GEOLOGICAL SURVEY CIRCULAR 641

Selected Sources of Information on United States and World Energy Resources: An Annotated Bibliography

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GEOLOGICAL SURVEY CIRCULAR 641

Washington 1970

United States Department of the Interior

Geological Survey
William T. Pecora, *Director*

First printing 1970
Second printing 1971

Free on application to the U.S. Geological Survey, Washington, D.C. 20242

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INTRODUCTION

This bibliography is a revision and an updating of an earlier bibliography on the same subject by Trumbull (1961), cited under the heading "General references." In the 10 years since the Trumbull bibliography was assembled, the number of reports on energy resources has increased significantly, and many older reports have been updated or superseded. As interest in the occurrence and availability of fuel and energy resources continues unabated, this updated bibliography has been prepared as an aid to students and others interested in the total energy-resource problem.

This bibliography, like its predecessor, includes selected summary reports applicable primarily to the United States and, secondarily, to the world at large. The selected reports includes data on resources of conventional and unconventional energy resources, the availability and future prospects of developing each source, overall studies of certain geographic areas, production and use statistics, and the probable future course of energy development. Most of these reports are in English.

Most of the reports included in this selected list were published during the 1960's, but a few older reports of encyclopedic coverage or of historic interest are also included. These and a few other reports common to the two bibliographies retain the Trumbull (1961) annotations. Earlier or more detailed reports on specific subjects will be found in bibliographies included in most of the cited reports. The report by Trumbull also includes citations of older reports that are not re-cited here.

The annotations are intended as guides to the type of information found in the reports, rather than as conventional abstracts of the subject matter. Reports concerned with the interrelation among fuels, or with more than one of the topic headings, or that do not properly belong under any of the topic headings, have been cited under the heading, "General references." Such reports are not re-cited under individual topic headings, though most contain data appropriate to individual topic headings.

GENERAL REFERENCES

Colby, D. S., and Brooks, D. B., 1969, Mineral resources valuation for public policy: U.S. Bur. Mines Inf. Circ. 8422, 34 p.

A manual for making the type of mineral resource valuation commonly required for such public-policy problems as mineral leasing. Presents a simplified accounting system for calculating cash flow. Utilizes revenue, plant costs, operating expenses, depletion allowances, royalty payments, and sales price of product to establish value of the resource. No bibliography is provided.

Committee on Resources and Man, Division of Earth Sciences, National Academy of Sciences-National Research Council, 1969, Resources and man—a study and recommendations: San Francisco, W. H. Freeman and Co., 259 p.

Perhaps the best study and summation of the population-resource problem of the 1960–69 decade. Includes chapters by various authors on

most mineral commodities and on all sources of energy. Concentrates on North America, but it is applicable to the world at large. Introductory chapter, "Introduction and recommendations," is highly recommended.

Energy Policy Staff, 1963, Supplies, costs and uses of the fossil fuels: U.S. Dept. of the Interior, 34 p., 25 tables.

Estimates of total potential United States resources of the fossil fuel presented in four categories: (1) Known recoverable reserves, (2) undiscovered recoverable resources, (3) known marginal resources and (4) undiscovered marginal resources. Considerable emphasis is placed on cost, future trends in use, and in future need for supplemental sources of energy.

Fisher, J. L. and Potter, Neil, 1964, World prospects for natural resources—some projections of demand and indicators of supply to the year 2000: Baltimore, The Johns Hopkins Press, 73 p. Published for Resources for the Future, Inc., Washington, D.C.

An examination of trends in production, and (or) consumption, employment per unit of output, relative price and (or) cost, exports and imports, and rate of use compared to estimated stocks, reserves, or estimated potential for the United States and for the world. Considers food, energy nonfuel minerals, and forest products. Includes some projections of demand and indicators of supply to the year 2000. Draws cautiously optimistic conclusions for the near term.

Gooding, R. M., 1963, Production of mineral fuels and hydropower in the United States since 1800: U.S. Bur. Mines Inf. Circ. 8155, 33 p.

A short history of the production of energy from mineral fuels and water power in the United States with brief discussions of utilization, competition, and interchangeability. The periods for which data are given are: Coal, 1800–1960; oil, gas, and natural gas liquids, 1859–1960; and hydropower, 1900–1960. No bibliography is provided.

Grunwald, Joseph, and Musgrove, Philip, 1970, Natural resources in Latin American economic development: Baltimore, The Johns Hopkins Press, 516 p. Published for Resources for the Future, Inc., Washington, D.C.

An economic study based on detailed statistical data on resources, production, consumption, and trade for 16 commodities, including petroleum and coal, that collectively represent a major sector of the economy of Latin American countries. Related discussion considers developments over the past three or four decades and prospects for the near future.

Hanke, S. H., ed., 1969, The political economy of energy and national security: Colorado School Mines Quart., v. 64, no. 4, 218 p.

Comprises 13 papers by various authors presented at the Rocky Mountain Petroleum Institute, June 1969. Subjects discussed include: (1) Role of domestic and imported petroleum and natural gas in national security from point of view of government, industry, consumers, and foreign suppliers, (2) role of synthetic liquid fuels and gas, (3) oil imports, (4) conservation, and (5) Federal land-leasing policies.

Haun, J. B., ed., 1969, Future energy outlook—a symposium, given at 53rd Annual Meeting, American Association of Petroleum Geologists, 1968: Colorado School Mines Spec. Pub., 147 p.

A survey of the outlook for coal, oil, gas, oil shale, tar sands, nuclear fuels, geothermal energy, and fracturing with nuclear explosives.

Herfindahl, O. C., 1969, Natural resource information for economic development: Baltimore, The Johns Hopkins Press, 212 p. Published for Resources for the Future, Inc., Washington, D.C.

A discussion of the role of natural resources in economic development, including an analysis of the process by which resource information is generated and how this information is related to decisions on investment and production. Some guidelines for decisions on natural resource information programs are proposed.

Hodgkins, J. A., 1961, Soviet power-energy resources, production and potentials: Englewood Cliffs, N.J., Prentice-Hall, Inc., 190 p.

An informed, readable account of the total energy position of the U.S.S.R.

Hubbert, M. K., 1962, Energy resources, Nat. Acad. Sci. Natl. Research Council Pub. 1000–D, 141 p.

A mathematical and graphic analysis of the life expectancy of United States resources of mineral fuels based on various estimates of total resources, on projected population growth, and on the per capita increase in use of energy.

Institute of Fuel, 1970, Fuel abstracts and current titles: London, Inst. Fuels.

A monthly annotated bibliography of world literature on all technical and scientific aspects of fuel and power. Titles and annotations in English. Author and detailed subject indexes printed semiannually. Supersedes "Fuel Abstracts," published between 1947 and 1958.

Published monthly since May 1960.

Interdepartmental Energy Study Group, 1965, Energy R & D and national progress: Washington, U.S. Govt. Printing Office, 437 p.

———1966, Energy R & D and natural progress: findings and conclusions: Washington, U.S. Govt. Printing Office, 18 p.

An analysis as of late 1963 of United States and world energy resources, use, transportation, projected future requirements, projected future costs, environmental problems, and the need for a long-range national energy policy supported by a definitive plan of research and development on specific sectors of the energy spectrum.

Jensen, W. G., 1967, Energy in Europe, 1945–1980: London, G. T. Foulis & Co., Ltd., 203 p.

An examination of the developments in the field of energy supply and demand in Europe since the end of the Second World War from an economy based on a single source of energy, coal, to the emergence of multifuel economy by 1980.

Landsberg, H. H., Fischman, L. L., and Fisher, J. L., 1963, Resources in America's future—patterns of requirements and availabilities, 1960–2000: Baltimore, The Johns Hopkins Press, 1017 p. Published for Resources for the Future, Inc., Washington, D.C.

A detailed projection to the year 2000 of the demand for and supply of all mineral, water, and land resources as related to population and economic growth. Two chapters, nos. 15 and 20, are devoted to fuel and energy.

Landsberg, H. H., and Schurr, S. H., 1968, Energy in the United States—sources, uses, and policy issues: New York, Random House, 242 p. Published for Resources for the Future, Inc., Washington, D.C.

A nontechnical, broad discussion of the place of energy, and energy policy, in the American economy, past, present, and future.

Linvill, Bill, and others, 1970, Petroleum and oil-shale research of the Bureau of Mines, Fiscal year 1967–68: U.S. Bur Mines Inf. Circ. 8448, 162 p.

A summary of research on exploration, production, storage, processing, and utilization of petroleum, natural gas, oil shale, and tar sands, with abstracts of results reported in recent publications.

McKelvey, V. E., 1967, Contradictions in energy resource estimates, *in* Energy—Seventh Biennial Gas Dynamics Symposium, Evanston, Ill.: Evanston, Ill., Northwestern Univ. Tech. Inst., 31 p.

An explanation of apparent contradictions in energy-resource estimates that should aid in the more effective use of the estimates.

McKelvey, V. E., and Duncan, D. C., 1964, United States and world resources of energy: Submitted by the U.S. Delegation for the 3rd Symposium on the Development of Petroleum Resources of Asia and the Far East, Tokyo, Japan, 28 p.

Estimates of total potential United States and world resources of fossil fuel, atomic energy, and water power, expressed in 10^9 barrels of oil equivalent. Includes data on lithium, not readily available in other general sources.

McKelvey, V. E., Tracey, J. I., Jr., Stoertz, G. E., and Vedder, J. G., 1969, Subsea mineral resources and problems related to their development: U.S. Geol. Survey Circ. 619, 26 p.

Comprises seven statements made by United States representatives before the Economic and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of the Seabed and Ocean Floor beyond the Limits of National Jurisdiction during its March 1969 meeting. Includes discussion of: (1) Progress in the exploration for and development of subsea petroleum and natural gas and implications for the future, (2) potential ill effects of development of subsea mineral resources, (3) the origin, incidence, effects and means of prevention and control of oil-well blowouts, and (4) implications of geologic and economic factors to seabed resource allocations, development, and management.

McKelvey, V. E., and Wang, F. F. H., 1969, World subsea mineral resources: U.S. Geol. Survey Misc. Geol. Inv. Map I–632.

Four preliminary maps and an explanatory text showing potential subsea resources of selected minerals, including petroleum, coal, uranium and geothermal energy.

Moore, J. C., 1967, Observations and remarks on United States energy policy—presented to Energy Committee, Organization for Economic Cooperation and Development: Washington, U.S. Govt. Printing Office, 33 p.

A concise description of the de facto nature of United States energy policy, including discussion of the function of the private sector, Federal Government organizations, and State and local governments, and of future policy problems.

Morrison, W. E., and Readling, C. L., 1968, An energy model for the United States, featuring energy balances for the years 1947 to 1965 and projections and forecasts to the years 1980 and 2000: U.S. Bur. Mines Inf. Circ. 8384, 127 p.

A simplified energy model is presented for a recent historical period. This model is used for several case studies that estimate short- and long-range shifts in energy resources demand and required supply. Historical data are presented by source, form, and consuming sector. The domestic resource base is assessed in its ability to meet forecast demand, and various issues and problems identified from the case studies are discussed. A common base of British thermal units is used throughout. No bibliography is provided.

Supersedes U.S. Bureau of Mines Information Circular 8242.

Organization for European Economic Cooperation, 1960, Towards a new energy pattern in Europe: Paris, Organization European Econ. Coop., 125 p.

A report by the Energy Advisory Commission of the O.E.E.C. Topics discussed include trends in energy consumption, production, and imports; trends of demand for individual forms of energy; forecasts of aggregate requirments; potential indigenous supplies; prospective developments in the field of nuclear energy; and financing and policy problems. Includes many brief statistical tables and projections of data for 1965 and 1975.

Organization for Economic Cooperation and Development, 1969, Statistics of energy, 1953–1967: Paris, Organization Econ. Coop. and Devel., 265 p.

A staff report of the National Accounts and Growth Studies Division of basic energy data in three parts. Part 1: Statistics for energy for the whole of the OECD area (European and North American member countries and Japan). Part 2: Statistics for energy for each of the three divisions. Part 3: Statistics for energy in each OECD member country (except Japan). For each of these three divisions tables by sources of energy, 1953–67, and annual tables, 1965–67, are given. Energy data are not reported in common units but each energy source is reported in its typical unit. No bibliography is provided.

Petroleum Industry Research Foundation, Inc., 1969, A profile of energy consumption and cost patterns at the U.S. east coast: New York, Petroleum Industry Research Found., Inc., 31 p.

An analysis of fuel and power costs in three east coast regions—New England, mid-Atlantic States, and South Atlantic States. The analysis is concerned primarily with fuels and power consumed by nonindustrial-end users, although electric utilities are considered. All major energy sources were analyzed but special emphasis was put on heating oils. No bibliography is provided.

Polach, J. G., 1970, The development of energy in East Europe, *in* Economic developments in countries of Eastern Europe—A compendium of papers: U.S. 91st Cong., 2d sess., Joint Comm. Print, p. 348–433.

A study of the development of energy in East Europe from 1950 through 1967 by analysis of the pattern of energy requirements and supply, their composition, the origin and direction of energy and commodity trade, and the structure and adequacy of the energy-resource base. Contains a table on the energy resources of East Europe by country and commodity and a four-page selected bibliography.

Potter, Neal, and Christy, F. T., Jr., 1962, Trends in natural resource commodities—statistics of prices, output, consumption, foreign trade, and employment in the United States, 1870–1957: Baltimore. The Johns Hopkins Press, 568 p. Published for Resources for the Future, Inc., Washington, D.C.

Includes data on petroleum, natural gas, bituminous coal, and anthracite 1870–1957. Contains a brief summary by commodity and tables on a continuous, uniform basis to facilitate comparison.

Resources for the Future, 1968, U.S. energy policies—an agenda for research: Baltimore, the Johns Hopkins Press, 152 p. Published for Resources for the Future, Inc., Washington, D.C.

A review of United States resources of petroleum, natural gas, coal, electricity, nuclear energy, and shale oil and an analysis of national policies extant and those needed for the proper future development of these resources.

Schurr, S. H., and Netschert, B. C., with Eliasberg, V. F., Lerner, Joseph, and Landsberg, H. H., 1960, Energy in the American economy, 1850–1975; its history and prospects: Baltimore, The Johns Hopkins Press, 774 p. Published for Resources for the Future, Inc., Washington, D.C.

An exhaustive treatise in three parts: energy use 1850–1955; the future of energy consumption; and the future of energy supply. Includes consideration of the possible impact of atomic energy. The 774 pages include 120 text tables, 73 graphs, and 255 pages of statistical appendices.

The Spokesman of the ECSC's High Authority and European Community Information Service, 1967, Europe and energy: Luxembourg, published jointly by The Spokesman of the ECSC's High Authority and European Community Information Service, 67 p.

Reviews the alteration of the structure of the energy market prior to 1966, the energy position and balance sheet for 1966, the long-term energy outlook to 1980, and the common energy policy for the six European Community countries—Belgium, France, Germany, Italy, Luxembourg, and the Netherlands. No bibliography is provided.

Trumbull, James, 1961, Selected sources of information on U.S. and world energy resources—an annotated bibliography: U.S. Geol. Survey Circ. 447, 8 p.

A selected and annotated bibliography of 72 articles and reports on energy resources published prior to January 1, 1961. Superseded by present bibliography, but includes citations of older articles and reports.

United Nations, 1956, The world's requirements for energy; the role of nuclear energy, volume 1 *of* Proceedings of the [First] International Conference on the Peaceful Uses of Atomic Energy, Geneva, 8 August –20 August, 1955: New York, United Nations, 479 p.

Includes "World energy requirements in 1975 and 2000" (p. 3–33) and "Contribution of nuclear energy to future world power needs" (p. 85–102),

prepared by the United Nations. The latter paper contains a six-page table of reserves of coal, lignite, petroleum, natural gas, waterpower, and per capita energy reserves for every country of the world. Three other papers discuss worldwide future energy needs (p. 34–70), two discuss nonconventional energy sources other than nuclear energy (p. 71–84), 34 discuss energy sources and needs in individual countries, and 24 discuss various aspects of nuclear energy.

The volume is an authoritative source of information as of 1955, and for some countries includes resource data not readily available elsewhere in English. For other countries, however, the information on resources has been superseded.

United Nations Department of Economic and Social Affairs, 1957a, Energy in Latin America—Study prepared by the Secretariat of the Economic Commission for Latin America: Geneva, United Nations, 268 p.

A study of many aspects of energy: sources; consumption by source, nation, and end use; trends of change in consumption; efficiency in use; resources; and institutional structure and finances. Projections to 1965 are made for production, consumption, and required capacity and investments. Fourteen annexes totaling 138 pages present much statistical and reference material, including a 20-page compilation of energy resources by country. Covers all South and Central American nations, including Mexico.

———1957b, New sources of energy and economic development—Solar energy, wind energy, tidal energy, geothermic energy, and thermal energy of the seas: New York, United Nations, 150 p.

Includes a comparative study of the features and possibilities of five nonconventional energy sources, a technical paper on each, and an annotated bibliography of 480 items. (See United Nations (1962).)

———1959, Sources of energy and electricity production [in Africa], *in* Economic survey of Africa since 1950: New York, United Nations, p. 127–133, also table 1–XVII, p. 35.

A discussion of fuel resources and the status of information (ca. 1957–58); trends and new developments in discovery, production, and consumption of coal, petroleum, and electricity throughout the continent. The cited table gives resources and 1957 production of crude oil, coal, hydroelectricity, and thermal electricity, by countries. Other short tables give data on production, exports, imports, and installed generating capacity.

———1962, New sources of energy and energy development: New York, United Nations, 65 p.

A summary report on a conference held in Rome, Aug. 21–31, 1961. Includes chapters on solar energy, wind power, and geothermal energy, and a list of 248 papers presented at the conference. (See United Nations (1957b).)

———1969, Study of power generation based on the utilization of low-grade fuels in developing countries: New York, United Nations, 70 p.

Discusses the utilization and development of low-grade fuels—lignite, peat, oil-shale, and industrial or residential waste—in developing countries where conventional fuel sources are limited or lacking.

United Nations Economic Commission for Asia and the Far East, 1967, Comprehensive energy surveys; an outline of procedure: New York, United Nations, 57 p.

A recommended program of study of energy resources suitable for the production of electric power.

United Nations Statistical Office, 1969a, Statistical yearbook, 1968: New York, U.N. Dept. Econ. and Social Affairs, Statistical Office, 796 p.

A source of world statistics on many subjects. Contains data by countries on production and consumption of energy and on production of coal, lignite, coke, crude petroleum, petroleum products, natural gas, natural gas products, manufactured gas, and electricity. Includes a summary of world and regional energy production, trade, and consumption classified by main sources—coal and lignite, crude petroleum, natural gas, and hydro and nuclear electricity—in terms of metric tons of coal equivalent. No text other than explanation of tables. No resources data.

Published annually.

———1969b, World energy supplies, 1964–1967: New York, U.N. Dept. Econ. and Social Affairs, Statistical Office Statistical Papers, ser. J, no. 12, 104 p.

Data by countries on production, trade, and consumption of coal, petroleum (crude and refined), gas, electricity, and coke. No text other than explanation of tables. No resources data.

Twelfth in a series. Published in 1952, 1957, and annually since 1960.

U.S. Bureau of Mines, 1965, Mineral facts and problems, 1965 edition: U.S. Bur. Mines Bull. 630, 1118 p.

A staff-prepared compendium of 89 chapters on all mineral, fuel and energy commodities, with emphasis mostly on the United States. Each chapter covers background and present status of the industry; definition of terms, grades and specifications; geology, mining, and transportation; technology of preparation and use; resources, production, consumption, and foreign trade; economic data; research; and industry outlook and problems. Includes chapters on anthracite (p. 43–63); bituminous coal (p. 119–147); lignite (p.

511–520); lithium (p. 531–536); petroleum and natural gas (p. 663–698); oil shale (p. 631–643); peat (p. 645–654); thorium (p. 947–959); and uranium (p. 1007–1037). Each chapter includes a short bibliography.

Report is updated and reprinted at 5-year intervals.

———1969, Metals, minerals, and fuels, volumes 1–2 *of* Minerals Yearbook 1968: U.S. Bur. Mines, 1208 p.

A statistical record of 80 chapters on the domestic minerals industry in 1968. Includes chapters on anthracite, bituminous coal and lignite, coke and coal chemicals, fuel briquettes, peat, carbon black, natural gas and associated liquids, petroleum and petroleum products, and thorium and uranium. Each chapter includes data on production and consumption, resources, mining and transportation, equipment and technology, prices and value, stocks, foreign trade, and world production.

Published annually since 1932. Continues previous series, "Mineral Resources of the United States." published 1885–1931 by the U.S. Geological Survey.

U.S. Congress, Committee on Interior and Insular Affairs, 1962, Report of the National Fuels and Energy Study Group on an assessment of available energy in the United States: U.S. 87th Cong., 2d sess., Senate Doc. 159, 499 p.

A summary of data on U.S. energy resources, plant capacity, labor-supply productivity, transportation, technology, corporate concentration, marketing and pricing patterns, costs, foreign trade, interfuel competition, government policies, laws, and regulations, and industry and consumer points of view. Includes a five-page bibliography.

U.S. Congress, Joint Committee on Atomic Energy, 1960, Review of the international atomic policies and programs of the United States, by Robert McKinney (v. 1, p. 1–78R), [and] Background material for the review of the international atomic policies and programs of the United States (v. 2, 3, 4, 5, p. 79–2080): U.S. 86th Cong., 2d sess.

Volume 1 includes, on pages 29–48, a summary of the detailed information in the succeeding volumes concerning the status, prospects, costs, and resources of atomic power, the supply of conventional fuels, and the overall demand for energy in the world. Volume 3 includes several reports on the progress of nonmilitary atomic energy programs in the world. Volume 4 contains 14 reports of diverse foreign and domestic authorship on the status and prospects of nuclear-fueled electric generating capacity throughout the world and 24 reports on nonnuclear energy resources. Among the latter are reports on the following: World consumption and availability of conventional fuels in 1975 and 2000; resources of coal, petroleum, natural gas, oil shale, and tar sands in the free world, by the U.S. Department of the Interior; the uranium and thorium resources of the free world and the Communist bloc, by the U.S. Atomic Energy Commission; future energy requirements in the United States, Latin America, Europe, the Sino-Soviet area, and Asia; and several reports on nonconventional nonnuclear energy sources. Volume 5 includes reports on the direct conversion of fission products to electricity, the peaceful applications of nuclear power for purposes other than central-station electricity generation, and progress toward controlled fusion.

U.S. Congress, Joint Economic Committee, Subcommittee on Automation and Energy Resources, 1959, Energy resources and technology, Hearings: U.S. 86th Cong., 1st sess., 352 p.

Many authoritative statements and exhibits on a great number of aspects of the general subject in the United States, with particular emphasis on prospective needs and cost relations among the conventional energy sources, and the outlook for development of newer sources. In a general way this report provides an updating of Volume 3 of the President's Materials Policy ["Paley"] Commission report, "The Outlook for Energy Sources."

U.S. Geological Survey and U.S. Bureau of Mines, 1968, Mineral resources of the Appalachian region: U.S. Geol. Survey Prof. Paper 580, 492 p.

A compilation of available data presented in nontechnical language on the mineral resources, mineral industry and economy, and geology of the Appalachian region. Various chapters deal with coal, oil and gas, bituminous sands and asphalt, oil shale, uranium, and water power.

Weeks, L. G., 1960, The next hundred years energy demand and sources of supply: Am. Geol. Inst., Geotimes, v. 5, no. 1, p. 18–21, 51–55.

A concise statement of estimated U.S. and world fuel and energy resources as related to increased population growth and increased per capita demand for energy.

Western Resources Conference, 1966, Natural gas, coal, ground water—exploring new methods and techniques in resources research: Western Resources Conference, Boulder, Colorado University Press, 248 p.

Twenty-one papers by 24 authors on various aspects of energy resources research. Of particular interest are two papers: (1) Outlook for energy resources in the United States, by Sam H. Schurr; and (2) Pipeline gas from coal and oil shale, by Henry R. Linden.

The Western Resources Conference is sponsored annually by the Colorado School of Mines, Colo-

rado State University, and the University of Colorado. This is the eighth annual volume.

Winger, J. G., Emerson, J. D., and Gunning, G. D., 1968, Outlook for energy in the United States: New York, The Chase Manhattan Bank, N. A., 60 p.

A well-written, profusely illustrated analysis of United States energy demand to 1980. Includes diagrams of projected population growth by age groups to 1980, projected increase in per capita use of energy, economic growth patterns of the United States by major regions, the energy imbalance of these same regions, transportation, and markets for energy in various forms and for various uses, and an analysis of resources available to meet the projected demand. Sources of data are not cited; no bibliography is provided.

World Power Conference, 1968, World Power Conference survey of energy resources, 1968: London, World Power Conf., Central Office, 79 p.

World statistics, solicited from each country and uniformly presented, on resources of coal, petroleum, oil in shale, oil in bituminous sandstone, natural gas, oxides of uranium, and oxides of thorium. Contains comprehensive bibliography.

This volume, edited by Albert Parker, is 11th of a series. The first nine volumes of the series, edited by Frederick Brown and titled "Statistical Yearbooks of the World Power Conference," were published in the period 1936–1958 [60] and contain comparable information. The 10th volume, edited by Albert Parker and having the same title as this reference, was published in 1962. Present plans call for the report to be updated and republished at 6-year intervals.

Zaffarano, R. F., Yasnowsky, L. H., Crump, L. H., and Mo, W. Y., 1970, Supply and demand for energy in the United States by states and regions, 1960 and 1965—integrated energy balances and energy flows (prepared from four parts): U.S. Bur. Mines Inf. Circ. 8434, 546 p.

Integrated energy balances and energy flows are presented for State, regional, and national levels from four separate supply and demand commodity balances for coal, dry natural gas, petroleum and natural gas liquids, and utility electricity. Commodity balances were integrated by expressing their energy equivalents in British thermal units (Btu). Hydropower and nuclear power are included in summaries for 1960 and 1965. Pertinent computerization details and more than 500 individual State and regional printout tables, in both original commodity units and Btu's, are shown.

PETROLEUM AND NATURAL GAS

American Association of Petroleum Geologists, 1969a, [Exploratory drilling and oil and gas developments in the United States and Canada in 1968; 22 chapters by different authors with no overall title]: Am. Assoc. Petroleum Geologists Bull., v. 53, no. 6, p. 1151–1328.

First chapter, titled "North American drilling activity in 1968" (p. 1151–1180), presents detailed statistics and an analysis of exploratory drilling in the United States and Canada in 19 tables, 16 figures, and a brief text. Twenty-one additional chapters present comparable data for individual States and regions, and they include information on stratigraphy and geologic relations as revealed by drilling.

Published annually in the June issue.

———1969b, [The] 1968 developments in foreign [petroleum] fields: Am. Assoc. Petroleum Geologists Bull., v. 53, no. 8, p. 1563–1820.

Eight summary chapters by different authors on petroleum exploration during 1968 in the following areas: Mexico; South America, Central America, and Caribbean; Europe; north Africa; central and southern Africa; Middle East; Far East; and the Southwest Pacific. Includes information on concessions, geological and geophysical surveys, exploratory and development drilling, discoveries, and production of petroleum and natural gas, with many tables and maps. The geologic setting of petroleum accumulations is described.

Published annually in the July or August issue.

American Gas Association, American Petroleum institute, and Canadian Petroleum Association, 1970, Reserves of crude oil, natural gas liquids, and natural gas in the United States and Canada, and United States productive capacity as of December 31, 1969: Published jointly by the Am. Gas Assoc., 1515 Wilson Blvd., Arlington, Va. 22209, The Am. Petroleum Inst., 1101 Seventeenth St. N.W., Washington, D.C. 20036, and the Canadian Petroleum Assoc., 330 Ninth Ave. S.W. Calgary, Alberta, Canada, v. 24, 308 p., 34 tables.

Contains industry-prepared estimates of proved recoverable reserves of crude oil, natural gas liquids, and natural gas. Includes annual data beginning generally in 1945, and for some States and regions beginning in 1920.

Published annually, usually in May, since 1946.

American Petroleum Institute, 1967, Petroleum facts and figures—1967 edition: New York, Am. Petroleum Inst., 344 p.

Presents data for 1958–66 on drilling, production, proved reserves, refining, transportation, marketing, utilization, prices, taxes, and related aspects of the petroleum industry. A supplement to the 1959 centennial edition of "Petroleum Facts and Figures" which provides data from 1859 through 1958.

Published biennially. The 1970 edition will replace the 1959 centennial edition and all supple-

ments and will furnish a record of the industry's activities from 1859 through 1969.

———1970, Annual statistical review—U.S. petroleum industry statistics, 1946–1969: Washington, Am. Petroleum Inst., 56 p.

Presents tables on supply and demand by uses, production, imports, exports, and stocks of crude oil (by State, region, or country of origin), gasoline, kerosine, jet fuel, distillate fuel oil, residual fuel oil, lubricants, and natural gas liquids and liquefied refinery gases. No bibliography is provided.

Published annually; appears in April.

Beebe, B. W., and Curtis, B. F., eds., 1968, Natural gases of North America: Am. Assoc. Petroleum Geologists Mem. 9, v. 1 [Gases in Mesozoic and Paleozoic rocks], 1226 p; v. 2 [gases in Paleozoic rocks and general papers], 1267 p.

An encyclopedic study. Comprises 146 papers and 184 case histories by 225 authors.

Cabinet Task Force on Oil Import Control, 1970, The oil import question: Washington, U.S. Govt. Printing Office, 397 p.

Report of the President's Cabinet Task Force created on March 25, 1969, to conduct a comprehensive review of oil import restrictions and policies. Covers all phases of the petroleum industry with forecasts to the year 1980. The report is in four parts as follows: (1) Purpose of the review, and description of the present oil import program; (2) the relationship of oil imports to the National security; (3) control mechanisms; and (4) summary, conclusions, and recommendations. An extensive appendix includes a separate report on the oil import question by the Secretary of the Interior, the Secretary of Commerce, and the Chairman of the Federal Power Commission. No bibliography is provided.

Cameron, V. S., ed., 1969, Exploration and economics of the petroleum industry, Volume 7: New York, Matthew Bender & Co., 279 p. Published for the Southwestern Legal Foundation.

Comprises about 18 papers by various authors covering the spectrum of petroleum exploration. Presented at the annual Institute on Economics of the Petroleum Industry, Southwestern Legal Foundation, Dallas, Texas. No bibliography is provided.

Published annually since 1963. The first six volumes were published by the Gulf Publishing Co., Houston, Texas. The first three volumes are titled "Economics of the Petroleum Industry."

Campbell, R. W., 1968, The economics of Soviet oil and gas: Baltimore, The Johns Hopkins Press, 279 p. Published for Resources for the Future, Inc., Washington, D.C.

A detailed case study of the petroleum industry of the Soviet Union, its recent development, future prospects, and potential as a competitor in world petroleum markets.

Dott, R. H., Sr., and Reynolds, M. J., compilers, 1969, Sourcebook for petroleum geology: Am. Assoc. Petroleum Geologists Mem. 5, 471 p.

A compendium of ideas, hypotheses, and theories on the origin, migration, and accumulation of petroleum, presented as quotations from the original authors, and integrated by discussion and comments of the compilers. Includes extensive bibliography.

Ebel, R. E., 1961, The petroleum industry in the Soviet Union: New York, Royer & Roger, Inc., 169 p. Published for the American Petroleum Institute.

An account of impressions of the Russian petroleum industry gained by a party of 10 United States oil and gas industry executives on a 30–day exchange visit to Russia in August 1960.

Elliott, M. A., and Linden, H. R., 1968, A new analysis of U.S. natural gas supplies: Jour. Petroleum Tech., v. 20, Feb., p. 135–141.

A report of the development of an empirical model of natural gas discovery and production in the United States used to express the overall effect of the various geologic, technologic, and economic forces that influence it. Forecasts from this model are made and compared with plausible estimates of gas demand and corresponding supply requirements to the year 2000.

Federal Power Commission, 1969, A staff report on national gas supply and demand: Washington, Federal Power Comm., 110 p.

An intensive analysis covering a short time span 1956–68 of natural gas supply-demand relationship for the United States, excluding Alaska, to serve as a guide to effective regulatory and management decisions with supply-demand forecasts focused on the 5-year period 1969–73. Future supply projections were made for eight separate areas. Potential sources of supply for natural gas and synthetic gas needed to meet future projected demand are evaluated.

Frendzel, D. J., 1961, The Soviet seven-year plan (1959–65) for oil: U.S. Bur. Mines Inf. Circ. 8023, 17 p.

A report based almost entirely on Soviet petroleum literature. Describes the planned expansion of the Soviet petroleum industry and tries to provide some idea of the size of future Soviet oil exports.

Future Requirements Committee, 1969, Future natural gas requirements of the United States: Denver, Future Requirements Agency, v. 3, 59 p.

The third biennial report of the Future Require-

ments Committee—a national gas industry committee that coordinates the work of 10 regional working committees. Covers estimated natural gas requirements of the United States by individual States for 5-year periods to 1990. No bibliography is provided.

The first report was issued in 1964, the second, in 1967.

Heiss, Klaus-Peter, 1967, The economic potentials of natural gas production stimulation by nuclear explosion: Princeton, N.J., Mathematica, PNE–3007, 61 p.

A discussion of the technical and economic potentials of natural gas production stimulation by nuclear explosives.

Hendricks, T. A., 1965, Resources of oil, gas, and natural gas liquids in the United States and the world: U.S. Geol. Survey Circ. 552, 20 p. [Repr. 1966.]

An estimate of resources originally present in the ground based on available data on exploratory footage drilled, fraction of the total volume of sedimentary rocks explored, past production records, estimates of proved reserves, and the attractiveness of the explored rocks relative to that of the rocks as yet unexplored. The volumes of explored and unexplored sedimentary rock were considered in four categories according to the relative degree of favorability. Contains 24-item bibliography.

Hepple, Peter, ed., 1969, The exploration for petroleum in Europe and North Africa: London, Inst. Petroleum, 281 p.

Proceedings of a joint meeting between the Institute of Petroleum and the American Association of Petroleum Geologists (in conjunction with the Petroleum Exploration Society of Great Britain held at Brighton, England, 29 June–2 July, 1969. Eighteen summary papers by various authors on the subject of geology and petroleum exploration in the countries of Europe and North Africa are included.

Huston, R. L., 1968, The speed of gas in Europe, *in* Proceedings of the AIME Council of Economics annual meeting, New York, Feb. 25–29, 1968: AIME Coun. Econ., p. 94–101.

Analysis of energy demand in Western Europe —actual 1960–65 and forecast 1970, 1975, and 1980—and the rapidly increasing share to be provided by natural gas from Western Europe's own resources. No bibliography is provided.

International Oil Scouts Association, 1969, International oil and gas development yearbook 1969 (review of 1968): Internat. Oil Scouts Assoc., v. 39, pt. 1, 496 p.; pt. 2, 912 p.

An annual publication since 1920 prepared in two parts. Part I, Exploration—Annual review of gelogical and geophysical prospecting, land and leasing activities, wildcat exploration, and proven field development in United States and Canada. Part II, Production—Annual review of oil and gas production by fields, oil and gas pipeline construction, refinery operation, and gasoline, carbon black, recycling, and repressuring plants in the United States, Mexico, Canada, and most foreign countries. The foreign section is an optional supplement to Part II and includes data on exploration as well as production.

Interstate Oil Compact Commission, 1964, A study of conservation of oil and gas in the United States, 1964: Interstate Oil Compact Comm., 307 p.

A résumé of the conservation programs of the oil and gas producing States and why they are employed. Prepared by working committees of the IOCC from responses to questionnaires supplied by State petroleum organizations, individual petroleum industries, and petroleum industry organizations. No bibliography is provided.

International Petroleum Institute, 1965, International petroleum industry. Volume I—World, Europe, Middle East: New York, Internatl. Petroleum Inst., Inc., 285 p.

———1967, International petroleum industry. Volume II—Central America, South America, Africa, Far East, North America: New York, Internatl. Petroleum Inst., Inc., 371 p.

An encyclopedic study of the international petroleum and natural gas industry by major geographic areas, beginning about 1859 with drilling of the first commercial well for oil. The major technical developments of the industry are described. The main emphasis, however, is on the international aspects of exploration, production, refining, transportation, marketing, and legal and fiscal regulations. Investment factors and policy are also discussed.

Ion, D. C., 1967, The significance of world petroleum reserves: Seventh World Petroleum Congress, Proc. v. 1B, p. 25–36.

A discussion and critical analysis of world resources of petroleum and other fossil fuels, in terms of both proved reserves and ultimate resources. Includes a two-page bibliography.

Lovejoy, W. F., and Homan, P. T., 1965, Methods of estimating reserves of crude oil, natural gas, and natural gas liquids: Baltimore, The Johns Hopkins Press, 163 p. Published for Resources for the Future, Inc., Washington, D.C.

A critical analysis of methods used in estimating proved reserves, ultimate resources, the resource base, and additions through secondary recovery. Cites examples of misuse and misinterpretation of estimates. Includes discussion of

methods employed by the A.P.I., A. D. Zapp, C. L. Moore, M. K. Hubbert, and industry committees.

———1967, Economic aspects of oil conservation regulation: Baltimore, Johns Hopkins Press, 295 p. Published for Resources for the Future, Inc., Washington, D.C.

A study of the economic aspects of oil conservation regulation in the United States. Written largely in nontechnical language. References are cited at the bottom of the text pages.

Lutfi, Ashraf, 1968, Opec oil: Beirut, Lebanon, Middle East Research Pub. Center, Middle East Oil Mon. 6, 120 p.

An analysis of the Organization of the Petroleum Exporting Countries and a review of the problems facing it and the individual member countries. No bibliography is provided.

McKinney, C. M., and Shelton, E. M., 1967, Sulfur content of crude oils of the Free World: U.S. Bur. Mines Rept. Inv. 7059, 36 p.

The volume and sulfur content by weight percent of crude oil produced in 10 geographic areas of the United States in the period 1956–66 are shown in tables and charts, based on analyses of 1,060 samples of United States crude oil. Similar data are presented for crude oil produced in 1966 in Africa, Canada, Middle East, and South America, based on analyses of 201 samples.

Martinez, A. R., 1966, Our gift, our oil: The Netherlands, N. V. Drukkerij D. Reidel-Dordrecht, 199 p.

A book about Venezuelan oil by a distinguished Venezuelan. The book covers the geology and history of development of the oil industry in Venezuela and current national Venezuelan petroleum policy. Chapters are included on the Organization of the Petroleum Exporting Countries (OPEC), the Indonesian oil situation, atomic energy, and oil, and some aspects of the oil situation in Italy, Argentina, Mexico, and the North Sea. The opinions expressed are the author's and may or may not conform to policies of the Venezuelan Government or of the Organization of the Petroleum Exporting Countries.

Nahai, L., and Kimbell, C. L., 1963, The petroleum industry of Iran: U.S. Bur. Mines Inf. Circ. 8203, 112 p.

A thorough report on the history and economic position of the petroleum industry of Iran as of 1962, prepared from published and other material on the geology and economic conditions of Iran. Contains a 42-item bibliography.

National Petroleum Council, 1967a Factors affecting U.S. exploration, development and production 1946–1965: Washington, Natl. Petroleum Council, 136 p.

An analysis prepared by a committee and two task forces made up of distinguished members of the United States petroleum industry and the Department of the Interior. Presented in three parts. Part I—Introduction, summary and conclusions; Part II—Report on geological and technological factors; Part III—Report on economic and policy factors. Parts II and III were prepared by the two separate task forces. No bibliography is provided.

———1967b Impact of new technology on the U.S. petroleum industry, 1946–1965: Washington, Natl. Petroleum Council, 341 p.

A report prepared by the National Petroleum Council at the request of the Department of the Interior to study the highly specialized field of petroleum technology and to evaluate the impact of new knowledge and procedures upon: (1) Petroleum productive capacity; (2) recovery factors in oil yields; (3) yields of petroleum products at refineries; (4) changes in quality of refined products and byproducts; and (5) conclusions as to future technologic trends. The report was prepared in two parts by separate subcommittees: Part 1—Impact of new technology on U.S. petroleum exploration and production; Part 2—Impact of new technology on United States petroleum refining.

———1969, Petroleum resources under the ocean floor: Washington, Natl. Petroleum Council, 107 p.

A well-organized, illustrated, and documented, industry-prepared analysis of the petroleum potential of the continental margins. Chapter headings are as follows: 1) Summary and recommendations, (2) United States energy requirements and national objectives, (3) Prospects for petroleum accumulations under the oceans, (4) Technological capability of industry for petroleum development, (5) Economics of offshore petroleum exploration and development, (6) Current national jurisdiction over petroleum resources of oceanic areas, (7) Implementation of United States policy objectives consistent with the 1958 Convention on the continental shelf, (8) Regime over oceanic areas beyond limits of exclusive national resource jurisdiction, and (9) Relations between the petroleum industry and other users of the oceans and seabeds; pollution control, conservation, and research.

———1970, Future petroleum provinces of the United States—A summary: Washington, Natl. Petroleum Council, 128 p.

A study of the future oil and gas potential of the United States, including Alaska and Hawaii and the continental shelves and slopes, prepared for the Secretary of the Interior by an advisory group of 135 petroleum geologists. Data is presented on petroleum previously discovered, the

potential for future discoveries, and the most favorable rock strata for each of 11 subdivisions of the United States. Estimates of potential discoveries of natural gas are those of the Potential Gas Committee (1969).

Details of this study will be published in 1971 by the American Association of Petroleum Geologists.

Oil and Gas Journal, 1969, Forecast for the seventies: Oil and Gas Jour., v. 67, no. 45, p. 159–204.

Projections to 1980 of energy demand, production, energy mix, government regulations, refining, gas processing, petrochemicals, pipeline construction, geophysics, exploration, and foreign activities.

———1970, Forecast-review report: Oil and Gas Jour., v. 68, no. 4, p. 113–139.

Includes discussion of 1969 developments in domestic exploration, drilling, producing, refining, transporting, marketing, and importing of oil and gas. Many detailed tables give the number, type, and footage of wildcat and field wells by county and State; the production, number of wells, and estimated proved recoverable reserves of crude oil by field and State; supply and demand for different products by quarters; and refinery runs, exports and imports, and much other information. Published annually, usually in a late January issue.

Petroleum Staff, Mineral Resource Offices, 1967, Heavy crude oil—resource, reserve, and potential production in the United States: U.S. Bur. Mines Inf. Circ. 8352, 76 p.

A study confined to subsurface reservoirs that contain heavy oils mobile at reservoir conditions. Contains data on proved reserves, production, and total resources of heavy crude oil (API gravity of 25° or less) in the United States. The information is presented for 22 heavy-oil-productive States within the five districts of the Petroleum Administration for Defense. Also included are brief discussions of the overall crude-oil supply-and-demand situations in each district, and proration practices that could affect development of the heavy-oil resources. Statistical data pertaining to the resource, reserve, production, and thermal projects are presented in the discussion of individual States.

Potential Gas Committee, 1969, Potential supply of natural gas in the United States: Potential Gas Agency, Mineral Resources Inst., Colorado School of Mines Found., Golden, Colorado, 39 p.

An industry-prepared estimate, as of Dec. 31, 1968, of undiscovered natural gas, based on analysis of many assigned areas, by many individuals, all operating under standardized procedures formulated by the Potential Gas Committee. Data published for 10 major geographic areas. Estimate includes probable, possible, and speculative resources yet to be discovered by drilling. It assumes adequate, but reasonable prices, and normal improvements in technology. Estimate does not include proved reserves as estimated by the Committee on Natural Gas Reserves of the American Gas Association, nor does it include cumulative past production. Sources of data are not cited; no bibliography is provided.

Simpson, R. A., Rutledge, D. W., and Nowlan, D. M., 1962, A survey of the petroleum industry in Canada in 1961: Canada Dept. Mines and Tech. Surveys, Mineral Resources Div., Mineral Inf. Bull. MR 62, 96 p.

"This survey of the petroleum industry in Canada covers the main developments in 1961 and presents an interrelated review of progress in each of the four principal sectors of the industry: exploration, developments and production; transportation and storage; petroleum processing; and marketing. Historical data are introduced where necessary to set recent developments in proper perspective. In certain instances, project plans covering the next few years are mentioned to give an indication of expected trends for the near future." (From the preface.) The report includes 44 tables and 13 graphs and maps.

Sproule, J. C., Edgington, A. N., and Cleland, N. A., 1968, The present and future of oil and gas in Canada: Jour. Canadian Petroleum Tech., v. 7, no. 3, p. 91–97.

Summary of Canadian petroleum situation presented as an address to the Petroleum Society of CIM, Calgary, Canada, May 1968. No bibliography is provided.

Swanson, E. B., compiler, 1960, A century of oil and gas in books—a descriptive bibliography: New York, Appleton-Century-Crofts, Inc., 214 p.

A descriptive bibliography of the books written in English on matters pertaining to oil and gas during the first 100 years—1859–1959—of the modern petroleum industry. This work was sponsored by the American Petroleum Institute.

Tiratsoo, E. N., 1967, Natural gas—a study: New York, Plenum Press, 386 p.

A comprehensive study of the origin, accumulation, and geographical occurrences of natural gas and of the general effects of its impact on the economics of the countries in which it is found. No bibliography is provided.

Torrey, P. D., 1966, Evaluation of United States oil resources as of January 1, 1966: Interstate Oil Compact Comm. Bull., v. 25, no. 2, p. 22–41.

A report on crude-oil resources of the United States by State giving: (1) Estimates of original

oil content of reservoirs, (2) total oil production to January 1, 1966, (3) 1965 oil production, (4) primary reserves as of January 1, 1966, (5) estimated additional recovery by conventional fluid injection methods under economic conditions prevailing as of January 1, 1966, (6) estimated additional recovery by conventional fluid injection methods technically possible but not profitable under economic conditions prevailing as of January 1, 1966, (7) estimated additional potential reserves recoverable by steam, fire flood, and solvents, (8) total estimated recoverable potential reserves by fluid injection, and (9) rank of State in total estimated fluid injection reserves.

This report is sixth and last in a series that began in 1954 and was prepared by the Interstate Oil and Gas Compact Commission from data supplied by State petroleum regulatory and conservation authorities.

United Nations Economic Commission for Asia and the Far East, 1965, Proceedings of the Seminar on the Development and Utilization of Natural Gas Resources, with special reference to the ECAFE region, Tehran, December 1–12, 1964: New York, United Nations Mineral Resources Devel. Ser. 25, 436 p.

Contains 61 papers on world occurrence, resources, development, operation, conservation, transmission, storage, distribution, and utilization of natural gas with special reference to the ECAFE countries.

United Nations Economic Commission for Europe, 1969, Annual bulletin of gas statistics for Europe, 1968: New York, United Nations, v. 14, 60 p.

Presents tables on production, imports, exports, and consumption of gas by country in 1967 and 1968, providing basic data on trends in European countries and the United States.

Published annually since 1956.

United Nations Economic Commission for the Far East, 1967, Proceedings of the Third Symposium on the development of petroleum resources of Asia and the Far East, Tokyo, Nov. 10–20, 1965: New York, United Nations Mineral Resources Devel. Ser. 26, 3 v., 1153 p.

Contains 194 papers on petroleum geology, resources, exploration methods and techniques, storage, transportation, utilization, economics, and recent progress in the petroleum industry of the world with special reference to the ECAFE region.

U.S. Department of the Interior, 1966, Projection of United States petroleum supply to 1980: Washington, U.S. Dept. Interior, 42 p.

Analyses and projections of the discovery, development, and production of crude oil, natural gas, and natural-gas liquids in the United States for the 15-year period, 1965–80, based on application of the Gompertz curve. The use of the curve is explained in an annex titled "The Gompertz curve for analyzing and projecting the historic supply patterns of exhaustible natural resources."

———1968, United States petroleum through 1980: Washington, U.S. Govt. Printing Office, 92 p.

An analysis of the outlook for domestic oil and natural-gas availability between 1965 and 1980. Includes many tables, graphs, and illustrations.

———1969a, Middle East petroleum emergency of 1967. Volume 1: Washington, U.S. Govt. Printing Office, 54 p.

A concise, factual, chronological account of events related to the interruption of Middle East oil supply as an aftermath of the Arab-Israeli confrontation in June 1967, and of corrective actions taken by the U.S. Government, other governments, and the international petroleum industry to alleviate the effects of such events upon the petroleum consumer. An appendix (volume 2) discusses in detail the historical background, beginning with the Korean War, of the means through which industry and government in cooperation have been able to take appropriate steps to overcome any disruption in the orderly movement of petroleum around the world. No bibliography is provided.

———1969b, Petroleum and sulfur on the U.S. continental shelf—a summary of activity in exploration and production of oil, gas, and sulfur, 1953–1968: Washington, U.S. Dept. Interior, 61 p.

A comprehensive, staff-written summary of activity in the exploration for and production of oil, gas, and sulfur on the United States continental shelf from their beginnings in 1953 to the end of 1968. Includes a chapter on the juridical and geological concepts of the outer continental shelf and a résumé of the Outer Continental Shelf Lands Act.

Supersedes a U.S. Department of the Interior report of 1966 on petroleum production, drilling, and leasing on the outer continental shelf.

U.S. Federal Power Commission, 1963, Natural gas supply and demand; statement of Harold H. Wein. . . . (Relating to exhibits 235, 236, 237, 238): Washington, Federal Power Comm., Office of Economics, Docket AR61–1, 129 p.

An analysis of proved reserves as of 1963, rate of discovery, and estimated future demand.

U.S. Geological Survey, 1969, Petroleum resource of outer continental shelf, *in* Geological Survey research 1969: U.S. Geol. Survey Prof. Paper 650–A, p. A16–A17.

Estimates of potential resources of crude oil, natural gas, and natural-gas liquids of the outer

continental shelves of the United States for Alaska, Pacific, Gulf, and Atlantic shelf areas from the limit of State jurisdiction to 200 meters depth, and from 200 to 2,500 meters depth. Details of the method used in preparing the estimates may be found in Hendricks (1965, p. 7–12) cited elsewhere in this report. This is a short announcement of current resources research of the U.S. Geological Survey. No bibliography is provided.

Weber, George, ed., 1965, Japan—today and tomorrow: Oil and Gas Jour., v. 63, no. 22, p. 57–96.

A summary of the current Japanese oil industry and predictions of future sources of supply, demand, imports, local production, refining, transportation, and marketing. No bibliography is provided.

———1969, International petroleum encyclopedia [1970]: Tulsa, Okla., Petroleum Pub. Co., 400 p.

This is the second of an annual series begun in 1968. Each geographical area includes a brief summary and forecast; a regional map; country-by-country listing of current oil and natural-gas production and reserves; refining and consumption figures, including gasoline quality and vehicle population; historical data on production, refining, and consumption for selected years since 1940; country-by-country cost indexes; and a compilation of government agencies regulating or otherwise dealing with petroleum and other energy sources. Every significant producing field, basin, and area is keyed into 64 maps in the six-color atlas. No bibliography is provided.

World Oil, 1969, International outlook issue: World Oil, v. 169, no. 3, p. 11–228.

A summary, by countries (including those of the Communist bloc), of the year's developments in exploration, drilling, discoveries, reserves, production, and other aspects of the petroleum industry in all parts of the world.

Published annually in August issue.

———1970, Forecast-review issue: World Oil, v. 170, no. 3, p. 67–112.

A summary of developments in all phases of the domestic petroleum industry. Includes many tables. Similar in content to the annual review-forecast section of the "Oil and Gas Journal."

Published annually in February issue.

World Petroleum Congress, 1967, Origin of oil geology and geophysics: World Petroleum Cong., 7th, Barking, Elsevier, v. 2, 974 p.

Includes many individual papers on the following topics: (1) Origin of oil and gas, (2) new oil-producing regions, and (3) exploration for oil and gas on the continental shelves. Also includes papers on many other subjects of less direct interest in energy studies. Proceedings volumes of previous World Petroleum Congresses, particularly the fifth (1960) and the sixth (1963), contain similar data.

Zaffarano, R. F., 1970, Natural gas liquids—a review of their role in the petroleum industry: U.S. Bur. Mines Inf. Circ. 8441, 22 p.

Presents information for the nonspecialist about recovery of natural-gas liquids from hydrocarbon streams in natural-gas processing plants. Significant changes in products and in market trends are highlighted. Cost estimates for medium-sized processing plants are given.

COAL

Averitt, Paul, 1969, Coal resources of the United States, January 1, 1967: U.S. Geol. Survey Bull. 1275, 116 p.

A comprehensive summary of information available on the coal resources of the United States. Includes chapter on world coal resources; a comparison between United States resources of coal, petroleum, natural gas, and bituminous sandstone; and a 10-page bibliography of summary reports on coal in various States.

Supersedes U.S. Geological Survey Bulletin 1136.

———1970, Stripping coal resources of the United States, January 1, 1970: U.S. Geol. Survey Bull. 1322, 34 p.

A review and analysis by States of data available on the stripping-coal potential of the United States. Includes five-page bibiography.

Supersedes U.S. Geological Survey Bulletin 1252–C.

Eavenson, H. N., 1942, The first century and a quarter of American coal industry: Pittsburgh, privately printed, 701 p.

An engaging description of the early history of coal mining in the United States. Includes many early maps, quotations from early documents, descriptions of early mining operations, and tables of coal production by States from the beginning of mining. For some States early production is given by counties.

Feys, Robert, and Fabre, Jean, 1966, Explanatory note, *for* Coal map of Africa: Paris, U.N. Econ. Comm. Africa-Assoc. African Geol. Surveys, 61 p.

An explanatory text in French and English that accompanies a 1:10,000,000-scale coal map of Africa, published in 1965 by the same agencies. The text provides a brief description of the major coal deposits of each African country, including quality, resources, production, current research, possibility of new discoveries, and a short list of available published sources of information.

International Geological Congress, 1913, The coal resources of the world—An inquiry made upon the initiative of the Executive Committee of the 12th International Geological Congress, Toronto, Canada, 1913, with the assistance of Geological Surveys and mining geologists of different countries: Toronto, Morang and Co., 3 v. and atlas, 1266 p.

An old treatise that is still of value because of the extent and detail of its coverage. Most of the resource estimates have been superseded by later ones.

MacKay, B. R., 1947, Coal reserves of Canada—Reprint of chapter 1 and appendix A *of* Report of the Royal Commission on Coal, 1946 [and four supplemental maps relating to estimates of coal reserves]: Ottawa, Canada, King's Printer, 113 p.

A summary of information on coal in Canada. Describes coal-bearing areas in each province and includes many colored coal-field maps. Presents estimates of known coal reserves, but not of total potential resources. No bibliography is provided.

National Coal Association, 1968, Bituminous coal facts —1968: Washington, National Coal Assoc., 107 p.

An illustrated compendium of domestic statistics on coal gathered from diverse sources and accompanied by a brief text. Includes sections on bituminous coal in general and in relation to other forms of energy, and on production, markets, utilization, transportation, manpower, resources, and research. Also contains information on the National Coal Association and its affiliates and a list of local Coal Operators Associations.

Report is updated and reprinted biennially.

Soper, E. K., and Osbon, C. C., 1922, The occurrence and uses of peat in the United States: U.S. Geol. Survey Bull. 728, 207 p.

A comprehensive summary of the occurrence and distribution of peat in the United States. Includes sections on the origin of peat and the classification of peat deposits; peat-forming floras; processes and rates of formation; physical and chemical properties; agricultural, fuel, and other uses; and the peat industry in the United States. The distribution of peat deposits is shown on a map of the nation, and details of individual peat deposits, areas of occurrence, and the quantity of peat available are discussed on a county-by-county basis for most peat-bearing States.

United Nations Department of Economic and Social Affairs, 1956, Lignite resources of Asia and the Far East, their exploration, exploitation, and utilization: United Nations Mineral Resources Devel. Ser. 7, 134 p.

An excellent summary of data on occurrences, mining, processing, and utilization of lignite in Afghanistan, Burma, China, India, Indonesia, Japan, Korea, Malaya and British Borneo, Pakistan, Phillippines, and Thailand.

United Nations Economic Commission for Asia and the Far East, Secretariat, 1952, Coal and iron ore resources of Asia and the Far East: Bangkok, United Nations, 155 p.

Contains much detailed information on different aspects of coal resources and on the status of surveys, and includes many maps. The U.S.S.R. is not included.

United Nations Economic Commission for Europe, 1968a, The coal situation in Europe in 1967 and its prospects: New York, United Nations, 49 p.

A review of current developments and future trends in supply and demand, competition from other forms of energy, production, delivery, and international trade of European coal. No bibliography is provided.

Ninth annual report.

———1968b, Annual bulletin of coal statistics for Europe, 1968: New York, United Nations, v. 3, 105 p.

Presents tables on the production, imports, exports, and deliveries of solid fuels by country providing basic data on the development of production and use of solid fuels and related trends in European countries and the United States in the last 5 years.

Third in a series.

Wlodek, T. W., 1968, The coal mining industry of Poland: Canada Dept. Energy, Mines and Resources Tech. Bull. TB 109, 27 p.

Supplies details on the history, resources, management and administration, safety programs, labor status and other facets of the coal-mining industry of Poland.

WATERPOWER

U.S. Federal Power Commission, 1968, Hydroelectric power evaluation: Washington, Federal Power Comm. Pub. FPC–P–35, 103 p.

A summation of the developed and undeveloped hydroelectric power potential of the United States.

Young, L. L., 1955, Developed and potential waterpower of the United States and other countries of the world, December 1954: U.S. Geol. Survey Circ. 367, 14 p.

Presents tables of installed waterpower capacity for the United States and the world as a whole for 14 selected years during 1920–54; capacity, plant factor, potential waterpower at ordinary minimum and at mean flow (100 percent efficiency) at the end of 1944 for all countries of the world; and potential waterpower of the United States by States. This report is a widely cited

source of information on the waterpower resources of the world. (See Young (1964).)

———1964, Summary of developed and potential waterpower of the United States and other countries of the world, 1955–62: U.S. Geol. Survey Circ. 483, 38 p.

A supplement to Young, L. L. (1955) covering developments during the period 1955–1962. Contains two-page bibliography.

ATOMIC ENERGY

Anderson, G. M., 1967, Use of nuclear energy in the power industry, *in* Energy—Seventh Biennial Gas Dynamics Symposium, Evanston, Ill.: Evanston, Ill., Northwestern Univ. Tech. Inst., 28 p.

The nuclear-fuel supply problem is reviewed in relation to the use of light-water reactors, advanced converters, and breeders. Establishment of several AEC task forces to assess the variables involved is covered along with a description of the development alternatives in the heavy-water program. The assessment of the heavy-water reactors is given in some detail as an example of the depth of inquiry. Possible uses of 1000-MWe light-water reactor plants and future breeders producing very low cost power are explored. No bibliography is provided.

Bowie, S. H. U., 1968, Uranium reserves and resources, *in* Low grade uranium ores and their processing: British Nuclear Soc. preprint, March 1968, paper 2, p. 5–10; also in British Nuclear Soc. Jour., April 1969, paper 2, p. 163–168.

Presents data on uranium resources, mostly from official sources, in three categories of less than \$10, \$10–15, and \$15–30 per pound of U_3O_8; outlines area favorable for exploration for new deposits; suggest plans for recovery of U_3O_8 as byproduct in processing of phosphate rock and monazite sand.

———1969, Uranium—the present and the future: Ninth Commonwealth Mining and Metallurgical Congress, London, Inst. Mining and Metallurgy, 16 p.

A survey of future demand, reserves, resources, and chief world occurrences.

Butler, A. P., Jr., 1967, Uranium reserves and progress in exploration and development: U.S. Geol. Survey Circ. 547, 8 p. [1968].

A concise review of data available on uranium resources of the United States as of late 1967, projected to Jan. 1, 1971. Presents, by diagrams, comparison of known and projected resources with requirements of nuclear reactors in use or order as of Jan. 1, 1971, and with reactors projected to be in service by 1980. Includes a bibliography of nine items.

Davis, M. D., 1968, Future uranium demands, *in* Low grade uranium ores and their processing: British Nuclear Soc. preprint, March 1968, paper 1, p. 1–4; also in British Nuclear Soc. Jour., April 1969, paper 1, p. 159–262.

Estimated demand for uranium to the year 2000 for projected nuclear power programs, compared with currently estimated uranium resources. Predicts need for future work on ores exceeding value of \$10 per pound of U_3O_8.

Electrical World, 1968, 13th annual nuclear report: Electrical World, v. 169, no. 19 (May 6), p. 81–96.

A detailed account of the status of nuclear power facilities in the United States including reports on the exploration, drilling, reserves, government stockpile, demand outlook, price trends, refining, and leasing of uranium as well as a discussion of four typical reactors and a list and description of nuclear plants in service, under construction, or planned.

———1969, 14th annual nuclear report: Facing the challenges: Electrical World, v. 171, no. 15 (April 14), p. 77–92.

Contains several papers surveying the problems and responsibilities of the nuclear power industry.

Faulkner, R. L., 1969, Uranium supply and demand: Paper presented at American Mining Cong., Oct. 19, 1969, 7 p., 6 figs. (Mimeographed and distributed by the Atomic Energy Comm. no. S–36–69.)

An analysis of United States and world requirements and production capability of uranium in the period 1970–85. Assumes no significant contribution of plutonium from breeder reactors during the period. Notes slight improvement in demand/resources relation because of (1) slowdown in construction of atomic-powered electric generating plants and (2) improved reactor design requiring smaller initial loads of U_3O_8.

Nininger, R. D., 1970, The world uranium picture: Talk presented before the Colorado Mining Assoc., Denver, Colorado, Feb. 13, 1970, 9 p., 24 figs. (Mimeographed and distributed by the Atomic Energy Comm.)

An analysis of United States and world requirements and production capability for uranium in the period 1970–85. Presented largely by maps and diagrams.

Olson, J. C., and Overstreet, W. C., 1964, Geologic distribution and resources of thorium: U.S. Geol. Survey Bull. 1204, 61 p.

An estimate of United States and world resources of thorium, including discussion of geologic distribution and factors determining concentration into workable deposits. Includes a 15-page bibliography.

Organization for Economic Cooperation and Development [European Nuclear Energy Agency], 1967, Uranium resources; revised estimate, December 1967: Paris, Organization Econ. Coop. and Devel., 25 p.

Country-by-country estimates of uranium resources in three categories of less than $10, $10–15, and $15–30 per pound of U_3O_8.

A revision of the agency's report titled "World Uranium and Thorium Resources," published in 1965.

United Nations, 1956a, The world's requirements for energy: The role of nuclear energy, volume 1 *of* Proceedings of the [First] International Conference on the Peaceful Uses of Atomic Energy, Geneva, 8 August–20 August, 1955: Geneva, United Nations, 479 p.

Comprises 65 papers on world energy needs, capital investment required for nuclear energy, the role of thorium, the role of nuclear power to the year 2000, the education and training of personnel in nuclear energy, and the economics of nuclear power. (See United Nations (1958, 1965a, and 1965b).)

———1956b, Geology of uranium and thorium, volume 6 *of* Proceedings of the International Conference on the Peaceful Uses of Atomic Energy, Geneva, 8 August–20 August, 1955: Geneva, United Nations, 825 p.

Comprises 100 papers on the geology of uranium and thorium throughout the world and 27 papers on prospecting for uranium and thorium. (See United Nations 1958, 1965a, and 1965b).)

———1958, Survey of raw material resources [for nuclear energy], volume 2 *of* Proceedings of the Second United Nations International Conference on the Peaceful Uses of Atomic Energy, Geneva, 1 September–13 September, 1958: Geneva, United Nations, 843 p.

Comprises 102 papers on reserves, prospecting, mining, geochemistry, mineralogy, geology, and origin of deposits of uranium and thorium throughout the world. (See United Nations (1956a, 1956b, 1965a, and 1965b).)

———1965a, Progress in atomic energy, volume 1 *of* Proceedings of the Third International Conference on the Peaceful Uses of Atomic Energy, Geneva, 31 August–9 September, 1964: New York, United Nations, 477 p.

Contains papers reviewing the nuclear power development in individual countries as well as future world energy needs and the role of nuclear power. (See United Nations (1956a, 1956b, and 1958).)

———1965b, Nuclear fuels—III. Raw materials, volume 12 *of* Proceedings of the Third International Conference on the Peaceful Uses of Atomic Energy, Geneva, 31 August–9 September, 1964: New York, United Nations, 496 p.

Includes three general papers on uranium and thorium requirements; one on world resources; and one each on resources in Canada, Argentina, Macedonia, Brazil, Spain, Portugal, India, Japan, and Gabon. (See United Nations 1956a, 1956b, and 1958).)

U.S. Atomic Energy Commission, 1962a, Civilian nuclear power—a report to the President—1962: U.S. Atomic Energy Comm., 67 p.

A study of the objectives, scope, and content of the U.S. nuclear power development program. Assumes success in production of plutonium in efficient breeder reactors in the period 1970 to the early 1980's. Assumes that by the year 2000 roughly half of the United States electricity will be generated by nuclear reactors. Includes data on nuclear-powered electric generating plants in operation or planned as of 1962 and a 10-item bibliography. (See U.S. Atomic Energy Commission (1962b).)

———1962b, Civilian nuclear power—appendices to a report to the President—1962: U.S. Atomic Energy Comm., 85 p.

Background data used in development of report above. Includes tables on resources of fossil fuels as prepared at different times by different individuals and organizations, tables on population growth, per-capita increase in use of energy, and cost of energy and related discussion. Most projections to the year 1980; a few to the year 2000.

———1969, The nuclear industry—1969: Washington, GovernmentPrinting Office, 338 p.

A complete summation of the state of the atomic energy industry. Includes data on uranium resources, requirements, processing, nuclear components and equipment, reactors, radiation applications, materials reprocessing, peaceful uses of nuclear explosives, services, licensing, regulation, legislation, and Government assistance to the industry.

Published annually in September.

Williams, R. M., 1969, Canada's future in uranium supply: Canada Dept. Energy, Mines and Resources, Mineral Resources Branch, Mineral Inf. Bull. MR 98, 65 p.

"Canada possesses almost one third of the presently known low-cost uranium reserves in the non-communist world; much of this reserve remains uncommitted. The potential for additional discoveries is great and few of the many favorable areas have been examined thoroughly enough to be seriously discounted. Further, Canada possesses almost one third of the non-communist world's near-term production capability, second only to the

United States." (From author's abstract.) Report includes discussion of (1) growth of world consumption of energy, (2) growth in nuclear energy, (3) Uranium requirements and future supply, and (4) future uranium production in Canada. Also includes 14 tables, 21 figures, and a 21-item bibliography.

BITUMINOUS SANDS AND ASPHALT

Abraham, Herbert, 1960, Asphalts and allied substances—their occurrence, modes of production, uses in the arts, and methods of testing: [6th ed.]: New York, D. Van Nostrand Co., 5 v, 2,547 p.

An encyclopedic work in five volumes that covers terminology, classification, chemistry, geology, origin of deposits, mining, transportation, refining, descriptions of deposits throughout the world, and many other aspects of the subject. Volume 1 includes a historical review of past knowledge and uses of asphalt and the names, locations, and properties of the natural raw materials. This volume is of greatest interest to students of energy resources. Volume 2 includes discussion of industrial raw materials. Volume 3 includes methods of handling and processing manufactured products. Volume 4 discusses methods of testing industrial raw bituminous materials. Volume 5 discusses methods of testing fabricated bituminous products. Each volume contains a comprehensive bibliography.

Ball Associates, Ltd., 1965, Surface and shallow oil-impregnated rocks and shallow oil fields in the United States: U.S. Bur. Mines Mon. 12, 375 p.

A summation of data on 546 occurrences of tar sands and 383 shallow oil fields in 27 States. Includes 40 maps of tar sand occurrences and shallow oil fields. Resource data are available for only a few of the deposits, but these few contain 2.5–5.5 billion barrels of bitumen recoverable by known methods. Report includes 396 references classified by State.

Eldridge, G. H., 1901, The asphalt and bituminous rock deposits of the United States: U.S. Geol. Survey 22d Ann. Rept., pt. 1, p. 209–452.

A description, now mostly of historical value, on the occurrence and geology of asphalt and bituminous sandstone deposits throughout the United states, with a short introductory section on the classification and analysis of material, and the distribution and origin of deposits. Most areas described have since been remapped. (See Ball Associates, Ltd. (1965).)

Phizackerley, P. H., and Scott, L. O., 1967, Major tar sand deposits of the world: Seventh World Petroleum Congress Proc., v. 3, p. 551–571.

Details of the stratigraphy, lithology, facies, and structure of twenty major tar sand accumulations in Canada, Venezuela, Malagasy, U.S.A., Albania, Trinidad, Rumania, and the U.S.S.R. are given together with reserve figures where known. The relationship of the tar oil impregnations to the geological setting and presumed origin of the oil are discussed.

Only four of the major tar sand deposits discussed, La Brea (Trinidad), Selenizza (Albania), Derna (Rumania), and Cheildaq (U.S.S.R.), are currently being developed.

Spencer, G. B., Eckard, W. E., and Johnson, F. S., 1969, Domestic tar sands and potential recovery methods—a review: Interstate Oil Compact Comm. Comm. Bull., v. 11, no. 2, p. 5–12.

A review and evaluation of present knowledge of United States tar sand deposits, including occurrence, physical properties, resources, and recovery methods.

OIL SHALE

Cadman, W. H., 1948, The oil-shale deposits of the world and recent developments in their exploitation and utilization, reviewed to May 1947: Inst. Petroleum Jour., v. 34, no. 290, p. 109–132.

A summary of the occurrence and development of oil-shale deposits in Great Britain, France, Estonia, Sweden, Spain, Portugal, Italy, Czechoslovakia, U.S.S.R., Turkey, Bulgaria, Germany, Japan, Australia, New Zealand, Canada, South Africa, India, Burma, Brazil, and the United States.

Cashion, W. B., 1967, Geology and fuel resources of the Green River Formation, southeastern Uinta Basin, Utah and Colorado: U.S. Geol. Survey Prof. Paper 548, 48 p.

A detailed study of the geology and resources of oil shale in a 2,300 square-mile area in northeastern Utah and northwestern Colorado. Also includes study of geology and resources of gilsonite.

Colorado School of Mines, 1968, Fifth symposium on oil shale: Colorado School Mines Quart., v. 63, no. 4, 167 p.

Comprises 11 papers on various aspects of oil-shale studies, technology, and problems. No resource data. Most papers contain selected bibliographies. Previous symposia that contain comparable material are: Fourth, v. 62, no. 3, 1967; Third, v. 61, no. 3, 1966; Second, v. 60, no. 3, 1965; and First, v. 59, no. 3, 1964.

Culbertson, W. C., 1965, Oil-shale resources and stratigraphy of the Green River Formation in Wyoming [abs.]: The Mountain Geologist, v. 1, no. 3, p. 181.

Includes data on shale-oil resources in the Tipton Shale, Wilkins Peak Shale, and Laney Shale Mem-

bers of the Green River Formation in Wyoming. Estimates are based on shale in beds 15 feet or more thick and are presented in two categories: (1) shale averaging 15 gallons or more per ton, and (2) shale averaging 25 gallons or more per ton.

Donnell, J. R., 1961, Tertiary geology and oil-shale resources of the Piceance Creek basin between the Colorado and White Rivers, northwestern Colorado: U.S. Geol. Survey Bull. 1082–L, p. 835–891.

A detailed study of the geology and an estimate of resources of oil shale in the largest known deposits in the United States.

Donnell, J. R., Culbertson, W. C., and Cashion, W. B., 1967, Oil shale in the Green River Formation: Seventh World Petroleum Congress Proc., v. 3, p. 699–702.

A concise summary of the geology and resources of oil shale in the Green River Formation of Colorado, Utah, and Wyoming.

Duncan, D. C., and Swanson, V. E., 1965, Organic-rich shale of the United States and world land areas: U.S. Geol. Survey Circ. 523, 30 p. [Repr. 1966.]

Review and estimate of the thermal energy and oil potential of oil shale and other organic-rich shale deposits. Data on deposits are summarized in grade categories of (1) more than 25 gallons per ton, (2) 10–25 gallons per ton, and (3) 5–10 gallons per ton. In the principal known deposits, the beds range in thickness from a minimum of 20 inches to 25 feet to a maximum of as much as 2,000 feet. The beds generally lie near the surface or at depths of no more than a few thousand feet, but a few areas deposits as much as 10,000 feet below the surface are included. A limiting depth of 20,000 feet was used in the inventory of undiscovered and incompletely appraised deposits. Includes a four-page bibliography.

Institute of Petroleum, 1938, 1951, Oil shale and cannel coal: London, Inst. Petroleum, v. 1, 476 p; v. 2, 832 p.

Proceedings of the First and Second Oil Shale and Cannel Coal Conferences, organized by the Institute of Petroleum and held in Glasgow in 1938 and in 1950. Eighty-five reports describe many oil-shale and cannel-coal deposits throughout the world and the technology of their mining, testing, and utilization. Includes the only substantial English-language description of some deposits.

Rogers, M. B., 1969, List of Bureau of Mines publications on oil shale and shale oil, 1917–69: U.S. Bur. Mines Inf. Circ. 8429, 61 p.

An annotated bibliography by series, with author index, but no subject index.

Swanson, V. E., 1960, Oil yield and uranium content of black shales: U.S. Geol. Survey Prof. Paper 356–A, p. 1–44.

Contains results of analyses of organic matter and selected chemical constituents of many black-shale deposits in the United States.

Thorne, H. M., and others, 1964, Oil shale technology —a review: U.S. Bur. Mines. Inf. Circ. 8216, 24 p.

A discussion of the occurrence and estimated resources of oil-shale deposits throughout the world and of methods devised to develop them. Emphasis is on oil shale and technology in the United States. (In part supersedes Bur. Mines Rept. Inv. 4776.)

United Nations, 1968, Symposium on the development and utilization of oil-shale resources—Section III, preprints: Tallinn, U.S.S.R., about 2,200 p.

Comprises at least 88 separately bound papers in English, individually 20–30 pages in length, on oil-shale deposits, technology, development, and utilization in many parts of the world. Most papers contain selected bibliographies.

United Nations Department of Economic and Social Affairs, 1967, Utilization of oil shale—progress and prospects: New York, United Nations, 112 p.

A review, description, and discussion of commercial possibilities of many world oil-shale deposits some of which are not described in any other English literature.

U.S. Department of the Interior, 1968, Prospects for oil shale development—Colorado, Utah, and Wyoming: Washington, U.S. Dept. Interior, 134 p.

A summary report of the results of a special Department of the Interior evaluation of such fundamental issues as the potential for oil-shale development in the near future, the current status and immediate prospects of technology and costs, and the relative merits of alternative courses that might be taken to assure the utilization of domestic oil-shale resources in a manner consistent with the national interest.

Watkins, J. W., 1967, Oil shale utilization—when and how?: Western Oil Reporter, v. 24, no. 7, p. 18–22.

Review of technology, economics, and research on in situ methods of retorting.

Williams, F. E., Russell, P. L., and Sheridan, M. J., 1969, Potential applications for nuclear explosives in a shale-oil industry: U.S. Bur Mines Inf. Circ. 8425, 37 p.

Nuclear detonation data were accumulated, studied, and evaluated by the Bureau of Mines to visualize how nuclear explosives might be used in a shale-oil industry. The evaluation shows that the Green River Formation at the semi-isolated locale

of Piceance Creek Basin, in northwestern Colorado, is thick and widespread enough to warrant consideration of nuclear mining in lieu of conventional methods. Because cost data for nuclear explosions are limited, cost comparisons are made largely by assumptions. Also described are the history of the shale-oil industry, the geology and size of oil-shale resources, and conventional mining methods and processing technology.

GEOTHERMAL ENERGY

International Geological Congress, 1968, Genesis of mineral and thermal waters: International Geol. Cong., 23d, Prague, Proc. Symposium II, 212 p.

Comprises 22 papers by 36 authors on thermal waters in the U.S.S.R. and various other areas. A classification of hydrothermal waters in areas of recent volcanism is proposed. More detailed papers discuss CO-bearing systems, such as the Salton Sea and Ostwestfalen, Germany; the origin of nitrogeneous thermal waters; and the bacterial origin of sulfuric acid in sulfurous hot springs.

Kaufman, Alvin, 1964, Geothermal power—an economic evaluation: U.S. Bur. Mines Inf. Circ. 8230, 24 p.

An analysis of the economics of geothermal power for generation of electricity in the United States relative to the economics of using other fuels. The presentation, including analysis and conclusions, is general rather than specific.

Oil and Gas Journal, 1964, Soviets eye geothermal development: Oil and Gas Jour., v. 62, no. 30, p. 122–124.

A summary report and map on the geothermal potential of Russia with a brief note on that of Hungary. No bibliography is provided.

White, D. E., 1965, Geothermal energy: U.S. Geol. Survey Circ. 519, 17 p.

A concise summary and analysis of most known areas of potential geothermal energy in the United States and in the world. Includes discussion of geologic characteristics of areas most favorable for economic development, and a two-page bibliography.

SOLAR ENERGY

Glaser, P. E., 1968, Power from the sun—its future: Science, v. 162, no. 3856, p. 857–861.

Excellent summation of extent of knowledge and experimentation to date. Includes extensive bibliography.

TIDAL POWER

Clancy, E. P., 1968, The tides—pulse of the earth: Garden City, N.Y., Doubleday & Co., 228 p.

A highly readable, popular summary of tidal theory, behavior, and measurements. Chaper 8, "Power from the tides" (p. 133–157), summarizes status of tidal power installation at La Rance, France, and of much-studied and proposed installations at Passamaquoddy Bay, Maine-New Brunswick.

SYNTHETIC LIQUID FUEL AND GAS

Appell, H. R., Wender, Irving, and Miller, R. D., 1970, Conversion of urban refuse to oil: U.S. Bur. Mines Tech. Prog. Rept. 25, 5 p.

Describes first research results by U.S. Bureau of Mines in attempt to convert urban refuse, cellulosic wastes, and sewage sludge into fuel oil. The resultant oil has a very low sulfur content. No bibliography is provided.

Cameron, R. J., 1968, A comparative study of oil shale, coal, and tar sands as sources of oil [presented at the Symposium on Petroleum Economics and Evaluation, Society of Petroleum Engineers of AIME, Dallas, Texas, March 4–5, 1968]: Denver, Cameron Engineers, 27 p.

An analysis of the economic potential of each subsidiary source of synthetic liquid fuels. Concludes that eastern coal deposits are most favorably located and that synthetic fuels will enter the fuel economy in the next decade and may be making significant contributions by 1985.

Con, A. L., and others, American Oil Company, 1967, Evaluation of "Project H-Coal": Springfield, Va., Clearinghouse, PB 177068, 78 p. Prepared for U.S. Dept. Interior, Office of Coal Research.

A study of the technical and economic feasibility of the H-Coal process—conversion of coal to hydrocarbon liquids by hydrogenation with a cobalt-molybdenum catalyst in an ebullating-bed reactor—developed by Hydrocarbon Research, Inc., under a government contract.

Feldmann, H. F., and others, 1966, Production of pipeline gas by hydrogasification of oil shale: Inst. Gas Tech. Research Bull. 36, 109 p.

A report on the results of studies aimed at the production of a high-Btu synthetic pipeline gas by destructive hydrogenation—hydrogasification—of oil shale. Most of the work was done with Colorado oil shale; a few feasibility tests were made of some promising oil shales of the Eastern United States and Canada. Gasification experiments were carried out in laboratory- and bench-scale equipment and a pilot-plant unit, at temperatures from 975° to 1400°F and pressures up to 5540 psig. The pilot-unit tests were conducted in moving-bed and free-fall operation. A list of publications of the Institute of Gas Technology is appended.

Forney, A. J., Gasior, S. J., Haynes, W. P., and Katell, Sidney, 1970, A process to make high-Btu gas from coal: U.S. Bur. Mines Tech. Prog. Rept. 24, 6 p.

A report on a new process for directly converting any grade of coal to clean-burning, high-energy pipeline gas for home and industrial use.

Ralph M. Parsons Company, 1969, 1969 Feasibility report—Consol synthetic fuel process synthetic crude production: Springfield, Va., Clearinghouse, PB 184330, 67 p. Prepared for U.S. Dept. Interior, Office of Coal Research.

A technical and economic re-evaluation of the Consol synthetic fuel process. Presents a conceptual design based on the Consol process for a commerical plant to produce synthetic crude oil from coal. The process is evaluated for eastern coal, not economic at $4.14 per barrel at the plant, and western coal, possibly economic at $3.25 per barrel at the plant, for a high-quality crude oil.

Schanz, J. J., Jr., 1969, Potential role of unconventional energy sources in National security, 1969–1985: Western Oil Reporter, v. 26, no. 8, p. 20–25.

A summary of the possibilities for commercial production of liquid hydrocarbons from unconventional sources. Covers shale oil, coal synthesis, tar sands, natural gas, and synthesis. Author concludes that it is reasonable to expect a modest-sized synthetic fuels industry in the decade of the seventies. No bibliography is provided.

Tsaros, C. L., and Joyce, T. J., 1968, Comparative economics of pipeline gas from coal processes [presented at 1968 American Gas Association Synthetic Pipeline Gas Symposium, Pittsburgh, Pa., November 22, 1968]: Chicago, Inst. Gas Technology, 23 p.

A description and economic evaluation of seven gas-production processes with coal and lignite as the raw materials. Contains a list of references which describe each process in detail.

Wu, W. R. K., and Storch, H. H., 1968, Hydrogenation of coal and tar: U.S. Bur. Mines Bull. 633, 195 p.

Literature review of status of hydrogenation research, including history, economics, engineering, production, and current developments.

ELECTRICITY

Brooksieker, H. H., 1967, Future needs of the energy industries, *in* Energy—Seventh Biennial Gas Dynamics Symposium, Evanston, Ill., August 23–25, 1967: Evanston, Ill., Northwestern Univ. Tech. Inst., 16 p.

The problems of growth, change, and technological innovation required to meet the growth and change of the energy industries are discussed in terms of the electric utility industry, and in particular, the transmission and distribution of electrical energy.

Brown, W. D., 1969, 20th annual electrical industry forecast: Electrical World, v. 172, no. 11, p. 85–100.

Industry predictions, to 1985, of residential, industrial, commercial, other, and total electricity sales as well as utility capital expenditures, generating capacity additions, output, peak load, capability, construction plans through 1975, and a two-page prediction for the year 2000 of the electric power industry in the United States.

Published annually; appears in September.

Federal Power Commission, 1964, National Power Survey: Washington, U.S. Govt. Printing Office, v. 1, 296 p.; v. 2, 423 p.

A comprehensive analysis, authored by 134 experts, of the future growth patterns of the Nation's 3,600 electric utility systems, designed to achieve long-term benefits by coordinating expansion plans of individual systems, while preserving benefits of the diverse ownership and local distribution pattern of today. Lays out guidelines for future development of the Nation's electric power industry designed to encourage full regional and countrywide coordination of all systems by 1980, and sets a target for a 27-percent reduction in the average unit price of electricity to all consumers. Control of air pollution is discussed.

———1968–69, [Six regional reports on electric power in the United States prepared by the six Regional Advisory Committees]: Federal Power Comm., approx. 1300 p.

An extensive analysis of the electric power industry in the United States for the years 1970–1990 including fuel resources, future power requirements and sources of supply, patterns of generation and transmission, coordinated planning and development, and environmental considerations. The data in these reports will be incorporated into the updated version of the 1964 National Power Survey to be published in late 1970 or early 1971. No bibliographies are provided.

Guyol, N. B., 1969, The world electric power industry: Berkeley, California Univ. Press, 366 p.

This study consists mainly of statistical data on the electric power industry in 162 countries put into comparable forms and combined to produce regional and world aggregates, plus observations concerning variations in characteristics of the industry from one region to another and from one country to another. The focal point of the study is the year 1964—the most recent year for which

adequately inclusive, internationally comparable data are available. Includes a 12-page bibliography.

Holcomb, R. W., 1970, Power generation—the next 30 years: Science, v. 167, no. 3915, p. 159–160.

An examination of the pollution problems associated with electric power production for the next 30 years.

Organization for Economic Cooperation and Development, 1969, The electricity supply industry, 19th enquiry—Achievements 1966–1967, forecasts, 1968–1973: Paris, Organization Econ. Coop. and Devel., 104 p.

Part I is a general review of the electricity supply industry in the OECD member countries—Europe, North America, and Japan—in 1966 and 1967 and the outlook for 1968 through 1973. Part II contains statistical tables showing data reported by the OECD countries for 1966 and 1967, together with estimates for 1968–1973.

United Nations, 1965, Situation, trends and prospects of electric power supply in Africa: New York, United Nations, 114 p.

First comprehensive survey and analysis on the production and use of electric energy in Africa.

United Nations Economic Commission for Asia and the Far East, 1962, Proceedings of the regional seminar on energy resources and electric power development, Bangkok, December 6–16, 1961: New York, United Nations, 441 p.

Contains papers on electric power development in the countries of the ECAFE region, assessment of resources for power development, forecasting of power demand, and technological developments in the electric power industry.

———1968, Electric power in Asia and the Far East, 1966: New York, United Nations, 104 p.

A brief review of the electric power situation in the region and detailed statistical data on the technical and financial aspects of the industry in the various countries.

Published annually since 1951.

United Nations Economic Commission for Europe, 1969, Annual bulletin of electric energy statistics for Europe, 1968: New York, United Nations, v. 14, 82 p.

Presents tables on production, imports, exports, and consumption of electric energy by country to provide basic data on electric energy developments in European countries and the United States in the last 5 years. Fourteenth in series.

United States Delegation Tour to Soviet Russia, 1962, Recent electric power developments in the U.S.S.R.: Washington, U.S. Govt. Printing Office, 63 p.

An account of impressions of the Russian electric power industry gained by a party of 17 United States industrialists on a 15-day exchange visit to Russia in the fall of 1962.

White, H. F., Jackson and Moreland Division of United Engineers and Constructors, Inc., 1966, Review and evaluation of Project Fuel Cell: Springfield, Va., Clearinghouse, PB 173765, 43 p. Prepared for U.S. Dept. Interior, Office of Coal Research.

A technical and economic examination of Project Fuel Cell being performed for the Office of Coal Research by Westinghouse Electric Corporation which concludes that a coal-oxidation, solid-electrolyte, fuel-cell power plant has the potential for becoming a competitive source in the supply of electrical energy for heavy industry and in the utility power field.

★ U.S. GOVERNMENT PRINTING OFFICE : 1971 O—413-052