian, last two considered Lower Mississippian. Includes Illinois-Iowa-Missouri correlation chart.

01820 Savage, T. E.
The Devonian formations of Illinois: Am. J. Sci., Ser. 4, Vol. 49, No. 241, art. 12, p. 169-182, 1920a.
Brief discussion of Sweetland Creek Shale - lithology, thickness, stratigraphic relations. Generalized columnar sections used to show regional correlations.

01821 Savage, Thomas E.
The Devonian rocks of Kentucky: Ky. Geol. Surv., Frankfort, 6 p., 1. 257 p., incl. front, (map), illus., tables. Ser. 6, Vol. 33, 1930.
The Devonian rocks are separated into descriptions by countries. Structure and character of the rocks are given, along with description and illustrations of selected outcrops. Some sections give paleontological data. New Albany Shale cited where exposed, but no economics of the black shale are discussed.

01822 Savage, T. E.
Geology and economic resources of the Jonesboro quadrangle: Unpub. report, 187 p., 3 pls. (in Survey open-file reports), 1920b.
Discussion of Mountain Glen Shale - lithology, distribution, thickness, stratigraphic relations, fossils, correlation, geologic map.

01823 Savage, T. E.
Geology and mineral resources of the Avon and Canton quadrangles; Unpub. report 40 p., (in Survey open-file

reports), 1921.
Brief consideration of Sweetland Creek-Kinderhook Shales - lithology, thickness.

01824 Savage, T. E.
Geology and mineral resources of the Vermont quadrangles; Unpub. report, 157 p., 3 pls. (in Survey open-file reports), 1922 (?), revised 1928.
Report consists of original and two revisions. Brief consideration of Sweetland Creek-Kinderhook Shales - lithology, thickness. Includes well records.

01825 Savage, T. E.
On the lower Paleozoic stratigraphy of south-western Illinois: Am. J. Sci. Ser. 4, Vol. 25, No. 149, art. 46, p. 431-443; expanded Ill. Geol. Survey Bull. 8, p. 100-116, Ill. Geol. Survey Extract Bull. 8, 14 p., 1908.
Considers black shales in southwestern Illinois equivalent to New Albany, Chattanooga, etc. Generalized stratigraphic section description.

01826 Savage, T. E.; Rich, J. L.; Blatchley, R. S.
Geology of the Hardinville, Sumner, Birds, and Vincennes quardangles: Unpub. report, 168 p. (in Survey open-file reports), 1916 (?).
Brief consideration of Sweetland Creek, Kinderhook Shales. Includes well records.

01827 Savage, T. E.; Udder, J. A.
The geology and mineral resources of the Edington and Milan quadrangles: Ill. Geol. Survey Extract Bull. 38, 96 p.; 1922, Idd. Geol. Survey Bull. 38, p. 115-208, 1921.
Only briefly mentions Sweetland Creek shale, which is a brown Devonian shale containing numerous spores. Deposits from Cambrian to Quaternary are described, character and location of dark Pennsylvanian shales are mentioned.

Savchenko, N. A. See Azhgirevich, L. F. 00068

Savchenko, N. A. See Azhgirevich, L. F. 00070

Savchenko, N. A. See Azhgirevich, L. F. 00069

01828 Sawai, T.
Geology of the Welf and Ulga oil shale deposits of the "San-ho" district, north Hsing-an province: South Manchuria Ry. Co., Geol. Inst. B, No. 88, p. 77-85, 8 figs., 4 pls. (incl. geol. map), Mr 1'37.

01829 Saxby, J. D.
Chemical separation and characterization of kerogen from oil shale: in Oil shale, No. 5, p. 103-128, illus. (incl. tables), Elsevier Sci. Publ. Co., Amsterdam, Netherland, 1976.

01830 Saxby, J. D.
Isolation of kerogen in sediments by chemical methods: Chem. Geol., Vol. 6, No. 3, p. 173-184, 1970.
Chemical methods of removing inorganic mineral matter with little or no kerogen alteration are reviewed with particular reference to HCl and HF acid. Four reagents are also presented that may be effective in removing pyrite. Possible reactions or organic functional groups that may result in kerogen alteration are shown.

01831 Sayers, R. R.
Synthetic liquid fuels: Statement at Hearings before Subcommittee of Committee on Public Lands and Surveys, U. S. senate, 78th Cong., 1st Sess., on S. 1243, p. 17-27, 180-195, 282-284, 414-420, 1943.
The hearings concern a bill authorizing construction and operation of demonstration plants to produce synthetic liquid fuels from foal and other substances. Dialogue between Sayers and congressmen on the need to develop a sizeable snhthetic fuels industry are presented. Shortage of petroleum in the U. S. and development by Germans of coal hydrogenation is discussed.

01832 Sayers, R. R.
Synthetic liquid fuels: Statement at Hearings before a Subcommittee of Committee on Public Lands, U. S. Senate, 80th Cong., 1st. Sess., p. 50-70, May 15, 16, and 20, 1947.

Schaaf, D. See Lamborn, R. E. 01266

01833 Schade, H.
Die Oelschiefergrube Messel bei Darmstadt (The Messel oil shale mine near Darmstadt): Gludskauf, Vol. III, No. 24, p. 1172-1176, illus. (incl. sect. geol. sketch map), 1974.
Reptiles, amphibians, fish, mammals, plants, birds found in Eocene oil shales; preservation of soft parts and hair; paleoecology and correlation with North America.

01834 Schieter, Rudolph
Oelschifer in America: Bohrtechniker-Zeitung, Jahrg. 53, Heft 7, p. 188-191, July 15, 1935.

01835 Schemehorn, N. R.
Sedimentaion study of (Upper Devonian) New Albany Shale, (Lower Mississippian) Rockford Limestone, New Providence Shale in Indiana: A. M. thesis (unpub.), Indiana Univ., 39 p., 10 figs., 1956.

Schenck, P. A. See Vander Berg, M. L. J. 02233

Schermann, O. See Agrargitis, G. 00006

Schierz, E. R. See Janssen, A. G. 01111

01836 Schiethauer, Waldemar
Burouglo'nye i slantsevye smoly, ikh plouchenie i pererabokta. Perevod s nemetskog N. V. Val'gis, pod redaktsiei V. K. Val'gis: Petrograd, Tipolithografiia Narodnogo komissariate putei soobschcheniia, 9, 1978 p., diagr., 1921.
Lignitic and oil shale, their obtainment and the working of them.

01837 Schiethauer, Waldemar
Shale oils and tars and their products: Trans. from the German by Chas. Salter. London, Scott Greenwood and Son, 183 p., incl. illus., diagrs., 1913.

Schlanger, S. O. See Arthur, M. A. 00058

01383 Schlatler, L. E.
Oil shale occurrences in Western Europe (with discussion): in The Exploration for Petroleum in Europe and North Africa, p. 251-258, illus., (incl. sketch map), Inst. Pet. Geol., London, 1969.
Oil shale deposits of this region are illustrated in terms of location, age, and depositional environment. A definition and genesis of oil shale are cited, and oil shale deposits in each country are discussed. No reserves are given, but discussion is presented of exploration and assessment.

01839 Schlater, L. Ye.
Opredeleniye, obrazovianiye i klassifikatsiya goryuchikh slantsev (The determination, genesis and classification of oil shale): in Razrabotko i ispol' zovaniye zapasoz goryuchikh slantsev (Baum, V.; chairperson), p. 161-166, Izd. Valgus, Tallin, Union of Soviet Socialist Republids, 1970.

01840 Schlatler, L. Ye.
Mestorozhdeniya goryuchikh slantsev Zapadnoy Yevropy (Oil shale deposits in western Europe): in Razrabotka i ispol'zovaniye zapasov goryuchikh slantsev (Baum, V.; chairperson), p. 42-49, illus. (incl. tables,

sketch map), Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

Schleicher, J. O. See Runnels, Russell T. 01801

Schmidt, O. See Sauer, Adolf 01817

01841 Schmidt-Collerus, J. J.; Bonome, F.; Gala, K.; et al. Polycondensed aromatic compounds (PCA) and carcinogens in shale ash of carbonaceous spent shale from retorting oil shale (Yen, T. F., editor), p. 115-156, illus. (incl. tables), Ann Arbor Sic. Publ. Inc., Ann Arbor, Mich., United States, 1976.

Examines the major concern of injection of trace organic compounds and their derivatives into the environment after their exposure as carbonaceous materials in oil shale mining. Samples of soil, water, vegetation, and air from potential oil shale operations were examined for PCA (ploycondensed aromatic compounds), and carcinogens after extraction from a variety of solvents. Sampling procedures, experimental methods, and results are presented.

01842 Schmidt-Collerus, J. J.; Prien, C. H. Investigations of the hydrocarbon structure of kerogen from oil shale of the Green River Formation: in Science and Technology of oil shale (Yen, T. F., editor), p. 183-192, illus. (incl. tables), Ann Arbor Sci. Publ. Inc., Ann Arbor, Mich., United States, 1976.

This paper describes a method for determining the structure of kerogen. The rock was prepared for testing, extracted for soluble organics, and leached with acid to remove the pyrolysis, pryochromatography, and mass spectrometry to determine compouents and structure of kerogen. Procedures are diagrammed and conclusions are given.

01843 Schmidt-Kollerus, Dzh. Dzh.; Balog, B.; Boner, Dzh. Ye. Karaktaristika razbetvlennykh zhirnykh kislot s vysokim molekulyarnym vesom i smolyanykh kislot iz rastverimogo bituma goryuchikhslantsev formatisii Grih River (Characteristics of fatty acids with a high molecular weight and resin acid from bitumen solutions of oil shale from the Green River Formation): in Razrabotka i ispolizovaniye zapasov goryuchikh slantsev (Baum, V., chairperson), p. 210-216, illus. (incl. tables), Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

01844 Schmidt-Kollerus, Dzh. Dzh.; Boner, Dzh. Ye.; Balog, B. Kharakteristika razvetvlennykh zhirnykh kislot s vysokim moledulyarnym vesom i smolyanykh kislot iz rastvorimogo bituma goryuchikh slantsev formatsii

Grin River (Characteristics of fatty aicds with a high molecular weight and resin acid from bitumen solutions of oil shale from the Green River Formation): in Razrabotka i ispol'zovaniye zapasov goryuchikh slantsev (Baum, V., chairperson), p. 210-216, illus. (incl. tables), Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

Schmitt, J. M. See Brown, K. B. 00294

Schneider, A. See Dheie, Charles 00636

01845 Schneiderhohn, H.; Claus, G.; Spitz, W.
The occurrence of titanium, vanadium chromium, molybdenum, nickel, and some other trace elemtns in German sedimentary rocks: Newes Jahrb. Mineral., Geol., Montash, p. 50-72, 1949A.
A summary of chemical and spectrographic analyses of 885 samples of 54 groups of rocks, with graphical representation of a few of the analyses. Certain black shales were particularly high in trace elements.

Schnoes, K. See Burlingame, A. L. 00309

Schnoes, H. K. See Haug, Pat 00989

Schnoes, H. K. See Simoneit, B. R. 01897

Scholle, P. A. See Mattick, R. E. 01405

01846 Schopf, James M.
Cannel, boghead, torbanite, oil shale: Econ. Geol., Vol. 44, No. 1, p. 68-71, 1949.
The purpose of this 1948 paper was to suggest that the controversial questions about classification of the carbonaceous rocks may not be near a satisfactory solution although many assume the problems have all been solved.

01847 Schopf. James M.
Organic matter of the Chattanooga shale: U. S. Atomic Energy Comm. TEI-330, p. 146-152 (dep.)(prepared by U. S. Geol. Survey), 1953.
The general relationship reported between organic content and radioactivity suggests an additional possible means of determining whether a similar relationship exists within the laminae. This is studied with nuclear-type autoradiographic films (after Hoover, 1960).

Schopf, J. M. See Breger, I. A. 00260

01848 Schopf, J. M.; Schwietering, J. E.
Littoral control of the Foerstia zone in Upper Devonian Ohio Shale: (abs.), Geol. Soc. Am. Abs., 1969, pt. 6 (N-Cent. Sect.), p. 42-43, 1969.
Considers paleographic implications of Foerstia zone.

01849 Schopf, J. M.; Schwietering, J. F.
The Foerstia zone of the Ohio and Chattanooga shales: U. S. Geol. Surv. Bull. 1294-H, p. H1-H15, illus., 1970.
The author indicates a newly discovered occurrence of Foerstia in the Huron Member of Ohio shale in western Ohio. He also states that further studies and testing of the littoral control theory should outline the paleogeography of part of the black shale basin in a restricted time interval.

01850 Schramm, Eck Frank
Notes on the oil shales of southwestern Wyoming: Am. Assoc. Pet. Geol., Bull., Vol. 4, No. 2, p. 195-208, 7 figs., 1920.
Character of the oil shale ouctrops of tha area is cited and illustrated, along with lithologic descriptions of exposed sections. Results of distillation of samples collected from three southwestern counties show oil per ton yield.

01851 Schramm, L. W.
Shale oil: U. S. Bur. Mines, Bull., No. 667 (Mineral facts and problems; 1975 editiron), p. 963-988, tables, 1976.
A good summary of the requirements and future of the oil shale technological development and deterrents to commercial shale oil production in the U. S. are discussed. History of the industry and reserves nationwide and worldwide are presented. Recent mining, retorting, and mining developments are noted.

Schramm, L. W. See Cattell, R. A. 00397

01852 Schrayer, G. J.; Zarella, W. M.
Organic carbon in the Mowry Formation and its relation to the occurrence of petroleum in Lower Cretaceous reservoir rocks, in Black Hills area, South Dakota, Montana, Wyoming-Wyo. Geol. Assoc., 20th Field Conf., 1968, Guidebook: Casper, Wyo., Pet. Inf., p. 35-39, illus., tables, 1968.
Outcrop, subsurface core and cutting samples are used to measure the organic carbon content of the Mowry Shale (Lower Cretaceous) in northern and south-central Wyoming. The author concludes the Mowry may be a source rock for Cretaceous oil reservoirs.

01853 Schrayer, G. J.; Zarella, W. M.
Organic chemistry of shales - (Pt. 2) Distribution of extractable organic matter in the siliceous Mowry Shale, Wyoming: Geochim. Cosmochim. Acta, Vol. 30, No. 4, p. 415-435, illus., table, 1966.
Organic geochemistry of the Mowry Shale, a Cretaceous oil source rock in northwest and central Wyoming, is examined by conduction of experiments. Results compare the amount of extractable organic matter versus organic carbon content both regionally and vertically at a given outcrop. Conditions of depositional environments favorable to these associations are studied.

01854 Schroeder, Juan
Rocas bituminosas y su explotacion quimica: Uruguay, Inst. Geol. y Perf., B. No. 22, p. 1-256, figs., 3 pls., May 1935. Oil shales in Uraguay.

01855 Schroeder, W. C.
Comparison of major processes for synthetic liquid fuels: Chem. Ind., Vol. 65, p. 574-577+, 1948.

01856 Schroeder. W. C.
Prototype plants for synthetic liquid fuels: Am. Gas Assoc. Proc., p. 267-279, 1952.

01857 Schroeder, W. C.
Synthetic liquid fuels can assure enough oil: World Oil, Vol. 129, p. 30, July 1949.
This 1949 article discusses the possible future development of synthetic liquid fuels and also lists four courses of action available to prevent oil shortages.

01858 Schroeder, W. C.
Synthetic liquid fuels in the United States: Mech. Eng., Vol. 69, p. 989-995, 1947.
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Schroeder, W. C. See Fieldner, A. C. 00793

01859 Schroer, C. R.
Notes on potash possibilities in Illinois: Ill. Geol. Survey. Bull. 38, p. 435-330, 1922.
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Biologic principles of paleogeography: Pop. Sci. Minthly, p. 551-560, 1910b.
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The conditions of black shale deposition as illustrated by Kupferschiefer and Lias of Germany: Amer. Philos. Soc. Print No. 54, p. 259-269, 1915.
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Paleogeography of North America: Geol. Soc. Am. Bull., Vol. 20, p. 427-606, 1910a.
Regional relations of transgressive and regressive sequences and movements of fauna and flora are described. Paleogeographic interpretation of time when Devonian black shale was deposited is cited.

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Quantitative interpretation of mineralogical compoistion from X-ray and chemical data for the Pierre Shale: U. S. Geol. Surv. Prof. Paper 391-C, 31 p. (out of print), 1964.
X-ray and chemical data are both used in determining mineralogic composition. No mention is made of organic constituents.

Schultz, Leonard G. See Gill, James R. 00894

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Kohlenpetrographische untersuchungen iiber brandschiefer: Wurzberg, Buchdruckerie K. Triltsch, 58 p., incl. illus., tables, 1932.

Schumaker, R. C. See Wheeler, R. L. 02318

01866 Schwartz, Donald; Curran, W. V.; Kinney, C. R.
An investigation of the chemical nature of the organic

matter of uraniferous shales, quarterly progress report October 1 to December 31, 1953: U. S. Energy Comm. NYO-6087, 11 p. (dep.; mc)(prepared by Pennsylvania State College), 1953.
Results of analysis of B-β counts of the products of air oxidation of Chattanooga Shale at 200 adn 225°C are tabulated, as well as the raction rate of ozonization and % yields from ozonization. (From abstract)

Schwartz, Wilhelm See Ebner, Hans Gerog 00730

Schwietering, J. E. See Schopf, J. M. 01848

01867 Schwietering, Joseph Francis
Devonian shales of Ohio and their eastern equivalents: Doctoral, The Ohio State Univ., 1970.

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Devonian shales of Ohio and their eastern equivalents (abs.): Dissert. Abs. Internat., Sec. B, Sci., and Eng., Vol. 31, No. 4, p. 2067B, 1970.
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Olentangy shale (Middle & Upper Devonian) and its equivalents in western parts of Pennsylvania and New York (abs.): in North-Central Section, 6th Ann. Mtg., Geol. Soc. Amer. Abst., Vol. 4, No. 5, p. 350, 1972.
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Schwietering, J. F. See Patchen, D. G. 01610

Schwietering, J. F. See Schopp, J. M. 01849

Scott, A. J. See Collinson, C. W. 00474

Scott, A. J. See Collinson. C. W. 00475

01870 Scott, A. J.; Collinson, C. W.
Intraspecific variability in condononts - Palmatolepis glabra Ulrich and Bassler: J. Paleo., Vol. 33, No. 4, p. 550-565; Ill. Geol. Survey reprint 1959-M, 6 p., 1959.
Specimens of P. Galbra collected from the Saverton

Shale of Illinois are used to illustrate intra-specific variability in conodonts.

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Mineral composition and mineral association of uranium in shale: U. S. Atomie Energy Comm. BMI-JDS-203, 34 p. (dep.; $8.50, LC)(prepared by Batelle Memorial Institute), 1949.
This report describes the mineral composition and the mineral association of uranium in shale sample LC 201-113, obtained by the U. S. Geol. Surv. from the Chattanooga Shale Bed near Sparta, Tenn. Includes tables and graphs.

Scott, W. G. See Campbell, G. G. 00346

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Oil shale; an environmental assesment: in South-Central Section, 9th Ann. Mtg., Geol. Soc. Am., Abs. Programs, Vol. 7, No. 2, p. 233, 1975.
Briefly discusses location reserves, and recovery of Green River oil shale. Suggests surface and sub-surface mining, followed by retorting, will cause significant surface alteration. Notes in-situ mining may also cause ground water and surface water contamination.

01873 Searight, W. V.
Geology and mineral resources of the Beardstown quardangle: Unpub. report 296 p. (in Survey open-file reports), 1929.
Brief mention of Sweetland Creek-Kinderhook Shale. Well records.

Seeley, de Benneville K. See Ritzma, Howard R.01741

Selvig, W. A. See Fieldner, A. C. 00792

01874 Selwyn-Brown, Arthur
Fuel oil from shale: Eng. Mag. Vol. 50, p. 913-920, 1916.

01875 Serdyuchenko, D. P.; Potemkin, K. V.
Metamorphic processes and genetics relations of rare metal concentrations in black shale, in Sidorenko, A. V. and others (ed.), Sostoyaniye i zadachi sovetskoy litologii: Vses. Litol. Soveshch., 8th, Proc., Vol. 2, p. 159-164 (in Russian), 1970.

Serebryakov, V. A. See Dobrynin, V. M. 00663

Serebryakova, M. B. See Rozhkova, E. V. 01792

01876 Serebryannikov, N. D.
Proizvodstvo by Tovogo gaza iz slantsev (Natural gas derivatives from shale): in Razrabotka i ispol'-zovaniye azpasov goryuchikh slantsev (Baum, V.; chairperson), p. 327-335, illus., Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

Sergeant, Richard E. See Wigley, Perry B. 02333

01877 Serikov, Yu. I.
The question of the origin of uranium in Khadum shales (U. S. S. R.): Geochemistry Internat., No. 2, p. 229-232 (English translation of Russian paper), 1964.
In this technical paper, radioactivity in the Khadum shale from a drill hole was investigated by geophysical, radiometric, chemical, and granulomoetric analyses. Relationship of organic carbon to the uranium content was measured, and a theory was proposed to suggest the source of uranium could be traced to organic matter. No mention is made of the economics of this shale in East Ciscaucasia.

Severin, D. W. K. See Weber, J. H. 02293

Sexton, J. L. See Cole, R. D. 00461

01878 Shabica, Charles W.
Depositional environments in the Francis Creek Shale, in Depositional environments in parts of the Carbondale Formation, western and northern Illinois - Francis Creek Shale and associated strata and Mazon Creek biota - Geol. Soc. America, Coal Geology Div., Ann. Field Trip, Milwaukee, Wis., 1970: Illinois Geol. Surv. Guidebook Ser. 8, p. 43-52, illus., tables, 1970.
Discusses a shale in which carbonaceous impressions of flora were abundant. Other articles on clays, limestones, coal, and sulfur were included in the field trip log. No economic mention of any black oil shales in included. Lithologies of four major depositional environments (pro delta and delta front bar, distributary channel and inter-distributary bay, marginal bay, and delta plain) are discussed.

01879 Shale Review, The
The shale review, Vol. 1-4, No. 1-9, (Feb. 1919-Sept. 1922) Denver, Colo. illus., monthly. Merges with "Mountain States Mineral Age."

01880 Shaler, N. S.
Notes in investigations of the Ky. Geol. Surv. during the years 1873, 1874, and 1875: Ky. Geol. Surv. Rept. Prog., Vol. 3, p. 129-282, 1877.
Contains many references to the black shales pertaining to their economic value for building stone, oil content, etc. Regards the Ohio Shale as a deep-water deposit (Hoover, 1960).

01881 Shanks, W. C.; Seyfried, W. E.; Meyer, W. C.; et al.
Mineralogy of oil shale: in Oil shale (Yen, T. F.; et al.; editors), No. 5, p. 81-102, illus. (incl. sketch maps), Elsevier Sci. Publ. Co., Amsterdam, Netherlands, 1976.

Sharp. L. H. See Gavin, M. J. 00876

01882 Sharp, L. H.; Strunk, A. T.
Some items of investment expense, and profit in commercial shale-oil production: U. S. Bur. of Mines Rept. of Invest. 2214, 1921, 3 p. See also Oildom, Vol. 12, p. 47, Mar. 1921; Oil Trade J., Vol. 12, p. 62, Mar. 1921; Chem. Age, Vol. 29, p. 69-70, Feb. 1921; Oil, Paint, Drug Reporter Vol. 99, Petrol. Sec., p. 8, Feb. 21, 1921; Oil Age, Vol. 17, p. 29, Apr. 1921; Eng. Min. J., Vol. 111, p. 595, 1921.
A very brief, general paper on considerations in starting an oil shale processing facility. Sources of income are determined to be the known products such as gasoline. Land costs, building, machinery and equipment needed are cited. Operating costs are noted.

01883 Sharp, William N.; McKeown, F. A.; McKay, E. J.
Occurrence of uraninite in Tertiary clastic sediments of Wasatch formation, Powder River Basin, Campbell County, Wyoming: U. S. Geol. Surv. Trace Elem. Mem. Rept. 570, 10 p., maps, 1954. For official use only.

01884 Shaw, R. J.
Specific heat of Colorado oil shales: U. S. Bur. of Mines Rept. of Invest. 4151, 9 p., 1947.
Method procedure, and apparatus for specific heat determination are given. Five Colorado oil shales and two spent shales were tested for specific heat and the results are given. Correlations obtained lead to a presentation of graphs and derivation of equations for mean specific heat.

Shaw, V. E. See Donnell, J. R. 00684

01885 Shazly, E. M.; Hazek, N. M. T.; Zayed, Z. M.
Leaching experiments on uraniferous shales and sandstones from Quatrain, Western Desert, United Arab Republic, in The Recovery of Uranium Proceedings of a Symposium held in San Paulo, 17-21 Augsut 1970: Internat. Atomic Energy Agency STI/PUB/262, p. 57-66 ($13, UNIPUB, Inc.), 1971.
Complex mineralogic composition of the shales is noted, and physical and chemical methods of concentration and recovery, both successful and unsuccessful, are cited. Testing of uraniferous sandstones by leaching techniques is also discussed. (From Author's abstract)

Schramm, L. See Guthrie, B. 00950

01886 Sheldon, R. P.
Geochemistry of uranium in phosphorites and black shales of the Phosphoria Formation: U. S. Geol. Surv. Bull. 1084-D, p. 83-115 (out of print but available through libraries), 1959.
This paper analyses the uranium in the phosphorite and black shale facies of the Phosphoria Formation (Wyoming), in terms of state and source. The phosphatic rocks are classified according to the Eh and Ph of their depositional environments and their uranium contents are compared. Uranium in apatite and a mechanism for the deposition of uranium in apatite is presented.

01887 Shepherd, S. R. Leonard
Cambrian oil shale, Camooweal: Queensland Govt. Min. J., Vol. 46, No. 521, p. 75-77, 1945.

Sheridan, M. J. See Williams, Frank E. 02337

Shibaoka, M. See Demaison, J. M. 00615

Shimp, Neil F. See Bergstrom, Robert, E. 00184

Shih, S. See Young, D. K. 02386

01888 Shirenko, I. K.
Mekhanizatsiyz ochistnykh rabot no shakhte No 3 treata "Leningradslanets" (Mechanized cleaning of layer number 3 of the Leningrad shale): in Razrabotka i ispol'zovaniye zapasov goryuchikh slantsev (Baum, V.; chairperson), p. 132-133, Izd. Valgu, Tallin, Union of Soviet Socialist Republics, 1970.

Shirley, W. B. See Horne, J. W. 01031

Shirokova, I. Ya. See Voytov, G. I. 02265

Shishkov, G. See Brunkin, K. 00298

01889 Shlatler, L. Ye.
Metody geologicheskoy razvedki i otsenki mestorozhdeniy goryuchikh slantsev (Geologic methods in the exploration and evaulation of oil shale deposits): in Razrabotka i ispol'zovaniye zapasov goryuchikh slantsev (Baum, V.; chairperson), p. 79-84, Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

Shmarivich, Ye. M. See Oparysheva, L. G. 01585

Shockey, D. A. See Murri, W. J. 01503

01890 Shoemaker, Eugene M.; Luedke, R. G.
Map of the uranium region of the Colorado Plateau: U. S. Geol. Surv. Trace Elem. Invest. Rept. No. 279, Map, 1952.

01891 Shomali, Behman Saghatchian
Ostacods from the shales of the Lingle Formation (Middle Devonian) of Southern Illinois: Master's, 19/2. (Southern Illinois ?)

Short, N. M. See Strahl, Erwin O. 02028

01892 Shumaker, R. C.
Devonian shale research undertaken at West Virginia Univ. Mtn. State Geol., No. 1, p. 24-25, 1977.

01893 Shumaker, Robert C.
Natural gas from ancient high-pressure shale zones from the Appalachian Foreland?: Geol. Soc. Am., Abs. Prog., Southeastern Sect. 27 Ann. Mtg., Vol. 10, No. 4, p. 197, 1978.
Two Paleozoic subsurface examples of possible ancient zones of fluid migration and fault movement are discussed. The Kentucky example is a well producing from Devonian shale west of the Pine Mountain Thurst Fault. Stresses, high pressure zones, and under compacted zones are mentioned in relation to stratigraphy and mineralized fractures.

Sibley, F. H. See Jakosky, J. J. 01106

Silver, H. F. See Lessley, G. E. 01307

01894 Silver, H. F.; Wang, N. H.; Jensen, H. B.
A comparison of shale gas oil dentrification reactions over Co-Mo and Ni-W catalysts: in Science and Technology of oil shale (Yen, T. F., editor), p. 163-173, illus. (incl. tables), Arr Arbor Sci., Publ. Inc., Ann Arbor,

Mich., United States, 1976. See also A. C. S. Preprints, Div.of Fuel Chem., Vol. 19, No. 2, p. 147-155, 1974.
Denitrification tests were conducted on gas-combusted shale oil gas using three differnet Co-Mo on Al_2O_3, and Ni-W on Al_2O_3. Percent of nitrogen removed, classification into nitrogen compound types is shown along with comparison of effectiveness of the catalysts.

01895 Silver, H. F.; Wang, N. H.; Jensen, H. B.
Denitrification reactions in shale gas oil: A. C. S. Preprints, Div. Petrol. Chem., Vol. 17, No. 4, p. G94-100, 1972. Also: 164th A. C. S. National Meeting, New York City, New York, Aug. 27-Sept. 1, 1972.
The results of this work indicate that nitrogen-type compound analysis, first based on pure compound studies by other, is also applicable with modifications, to analyses of shale gas oil mixtures.

Silverman, E. N. See Strahl, Erwin O. 02031

Silverman, E. N. See Strahl, Erwin O. 02030

Simon, J. A. See Lamar, J. E. 01264

Simoneit, B. R. See Burlingame, A. C. 00310

01896 Simoneit, B. R.; Burlingame, A. L.
Ketones derived from the oxidative degradation of Green River Formation oil shale kerogen: in Advances in Organic Geochemistry, 1973, Int. Mtg. Org. Geochem., Programme Abs., No. 6, p. 191-201, illus. (incl. table). 1974.

01897 Simoneit, B. R.; Schnoes, H. K.; Haug, P.
Nitrogenous compounds of the Colorado Green River Formation oil shale - A preliminary analysis by mass spectrometry: Nature, Vol. 226, No. 5240, p. 75-76, illus., table, 1970.
Presented here are the results of an analysis of nitrogen directly extractable from the Green River Formation.

01898 Simpson, Louis
Oil yielding shales in the province of New Brunswick: Canadian Min. Inst., Monthly Bull., No. 1, p. 42-47, Jan., 1919.

01899 Sipprelle, E. M.
Oil-shale mining investigations, Rifle, Colo.: Mines Mag., Vol. 38, No. 12, p. 61-64, 1948.

01900 Sipprelle, E. M.
Oil-shale mining 1949: Colorado Min. Assoc., Denver, Colo., 1950 Min. Yearbook, p. 114-116, 128, 1950.

Sipprelle, E. M. See Gardner, E. D. 00853

Sipprelle, E. M. See Gardner, E. D. 00854

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Sipprelle, E. M. See Hull, Wm. Q. 01056

01901 Sipprelle, E. M.; Ballinger, H. J.
Applicability of oil shale mining developments to the mining industry; (abs.): Min. Cong. J., Vol. 36, p. 82, Oct. 1950.
This 1950 article describes the operation of the U. S. Bur. of Mines experimental mine in the oil shale beds of the Green River Formation near Rifle, Colorado.

01902 Sipprelle, E. M.; Teichman, H. L.
Roof studies and mine structure stresses analysis, Bureau of Mines oil-shale mine, Rifle, Colorado: Min. Eng., Vol. 187, Trans., p. 1031-1036, 1950. See also A. I. M. E. Tech. Pub. No. 2942.
The purpose of this paper is to discuss the roofstone behavior and determination of mine structure stresses, phase of the Bur. of Mines research program pertaining to oil shale development.

01903 Skjeseth, Steinar
Uranium in Cambrian alum shales of the Oslo region and adjacent districts: Norges Geol. Unders. No. 203, p. 100-111 (in Norwegian with English sum.), 1958.
Investigation of the Alum Shales, a Cambrian black shale, showed significant uranium in southern Norway. Field investigations using Geiger-Muller and scintillation counters showed the richest uranium area had an average of 50-100 g. U per ton.

Slack, Howard A. See Krumbein, William C. 01256

01904 Sladek, T. A.
Recent trends in oil shale; Part 1, History, nature, and reserves: Colo. Sch. Mines, Miner. Ind. Bull., Vol. 17, No. 6, 20 p., illus. (incl. table, sketch map), 1974.
In this non-technical paper, oil shale mining and

and surface (open pit) mining are discussed. Seven retorting processes, including three from the Union Oil Co. are briefly summarized. Current designs of these retorts were diagrammed and advantages and disadvantages outlined.

01905 Sladek, T. A.
Recent trends in oil shale; Part 2, Mining and shale oil extraction processes: Colo. Sch. Mines, Miner. Ind. Bull., Vol. 18, No. 1, 20 p., illus., 1975.
History of oil shale development nationwide is presented. Reserves, particularly those of the Piceance, Uinta, and Washakie basins are mentioned.

01906 Sladek, T. A.
Recent trends in oil shale; Part 3, Shale oil refining and some oil shale problems: Colo. Sch. Mines, Miner. Ind. Bull., Vol. 18, No. 2, 11 p., illus. (incl. tables, sketch map), 1975.
Topics discussed in the two previous issues of "Recent trends in oil shale," are reviewed (See other annotations by Sladek). The properties of crude shale oil from several retorts were listed, and refining problems associated with these properties were discussed. This article also mentions complex economic, social, and political issues that affect oil shale progress.

01907 Slaughter, Archibald L.; Clabaugh, S. E.
Eastern black shale reconnaisance preliminary report: U. S. Geol Surv. Trace Elem. Invest. Rept. 1, var. pag., map, tables, diagrs., 1944.

01908 Sloss, L. L.; Dapples, E. O.; Krumbein, W. C.
Lithofacies maps. An atlas of the United States southern Canada: John Wiley & Sons, Inc., New York, 1960.
Nationwide Chattanooga Shale isopach maps are shown. Sand-shale versus clastic ratios are also shown on the maps. Tertiary maps of the Eocene Green River Formation are not shown.

Smit, Dzh. V. See Dinnin, G. Yu. 00660

01909 Smith, C. DeWitt
A unique approach to get oil shale out of the ground: Min. Eng., Vol. 26, No. 10, p. 52-56, illus. (incl. sketch map), 1974.
This 1974 article describes the geology of the Piceance Creek Basin, Colo. and its possibilities as a mining proposition.

Smith, C. R., Jr. See Smith, J. R. 01916

Smith, D. H. See Gentry, R. V. 00883

Smith, D. K., Jr. See Graner, John W. 00918

01910 Smith, E. B.
Lowering the sulfur and ash contents of high-sulfur coals by peroxide-acid treatment: A. C. S. Preprints, Div. of Fuel Chem., Vol. 20, No. 2, p. 140-146, 1975. Also: 169th A. C. S. National Mtg., Philadelphia, PA, Apr. 6-11, 1975 (abs.)
High-sulfur coals at room temperature were treated with peroxide-acid solutions. It was concluded from these preliminary experiments that acid-peroxide treating shows promise as a method for upgrading high-sulfur coals. (From asbtract).

01911 Smith, E. B.; Decora, A. W.; Cook, G. L.
The effect of mild oxidation on the quality of a shale-oil naphtha: A. C. S. Preprints, Div. Fuel Chem., Vol. 16, No. 1, p. 88-93, 1972. Also: 163rd A. C. S. National Meeting, Boston, Mass. Apr. 9-14, 1972.
A shale-oil naptha fraction, chosen for its high nitrogen content and reactivity was exposed to air at room temperature and atmospheric pressure in a closed system. (From abstract). The results showed that mild oxidation holds promise for improving the quality of shale-oil napthas. (From abstract)

01912 Smith, E. B.; Jensen, H. B.
Autoxidation of three 1-alkylpyrroles: J. of Org. Chem., Vol. 32, p. 3330-3334, 1967.
Four carbonyl compounds, thought to arise from peroxide decomposition, were isolated from 1-methyl-pyrrole oxidation products and subjected to spectral examination. It suggested that 1-alkylpyrroles react with oxygen by a free-radical peroxy addition process. (From abstract)

Smith, C. G. See Kantsler, A. J. 01144

Smith, G. V. See Cole, R. D. 00462

Smith, H. N. See Hubbard, A. B. 01046

01913 Smith, H. N.; Heady, H. H.
Identification of frozen liquid samples with the X-ray diffractometer: Anal. Chem., Vol. 27, p. 883-888, 1955.
The main purpose for devising the low-temperature attachment for the X-ray diffractometer was to provide a means of analyzing shale-oil distillate

fractions of high boiling point. Procedure and apparatus are described and illustrated.

01914 Smith, H. N.; Smith, J. W.; Kommes, W. C.
Petrographic examination and chemical - analyses for several foreign oil shales: U. S. Bur. of Mines Rept. of Invest. 5504, 34 p., 1959.
Samples from major foreign deposits except Germany, Estonia, and Russia were analyzed by petrographic, chemical, oxide, and mass spectrometric methods and assayed by the Fischer method. Short descriptions of the location and history of these foreign deposits is given. Results of analyses are presented.

Smith, J. R. See Dinneen, G. U. 00646

Smith, J. R. See Dinneen, G. U. 00654

Smith, J. R. See Dinneen, G. U. 00653

Smith, J. R. See Dinneen, G. U. 00655

Smith, J. R. See Dinneen, G. U. 00659

Smith, J. R. See Kinney, I. W., Jr. 01197

Smith, J. R. See Van Meter, R. 02238

01915 Smith, J. R.; Dinneen, G. U.
Refining of shale oil: U. S. Patent 2,606,143, Aug. 5, 1952.
A method for separation of organic nitrogen compounds from shale oils using magnesium silicate to absorb nitrogen compounds is summarized. Diagram for the system is shown.

01916 Smith, J. R.; Smith, C. R., Jr.; Dinneen, G. U.
Separation of nitrogen compounds from shale oil: Anal. Chem., Vol. 22, p. 867-870, 1950.
Described is a procedure for separating shale-oil distillates into two fraction: 1) hydrocarbons, 2) nitrogen and heterocyclic compounds. Factors investigated in optimun condition selection are discussed.

01917 Smith, J. W.
Analytical method for study of thermal degradation of oil shale: U. S. Bur. of Mines Rept. of Invest. 5932, 17 p., 1962.
Procedure for the modified assay is outlined. Product balance (products from pyrolysis of the charge) and materials balance (distribution of the organic elements of the charges sample in the thermal degradation products) are determined.

Apparatus and results of testing on eight portions of sample of Colorado oil shale are given.

01918 Smith, J. Ward
Applicability of a specific gravity oil yield relationship to Green River oil shale: Chem. Eng. Data Series, Vol. 3, No. 2, p. 306-310, 1958.
This study demonstrates the applicability of one of the relationships between specific gravity and oil yield, developed for test hole-D5 of the Rifle, Colo. area to nine other cores and to the Mahogany-zone shales of the Green River Formation. Includes tables of results.

01919 Smith, John Ward
Conversion constants for Mahogany-zone oil shale: Am. Assoc. Pet. Geol., Bull., Vol. 50, No. 1, p. 167-170, 1966.
Constants for conversion of organic matter and organic carbon in the oil shale into oil were calculated. Values were calculated from samples of the Mahogany zone of the Green River Formation in Utah and Colorado and from previous data on average oil yields.

01920 Smith, J. W.
Geochemistry of oil shale genesis, Green River Formation, Wyoming, in Symposium on Tertiary rocks of Wyoming - Wyoming Geol. Assoc. 21st Field Conf., 1969, Guideb.: Casper, Wyo., Pet. Inf., p. 185-190, illus., 1969.
Summaries of the oil shale, its characteristics, organic and mineral composition, and mineral characteristics are given. Varves are discussed as features of seasonal deposition. Geochemical analysis of the sediments' depositional environment is postulated.

01921 Smith, John Ward
Geochemistry of oil shale genesis in the Piceance Creek Basin Colorado, Rocky Mt. Assoc. Geol., Field Conf., Guideb., No. 25 (Guideb. to the energy resources of the Piceance Creek Basin, Colo.), p. 71-79, illus (incl. geol. sketch map), 1974.
A "geochemical genesis pattern" for the oil shale minerals of the Green River Form. in the Piceance Creek basin is presented that is consistent with present day observations. Depositional requirements and the postulated chemical (or biochemical) history of Lake Uinta lead to the authigenesis of oil shale minerals. Chemical stratification and stability of lake is suggested.

01922 Smith, John Ward
Preparation of organic concentrate from Green River oil shale: Anal. Chemistry, Vol. 32, No. 12, p. 1718-1719, 1960.
The procedure presented in this paper reduces the interference problems associated with direct shale analysis, by concentrating the organic matter.

01923 Smith, J. W.
Relationship between rock and volume of organic matter in oil shales: Laramie Energy Research Center/ Rept. of Invest. 76/6, 11 p., Sept. 1976.

01924 Smith, John Ward
Specific gravity - oil yield relationships of two Colorado oil-shale cores: Indus. and Eng. Chemistry, Vol. 48, No. 3, pt. 1, p. 441-444, Mar. 1956.
This paper presents the relationship of the specific gravity of Mahogany zone oil shale to its oil yield per unit weight based upon analytical data on cores from two locations in Colorado. (From p. 441)

01925 Smith, John Ward
Stratigraphic change in organic composition demonstrated by oil. Oil specific gravity depth correlation in Tertiary Green River oil shale, Colo.: Am. Assoc. Pet. Geol., Bull., Vol. 47, No. 5, p. 804-813, illus., tables, 1963.
Samples from 18 drilled sites showed specific gravity of oil retorted from Colorado oil shales decreases uniformly with an increase in depth. This is correlated with a decrease in the oxygen content of organic matter. A mechanism is suggested for this stratigraphic change.

01926 Smith, J. W.
Theoretical relationship between density and oil yield for oil shales: U. S. Bur. of Mines, Rept. Invest., No. 7248, 14 p., illus., 1969.
Correlations between density of an oil shale and the rock's organic content or oil yield were studied by analyzing samples from the Green River Formation. Effect of variation of mineral composition of theoretical shale density was noted. Equations showing theoretical relationships between oil shale density and organic content are presented, and application of theoretical relationships to the Green River shales is shown.

01927 Smith, J. W.
Thermal analysis in earth science: Experience and expectations: Thermal Analysis, Vol. 3, ed. by H. G. Wedemann. Birkhauser Verlag, Basel and Stuttgart, p. 605-635, 1972.

01928 Smith, John Ward
Ultimate composition of organic material in Green River oil shale: U. S. Bur. of Mines Rept. Inv. 5725, 16 p., illus., tables, 1961.
Different methods for determining composition of organic matter are compared. Carbon, sulfur, and hydrogen corrections that provide for mineral forms of these three elements are discussed. Source of the ten samples and preparation of their concentrates were described stepwise. but analytical methods were only cited and results shown. The overall technique was evaluated, and source of possible discrepancies cited (though they are of minor importance).

Smith, John Ward See Beard, Thomas 00148

Smith, John Ward See Chong, K. P. 00435

Wmith, John Ward See Chong, K. P. 00436

Smith, J. W. See Dana, G. F. 00578

Smith, J. W. See Dana, George F. 00579

Smith, J. W. See Dana, George F. 00580

Smith, J. W. See Dana, George F. 00581

Smith, J. W. See Johnson, D. R. 01122

Smith, J. W. See Johnson, Donald R. 01121

Smith, J. W. See Johnson, Donald R. 01123

Smith, J. W. See Johnson, D. R. 01124

Smith, J. W. See Lee, Kwang K. 01297

Smith, J. W. See Robb, William A. 01744

Smith, J. W. See Robb, William A. 01745

Smith, J. W. See Rohrer, W. L. 01779

Smith, J. W. See Smith, H. N. 01914

Smith, J. W. See Stanfield, K. E. 02002

Smith, John Ward See Stanfield, K. E. 01998

Smith, J. W. See Stanfield, K. E. 02201

Smith, John Ward See Thomas, Harold E. 02078

Smith, J. W. See Trudell, L. G. 02131

Smith, J. W. See Trudell. L. G. 02133

Smith, J. W. See Trudell, L. G. 02132

Smith, J. W. See Young, Neil B. 02388

Smith, J. W. See Young, Neil B. 02389

01929 Smith, J. W.; Atwood, (editor)
Oil shale and tar sands: Am. Inst. Chem. Eng. Symp. Ser., No. 155, Vol. 72, 78 p., illus., 1976. Individual papers within the scope of this bibliography are cited under separate authors.
The subject of this symposium volume is oil shale and tar sand resources and their development technology.

01930 Smith, J. W.; Beard, T. N.; Wade, P. M.
Estimating nahcolite and dawsonite content of Colorado oil shale from oil-yield assay data: U. S. Bur. of Mines Rept. of Invest. 7689, 24 p., 1972.
Methods for estimating amount of dawsonite and nahcolite from oil-yield assay data are shown and tested on Colorado oil shales. The minerals are statistically derived from amounts of water and gas measured during testing by a modified Fischer assay. Estimate of the accuracy of this method is discussed, and calculations are shown. Nahcolite plus dawsonite contents were measured for 179 samples.

01931 Smith, John Ward; Futa, Koyotot
Direct determination of organic hydrogen in oil shales by low-temperature ashing: Chem. Geol., Vol. 14, No. 1-2, p. 31-38, illus., 1974.
Analysis method of the low-temperature asher is discussed. Comparison is made with indirect methods. Ways to make sure there is a distinction between organic and mineral hydrogen are presented. Results of the LTA method on Green River and New Albany shale samples are shown. Comparison is made with indirect methods.

01932 Smith, J. W.; Harbaugh, J. W.
Stratigraphic and geographic variation of shale-oil specific gravity from Colorado's Green River Formation: U. S. Bur. of Mines Rept. Invest. 6883, 11 p., illus., tables, 1966.
A mechanism for loss of specific gravity of organic matter with depth is suggested. Well locations for which oil-gravity data were figured are shown. Basin side hypersurfaces were drawn from gravity calculations.

01933 Smith, J. W.; Johnson, D. R.
Dolomite for determining atmopshere control in thermal analysis: Thermochimica Acta, Vol. 8, No. 1, p. 45-46, Jan. 1974.
This paper describes the use of a National Bureau of Standards dolomite sample to define for most thermal analysis equipment whether product gases can be adequately removed and whether atmosphere control can be achieved. (From Intro.) Includes figures and tables of results.

01934 Smith, J. W.; Johnson, Donald R.
Mechanisms helping to heat oil-shale blocks: A. C. S. Preprints, Div. of Fuel Chem., Vol. 21, No. 6, p. 25-33, 1976. Also: 172nd A. C. S. National Mtg., San Francisco, CA, Aug. 29-Sept. 3, 1976. (abs.)
Three separate mechanisms assisting in the heating of oil shale blocks are identified and discussed in detail.

01935 Smith, J. W.; Johnson, D. R.
Multiple thermal analysis of natural materials: Am. Laboratory, p. 8-14, Jan. 1971.

01936 Smith, J. W.; Johnson, Donald R.
Simultaneous DTA-MSA apparatus for thermal study of natural fuels, in Thermal analysis - Vol. 2, Inorganic materials and physical chemistry (R. F. Schwenter, Jr. and Pual D. Garn, editors) - Internat. Conf. Thermal Analysis, 2nd, Worcester, Mass., 1966, Proc.: New York and London, Academic Press, p. 1251-1269, illus., 1969.

01937 Smith, J. W.; Johnson, D. R.
Thermal analysis of natural fuels: Proc. Second Toronto Symp. on Thermal Analysis, p. 95-116, 1967.
The U. S. Bur. of Mines developed thermoanalytical equipment and techniques to overcome the problems presented by natural fuels. This apparatus is described and its application to a study of natural fuels, particularly oil shale from the Green River Formation. (From Intro. p. 95)

01938 Smith, J. W.; Johnson, D. R.; Robb, W. A.
Thermal synthesis of sodium calcium carbonate - a potential thermal analysis standard: Thermochimica Acta, Vol. 2, No. 4, p. 305-312, 1971.
Described in this paper are the preparation, characteristics and thermal properties of the double carbonate sodium calcium carbonate.

01939 Smith, J. W.; Milton, Charles
Dawsonite in the Green River Formation of Colorado: Econ. Geol. Vol. 61, p. 1029-1042, 1966.
This paper reviews briefly what is known about dawsonite its literature and gives new data on the Colorado occurrence, its mineralogy, geochemistry, and its geographic and stratigraphic extent.

01940 Smith, J. W.; Robb, William A.
Ankerite in the Green River Formation's Mahogany Zone: J. Sed. Pet., Vol. 36, No. 2, p. 486-490, 1966.
X-ray diffraction techniques are used in determination of ankerite and dolomite in 10 Mahogany Zone samples. Strantium content and substitution of Mg and Ca ions by Fe and Sr ions led to detection of a shift in X-ray diffraction spacing.

01941 Smith, J. W.; Robb, W. A.
Aragonite and the genesis of carbonates in Mahogany Zone oil shales of Colorado's Green River Formation: U. S. Bur. of Mines Rept. of Invest. No. 7727, 21 p., illus. incl. tables, map, 1973.
This article shows recognition and verification of aragonite from the Mahogany zone of the Green River Formation. A geochemical patten, outlining genesis of the formation oil shale is given. Relationships of the development of three separate carbonates, aragonite, calcite, and dolomite, are shown to be consequences of the genetic pattern.

01942 Smith, John Ward; Stanfield, K. E.
Oil shales of the Green River Formation in Wyoming in sedimentation of late Cretaceous and Tertiary outcrops, Rock springs Uplift - Wyoming, Geol. Assoc. 19th Field Conf. 1965, Guidebook: Casper, Wyoming, Pet. Inf., p. 167-170, illus., 1965.
This paper summarizes the depositional environment, and geographical distribution of Green River Formation oil shales in Wyoming. Drilled core locations are shown, but no samples were analyzed. Locations where members are rich are cited.

01943 Smith, John Ward; Stanfield, Kenneth
Oil yields of Devonian. New Albany shales, Kentucky: Am. Assoc. Pet. Geol. Bull., Vol. 48, No. 5, p. 712-714, illus., 1964.
This short article notes Fischer assay oil yields

from samples of New Albany black shale cores drilled in Rockcastle, Pulaski, and Adair Counties, Kentucky. Logs for each core are diagrammed in terms of oil yield.

01944 Smith, John Ward; Stanfield, Kenneth
Oil yields and properties of Green River oil shales in Uinta Basin, Utah, in Guidebook to the geology and mineral resources of the Uinta Basin, Utah's hydrocarbon storehouse, 13th Ann. Field Conf., 1964: Salt Lake City, Utah, Intermountain Assoc. Pet. Geol., p. 213-221, illus., tables, 1964.
This article describes the method for sampling oil shale in the Uinta basin and gives the results of testing for ash and trace element content. Composite statistics on organic matter in the Mahogany Zone are presented, but Bureau of Mines RI-6420 has oil yield for each hole sampled. Samples were derived from drill cuttings, and in a few cases, cores.

01945 Smith, John Ward; Thomas, Harold E.; Trudell, Laurence G.
Geologic factors affecting density logs in oil shale: in SPWLA Logging Symp., 95th Ann., New Orleans, La., 1968, Trans: Houston, Tex., Soc. Prof. Well Log Analy., p. P1-P17, illus., tables, 1968.
In the nahcolite-bearing sections of the Green River Formation oil yeilds of long sections can be estimated from density logs with reduced but usable accuracy. (From conclusion). Includes discussion of experimental procedure and tables of results obtained.

01946 Smith, John Ward: Trudell, Laruence G.
Wyoming Corehole No. 1 - a potential site for production of oil shale in place; in Fifth symposium on oil shale: Colo. Sch. of Mines. Q., Vol. 63, No. 4, p. 55-69, illus., tables, 1968.
This article is concerned with a corehole drilled near Eden, Wyo., in the Green River basin. Characterization of these Green River Formation oil shales is given in summaries of stratigraphy, oil yields, oil shale distribution, lithology, and mineralogy. Their similarity of Mahogany Zone oil shales and it situ development possibilities are discussed.

01947 Smith, J. W.; Trudell, L. G.; Dana, G. F.
Oil yields of Green River oil shales from Colorado Corehole No. 1: U. S. Bur. Mines Rept. Invest. 7071, 28 p., illus., tables, 1968.
Stratigraphy of thw northern part of the Piceance Creek basin is reviewed. Complete oil yield log for the 2360 foot corehole is shown. Isopach

map of 25-gal.-per-ton oil shales is given. Comparison is made with richer oil shale intervals further south in the basin.

01948 Smith, J. W.; Trudell, L. G.; Robb, W. A.
Oil Yields and characteristics of Green River Formation oil shales at WOSCO EX-1, Uinta County, Utah: U. S. Bur. of Mines, Rept. Invest. NO. 7693, 145 p., illus., 1972.
Profiles for the corehole show oil yield and specific mineral contents. A very detailed lithologic log is shown for the 1200 foot core interval. Discussion of the shale in terms of possible in situ development is presented.

01949 Smith, J. W.; Trudell, L. G.; Stanfield, K. E.
Characteristics of Green River Formation oil shales at Bureau of Mines Wyoming Corehole No. 1: U. S. Bur. Mines, Rept. Inv. 7172, 92 p., illus., tables, 1968.
A very complete lithology, is presented for the corehole, which was in the Green River basin. Oil yield assay data are also presented for the corehole. Stratigraphy, mineralogy, and density, resistivity, and gamma ray logs are also shown. Author suggests the deposit may be one suitable to in situ recovery.

01950 Smith, J. W.; Trude l, L. G.; Satnfield, K. E.
Comparison of oil yields from core and drill-cutting sampling of Green River oil shales: U. S. Bur. of Mines Rept. of Invest. 6299, 35 p., 1963.
Oil yields from two types of drill cutting samples, mud cuttings, were compared, and linear equations drawn with core samples. Gas cutting oil yields were found to be similar to those of core samples. Sampling methods are discussed and oil yeilld logs are shown. Core and gas cuttings samples were were obtained from the eastern part of the Uinta Basin, and cores and mud cuttings were obtained from west-central Piceance Creek basin oil shales.

01951 Smith, John Ward; Trudell, Laurence G.; Stanfield, Kenneth E.
Drill cutting sampling for oil yields of Green River oil shales. Colo. Sch. Mines, Q., Vol. 58, No. 4, p. 113-127, illus., tables, discussion 1963.
In this article, oil yields from mud cuttings of hydraulic rotary drilling in Colorado and gas cuttings from pneumatiac rotary drilling in Utah are compared with core samples from adjacent holes. Sampling methods showing how cuttings and cores are obtained are discussed.

01952 Smith, J. W.; Young, Neil B.
Dawsonite: Its Geochemistry, thermal behavior, and extraction from Green River oil shale: Colo. Sch. of Mines Q., Vol. 70, No. 3, p. 69-93, July, 1975.
Analytical methods for determining dawsonite and nordstrandite (sources of alumina) in oil shale are described and evaluated. The geochemical conditions which produced these minerals and thermal decomposition reactions of both minerals are described. Two alumina extraction methods are compared, one using spent oil shale.

01953 Smith, J. W.; Young, N. B.
Determination of dawsonite and nahcolite, and non-dawsonite alumina in Green River oil shales is presented. Shale-oil yields, nahcolite contents, and yields of alumina were determined on 83 samples from an 821-foot section of a corehole drilled in the Piceance Creek basin. Reproducibility, specificity, and interferences are cited in a discussion of the method.

01954 Smith, John Ward; Young, Neil B.; Lawler, Dale L.
Direct determination of sulfur forms in Green River oil shale: Anal. Chemistry, Vol. 36, No. 3, p. 618-622, illus., tables, 1964.
A method is presented in this paper for the direct determination of pyrite, organic, sulfate sulfur in Green River oil shale. Experimental procedure is described and tables of results are given.

01955 Smith, John Ward; Young, Neil B.
Organic composition of Kentucky's New Albany Shale; determination and uses: Chem. Geol., Vol. 2, No. 2, p. 157-170, illus. (incl. sketch map), 1967.
Samples of cores from Rockcastle, Adair, and Pulaski counties were studied to determine their organic composition. Procedure used in separation of organic material from non-organic is given. Chemical analysis in infrared spectra are used in determination of the organic composition, and spectra were compared to Green River shales. Gas and oil recovery from the Kentucky shales are estimated.

01956 Smith, John Ward; Young, Neil B.
Specific-gravity to oil yield relationships for black shales of Kentucky's New Albany Formation: U. S. Bur. of Mines, Rept. of Invest. 6531, 13 p., illus., tables, 1964.
Specific gravity-oil yield relationships were developed from core samples representing the complete black shale section in Adair, Pulaski, and Rockcastle counties. Two linear equations

and correlation coefficients were derived to express the relationships. Variation in the pyrite content is discussed as an error source, and application of the methods to field studies are suggested.

01957 Smith, Paul V.
Studies on the origin of petroleum: occurrence of hydrocarbons in recent marine sediments, Condensed in world Petrol. Conf., 4th Rome Proc., Sec. 1, p. 359-376, 1955.

01958 Smith, Paul V.
Studies on the origin of petroleum: occurrence of hydrocarbons in rencent marine sediments, Am. Assoc. Pet. Geol., Bull., Vol. 38, No. 3, p. 377-404, 1954.
Organic matter in recent sediments deposited in the Gulf of Mexico off Louisiana have been detected in cores, with free hydrocarbon ratios as high as 283 parts per million. An estimate of 4,500,000 barrels of crude oil per cubic mile of sediment has been made.
Also published by: Standard Oil Development Co., Lindon, N. J.

01959 Smith, R. E.
Oil shale; big strides toward development halted by new economic uncertainties: Eng. Min. J., Vol. 176, No. 3, (106th annual review and outlook), p. 181-183, 1975.
Expenditures by all oil shale projects to be scrutinized in 1975; author says unlikely there will be important newcomers to oil shale development during the year, since investment dollars will be difficult to obtain. (From p. 183).

01960 Smith, William H.
Lithology and distribution of the Francis Creek Shale in Illinois, in Depositional Environments in Parts of the Carbondale Formation, Western and Northern Illinois - Francis Creek Shale and Associated Strata and Mazon Creek Biota - Geol. Soc. America Coal Geology Div., Ann. Field Trip, Milwaukee, Wis., 1970: Illinois Geol. Survey Guidebook Ser. 8, p. 34-42, illus., 1970.
This article describes a widespread medium light gray fossiliferous shale associated with other clastic rocks. Carbonaceous remains may be found, but no mention of uranium of oily matter in it.

01961 Smits, L. J. M.
Sp log interpretation in shaly sands: Soc. Petroleum Engineers A. I. M. E. trans., Vol. 243 (pt. 2), p. 123-

136, illus., table, reprinted 1969; originally published 1968.
A theoretical equation is developed describing membrane potentials of shaly sands as a function of the cation-exchange capacity per unit volume of the rock and saturating water salinity. (From abstract)

Smits, L. J. M. See Waxman, M. H. 02289

01962 Sneddeon, J. B.; Caldwell, W.; Stein, J.
Seventy-five years of oil shale mining: Colliery Guardian, Vol. 156, No. 4041, p. 1050-1053, 4 figs., JE 10' 38.
This 1938 article describes the oil shale mines, crude oil works and refinery working at that time in Scotland.

01963 Snider, John L.
Reconnaissance for uranium in the Indiana coal field: U. S. Atomic Energy Comm. TEM-/84, 26 p. (Dep.; $6.50, LC)(prepared by U. S. Geol. Surv.), 1954.
A radioactivity of 0.001 or more percent equivalent uranium was found in five Indiana coal beds: the Upper Block, Minshall, Gentryville, Coal II, and Coal III. (From abstract)

01964 Snider, John L.
Radioactivity of some coal and shale of Pennsylvanian age in Ohio: U. S. Atomic Energy Comm. TEI-404, 22 p. (dep.; $6.50, LC)(prepared by U. S. Geol. Surv.), 1954.
Stratigraphy of the area and location of samples are presented. None of the coals or shales tested had recoverable uranium contents.

01965 Snider, John L.
Reconnaisance for uranium in coal and shale in southern West Virginia and Southwestern Virginia: U. S. G. S. Trace Elem. Invest. Rept. 409, 28 p., maps, tables, 1953.
In this investigation, coal sampled was low in uranium content, but Upper Devonian shales contained .003-.004% uranium. Stratigraphy of the area was presented, and location, thickness, lithology, and uranium content shown for all samples.

Sochett, William M. See Mo, Tin 01459

01966 Soderstrom. Gleen S.
Central Texas Llano area may prove to be prime prospect for nation's future oil shale production: Oil and Gas J., Vol. 65, No. 13, p. 148, 149, illus., 1967.
This article is concerned with the Barnett Shale, which outcrops in five central Texas counties. Regional stratigraphy and topography of the Llano

unlift area is noted. Author notes 42 gal/ton assay of the oil shale and says that no government ownership of the land may lead to development.

01967 Shohns, H. W.
Feasability of in situ retorting of Green River oil shale, utilizing nuclear explosives for fracturing: in Peaceful nuclear explosions III; applications characteristics and effects, p. 99-121 (incl. French, Russian, Spanish samples), illus. (incl. tables, sketch maps), IAEX, Vienna, Austria, 1974.
Advantages of in situ retorting are cited. Work conducted with above-ground batch-type retorts are summarized, and capacities and oil yields from them are given. Field tests of the in situ method at Rock Springs, Wyoming, are reported to be encouraging.

01968 Sohns, Harold W.
In situ oil shale retorting research: The Oil Daily, p. 10, Mar. 29-31, 1968.

01969 Sohns, Harold W.
Oil shale: its role in solving the energy problem: Proc. Symp., The Energy Problem: What Can be done? Texas Tech. Univ., Lubbock, Tex., p. 18-24, Feb. 20, 1974, 1974.

01970 Sohns, H. W.
A summary of current techniques for processing Green River oil shale: Intermountain Assoc. of Petrol. Geol.: Guidebook to the Geology and Mineral Resources of the Uinta Basin, p. 223-225, 1964.
This is a very brief presentation of mining and retorting. The room and pillar mining method developed by the Bureau of Mines and applied near Rifle, Colo., is summarized. Four retorting processes (gas combustion, Union oil process, TOSCO process, and the in situ method) of interest in Green River shale are also summarized.

Sohns, H. W. See Brantley, F. E. 00249

Sohns, H. W. See Burwell, E. L. 00321

Sohns, H. W. See Burwell, E. L. 00324

Sohns, H. W. See Carpenter, H. C. 00367

Sohns, H. W. See Carpenter, H. C. 00370

Sohns, H. W. See Carpenter, H. C. 00369

Sohns, H. W. See Carpenter, H. C. 00359

Sohns, Harold W. See Carpenter, Harry C. 00368

Sohns, H. W. See Lombard, D. B. 01348

Sohns, H. W. See Lombard, D. B. 01349

Sohns, H. W. See Ruark, J. R. 01794

Sohns, H. W. See Ruark, J. R. 01795

Sohns, H. W. See Tihen, S. S. 02102

Sohns, H. W. See Tisot, P. R. 02113

Sohns, Harold W. See Tisot, Peter R, 02114

Sohns, H. W. See Tisot, P. R. 02112

Sohns, H. W. See Wise, R. L. 02360

01971 Sohns, H. W.; Carpenter, H. C.
In-situ oil shale retorting: Chem. Eng. Prog., Vol. 62, No. 8, p. 75-78, 1966.
This is the report of a study of the properties of Green River oil shale and their effects on a possible in-situ shale oil recovery operation. (From conclusion)

01972 Sohns, H. W.; Jukkola, E. E.; Murphy, W. I. R.
Development and operation of an experimental entrained-solids, oil-shale retort: U. S. Bur. of Mines Rept. of Invest. 5522, 45 p., 1959.
"Summarized work performed with entrained solids experimental retort; studies included investigation of the effects of temperature upon quality and quantity of products obtained from Green River and Chattanooga oil shales." (Author)

01973 Sohns, H. W.; Jukkola, E. E.; Cox, R. J.
Entrained-solids retorting of Colorado oil shale; equipment and operation: Ind. Eng. Chem., Vol. 47, p. 461-464, 1955.
Results of a study on the variation in yield and quality of products obtained from oil shale retorting at several temperatures (1000° to 1650°F) are reported here. Includes figures and tables of results obtained.

01974 Sohns, H. W.; Long, A., Jr.
In situ oil shale processing research; In Situ Recovery of Shale Oil, S. S. Penner, ed., N. S. E./E. R. A. N. N. Report No. 75-001, p. 148-173, 1975.
"This paper discusses field-scale fracturing research

that has been carried on in the Green River basin of western Wyoming and work under similar in situ retorting near Laramie." Research on above ground retorting (150 ton) of large pieces (5 ton) of shale is being conducted to solve underground problems. Success of fracturing techniques investigated, including electrolinking, hydraulic fracturing, and liquid or slurry chemical high-explosive methods are discussed.

01975 Sohns, H. W.;Mitchell, L. E.; Cox, R. J.
Heat requirements for retorting oil shale: Ind. Eng. Chem., Vol. 43, p. 33-36, 1951.
This study was made to determine the total heat necessary to retort Colorado oil shale to produce shale oil and by-products under conditions that would exist in commercial practice. (From Abstract). Includes description of apparatus and tables of results.

01976 Sokolova, N. T.; Motorina, Z. M.; Uspenskiy, V. A.
Alterations of disseminated organic material as effects of processes of contact metamorphism and uranium-bearing hydrothermal solutions: Geokhimiya, No. 1, p. 110-123, (in Russian), 1972.

Solti, G. See Jambor, A. 01107

01977 Soong, R.; Olivercrona, J. A.
An occurrence of cymrite in black shale, North-west Nelson, South, Island, New Zealand: Mineral Mag., Vol. 40, No. 311, p. 311-312, 1975.
This short article describes the discovery of cymrite. This rare barium tectosilicate was identified by refractive index measurements and X-ray fluorescence examination. Mode of occurrence and associated minerals in the black shale are noted.

01978 Sorgenfrei, Harold, Jr.
Gas production from the New Albany Shale: M. S. thesis (unpub.), Indiana Univ., 26 p., 1952.

Soshnikov, V. K. See Zorkin, L. M. 02395

Soudan, P. See Mouret, P. 01484

Spann, M. M. See Kern, J. W. 01170

01979 Sparks, Felix L.
Water prospects for the emerging oil shale industry: in Oil Shale Sympsoium, 7th, Proceedings, Colo. Sch. Mines, Q., Vol. 69, No. 2, p. 91-101, 1974.
Estimated of industrial use of water by the oil shale industry are stated, assuming a one million barrel a day oil shale industry. Two locations of the oil

shale industry are compared in terms of water supply. Courses of action the industry could take to obtain water are shown, and environmental concerns are also cited.

01980 Spears, D. A.
The radioactivity of the Mansfield marine band, Yorkshire (United Kinggom): Geochim. Cosmochim. Acta, Vol. 28, p. 673-681, 1964.
"Chemical and radiometric techniques have been used to study the distribution of radioactivity in the Mansfield Marine Band." (Author) Uranium equivalent uranium and thorium were measured and their association with clays and phosphatic nodules were noted. Correlation between macrofauna distribution, salinity, and uranium soprtion are analysed.

Spedding, T. J. See Jackson. L. F. 01091

01981 Speight, J. G.
A structural investigation of the constituents of Athabasca birumen by proton magnetic resonance spectroscopy: Fuel, Vol. 59, No. 1, p. 76-90, illus., tables, 1970.
A structural investigation was made of the constituents of the athabasca bitumen by proton magnetic resonance spectroscopy. Included descriptions of experimental procedure and tables of results obtained.

01982 Spence, H. S.
The oil shales of Picton, Cape Breton: Can. Min. Inst., B 79, p. 928-931, 1918.

01983 Spencer, A. M., ed.
Mesozoic-Conozoic orgenic Belts: Edinburgh and London, Scottish Acad. Press and Geol. Soc. Sp. Pub. 4, 809 p., 1974.
Looking for a source book to guide you to thick Mesozoic and Cenozoic geosynclinal shales? This massive systematically edited volume is it with Figures 12, 13, 14, and 15 providing a summary of shale occurrence, as well as the many detailed tables of the 45 orogenic belts described in the text. Remarkable collection of data.

01984 Spencer, John D.; Linville, Bill
Bureau of Mines Energy Program, 1973: U. S. Bur. of Mines Inform. Circ. 8651, 73 p., 1974.
Research objectives and results of Bureau of Mines work of petroleum, natural gas, tar sands, oil shale, and coal are presented. Fracturing for in situ processing, experimental retorts, and control and management of oil shale wastes, and occurrence, properties, and characteristics of oil shales are

among topics summarized. NMR spectroscopy for rapid oil yield analysis, water bearing strata in Wyoming, and studies on depth changes in organic matter and mineral matter in oil shales are cited. (Heat and pressure changes)

01985 Spencer, John D.; Linville, Bill
Review of Bureau of Mines Energy Program, 1971: U. S. Bur. of Mines Inform. Circ. 8551, 102 p., 1972.
Studies on clean energy production from coal, oil, and gas, with special emphasis on production of fluid fuels from coal are discussed. In a 12-page section on oil shale extraction and processing, major emphasis was placed on in situ processing, waste control, shale oil classification, and conversion to fuels and products. Experiments of two above ground retorts (10 and 150 tons) are discussed, along with in situ processing in Wyoming.

Spencer, J. D. See Linville, B. 01335

Spencer, John D. See Linville, Bill 01334

Spiess, Erick, P. See Coffer, H. J. 00454

Spitz, W. See Schnediderhohn, H. 01845

Spykerelle, C. See Greiner, A. C. 00922

Spyckerelle, Ch. See Ensminger, A. 00751

01986 Spykerelle, C.; Grienver, A. Ch.; Albrecht, P.
Hydrocarbures aromatiques d'origine geologique; IV, Un octahydrochrysese, derive de treiterpenes, dans un schiste bitumineux (Aromatic hydrocarbons of Geologic origin; IV, An octo-hydrochryses derived from triterpenes in an oil shale): J. Chem. Res., Miniprint, No. 12, p. 3801-3828 (incl. Eng. sum.), illus., incl. tables, 1977.

01987 Staatz, M. H.
Thorium veins in the United States, (abs.) Min. Eng., Vol. 25, No. 12, p. 58, 1973.
The largest known, easily exploitable potential resources of thorium in the U. S. are in qtz-feldspar iron-oxide thorium-bearing veins. Fifty-one minerals have been identified from the veins. (From abstract)

01988 Stach, F.; Mockowsky, Dr. M-Th.; Teichmüller, Dr. M.; et al.
Stach's Textbook of Coal Petrology: Berlin-Stuttgart, Gebruder Borntraeger. 2nd ed. 428 p., 1975.
Fundamentals of coal formation, along with origin

of petrographic constituents, methods and tools of examination. Application in industrial and technical processes are presented.

Stadnichenko, T. See White, D. 02323

01989 Stadnickenko, Taisia; White, David
Microthermal observations of some oil shales and other carbonaceous rocks: Am. Assoc. Pet. Geol., Bull., Vol. 10, No. 9, p. 860-876, Sept., 1926.
This article studies the differences in thermal and chemical characteristics of different fossil components on oil shale and other carbonaceous rocks. It discusses the four principal kinds of organic matter present in oil shales and other source rocks of petroleum. Ohio, Colorado, and Australian oil shales were used in testing of components in a microfurance.

Staduik, Ye. See Zorkin, L. M. 02395

01990 Stahl, W. J.
Carbon istope fractionations in natural gases: Nature, Vol. 251, p. 134-135, 1974.
An attempt is made to establish a model to explain the isotopic fractionations of methane as a funaction of the thermocatalytic development of the corresponding source material. (From p. 134) Includes figures.

01991 Stahl, W. J.
Carbon and nitrogen isotpoes in hydrocarbon research an exploration: Chemical Geology, Vol. 20, p. 121-149, 1977.
The present knowledge of C- and N- isotope variations in hydrocarbons is reviewed, including some recent results. There is no examination of oil shales, but isotopic study of kerogen in source rocks is presented along with comparisons of kerogen and crude oil. Uses for stable isotope techniques are mentioned.

01992 Stanfield, K. E.
Estimating oil yield of lean oil shale: Anal. Chem., Vol. 25, p. 1552, 1953.
A simple rapid method is described from estimation the oil yield of lean oil shale. (From abstract) . Includes a discussion of the procedure followed.

01993 Stanfield, K. E.
Oil-shale consitution research: Presented before Ind. Bur. of Mines Oil-Shale Conf., Univ. Wyo. Su-mer Science Camp, Laramie, Wyo., Qug. 1954. Pub. in Minutes of Conf., U. S. Bur. of Mines Administrative Pub.

01994 Stanfield, K. E.
Oil yields of sections of Green River oil shale in Colorado, Utah, and Wyoming, 1945-52: U. S. Bur. of Mines Rept. Invest. 5081, vii, 153 p., illus., incl. geol. sketch maps, Oct. 1954.
Thickness and richness of 202 sections of oil shale are presented in the form of logs. Oil resources in maximum continous sections averaging 15 and 30 gallons of oil per ton of rock were calculated. Volume-specific gravity-oil yield relationships were drawn for one of the cores.

01995 Stanfield, K. E.
Oil yeilds of sections of Green River oil shale in Colorado, 1954-1957: U. S. Bur. of Mines Rept. of Invest. 5614, 186 p., incl. sketch maps, sections, diagrams, tables, 1960.
Oil yields of samples from 24 coreholes drilled in the Green River Formation during the four year period are presented in log form. Maximum continuous section averaging 15, 25, and 30 gallons of oil per ton of shale were calculated. Volume-specific gravity-oil yield relationships were drawn for one of the cores.

01996 Stanfield, K. E.
Progress Report on BuMines-AEC Corehole, Rio Blanco County, Colorado: Colo. Sch. of Mines Q., Vol. 61, No. 3, p. 33-44, July 1966.
Describes the drilling of an exploratory corehole in Piceance Creek basin by the Bureau of Mines. Its purpose was to study buried oil shales and see if they could be fractured by nuclear explosives that could lead to underground retorting. Selection of site, drilling of the corehole are discussed, and stratigraphic markers in the core are noted. Results of oil yields were not yet determined.

01997 Stanfield, K. E.
Properties of Colorado oil shale: U. S. Bur. of Mines Rept. of Invest. 4825, 27 p., illus., Nov. 1951.
Results of analytical studies on two series of oil shale samples from the Mahogany zone of the Green River Formation are presented. Elements detected in mineral and organic portions are shown. These were determined from petrographic and X-ray diffraction-techniques. Yields of oil, gas, and residual organic material were determined. Physical and chemical properties of raw shales, shale oil, and spent shale are discussed, including coking tendency and gross heating value.

Stanfield, K. E. See Dinneen, G. U, 00656

Stanfield, K. E. See Dinneen, G. U. 00657

Stanfield, K. E. See Frost, I. C. 00840

Stanfield, K. E. See Hubbard, Rethel L. 01047

Stanfield, K. E. See Hubbard, R. L. 01048

Stanfield, K. E. See Kommes, W. C. 01222

Stanfield, K. E. See Robinson, W. E. 01760

Stanfield, K. E. See Robinson, W. E. 01767

Stanfield, Kenneth E. See Smith, John Ward 01950

Stanfield, K. E. See Smith, J. W. 01951

Stanfield, Kenneth See Smith, John Ward 01944

Stanfield, Kenneth See Smith, John Ward 01943

Stanfield, K. E. See Smith, John Ward 01942

Stanfield, K. E. See Smith, J. W. 01949

Stanfield, K. E. See Thorne, H. M. 02094

Stanfield, K. E. See Throne, H. M. 02097

Stanfield, K. E. See Thorne, H. M. 02095

Stanfield, K. E. See Thorne, H. M. 02096

01998 Stanfield, K. E.; Dana, George F.; Smith, John Ward
Bureau of Mines - Atomic Energy Commission Colorado Corehole No 1, Rio Blanco County, Colo., November 1965. OPEN FILE at Laramie Petroleum Research Center Library. NO PUBLIC DISTRIBUTION.

01999 Stanfield, K. E.; Frost, I. C.
Method of assaying oil shale by the modified Fischer retort: U. S. Dept. of the Interior, Bureau of Mines Report of Invest. 4477 (Revision of No. 3977), 13 p., illus., tables, 1949.

The report gives a description of preliminary oil-shale assays the Fischer retort discussing the effects of weight of charge, particle size, and retorting time and temperature on oil yields. There follows a detailed discussion of the method of assaying oil shale by the modified Fischer retort. The apparatus is diagramed and its function outlined. Preparation, procedure, claculations, precautions and adaptations are discussed.

02000 Stanfield, K. E.; Rose, C. K.; McAuley, W. S.
Oil yields of sections of Green River oil shale in Colorado, 1952-54: U. S. Bur. of Mines Rept. of Invest. 5321, 132 p., 1957.
Oil yields of 9651 samples from 48 holes drilled in the Green River Formation are shown in logs. A specific gravity-oil yield relationship for one core is given. Oil resources in 30, 25, and 15 gallon per ton shales are presented for the samples sections.

02001 Stanfield, K. E.; Smith, J. W.; Trudell, L. G.
Oil yields of sections of Green River oil shale in Colorado, 1957-63: U. S. Bur. of Mines Rept. Invest. 7051, 284 p., illus., tables, 1967.
65 sections samples in the 7-year period are presented in terms of oil yield. 135 sets of cores that penetrated at least the Mahogany zone and 68 sets of drill cutting samples of four lower zone oil shales are presented in terms of oil yield.

02002 Stanfield, K. E.; Smith, J. W.; Trudell, L. G.
Oil yields of sections of Green River oil shale in Utah, 1952-62: U. S. Bur. of Mines Rept. Invest. 6420, 217 p., illus., tables, 1964.
Logs of oil yields from 40 sites of cores and 83 rotary drill cuttings collected from the Uinta basin in the 11-year period are shown. Sampled sections show thicknesses, depths, elevations, richest samples, and Mahogany markers. Much accumulated information on these are given.

02003 Stanfield, K. E. Thorne, H. M.
Oil-shale research and process development: Ind. Eng. Chem., Vol. 43, p. 16-20, 1951.
This research was undertaken by the Bur. of Mines to procure the chemical, p-ysical, and engineering data necessary for extracting oil from oil shale and refining shale oil into products meeting commerical specifications. (From author's abstract)

Stanfield, Robert G. See Conant, Louis C. 00495

Stanfield, Robert G. See Conant, Louis C. 00496

Stangeland, B. F. See Sullivan, R. F. 02039

02004 Staplin, F. L.
Interpretation of thermal history from color of particulate organic matter - A review: In Palynology, Vol. 1, Proc. of the 8th Ann. Mtg. of the Am. Assoc. of Stratigraphy Palynologists, Houston, Texas, Oct. 1975, p. 9-18, 1977.
This article presents the three facies of organic

metamorphism, all of which are temperature and time dependent. These are the immature, mature, and metamorphic facies. Relationship of color and light transmission to these facies are shown, and a thermal study of organics in the Northwest Territories of Canada is presented. This article has to do with oil, gas, and coal formation, and has no specific mention of oil shales.

02005 Staplin, Frank L.
Sedimentary organic matter, organic metamorphism, and oil and gas occurrence: Can. Pet. Geol., Bull. Vol. 17, No. 1, p. 47-66, illus., table, 1969.
This paper states a study of the organic matter in sedimentary rocks is useful in determining the petroleum potential of that rock. Sources of the organic matter are outlined and the effect of thermal alterations on them is shown. Devonian sediments in western Canada are studied, but there is very little mention of oil shales.

02006 Stauffer, John C.
The nitrogen compounds of Colorado shale oil: Thesis, Columbia Univ., New York, N. Y., 61 p., diagrs., 1926.

02007 Stchepinsky, V.
Sakarya nehri lignite ve bitumle sisterli - lignites st schistes bitumin - eux du bassin de la sakarya nehri: Maden Tetkik ve Arama, Ankara, Turkey, Sene 6, sayı 1/22, p. 9-36, (Turkish and French). 3 pls. (incl. geol. map 1:800,000), Jan. 1941, Oil shales of Sakarya Nehri Basin, Turkey.

Stein, J. See Sneddon, J. B. 01962

Stenfild, K. Ye. See Dinnin, G. Yu. 00661

02009 Stepanov, P. I.
A comprendium of coal, oil and related deposits: Gen. Pub. Co. Geol. Invest. and Geol. Lit., Leningrad, Moscow, 1937.

02010 Stephens, J. G.
A preliminary study of the basal sandy zone of the Ohio-New Albany black shale: M. S. Thesie (unpub.), Univ. Cincinnati, 1953.

Stephens, J. G. See Moore, Geroge W. 01463

Sternberg, Y. M. See Meinschein, W. G. 01417

Sterner, T. E. See Burwell, E. L. 00320

Sterner, T. E. See Burwell, E. L. 00323

Sterner, T. E. See Thomas, H. E. 02079

Sterner, T. E. See Thomas, H. E. 02077

02011 Sterner, T. E.; Thomas, H. E.; Carpenter, H. C.
Evaluation of in situ oil shale experiments by hot-film flow logging: Laramie Energy Research Center/ Rept. of Invest. - 75/1, 26 p., June 1975.

Stevens, R. E. See Wells, R. C. 02312

02012 Stevens, R. F.; Dinneen, G. U.; Ball, J. S.
Analysis of crude shale oil: U. S. Bur. of Mines Rept. of Invest. 4898, 20 p., 1952.
Description of a laboratory method for examining crude shale oil is given. Analyses of shale oils produced in seven countries including seven U. S. shale oils are given. Apparatus and procedure are shown. Components and properties for 20 shale oils are presented.

02013 Stevenson, D. L.; Dickerson, D. R.
Organic geochemistry of the New Albany Shale in Illinois: Ill. Geol. Survey, Ill., Petrol. 90, 11 p., 1969.
Considers potential of New Albany Shale as petroleum source rock. Concludes from organic geochemical data that New Albany was probable source of most Devonian-Silurian oil in Illinois. Includes contour map of organic carbon content of lower 50 feet of New Albany.

Stevenson, D. L. See Whiting, L. L. 02332

02014 Stil, G. B.
Otsenka Ekonomickeskoy tselesoobraznosti proizvodstva iskusstvennogo topliva iz Koloradskikh slantsev (an evaluation of artificial fuel oil from the Colorado shale).: in Razrabotka i ispol'zovaniye zapasov goryuchikh slantsev (Baum, V., chairperson), p. 579-587, tables, izd. Vaigus, Tallin, Union of Soveit Socialist Republics, 1970.

02015 Stinson, D. L.; et al.
Power recovery from in situ combutsion exhaust gases: Preprint S. O. E. 5332, p. 1-5, 1975.

02016 Stockdale, Paris B.
An investigation of the Chattanooga black shale of Tennessee as a source of uranium, progress report, January 1, 1953, to June 30, 1953: U. S. Atomic Energy

Comm. ORO-106, 27 p. (dep.)(prepared by University of Tennessee), 1953.

02017 Stockdale, Paris B.
An investigation of the Chattanooga uranium progress report July 1, 1954, to December 3, 1954: U. S. Atomic Energy Comm. ORO-138, 17 p., (dep., $5.10, LC) (prepared by University of Tennessee), 1955.
Progress is reported in an investigation of the geologic picture of the Chattanooga shale in Tenn. and uranium distribution in the shale. (From Abstract)

02018 Stockdale, Paris B.
An investigation of the Chattanooga . . . uranium, progress report January 1, 1955, to June 30, 1955: U. S. Atomic Energy Comm. ORO-143, 11 p. (dep.)(prepared by University of Tennessee), 1955.
The main purpose of this investigation was to obtain a complete geologic picture of the Chattanooga Shale in the outcrop area of the Eastern Northern Highland Rim of the Tenn. and adjoining Kentucky.

02019 Stockdale, Paris B.
An investigation of the Chattanooga uranium, progress report January 1, 1956 to June 30, 1956: U. S. Atomic Energy Comm. ORO-154, 9 p. (dep.; $2.70, LC)(prepared by Univ. of Tennessee), 1956.
A report is presented of progress on the studies of the Chattanooga shale to obtain a complete geologic picture of the Chattanooga shale in the outcrop area of the Eastern Highland Rim and Northern Highland Rim of the Tennessee and in a small area of adjoining Kentucky. Both field and laboratory studies have been involved. (From abstract)

02020 Stockdale, Paris B.; Klepser, Harry J.
The Chattanooga Shale of Tennessee as a source of uranium, final report: U. S. Atomic Energy Comm. ORO-205, 223 p. (dep.; $6, NTIS)(prepared by University of Tennessee), 1959.
The over-all aim of the study was to obtain a thorough geologic picture of the Chattanooga shale, with emphasis upon stratigraphic relationships and associated special problems; from which implications may be obtained as to the origin and possibly the source of the uranium. (From Abstract)

02021 Aronw, E. V.
Technical and economic study of underground mining, rubblization and situ retorting for deep oil shale deposits: Colo. Sch. Mines, Q., Vol. 71, No. 4

(Proceedings of the Ninth oil shale symposium), p. 235-255, illus. (incl. tables, geol. sketch map), 1976.
Technical, environmental, and economic feasibility of the combined underground mining, in situ retorting, shale oil extraction process was examined in this study. Five variables which control the in situ retorting process and mine design were identified. Four mining systems were evaluated in this study and capital and operating costs were presented for each of them.

Sonte, Reid See Katell, Sidney 01153

02022 Stout, N. D.; Koskinas, G. J.; Raley, J. H.; et al.
Pyrolysis of oil shale; effects of thermal history on oil yield: Colo. Sch. Mines, Q., Vol. 71, No. 4 (Proceedings of the Ninth Oil Shale Symp.), p. 153-172, illus. (incl. talbes), 1976. (U. S. Energy Res. Dev. Adm., No. W-7405-Eng-48).
The effect of thermal history on the oil yield of powdered 22 gal/ton Colorado oil shale was studied. The sample, apparatus, and procedure for experiments were described. Isothermal with autogenous atmosphere and isothermal with nitrogen flow experiments were conducted. Results include tables showing oil density, hydrogen: carbon ratio of oil, nitrogen and sulfur content of oil, gas composition, and other measured quantities.

02023 Stout, Wilber
Geology of southern Ohio: including Jackson and Lawrence Counties and parts of Pike, Scioto, and Gallia: Ohio Geol. Survey Bull. 20, 723 p., 1916.
Considers the Bedford Shale for each county, particulary its oil and gas potentials (Hoover, 1960).

02024 Stout, Wilber
Ohio's progress due largely to state's abundant mineral resources: Pit and Quarry, Vol. 23, No. 11, p. 31-32, 1932.
Discusses stratigraphy and economic use of the Olentangy Shale, Ohio Formation, and Bedford Formation (Hoover, 1960).

02025 Stout, Wilber; Lamborn, R. E.
Geology of Columbiana County: Ohio Geol. Surv. Bull. 28, 408 p., 1924.
Considers the oil and gas possibilities of the Devonian-Mississippian series (Hoover, 1960).

02026 Stowe, C. H.
Energy and the environment; a potential crisis in resources supply: Utah Geol. Miner. Surv., Circ., No. 54, 18 p., illus. incl. tables, maps, 1972.

02027 Strahl, Erwin O.
An investigation of the mineralogy and petrography of uranium-bearing shales. An investigation of the relationships between selected minerals, trace elements and organic constituents of several black shales: U. S. Atomic Energy Comm. NYO-7908, 155 p. (dep.; $6, NTIS)(prepared by Pennsylvanian State University), 1958.
280 samples were analyzed for total carbon, organic carbon, aliphatic and aromatic hydrocarbon, carbonate total iron, iron oxides, pyrite, total silicates, quartz, kaolinite, illite and several other minerals. (From asbtract)

02028 Strahl, Erwin O.; Camilli, E.; Short, N. M.
An investigation of the mineralogy, lignites (Scope A - Shales), third annual report for period of April 1, 1953, to March 31, 1954: U. S. Atomic Energy Comm. NYO-6060, 75 p. (dep.)(prepared by Pennsylvanian State University), 1954.
Mineralogical and petrographic analysis of the Chattanooga formation has resulted in the development of several important techniques and the accumulation of a large amount of quantitative data. The relationship of uranium with composition and texture is illustrated by a detailed analysis of a core from the Highland Rim area. (From asbtract)

02029 Strahl, Erwin O.; Camilli, E.; Dolsen, C. P.
An investigation of the mineralogy, lignites (Scope A - Shales, quarterly progress report for progress report for period of April 1-June, 1954: U. S. Atomic Energy Comm. NYO-6062, 16 p. (dep., mc; $4.80, LC) (prepared by Pennsylvania State University), 1954.
The investigation of the pyrite nodules and lenses in the Chattanooga shale was resumed in order to study the clays that are directly associated with the pyrite. (From asbtract)

02030 Strahl, Erwin O.; Silverman, E. N.; O'Neil, R. L.
An investigation of the mineralogy, lignites (Scope A - Shales), fourth annual report for the period of April 1, 1954, to March 31, 1955: U. S. Atomic Energy Comm. NYO-6068, 78 p. (dep.; $19.75, LC)(prepared by Pennsylvania State University), 1955.
Samples from two drill cores of the Youngs Bend coring area east of Nashville, TN have been analyzed quantitatively and evaluated mineralogically.

Research was initiated on the use of fission fragement tracks to shorten exposure time and to locate U^{235} in shale thin sections. (From abstract)

02031 Strahl, Erwin O.; Camilli, E.; Silverman, E.
An investigation of the mineralogy, petrography and paleobotany of uranium-bearing shales and lignites (Scope A - Shales), quarterly progress report for period of July 1 - September 30, 1953: U. S. Atomic Energy Comm.: NYO-6056, 17 p. (dep., mc; $5.10, LC)(prepared by Pennsylvania State College), 1953.
Reported are the results of the visual estimates of color mineral composition by point count method, and equivalent U content by beta-gamma counting of one U shale core. (From abstract)

Strahl, E. O. See Bates, Thomas F. 00131

Strahl, Erwin O. See Bates, Thomas F. 00135

Strahl, Erwin See Bates, Thomas F. 00134

Straight, M. T. See Martin, H. M. 01398

Strelyanov, N. P. See Danchev, V. I. 00582

02032 Strom, K. M.
Land-locked waters and the deposition of black muds: in Recent Marine Sediments (Trask, P., editor), p. 356-372, 1939.
Water in enclosed basins such as Norwegian fjords tends to become stagnant as salt water sinks to the bottom with no ventilation. Hydrogen sulfude, which preserves organic matter can form after oxygen is consumed. Exaplies of historical and modern basics where these organic rich sediments can develop are discussed.

02033 Strom, K. M.
Land-locked waters: Det Norske videnskapp-Akademi i Oslo, Nat. Naturv. Klasse, Vol. 1, No. 7, p. 1-85, 1936.
Discussion of circulation, deposition, and life in barred or land-locked basins. Describes bays and fjords (after Hoover, 1960).

Strunk, A. T. See Sharp, L. H. 01882

02034 Stuart, Murray
The geology of oil, oil shale and coal: London, Min. Publ. Ltd., 104 p., incl. illus., 1926.

02035 Stugard, Frederick, Jr.; Wyant, D. G.; Gude, A. J., III
Secondary uranium deposits in the United States: (abs.) Geol. Soc. Am. Bull., vol. 42, p. 1542, 1951.
Considers reconstituted (secondary) uranium minerals. Most secondary uranium deposits show no apparent relationship to known primary minerals. Successful distinction between secondary deposits resulting from concentration and those resulting from dispersion of primary deposits not made to date (Hoover, 1960).

Stumm, E. C. See Ehlers, G. M. 00736

02036 Styrikovich, M. A.
Place and role of various energy resources in energetics of the future: in Alternative Energy Sources (Harnett, J. P., ed.), p. 1-17, Hemisphere Pub. Co., Washington, D. C., 1976.

02037 Styuart, D.
Istoriya, tekhnologiya i ekonomika ispol zovaniya goryuchikh slantsev v soyedinennam korolevst ve. (The history, technology and economic utilization of oil shale in the United Kingdom): in Razrabotka i ispol zovaniye zapasov goryuchikh slantsev (Baum V., chairperson, p. 128-129, Izd. Valgus, Tallin, Union of Soviet Socialist Republics.) 1970.

Sudduth, B. C. See Wise, R. L. 02361

02038 Suginnora, M.; Okuno, T.
On uraniferous shale bed of Nakatsugo ore deposit, Ningyotogo mine, Okayama prefercture: Min. and Metall. Inst. Japan J., vol. 79, No. 902, p. 537-542, 1963.

Sukhanova, S. M. See Davydova, T. N. 00594

Sullivan, G. R. See Burton, V. L. 00318

02039 Sullivian, F. R.; Stangeland, B. F.
Converting Green River shale oil to transportation fuels, in Oil Shale Symp., Proc., 11th: Colo. Sch. of Mines, p. 120-134, 1978.
Shale oils contain significant quantities of nitrogen, oxygen, and heavy metals. (From abs.) Pilot plant data for 3 processing schemes to remove these contaminants are described.

02040 Sundius, Nils G.
Oljeskiffrar och skifferoljeindustri: Sweden. Geologiska undersokningen Ser. C. Avhandlingar och uppsatser, No. 441. Arsbok 35 (1941), No. 4, 45 p., illus. incl. maps, 1941. In Swedish.

02041 Sundiu, Nils
Om oljeskiffer orch skiffersol jeindustrien i vart land: Ymer (Svenska Sallskapet Antro. och Geog.) arg. 63, H. 1, p. 1-16, 6 figs. (incl. geol. sketch maps), 1943. Oil shale industry of Sweden.

Surdam, R. C. See Buchheim, H. P. 00300

Surdam, R. C. See Lundell, L. L. 03163

02042 Surdam, R. C.; Lundell, L. L.
Depositional environments of oil shale (abs.): Am. Assoc. Pet. Geol., Bull., Vol. 60, No. 8, (New concepts of exploration in the Rockies; AAPG-SEPM Mtg.), p. 1412, 1976.
Association of Green River oil shale to sedimentary structures, saline minerals, and some shallow or high energy sedimentary rocks is cited. Influx of detrital sediments is noted to be a hinderance to oil shale deposition. Deposition of kerogen-rich and carbonate-rich laminae are summarized.

Susano, C. D. See Brown, K. B. 00286

Susano, C. D. See Brown, K. B. 00287

Susano, C. D. See Brown, K. B. 00288

Susano, C. D. See Brown, K. B. 00289

Susano, C. D. See Brown, K. B. 00290

Susano, C. D. See Brown, K. B. 00291

Susano, C. D. See Brown, K. B. 00292

Susano, C. D. See Brown, K. B. 00293

Susano, C. D. See McCutcheon, Roberts L. 01517

Suttle, Andrew D. See Mo, Tin 01459

02043 Sutton, A. H.
Devonian System in Indiana: Ill. Geol. Survey Bull. 68, p. 162-173, 1944.
Discussion of New Albany Shale - lithology, thickness, stratigraphic relations, age. Includes outcrop distribution map.

02044 Svenke, Erik
The occurrence of uranium and thorium in Sweden: Unite Nations, Internat. Conf. on the Peaceful Uses of Atomic Energy, 1st, Proc., Vol. 6, p. 198-199, 1956.
Uranium content of the olum shales (Olenus, Dictyonema,

and Ceratopyge) are discussed, and location of the richest deposit, including concretions with concentrations of U at 3000g/ton are cited. Uranium and thorium in pegmatite rocks are also mentioned.

Sutton, A. H. See Weiler, J. M. 02310

Svonson, V. Ye. See Dunkan, D. K. 00716

02045 Swager, Dennis R.; Ettensohn, Frank R.
The stratigraphy of devonian - Mississippian black shales along the east-central Kentucky outcrop belt: Geol. Soc. Am. Abs. South-eastern section 27th Ann. Mtg., Vol. 10, No. 4, 1978.
The abstract states stratigraphy is related to the radioactive properties of the two dominant lithologies. Comparison of the radioacitve profiles of five sections shows the two lithologies indistinguishable. Two biostratigraphic zones can be defined by the presence of an alga (Foerstia) and the inarticulate brachiopod Lingula.

Swan, D. H. See Folks, S. H. 00811

Swann, D. H. See Collinson, C. W. 00477

Swann, D. H. See Collinson, C. W. 00476

Swann, D. H. See Meents, W. F. 01416

02046 Swann, D. H.; Bell, A. H.
Habitat of oil in the Illinois Basin, in L. G. Weeks, ed., Habitat of Oil: Am. Assoc. Petrol. Geol., p. 447-472; Ill. Geol. Survey Reprint 1958-W, 26 p., 1958.
Structure contour map of Illinois Basin on base of New Albany Shale. NE-SW cross-section through center of Basin.

02047 Swann, D. H.; Henderson, J. W.; Combs, E. J.
Future oil possibilities of the Eastern Interior Basin: Am. Assoc. Petrol. Geol. Bull., Vol. 35, No. 2, p. 486-498, Geol. Survey Circ. 169, 13 p., 1951.
Structure map of Eastern Interior Basin drawn on base of Chattanooga-New Albany Shale. Cross-section through basin.

02048 Swanson, Vernon E.
Geology and geochemistry of uranium in marine shale - - a review: U. S. Geol. Survey Prof. Paper 356-C, p. 67-112 (out of print but available through libraries), 1961.
A summary of investigations of more than 200 formations

in the U. S. containing marine black shale is presented, noting especially high U bearing strata such as the Chattanooga Shale and Midwest phosphatic shales. Sources of uranium and mechanisms for its enrichment in both modern and ancient environments are speculated. Relations of uranium to organic matter, pyrite, H_2S, and phosphates are given. Chemical variables such as Eh, Ph, and salinity significant to uranium precipitation of sorption are noted.

02049 Swanson, V. E.
Oil yield and uranium content of black shales: U. S. Geol. Survey Prof. Paper 356-A, 44 p., 1960.
Discusses uranium content of Chattanooga, New Albany, and equivalents. Includes data tables, columnar section of Chattanooga Shale.

02050 Swanson, Veron E.
Preliminary summary of investigations of Chattanooga shale in 1952: U. S. Geol. Surv. Trace Elem. Mem. Rept. 533, 1952. For official use only.

02051 Swanson,Vernon E.
Uranium in marine black shales of the United States: U. S. Geol. Survey Prof. Paper 300, p. 451-456 (out of print), 1956.
The most uraniferous black shale deposits around the U. S. are noted, along with their association with pyrite, organic matter, and phosphate matter. This article suggests marine black shales may be classified according to tectonic and paleogeographic setting of the area during depositional time. Mineralogy, character, and uranium content of Chattanooga, Midwest Penn. black shale, and Phosphoria Formation in the West are briefly discussed.

Swanson, Vernon E. See Conant, Louis C. 00498

Swanson, V. E. See Conant, L. C. 00497

Swanson, V. E. See Duncan, Donald C. 00714

Swanson, V. E. See Milton, Charles E. 01451

02052 Swanson, Vernon E.; Landis, Edwin R.
Geology of a uranium - bearing black shale of Late Devonian age in north-central Arkansas: Arkansas Geol. and Conser. Comm. Inf. Circ. 22, 16 p. ($1.15, Arkansas Geological Commission, 3815 West Roosevelt Road, Little Rock, Arkansas 72204), 1962.
Regional stratigraphy is discussed. Location and lithology of the Marion County outcrop is noted and differences with the Chattanooga Shale were

noted in hand specimen and thin section. Plant microfossils are noted and their relation in uranium-rich samples is cited.

02053 Swanson, Vernon E.; Kehn, Thomas M.
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Syrova, G. M. See Beletskaya, S. N. 00165

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Rich oil shale from northern Alaska, art. 148, in Short papers in geology hydrology: U. S. Geol. Surv. Prof. Paper 475-D, p. D131-133, illus., tables, 1964.
An occurrence of float and outcrop oil shales of Mesozoic age was noted from northern Alaska. Eight assayed samples showed up to 146 gal/ton. Location of the float and outcrop samples was given, but lack of stratigraphic information made the range of the deposits difficult to determine. Character and Fischer assay data was presented.

Tailleur, Irvin L. See Donnell, John R. 00685

Tailleur, I. L. See Donnell, John R. 00686

Tailleur, Irvin V. See Tourtelot, Harry A. 02125

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Taliyeu, S. D. See Beskrovnyy, N. S. 00189

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The author's intent was through an investigative stud of the Tipton Shale Member to evaluate the significance of source conditions, depositional environment, and diagenesis of the clay mineral assemblage.

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Teichmuller, Dr. M. See Stach, F. 01988

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Thames, J. L. See Kilburn, P. D. 01186

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Origin and composition of certain oil shales: Econ. Geol., Vol. 16, p. 289-300, 1921. See also Geol. Soc. Am., Bull., Vol. 30, p. 72, 1921; Petrol. Times, Vol. 6, p. 617-618, 1921.
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Field hydraulic fracturing to 400 foot depths of Green River oil shale was conducted to determine preferential orientation of fractures. Discussion

of fracturing method conducive to in situ retorting is mentioned. Procedure of the fracturing and measurements made during the treatment are shown. Evaluation of the experiment and conclusions reached are also presented.

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Devonian shale gas production in central Appalachian area: Am. Assoc. Pet. Geol., Bull., Vol. 35, No. 10, p. 2249-2256, illus., Oct. 1951; reprinted as Ky. Geol. Survey, Ser. 9, Reprint 4, 1951.
Explanation of stratigraphy of Devonian gas-bearing shales with isopachs of Ky-Ohio-W. Va. area. Structural and historical geology explains gas reservoirs. Interactions of wells in primary and secondary gas fields.

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Use of carbonic acid to concentrate kerogen in oil shale: Fuel, Vol. 48, p. 75-80, Jan. 1969.
This paper describes a method for separating kerogen from the mineral matter in oil shale. The method uses carbonic acid to concentrate the organic matter of oil shale.

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of organic sulfur, organic nitrogen, and organic oxygen compounds was observed. Apparatus, procedure, results, and discussion of results are given.

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Thompson, William D. See Picard, M. Dane 01645

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Oil-shale research program: Presented before Ind. Bur. of Mines Oil-Shale Conf., Univ. Wyo. Summer Science Camp, Laramie, Wyo., Aug. 1954. Pub. in Minutes of Conf., U. S. Bur. of Mines Admin. Pub.

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Composition of shale oil: Chap. in The Chemistry of Petroleum Hydrocarbons, Vol. I, edited by B. T. Brooks, et al. Reinhold Publishing Corp., New York, N. Y., p. 63-82, 1954.

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Oil-shale operations in the Union of South Africa, Oct. 1947: U. S. Bur. of Mines Rept. of Invest. 5019, 31 p., 1954.
"One of a series on oil shale operations in foreign countries, report deals mainly with the torbanite (oil shale) deposits near Ermela, Transvaal, in Union of South Africe, and the operations of South Africa Torbanite Mining and Refining Co., Ltd., in mining the torbanite, retorting it, and refining the crude oil."

02091 Thorne, H. M.; Kraemer, A. J.
Oil shale in Spain: U. S. Bur. of Mines Rept. of Invest. 4736, 21 p., 1950.
Thickness, richness, and extent of oil shales of the Puertollano basin are presented. Data from logs of cores drilled in the basin are shown. Bureau of Mines analysis of properties of this shale are given. Development by two companies, Pennaroya and Calvo Sotelo, are discussed.

02092 Thorne, H. M.; Murphy, W. I. R.; Ball, J. S.
Characteristics and utilization of oil shale and shale oil: Ind. Eng. Chem., Vol. 43, p. 20-27, 1951.
This paper presents a general discussion of the properties and characteristics of oil shale, shale oils and their products, and presents briefly the results of major phases of the research and process development work at the Laramie, Wyoming, station of the Bur. of Mines. (From author's abstract)

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Oil shale facts; abstract: Chem. Eng., Vol. 57, p. 241-242, Jan. 1950.
This is a discussion of the location of oil shale deposits world-wide and their potential as a source of fuel.

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Green River oil shales and products - their character, processing requirements, and utilization: Chap. in

Conf. on Oil shale and Cannel Coal. Oil Shale and Cannel Coal, Proc., Vol. 2, Inst. of Petrol., London, p. 301-344, 1951.

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Fifteen trace elements were used in weathering profiles to measure differences in trace element content in A, B, and C soil horizons and the parent rocks. Amount

of depletion of each of the elements in the soils were measured and compared. Factors and mechanisms involved in the depletions are suggested.

Tihen, Samuel S. See Burwell, E. L. 00324

Tihen, S. S. See Carpenter, H. C. 00370

Tihen, S. S. See Cottingham, P. L. 00538

Tihen, S. S. See Cottingham, P. L. 00539

02101 Tihen, S. S.; Brown, J. F.; Jensen, H. B.
Entrained-solids retorting of Colorado oil shale: product yields and properties: Ind. Eng. Chem., Vol. 47, p. 464-468, 1955.
The purpose of this investigation, conducted at Laramie, Wyoming was to establish the relationship between the quantity of volatile products produced in the retorting of shale and the retorting variables. Include figures and tables of results.

02102 Tihen, S. S.; Carpenter, H. C.; Sohns, H. W.
Thermal conductivity and thermal diffusivity of Green River oil shale: in Thermal Conductivity, 7th Conf., Gaithersburg, Md., 1967, Proc.: U. S. Natl. Bur. Standards Spec. Pub. 302, p. 529-535, illus., tables, 1968.
Data on thermal conductivites and thermal diffusivities of various grades of oil shale, retorted shales, and burned shales is presented and equations developed for calculating the two. "The thermal properties are correlated with shale grade, temperature, and bedding plane orientation." Thermal diffusivities were determined from 12 grades of raw shale, and retorted and burned forms of these. Apparatus, experimental procedure, sample preparation, and calculations are shown.

02103 Tillman, John R.
The age, stratigraphic relationships, and correlation of the lower part of the Olentangy Shale of central Ohio: Ohio J. Sci., Vol. 70. No. 4, p. 202-217, illus., table, 1970.
Stratigraphy and fauna of the Upper and Lower Olentangy shales (Middle to Upper Devonian) are studied from samples taken near the type locality near Delaware, Ohio. There is little mention of organic matter in these shales, which lie below the Ohio Black Shale.

02104 Tillman, John R.
On the age of the Olentangy Shale of Central Ohio (abs): Geol. Soc. America Abs. Programs, 1969, pt. 6, North-Central Sec., p. 49, 1969.
The author contrasts the Upper and Lower Olentangy

Shale, and notes age distinction from ostracod fauna. Though brownish-black strata exist, there is no mention of floral components. These shales correlate with the Plum Brook Shale.

Timko, Donald J. See Ferth, Walter H. 00783

Tippie, F. E. See Weller, J. M. 02308

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Alternations in structure and physical properties of Green River oil shales by thermal treatment: J. of Chem. Eng. Data, Vol. 12, No. 3, p. 405-411, 1967.
Experimental data are presented which show changes that occur in the physical structure and physical properties when oil shales of very different organic content from the Green River formation are heated under laboratory conditions. Includes figures.

02106 Tisot, P. R.
Properties of Green River oil shale: Chem. Eng. Data, Vol. 7, p. 405-410, 1962.
This study indicates that oil shale is a highly consolidated organic-inorganic system with no significant micropore structure, pore volume, or internal surface. (From p. 405) Includes figures and tables of results.

02107 Tisot, P. R.
Structural response of propped fractures in Green River oil shale as it relates to underground retorting: U. S. Bur. of Mines Rept. of Invest. 8021, 21 p., 1975.
"The structural response of propped oil shale fractures was determined for each of two different grades of Green River oil shales . . . as they were heated . . ." Experimental procedure and a discussion of results is presented. Biaxially and triaxially confined specimens of 29 and 38 gallon per ton oil shale partially to totally collapsed as evidenced by propant embedment. These studies are important in ensuring permeability during in situ processing.

Tisot, P. R. See Yarton, E. E. 00981

Tisot, P. R. See Horne, J. W. 01032

02108 Tisot, P. R.; Horne, J. W.
Waxes from shale-oil wax distillate: U. S. Bur of Mines Rept. of Invest. 4708, 21 p., 1950.
"Describes methods used in extracting refining, analyzing, and testing waxes from shale-oil distillates and lists physical properties of the waxes."

02109 Tisot, P. R.; Murphy, W. I. R.
Physical structure of Green River oil shale: Chem. Eng. Progress Symp. Ser., Vol. 61, No. 54, p. 25-32, 1965.
This paper presents information concerning particle size and article size distribution of the inorganic constituents oil shale. (From p. 25) Includes figures, photographs, and tables of results.

02110 Tisot, P. R.; Murphy, W. I. R.
Physical structure of Green River oil shale from Colorado: U. S. Bur. of Mines Rept. Invest. 6184, 24 p., illus., tables, 1963.
"Analyses oil shale in regard to distribution of organic carbon, grade limits, particle designation, surface area, and pore volume of mineral constituents, amount of organic matter in contact with mineral constituents, and other factors."

02111 Tisot, P. R.; Murphy, W. I. R.
Physiochemical properties of Green River oil shale - Particle size and particle size distribution of inorganic constituents: J. Chem. and Eng. Data, Vol. 5, No. 4, p. 558-562, incl. diagr., table, illus., Oct. 1960.
Particle size and particle-size distribution of the inorganic constituents in Green River oil shale are presented in this paper. (From p. 558) Includes schematic diagram for the preparation of organic-free shale residue for particle-size measurements.

02112 Tisot, P. R.; Sohns, H. W.
Structural deformation of Green River oil shale as it relates to in situ retorting: U. S. Bur. of Mines Rept. of Invest. 7576, 27 p., 1971.
"Structural response and/or deformation was determined for each of four different grade Green River oil shales (27.0, 34.5, 45.5, and 63.5 gal/ton) as they were heated in an inert atmosphere, under constant compressive stress, from ambient to subretorting temperatures: ... The obtained stress-strain-time-temperature relationships provide information regarding the oil shale's yield temperature, yield stress, rate of compressive strain, loss of mechanical strength, and nature of structural deformation." This study examines loss of induced permeability in in situ retorting.

02113 Tisot, P. R.; Sohns, H. W.
Structural response of rich Green River oil shales to heat and stress and its relationship to induced permeability: A. C. S. Preprints, Div. of Petrol.

Chem., Vol. 14, No. 3, p. B94-B104, Sept. 1969.
Also: 158th A. C. S. Natl. Mtg., Sept. 1969. (abs.)
An investigation was conducted to obtain data which serves as a guidelines to appraise probable engineering problems associated with designs for underground processing of oil shale. (From abstract).

02114 Tisot, Peter R.; Sohns, Harold W.
Structural response of rich Green River oil shales to heat and stress and its relationship to induce premeability: J. Chem. Eng. Data, Vol. 15, No. 3, p. 425-434, July 1970.
Structural response and/or deformation of three rich oil shales to heat and compressive stress was determined. The results provide guidelines to assess and evaluate some problems that may be associated with recovery of shale oil by underground retorting methods. (From abstract)

02115 Tissot, Bernard P.
The role of kerogen in the formation of hydrocarbons: Natl. Conf. Earth, Sci. (Papers), Vol. 1973 (The geology of fluids and organic matter in sediments), p. 99-105, illus. (incl. table), 1973.

02116 Tixier, M. P.; Curtis, M. R.
Oil shale yield predicted from well logs (with Fr. and Span. abs.) in Drilling and production - World Petroleum Congr., 7th, Mexico, 1967, Proc., Vol. 3: London, Elsevier Publ. Co., p. 713-715, illus., 1967.

Tizot, P. R. See Dinnin, G. Yu. 00660

02117 Tohill, Bruce
Geologist describes potential of the Frontier West. Oil Rept., Vol. 32, No. 7, p. 17-18, 1975.

Tokarev, L. V. See Kozlov, V. P. 02140

Tokhein, R. E. See Murri, W. J. 01503

02118 Toman, J.; Denny, M. D.; Emerson, D. O.; et al.
Status of gas-stimulation technology employing nuclear explosions (abs.): Am. Assoc. Pet. Geol., Bull., Vol. 57, No. 4, p. 809, 1973.
Studies have concluded that the tight gas sands in the Rocky Mountain region contain a resource potential of nearly 600 tcf of natural gas. Significant results have been obtained from full-scale tests conducted.

02119 Toraska, Krystyna
Systemy kodowe wynikow baden geochemcznyck bituminow rozprodzonych, rop i gazow (Coding of geochemical data concerning disseminated bitumens, oil and gas) Przegl. Geol., Vol. 22, No. 6, p. 254-257 (incl. Eng., Russ. sum.), illus., 1974.

Totsev, D. See Angelova, G. 00040

02120 Tourtelot, Elizabeth B.
Selected annotated bibliography of minor-element content of marine black shales and realted sedimentary rocks, 1930-1965: U. S. Geol. Survey Bull. 1293, 118 p., (.60, GPO), 1970.
This bibliography presents minor-element data from analysis of black shales and related organic-rich sedimentary rocks plus selected discussions on the source of the minor-elements. (From author's introduction page V) A list of abbreviations of Serials of citations in included along with 375 abstracts of selected articles pertaining to worldwide occurrences of black shale. An index is included.

Tourtelot, Elizabeth B. See Vine, James D. 00256

Tourtelot, Elizabeth B. See Vine, James D. 00257

02121 Tourtelot, Harry A.
Preliminary investigation of the geologic setting and chemical composition of the Pierre Shale, Great Plains region: U. S. Geol. Survey Prof. Paper 390, 74 p. (out of print), 1962.
The range of variation in chemical and mineralogical composition of samples from widely scattered localities in Montana, Wyoming, and South Dakota is studied. "Standard rock analyses for a set of 22 samples are given, together with chemical and semiquantitative spectrographic analyses for minor elements, size analyses, X-ray mineralogical determinations, and measurement of slurry pH. (Author) Weathered and fresh shale samples are compared.

02122 Tourtelot, Harry A.
Radioactivity and uranium content of Cretaceous shale, central Great Plains: Am. Assoc. Pet. Geol. Bull., Vol. 40, p. 62-82, 1956.
The Sharon Springs Member of the Pierre Shale (Late Cretaceous) was investigated for uranium and other trace element content. The uranium content was determined from ouctrop and subsurface gamma-ray log data. The origin of uranium in this member is examined.

02123 Tourtelot, Harry A.
Radioactivity and uranium content of some Cretaceous shales central Great Plains: U. S. Geol. Surv. Trace Elem. Invest. Rept. 298, 41 p., map, diagrs., tables, 1955.

02124 Tourtelot, Harry A.
Reconnaisance for uraniferous rocks in the northeastern Wind River Basin, Wyoming: U. S. Geol. Surv. Trace Elem. Mem. Rept. No. 445, 14 p., maps, table, 1952.

Tourtelot, Harry A. See Donnell, John R. 00685

Tourtelot, H. A. See Donnell, John R. 00686

Tourtelot, H. A. See Breger, Irving, A. 00261

02125 Tourtelot, Harry A.; Donnell, John R.; Tailleur, Irvin L.
Oil yield and chemical composition of shale from northern Alaska (Fr. and Span. abs.): in Drilling and production - World Petroleum Cong., 7th, Mexico, 1967, Proc., Vol. 3: London, Elsevier Publ. Co., p. 707-711, tables, 1967.

02026 Tourtelot, Harry A.; Tailleur, I. L.; Donnell, J. R.
Tasmanite and associated organic-rich rocks, Brooks Range, Northern Alaska (abs.): Geol. Soc. Am. Spec. Pap. 101, p. 222-223, 1968.
This article notes Mesozoic rocks which are composed of a high % of Tasmanites, which yield as much as 150 gal. oil/ton rock. Also cited are deposits of a black papery coal that contains no observable plant structure, but assays 40 gal. oil/ton rock.

02127 Trager, Earl A.
A resume of the oil shale industry, with an outline of methods of distillation: Am. Assoc. Pet. Geol. Bull., Vol. 4, No. 1, p. 59-71, 6 figs., 1920.
A brief review of the shale oil industry, the petroleum shortage, and occurrences of oil shales in the U. S. is given. Apparatus, method of testing, and calculation of results is given for both field and laboratory investigations. A method is also given for the determination of nitrogen in oil shale.

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Origin and environment of source of petroleum: Houston Texas, Guld Publishing Co., 373 p., 1932.
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02129 Triplehorn, Don M.
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The author questions the earlier hypothesis advanced by Cassidy of a reef north of the Kansas-Oklahoma border controlling deposition of the two major facies of the Excello Shale, a black Mississippian-Pennsylvanian shale. The author suggests the reef may not have been high enough or wide enough to separate the organic matter. He also questions the use of kaolinite as an indicator of acidic conditions.

02130 Tripp, J. G.; Guthrie, Boyd
Oil shale as a source of synthetic liquid fuels (abs.): Pet. Processing, Vol. 3, p. 404, 1948.

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Trudell, L. G. See Stanfield, K. E. 02002

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Trudell, L. G. See Smith, J. W. 01948

02131 Trudell, L. G.; Beard, Thomas N.; Smith, J. W.
Green River Formation lithology and oil shale correlations in the Piceance Creek Basin: U. S. Bur. of Mines, Rept. Invest. No. 7357, 212 p., 1970.
"A geologic framework for interpreting stratigraphic and geographic variations of the Green River Formation in the Piceance Creek basin is developed from lithologic data accumulated . . . from oil shale coreholes . . . Three cross sections were constructed along lines transecting the basin. Plotted as lithologic columns with corresponding oil yields and resistivity logs, the samples sections are correlated on a time stratigraphic basis. Distribution and correlation of nahcolite and halite zones are shown, and the

approximate base of leaching . . . is indicated. General lithologic characteristics of members and zones are discussed and interpreted." (Bureau of Mines)

02132 Trudell, L. G.; Beard, Thomas N.; Smith, J. W.
Stratigraphic framework of Green River Formation oil shales in the Piceance Creek Basin, Colorado: Rocky Mt. Assoc. Geol., Field Conf., Guideb., No. 25, Guideb. to the Energy Resour. of the Piceance Creek Basin, Colo., p. 65-70, 1974.
Correlations of the Green River Formation oil shales are used in developing a framework that providing a basis for evaluating the deposits of oil shale and some saline minerals. A description is made of the three lithologic zones and lithologic and oil yield logs are presented.

02133 Trudell. L. G.; Roehler, H. W.; Smith, J. W.
Geology of Eocene rocks and oil yields of Green River oil shales on part of Kinney Rim, Washakie Basin, Wyoming: U. S. Bur. of Mines, Rept. Invest. No. 7775, 151 p., 1973.
Geology and oil yield data are presented for a 58 square mile area encompassing oil shale leased tracts in Washakie basin, Wyoming. Mineable sections of Laney Member averaging up to 25 gallons of oil per ton of shale are shown and reserves estimated. Oil shale in a section of the Tipton Shale Member is also discussed.

02134 Truez, John N.
Fractured shale and basement reservoir, Long Beach Unit, California: Am. Assoc. Pet. Geol., Bull., Vol. 56, No. 10, p. 1931-1938, illus., (incl. sketch maps), 1972.
A Miocene black shale that contains oil in fractures has been producing oil since 1945. Local stratigraphy is shown, and this shale is correlated with the Altamira Shale. The method of oil accumulation and migration is suggested.

Tsaros, Ch. L. See Linden, Kh. R. 01325

02135 Tschanz, C. M.; Laub, D. C.; Fuller, G. W.
Copper and uranium deposits of the Coyote district, Mora County, New Mexico: U. S. Geol. Surv. Bull. 1030-L, p. 343-398 (out of print)(analyses of uraniferous black shales: p. 360-366), 1958.
This article discusses copper deposits occurring in carbonaceous shale and uranium deposits occurring in associated sandstone. A suggestion of the origin of the metals is Pre-Cambrian granitic rocks. Strati-

graphy of these rocks, the Magdalena Group, Sangre de Cristo Formation, and other minor formations are given. Analytical data measuring Cu, U, and V_2O_5 is given.

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Changing energy picture (ABC's of the energy crunch). Privately published, Dallas, Tex., 26 p., 1976.

02137 Tufft, H. E.
Subject lists of Reports of Investigations issued during 1923: U. S. Bur. of Mines Rept. of Invest. 2568, 6 p., 1923.

02138 Tulsa Public Library, Technical Department
Oil shale; Petroleum bibliography No. 1, 11 p., Tulsa, Okla., Nov. 1942.

02139 Tulsa Public Library, Technical Department
Supplement to petroleum bibliography No. 1 (Oil shale), 1942-1945, 1 p., 1945.

2140 Turner, A.
Computer aided environmental impact analysis: Part 2, Applications. Colo. Sch. Mines, Miner. Ind. Bull., Vol. 19, No. 3, 16 p., 1976.
Three applications of computer programs to environmental studies are presented. Coal, oil, oil shale, and natural gas reserves and the impact of their recovery and utilization are measured in "A Regional Environmental Study in North-western Colorado." Eight oil shale resource maps of the area are illustrated.

Turner, T. L. See Huggins, Charles W. 01055

02141 Tverdova, R. A.; Aref'yev, N. V.
A geneticheskoy prirode bitumoidova paleozoyskikh otlozheniy Volgogradskogo Povolzh'ya (Origin of bitumens from Paleozoic sedimentary rocks in the Volgograd area of the Volga region): Geol. Nefti Gaza, No. 7, p. 60-66, tables, 1975.

02142 Twelvetress, William H.
The Tasmanite shale fields of the Mersey District: Tasmania Geol. Surv. Bull. No. 11, 123 p., incl. plates, maps, diagr., tables, 1911.

02143 Twenhofel, W. H.
Environments of origin of black shales: Am. Assoc. Pet. Geol. Bull., Vol. 23, p. 1178-1198; (abs.), Oil Weekly, Vol. 93, No. 3, p. 69, 1939.
Explanations of origins reviewed; considers origin of black color, depositional environments.

02144 Tyzhnov, A. V.
Ugol' i goryuchiye slantsy (Coal and bituminous shale): in Uspekhi v izucnenii glavneyskikh osadochnykh poleznykh iskopayemykh v SSSR, p. 17-39, Akad. Nauk SSSR, Lab., Osad., Polez, Iskop., Moscow, 1967.

02145 Udas, G. R.; Mahadevan, T. M.
Controls and genesis of uranium mineralization in some geological environments in India: in Formation of Uranium Ore Deposits (see Nininger, R. D.): Sedimentary basins and sandstone-type deposits: Sedimentary deposits in other areas, Proc. Ser., No. STI/PUB/374, p. 425-436, 1974.
The favorability factors influencing localization of uranium are discussed in relation to some selected geological environments in India. The association of uranium with the copper-lead-zinc mineralization in the Bihar-Madya Pradesh-Rajasthan Metallogenic province and the tectonic controls in localization of uranium are birefly discussed. (From abstract)

02146 Udden, J. A.
Artesian wells in Peoria and vicinity: Ill. Geol. Surv. Bull. 8, p. 313-334: Ill. Geol. Survey Extract Bull. 8, 22 p., 1908.
Brief mention of Sweetland Creek Shale, Includes well records, columnar sections.

02147 Udden, J. A.
The eastward extension of the Sweetland Creek Shale in Illinois: Ill. Acad. Sci. Trans. (1911), Vol. 4, p. 103-107, 1921.
Discusses occurrences of Sweetland Creek Shale in Illinois. Includes well records, lithologic descriptions.

02148 Udden, J. A.
The Sweetland Creek Beds: J. Geol., Vol. 7, p. 65-78, 1899.
Discussion of Sweetland Creek Shale in Musctaine County, Iowa. Considers lithology, structural relations, fossils, etc. Includes section descriptions.

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Fossiliferous boulders in the Quachita "Caney" shale and the age of the shale containing them: Norman, 1927, 48 p. wraps. Oklahoma geological Survey Bull. #45.
Description of Quachita Caney boulders in terms of lithologic character and faunal content. Age and geographic origin of the boulders and related formations.

02150 Ulrich, E. O.
Kinderhookian age of the Chattanooga Series: Geol. Soc. Am. Bull., Vol. 26, p. 96-99, 1915.
Considers Chattanooga Shale to be Kinderhookian.

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Quarrying industry in Missouri: in E. R. Buckley and H. A. Buchler; Missouri Bureau of Geology and Mines, Vol. 2, 371 p., 1974.

02152 Uluots, Yu. O.
Tekhnologiya dobyshi slantsa V kar'yere No. 1 tresta "Estonalanets" (The technology of shale mining i open pit mine number 1 of the Estonia shales): in Razrabitja u usoik'zavaniye zapasov goryuchikh slantsev (Baum, V., chairperson), p. 140-141, Izd. Valgus, Tallin, Union of Soviet Socialist Republics, 1970.

02153 Underwood, Lloyd B.
Classification and identification of shales -- Closure (to discussion of paper 5560, 1967): Am. Soc. Civil Engineers Proc., Vol. 95, J. Soil Mechanics and Found. Div., No. SM5, p. 1259-1260, 1969.
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02154 United Nations Resources Conference
Papers relating to petroleum, natural gas, shale-oil, and synthetic fuels summarized: Petrol. Eng., Vol. 21, p. A44-45, 48, 53, 55, 58, Oct. 1949.

02155 United States Atomic Energy Commission
Geologic investigations of radioactive deposits: United States Atomic Energy Comm., Technical Information Service, Oak Ridge, Tenn., TEI-440, 250 p., 1954.
Extensive discussion of investigations of uranium deposits in the United States. Comments of urnaium contents of black shales.

02156 U. S. Atomic Energy Commission
An investigation of the minerology, petrography, and palebotany of uranium-bearing shales and lignites: 5th Annual Report, April 1955 - March 1956. Oak Ridge Tech. Inform. Serv. Exten. Diagrs., tables, 1956.
"Qualitative and semi-quantitative mineralogical and quantitative chemical analyses have been made of 205 Chattanooga shale samples and 130 samples of shales from Pennsylvania, New Mexico, France, and Sweden. Heavy minerals, pyrite, feldspars, and bentonite were discussed in qualitative mineralogy. From the nine Chattanooga cores, regional variations and correlations were studied.

02157 United States Atomic Energy Commission
Recovery of uranium from Chattanooga Shale (Final Report): U. S. Atomic Energy Commission RMO-4015, 256 p., (sketches, charts, tables), Mineral Beneficiation Laboratory, Columbia University, New York, N. Y., 1960.
Summary of a project designed to find one or more methods of beneficiation Chattanooga shales for their uranium content, and the technico-economic evaluation of the process.

02158 United States Atomic Energy Commission
Recovery of uranium from Chattanooga shale - cost estimation of an Ion Exchange Plant: U. S. Atomic Energy Comm. Topical Report 4017. Mineral Beneficiation Laboratory, Columbia University, New Yor, N. Y. 54 p., 1959.
Fixed bed ion exchange and amine complexant solvent extraction were studied as methods to recover uranium from Chattanooga Shale leach solutions. The study provides a general picture of the cost of recovery by ion exchange.

02159 United States Aomtic Energy Commission
Recovery of uranium from Chattanooga shale - cost estimation of a solvent extraction plant: U. S. Atomic Energy Comm. Topical Rept. RMO-4016, Mineral Beneficiation Laboratory, Columbia University, New York, N. Y., 61 p., 1959.
Fixed bed ion exchange and amine complexant solvent extraction were studied as methods to recover uranium from Chattanooga shale leach solutions. The study provides a general picture of the cost of recovery by solvent extraction.

02160 U. S. Bureau of Land Management Washington, D. C.
Final environmental impact statement, proposed development of oil shale resources by the Colony Development Operation in Colorado; Volume II: U. S. Gov. Print.

Off., Washington, D. C., variously paginated p., 1977.

Consultation and coordination in the development of the draft environmental statement is discussed, and public comments and responses are given.

02161 U. S. Bureau of Mines - Pet. Research Laramie, Wyo.
Application of nuclear explosions to oil shale utilization Prepared for U. S. Bur. of Mines - AEC - Industry Meeting, Dallas, Texas, 27 p., Jan. 1959.

02162 U. S. Bureau of Mines
A bibliography of publication dealing with oil shale and shale oil: U. S. Bur. of Mines, 1917-1974, and the ERDA Laramie Energy Research Center, 1975-1976. Laramie Energy Research Center (1977). 51 p. Paper Copy, $5.25; microfiche, $3.00: from National Technical Information Service, Springfield, VA 22161.

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Mineral facts and problems. Chapter on Oil Shale: U. S. Bur. of Mines Bull. 585, p. 573-580, 1960.

General view of oil shale grades and properties, locations, age, mining, retorting, refining, reserves, outlook, and problems. Experimental work in Colorado is discussed.

02164 U. S. Bureau of Mines
Oil shale, America's fuel ace in the hole: Oil and Gas J., Vol. 45, No. 17, p. 68-69, 97-98, 100, 8 figs. (incl. index map), Aug. 31. 1946.

This article discusses the American reserves of oil shale, the demonstration plant under construction at Rifle, Colo., and research laboratory at Laramie, Wyoming. The nature of American oil shale and problems of the indstruy are mentioned. Also discusses are a few early attempts at deriving shale oil.

02165 U. S. Bureau of Mines
Oil-shale demonstration plant: U. S. Bureau of Mines release. Pet. Eng., Vol. 18, p. 87, July 1947.

02166 U. S. Bureau of Mines
Oil from oil shale. 1948 Ann. Rept. of the Secretary of the Interior on synthetic liquid fuels, Part II: U. S. Bur. of Mines Rept. of Invest. 4457, 55 p., 1949.

Summarizes progress made by Bureau of Mines in 1948 toward development of industrial methods for producing

synthetic liquid fuels from oil shale. Mining, crushing, retorting, and refining of shale at the Rifle, Colo., facility is summarized. Oil shale and shale oil research and development at Laramie experiment station is discussed.

02167 U. S. Bureau of Mines
Oil from oil shale; 1949 Ann. Rept. of the Secretary of the Interior on synthetic liquid fuels, Part II: U. S. Bur. of Mines Rept. of Invest. 4652, 70 p., 1950.
"Deals primarily with progress made in producing synthetic liquid fuels from oil shale." Mining, crushing, retorting, and refining of shale at Rifle, Colo. facility is summarized. Oil shale and shale oil research and development at Laramie experiment station is discussed.

02168 U. S. Bureau of Mines
Oil from oil shale. 1950 Ann. Rept. of the Secretary of the Interior on synthetic liquid fuels, Part II: U. S. Bur. of Mines Rept. of Invest. 4771, 89 p., 1951.
"Deals primarily with progress made in producing synthetic liquid fuels from oil shale." Mining, crushing, retorting, and refining of shale at Rifle, Colo., facility is summarized. Oil shale and shale oil research and development at Laramie experiment station is discussed.

02169 U. S. Bureau of Mines
Oil from oil shale: 1951 Ann. Rept. of the Secretary of the Interior on synthetic liquid fuels, Part II, U. S. Bur. of Mines Rept. of Invest. 4866, 86 p., 1962.
"Deals primarily with progress made in producing synthetic liquid fuels from oil shale." Mining, crushing, retorting, and refining of shale at Rifle, Colo., facility is summarized. Oil shale and shale oil research and development at Laramie experiment station is discussed.

02170 U. S. Bureau of Mines
Oil from oil shale: 1952 Ann. Rept. of the Secretary of the Interior on synthetic liquif fuels, Part II, U. S. Bur. of Mines Rept. of Invest. 4943, 70 p., 1953.
"Deals primarily with progress made in producing synthetic liquid fuels from oil shale." Mining, crushing, retorting and refining of shale at Rifle, Colo., facility is summarized. Oil shale and shale oil research and development at Laramie experiment station is discussed.

02171 U. S. Bureau of Mines
Oil from oil shale: 1953 Ann. Rept. of the Secretary of the Interior on synthetic liquid fuels, Part II, U. S. Bureau of Mines Rept. of Invest. 5044, 55 p., 1954.
Mining, oil shale retorting development and engineering development, refining engineering development, and lab testing at the Rifle, Colo., facilities are discussed. Laboratory research at Laramie experiment station included work on entrained solids retort, hydrogenation, and retorting Brazilian and Chattanooga oil shales. Shale oil research and analyses of gas-oil fraction, shale-oil naptha, and oxygen-bearing products are also discussed.

02172 U. S. Bureau of Mines
Oil from oil shale: 1954 Ann. Rept. of the Secretary of the Interior on synthetic liquid fuels, Part II. U. S. Bur. of Mines Rept. of Invest. 5119, 115 p., 1955.
Mining, oil shale processing, and shale oil refining at Rifle, Colo., facilities are discussed. Pilot plant and engineering scale retort activities at Rifle are also discussed. Laboratory research at Laramie experiment station included studies on composition, properties, and yield of shale oil processed products. Analyses of Brazilian oil shales, and destructive hydrogenation are among other topics described.

02173 U. S. Bureau of Mines
Oil from oil shale: 1955 Ann. Rept. of the Secretary of the Interior on synthetic liquid fuels, Part II. U. S. Bur. of Mines Rept. of Invest. 5237, 80 p., 1956.
Mining, oil shale retorting and refining at Rifle, Colo., facilities are discussed. Runs on the 25 and 150 ton retorts, particle size, nucleation, and combustion-zone studies are among retorting topics discussed. Laboratory research conducted at the Laramie experiment station are also described.

02174 U. S. Bureau of Mines
Oil-shale plant: Pamphlet for distribution to observers of oil-shale display, 6 p., Sept. 1953, (GPO 830496).

02175 U. S. Bureau of Mines
Production of oil from oil shale: U. S. Federal Oil Conservation Board to the President of the U. S., Rept. II, Appendix II, p. 15-20, 1928.

02176 U. S. Bureau of Mines
Some concise information on oil shales. Chem. Age, (N. Y.) Aug. 1919, p. 123-124. See also Oil Gas J., Vol. 17, Feb. 28, 1919, p. 52; Salt Lake Min., Rev., Vol. 21, No. 3, 1919, p. 25-26; Railroad Red Book, Vol. 36, p. 317-318, 1919.
This article compares products obtainable from American and Scottish shale oils. The use of shale oils to alleviate future petroleum supply problems is metnioned and the cost of retorted oil versus crude oil is discussed. Production of ammonium sulfate is also mentioned.

02177 U. S. Bureau of Mines
A symposium on Western oil shale. Railroad Red Book, Vol. 36, p. 543, 545-549, 551-552, 1919.

02178 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Mineral Resources of the U. S., Part II, Nonmetals, p. 456-458, 1924.
Amount of oil and specific gravity of oil from three American plants which processed oil shale is presented, along with a table showing world oil shale production in the years 1920-1924.

02179 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Mineral Resources of the U. S. Part II, Nonmetals, p. 590-592, 1927.
Table of world oil shale production in the years 1923-1927 is shown. American operations of Pumpherston and NTU retorts at Bureau of Mines Rulison, Colo., plant is discussed.

02180 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Mineral Resources of the U. S., Part II, Nonmetals, p. 703, 1928.
Table of world production of oil shale, 1924-1928 is shown. Operations of Bureau of Mines plant at Rulison, Colo., is briefly discussed. NTU and Pumpherston retorts are briefly discussed.

02181 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Mineral Resources of the U. S., Part II, Nonmetals, p. 519-520, 1929.
Table of world production of oil shale production, 1925-1929 is presented. Operations of Pumpherston and NTU retorts at Bureau of Mines Rulison plant and discussed.

02182 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Mineral Resources of the U. S., Part II, Nonmetlas, p. 875, 1930.
Table of world production of oil shale in each of the years 1926-1930 is given. It was noted that there was no U. S. production in the year 1930.

02183 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Mineral Resources of the U. S., Part II, Nonmetals, p. 669, 1931.
Table of world production of oil shale 1927-1931, is shown. Decline of oil shale industry is mentioned.

02184 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Minerals Yearbook, Statistical Appendix, p. 278, 1934.
Table of world production in the years 1929-1933, is given.

02185 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Minerals Yearbook, Statistical Appendix, p. 440, 1935.
Table of world production of oil shale in each of the years 1930-1934 is given.

02186 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Minerals Yearbook, p. 702, 1936.
Table of world production of oil shale in the years 1931-1935 is given.

02187 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines, Minerals Yearbook, p. 1048, 1937.
Table of world production of oil shale in the years 1932-1936 is given.

02188 U. S. Bureau of Mines
World production of oil shales and shale oils: U. S. Bur. of Mines. Minerals Yearbook, p. 895-896, 1938.
Tables of world production of oil shale in each of the years 1933-1937 is given.

U. S. Bureau of Mines See Linville, B. 01536

02189 U. S. Bur. of Mines, Petroleum Research Staff
Petroleum and oil shale research at the Bur. of Mines, Fiscal Year 1966: U. S. Bur. of Mines Inform. Circ. 8364, 52 p., 1968.
99 scientific and technical reports published between July, 1965 and July, 1966, having to do with petroleum, natural gas, or oil shales, are cited with abstracts. A list of research projects and their purposes are also given. Completion of a bulletin on the oil-shale gas combustion retort was noted as significant.

02190 U. S. Bureau of Mines Staff
An economic analysis of an oil shale, nahcolite, dawsonite, complex in Colorado, Option III, Circa, 1971. Open File Report No. 33-72, 176 p., 1972. Available for reference during working hours at Bureau of Mines libraries in Denver, Colo.; Laramie, Wyo.; San Fransisco, Calif.; Bartlesville, Okla.; Morgantown, W. Va.; and at the Central Library, U. S. Dept. of the Interior, Washington, D. C.
A two-level shaft mining operations, retorting, partial refining and a mineral processing plant requires a capital investment of $605,947,700 in 1971 dollars to process 8,000 tons per day of nahcolite ore and 60,000 tons of the mineral containing oil shale. (From abstract)

02191 U. S. Bureau of Mines Staff
Technologic and related trends in the mineral industries, 1973: U. S. Bur. of Mines Inform. Circ. 8643, 52 p., 1974.
Three paragraph section cites companies involved in oil shale projects. Projections for shale oil production are given in terms of price and amount.

02192 U. S. Bureau of Mines Washington, D. C.
Bureau of Mines Research 1971; a summary of significant results in mining metallurgy and energy: U. S. Bur. of Mines, Res., Vol. 1971, 61 p., 1971.

02193 U. S. Bureau of Mines Washington, D. C.
Bureau of Mines Research 1972, a summary of significant results in mining metallurgy and energy: U. S. Bur. Mines, Bur. Mines Res., Vol. 1972, 82 p., 1972.

02194 U. S. Bureau of Mines Washington, D. C.
Bureau of Mines Research 1973, a summary of significant results in mining metallurgy and energy: U. S. Bur. Mines, Bur. Mines Res., Vol. 1973, 107 p., 1973.

02195 U. S. Congress. House. Committee on Public Lands.
Applications for patent on oil-shale lands: Consolidated hearings before the Committee on the public lands, House of Representatives, Seventy-first Congress, 2nd session on H. R. 3754, H. R. 12802, H. R. 13191, H. R. 15002, H. R. 15130, H. R. 15131, H. R. 15132, pts. 1-3 Washington, U. S. Govt. Printing office. 188 p., tables, 1931.

02196 U. S. Congress. Office of Technology Assessment.
Status report on the gas potential from Devonian shales of Appalachian Basin: 81 p., illus. (incl. tables), 1977. Available from U. S. Govt. Print. Off., Washington.
This report "estimates recoverable gas reserves, describes reservoir characteristics and recovery techniques; analyses economic feasibility of and obstacles to gas production; and reviews energy options for price, tax, research and development, and information policies to encourage production."

02197 U. S. Congress. Senate Subcommittee on Energy Research Development
Petroleum industry involvement in alternative sources of energy: 385 p., illus., (incl. tables), U. S. Govt. Print. Off., 1977.
In this article, the location of U. S. reserves of coal, geothermal energy, oil shale, and uranium are shown along with area of these reserves currently held by the petroleum industry. Non-petroleum research and development by oil companies is cited along with federally and internally funded research projects.

02198 U. S. Department of Commerce
A bibliography of publications dealing with oil shale and shale oil from U. S. Bur. of Mines, 1917-1974, and the ERA Laramie Energy Research Center, 1975-1976: Laramie Energy Research Center LERC/RI-77/7, Laramie, Wyoming. Sept. 1977.

02199 U. S. Dept. of the Interior
Hearings December 1, 1926 before the Secretary of the Interior on the question of what constitues a sufficient discovery to support the claim of an oil shale locator under the general mining laws. Mimeographied, Washington, 1926.

02200 U. D. Department of the Interior
Oil-shale demonstration plant: U. S. Dept. of the Inter. Rept. of the Dept. of the Interior, p. 37-40, 1945.

02201 U. S. Department of the Interior
Oil-shale demonstration plant: U. S. Dept. of the Interior. Rept. of the Dept. of the Interior, p. 61-68, 1946.

02202 U. S. Department of the Interior
Oil-shale demonstration plant: Report of the Dept. of the Interior, p. 1-28, 1947.

02203 U. S. Department of the Interior
Oil-shale mining: U. S. Dept. of the Interior. Rept. of the Dept. of the Interior, p. 41-42, 1945.

02204 U. S. Department of the Interior
Oil-shale mining: U. S. Dept of the Interior. Rept. of the Dept. of the Interior, p. 68-78, 1946.

02205 U. S. Department of the Interior
Oil-shale mining: Report of the Dept. of the Interior, p. 6-12, 1947.

02206 U. S. Department of the Interior
Oil-shale research and development: U. S. Dept. of the Interior. Rept. of the Dept. of the Interior, p. 22-36, 1945.

02207 U. S. Department of the Interior
Oil-shale research and development: U. S. Dept. of the Interior, Rept. of the Dept. of the Interior, p. 43-60, 1946.

02208 U. S. Department of the Interior
Oil-shale research and development: Report of the Dept. of the Interior, p. 51-80, 1947.

02209 U. S. Department of the Interior, Bureau of Land Management
Proposed development of oil shale resources by the Colony Development operation in Colo. Variously pagniated, p., 1977. Vol. I.
"This statement is an analysis of environmental impacts that may result from proposed Federal actions in connection with development of an oil shale plant, mine, service corridor, land exchange, products pipeline, water use contracts, and power line corridor by Colony Development Operation." A description of the environment, environmental impacts of the proposed action, mitigating measures, short term environment and long term productivity relationships, and alternatives to the action are given.

02210 U. S. General Land Office
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Coal, oil shale, uranium, geothermal, petroleum, and natural gas districts of deposits are shown. Rich oil shale zones are separated from poorer or unevaluated zones. Electrical generating stations and major transmission lines are also shown. Structure line shows base of Parachute Creek Member of Green River Formation.

02212 U. S. Geological Survey
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Summaries of studies of uranium localities are divided into types of deposits, then into sections of the country. Black shale reports include a drilling program in the Chattanooga Shale in De Kalb Co., Tenn. Mentioned also is the Pierre Shale in Nebraska and South Dakota.

02213 U. S. Geological Survey
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This article discusses a program developed to overcome the technical obstacles that have retarded in situ development. Financial responsibility for the nationwide program is suggested. Three areas of research would include: 1-in situ production of liquids (including fracturing techniques), 2-modified in situ production of liquids, and 3-in situ production of gases.

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Session 5B recorded in Vol. 1, has five articles having to do with oil shale technology.

Wang, N. H. See Silver, H. F. 01895

Wang, N. H. See Silver, H. F. 01894

02279 Wang, Pi-chen; Yu Chi-an; Chang, Kuei-Lan
A preliminary study of the composite vanadium minerals and its mode of occurrence in the lower Cambrian black shales in a region of China: Acta Geol. Sin., No. 2, p. 219-299 (Chinese, incl. Eng. sum.), illus., 1974.

02280 Wanless, H. R.
Geology and mineral resources of the Alexis quadrangle: Ill. Geol. Survey Bull. 57, 230 p., 1929.
Discussion of Sweetland Creek Shale - lithology, thickness, correlations. Includes cross-sections, section descriptions, well records.

02281 Wanless, H. R.
Geology and mineral resources of the Beardstown, Glasford, Havana, and Vermont quadrangles: Ill. Geol. Survey Bull. 82, 233 p., 1957.
Discusses Grassy Creek Shale - lithology, thickness, correlation with lower New Albany. Considered as petroleum source rock. Includes records of deep wells, cross-sections.

02282 Wanless, H. R.
Geology and mineral resources of the Havana Quadrangle: Unpub. report, 428 p., 139 pls. (in Survey open-file reports), 1930.
Considers Sweetland Creek Shale - lithology, thickness, correlation stratigraphic relations. Includes structure contour maps, well records, etc.

02283 Ward, J. C.; Reinecke, S. E.
Water pollution potential of snowfall on spent oil shale residues: Open File Report No. 20-72, 53 p., 1972. Available for reference during working hours at Bur. of Mines libraries at Denver, Colo.; Laramie, Wyo.; Bartlesville, Okla.; San Francisco, Calif.; and at the Central Library, U. S. Dept. of the Interior, Washington, D. C.
The concentration and composition of totally dissolved solids were determined both in surface runoff water and in water which had percolated through a bed of the residue. An equation was developed to predict the concentration of the runoff water as a function of independent parameter. (From abstract)

02284 Warg, Jamison B.; Traverse, Alfred
A palynological study of shales and "coals" of a Devonian-Mississippian transition zone, central Penn.: Geoscience Man., Vol. 7, p. 39-46, illus., 1973.

Warren, Phillip L. See Reed, P. Robert 01709

02285 Watkins, J. Wade
Oil shale utilization - when and how?: Western Oil Reporter, Vol. 24, No. 7, p. 18-22, July, 1967.

02286 Watkins, J. Wade
Summary of oil shale activity: Internat. Oil Scouts Assoc., Vol. 7, No. 9, 5 p., Sept. 1967.

02287 Watkins, J. Wade; Anderson, C. C.
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. of Mines Inf. Circ. 8219, 17 p., 1964.
Presents a theoretical study of the feasibility of using nuclear explosives to stimulate production of hydrocarbons from nonproducing formations.

02288 Watkins, J. Wade; Mills, G. Alex; Phillips, J. E.
The outlook for hydrocarbon production from domestic oil shale, coal, and tar sands: Proc. Symp. of Current Status of Oil Recovery, Research, and Development. 71st Nat'l. Meeting, A. I. Ch. E., 25 p., 1972.
This 1972 paper discusses the possible future production of fluid hydrocarbons from our domestic deposits of oil shale and tar sands and the production of low-sulfur gaseous and liquid fuels from coal.

02289 Waxman, M. H.; Smits, L. J. M.
Electrical conductivities in oil-bearing shaly sands: Soc. Petroleum Engineers A. I. M. E. Trans., Vol. 243 (pt. 2), p. 107-122, illus., tables, reprinted 1969: originally published 1968.
A simple physical model was used to develop an equation that relates the electrical conductivity and the cation-exchange capacity per unit pore volume of the rock. (From abstract) Includes tables of results and figures.

Weaver, C. E. See Adams, J. A. S. 00004

Weaver, C. E. See Bates, Thomas F. 00133

02290 Weaver, C. R.; Wright, H. D.; Bates, T. F.
An investigation of the mineralogy and petrolgraphy of uranium-bearing shales, annual report, July 1, 1951 to April 1, 1952: U. S. Atomic Energy Comm. NYO-3357, 40, (dep., mc)(prepared by Pennsylvanian State College), 1952.
This investigation was undertaken in an effort to explain the nature, occurrence, association, and origin of the uranium in black shales.

02291 Weaver, G. D.
Comparative analysis of oil shales and tar sands: Great Plains-Rocky Mt. Geogr. J., Vol. 6, No. 2, p. 359-365, 1977.

02292 Weaver, O. D.; Calvert, W. L.; McGuire, W. H.
A new look at the gas and oil potential of the Appalachian basin, Oil and Gas Journal, Jan. 17, part 1, p. 126-130, 1972; and Oil and Gas Journal, Jan. 24, p. 100-164, 1972.

02293 Weber, J. H.; Earnshaw, D. G.; Severin, D. W. K.
Processing high-resolution mass spectrographic plates with a comparator-microdensitometer-programmable calculator system: U. S. Bur. of Mines Rept. of Invest. 7938, 14 p., 1974.
Describes the hardware system and software package for the semiautomatic acquisition and automatic processing of high-resolution mass spectrographic plates. (From Abstract)

Weber, R. H. See Kottlowski, R. D. 01239

02294 Wedow, Helmuth, Jr.
Reconnaissance for radioactive deposits in the Gagle-Nation area, east-central Alaska, 1948: U. S. Geol. Surv. Circ. 316, 9 p., (out or pfint), 1954.
Radioactivity of rocks of each age period were tested with portable survey field meters. Black carbonaceous shale of Mississippian age were found to be the most radioactive of the sections measured, but each section is discussed in terms of radioacitvity and lithology.

02295 Wefing, H.
Verwertung von Oelschiefer (Utilization of oil shale): Erdoel-Erdgas-Z, Vol. 94, No. 5, p. 180-185, (incl. Eng. sum.), illus., incl. tables, 1978.

02296 Weichman, B. E.
Oil shale is not dead: Colo. Sch. Mines, Q., Vol. 71, No. 4, (Proceedings of the Ninth oil shale symposium) p. 71-84, illus. (incl. sketch map), 1976.
Reasons why use of synthetic fuels from shale and coal are outlined, and barriers to commercialization

02297 Weil, S. A.; Feldkirchnes, H. L.; Tarman, P. B.
Hydrogasification of oil shale: in Shale oil, tar sands, and related fuelsources (Yen, R. F., editor), No. 151, p. 550/6, illus. (incl. tab es) Am. Chem. Soc., Washington, D. C., United States, 1976.
This study was initiated to investigate the technical and economic feasibility of producing synthetic

pipeline gas from oil shale by hydrogasification. (From p. 56) Includes illustrations, graphs, and tables of results.

02298 Welch, Stewart W.
Radioactivity of coal and associated rocks in the anthracite fields of eastern Pennsylvania: U. S. Geol. Surv. Trace Elem. Invest. Rept. 348, 31 p., map, tables, 1953.
Geology and stratigraphy of the coal fields is presented and lithologies, thicknesses, and uranium content of the 47 localities is presented. 150 samples of coal and three shale samples showed no greater then .003% uranium as measured by a portable survey meter.

02299 Welch, Stewart W.
Radioactivity of coal and associated rock in the coal fields of eastern Kentucky and southern West Virginia: U. S. Atomic Energy Comm. Trace Elem. Invest. 347 A, 38 p., map, 1953.
Location, lithology, thickness, and uranium content was given for samples from sixty-one localities. Of the 98 sampels, only four were shales. No correlations existed between radioactivity and stratigraphic position or structural relationship.

02300 Weller, J. M.
Devonian correlations in Illinois and Surrounding states: A summary: Ill. Geol. Surv. Bull. 68, p. 205-213, 1944b.
Discusses problem of Upper Devonian vs. Lower Mississippian age of black shales. Comments on lateral and vartical stratigraphic relations. Includes correlation chart.

02301 Weller, J. M.
Devonian System in southern Illinois: Ill. Geol. Surv. Bull. 68, p. 89-102; Ill. Geol. Survey Extract Bull. 68, p. 89-102, 1944a.
Mountain Glen Shale considered equivalent to Chattanooga and New Albany. Includes generalized columnar sections.

02302 Weller, J. M.
Generalized stratigraphic and structure section of Illinois bluffs of Mississippi River from East St. Louis to Thebes and guide to field study in southern Illinois: Kans. Geol. Soc. Guidebook, 13th Ann. Field Conf., p. 14-15, 41-56, 1939b.
Brief mention of Mountain Glen Shale. Generalized cross-sections.

02303 Weller, J. M.
Geology and oil possibilities of extreme southern Illinois: Union, Johnson, Pope, Hardin, Alexander, Pulaski, and Massac Counties: Ill. Geol. Survey Rept. of Invest. 71. 71 p., 1940.
Considers Mountain Glen and New Albany shales - lithology, thickness, outcrops. Includes generalized columnar section, structure contour maps (horizons near black shales), well records.

02304 Weller, J. M.
Geology and oil possibilities of the Illinois Basin: Ill. Geol. Survey, Ill. Petrol. 27, 19 p., 1936a.
Brief mention of New Albany, Sweetland Creek Shales.

02305 Weller, J. M.
"Grassy Creek" Shales: Ill. Acad. Sci. Trans. (1935), Vol. 28, No. 2, p. 191-192, 1936b.
Appears to have been some confusion in original definition of Grassy Creek shale and its distinction from Saverton shale. Includes description of original Grassy Creek section.

02306 Weller, J. M.
The Mississippian System: Kans. Geol. Sec. 13th Ann. Conf. Guidebook, p. 131-137, 1939a.
Brief mention of Mountain Glen shale in Union County, Illinois.

02307 Weller, J. M.; Ekblaw, G. E.
Preliminary geologic map of part of the Alto pass, Jonesboro, and Thebes quadrangles, Union, Alexander, and Jackson Counties. Explanation and stratigraphic summary by J. M. Weller: Ill. Geol. Survey Rept. of Invest. 70, 26 p., 1940.
Brief consideration of Mountain Glen shale - lithology, thickness, outcrops. Correlated with part of New Albany shale. Includes geologic map.

02308 Weller, J. M.; Grogan, R. M.; Tippie, F. E.
Geology of flourspar deposits of Illinois: Ill. Geol. Survey Bull. 76, 147 p., Contribs. by L. E. Workman and A. H. Sutton, 1952.

02309 Weller, Stuart; Krey, Frank, contrib. by J. M. Weller
Preliminary geologic map of the Mississippian formations in the Dongola, Vienna, and Brownfield quadrangles: Ill. Geol. Survey Rept. of Invest. 60, 11 p., 1939.
Brief consideration of Mountain Glen shale - lithology, thickness, outcrops. Geologic map.

02310 Weller, J. M.; Sutton, A. H.
Mississippian border of Eastern Interior Basin: Am. Assoc. Petrol. Geol. Bull., Vol. 24, No. 5, p. 765-858; correction, No. 6, p. 1133, Ill. Geol. Survey Rept. of Invest. 62, 93 p., 1940.
Discussion of New Albany shale group (considered Lower Mississippian) - lithology, outcrop, thickness.

02311 Weller, Stuart; Butts, C.; Cumer, L. W.; et al.
The geology of Hardin County and the adjoining part of Pope County, Ill.: Geol. Survey Bull. 41, 402 p., pt. 1, 2, 4, 5,; Ill. Geol. Survey Extract Bull. 41, 146 p., 1920.
Structure contour map on top of Chattanooga shale.

Wellman, P. See Katell, S. 01155

Wellman, Paul See Katell, Sidney 01153

Wellman, Paul See Katell, Sidney 01154

02312 Wells, R. C.; Stevens, R. E.
Further studies of Kolm (Sweden): Washington Acad. Sciences J., Vol. 21, No. 17, p. 409-414, 1931.
This 1931 article discusses a study made on Swedish kolm, a material which resembles oil shale, and whose age can be determined both from fossils and from the lead-uranium ratio. (From Intro.) Includes tables of results.

02313 Wells, W. E.; Ruark, J. R.
Pilot-plant batch retorting of Colorado oil shale: U. S. Bur. of Mines Rept. of Invest. 4874, 19 p., 1952.

02314 Welte, D.
Recent advances in organic geochemistry of humic substances and kerogen; a review: Int. Mtg. Org. Geochem., Programme Abs., No. 6 (Advances in organic geochemistry, 1973), p. 3-13 (incl. German sum.), illus., 1974. With discussion.

02315 Wen, C. S.; Yen, T. F.; Knight, J. B.
Studies of soluble organics in simulated in situ oil-shale retort water by electron impact and chemical ionization from a combined gas chromatograph-mass spectometer system: A. C. S. Preprints, Div. of Fuel Chem., Vol. 21, No. 6, p. 290-293, 1976. See also: 172nd A. C. S. Nation l Meeting, San Francisco, CA Aug. 29-Sept. 3, 1976.
Retort water samples collected from the Laramie 10-ton simulated in situ retort were examined by electron impact and chemical ionization mass spectrometry. (From Abstract) These water samples were filtered, lyophilized, extracted with benzene, and esterified.

Werneck, Jorge Eiras Furguim See Byington, Alberto Jackson, Jr. 00334

02316 Westergard, A. H.
New deep borings through the lowest Ordovician and Cambrian of Ostergotland and Närke (Sweden): Sveriges Geol. Unders., Arsbok 34, ser. C, No. 7, 68 p. (in Swedish with English sum.), 1940.
Stratigraphy relations of cores of Cambrian and Lower Ordovician strata at Ostergotland and Narke were studied. Chemical tests to study oil and gas yield from the alum shales and bituminous limestones are shown. Much paleontological data, especially regarding trilobites are also used in correlation.

02317 Westergard, Anton Hilmar
Skifferborrningarna i Yxhult straken i Narke 1940 - Borings through the alum shale in the neighborhood of Yxhult in Närke, made in 1940: Sveriges Geol. Unders., Arsbok 35, No. 5, ser. C, No. 442, 20 p. (in Swedish with English sum.), 3 pls. (incl. geol. map 1:50,000), 1941.
Lithologic character of cores, % of oil and sulfur and coloric value of the alum shale are studied. Stratigraphic and paleontologic correlation is made with other cores taken.

02318 Wheeler, R. L.; Schumaker, R. C.; Woodfork, L. D.; et al.
Gas from Devonian shale in Morgantown: Geotimes, Vol. 21, No. 10, p. 18-19, 1976.
In this brief article, economics of gas production in the Appalachian area are discussed, along with basin shale stratigraphy. Geochemical zoning of the black shale stratigraphy. Geochemical zoning of the black shale is suggested. Factors influencing the structure and fracture density, which in turn regulate gas movement are mentioned, as are ways of artificially fracturing the shale.

02319 Whelan, J. A.
Semi-quantitative estimates of bulk mineralogical composition of some Utah shales, siltstones, and related materials: Utah Geol. and Mineral. Survey Circ. 49, 13 p., illus., tables, 1966.

02320 Whitcombe, J. A.; Vawter, R. G.
The Tosco-II oil shale process; in Science and Technology of oil shale (Yen, T. F., editor), p. 47-64, illus. (incl. tables), Ann Arbor Sci. Publ. Inc., Ann Arbor, Mich., United States, 1976.
"This chapter describes the TOSCO-II retorting process and other processing facilities included in the design of a commercial oil shale plant. It

also presents economic projections for production of hydrotreated shale oil, and for crude shale oil." (Authors) Products of the TOSCO process, including spent shale, are cited.

02321 White, (Charles) David
Oil shales of the United States: Am. Mining Congr., 23rd Ann. Conventions, Rept. of Proc., p. 151-153, 1921.

02322 White, D.
Regional alterations of oil shales (abs): Geol. Soc. Am., B 26:101-102, 1915.
Differences in distribution of oil shales and cannel coals to oil pools are examined. Alteration of oil shales and coals is suggested to be more similar then alteration of oil. Abnormal occurrences of oil are speculated to have come about by migration, filtration, or igneous alteration.

White, David See Stadnickenko, Taisia 01989

White, David See Thiessen, Reinhardt 02074

02323 White, D.; Stadnickenko, T.
Some mother plants of petroleum in the Devonian black shales: Econ. Geol., Vol. 18, p. 238-253, pl. 5-9, 1923.
Considers the microscopic plant material of the Ohio shale (Hoover, 1960).

White, E. R. See Cottingham, P. L. 00540

02324 White, Max G.
Reconnaissance for radioactive deposits along the upper Porcupine and lower Coleen rivers, northeastern Alaska: U. S. Geol. Surv. Circ. 185, 13 p. (out of print), 1952.
Radioactivity of sedimentary and igneous rocks in this area was tested by field radiometric surveys. The lithology of the periods was presented with black shales of Ordovician and Silurian strata showing the greatest effective uranium content. Igneous rocks also tested were found to contain minerals with minor amounts of uranium in place of other ions.

White, W. A. See Grim, R. E. 00929

White, W. A. See Ostrom, M. E. 01595

02325 White, W. A.; O'Brien, N. R.
Illinois clay resources for lightweight ceramic block: Ill. Geol. Survey Circ. 371, 15 p., 1964.
Grassy Creek shale described as poor bonding clay because of its fissility and organic content.

White, W. H. See McFarland, A. C. 01528

02326 White, Walter S.
Copper shales of Germany and Michigan: Economic Geology, Vol. 48, No. 7, p. 631, Nov. 1953.
Copper deposits of Nonesuch shale in Michigan and Supferschiefer in Germany have copper sulfides in black shales. The copper is widespread. In both formations, the copper is related to sedimentary facies and only locally affected by structural features.

02327 White, Walter S.; Wright, J. C.
Radioactivity of the Nonesuch shale, White Pine Mine, Ontagon County, Mich.: U. S. Geol. Surv. Trace Elem. Invest. Rept. 158, 4 p., 1950.

Whitehead, E. V. See Anderson, P. C. 00037

Whitehead, E. V. See Hills, I. R. 01014

02328 Whitehead, Kenneth L.; Saltsman, Robert D.
The state-of-the art in continuous mining machine bit technology: U. S. Bur. Mines PB-225, 633/7as ($5.50, NTIS), 1973.
The purpose of this project was to determine the state-of-the-art in continuous-mining machine but technology, especially with regard to dust production. (From abstract)

02329 Whitehead, W. L.
Studies of the effect of radioactivity in the transformation of marine organic materials into petroleum hydrocarbons, in Report of progress - fundamental research on occurrence and recovery of petroleum, 1950-1951: Am. Petroleum Inst., p. 192-201, 1952.
Interrelations between potassium (a radioactive decay product), organic matter, phosphorus, and radioactivity were measured in sedimentary rocks. These rocks included a Pennsylvanian black shale from Oklahoma, Devonian shale from Michigan, a Cretaceous black shale from Texas, and a Miocene nodular shale from California. Observations of tracks of alpha particles were recorded on film.

Whitehead, W. L. See Bell, Kenneth G. 00173

02330 Whiting, L. L.
Geology and history of oil production in the Decatur-Mt. Auburn-Springfield area, Illinois: Ill. Geol. Survey Circ. 211, 17 p., 1956.
Mention of New Albany shale - thickness, lithology, stratigraphic relations, E-log characteristics. Includes map showing pre-New Albany paleogeography.

02331 Whiting, L. L.; Oros, M. O.
Electric-log cross-section of the Silurian-Devonian formations of a part of central Illinois: Ill. Acad. Sci. Trans. (1957), Vol. 50, p. 172-179; Ill. Geol. Survey Reprint 1958-Q, 8 p., 1958.
Brief mentions of New Albany, Grassy Creek shales. Considered source of Devonian-Silurian oil. Structure map on base of New Albany (not very detailed).

02332 Whiting, L. L.; Stevenson, D. L.
The Sangamon Arch: Ill. Geol. Survey Circ. 383, 20 p., 1965.
New Albany shale shown in generalized columnar section.

02333 Wigley, Perry B.; Sergeant, Richard E.
Penecontemporaneous sedimentary structures in the Ravenna facies of the New Albany shale (abs): Geol. Soc. Am. Abs. Programs, Vol. 2, No. 3, p. 248-249, 1970.
This facies of alternating dolomitic limestone and black shale is discussed in terms of location, thickness. Origin and types of penecontemporaneous sedimentary structures in limestone are described.

Willemyns, P. See Lecomte, P. 01295

02334 Willett, R. W.
The Nevis oil shale deposit, Nevis Survey district, Otago central: New Zealand J. Sci. and TEch., Vol. 24, No. 6, p. 239-254, 8 figs. (incl. geol. sketch maps), May, 1943.

02335 Willett, R. W.
Oil shales at Cambrian, Freshford, and Waitata: Otago, and Southland: New Zealand J. Sci. and Tech., Vol. 24, No. 6, p. 255-271, 5 figs. (incl. Geol. sketch maps), May 1943.

Williams, E. G. See Degens, E. T. 00612

02336 Willman, H. B.; Workmann, L. E.; Bell, A. H.
Guide to field study in southwestern Illinois between Cape Girardeau and St. Louis, Missouri, in Guidebook for 34th Ann. Field Conf., Am. Assoc. Petrol. Geol. p. 18-30, 1949.

02337 Williams, Frank E.; Russell, P. L.; Sheridan, M. J.
Potential applications for nuclear explosives in a shale-oil industry: U. S. Bur. of Mines Inform. Circ. 8425, 37 p., 1969.
Nuclear detonation data were accumulated, studied, and exaluated by the Bur. of Mines to visualize how nuclear explosives might be used in a shale-oil industry. Described are the history of the shale oil industry the geology and size of oil-shale resources, and conventional mining methods and processing technology. (From abstract).

Williams, G, K. See MacQueen, R. W. 01371

02338 Williams, H. H.
Some aspects of ion exchange in shales (abs.): Bull. Canadian Petroleum Geology, Vol. 16, No. 2, p. 207, 1968.
"Marine and non-marine shales from two sedimentary basins were analyzed chemically and mineralogically." (Author) Ion exchange characteristics of subsurface and surface shale samples were compared, and exchange capacity with age was also studied. Clay mineralogy and the effect of organic matter in clays controlling ion exchange was also studied.

02339 Williams, J. S.
Paleoecology of the Mississippian of the upper Mississippi Valley region, in H. S. Ladd, ed., Treatise on Marine ecology and paleoecology: Geol. Soc. Am. Memior 67, Vol. 2, p. 270-324, 1957.
Considers Grassy Creek and Saverton shales - lithology, thickness, paleontology, paleoecology.

Williamson, Charles Ross See Picard, M. Dane 01645

02340 Williamson, D. R.
The connection between kerogens and petroleum: Mtn. Geologist, Vol. 2, No. 3, p. 129-134, 1965.
Definitions and characteristics of kerogen and petroleum are given, noting the broad range of compositions that fall under each. Arguments for and against kerogens being parent materials for petroleum are given. Discussion of simultaneous formation of the two is given.

02341 Williamson, D. R.
Oil-shales - pt. 3, The natures and origins of kerogen: Colo. Sch. Mines, Mineral Industries Bull., Vol. 7, No. 5, 15 p., tables, 1964.

Willis, D. G. See Hubbert, M. K. 01049

02342 Willis, J. L.
Uranium mineral industry of New South Wales, No. 43, 1971.

Willman, H. B. See Collinson, C. W. 00477

02343 Willman, H.B.; Atherton, Elwood; Buschback, T. C.
Handbook of Illinois Stratigraphy: Ill. State Geol. Survey Bull. 95, 261 p., 1975.
New Albany discussed on pages 121, 131. Thickness maps of Blocher shale, Upper Devonian and Kinderhookian columnar sections.

02344 Willman, H. B.; Workman, L. E.; Bell, A. H.
Guide to field study in southwestern Illinois between Cape Girardeau and St. Louis, Missouri, in Guidebook for 34th Ann. Field Conf.; Am. Assoc. Petrol. Geol., p. 18-30, 1949.
Mountain Glen shale appear in generalized columnar sections.

02345 Wilson, Charles W., Jr.
Geologic map of the Smithville quadrangle, Tennessee: Tennessee Div. Geology Geol. Map GM 323-NE, scale 1:24,000, separate text, 1968.

02346 Wilson, Charles W., Jr.; Barnes, Robert H.
Geologic map and mineral resources summary of the Sligo Bride Quadrangle, Tennessee: Tenn. Geol. Surv., 1968.

Wilson, D. M. See Balogh, B. 00101

Wilson, K. See Bugle, R. C. 00302

Wilson, K. See Conley, J. E. 00503

02347 Wilson, M. V. H.
Paleoecology of the Eocene lacustrine varves at Horsefly, British Columbia: Can. J. Earth Sci., Vol. 14, No. 5, p. 953-962 (incl. French sum.), illus. (incl. table, sketch map), 1977.
This article discusses abundant flora and fauna trapped and preserved in lake sediments as carbonized layers. Climate is speculated from the plant fossils, and a mechanism for a lake stratification is given. Studies of the varves show seasonal fluctuations of climate led to different periods of deposition of the flora and fauna.

02348 Wilson, Robert E.
Oil from coal and shale, in Our Oil Resources, Fanning, ed., p. 210-229, 3 figs., 1945.
A discussion is given of development needed to bring

synthetic fuels into the economy. Intermediate processes for the production of liquid fuels, which could be used before the conversion of coal and oil shale to liquid fuels are shown. Brief non-technical summaries of processes to produce synthetic fuels from coal, oil shale, and oil sands are given. Advantages, disadvantages, and objectives of government research are outlined.

02349 Wilson, Robert Q.; Ewing, R. A.; Hanway, J. E.
The recovery of uranium from Chattanooga shales, final report for November 15, 1952, to January 15, 1954: U. S. Atomic Energy Comm. BMI-274, 138 p. (dep.; $34.50, LC)(prepared by Battelle Memorial Institute), 1954.
This final report summarizes the work done on developing a process for extracting uranium from Chattanooga shale. It consisted of retorting the shale, a leaching process, and the recovery of uranium by ion exchange.

02350 Winchester, D. E.
Contorted bituminous shale of Green River Formation in north-western Colorado (abs. with discussion by E. O. Ulrick, David White, W. C. Alden, and G. H. Askley): Washington Acad. Sci., J., Vol. 9, No. 10, p. 295-296, May 19, 1919.
This 1919 article desribed the composition, stratigraphy and structure of the upper part of the oil shale series of north-western Colorado.

02351 Winchester, D. E.
Distribution and importance of the oil-shale deposits of the United States: Am. Min. Congr., Ann. Rept. Proc., No. 25, p. 756-758, 1922.

02352 Winchester, D. E.
Distribution and importance of the oil-shale deposits of the United States: Colo. Sch. Mines, Q., Vol. 17, No. 4, Supplement B, p. 51-52, Oct., 1922: Am. Min. Congress 25th Ann. Convention, Rept. of Proc., p. 756-758, 1922.
Most of the discussion is summarized in two tables. One table shows geologic age and distribution of oil shale and cannel coal deposits in the U. S. Comparison of richness and thickness is given for the largest oil shale deposits in six states.

02353 Winchester, D. E.
Oil shales: Franklin Inst., J., Vol. 187, No. 6, p. 689-703, June, 1919.
This 1919 article discusses the potentialities of oil shale as a future source of fuel.

02354 Winchester, D. E.
Oil shale in northwestern Colorado and adjacent areas: U. S. G. S., B. 641:F, 139-198, maps, 1916. Abs. by R. W. S., Wash. Acad. Sci., Vol. 7, p. 265, 1917.
The report contains information showing the quantity and quality of oil that may be distilled from the richer beds of shale and the number of such beds at the different localities examined. The results given in this paper show that the shale of the Green River formation will yield a vast quantity of oil and gas sufficient to carry on the process of distillation. (From Abstract)

02355 Winchester, D. E.
Oil shale of the Rocky Mtn. region: U. S. Geol. Surv. Bull. 729, 204 p., 4 figs., 18 pls. (incl. maps), 1923.
A very comprehensive study on stratigraphy, structure, general geology, and geography of oil shale deposits is presented for the states of Colorado, Montana, Utah, Wyoming, and Idaho. Many stratigraphic sections are shown, with oil, ammonium sulfate, sulfur, and nitrogen yields given. Previous retorting operations are noted, and a list of fauna and flora of the Green River Formation is shown.

02356 Winchester, Dean Eddy
Oil shale of the Uinta Basin, northeastern Utah: U. S. Geol. Surv. Bull. 691, p. 27-50, map, 1918, Abs. by R. W. Stone, Wash. Acad. Sci., J. 8, p. 501, 1918.
Stratigraphic sections of the Green River Formation are shown, along with illustrations of fossil vegetative matter. Character of oil shale is described, and results of distillation tests on Uinta Basin samples is given. Value of the products, including the oil, ammonium sulfate, and nitrogen is discussed and compared to the Scotch shale oil.

02357 Winchester, D. E.
Oil shale in the United States: Econ. Geol. Vol. 12, p. 505-518, 1917. Reprinted in the Railroad Redbook (Denver and Rio Grande Railroad) 35:33-38, 1918. Abs. Wash. Acad. Sci., J.7: 432-433, 1917.
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Wright, H. D. See Bates, Thomas F. 00131

Wright, H. D. See Weaver, C. E. 02290

Wright, J. C. See Waldron, Fred R. 02271

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Issledovanie sostava paleoginovykh bitumolitov mestorozhdeniya Krasava, Pernikskogo rayona (Study of the composition of bitumolites from the Krasave Deposit, Pernik District): Neft. Vuglishchna Geol., Vol. 7, p. 46-52 (incl. Russian, English sum.), illus., 19/7.
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Slantsenosnost' verkhney urshikh otlexheniy (Oil shale from upper Jurassic deposits): in Prognoz goryuchikh slantsev Yevropeyskoy chasti SSSR (Kotlukev, V. A., editor; et al.), p. 28-38, tables, Izd. Akad. Nauk ESSR, Tallin, Union of Soviet Socialist Republics, 1974.

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A wide variety of topics are discussed in this collection of articles written about oil shale. Biochemical reactions, new methods extimating oil yields, environmental concents with ex situ and in situ spent shales, kerogen structure, and sulfur recovery are among the fifteen articles presented in this book. Most of the papers discuss new technology.

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Shale oil, tar sands, and related fuel sources, in the collection Advances in chemistry series, No. 151, 184 p., illus., Am. Chem. Soc., Washington, D. C., United States, 1976. Individual papers within the scope of this bibliography are cited under the separate authors.

This volume was written because petroleum has achieved great importance as a concentrated fuel in American industrial life and because oil from oil shale promises to supplement the supplies of well petroleum. (From preface, p. vii)

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Structural investigations of Green River oil shale kerogen: Ann Arbor Sci. Publ. Inc., Ann Arbor, Mich., United States, 1976. In Science and Technology of oil shale, p. 193-203, illus.

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Composition and oil yield of some oil shales, worldwide and nationwide, are shown and their potantial contribution as energy reserves discussed. Advantages and disadvantages of convential and in situ retorting processes are outlined, and paragraph summaries of some ex-situ processes are presented. Color plates of thin sections and descriptive comparisons of Appalachian, Chattanooga and Green River shales are given.

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Yen, T. F. See Kim, K. E. 00187

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The nature of straight-chain aliphatic structures in Green River kerogen: Geochim. Cosmochim. Acta, Vol. 41, No. 10, p. 1411-1417, illus. (incl. tables), 1977.
This paper describes experimentation of mild degradative reactions caused by permanganate solution reaction on Mahogany ledge Green River kerogen. Gas-liquid chromatography and mass spectrometry were used to detect some of the products, as was proton-NMR spectroscopy. A discussion of the experiment is presented, and a model for structure of the Green River kerogen is illustrated.

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Young, E. G. See Munson, D. E. 01491

Young, N. B. See Johnson, Donald R. 01125

Young, N. B. See Johnson, D. R. 01124

Young, Neil B. See Smith, John Ward 01954

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Youngguist, W. See Miller, A. K. 01440

Yu, Chi-an See Wang, Pi-chen 02279

Zagidullina, F. G. See Pernikov, M. A. 01627

Zajic, James E. See Quigley, Robert M. 01693

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Zasorina, Ye. F. See Azizkulova, O. A. 00071

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02395 Zorkin, L. M.; Staduik, Ye. V.; Soshnikov, V. K. Geochemistry of gases in ground water in Devonian terrigenous rocks of the Russian Platform: Acad. Sci., SSSR, Dokl., Earth Sci. Sect., Vol. 203, p. 200-202, 1972.

This paper discusses the gas composition and the gas-content ratio of strata water in Devonian terrigenous rocks of the Russian platform. (From p. 201)

GEOGRAPHICAL INDEX

Acland, Australia
See 00094

Africa
See 01543

Africa
See 01636

Africa (north)
See 01838

Africa (south)
See 02090

Africa (south)
See 00041

Alabama
See 00902

Alabama
See 00903

Alabama
See 01677

Alabama, Jefferson County
See 00519

Alabama, Limestone County
See 01161

Alabama (north central)
See 00372

Alabama (northeastern)
See 00904

Alaska
See 00686

Alaska
See 02063

Alaska
See 02125

Alaska
See 02294

Alaska
See 02324

Alaska (northern)
See 02026

Alberta, Canada Leduc area
See 00038

Alberta, Canada Redwater area
See 00038

Alberta, Canada Slettler area
See 00038

Alexis quadrangle, Illinois
See 02280

Alps (east)
See 01008

Alton, Illinois
See 00738

Amazon shelf
See 00892

Antarctica, Ross Sea
See 01807

Appalachian area
See 00620

Appalachian area
See 01509

Appalachian area (central)
See 02081

Appalachian Basin
See 00601

Appalachian Basin
See 00635

Appalachian Basin
See 00842

Appalachian Basin
See 00975

Appalachian Basin
See 01260

Appalachian Basin
See 01439

Appalachian Basin
See 02196

Appalachian Basin
See 02272

Appalachian Basin
See 02274

Appalachian Basin
See 02273

Appalachian Basin
See 02292

Appalachian Basin
See 01423

Appalachian Basin (central)
See 01682

Appalachian region
See 01428

Appalachians
See 00495

Appalachians
See 00801

Appalachians
See 01018

Appalachians
See 01893

Appalachians (central)
See 00618

Appalachians (central)
See 00619

Argentina
See 00218

Arizona
See 00221

Arizona, Marble Canyon Quadrangle
See 00993

Arkansas
See 01805

Arkansas
See 02008

Arkansas
See 02052

Asia
See 02097

Asia
See 02095

Asia, Middle
See 00124

Athens
See 00926

Atlantic Ocean
See 01405

Australia
See 01249

Australia
See 01304

Australia
See 01326

Australia
See 01543

Australia
See 02099

Austria
See 00906

Austria, Carnic Alps
See 00104

Austria, Salzburg, Mitterburg Copper Deposit
See 00006

Avon quadrangle
See 01823

Baltic Basin
See 01199

Baltic region
See 01232

Bandanna Formation, Queensland
See 00036

Beardstown quadrangle
See 01873

Beardstown quadrangle
See 02281

Beaufort Basin
See 00224

Belgium
See 01295

Birds quadrangle, Illinois
See 01826

Black Hills region
See 01797

Black Sea
See 00389

Bowen Basin
See 02056

Brazil
See 00003

Brazil
See 00018

Brazil
See 00490

Brazil
See 00645

Brazil
See 00827

Brazil
See 00829

Brazil
See 01245

Brazil
See 01367

Brazil
See 01368

Brenznik region, U. S. S. R. Krasova
See 01227

British Columbia
See 01619

British Columbia
See 02347

Bulgaria
See 00040

Bulgaria
See 02269

Bulgaria
See 02268

Burma
See 00283

Burma
See 00490

California
See 00490

California
See 01026

California
See 01463

California
See 01641

California, Walker River Basin
See 02220

California, Kern County-Elk Hills
See 01376

California, Livermore
See 01495

California, Long Beach Unit
See 02134

California, San Diego
See 00408

California, Santa Barbara County
See 00911

California, Santa Barbara County
See 00910

Commonwealth of Australia
See 01887

Canada
See 0125

Canada
See 00613

Canada
See 00623

Canada
See 00743

Canada
See 00742

Canada
See 00746

Canada
See 00747

Canada
See 01692

Canada
See 01784

Canada
See 01908

Canada, Alberta (Zama area)
See 01513

Canada, Arctic Ellesmere Island
See 01171

Canada, District of MacKenzie
See 01370

Canada, District of MacKenzie
See 01371

Canada, Quebec
See 01160

Canada, Selwyn Basin, Yukon and District of MacKenzie
See 00207

Canada (western)
See 00178

Canada (western)
See 00250

Canadian Appalachians
See 00562

Canton quadrangle
See 01823

Cariinville quadrangle
See 00089

Cave Valley Basin, Nevada
See 02217

Chattanooga Shale
See 00135

Chattanooga Shale
See 00166

Chattanooga Shale
See 00220

Chattanooga Shale
See 00256

Chattanooga Shale
See 00379

Chattanooga Shale
See 00482

Chattanooga Shale
See 00480

Chattanooga Shale
See 00481

Chattanooga Shale
See 00483

Chattanooga Shale
See 00485

Chattanooga Shale
See 00486

Chattanooga Shale
See 00484

Chattanooga Shale
See 00498

Chattanooga Shale
See 00494

Chattanooga Shale
See 00544

Chattanooga Shale
See 00698

Chattanooga Shale
See 00703

Chattanooga Shale
See 01176

Chattanooga Shale
See 01302

Chattanooga Shale
See 01314

Chattanooga Shale
See 01358

Chattanooga Shale
See 01658

Chattanooga Shale
See 01847

Chattanooga Shale
See 02050

Chattanooga Shale
See 02158

Chattanooga Shale
See 02159

Chattanooga Shale
See 02157

Chattanooga Shale
See 02248

Chattanooga Shale
See 02349

Chien-Tao province, southeast China
See 01808

Chile
See 00490

China
See 02279

China, Jehol province
See 00007

China, Manchuria (south)
See 00007

China's Petroleum Industry
See 00506

Cincinnati Arch
See 01064

Cincinnati Arch province
See 01344

Cobden quadrangle
See 01815

Colorado
See 00001

Colorado
See 00005

Colorado
See 00013

Colorado
See 00012

Colorado
See 00087

Colorado
See 00092

Colorado
See 00109

Colorado
See 00144

Colorado
See 00174

Colorado
See 00233

Colorado
See 00237

Colorado
See 00306

Colorado
See 00397

Colorado
See 00421

Colorado
See 00422

Colorado
See 00438

Colorado
See 00478

Colorado
See 00479

Colorado
See 00520

Colorado
See 00540

Colorado
See 00597

Colorado
See 00598

Colorado
See 00645

Colorado
See 00676

Colorado
See 00705

Colorado
See 00732

Colorado
See 00759

Colorado
See 00753

Colorado
See 00823

Colorado
See 00826

Colorado
See 00825

Colroado
See 00824

Colorado
See 00887

Colorado
See 00886

Colorado
See 00915

Colorado
See 00944

Colorado
See 00994

Colorado
See 01043

Colorado
See 01044

Colorado
See 01045

Colorado
See 01118

Colorado
See 01184

Colorado
See 01222

Colorado
See 01259

Colorado
See 01272

Colorado
See 01268

Colorado
See 01269

Colorado
See 01273

Colorado
See 01281

Colorado
See 01323

Colorado
See 01511

Colorado
See 01404

Colorado
See 01475

Colorado
See 01480

Colorado
See 01498

Colorado
See 01499

Colorado
See 01562

Colorado
See 01697

Colorado
See 01725

Colorado
See 01744

Colorado
See 01756

Colorado
See 01760

Colorado
See 01763

Colorado
See 01766

Colorado
See 01793

Colorado
See 01818

Colorado
See 01884

Colorado
See 01924

Colorado
See 01930

Colorado
See 01951

Colorado
See 01973

Colorado
See 01997

Colorado
See 02006

Colorado
See 02101

Colorado
See 02160

Coloraro
See 02190

Colorado
See 02209

Colorado
See 02211

Colorado
See 02313

Colorado
See 02350

Colorado
See 02355

Colorado, Debeque
See 00428

Colorado, Debeque
See 00605

Colorado, Debeque
See 00606

Colorado, Denver
See 00044

Colorado, Denver
See 00338

Colorado (east and northwest)
See 00781

Colorado, Eocene Green River Formation
See 00989

Colorado, Eocene Green River Formation
See 00559

Colorado, Eocene Green River Formation
See 00628

Colorado, Fort Collins
See 00507

Colorado, Fort Collins
See 01415

Colorado, Garfield
See 01343

Colorado, Garfield
See 02271

Colorado, Garfield and Rio Blanco Counties
See 00681

Colorado, Garfield and Rio Blanco Counties
See 00682

Colorado, Garfield County
See 00713

Colorado, Garfield County
See 02271

Colorado, Green River
See 00030

Colorado, Green River
See 00032

Colorado, Green River
See 01014

Colorado, Green River
See 01753

Colorado, Green River
See 01947

Colorado, Green River
See 01995

Colorado, Green River
See 02110

Colorado, Green River Formation
See 00233

Colorado, Green River Formation
See 00237

Colorado, Green River Formation
See 00365

Colorado, Green River Formation
See 00461

Colorado, Green River Formation
See 00462

Colorado, Green River Formation
See 00626

Colorado, Green River Formation
See 00656

Colorado, Green River Formation
See 00679

Colorado, Green River Formation
See 00680

Colorado, Green River Formation
See 00684

Colorado, Green River Formation
See 00723

Colorado, Green River Formation
See 01036

Colorado, Green River Formation
See 01297

Colorado, Green River Formation
See 01449

Colorado, Green River Formation
See 01897

Colorado, Green River Formation
See 01932

Colorado, Green River Formation
See 01939

Colorado, Green River Formation
See 01941

Colorado, Green River Formation
See 01994

Colorado, Green River Formation
See 02000

Colorado, Green River Formation
See 02001

Colorado, Green River Formation, 02132

Colorado, Green River Formation, southeast Uinta Basin
See 00381

Colorado, Green River Formation, Uinta Basin
See 00384

Colorado, Green River Formation, Uinta Basin
See 00385

Colorado, Mesa County
See 02271

Colorado (northwest)
See 00175

Colorado (northwest)
See 00187

Colorado (northwest)
See 00307

Colorado (northwest)
See 01033

Colorado (northwest)
See 01364

Colorado (northwest)
See 01563

Colorado (northwest)
See 02254

Colorado, Piceance Creek Basin
See 00059

Colorado, Piceance Creek Basin
See 00106

Colorado, Piceance Creek Basin
See 00107

Colorado, Piceance Creek Basin
See 00140

Colorado, Piceance Creek Basin
See 00148

Colorado, Piceance Creek Basin
See 00342

Colorado, Piceance Creek Basin
See 00343

Colorado, Piceance Creek Basin
See 00407

Colorado, Piceance Creek Basin
See 00458

Colorado, Piceance Creek Basin
See 00459

Colorado, Piceance Creek Basin
See 00461

Colorado, Piceance Creek Basin
See 00604

Colorado, Piceance Creek Basin
See 00630

Colorado, Piceance Creek Basin
See 00628

Colorado, Piceance Creek Basin
See 00677

Colorado, Piceance Creek Basin
See 00678

Colorado, Piceance Creek Basin
See 00679

Colorado, Piceance Creek Basin
See 00693

Colorado, Piceance Creek Basin
See 00757

Colorado, Piceance Creek Basin
See 00956

Colorado, Piceance Creek Basin
See 01016

Colorado, Piceance Creek Basin
See 01165

Colorado, Piceance Creek Basin
See 01362

Colorado, Piceance Creek Basin
See 01363

Colorado, Piceance Creek Basin
See 01441

Colorado, Piceance Creek Basin
See 01500

Colorado, Piceance Creek Basin
See 01501

Colorado, Piceance Creek Basin
See 01646

Colorado, Piceance Creek Basin
See 01648

Colorado, Piceance Creek Basin
See 01790

Colorado, Piceance Creek Basin
See 01921

Colorado, Piceance Creek Basin
See 01952

Colorado, Piceance Creek Basin
See 02388

Colorado. Plateau
See 00959

Colorado, plateau
See 01890

Colorado (southwest)
See 00201

Colorado, Rifle
See 00728

Colorado, Rifle
See 00737

Colorado, Rifle
See 00848

Colorado, Rifle
See 00847

Colorado, Rifle
See 00846

Colorado, Rifle
See 00853

Colorado, Rifle
See 00854

Colorado, Rifle
See 00852

Colorado, Rifle
See 01407

Colorado, Rifle
See 01422

Colorado, Rifle
See 01577

Colorado, Rifle
See 01902

Colorado, Rifle
See 01918

Colorado, Rifle
See 01970

Colorado, Rifle
See 02109

Colorado, Rio Blanco
See 01452

Colorado, Rio Blanco and Garfield Counties
See 00711

Colorado, Rio Blanco County
See 00341

Colorado, Rio Blanco County
See 00349

Colorado, Rio Blanco County
See 00387

Colorado, Rio Blanco County
See 00576

Colorad, Rio Blanco County
See 00577

Colorado, Rio Blanco County
See 00405

Colorado, Rio Blanco County
See 00406

Colorado, Rio Blanco County
See 02394

Colorado River Basin
See 01391

Colorado, Rulison
See 00851

Connecticut, East Berlin Formation
See 00047

Connecticut, East Berlin Formation
See 01292

Covasna Valley, central Romania
See 00927

Darmstadt, city, southern West Germany
See 01833

Deep River Valley, north central, North Carolina
See 02246

Devonian Chkalov region, Orenburg, Russia
See 01380

Devonian, Mississippian (east central)
See 01034

Devonian, Mississippian, Ohio
See 00808

Eastern Interior Coal Basin
See 00166

Eastern Interior Coal Basin, Mississippian border
See 02310

Edington quadrangle Wiltshire, England
See 01827

Ellesmere Island, Canada, Arctic
See 01171

England, Clee Hills area, Shropshire
See 00019

Eocene, Green River Formation southwest Wyoming
See 00101

Eocene, Green River Formation southwest Wyoming
See 00310

Eocene, Green River Formation southwest Wyoming
See 00952

Estonia
See 00490

Estonia
See 01406

Estonian, Russian
See 00439

Eungella, Queensland
See 02270

Eungella district Plevna, Queensland
See 01722

Europe
See 00844

Europe
See 00845

Europe
See 00947

Europe
See 01838

Europe
See 01840

Europe (western)
See 00194

Far East, east and southeast Asia
See 02095

Far East, east and southeast Asis, Burma, China
See 02097

Florida, Marion County Mud Lake
See 01082

Florida, Mud Lake
See 00241

France
See 00412

France
See 00413

France
See 00417

France
See 00419

France
See 00487

France
See 00488

France
See 00490

France
See 01351

France
See 01375

France
See 01676

France
See 02232

France, Gevandan region
See 00420

France, Herault
See 01006

France, Paris
See 00410

France, Paris
See 00411

France, Paris
See 00414

France, Paris
See 00415

France, Paris
See 00416

France, Paris
See 00418

France, Paris Basin
See 00400

Frankfort quadrangle
See 00336

Foresudetic Monocline Lower Permian rocks
See 00072

Galilee Basin, north Israel
See 00021

Gallia quadrangle, Ohio
See 00336

Georgia
See 00858

Georgia, Chattanooga Shale
See 00903

Georgia (northwest)
See 00269

Gerogia (northwest)
See 00904

Germany
See 00638

Germany
See 01862

Germany
See 02326

Glasford quadrangle, Illinois
See 02281

Glasgow, west central Scotland, Lanark County
See 00502

Great Basin, Nevada, Utah, California, Idaho, Wyoming, and Oregon
See 01812

Great Basin Devonian Western Assemblage, Nevada, Utah, Idaho, California, Wyoming
See 00188

Great Plains, central North America from Rockies to central plains of U. S.
See 01388

Great Plains, central North America from Rockies to central plains of U. S.
See 01387

Great Plains, central North America from Rockies to central plains of U. S.
See 02122

Great Plains, central North America, from Rockies to central plains of U. S.
See 02123

Great Plains region
See 02121

Greece, Athens
See 01006

Green River
See 00031

Green River
See 00037

Green River
See 00565

Green River
See 00566

Green River
See 01133

Green River
See 01400

Green River
See 01430

Green River
See 01431

Green River
See 01492

Green River
See 01493

Green River
See 01654

Green River
See 01655

Green River
See 01675

Green River
See 01749

Green River
See 01752

Green River
See 01754

Green River
See 01759

Green River
See 01922

Green River
See 01928

Green River
See 01952

Green River
See 01954

Green River
See 02102

Green River
See 02106

Green River
See 02105

Green River
See 02107

Green River
See 02111

Green River
See 02109

Green River
See 02113

Green River
See 02112

Green River
See 02114

Green River
See 02360

Green River
See 02383

Green River
See 02387

Green River Basin
See 00581

Green River Basin
See 01644

Green River Formation,
Colorado
See 00232

Green River Formation,
Colorado
See 00235

Green River Formation,
Colorado
See 00309

Green River Formation,
Colorado
See 00627

Green River Formation,
Colorado
See 00650

Green River Formation,
Colorado
See 00669

Green River Formation,
Colorado
See 00673

Green River Formation,
olorado
See 00674

Green River Formation,
Colorado
See 00683

Green River Fromation,
Colorado
See 00786

Green River Formation,
Colorado
See 01290

Green River Formation,
Colorado
See 01450

Green River Formation,
Colorado
See 01751

Green River Formation,
Colorado
See 01758

Green River Formation,
Colorado
See 01842

Green River Formation,
Colorado
See 01896

Green River Formation,
Colorado
See 01940

Green River Formation,
Colorado
See 01945

Green River Formation, Colorado
See 02131

Green River Formation, Colorado
See 02389

Green River Formation, Colorado
See 00233

Green River Formation, Colorado
See 00237

Green River Formation, Colorado
See 00462

Green River Formation, Colorado
See 00679

Green River Formation, Colorado
See 00680

Green River Formation Colorado
See 01036

Green River Formation, Colorado
See 01939

Green River Formation, Utah
See 00233

Green River Formation, Utah
See 00237

Green River Formation, Utah
See 01755

Green River Formation, Wyoming (southwestern)
See 00233

Green River, Wyoming
See 00029

Green County, Illinois
See 00465

Hardin County, Illinois
See 00330

Hardinville quadrangle, Illinois
See 01826

Haut-Rhin, St. Hippolyte northeast France
See 00353

Havana quadrangle, central Illinois
See 02282

Havana quadrangle, central Illinois
See 02281

Hsing-an Province north Manchuria
See 01828

Hudson Bay basin
See 01552

Hungary
See 01701

Hungary, Balton Highland
See 01107

Hungary, Dunantul (Pula and Gerce)
See 00048

Hungary, Dunantul
See 01107

Hungary, Kemineshat
See 01107

Huron County, Ohio
See 01849

Idaho
See 00915

Idaho
See 01413

Idaho
See 02254

Idaho
See 02355

Idaho, Bonneville
See 02252

Idaho, Bonneville
See 02251

Idaho, Bonneville
See 02253

Idaho, Cassia County
See 00920

Idaho, Cassia County
See 00954

Idaho, Cassia County
See 01390

Idaho, Cassia County
See 01389

Idaho (southeastern)
See 00500

Illinois
See 00053

Illinois
See 00122

Illinois
See 00167

Illinois
See 00184

Illinois
See 00463

Illinois
See 00929

Illinois
See 00934

Illinois
See 00965

Illinois
See 01057

Illinois
See 01066

Illinois
See 01067

Illinois
See 01065

Illinois
See 01108

Illinois
See 01177

Illinois
See 01256

Illinois
See 01262

Illinois
See 01263

Illinois
See 01264

Illinois
See 01360

Illinois
See 01416

Illinois
See 01483

Illinois
See 01509

Illinois
See 01572

Illinois
See 01571

Illinois
See 01588

Illinois
See 01595

Illinois
See 01607

Illinois
See 01613

Illinois
See 01786

Illinois
See 01820

Illinois
See 01819

Illinois
See 01859

Illinois
See 01878

Illiniois
See 01891

Illinois
See 02013

Illinois
See 02046

Illinois
See 02147

Illinois
See 02302

Illinois
See 02303

Illinois
See 02301

Illinois
See 02300

Illinois
See 02308

Illinois
See 02325

Illinois
See 02330

Illinois
See 02331

Illinois
See 02336

Illinois
See 02343

Illinois
See 02344

Illinois
See 02367

Illinois
See 02368

Illinois, Alexis quadrangle
See 02280

Illinois, Alto Pass quadrangle
See 00127

Illinois, Alto Pass quadrangle
See 00128

Illinois, Alton
See 00738

Illinois Basin
See 00212

Illinois Basin
See 00473

Illinois Basin
See 01064

Illinois Basin
See 01109

Illinois Basin
See 01110

Illinois Basin
See 02304

Illinois Basin, Illinois
See 00065

Illinois, Birds quadrangle
See 01826

Illinois, Chicago
See 01068

Illinois, Clark County
See 01482

Illinois, Clinton County
See 00356

Illinois, Devonian formations
See 00523

Illinois, Devonian system
See 00472

Illinois, Greene County
See 00465

Illinois, Hardin County
See 00231

Illinois, Hardin County
See 01647

Illinois, Hardin County
See 02311

Illinois, Hardinville quadrangle
See 01826

Illinois, Jersey County
See 00465

Illinois, Karbers Ridge quadrangle
See 00143

Illinois, Kinderhook-New Albany shale
See 00169

Illinois, Loncoln Fold
See 00477

Illinois, Madison County
See 00465

Illinois, Madison County
See 01359

Illinois, Marion County
See 01029

Illinois, Monmouth
See 02365

Illinois, McClasky
See 00168

Illinois, McLean County
See 02366

Illinois, Nouvoo
See 01254

Illinois, New Albany shale group
See 00449

Illinois, Rosiclare quadrangle
See 00143

Illinois (southwestern)
See 01825

Illinois (southern)
See 00179

Illinois (southern)
See 00474

Illinois, Sumner quadrangle
See 01826

Illinois, Union County
See 01253

Illinois, Vincennes quadrangle
See 01826

Illinois, Warsaw
See 00738

Illinois, Washington County, McKinley pool
See 00105

Illinois (western)
See 00470

Illinois (western)
See 00476

Illinois (western)
See 00471

Illinois (western and northern)
See 01960

India
See 02145

Indian Ocean
See 00926

Indian (subcontinent)
See 00283

Indiana (southeastern)
See 00763

Indiana (southwestern)
See 00159

Indiana
See 00344

Indiana
See 00490

Indiana
See 00596

Indiana
See 00762

Indiana
See 01714

Indiana
See 01712

Indiana
See 01978

Indiana
See 00977

Indiana
See 01052

Indiana
See 01177

Indiana
See 01189

Indiana
See 01330

Indiana
See 01328

Indiana
See 01329

Indiana
See 01331

Indiana
See 01345

Indiana
See 01717

Indiana
See 01716

Indiana
See 01715

Indiana
See 11713

Indiana
See 01746

Indiana
See 01835

Indiana
See 01963

Indiana
See 02043

Indiana, Benton
See 01418

Indiana, Clark
See 00217

Indiana, Delphi
See 01396

Indiana, Floyd
See 00217

Indiana, New Albany shale
See 01053

Indiana, New Albany shale
See 00702

Indiana, North Vernon
See 01024

Indiana (southern)
See 01190

Indiana (southwestern)
See 00166

Indiana, White
See 01418

Iowa
See 00056

Iowa
See 01180

Iowa
See 01202

Iowa, Cedar Valley, Shell Rock, Lime Creek
See 00692

Iowa, central section
See 00081

Iowa, Devonian Cedar Valley Formation
See 01175

Iowa, Sweetland Creek Shale
See 01440

Israel, Gevar'am shales
See 00026

Israll, Helez Oil Field
See 00457

Italy
See 01374

Japan
See 01062

Japan
See 01221

Japan
See 01814

Japan (central)
See 01221

Japan, Niigota Tertiary Basin
See 01221

Jehol, China
See 00007

Jersey County, Illinois
See 00465

Jonesboro quadrangle, Illinois
See 01822

Jurassic Basin
See 01156

Kansas
See 00767

Kansas
See 00894

Kansas
See 00909

Kansas
See 00987

Kansas
See 01061

Kansas
See 01272

Kansas
See 01268

Kansas
See 01269

Kansas
See 01270

Kansas
See 01273

Kansas
See 01460

Kansas
See 01800

Kansas
See 01801

Kansas
See 01805

Kansas (central)
See 00988

Kansas (eastern)
See 00273

Kansas (southeastern)
See 00181

Karbus Ridge quadrangle
Illinois
See 00143

Kazakhstan (eastern)
See 00928

Kentucky
See 00015

Kentucky
See 00196

Kentucky
See 00211

Kentucky
See 00490

Kentucky
See 00553

Kentucky
See 00555

Kentucky
See 01190

Kentucky
See 01167

Kentucky
See 01308

Kentucky
See 01309

Kentucky
See 01527

Kentucky
See 01532

Kentucky
See 01445

Kentucky
See 01451

Kentucky
See 01481

Kentucky
See 01551

Kentucky
See 01702

Kentucky
See 01703

Kentucky
See 01746

Kentucky
See 01821

Kentucky
See 01880

Kentucky
See 01943

Kentucky
See 02045

Kentucky
See 02072

Kentucky
See 02074

Kentucky
See 02299

Kentucky, Big Sandy
Gasfield
See 01059

Kentucky (eastern)
See 00067

Kentucky (eastern)
See 00898

Kentucky (eastern)
See 01058

Kentucky (eastern)
See 01683

Kentucky, Estill County
See 00554

Kentucky, New Albany Formation
See 01955

Kentucky, New Albany Formation
See 01956

Kentucky (southern)
See 00498

Kentucky (western)
See 00166

Kentucky (western)
See 00450

Kentucky (western)
See 01788

Kentucky (western)
See 02100

Kinderhook, Columbia County, southeast New York
See 00521

Kinderhookian series, New York
See 00469

Kinderhook, New York
See 02150

Kinderhook, New York
See 00800

Koburra Trough, Kobuk, Alaska
See 00020

Korea
See 01296

Krasava
See 01227

Krasava, USSR, Brenznik region
See 01227

Kuibyshev Volga region, Russia
See 01240

La Vela Bay
See 02244

Libreville, Gagon, Africa
See 01075

Lo-Tzu-Kon district, Chien Tao province, Manchuria
See 01808

Louisiana, Claiborne Parish
See 00192

Louisiana, Krotz Springs Field
See 00455

Mackenzie River delta, Reindeer Well
See 00146

Madison County, Illinois
See 00465

Manchuria
See 00490

Manchuria
See 02231

Manchuria (south), China
See 00007

Mandra
See 00298

Marcellus, Ohio
See 01730

Marcellus, Ohio
See 01731

Marine Basins
See 01729

Maryland
See 00986

Massachusetts, East Berlin Formation
See 00047

Maury Formation
See 00983

Michigan
See 01142

Michigan
See 01398

Michigan
See 01506

Michigan
See 01781

Michigan
See 02326

Michigan, Barry County
See 01324

Michigan Basin
See 01533

Michigan, Ontonagon County
See 02377

Michigan (southeastern)
See 00736

Middle Carpathians
See 01201

Milan quadrangle
See 01827

Mississippi
See 02235

Mississippi
See 02036

Mississippi, Clarke County
See 00076

Mississippi Embayment
See 01064

Mississippi River
See 00738

Mississippi Valley
See 02339

Mississippi Formation
See 02309

Mississippian stratigraphy (in Illinois Basin)
See 00065

Missouri
See 00246

Missouri
See 00938

Missouri
See 00937

Missouri
See 01061

Missouri
See 01466

Missouri
See 01819

Missouri
See 02151

Missouri
See 02235

Missouri
See 02344

Missouri
See 00244

Missouri, Old Monroe
See 01254

Montana
See 00180

Montana
See 01852

Montana
See 02355

Montana, Beaverhead County
See 00222

Montana, Bowdain area
See 00551

Montana, Disturbed Belt
see 00208

Montana (eastern)
See 00749

Montana (northeastern)
See 00247

Montana, Phosphoria Formation
See 00130

Montana, Townsend and Helena valleys
See 00160

Montana (western)
See 00500

Montana (western)
See 00957

Montana (western)
See 00955

Morgantown
See 02318

Natal, Impendhle County
See 00720

Nebraska
See 01169

Nebraska (northeastern)
See 01168

Netherlands
See 01287

Nevada
See 00274

Nevada
See 01463

Nevada, Cave Valley Basin
See 02217

Nevada, Elko County
See 01390

Nevada, Pahianagat Range, Lincoln County
See 01811

Nevada, Smoke Creek Desert Basin
See 02218

Nevada, Winuemucca Dry Lake Basin
See 02219

New Albany shale
See 00166

New Brunswick
See 00741

New Brunswick
See 00744

New Brunswick
See 00923

New Brunswick
See 01191

New Brunswick
See 01735

New Brunswick,
See 01898

New Brunswick, Albert mines
See 00009

New Brunswick, east Canada
See 00490

New Brunswick, Rosevale area
See 00748

New Brunswick, Taylor Village
See 00010

New England states
See 00562

New Guinea, Paupa
See 01304

New Jersey, Park Ridge
See 01518

New Mexico
See 00201

New Mexico
See 00705

New Mexico
See 00740

New Mexico
See 00802

New Mexico
See 00820

New Mexico
See 00821

New Mexico
See 00915

New Mexico, Carbonaceous rocks
See 00073

New Mexico, La Ventana Mesa area
See 00075

New Mexico, Mora County
See 02135

New Mexico, Rio Arriba County
See 00074

New Mexico, Sandoval
See 01706

New Mexico, Sandoval County
See 00074

New Mexico, Sandoval County
See 02255

New Mexico (southwestern)
See 01214

New York
See 00969

New York
See 01198

New York
See 01553

New York
See 01799

New York
See 01869

New York
See 02245

New York, Erie County
See 00266

New York, Erie County
See 00267

New York, Kinderhook
See 00800

New York, Kinderhook
See 02150

New York Paleozoic
See 00687

New York (southwestern)
See 00900

New York (west central)
See 00084

New Zealand
See 01977

Niigota Tertiary Basin, Japan
See 01221

Nile Delta
See 01401

Nord region, north France
See 00200

North America
See 01138

North America
See 01774

North America
See 01863

North America
See 01860

North America (western states)
See 01598

North Carolina
See 02247

North Dakota (lignite)
See 00364

North Eromanga Basin
See 01601

North Queensland, Broken River Province
See 00055

Norway
See 01903

Nova Scotia
See 00490

Nova Scotia
See 00741

Nova Scotia
See 00744

Nova Scotia
See 00809

Nova Scotia
See 01735

Nova Scotia, Pictou County
See 00694

Nova Scotia, Pictou County
See 02059

Nova Scotia, Pictou County
See 02060

Ohio
See 00066

Ohio
See 00223

Ohio
See 00245

Ohio
See 00345

Ohio
See 00448

Ohio
See 00467

Ohio
See 00490

Ohio
See 00750

Ohio
See 00808

Ohio
See 01027

Ohio
See 01112

Ohio
See 01173

Ohio
See 01257

Ohio
See 01266

Ohio
See 01265

Ohio
See 01319

Ohio
See 01320

Ohio
See 01528

Ohio
See 01447

Ohio
See 01561

Ohio
See 01557

Ohio
See 01559

Ohio
See 01560

Ohio
See 01592

Ohio
See 01593

Ohio
See 01594

Ohio
See 01590

Ohio
See 01616

Ohio
See 01730

Ohio
See 01731

Ohio
See 01746

Ohio
See 01772

Ohio
See 01848

Ohio
See 01849

Ohio
See 01867

Ohio
See 01868

Ohio
See 01964

Ohio
See 02010

Ohio
See 02023

Ohio
See 02062

Ohio
See 02104

Ohio
See 02245

Ohio (central)
See 02103

Ohio, Cleveland
See 01220

Ohio, Cleveland
See 02236

Ohio, Columbiana County
See 02025

Ohio, Erie and Louan
See 00355

Ohio, Huron County
See 01849

Ohio, Marcellus
See 01730

Ohio, Marcellus
See 01731

Ohio (northwestern)
See 00736

Ohio (northwestern)
See 00773

Ohio, Pike County
See 00778

Ohio, Ravenna
See 02333

Oklahoma
See 00027

Oklahoma
See 00215

Oklahoma
See 00272

Oklahoma
See 01061

Oklahoma
See 01805

Oklahoma, Ellis County (southern)
See 00203

Oklahoma (northeastern)
See 00390

Oklahoma (northeastern)
See 00391

Oklahoma (northeastern)
See 02129

Oklahoma, Osage County
See 01294

Oklahoma, Tulsa
See 00668

Oregon
See 01463

Oregon
See 01564

Orsha Basin, Russia
See 01284

Orshanskiy Basin
See 01283

Oslo region, southeast Norway
See 00197

Pacific Ocean
See 00926

Pacific Ocean
See 01727

Paris
See 01079

Paris Basin
See 01051

Parana Basin, central South America
See 00625

Pas-de-Calais coal basin
See 00200

Pennsylvania
See 00767

Pennsylvania
See 00787

Pennsylvania
See 00788

Pennsylvania
See 01549

Pennsylvania
See 01551

Pennsylvania
See 01772

Pennsylvania
See 01869

Pennsylvania
See 02068

Pennsylvania
See 02245

Pennsylvania
See 02284

Pennsylvania
See 02298

Pennsylvania Beaver
See 00780

Pennsylvania (central)
See 00264

Pennsylvania (central)
See 01139

Pennsylvania, Clearfield
See 00780

Pennsylvania, Jefferson
See 00780

Pennsylvania (northwestern)
See 00392

Pennsylvania State University
See 00612

Pennsylvanian Cyclothems
See 00997

Piceance Creek Basin
See 00704

Piceance Creek
(west central)
See 01950

Piceance Creek Basin,
Colorado
See 00458

Piceance Creek Basin,
Colorado
See 01953

Podhale (eastern) between
the Tatra Mtns. - Piening
belt, Czechoslovakia
See 01402

Pope County, Illinois
See 00330

Pripet Basin
See 00070

Pripet Basin
See 00079

Pretoria, Natal, Impendhle
County, South Africa
See 00720

Quebec, Bonaventure County
See 02060

Queensland
See 00097

Queensland
See 00156

Queensland
See 01327

Queensland
See 02055

Queensland
See 02054

Queensland (central)
See 00096

Queensland (central)
See 00504

Quincy and Liberty
Quadrangles, Florida
See 00543

Ravenna, Ohio
See 02333

Rifle, Colorado
See 00737

Rifle, Colorado
See 01407

Rifle, Colorado
See 01918

Rifle, Colorado
See 01970

Rifle, Colorado
See 02109

Rock Springs, Wyoming
See 01967

Rocky Mountain area
See 00145

Rocky Mountain District
See 00874

Rocky Mountain region
See 00715

Rocky Mountain section
See 00717

Rocky Mountain section
See 00856

Rocky Mountains
See 01387

Rocky Mountains
See 01388

Rosiclare quadrangle, Illinois
See 00143

Russia
See 00490

Russia
See 01212

St. Hippolyte, Haut-Rhin, northeast France
See 00353

Saline County, Illinois
See 00330

San-ho district
See 01828

Saskatchewan, Upper Devonian Birdbear Formation
See 01565

Scotland
See 00371

Scotland
See 00490

Scotland
See 00501

Scotland
See 00744

Scotland
See 00745

Scotland
See 01962

Scotland, the Lothians
See 00489

Scotland (northern)
See 00688

Scotland (northern)
See 00689

Sea of Asov
See 00389

Shawneetown, southeast Illinois
See 00392

Smoke Creek Desert Basin, Illinois
See 02218

South Africa
See 00490

South Carolina
See 01007

South Dakota
See 01169

South Dakota
See 01168

South Dakota
See 01852

South Wales
See 00490

Spain
See 01009

Spain
See 02091

Spain, Portilla de Luna
See 00111

Sumner Quadrangle, Illinois
See 01826

Sweden
See 00452

Sweden
See 01215

Sweden
See 01540

Sweden
See 01633

Sweden
See 02044

Sweden
See 02312

Sweden
See 02316

Switzerland
See 00158

Switzerland
See 00890

Sydney Basin
See 01414

Taiwan (northern)
See 00404

Tasmania
See 00490

Tasmania
See 00422

Tasmania
See 01720

Tatman Formation
See 01779

Tennessee
See 00198

Tennessee
See 00280

Tennessee
See 00294

Tennessee
See 00621

Tennessee
See 00902

Tennessee
See 00903

Tennessee
See 00904

Tennessee
See 01010

Tennessee
See 01203

Tennessee
See 01451

Tennessee
See 01551

Tennessee
See 01631

Tennessee
See 01657

Tennessee
See 01746

Tennessee
See 01768

Tennessee
See 02016

Tennessee
See 02017

Tennessee
See 02020

Tennessee
See 02053

Tennessee
See 02057

Tennessee
See 02345

Tennasse and adjacent areas
See 00983

Tennessee (central)
See 00497

Tennessee, central Tennessee Basin
See 00017

Tennessee, east central
See 00498

Tennessee, eastern Highland Rim
See 00491

Tennessee, Highland Rim and Walden area
See 00620

Tennessee, Macon County
See 01448

Tennessee, middle
See 00017

Tennessee, northeastern Highland Rim
See 02018

Tennessee, northeastern Highland Rim
See 02019

Tennessee (northern)
See 01707

Tennessee Rim (Eastern Highland)
See 01163

Tennessee, Waverlyan period
See 00129

Texas
See 00725

Texas
See 00807

Texas
See 01805

Texas
See 01966

Texas, Aransas County
See 00182

Texas Gulf Coast
See 00277

Texas Gulf Coast
See 00276

Texas Gulf Coast, Frio Formation
See 00157

Texas, Houston
See 02128

Texas (west)
See 00740

Thailand
See 00403

Thailand
See 01662

Tropical Atlantic Ocean
See 00892

Tung-ning
See 01809

Uinta and Piceance Creek Basins
See 00571

Uinta Basin
See 00570

Uinta Basin, Utah
See 00458

Uinta Basin, Utah
and Colorado
See 00108

Uinta Basin, Utah and
Wyoming
See 01037

Uinta Basin, Utah
and Wyoming
See 01174

U. S. S. R.
See 00895

U. S. S. R.
See 01145

U. S. S. R.
See 01637

U. S. S. R.
See 01724

U. S. S. R.
See 01229

U. S. S. R.
See 01877

U. S. S. R.
See 02264

U. S. S. R.
See 02395

U. S. S. R., Brenznick
region, Krasova
See 01227

United Arab Republic
See 01885

United Kingdom
(Yorkshire)
See 01980

United Nations
See 02097

United States
See 00018

United States
See 00088

United States
See 00557

United States
See 00561

United States
See 00600

United States
See 00710

United States
See 00707

United States
See 00714

United States
See 00716

United States
See 00803

United States
See 00828

United States
See 00891

United States
See 00914

United States
See 00916

United States
See 01106

United States
See 01119

United States
See 01162

United States
See 01241

United States
See 01258

United States
See 01411

United States
See 01568

United States
See 01570

United States
See 01858

United States
See 01908

United States
See 01987

United States
See 02036

United States
See 02051

United States
See 02058

United States
See 02220

United States
See 02287

United States
See 02321

United States
See 02357

United States
See 02351

United States
See 02383

United States, Atomic Energy Commission
See 00150

United States, Atomic Energy Commission
See 00153

United States, Atomic Energy Commission
See 00154

United States, Atomic Energy Commission
See 00149

United States (central)
See 00049

United States (central)
See 00050

United States (central)
See 00051

United States (east central)
See 00099

United States, east central interior
See 00550

United States (eastern)
See 00062

United States (eastern)
See 00496

United States (eastern)
See 01166

United States, north central region
See 00468

United States (southeastern)
See 00492

United States (western)
See 00525

United States, western interior
See 00444

Upper Mississippi Valley
See 00475

Upper Rhine, Germany
See 00930

Utah
See 00005

Utah
See 00043

Utah
See 00174

Utah
See 00233

Utah
See 00237

Utah
See 00347

Utah
See 00383

Utah
See 00490

Utah
See 00500

Utah
See 00597

Utah
See 00598

Utah
See 00656

Utah
See 00822

Utah
See 01118

Utah
See 00915

Utah
See 01318

Utah
See 01740

Utah
See 01951

Utah
See 01994

Utah
See 02229

Utah
See 02254

Utah
See 02319

Utah
See 02355

Utah
See 02356

Utah, Boxelder County
See 01390

Utah (eastern)
See 00705

Utah, Eocene, Green River Formation
See 00628

Utah, Green River
See 01691

Utah, Green River
See 02002

Utah, Green River Formation
See 00086

Utah, Green River Formation
See 00233

Utah, Green River Formation
See 00237

Utah, Green River Formation
See 00656

Utah, Green River Formation
See 00684

Utah, Green River Formation
See 01449

Utah, Green River Formation
See 01755

Utah, Green River Formation
See 01994

Utah, Green River Formation, eastern Utah Basin
See 00379

Utah, Green River Formation, southeastern Uinta Basin
See 00381

Utah, Green River Formation, Uinta Basin
See 00384

Utah, Green River Formation, Uinta Basin
See 00385

Utah, Kane Creek
See 00586

Utah (northeast)
See 00466

Utah (northeast)
See 00187

Utah, Red Wash Field, Green River Formation
See 01218

Utah, Uinta
See 01441

Utah, Uinta Basin
See 00458

Utah, Uinta Basin
See 00630

Utah, Uinta Basin
See 01645

Utah, Uinta Basin
See 01741

Utah, Uinta Basin
See 01944

Utah, Uinta Basin (eastern)
See 01950

Utah, Uinta Basin, Green River Formation
See 00774

Utah, Uinta County
See 00387

Utah, Uinta and Carbon Counties
See 00380

Utah, Uinta County, Green River
See 01948

Uzon hydrothermal system
See 00189

Vendom quadrangle
See 01531

Vermont quadrangle, Illinois
See 01824

Vermont quadrangle, Illinois
See 02281

Vienna
See 01071

Vincennes quadrangle, Illinois
See 01826

Virginia
See 00810

Virginia
See 00986

Virginia
See 01023

Virginia
See 01746

Virginia
See 01965

Virginia, Salem quadrangle
See 00022

Virginia, Springfield
See 00373

Virginia, Springfield
See 00374

Vosges Mountains, northeast France
See 00931

Wales, New South
See 01249

Wales, New South
See 02342

Wales, South
See 00204

Wales, South
See 00205

Walker River Basin, California
See 02220

Warsaw, Illinois
See 00738

Washakie Basin, Wyoming
See 00233

Washington, D. C.
See 00045

Washington, Red Oreille River Valley
See 01394

West Siberian Platform
See 01652

West Virginia
See 00986

West Virginia
See 00990

West Virginia
See 01457

West Virginia
See 01551

West Virginia
See 01609

West Virginia
See 01610

West Virginia
See 01612

West Virginia
See 01965

West Virginia
See 02299

West Virginia
See 02364

West Virginia, Lincoln County
See 01575

West Virginia, Mingo County
See 00671

West Virginia (southwest)
See 00077

West Virginia University
See 01892

Winuemucca Dry Lake Basin, Nevada
See 02219

Wisconsin
See 01142

Wisconsin
See 01878

Wyoming
See 00174

Wyoming
See 00233

Wyoming
See 00436

Wyoming
See 00490

Wyoming
See 00500

Wyoming
See 00539

Wyoming
See 00639

Wyoming
See 00656

Wyoming
See 00915

Wyoming
See 01118

Wyoming
See 01213

Wyoming
See 01355

Wyoming
See 01511

Wyoming
See 01534

Wyoming
See 01699

Wyoming
See 01850

Wyoming
See 01853

Wyoming
See 01852

Wyoming
See 01946

Wyoming
See 01994

Wyoming
See 02355

Wyoming, Campbell County
See 01883

Wyoming, Cretaceous Mowry shale
See 00590

Wyoming, Eocene Green Rvier Formation
See 00628

Wyoming, Fuson Formation
See 00236

Wyoming, Green River
See 00029

Wyoming, Green River
See 00578

Wyoming, Green River
See 01949

Wyoming, Green River
See 02077

Wyoming, Green River Basin
See 00560

Wyoming, Green
River Basin
See 00575

Wyoming, Green River
Basin
See 00579

Wyoming, Green
River Basin
See 00580

Wyoming, Green River
Basin
See 01644

Wyoming, Green
River Formation
See 00300

Wyoming, Green
River Formation
See 00626

Wyoming, Green
River Formation
See 00656

Wyoming, Green
River Formation
See 01356

Wyoming, Green
River Formation
See 01449

Wyoming, Green
River Formation
See 01745

Wyoming, Green
River Formation
See 01770

Wyoming, Green
River Formation
See 01920

Wyoming, Green
River Formation
See 01942

Wyoming, Green
River Formation
See 01994

Wyoming, Green
River Formation
See 02065

Wyoming, Hamilton
Dome, Bighorn
See 00182

Wyoming, Laramie
See 00538

Wyoming, Laramie
See 02092

Wyoming, Lincoln County
Wee 01507

Wyoming, Rock Springs
See 00321

Wyoming, Rock Springs
See 00346

Wyoming, Rock Springs
See 01967

Wyoming (southwest)
See 00187

Wyoming (southwest)
See 02254

Wyoming,
Sweetwater County
See 00239

Wyoming, Sweetwater
County
See 01172

Wyoming, Washakie Basin
See 01771

Wyoming, Washakie Basin
See 02133

Wyoming, Washakie Basin,
Green River Formation
See 01298

Wyoming, Wind River
Basin
See 02124

Yugoslavia
See 02259

Yugoslavia
See 01346

Yugoslavia
See 01361

ADDENDUM I

UGR Reports, Well Logs and Symposiums

A listing of reports, well logs, symposiums, and maps published in the Unconventional Gas Recovery (UGR) File of the Morgantown Energy Technology Center, Morgantown, West Virginia. Any questions and/or requests for personal copies of UGR File documents, logs, or maps should be addressed to:

Morgantown Energy Technology Center
U. S. Department of Energy
P. O. Box 880
Morgantown, WV 026505
Phone - (304) 599-7274

Certain numbers have a letter preceding the number, with the following meanings:

B. . . .Bibliographies

C. . . .Contractor Reports -- These are quarterly, semiannual, and annual reports of progress by EGSP Contractors. They are not cross referenced except by the name of the contractor, name of the PI, as Resource Characterization or Extraction Technolggy.

L. . . .Logs

M. . . .Maps -- Maps are listed following the report, well log, and symposium indices, with the map author-subject index following the map listing.

S. . . .Symposiums

001 "Increasing Eastern U. S. Natural Gas Reserves From Gas Bearing Shales." Overbey, William K., Paper Number SPE 6364, AIME, Columbus, OH, November 18-19, 1976, 8 p.

002 "Devonian Shale Gas." Science Applications, Inc., MERC/SP-77/3, June 1977, 24 p.

003 "ERDA Research in Fracturing Technology." Komar, C. A., Paper Number SPE 6363, AIME, Columbus, OH, November 18-19, 1976, 12 p.

004 "Natural Gas From Eastern U. S. Shales." Schrider, Leo A., C. A. Komar, and J. Pasini III, Paper Number SPE 6841, AIME, Denver, CO, October 9-12, 1977, 4 p.

005 "Some Practical Considerations in X-Radiography." Renton, John J., WVGES, MERC/SP/77-7, December, 1977, 30 p.

B006 "Bibliography of Upper Devonian Shale Sequence." Tripplett, J. C., and D. B. Trumbo, December 1975, 78 p.

007 "Drilling a Directionally Deviated Well to Stimulate Gas Production From a Marginal Reservoir in Southern West Virginia." Overbey, W. K., Jr. and W. M. Bryan, MERC/TPR-76/3, No Date, 33 p.

S008 "Devonian Shale Production and Potential, Proceeding of the Seventh Appalachian Petroleum Geology Symposium held at Morgantown, W. Va., March 1-4, 1976." Shumaker, R. C. and W. K. Overbey, Jr., Editors, WVGES, WVU, and MERC, MERC/SP-76/2, 271 p.

009 "Three Lick Bed: Useful Stratigraphic Marker in Upper Devonian Shale in Eastern Kentucky and Adjacent Areas of Ohio, West Virginia, and Tennessee." Provo, Linda J., Roy C. Kepferle, and Paul Edwin Potter, U. of Cin. and USGS, MERC/CR-77-2, No date, 56 p.

010 "Large Scale Foam Fracturing in the Devonian Shale -- A Field Demonstration in West Virginia." Frohne, K.H., MERC/TPR-77/2, April 1977, 14 p.

011 "Comparison of Conventional Hydraulic and Water/ Nitrogen Foam Fracutring in Two Ohio Devonian Shale Gas Wells." Frohne, K-H., MERC/TPR-76/1, February 1976, 12 p.

012 "lithologic Description of Core Material From Nicholas Combs No. 7239 Well, Perry County, Kentucky." Byrer, C. W., and D. B. Trumbo, MERC/TPR-76/2, May, 1976, 22 p.

013 "Lithologic Description of Cored Wells 11940 and 12041 in the Devonian Shale in the Cottageville, West Virginia Area." Byrer, C. W., D. B. Trumbo, MERC/TPR-76/7, October 1976, 22 p.

014 "Use of Uncorrected X-ray Diffraction Data in Quantitative Analytical Determination." Renton, John J., WVGES, MERC/CR-7710, October 1977, 20 p.

015 "Exchange Cations in the Devonian Shale Sequence." Maynard, J. Barry and R. Ulmschneider, U. of Cin., MERC/CR-77/9, October 1977, 10 p.

B016 "Geology of Argillaceous Sediments, an Annotated and Illustrated Bibliography." Potter, Paul Edwin, J. Barry Maynard, and Wayne A. Pryor, U. of Cin., MERC/CR-77/8, June 1977, 134 p.

017 "Devonian Shale-Fracturing Fluids Studies." Chenevert, Martin E., Chenevert & Associates, Inc., Final Report, September 8, 1977, 24 p.

018 "Organic Composition of Devonian Shale from Perry County, Kentucky." Lamey, Steven C. and Edward E. Childers, MERC/TPR-77/3, December 1977, 26 p.

019 "Fields and Laboratory Procedures for Oriented Core Analysis of Devonian Shales." Byrer, C. W. and C. A. Komar, MERC/SP-77/4, August 1977, 15 p.

020 "A Borehole Grarity Survey to Determine Density Variations in the Devonian Shale Sequence of Lincoln County, West Virginia." Schmoker, James W., USGS, MERC/CR-77/7, May 1977, 15 p.

021 "Petrography of Selected Devonian Shale Core Samples From the CGTC 020403 and CSGC 11940 Wells, Lincoln and Jackson Counties, West Virginia." Larese, Richard E., and Milton T. Heald, WVGES and WVU, Dept. of Geol. & Geography, MERC/CR-77/6, No date, 27 p.

022 "Subsurface Stratigraphy and Gas Production of the Devonian Shales in West Virginia." Patchen, Douglas G., WVGES, MERC/CR-77/5, March 1977, 35 p.

023 "Prediction of Fracture Extent by Stimulation of Gas Well Pressure and Production Behavior." Sawyer, W. K., J. C. Mercer, and K-H. Frohne, MERC/TPR-76/8, October 1976, 20.

024 "Lithologic Description of Core Material From Glen Gery #5/745 Well, Rose Township, Carroll County, Ohio." Byrer, C. W., and S. J. Rhoades, MERC/TPR-76/6, October 1976, 20 p.

025 "Lithologic Description of Cored Wells #20402 and #20403 in the Devonian Shale in Lincoln County, West Virginia." Byrer, C. W., M. K. Vickers, S. J. Rhoades, and B. G. Easterday, MERC/TPR-76/9, October 1976, 58 p.

026 "Fractographic Logging for Determination of Pre-Core and Core-Induced Fractures -- Nicholas Combs No. 7239 Well, Hazard, Kentucky." Kulander, Byron R., Stuart L. Dean, and Christopher C. Barton, MERC/CR-77/3, January 1977, 44 p.

027 "Eastern Gas Shales Project Newsletter." in Devonian Shale Gas, Science Applications, Inc., V. I, Issue 1, October 1977, 8 p.

028 "Development of a Rationale for Stimulation Design in the Devonian Shale." Komar, C. A., SPE 7166, June 7-9, 1978, 14 p.

029 "Stratigraphy of the Upper Devonian-Lower Mississippian Shale Sequence in the Eastern Kentucky Outcrop Belts." Swager, Dennis Ray, Thesis submitted to Frank R. Ettensohn, U. of KY, 1978, 116 p.

030 "In Situ Stress Determination in the Devonian Shale (IRA McCOY 20402) Within the Rome Basin." Brechtel, C. E., A. S. Abou-Sayed, Terra Tek, Inc., and R. J. Clifton, Brown University, TR76/36, July 1976, 45 p.

031 "DOE-METC Gas Well Testing Service Contract No. EW-78-C-21-8096, Well Test Analysis for Pacific States Gas and Oil Company L. Bonnet No. 1 Well." Gruy Federal, Inc., Vols. 1 and 2, December 6, 1978, 111 p.

032 "Environmental Impact Assessement for the Proposed MERC-1 Gas Well to be Drilled at the Morgantown Energy Research Center, Morgantown, West Virginia." DOE/MERC, January 1978, 59 p.

033 "Test Prognosis for Pacific States Gas and Oil Company Well, Gilmer County, West Virginia." Gruy Federal, Inc., February 1979, 10 p.

034 "DOE-METC Gas Well Testing Service Contract No. EW-78-C-21-8096, Well Test Analysis for Kentucky-West Virginia Gas Company Well No. 1627." Gruy Federal, Inc., Submitted to USCOE/METC, January 25, 1979, Vols. 1 and 2, 39 p.

035 "Mountain State Geology." Erwin, Robert B., WVGES, December 1977, 59 p.

036 "Rock Mechanics Studies Related to Massive Hydraulic Fracturing of Eastern United States Devonian Shales Final Core Analysis Report." Rogers, L. A., A. S. Abou-Sayed, E. R. Simonson, R. Lingle, L. M. Buchholdt,

and A. H. Jones, Terra Tek, Inc., Submitted to Columbia Gas System Service Corportation, March 1977, 64 p.

037 "Appendix A, Comparison of Log and Laboratory Measured P-Wave and S-Wave Velocities; Appendix B, Comparison of Laboratory and Log Data; Appendix C, Method For Determining the Permeability of Rock Samples; Appendix D, Flow Capacity Measurements." Terra Tek, Inc., Submitted to Columbia Gas System Service Corporation, June 6, 1977, 34 p.

038 "Determination of the Strain Relaxation and Their Relation to Subsurface Stresses in the Devonian Shale." Swolfs, H. S., R. Lingle, and J. M. Thomas, Terra Tek, Inc., Submitted to Columbia Gas System Service Corporation, February 1977, 36 p.

039 "Fracture Investigation of the Devonian Shale Using Geophysical Well Logging Techniques." Myung, John L., WVGES, March 1976, 29 p.

040 "Appliaction of Remote Sensing Studies to the Interpretation of Fracture Systems and Structural Styles in the Plateau Regions of Eastern Kentucky, Southwestern Virginia, and Southwestern West Virginia for Appliaction to Fossil Fuel Extraction Processes." Werner, Eberhard, WVU, Dept. of Geol. & Geography, December 1977, 98 p. (9 Maps).

041 "Eastern Gas Shales Project, Field Operations." USDOE/MERC, 12 p.

042 "Stilumation Technology Development in the Eastern Gas Shales Project." Komar, C. A., K.H. Frohne, and A. B. Yost, MERC, February 28, 1978, 70 p.

043 "Amex-Vescorp Phase 1 Report, Eastern Gas Shales Project." Amex-Vescorp, June 1977, 60 p.

044 "Devonian-Mississippian Shale Sequence in Ohio." Hoover, Karl V., OHGS, Information Circular No. 27, 1960, 154 p. (3 Maps).

C045 "Evaluation of Methods for Stimulation and Characterization of Eastern Gas Shales." Los Alamos Scientific Laboratory Progress Reports (W-7405-ENG-36): 77Q3, 78Q1, Q3.

C046 "Characterization and Hydrocarbon Resource Appraisal of Middle and Upper Devonian Shales in New York." New York State Geological Survey (NYSGS) Quarterly Reports (EY-76-C-05-5206): 77Q1, Q3, Q4, 78Q2, Q3, Q4, 79Q1.

C047 "EGSP Study of the Upper Devonian Shale in Ohio." Ohio Division of Geological Survey (OHGS) Quarterly Reports (DE-AS05-76MC05200): 78Q2, Q3, Q4, 79Q1, Q2.

C048 "Analysis of Structural Geological Parameters that Influence Gas Production From the Devonian Shale of the Appalachian Basin." West Virginia University, Dept. of Geol. and Geography (WVU, Dept. of Geol. & Geography) Quarterly and Annual Rpports (DE-AC21-76MC05194): 77Q3, A77, 78Q1, Q2, Q3, Q4, A78-2 Vols., 79A1.

049 "Status and Results of ERDA's Devonian Shale Program." Hunt, A. E., and W. K. Overbey, Jr., MERC, June 1977, 11 p.

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AUTHOR - SUBJECT INDEX
FOR
UGR REPORTS, LOGS AND SYMPOSIUMS

Abel, Kathleen D.....C142
Abou-Sayed, A. S.....036
Advani, S. H.....125
AIME.....001, 003, 004
Alam, Javaid.....128
Alfred University.....114
Amek-Vescrop.....043
Amoco Production Company.....L145
Analysis Techniques (see Sample Analysis Techniques)
Anderson, Gordon.....C162
Annual Reports (see Contractor Reports, Resource Characterization Contractors, or Extraction Technology Contractors)
Appalachian Basin
    Biostratigraphy.....176
    Clay Mineralogy.....140
    Fractures.....040, 059, 064, 159
    Fracture Prediction.....137
    Gas Estimates.....058, 062, 128, 176
    Gas Production.....040, 058, 062, 128, 176
    Gas Production Barriers.....094
    Geochemistry.....117, 124, 131, 176
    Lineament Analysis.....040, 059, 060, 064, 137
    Paleontology.....113
    Physiochemistry.....119
    Specific Degasibility.....177
    Stratigraphy.....053, 110, 113, 163
    Structural Geology.....040
    Sulfur isotpoes.....139
    Three Lick Bed.....009
    Well Reports (Core Geology & Chemistry.....061, 113, 117, 119, 131, 176
    Well Stimulations & Testing.....062
Aquifers in West Virginia.....161
Archaeology in Ohio.....132
Ashland Oil, Inc.....L154
Attalla, A.....119
Avila, John.....058

Barton, Christopher C.....026
Battelle Columbus Laboratories.....C054, 150, 168
Berger, Philip S.....159
Bergstrom, Robert E.....C050
Bialobok, Stepnanie J.....127
Bibliographies.....B006, B016, B115

Big Sandy Field in Kentucky.....056, 172
Black, Deborah B.....132
Borehole Gravimeter.....020
Boyer, J. P.....150
Brechtel, C. E.....030, 116
Briggs, P. H.....068
Brown, Porter J.....062
Brownell, W. E.....114, 136
Buchholdt, L. M.....036
Byrer, C. W.....012, 013, 019, 024, 025

Canton Oil and Gas Company.....L083
Carlton, Richard W.....C047, 091
Carr, Donald D.....097
Cavities in West Virginia.....161
Chenevert & Associates, Inc.....017
Chenevert, Martin E.....017
Childers, Edward E.....018, 121, 127
Ciccioli, Paolo.....120
C. K. GeoEnergy Corporation.....103, 172
Clastic Formations.....035
Clay Mineralogy, Ap. Basin.....140
Clifton, R. J.....030
Colton, G. W.....053
Columbia Gas System Service Corporation (Col. GSSC).....036, 037, 038, 182
Columbia Gas Transmission Corporation (Col. GTC).....L074, L075, L076, L085, L086
Consolidated Gas Supply Corporation (Col. GSC).....L072, L080, L089, C111, 143
Contractor Reports, Extraction Technology (EGSP).....C045, C073, C111, C126, C162
Contractor Reports, Resource Characterization (EGSP).....C046, C047, C048, C050, C051, C054, C055, C070, C071, C092, C105, C106, C126, C134, C141, C142
Core Analysis or Core Description...see Sample Analysis Techniques or Well Reports (Core Geology and Chemistry)
Cottageville Area in West Virginia.... 013, 101, 123, 127, 172, 178, 180
Craft, B. D.....119
Crock, J. C.....068
Cross-Strike Structural Discontinuities.....137
Curran, D. R.....065
Curtis, John B.....144

Data Management, EGSP.....117
Dean, Stuart F.....026
Dennen, W. H.....C105
Dennison, John M.....110
Denson, Kenneth B.....120
Deviated Wells in West Virginia.....007, 143
Devonian Shale Production Characteristics.....179
DeWitt, Wallace.....057

Dixon, Jeanette M.....102, 169
Duffield, Susan Linda.....158

Easterday, B. G.....025
ECONGAS Program.....066
Eastern Gas Shales Project (EGSP)
    Bibliographies.....B006, B016, B115
    Contractor Reports (see Contractor Reports)
    Core Well Logs.....041
    Coring & Logging Plan.....095, 133
    Data Management.....118
    Description.....001, 002, 004, 041, 042, 049, 098, C126, 170
    Extraction Technology.....042, 066, 100, 103, 128, 135, 149, 183
    Field Operations.....041, 100, 103, 149
    Newsletters.....027, 035, 135
    Procurement Procedures.....149
    Resource Assessment.....128
    Shale Standard.....068
    Summary of Activities.....003, 042, 049, 098, 103, C126, 135, 149, 170
    Symposiums.....S008, S129, S130
    Well Reports (Core Geology & Chemistry).....061
Energy Research and Development Administration (ERDA).....098
Energy Resource of Indiana, Inc.....L087
Enhanced Gas Recovery (EGR).....002
Environmental and Regional Research Associates, Inc. (ERRA)...110
Environmental Impact.....032
Erwin, Robert B.....035, 138, 157, 171
Ettensohn, Frank R.....029
Evans, Mark A.....052
Exchangeable Cations.....015
Exploration Techniques.....010, 019, 020, 023, 026, 028, 030, 035, 036, 038, 039, 040, 065, 108, 135, 137, 160, 161, 169, 177, 179, 181, 183, 186
Extraction Technology Contractors (EGSP).....C045, C073, C111, C126, C162

Field and Laboratory Procedures (see Exploration Techniques, Sample Analysis Techniques, or a specific procedure or technique)
Fingleton, W. George.....144
Forrest, Robert M.....182
Fracturing (General)
    Chemical Explosive.....067, 181
    Cryogenic.....096
    Fluids 017, 179
    Foam.....010, 011, 096, 112, 156, 164
    Hydraulic.....011, 036, 066, 096, 116, 125, 179,
    Technology.....003, 036, 066, 100, 179, 182, 183
Fracturing Technology Inc.....112

Fractures (General)
Determination.....103
Description.....019, 026, 099, 169
In Situ Stress.....030, 108, 125
Mechanics.....125
Prediction.....023, 137, 159
Fractures and Faults (State Specific)
Regional Appalachian Basin.....040, 059, 064, 137, 159
Indiana.....122
Kentucky.....099, 178
West Virginia.....052, 063, 099, 108, 161,
Frohne, K-H.....010, 011, 023, 042, 164

Gangarao, H. V. S.....125
Gas Estimates (State Specific)
Regional, Appalachian Basin.....058, 062, 128, 176
Regional, Illinois Basin.....062, 133, 176
Regional, Michigan Basin.....062, 133
Illinois.....133
Indiana.....097, 133
Kentucky.....058, 133
Gas Liquid Solid Chromatography.....120
Gas Production (General)
Analysis of.....101, 103,
Barriers to.....094
Economics.....066, 094
Potential.....057
Stratigraphic Controls.....053
Gas Production (State Specific)
Regional, Appalachian Basin.....040, 058, 062, 128, 176
Regional, Illinois Basin.....176
Indiana.....097
Kentucky.....056, 058, 101, 102, 178
Ohio.....128
West Virginia.....022, 101, 102, 123, 128, 178, 180
Geochemical Techniques.....120
Geochemistry (State Specific)
Regional, Appalachian Basin.....117, 124, 131, 176
Regional, Illinois Basin.....117, 131, 176
GEOLOG System.....118
Geophysical Well Logging.....039
Ground Water in West Virginia.....107, 123
Gruy Federal, Inc.....031, 033, 034, 104, 133, 186

Hall, Vivian.....B115
Hanson, Merle E.....C162
Harper, John A.....C142
Harris, Leonard D.....053
Hartsock, James H.....031, 033, 034, 104, 186
Hasson, Kenneth O.....110

Hayes, John M.....120
Heald, Milton T.....021
Hoover, Karl V.....044
Hosterman, John W.....140
Hunt, Arlen E.....049
Hydraulic Fracturing.....011, 036, 066, 096, 116, 125, 179, 182
Hydrology in West Virginia.....107

Illinois (State Specific)
    Gas Estimates.....133
    Well Logs.....L082, L084, L086, L151
    Well Reports (Core Geology & Chemistry).....117, 119, 131, 176
Illinois Basin
    Biostratigraphy.....176
    Gas Estimates.....062, 133, 176
    Gas Production.....176
    Geochemistry.....117, 131, 176
    Paleontology.....113
    Physiochemistry.....119
    Stratigraphy.....113
    Well Reports (Core Geology & Chemistry).....113, 117, 119, 131, 176
    Well (Stimulations & Testing).....062
Illinois State Geological Survey (ILSGS).....C050, C134
Indiana (State Specific)
    Fractures & Faults.....122
    Gas Estimates.....097, 133, 176
    Gas Production.....097, 176
    Lineament Analysis.....122
    Well Logs.....L087, L155
    Well Reports (Core Geology & Chemistry).....113, 117, 119, 131, 176
Indiana Geological Survey (INGS)...C070, 097, 122, L155
Indiana University.....120
In Situ Stress.....030, 036, 108, 116, 125

Jenkins, E. B.....156
Jointing of Joints (see Fractures)
Jones, A. H.....036, 037
Jones, D. Scott.....107, 123
Juniata College.....C055, 177

Kalyoncu, R. S.....150, 168
Kaolinite.....140
Kentucky (State Specific)
    Big Sandy Field.....056, 172
    Exchangeable Cations.....015
    Fractures.....099, 178
    Gas Estimates.....058, 133, 176

Gas Production.....056, 058, 101, 102, 176, 178
Lineaments.....172
Stratigraphy.....029
Structural Geology.....101, 102, 178
Three Lick Bed.....009, 029
Well Logs.....L079, L081, L085, L154
Well Reports (Core Geology & Chemistry).....012, 015, 018, 025, 067, 099, 113, 117, 119, 121, 124, 131, 176
Well Stimulations & Testing.....017, 034, 067, 104, 112, 116, 156, 182, 186
Kentucky West Virginia Gas Company..L081, 156
Keough, D. D.....065
Kepferle, Roy C.....009, 061
Kerogen.....121
Kirk, Keith.....102, 161
Knuston, Carroll F.....103, 172
Komar, C. A.....003, 004, 019, 028, 042, 183
Kucuk, Fikri.....128
Kujawa, Patrick S.....095
Kulander, Byron R.....026

Lamey, Steven C.....018, 121, 127
Larese, Richard E.....021, 069
LaRocca, S. J.....067, 181
Lawrence Livermore Laboratory (ILL).....C162
Leininger, Richard K.....097
Leventhal, J. S.....068
Lineament Analysis (State Specific)
Regional, Appalachian Basin.....040, 059, 060, 064, 137
Indiana.....122
Ohio.....043, 160
West Virginia.....063, 123, 172
Lineback, Jerry A.....C134
Lingle, R.....036, 037, 038
Loferski, Patricia J.....140
Logs (see Well Logs)
Logging Procedures (see Well Logging Procedures)
Long, B. R.....102
Los Alamos Scientific Laboratory....C045

Mahmud, Sarwar.....095
Malcolm, M. J.....068
Martin, Stephen J.....113
Maynard, J. Barry.....015, 016, C071, 139
McHugh, S. L.....065
McIver, Richard D.....131
McKetta, Steven F.....182
McManus, G. R.....143
Meinschein, Warren G.....120
Mercer, J. C.....023
Methane Recovery From Coalbeds Project (MRCP)
Extraction and Utilization Program.....187
Summary of Activities.....170
Symposiums.....S184

Metzler, R. N.....143
Michigan (State Specific)
    Well Stimulations & Testing.....112
Michigan Basin
    Gas Estimates.....062, 133
    Well Stimulations & Testing.....062
Milici, Robert C.....C106
Minard Run Oil Company.....L173
Mobay Chemical Corporation.....L152
Modeling
    Deformation.....159
    Hydraulic Fracture.....125
    Reservoir.....103, 128
Morgantown Energy Research Center (MERC).....001, 002, 003, 004, 006, 007, 008, 010, 011, 012, 018, 019, 023, 024, 026, 028, 032, 041, 042, 049, 127, S129
Morgantown Energy Technology Center (METC).....121, C126, S130, 135, 149, 164, 169, 183
Mound Facility.....C051, 113, 117, 118, 119 131, 176
Mountjoy, W.....068
Murri, W. J.....065
Myung, John L.....039

NAG-FRAG Fracture Model.....065
Nance, Steven W.....C051, 176
National Fuel Gas Supply Corporation.....L153
New York (State Specific)
    Well Logs.....L153
New York State College of Ceramics..114, 136
New York State Geological Survey (NYSGS).....C046
Northern Illinois Gas Company.....L084, L088
Northrop, D. A.....C073
Nuckols, E. B. III.....102

Ohio((State Specific)
    Archaeology.....132
    Exchangeable Cations.....015
    Gas Estimates.....176
    Gas Production.....128, 175, 176
    Geochemistry.....175
    Lineament Analysis.....043, 160, 175
    Paleontology.....044
    Petrology.....044, 175
    Stratigraphy..... .....044, 163, 175
    Structural Geology.....044
    Three Lick Bed.....009
    Well Logs.....L078, L083, L165, L166, L167, L174
    Well Reports (Core Geology & Chemistry).....024, 124, 131, 176
    Well Site Selection.....043, 132
    Well Stimulations & Testing.....011, 023, 182

Ohio Division of Geological Survey (OHGS).....044, C047, 091, 175
Okubo, Seisuke.....108
Overbey, William K.....001, 004, 006, 007, 049

Paleontology (State Specific)
    Regional, Appalachian Basin.....113
    Regional, Illinois Basin.....113
    Ohio.....044
    West Virginia.....035, 109, 158
Parsons Lineament, West Virginia...169
Pasini, J. III.....004
Patchen, Douglas G.....022, 069
Peebles, Christopher S.....132
Peng, Syd S.....108
Pennsylvania (State Specific)
    Well Logs.....L145, L173
    Well Stimulations & Testing.....164
Pennsylvania Division of Topographic and Geologic Survey (PAGS) C142
Petroleum Technology Corporation (PTC).....067, L146, L147,
Petrology (State Specific)
    Ohio.....044
    West Virginia.....069, 138, 157
Physiochemistry (State Specific)
    Regional, Appalachian Basin.....119
    Regional, Illinois Basin.....119
Piotrowski, Robert G.....C142
Potter Paul Edwin.....009, 016, 061, C071
Powell, Richard L.....122
Provo, Linda J.....009
Pryor, Wayne A.....016, C071

Quarterly Reports (see Contractor Reports, Resource Characterization Contractors, or Extraction Technology Contractors)

Rauch, Henry W.....102, 107, 123, 161
Ray, Edward O.....056
Rector & Stone Drilling Company.....L151
Reel Drilling Company.....L077
Remote Sensing.....040, 059, 060, 063, 064
Renton, John J.....005, 014, 185
Resistivity Survey.....161
Resource Characterization Contractors (EGSP).....C046, C047, C048, C050, C051, C054, C055, C070, C071, C092, C105, C106, C126, C134, C141, C142
Rhoades, S. J.....013, 024, 025
Rinaldi, Gianfranco.....120
River Gas Company.....L078
Rogers, L. A.....036
Rome Trough.....137
Ryan, W. M.....007

Sample Analysis Techniques.....005, 014, 019, 026, 035, 036, 037, 068, 091, 093, 114, 120, 136, 144, 177, 185
Sandia Laboratories.....C073
Sawyer, W. K.....023
Schettler, Paul.....C055, 177
Schott, Garry L.....C045
Schrider, Leo A.....004
Schuster, C. L.....C073
Schwietering, Joseph F.....163
Science Applications, Inc. (SAI)....002, 027, 100, C126, 128, 144, 179
Seabaugh, Pyrtle W.....118
Seaman, L.....065
Shafer, William E.....160
Shahrokhi, F.....060
Shale Standard.....068
Shaw, V. E.....068
Shumaker, Robert C.....C048, 099, 101, 102, 178, 180
Simonson, E. R.....036
Sinclair, A. Richard.....112
Smith, Lynne E.....143
Smith, S. E.....006
Smith, Steven T.....114, 136
Snyder, M. J.....C054, 150, 168
Snyder, Robert L.....114, 136
Specific Degasibility.....177
Spencer, A. M.....067, 181
Spray, Drying.....114, 136
SRI International.....065
Stacy, E.....119
Stimulation (see Fracturing or Well Stimulation)
Strain -- Relaxation Tests.....038
Stratigraphy (State Specific)
    Regional, Appalachian Basin.....053, 110, 113, 163
    Regional, Illinois Basin.....113
    Kentucky.....029
    Ohio.....044, 163
    West Virginia.....022, 035, 069, 107
Streib, Donald L.....128
Struble, Richard A.....C047, 175
Structural Geology (State Specific)
    Regional, Appalachian Basin.....040
    Kentucky.....101, 102, 178
    Ohio.....044
    West Virginia.....101, 102, 107, 178, 180
Sulfur Isotopes, Appalachian Basin..139
Swager, Dennis Ray.....029
Swolfs, H. S.....038
Symposiums.....S108, S129, S130, S184

Tailored Pulse-Loading.....065
Tennessee (State Specific)
    Three Lick Bed.....009
Tennessee Geological Survey (TNGS)..C106
Terra Tek, Inc.....030, 036, 037, 038, 116
Thomas, J. A.....068
Thomas, J. M.....038
Three Lick Bed.....009, 029
Thurlow-Weed & Associates, Inc.....160, L165, L166, L167, L174
Ting, Francis T. C.....093
Triplett, J. C.....006
Tri-Star Producing Company, Inc.....L082
Trumbo, D. B.....006, 012, 013
TRW.....066, 094, 095

Ulmschneider, R.....015
Unconventional Gas Recovery Program (UGR).....170
United States Department of Energy (USDOE).....L090
United States Geological Survey (USGS).....009, 020, 053, 057, 061, 068, 140, C141
University of Cincinnati (U. of Cin.).....009, 015, 016, 061, C071, 139
University of Kentucky (U. of KY)...029, C105, B115

VanTyne, Arthur M.....C046
Vickers, M. K.....025
Virginia (State Specific)
    Gas Estimates.....176
    Gas Production.....176
    Well Logs.....L086
    Well Reports (Core Geology & Chemistry).....113, 119, 131
    Well Stimulations & Testing.....182
Vitrinite Reflectance.....093

Wahlberg, J. S.....068
Warshauer, Steven M.....109, 124
Well Logs and Well Reports (Core Geology & Chemistry, Stimulations & Testing) by State, County, and Well Number (including EGSP and contractor numbers where different)
    Illinois
        Effingham County, Lancaster #1-D (EGSP #1L-1; Mound #1-1; Battelle #T-1).....L082, 117, 119, 131, 176
        Hardin County, Missouri-Portland #1 (EGSP #1L-4)....L151
        Henderson County, RAR #1 (EGSP #1L02; Mound #1-2; Batelle #N-1).....L088, 117, 119, 131, 176
        Tazewell County, MAK #1 (EGSP #1L-3; mound #1-3; Batelle #N-2).....L084, 117, 119, 131, 176
    Indiana
        Clarke County, SDH-290 (EGSP #N-2).....L155
        Batelle #P-1.....L087, 113, 117, 119, 131, 176

Kentucky

Christian County, RC #1 (EGSP #KY-2; Mound and Battelle #0-1.....112, 113, 117, 119, 131, 176

Johnson County, Skaggs Kelly #3-RS (EGSP #KY-4)...L154

Martin County, Col. GTC #20336 (EGSP #KY-3; Mound #KY-2; Battelle #C-336).....L079, 104, 113, 117, 119, 176, 182, 186

Martin County, Col. GTC #20337.....L085, 131, 182

Perry County, Nicholas Combs #7239 (EGSP #KY-1)...L081, 012, 018, 026, 112, 121, 124, 156

Perry County, KY-WV Gas Co. #1627.....034, 112, 186

Perry County, KY-WV Gas Co. #7246.....112

Perry County, PTC #685-1.....067

Michigan

Ostego County, Welch #1-15.....112

New York

Allegany County, JO #6213 (EGSP #NY-1)..L153

Ohio

Carroll County, Glen Gery #50745 (EGSP #OH-1; #GG5).....L083, 024, 124

Knox County, Everett Black #1.....L165

Knox County, Fravel #1.....L167

Knox County, Louise Beckholt #1.....L174

Knox County, Yauger #1.....L166

Trumbull County, #11236.....182

Washington County, FL House #R-109 (EGSP #OH-2; Mound and Bettelle #R-109).....L078, 131, 176

Youngstown, YST #16.....011

Youngstown, YST #17.....011

Youngstown, YST #18.....023

Pennsylvania

Fayette County, Francis R. Griffin #1...L145

McKean County, MR Exploration #1.....L173

Mercer County, PNG #4987 (JE Fleck #1)..164

Virginia

Wise County, Col. GTC #20338 (EGS #VA-1; Battelle #C-338).....L086, 017, 113, 117, 119, 131, 176 182

West Virginia

Gilmer County, L. Bonnet #1.....031, 033, 186

Jackson County, L. A. Baler #11940 (EGSP #WV-1; Mound #CW-A; WVGES #JACK 1369).....L098, 013, 021, 121, 124, 127, 131, 157, 176

Jackson County, W. B. Barnett #12501....L072, 143

Jackson County, W. L. Pinnel #12041 (EGSP #WV-2; Mound #CW-A; EVGES #JACK 1371).....L080, 010, 013, 121, 124, 127, 131, 171, 176

Lincoln County, Col. GTC #20401.....L075, 128, 182

Lincoln County, Col. GTC #20402 (EGSP #WV-4; Mound #CW-B; Battelle #C-2).....L074, 017, 020, 025, 030, 036, 128, 131, 168, 176

Lincoln County, Col. GTC #20403 (EGSP #WV-3; Mound #CW-B; Battelle #C-1; WVGES #Linc 1367).....L076, 021, 025, 036, 108, 109, 124, 128, 131, 138, 150, 158, 176, 182
Lincoln County, PTC #1.....L146
Lincoln County, PTC #2.....L147
Lincoln County, PTC #3.....L148
Mason County, D/K Farms #3 (EGSP #WV-5).....L977, 052, 112
Mingo County, Col. GTC #9675....007
Monongalia County, MERC #1 (EGSP #WV-6)....L090, 032, 116
Wetzel County, H. Emch & A. Pyles #1 (EGSP #WV-7)..L152

Well Logging Procedures.....026, 036, 037, 039, 095, 133, 144
Well Reports (Core Geology & Chemistry)
(see also Well Logs and Well Reports)
Regional, Appalachian Basin.....061, 113, 117, 119, 131, 176
Regional, Illinois Basin.....113, 117, 119, 131, 176
Illinois.....117, 119, 131, 176
Indiana.....113, 117, 119, 131, 176
Kentucky.....012, 015, 018, 026, 027, 067, 099, 113, 117, 119, 121, 124, 131, 176
Ohio.....024, 124, 131, 176
Virginia.....113, 119, 131, 176
West Virginia.....007, 013, 020, 021, 025, 030, 032, 036, 052, 099, 108, 113, 121, 124, 127, 128, 131, 138, 150, 157, 158, 168, 171, 176
Well Reports (Stimulations & Testing)
(see also Well Logs and Well Reports)
Regional, Appalachian Basin.....062
Regional, Illinois Basin.....062
Michigan Basin.....062
Kentucky.....017, 034, 067, 104, 112, 116, 156, 182, 186
Michigan.....112
Ohio.....011, 023, 182
Pennsylvania.....164
Virginia.....182
West Virginia.....007, 010, 017, 031, 033, 036, 112, 116, 143, 182, 186
Well Site Selection
Ohio.....043, 132
Well Stimulation & Testing (General)
Design.....023, 028, 116, 179, 183, 186
Economic Analysis.....066
Effectiveness.....096, 100, 103, 116, 186
Techniques.....042, 062, 065, 096, 100, 103, 116, 133, 164, 179, 183, 186
Zones.....038
Werner, Eberhard.....040, 059, 060, 063, 064

West Virginia (State Specific)
Borehole Gravity Survey.....020
Cottageville Area.....013, 101, 123, 127, 172, 178, 180
Deviated Wells.....007, 143
Foam Fracturing.....010
Fractures.....052, 063, 099, 108, 161, 169, 178
Gas Content.....150, 168
Gas Estimates.....176
Gas Production.....022, 101, 102, 123, 128, 176, 178, 180
Ground Water.....107, 123
In Situ Stress.....116
Lineaments.....063, 123, 172
Paleontology.....035, 109, 158
Parsons Lineament.....169
Petrology.....069, 138, 157, 171
Stratigraphy.....022, 035, 069, 107
Structural Geology.....101, 102, 107, 178, 180
Three Lick Bed.....009
Well Logs.....L072, L074, L075, L076, L077 L080, L089, L090, L146, L147, L148, L152
Well Reports (Core Geology & Chemistry).....007, 013, 020, 021, 025, 030, 032, 036, 052, 099, 108, 113, 121, 124, 127, 128, 131, 138, 150, 157, 158, 168, 171, 176
Well Stimulations and Testing...007, 010, 017, 031, 033, 036, 112, 116, 143, 182, 186
West Virginia Geological & Economic Survey (WVGES).....005, S008, 014, 021, 022, 035, 039, 069, C092, 093, 109, 124, 157, 158, 163, 171, 185
West Virginia University (WVU)
College of Engineering.....125
College of Mineral and Energy Resources.....108
Department of Geology & Geography.....S008, 021, 040, C048, 052, 059, 060, 063, 064, 099, 101, 137, 159, 161, 178, 180
Western Gas Sands Project (WGSP)....170
Westinghouse Electric Corporation...187
Wheeler, Russell L.....102, 137
Wilson, T. H.....102
Wise, R. L.....119
Woodfork, Larry.....C092

X-Radiography.....005
X-Ray Diffraction.....014, 091, 114, 136, 140, 185

Yost, Albert B. III.....042, 096
Young, Chapman.....179

Zielinski, Ronald E.....C051, 113, 117, 118, 119, 131, 132, 176

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AUTHOR - SUBJECT INDEX
FOR
UGR MAPS

Appalachian Basin
Cross Section.....M01, M05, M09, M15
Isopach Maps.....M02, M07, M12, M13, M16, M22
Lineament Maps.....M68
Structural Contour Maps.....M08

Bassett, John.....M28, M29, M30, M31, M32, M33

Chattanooga Shale.....M35
Cleveland Shale.....M13, M43, M46, M48
Colton, George W.....M68
Cottageville Gas Field.....M19
Cross Sections
Regional, Appalachian Basin.....M01, M05, M09, M15
Indiana.....M32
Kentucky.....M17, M59, M61
Ohio.....M04, M20, M62, M63, M64, M65, M66, M67
Pennsylvania.....M18, M20, M69, M70, M71, M72, M73, M74m M75, M76
West Virginia.....M04, M38, M40, M41, M42

Devonian Black Shale.....M01, M04, M05, M09, M15, M18, M20, M23, M24, M69, M70, M71, M72, M73, M74, M75, M76
Devonian Clastic Sequence.....M39, M40, M41, M42
deWitt, Wallace, Jr.....M04, M05, M09, M20

EGSP Map Series.....M18, M23, M24, M69, M70, M71, M72, M73, M74, M75, M76
Ettensohn, Frank R.....M15

Gas and Oil Shows Maps
Indiana.....M28, M33
Ohio.....M14
Gas Fields
Indiana.....M33
Gas Production Maps
Ohio.....M06
West Virginia.....M19
Gas Shows and Production Maps
Pennsylvania.....M24
Gas Well Locations
Indiana.....M32
Gearhart, Linda C.....M14
Genesse Formation.....M50, M51

Grapes, Charles R., II.....M14
Grassy Creek Shale.....M60

Hamilton Group.....M58
Haney, Donald C.....M61
Hasenmueller, Nancy.....M28, M29, M30, M31, M32, M33
Huron Shale.....M02, M07, M12, M21, M25,
M26, M27, M36, M37, M44, M45, M47, M49

Illinois (State Specific)
Lineament Maps.....M03, M10, M11
Indiana (State Specific)
Cross Section Locations.....M32
Gas and Oil Shows Maps.....M28, M33
Gas Fields.....M33
Gas Well Locations.....M32
Isopach Maps.....M30
Lineament Maps.....M03, M10, M11
Structural Contour Maps.....M29, M31
Indiana Geological Survey (INGS)....M03, M10, M11, M26, M29,
M30, M31, M32, M33
Isopach Maps
Regional, Appalachian Basin.....M02, M07, M12, M13, M16, M22
Indiana.....M30
Kentucky.....M35, M60
Ohio.....M36, M37, M38
West Virginia.....M26, M27, M43, M44, M45
M51, M53, M55, M57, M58

Janssens, A.....M06
Java Formation.....M54, M55

Kentucky (State Specific)
Cross Sections.....M17, M59, M61
Isopach Maps.....M35, M60
Structural Contour Maps.....M35
Kentucky Geological Survey (KYGS)...M17, M35, M59, M60, M61
Kepferle, Roy C.....M15
Krajewski, S. A.....M18, M23, M24, M69, M70,
M71, M72, M73, M74, M75, M76

Lineament Maps
Regional, Appalachian Basin.....M08
Illinois.....M03, M10, M11
Indiana.....M03, M10, M11

Majchszak, Frank L.....M21, M34, M36, M37, M38,
M62, M63, M64, M65, M66, M67
Marcellus Shale.....M21

New Albany Shale.....M28, M29, M30, M31, M32, M33, M35, M60
Norris, Ronald.....M17, M60
Nuckols, E. B.....M19

Ohio (State Specific)
Cross Sections.....M04, M20, M62, M63, M64, M65, M66, M67
Gas and Oil Shows Maps.....M14
Gas Production Maps.....M06
Isopach Maps.....M36, M37, M38
Structural Contour Maps.....M21, M34
Ohio Division of Geological Survey (OHGS).....M06, M14, M21, M34, M36, M37, M38, M62, M63, M64, M65, M66, M67
Ohio Shale.....M02, M06, M07, M08, M12, M13, M14, M16, M21, M22, M35, M36, M37, M43, M44, M45, M46, M47, M48, M49
Olentangy Shale.....M21, M22, M34, M38
Onondago Shale.....M23

Pennsylvania (State Specific)
Cross Sections.....M18, M20, M69, M70 M71, M72, M73, M74, M75, M76
Gas Show and Production Maps....M24
Structural Contour Maps.....M23
Pennsylvania Bureau of Topographic and Geologic Survey (PAGS)..
.....M18, M23, M24, M69, M70, M71, M72, M73, M74, M75, M76
Piotrowski, R. G.....M18, M23, M24, M69, M70, M71, M72, M73, M74, M75, M76
Potter, Paul Edwin.....M35
Provo, Linda J.....M02, M07, M08, M12, M13, M16, M22

Radioactive Shale Zones
Regional, Appalachian Basin.....M01, M05, M09, M15
Ohio.....M04, M34, M36, M37, M38
Pennsylvania.....M18, M20, M69, M70, M71, M72, M73, M74, M75, M76
West Virginia.....M04, M43, M44, M45, M51, M53, M55, M57, M58
Rhinestreet Shale.....M34, M38
Roen, John B.....M04, M05, M09, M20
Rough Creek Fault System.....M17

Schwalb, Howard.....M17, M35, M59, M60
Schwietering, Joseph F.....M43, M44, M45, M46, M47, M48, M49, M50, M51, M52, M53, M54, M55, M56, M57, M58
Sonyea Formation.....M56, M57
Structural Contour Maps
Regional, Appalachian Basin.....M08
Indiana.....M29, M31
Kentucky.....M35

Ohio.....M21, M34
Pennsylvania.....M23
West Virginia.....M25, M46, M47, M48, M49, M50, M52, M54, M56

Three Lick Bed.....M16

United States Geological Survey (UGSG).....M01, M04, M05, M09, M15
University of Cincinnati (U. of Cin.).....M02, M07, M08, M12, M13
Univeristy of Kentucky (U. of KY).....M61

Wallace, Laure G.....M04, M05, M09, M20
West, Mareta.....M01
West Falls Formation.....M34, M38, M52, M53
West Virginia (State Specific)
Cross Sections.....M04, M39, M40, M41, M42
Gas Production Maps.....M19
Isopach Maps.....M26, M27, M43, M44, M45, M51, M53, M55, M57, M58
Structural Contour Maps.....M25, M46, M47, M48, M49, M50, M52, M54, M56
West Virginia Geological and Economic Survey (WVGES)...M25, M26, M27, M39, M40, M41, M42, M43, M44, M45, M46, M47, M48, M49, M50, M51, M52, M53, M54, M55, M56, M57, M58
West Virginia University (WVU).....M19
Wier, C. E.....M03, M10, M11
Wilson, Edward N.....M15

ADDENDUM II

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GEOGRAPHICAL INDEX
ADDENDUM II

Appalachia
See Schmoker, 1979
Addendum II

Appalachian Basin (central)
See Fulton, 1977
Addendum II

Illinois Basin
See Bostick, 1971
Addendum II

Illinois Basin
See Wilson, 1971
Addendum II

Kentucky
See Barron, 1980
Addendum II

Kentucky
See Fensternaker, 1968
Addendum II

Kentucky
See Nunez, 1980
Addendum II

Kentucky
See Pasini, 1969
Addendum II

Kentucky (eastern)
See Dillman, 1980
Addendum II

Kentucky (eastern)
See Miller, 1978
Addendum II

Kentucky (eastern)
See Swager, 1978
Addendum II

Kentucky (eastern)
See Wilson, 1979
Addendum II

Kentucky (eastern)
See Wilson, 1971
Addendum II

Kentucky (eastern)
See Woock, 1980
Addendum II

Kentucky (eastern)
See Zafar, 1979
Addendum II

Pennsylvania
See Grow, 1964
Addendum II

Pennsylvania
See Penn. Geol. Surv., 1979
Addendum II

Pennsylvania
See Piotrowski, 1977
Addendum II

Rocky Mountain Region
See Winchester, 1923
Addendum II

United States
See Culbertson, 1973
Addendum II

United States
See Rickert, 1979
Addendum II

Virginia, Jonesville District
See Miller, 1954
Addendum II

Virginia, Lee County
See Miller, 1954
Addendum II

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