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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

**LIST OF PUBLICATIONS
BUREAU OF MINES
1910-1937**

WITH SUBJECT AND AUTHOR INDEX



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UNITED STATES
DEPARTMENT OF THE INTERIOR
HAROLD L. ICKES, Secretary
BUREAU OF MINES
JOHN W. FINCH, Director

LIST OF PUBLICATIONS
BUREAU OF MINES

Complete from Establishment of Bureau
1910 to June 30, 1937

WITH SUBJECT AND AUTHOR
INDEX



Wpisano do inwentarza
ZAKŁADU GEOLOGII

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LIST OF PUBLICATIONS OF THE BUREAU OF MINES WITH SUBJECT AND AUTHOR INDEX

1910-1937

CLASSES OF PUBLICATIONS

Bulletins and technical papers present the results of scientific and technical investigations. Economic papers are analytical studies of production statistics, sources, resources, distribution, and industrial flow of mineral commodities. The annual report entitled "Minerals Yearbook" includes chapters, usually published separately, on the production and consumption of metals and of nonmetallic minerals. Monographs give detailed results of extensive cooperative investigations of special subjects. Handbooks are special manuals on subjects relating to safety or efficiency. Schedules outline the procedure for testing materials or equipment to determine their permissibility for use in coal mines.

Miners' circulars deal with the prevention of mine accidents, first-aid and rescue methods, and precautions against disease; that is, with matters of general interest to men actually engaged in mining. Annual reports of the director discuss the work of the Bureau for the year indicated.

Reports of investigations consist of short papers which present the principal features and results of minor investigations or of special phases of major investigations. Their function is to make available quickly to the industries and the public the outstanding results of original investigative work by the Bureau. Information circulars are also short papers, essentially of an informational character. They include compilations, reviews, abstracts, and discussions and do not as a rule represent original investigative work. Their chief purpose is to present to the mining industry the principal facts on subjects of interest in a concise form suitable for sending out in reply to inquiries received by the Bureau of Mines.

Periodical reports give data on the status of the market for various minerals.

Mineral market reports are brief statistical reviews issued annually. Health and safety reports cover briefly some phase of the Bureau's work to make the mining industry safer.

DISTRIBUTION

Bulletins, technical papers, economic papers, minerals yearbooks, miners' circulars, handbooks, and schedules are obtainable at the prices indicated from the Superintendent of Documents who is an

official of the Government Printing Office—an entirely separate organization from the Bureau of Mines and in an entirely separate section of the city. His correct address is: Superintendent of Documents, Government Printing Office, Washington, D. C.

Any orders or remittances in payment for the above Bureau of Mines publications should be sent directly to the Superintendent of Documents and not to the Bureau of Mines. This will prevent delay in filling orders and avoid the extra work of transmitting them from the Bureau to the Superintendent of Documents and of obtaining receipts for funds which the Bureau of Mines cannot accept.

For convenience in remitting, coupons having a face value of 5 cents each are sold by the Superintendent of Documents in sheets of 20 for \$1. These coupons are accepted in orders for relatively small amounts.

Periodical reports may be obtained free of charge from the Information Division, Bureau of Mines, Washington, D. C. Addresses will be listed for the regular forwarding of any of these reports on request.

Annual reports of the director, reports of investigations, information circulars, mineral market reports, and accident statistics may be obtained free from the Information Division, Bureau of Mines, Washington, D. C.

Cooperative publications present the results of investigations conducted cooperatively with various agencies. These reports and papers have been written either wholly or in part by members of the bureau and published otherwise than by the Bureau or by journals of various technical societies or by the technical press. The source from which cooperative publications may be obtained is indicated in each case.

DISTRIBUTION

SALES PUBLICATIONS

BULLETINS

- †B 1. The Volatile Matter of Coal, by H. C. Porter and F. K. Ovitz. 1910. 56 pp., 1 pl., 9 figs. Discusses briefly the composition of the volatile matter of several typical American coals and the amount given off at different temperatures.
- †B 2. North Dakota Lignite as a Fuel for Power-Plant Boilers, by D. T. Randall and Henry Kreisinger. 1910. 42 pp., 1 pl., 7 figs. Gives results of steaming tests at Williston, N. Dak., in a boiler plant having furnace of special design. Of interest to mechanical engineers and to users of lignite.
- †B 3. The Coke Industry of the United States as Related to the Foundry, by Richard Moldenke. 1910. 32 pp. Calls attention to the waste in coke making; points out how coke can be used to best advantage in the cupola and suggests improvements in foundry practice.
- †B 4. Features of Producer-Gas Power-Plant Development in Europe, by R. H. Fernald. 1911. 27 pp., 4 pls., 7 figs. Briefly summarizes some features of gas-producing practice, with particular reference to the use of low-grade fuels.
- †B 5. Washing and Coking Tests of Coal at the Fuel-Testing Plant, Denver, Colo., July 1, 1908, to June 30, 1909, by A. W. Belden, R. G. Delameter, J. W. Groves, and K. M. Way. 1910. 62 pp., 1 fig. Describes methods and results. Most of the coals tested were from coal fields in the Rocky Mountain province.
- †B 6. Coals Available for the Manufacture of Illuminating Gas, by A. H. White and Perry Barker, compiled and revised by H. M. Wilson. 1911. 77 pp., 4 pls., 12 figs. Gives tests of coals from Blocton, Ala.; Oak Creek and Sopris, Colo.; Harrisburg, Ill.; Heller, Ky.; Saginaw, Mich.; Van Houton, N. Mex.; Scott Haven, Pa.; La Follette, Tenn.; Page, W. Va.; and Hanna, Wyo.
- †B 7. Essential Factors in the Formation of Producer Gas, by J. K. Clement, L. H. Adams, and C. N. Haskins. 1911. 58 pp., 1 pl., 16 figs. Describes laboratory experiments bearing on the rate of formation of carbon monoxide at high temperatures and the effect of temperature on the rate of formation and the composition of water gas. Indicates how the results of the tests apply to the operation of boiler furnaces and gas producers.
- †B 8. The Flow of Heat Through Furnace Walls, by W. T. Ray and Henry Kreisinger. 1911. 32 pp., 19 figs. Describes experiments that show that a furnace wall with an air space offers less resistance to heat flow than a solid wall of the same thickness. Discusses the laws of heat transmission.
- †B 9. Recent Development of the Producer-Gas Power Plant in the United States, by R. H. Fernald. 1910. 82 pp., 2 pls., 3 figs. Discusses the opinions of owners and manufacturers on the efficiency of the plants and gives a list of installations in the United States. Reprint of Geological Survey Bulletin 416.
- †B 10. The Use of Permissible Explosives, by J. J. Rutledge and Clarence Hall. 1912. 34 pp., 5 pls., 4 figs. Discusses the manner in which permissible explosives can be used to best advantage in blasting coal. Is intended especially for coal miners and mine officials. See B 17 and 137.
- †B 11. The Purchase of Coal by the Government under Specifications, with Analyses of Coal Delivered for the Fiscal Year 1908-9, by G. S. Pope. 1910. 80 pp. Describes the Government's plan of purchasing coal under specifications, the methods of sampling and testing and many analyses of coals. Reprint of Geological Survey Bulletin 428.
- †B 12. Apparatus and Methods for the Sampling and Analysis of Furnace Gases, by J. C. W. Frazer and E. J. Hoffman. 1911. 22 pp., 6 figs. Describes methods of taking "continuous" and "instantaneous" samples and the special apparatus designed for such sampling.

† Out of print.

- †B 13. *Résumé of Producer-Gas Investigations, October 1, 1904, to June 30, 1910*, by R. H. Fernald and C. D. Smith. 1911. 393 pp. Summarizes the results of producer-gas investigations at the Government fuel-testing plants. Incidentally discusses gas-producer development in this country and in Europe. Is intended especially for mechanical engineers and power-plant officials interested in gas-producer design and in the operation of gas producers on the coal available at different points in the United States.
- †B 14. *Briquetting Tests of Lignite at Pittsburgh, Pa., 1908-9*, with a chapter on Sulphite-Pitch Binder, by C. L. Wright. 1911. 64 pp., 12 pls., 4 figs. Describes the lignites tested and the briquetting plant, gives results of the tests, and presents a statement of the probable cost of briquetting lignite on a commercial scale.
- †B 15. *Investigations of Explosives Used in Coal Mines*, by Clarence Hall, W. O. Snelling, and S. P. Howell, with a chapter on the Natural Gas Used at Pittsburgh, by G. A. Burrell, and an introduction by C. E. Munroe. 1911. 197 pp., 7 pls., 5 figs. Discusses thermochemistry of explosives, apparatus and methods for physical tests of explosives, and results of tests of various explosives.
- †B 16. *The Uses of Peat for Fuel and Other Purposes*, by C. A. Davis. 1911. 214 pp., 1 pl., 1 fig. Superseded by B 253.
- †B 17. *A Primer on Explosives for Coal Miners*, by C. E. Munroe and Clarence Hall. 1911. 69 pp., 10 pls., 12 figs. Discusses combustion and explosion, the composition of explosives, the handling and use of explosives and of squibs, fuses, and detonators, and concludes with notes on the safe shipment and storage of explosives and the requirements of permissible explosives. Reprint of Geological Survey Bulletin, 423.
- †B 18. *The Transmission of Heat Into Steam Boilers*, by Henry Kreisinger and W. T. Ray. 1912. 180 pp., 78 figs. Is a technical discussion of the factors affecting the capacity and efficiency of steam boilers. Presents the results of numerous tests and a mathematical treatment of the theory of heat transmission through boiler tubes.
- †B 19. *Physical and Chemical Properties of the Petroleum of the San Joaquin Valley, Calif.*, by I. C. Allen and W. A. Jacobs, with a chapter on Analyses of Natural Gas from the Southern California Oil Fields, by G. A. Burrell. 1911. 60 pp., 2 pls., 10 figs. Briefly states the method used by the Bureau of Mines in determining the heating value, and other properties of the fuel products derived from the petroleum mentioned and gives the results of the examination of a large number of samples. Also describes an electric still for fractionating petroleum and briefly summarizes the methods used in analyzing natural gas.
- B 20. *The Explosibility of Coal Dust*, by G. S. Rice, with chapter by J. C. W. Frazer, Axel Larsen, Frank Haas, and Carl Scholz. 1911. 204 pp., 14 pls., 28 figs. Gives a résumé of existing knowledge regarding the explosibility of coal dust suspended in air. Is written for the information of officials of coal-mining companies and of persons investigating the properties of coal dust. Treats of the growth of the coal-dust problem in Europe and in this country, the factors that govern the explosibility of coal dust, and the remedies that may be applied in mines to render coal dust harmless. Revision of Geological Survey Bulletin 425. 35 cents.
- †B 21. *The Significance of Drafts in Steam-Boiler Practice*, by W. T. Ray and Henry Kreisinger. 1911. 64 pp., 26 figs. Discusses the factors that govern the flow of air through fuel beds and boilers and the capacity of boilers. Written for the information of power-plant engineers and designers of boilers. Reprint of Geological Survey Bulletin 367.
- †B 22. *Analyses of Coals in the United States, with Descriptions of Mine and Field Samples Collected between July 1, 1904, and June 30, 1910*, by N. W. Lord, with chapters by J. A. Holmes, F. M. Stanton, A. C. Fieldner, and Samuel Sanford. 1913. Part I, Analyses, pp. 1-321; Part II, Descriptions of samples, pp. 323-1200, 1 fig. Describes methods of collecting and analyzing samples of coal which were taken from over 1,500 mines and prospects in different parts of the United States. Heating values of all the coals are given and both proximate and ultimate analyses of a large proportion of samples.

- †B 23. Steaming Tests of Coals and Related Investigations, September 1, 1904, to December 31, 1908, by L. P. Breckenridge, Henry Kreisinger, and W. T. Ray. 1912. 380 pp., 2 pls., 94 figs. Gives a comprehensive summary of tests at the Government fuel-testing plants at St. Louis, Mo., and Norfolk, Va. It is especially intended for mechanical engineers, designers of boiler plants, and persons interested in the efficient utilization of coal under boilers. Summarizes the results of 551 steaming tests with a wide variety of coals and several different types of boilers. Among the subjects discussed are the efficiencies of furnaces and boilers and the relation of combustion, composition of the products of combustion, air supply, combustion of coal, the results of the tests, and the principles involved in the combustion of coal in boiler furnaces.
- †B 24. Binders for Coal Briquets, by J. E. Mills. 1911. 56 pp., 1 fig. See B 58 for details of tests. Describes investigations to determine the suitability of various substances as binders for coal briquets. Reprint of Geological Survey Bulletin 343.
- †B 25. Mining Conditions under the City of Scranton, Pa., Report and Maps, by William Griffith and E. T. Conner, with a preface by J. A. Holmes and a chapter by N. H. Darton. 1912. 89 pp., 29 pls. Gives results of an investigation undertaken to determine the probable danger from subsidence of the surface through the removal of coal from the various beds underlying the city. Shows by large-scale maps the extent of the workings in each bed. Discusses various methods for supporting the roof and commends the flushing of sand or other material from the surface.
- †B 26. Notes on Explosive Mine Gases and Dusts, with Especial Reference to Explosions in the Monongah, Darr, and Naomi Coal Mines, by R. T. Chamberlin. 1911. 67 pp., 1 fig. Describes an investigation of the gases in coal, their quantity and composition. Discusses factors governing the escape of gas in mines and the part played by coal dust in three great mine disasters. Reprint of Geological Survey Bulletin 383.
- †B 27. Tests of Coal and Briquets as Fuel for House-Heating Boilers, by D. T. Randall. 1911. 44 pp., 3 pls., 2 figs. Compares bituminous coal, anthracite, and briquets. Gives the results of tests and presents data for determining the relative value of fuels for use in house-heating boilers. Reprint of Geological Survey Bulletin 366.
- †B 28. Experimental Work Conducted in the Chemical Laboratory of the United States Fuel-Testing Plant at St. Louis, Mo., January 1, 1905, to July 31, 1906, by N. W. Lord. 1911. 51 pp. Discusses factors affecting the accuracy of the analysis of coal by the methods used at the fuel-testing plant in St. Louis. Reprint of Geological Survey Bulletin 323.
- B 29. The Effect of Oxygen in Coal, by David White. 1911. 80 pp., 3 pls. Compares the composition, especially the oxygen content, of a large number of coals in its relation to the calorific value of a given coal. Discusses the cause of the variation in oxygen content and the relation of the original constituents of a coal to coking properties. Is intended for chemists, geologists, and fuel engineers. Reprint of Geological Survey Bulletin 382. 20 cents.
- †B 30. Briquetting Tests at the United States Fuel-Testing Plant, Norfolk, Va., 1907-8, by C. L. Wright. 1911. 41 pp., 9 pls. Describes the two types of presses used in the tests and results obtained with 15 different coals. Reprint of Geological Survey Bulletin 385.
- †B 31. Incidental Problems in Gas-Producer Tests, by R. H. Fernald, C. D. Smith, J. K. Clement, and H. A. Grine. 1911. 29 pp., 8 figs. Considers the factors affecting the proper length of gas-producer tests and the differences in temperature at different points in the fuel bed. Reprint of Geological Survey Bulletin 393.
- †B 32. Commercial Deductions from Comparisons of Gasoline and Alcohol Tests on Internal-Combustion Engines, by R. M. Strong. 1911. 38 pp. Summarizes deductions based on 2,000 comparative tests of gasoline and alcohol. Reprint of Geological Survey Bulletin 392.
- †B 33. Comparative Tests of Run-of-Mine and Briquetted Coal on the Torpedo Boat *Biddle*, by W. T. Ray and Henry Kreisinger. 1911. 50 pp., 10 figs. Describes the tests. Calls attention to the importance of large combustion space in burning smoky coals. Reprint of Geological Survey Bulletin 403.

† Out of print.

Bulletins

- †B 34. Tests of Run-of-Mine and Briquetted Coal in a Locomotive Boiler, by W. T. Ray and Henry Kreisinger. 1911. 33 pp., 9 figs. Describes the tests. Gives suggestions as to possible methods of increasing the capacity of locomotive boilers. Reprint of Geological Survey Bulletin 412.
- †B 35. The Utilization of Fuel in Locomotive Practice, by W. F. M. Goss. 1911. 29 pp., 8 figs. Presents the results of tests bearing on the heat lost and utilized from the fuel burned. Gives some general conclusions as to the probable economies to be effected. Reprint of Geological Survey Bulletin 402.
- †B 36. Alaskan Coal Problems, by W. L. Fisher. 1911. 32 pp., 1 pl. Summarizes information regarding the areal extent of the Alaska coal fields, the quality of the coal, its suitability for various purposes, and the probable market for it.
- †B 37. Comparative Tests of Run-of-Mine and Briquetted Coal on Locomotives, Including Torpedo-Boat Tests, and Some Foreign Specifications for Briquetted Fuel, by W. F. M. Goss. 1911. 58 pp., 4 pls., 35 figs. Discusses the use of briquets in Germany, Belgium, and France, and gives the results of some tests of a Pennsylvania bituminous coal. Reprint of Geological Survey Bulletin 363.
- †B 38. The Origin of Coal, by David White and Reinhart Thiessen, with a chapter on the Formation of Peat, by C. A. Davis. 1913. 390 pp., 54 pls. Discusses the geologic relations of the different coals and the effects of physiographic conditions, rate of deposition, and regional metamorphism, the origin and formation of peat, and the constitution of coal as determined by microscopic study.
- B 39. The Smoke Problem at Boiler Plants, a Preliminary Report, by D. T. Randall. 1912. 31 pp. Discusses conditions at boiler plants in the United States, the smoke ordinances of various cities, the factors that cause smoke, and the methods of smoke abatement. Revision, by S. B. Flagg, of Geological Survey Bulletin 334. 5 cents.
- †B 40. The Smokeless Combustion of Coal in Boiler Furnaces, with a chapter on Central Heating Plants, by D. T. Randall and H. W. Weeks. 1912. 188 pp., 40 figs. Describes results of an investigation of a large number of boiler plants in different cities. Gives details of the furnaces and boilers used at these plants and the methods of firing. Also gives the results of tests made at the Government fuel-testing plants at St. Louis, Mo., and Norfolk, Va., to determine the factors governing the production of smoke. Revision, by Henry Kreisinger, of Geological Survey Bulletin 373.
- †B 41. Government Coal Purchases under Specifications, with Analyses for the Fiscal Year 1909-10, by G. S. Pope, with a chapter on the Fuel-Inspection Laboratory of the Bureau of Mines, by J. D. Davis. 1912. 97 pp., 3 pls. Discusses the value of coal as fuel, the advantages of definite specifications for purchasing coal, and the Government as a coal purchaser. Gives heating value of a large number of coals used at Government power plants and the proximate analyses of most of these coals.
- †B 42. The Sampling and Examination of Mine Gases and Natural Gas, by G. A. Burrell and F. M. Seibert. 1913. 116 pp., 2 pls., 23 figs. Superseded by B 197.
- †B 43. Comparative Fuel Values of Gasoline and Denatured Alcohol in Internal-Combustion Engines, by R. M. Strong and Lauson Stone. 1912. 243 pp., 3 pls., 32 figs. Gives a detailed statement of the results of 2,000 tests made to determine the comparative value of the two fuels for use in internal-combustion engines. Is a technical report, written for mechanical engineers and persons interested in the utilization of liquid fuels.
- †B 44. First National Mine Safety Demonstration, Pittsburgh, Pa., October 30 and 31, 1911, by H. M. Wilson and A. H. Fay, with a chapter on the Explosion at the Experimental Mine, by G. S. Rice. 1912. 75 pp., 7 pls., 4 figs.
- †B 45. Sand Available for Filling Mine Workings in the Northern Anthracite Basin of Pennsylvania, by N. H. Darton. 1913. 33 pp., 8 pls., 5 figs. Discusses character and extent of deposits of sand available for hydraulic filling of anthracite mine workings. Is of local interest.

- †B 46. An Investigation of Explosion-Proof Motors, by H. H. Clark. 1912. 44 pp., 6 pls., 14 figs. Describes tests of several types of protective devices for mine motors and states the effectiveness of these devices in preventing the ignition of mine gases by sparks within the motor casing.
- †B 47. Notes on Mineral Wastes, by C. L. Parsons. 1912. 44 pp. Reviews the more important losses in the treatment and utilization of minerals, ores, and metals; discusses new sources of supply and the probable development of new uses.
- †B 48. The Selection of Explosives Used in Engineering and Mining Operations, by Clarence Hall and S. P. Howell. 1914. 50 pp., 3 pls., 7 figs. States the characteristics of different classes of explosives and sets forth the results of tests showing the suitability of explosives for different kinds of blasting. The pamphlet is written for the information of all persons interested in the use of explosives for blasting rock.
- †B 49. Smoke Abatement and City Smoke Ordinances, by S. B. Flagg. 1912. 55 pp. Discusses status of smoke abatement in 28 American cities and the essential features of a smoke ordinance for a large, medium-size, and small city.
- †B 50. A Laboratory Study of the Inflammability of Coal Dust, by J. C. W. Frazer, E. J. Hoffman, and L. A. Scholl, Jr. 1913. 60 pp., 95 figs. Summarizes the results of tests of the inflammability of a large number of samples of coal dust from different mines.
- †B 51. The Analysis of Black Powder and Dynamite, by W. O. Snelling and C. G. Storm. 1913. 80 pp., 5 pls., 5 figs. Superseded by B 219.
- B 52. Ignition of Mine Gases by the Filaments of Incandescent Electric Lamps, by H. H. Clark and L. C. Isley. 1913. 31 pp., 6 pls., 2 figs. Describes tests showing the liability of the filaments to ignite firedamp. 5 cents.
- †B 53. Mining and Treatment of Feldspar and Kaolin in the Southern Appalachian Region, by A. S. Watts. 1913. 170 pp., 16 pls., 12 figs. Describes the feldspar and kaolin obtained from the pegmatite dikes of the region investigated, the tests made, and the mining and washing of kaolin.
- †B 54. Foundry-Cupola Gases and Temperatures, by A. W. Belden. 1913. 29 pp., 3 pls., 16 figs. Discusses the sampling of gases during their travel from the tuyères upward, the method of determining the temperature of the fuel bed, the apparatus used, and the results obtained.
- †B 55. The Commercial Trend of the Producer-Gas Power Plant, by R. H. Fernald. 1913. 93 pp., 1 pl., 4 figs. Discusses the present status of the producer-gas power plant, with views of manufacturers and of owners and operators of producer-gas power plants. The number and distribution of producer-gas power plants in the United States are shown.
- †B 56. First Series of Coal-Dust Explosion Tests in the Experimental Mine, by G. S. Rice, L. M. Jones, J. K. Clement, and W. L. Egy. 1913. 115 pp., 12 pls., 28 figs. Describes the Experimental mine and its equipment and gives the results of a series of explosion tests.
- †B 57. Safety and Efficiency in Mine Tunneling, by D. W. Brunton and J. A. Davis. 1914. 271 pp., 6 pls., 45 figs. Discusses selection of power, surface, and underground equipment; methods of drilling, blasting, and mucking; and the causes and prevention of accidents. Gives a review of the history of tunneling and a bibliography of the more important literature.
- †B 58. Fuel-Briquetting Investigations, July 1904 to July 1912, by C. L. Wright. 1913. 277 pp., 21 pls., 3 figs. Summarizes the fuel-briquetting investigations conducted by the Government within the period indicated.
- †B 59. Investigations of Detonators and Electric Detonators, by Clarence Hall and S. P. Howell. 1913. 73 pp., 7 pls., 5 figs. Describes the results of tests undertaken to determine the efficiency of different grades of detonators and gives a simple test for determining the strength of detonators or electric detonators.
- B 60. Hydraulic Mine Filling, Its Use in the Pennsylvania Anthracite Fields, a Preliminary Report, by Charles Enzian. 1913. 77 pp., 3 pls., 12 figs. Describes the method of filling mine workings with culm and other fine refuse, the equipment used, and the cost. 15 cents.

† Out of print.

Bulletins

- †B 61. Abstracts of Current Decisions on Mines and Mining, October 1912 to March 1913, by J. W. Thompson. 1913. 82 pp. Records decisions of Federal and State courts of last resort on questions relating to the mineral industry. See B 79, 90, 101, 113, 118, 126, 143, 147, 152, 159, 164, 172, 174, 179, 180, 181, 183.
- †B 62. National Mine Rescue and First-Aid Conference, Pittsburgh, Pa., September 23-26, 1912, by H. M. Wilson. 1913. 74 pp. Gives the addresses made at the conference, the resolutions adopted, and the discussions of various topics relating to rescue and first-aid methods at mines.
- †B 63. Sampling Coal Deliveries and Types of Government Specifications for the Purchase of Coal, by G. S. Pope. 1913. 68 pp., 4 pls., 3 figs. Describes in detail the methods of sampling and the reasons therefor; gives new specifications for the purchase of coal by the Government.
- *†B 64. The Titaniferous Iron Ores in the United States; Their Composition and Economic Value, by J. T. Singewald, Jr. 1913. 145 pp., 16 pls., 3 figs. Gives the results of an investigation to determine the practicability of separating magnetite and ilmenite in titaniferous magnetites by magnetic concentration.
- †B 65. Oil and Gas Wells through Workable Coal Beds; Papers and Discussions, by G. S. Rice, O. P. Hood, and others. 1913. 101 pp., 1 pl., 11 figs. Papers read before a conference held to discuss suitable methods of safeguarding coal miners from the dangers attending the drilling of oil and gas wells through coal beds.
- †B 66. Tests of Permissible Explosives, by Clarence Hall and S. P. Howell. 1913. 313 pp., 1 pl., 6 figs. Presents the results of tests made at the Pittsburgh Experiment Station to determine the permissibility of explosives and describes principal features of apparatus used.
- †B 67. Electric Furnaces for Making Iron and Steel, by D. A. Lyon and R. M. Keeney. 1914. 142 pp., 36 figs. Summarizes development of furnaces and methods to 1914.
- B 68. Electric Switches for Use in Gaseous Mines, by H. H. Clark and R. W. Crocker. 1913. 38 pp., 6 pls., 1 fig. Describes two types of switches and gives results of tests of each type. 10 cents.
- B 69. Coal-Mine Accidents in the United States and Foreign Countries, compiled by F. W. Horton. 1913. 102 pp., 3 pls., 40 figs. Shows number of men employed, tonnage of coal produced, and accident and fatality rates. Accidents and fatalities classified by causes. 25 cents.
- †B 70. A Preliminary Report on Uranium, Radium, and Vanadium, by R. B. Moore and K. L. Kithil. 1913. 114 pp., 4 pls., 2 figs. Describes the occurrence of carnotite and associated uranium-bearing minerals in Colorado and Utah, points out the importance of the minerals as a source of radium, and describes methods of mining and treatment.
- †B 71. Fuller's Earth, by C. L. Parsons. 1913. 38 pp. Briefly discusses characteristics of fuller's earth, excellence of American earths for refining edible oils, and methods of mining and purifying the raw earth.
- †B 72. Occurrence of Explosive Gases in Coal Mines, by N. H. Darton. 1915. 248 pp., 7 pls., 33 figs. Considers particularly mines in the northern anthracite field of Pennsylvania and the southern part of the Illinois coal field.
- †B 73. Brass-Furnace Practice in the United States, by H. W. Gillett. 1914. 298 pp., 2 pls., 23 figs. Discusses features of different types of furnaces, losses in melting, sanitary conditions at foundries, and the health of foundrymen.
- B 74. Gasoline Mine Locomotives in Relation to Safety and Health, by O. P. Hood and R. H. Kudlich, with a chapter on Methods of Analyzing Exhaust Gases, by G. A. Burrell. 1915. 83 pp., 3 pls., 27 figs. Describes results of tests of a gasoline locomotive. 15 cents.
- †B 75. Rules and Regulations for Metal Mines, by W. R. Ingalls and others. 1915. 296 pp., 1 fig. Gives rules proposed by a committee of mining engineers.
- B 76. United States Coal Available for Export Trade, by V. H. Manning. 1914. 15 pp., 1 pl. Also printed in Spanish and in Portuguese. Briefly describes general character and commercial quality of some of the coal most available for export. 5 cents.

† Out of print.

- †B 77. *The Electric Furnace in Metallurgical Work*, by D. A. Lyon, R. M. Keeney, and J. F. Cullen. 1914. 216 pp., 56 figs. Furnaces and methods discussed are now largely out of date.
- B 78. *Approved Explosion-Proof Coal-Cutting Equipment*, by L. C. Hsley and E. J. Gleim. 1920. 53 pp., 18 pls., 3 figs. Describes essential features of explosion-proof equipment and describes equipment approved by Bureau of Mines. 25 cents.
- †B 79. *Abstracts of Current Decisions on Mines and Mining, Reported from March to December 1913*, by J. W. Thompson. 1914. 140 pp.
- B 80. *A Primer on Explosives for Metal Miners and Quarrymen*, by C. E. Munroe and Clarence Hall. 1915. 125 pp., 15 pls., 17 figs. Treats of the use of fuses, detonators, and electric detonators; drilling and blasting methods; and construction, care, and use of magazines and thaw houses. 25 cents.
- †B 81. *The Smelting of Copper Ores in the Electric Furnace*, by D. A. Lyon and R. M. Keeney. 1915. 80 pp., 6 figs. Furnaces and methods discussed are now largely out of date.
- †B 82. *International Conference of Mine Experiment Stations, Pittsburgh, Pa., September 14-21, 1912*, compiled by G. S. Rice. 1914. 99 pp., 4 figs. Contains papers on explosion tests, spontaneous combustion of coal, escape of gas from weathering and oxidation of coal, explosibility of mine gases, sampling and analysis of coal dust and mine gases, mine rescue apparatus, miners' safety lamps, and requirements.
- †B 83. *The Humidity of Mine Air, with Especial Reference to Coal Mines in Illinois*, by R. Y. Williams. 1914. 69 pp., 2 pls., 7 figs. Describes apparatus and methods and summarizes results of investigations.
- †B 84. *Metallurgical Smoke*, by C. H. Fulton. 1915. 94 pp., 6 pls., 15 figs. Discusses constituents and their removal.
- †B 85. *Analyses of Mine and Car Samples of Coal Collected in the Fiscal Years 1911 to 1913*, by A. C. Fieldner, H. I. Smith, A. H. Fay, and Samuel Sanford. 1914. 444 pp., 2 figs. Describes methods of collecting and analyzing samples of coal. Gives analyses of coal samples collected and notes on the mines.
- †B 86. *Some Mining and Engineering Problems of the Panama Canal in their Relation to Geology and Topography*, by D. F. McDonald. 1915. 88 pp., 29 pls., 9 figs.
- B 87. *Houses for Mining Towns*, by J. H. White. 1914. 64 pp., 8 pls., 9 figs. Treats of plans for and arrangement of mining towns and the construction of houses and briefly discusses water supply and sewage disposal. 15 cents.
- †B 88. *The Condensation of Gasoline from Natural Gas*, by G. A. Burrell, F. M. Seibert, and G. G. Oberfell. 1915. 106 pp., 6 pls., 18 figs. Describes the growth of the industry. Discusses methods of condensation, transportation, and blending with reference to lessening waste of gas.
- †B 89. *Economic Methods of Utilizing Western Lignite*, by E. J. Babcock. 1915. 73 pp., 5 pls., 5 figs. See B 255 for summary of work described.
- †B 90. *Abstracts of Current Decisions on Mines and Mining, Reported from December 1913 to September 1914*, by J. W. Thompson. 1915. 176 pp.
- †B 91. *Instruments for Recording Carbon Dioxide in Flue Gases*, by J. F. Barkley and S. B. Flagg. 1916. 60 pp., 1 pl., 25 figs. Describes results of tests of various instruments to determine accuracy, durability, and attention required.
- †B 92. *Feldspar of the New England and Northern Appalachian States*, by A. S. Watts. 1916. 181 pp., 8 pls., 22 figs. Gives results of examination of deposits and tests of samples.
- B 93. *Miners' Nystagmus*, by F. L. Hoffman. 1916. 67 pp. Reviews the results of investigations of miners' nystagmus in Europe and draws tentative conclusions as to the possible frequency of the disease in the United States. 10 cents.
- †B 94. *United States Mining Statutes Annotated*, by J. W. Thompson. 1915. 1,772 pp. Is intended for persons engaged in mining enterprises that come within the scope of the Federal mining laws, and as a guide in the determination of mining rights and duties. Shows the status of every Federal mining law, both laws relating to metal mining and those relating to coal, oil, and phosphate, and to mining on public, Indian, and railroad lands. Includes references to Alaska and the Philippine Islands.

† Out of print.

- †B 95. Glossary of Mining Terms, by A. H. Fay. 1920. 754 pp. Is a comprehensive glossary, defining 20,000 words and terms used in geology, mining, chemistry, and metallurgy, including localisms, provincialisms, and words now obsolete.
- †B 96. The Analysis of Permissible Explosives, by C. G. Storm. 1916. 88 pp., 3 pls., 7 figs. Describes methods used by the Bureau of Mines in the analysis of samples of explosives received for tests to determine their permissibility. Is intended especially for manufacturers of explosives, but should be of interest to chemists engaged in similar analytical work.
- B 97. Sampling and Analyzing Flue Gases, by Henry Kreisinger and F. K. Ovitz. 1915. 70 pp., 1 pl., 36 figs. Describes simple methods that can be used by men in charge of boiler plants. 15 cents.
- †B 98. Report of the Selby Smelter Commission, by J. A. Holmes, E. C. Franklin, and R. A. Gould, with reports by associates on the commissioners' staff. 1915. 528 pp., 41 pls., 14 figs. Describes in detail the methods used in determining the contamination of the air and the damage to trees, crops, and livestock by the smoke and fume from the Selby smelter, in California, and gives the conclusions of the commission on the methods used by the smelter company to prevent injury. Is of especial interest to metallurgical companies, municipal or State boards of health, and persons investigating damage by smelter smoke.
- B 99. Mine-Ventilation Stoppings, with Especial Reference to Coal Mines in Illinois, by R. Y. Williams. 1915. 30 pp., 4 pls., 4 figs. Discusses first cost of different types of stoppings and cost of maintenance. 10 cents.
- †B 100. Manufacture and Use of Alloy Steels, by H. D. Hibbard. 1915. 77 pp. A general statement on the composition and heat treatment of various steels and their use for special purposes.
- †B 101. Abstracts of Current Decisions on Mines and Mining, Reported from October 1914 to April 1915, by J. W. Thompson. 1915. 138 pp.
- B 102. The Inflammability of Illinois Coal Dusts, by J. K. Clement and L. A. Scholl, Jr. 1916. 74 pp., 5 pls., 22 figs. Presents the results of a detailed study of coal dusts collected in the bituminous-coal mines of the State. 15 cents.
- †B 103. Mining and Concentration of Carnotite Ores, by K. L. Kithil and J. A. Davis. 1917. 89 pp., 14 pls., 5 figs. Describes methods used by Bureau of Mines.
- †B 104. Extraction and Recovery of Radium, Uranium, and Vanadium from Carnotite, by C. L. Parsons, R. B. Moore, S. C. Lind, and O. C. Schaefer. 1916. 124 pp., 14 pls., 9 figs. Describes methods used at Denver (Colo.) plant of Bureau of Mines in the treatment of carnotite.
- †B 105. Black Damp in Mines, by G. A. Burrell, I. W. Robertson, and G. G. Oberfell. 1916. 88 pp. Presents results of analyses of mine air and discusses the physiological effects of the constituents of black damp.
- †B 106. The Technology of Marble Quarrying, by Oliver Bowles. 1916. 174 pp., 12 pls., 33 figs. Summarizes efficient and economical methods of quarrying and preparing marble; describes special and improved machinery and equipment; and points out the need of better systems of cost keeping.
- †B 107. Prospecting and Mining of Copper Ore at Santa Rita, N. Mex., by D. F. McDonald and Charles Enzian. 1916. 122 pp., 10 pls., 20 figs. Presents a detailed study of mining operations and costs. Also discusses timekeeping, accounting, and warehouse methods.
- †B 108. Melting Aluminum Chips, by H. W. Gillett and G. M. James. 1916. 88 pp. Discusses the loss of aluminum and its alloys in melting scrap and the various preventive methods tested.
- †B 109. Operating Details of Gas Producers, by R. H. Fernald. 1916. 74 pp. Discusses present status of producer-gas plants and their uses. Also gives character of fuel used and data on fuel consumption.
- B 110. Concentration Experiments on the Siliceous Red Hematites of the Birmingham District, Alabama, by J. T. Singewald, Jr. 1917. 91 pp., 1 pl., 47 figs. Points out difficulty of concentrating ores by wet methods. 15 cents.
- †B 111. Molybdenum; Its Ores and Their Concentration, with a Discussion of Markets, Prices, and Uses, by F. W. Horton. 1916. 132 pp., 18 pls., 2 figs. Describes molybdenum deposits and molybdenum industry in the United States.

- B 112. Mining and Preparing Domestic Graphite for Crucible Use, by G. D. Dub and F. G. Moses. 1920. 80 pp., 5 pls., 20 figs. Suggests a standard method for sampling finished graphite and describes a rapid, convenient method of analysis used by the Bureau. 20 cents.
- †B 113. Abstracts of Current Decisions on Mines and Mining, Reported from May to September 1915, by J. W. Thompson. 1916. 124 pp.
- †B 114. Manufacture of Gasoline and Benzine-Toluene from Petroleum and Other Hydrocarbons, by W. F. Rittman, C. B. Dutton, and E. W. Dean, with a bibliography compiled by M. S. Howard. 1916. 268 pp., 9 pls., 45 figs. Reviews the literature on the cracking of petroleum and presents in much detail the results of experiments made in the development of improved processes for manufacturing gasoline and benzine-toluene. Gives some of the results achieved in working out the benzene-toluene process on a commercial scale.
- B 115. Coal-Mine Fatalities in the United States, 1870-1914, with Statistics of Coal Production, Labor, and Mining Methods, by States and Calendar Years, compiled by A. H. Fay. 1916. 370 pp., 3 pls., 13 figs. Gives all the fatal accidents described in reports of State inspectors, by States, causes, and calendar years, from the beginning of inspection service to date. 40 cents.
- †B 116. Methods of Sampling Delivered Coal, and Specifications for the Purchase of Coal for the Government, by G. S. Pope. 1916. 64 pp., 5 pls., 2 figs. A revision of B 63. Describes more fully the methods of sampling.
- B 117. Structure in Paleozoic Bituminous Coals, by Reinhardt Theissen. 1920. 296 pp., 160 pls. Discusses results of microscopic examination, by transmitted and by reflected light, of sections of several typical coals. Presents much evidence on origin of coal from vegetable debris. 80 cents.
- †B 118. Abstracts of Current Decisions on Mines and Mining, Reported from October to December 1915, by J. W. Thompson. 1916. 74 pp.
- †B 119. Analyses of Coals Purchased by the Government During the Fiscal Years 1908-1915, by G. S. Pope. 1916. 118 pp. Gives analyses of samples representing deliveries of coal purchased for the Government under specifications.
- B 120. Extraction of Gasoline from Natural Gas by Absorption Methods, by G. A. Burrell, P. M. Biddison, and G. G. Oberfell. 1917. 71 pp., 2 pls., 15 figs. Describes experiments and gives cost of an absorption plant. 10 cents.
- †B 121. The History and Development of Gold Dredging in Montana, by Hennen Jennings, with a chapter on Placer-Mining Methods and Operating Costs, by Charles Janin. 1916. 63 pp., 29 pls., 1 fig. Presents cost figures and other data of interest.
- †B 122. The Principles and Practice of Sampling Metallurgical Materials, with Special Reference to the Sampling of Copper Bullion, by Edward Keller. 1910. 102 pp., 13 pls., 31 figs. Discusses theory of sampling and its application. Describes procedure and equipment in detail.
- †B 123. Analyses of Mine and Car Samples of Coal Collected in the Fiscal Years 1913 to 1916, by A. C. Fieldner, H. I. Smith, J. W. Paul, and Samuel Sanford. 1918. 478 pp., 2 figs. Gives analyses and describes samples.
- B 124. Sandstone Quarrying in the United States, by Oliver Bowles. 1917. 143 pp., 6 pls., 19 figs. Discusses practice and equipment and describes methods and machinery at different quarries. 25 cents.
- †B 125. The Analytical Distillation of Petroleum, by W. E. Rittman and E. W. Dean. 1916. 79 pp., 1 pl., 16 figs. Presents results of experiments in distillation methods, the efficiencies of types of fractionation apparatus, and the effect of cracking as a factor in the analytical distillation of petroleum in still heads.
- †B 126. Abstracts of Current Decisions on Mines and Mining, Reported from January to April 1916, by J. W. Thompson. 1916. 90 pp.
- †B 127. Gold Dredging in the United States, by Charles Janin. 1918. 226 pp., 63 pls., 23 figs. Describes methods of recovering gold from sands and gravels.
- †B 128. Refining and Utilization of Georgia Kaolins, by I. E. Sproat. 1916. 59 pp., 5 pls., 11 figs. Discusses practicability of applying technical control of clay disperse systems to kaolin refining and the utilization of the prepared clay in the manufacture of vitreous china and wall tile.

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- †B 129. The Fusibility of Coal Ash and the Determination of the Softening Temperature, by A. C. Fieldner, A. E. Hall, and A. L. Feild. 1918. 146 pp., 4 pls., 38 figs. Gives laboratory methods of determining the fusibility of coal ash and the bearing of the results on clinker formation in fuel beds.
- †B 130. Blast-Furnace Breakouts, Explosions, and Slips, and Methods of Prevention, by F. H. Willecox. 1917. 280 pp., 2 pls., 37 figs. Includes a comprehensive and detailed review of blast-furnace construction and practice in their relation to the accidents discussed.
- †B 131. Approved Electric Lamps for Miners, by H. H. Clark and L. C. Ilsley. 1917. 59 pp., 17 pls., 7 figs. Describes tests and lamps.
- †B 132. Siliceous Dust in Relation to Pulmonary Disease Among Miners in the Joplin District, Missouri, by Edwin Higgins, A. J. Lanza, F. B. Laney, and G. S. Rice. 1917. 116 pp., 16 pls., 6 figs. Discusses need of sanitation in mines in order to prevent disease.
- †B 133. Wet Thiogen Process for Recovering Sulphur from Sulphur Dioxide in Smelter Gases; a Critical Study, by A. E. Wells. 1917. 66 pp., 2 pls., 3 figs. Gives results of an exhaustive series of tests and indicates possibilities of the process.
- †B 134. The Use of Mud-Laden Fluid in Oil and Gas Wells, by J. O. Lewis and W. F. McMurray. 1916. 86 pp., 3 pls., 18 figs. Discusses wastes from faulty methods and the advantages of using mud-laden fluid.
- B 135. Combustion of Coal and Design of Furnaces, by Henry Kreisinger, C. E. Augustine, and F. K. Ovitz. 1917. 144 pp., 1 pl., 45 figs. Discusses the burning of coal on the grate and of volatile matter in the combustion space above the fuel bed. 20 cents.
- †B 136. The Deterioration of Stored Coal, by H. C. Porter and F. K. Ovitz. 1917. 38 pp., 7 pls. Covers the results of storage for five years, under widely different conditions, of samples of coal from Pennsylvania, West Virginia, and Wyoming; shows small loss of heating value of bituminous coal during storage.
- †B 137. The Use of Permissible Explosives in the Coal Mines of Illinois, by J. R. Fleming and J. W. Koster. 1917. 106 pp., 8 pls., 17 figs. Treats the placing and firing of shots and the advantages of permissible explosives.
- B 138. Coking of Illinois Coal, by F. K. Ovitz. 1917. 71 pp., 11 pls., 1 fig. Discusses experiments with coal from different mines and beds; indicates possibility of developing the use of coke from Illinois coal. 20 cents.
- †B 139. Control of Hookworm Infection at the Deep Gold Mines of the Mother Lode, California, by J. G. Cumming and J. H. White. 1917. 52 pp., 1 pl., 5 figs. Points out prevalence of hookworm infection and the measures being taken to abate the disease.
- B 140. Occupational Hazards and Accident Prevention at Blast-Furnace Plants, Based on Records of Accidents at Blast Furnaces in Pennsylvania, 1915, by F. H. Willecox. 1917. 155 pp., 16 pls. 30 cents.
- †B 141. Yearbook of the Bureau of Mines, 1916, by V. H. Manning. 1917. 174 pp., 17 pls., 8 figs. Describes noteworthy results of the year's work and the apparatus and equipment used.
- †B 142. The Mining Industry in the Territory of Alaska During the Calendar Year 1915, by S. S. Smith. 1917. 65 pp., 1 pl. Gives mineral production of mines and districts, with legal regulations.
- †B 143. Abstracts of Current Decisions on Mines and Mining, Reported from May to August 1916, by J. W. Thompson. 1917. 72 pp.
- †B 144. Report of a Joint Committee Appointed from the Bureau of Mines and the United States Geological Survey by the Secretary of the Interior to Study the Gold Situation, October 30, 1918. 84 pp., 1 pl., 3 figs. Presents statistical data on gold production; discusses its relations to finance and credit, the causes of decline in output, and mining costs; and suggests aiding the industry.
- †B 145. Measuring the Temperature of Gases in Boiler Settings, by Henry Kreisinger and J. F. Barkley. 1918. 72 pp., 31 figs. Is intended for boiler-room operators, testing engineers, and others. Presents results of temperature measurements in common types of boilers and discusses errors in usual methods of measurements.
- †B 146. The Technology of Salt Making in the United States, by W. C. Phalen. 1917. 149 pp., 24 pls., 10 figs. Reviews the salt industry, with description of methods and equipment.

- †B 147. Abstracts of Current Decisions on Mines and Mining, Reported from September to December 1916, by J. W. Thompson. 1917. 84 pp.
- †B 148. Methods for Increasing the Recovery from Oil Sands, by J. O. Lewis. 1917. 128 pp., 4 pls., 32 figs. Describes particularly the application of compressed air.
- †B 149. Bibliography of Petroleum and Allied Substances, 1915, by E. H. Burroughs. 1917. 147 pp.
- B 150. Electrodeposition of Gold and Silver from Cyanide Solutions, by S. B. Christy. 1919. 171 pp., 8 pls., 40 figs. Reviews experiments to determine the factors influencing electrodeposition of the precious metals from cyanide solutions and the process for obtaining maximum efficiency. 25 cents.
- †B 151. Recovery of Gasoline from Natural Gas by Compression and Refrigeration, by W. P. Dykema. 1918. 123 pp., 15 pls., 15 figs. Treats the compression and refrigeration process for the recovery of gasoline from natural gas from the viewpoint of the practical engineer and business man.
- †B 152. Abstracts of Current Decisions on Mines and Mining, Reported from January to April 1917, by J. W. Thompson. 1917. 79 pp.
- †B 153. The Mining Industry in the Territory of Alaska During the Calendar Year 1916, by S. S. Smith. 1917. 89 pp., 1 pl. Presents a report on mines and on mineral production, with statistical data.
- †B 154. Mining and Milling of Lead and Zinc Ores in the Missouri-Kansas-Oklahoma Zinc District, by C. A. Wright and H. A. Buehler. 1918. 134 pp., 17 pls., 13 figs. Describes the methods used in the district and suggests certain improvements whereby a greater saving may be effected.
- †B 155. Oil-Storage Tanks and Reservoirs, with a Brief Discussion of Losses of Oil in Storage and Methods of Prevention, by C. P. Bowie. 1918. 76 pp., 21 pls.
- †B 156. The Diesel Engine: Its Fuels and Its Uses, by Herbert Haas. 1918. 132 pp., 16 pls., 57 figs. Describes engine as an important device for insuring more efficient utilization of petroleum and coal-tar products, for the reason that it consumes heavy liquid fuels such as cannot be utilized in other types.
- †B 157. Innovations in the Metallurgy of Lead, by D. A. Lyon and O. C. Ralston. 1918. 176 pp., 13 figs. Gives data largely the result of experiments conducted by the Bureau of Mines in cooperation with the department of metallurgical research of the University of Utah. Experiments were with low-grade ores, chiefly lead carbonate.
- †B 158. Cost Accounting for Oil Producers, by C. G. Smith. 1917. 123 pp. Presents descriptions and discussions of balance sheets, profit and loss statements, and bookkeeping methods peculiarly adapted to the oil business.
- †B 159. Abstracts of Current Decisions on Mines and Mining, Reported from May to August 1917, by J. F. Thompson. 1917. 111 pp.
- †B 160. Rock Quarrying for Cement Manufacturers, by Oliver Bowles. 1918. 160 pp., 6 pls., 30 figs. Describes chief types of cement, growth of industry, and character of raw materials used. Explains quarrying methods and equipment, with special attention to drilling and blasting, etc.
- †B 161. California Mining Statutes, Annotated, by J. W. Thompson. 1918. 312 pp.
- †B 162. Removal of the Lighter Hydrocarbons from Petroleum by Continuous Distillation, by J. M. Wadsworth. 1919. 162 pp., 50 pls., 45 figs. Describes the methods of constructing and operating representative types of plants in the United States used for removing the light hydrocarbons from petroleum by continuous distillation. Such plants are known commonly in the trade as topping or skimming plants.
- B 163. Method of Shutting Off Water in Oil and Gas Wells, by F. B. Tough. 1918. 122 pp., 20 pls., 7 figs. Describes the importance of protecting oil or gas sands from the encroachments of water and summarizes existing knowledge of methods and devices. 30 cents.
- †B 164. Abstracts of Current Decisions on Mines and Mining, Reported from September to December 1917, by J. W. Thompson. 1918. 147 pp.
- †B 165. Bibliography of Petroleum and Allied Substances, 1916, by E. H. Burroughs. 1919. 159 pp.

† Out of print.

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- †B 166. A Preliminary Report on the Mining Districts of Idaho, by Thomas Varley, C. A. Wright, E. K. Soper, and D. C. Livingston, in cooperation with the University of Idaho. 1919. 113 pp., 3 pls., 3 figs. Gives a preliminary account of the principal mining districts, past and present, operations, the character of the ores, and the mining and milling methods. Contains a description of the Horseshoe district coal field.
- B 167. Coal-Dust Explosion Tests in the Experimental Mine, 1913 to 1918, inclusive, by G. S. Rice, L. M. Jones, W. L. Egy, and H. P. Greenwald. 1922. 639 pp., 31 pls., 82 figs. Describes the Experimental mine and its equipment and gives results of second series of explosion tests. See B 56. \$1.
- †B 168. Recovery of Zinc from Low-Grade and Complex Ores, by D. A. Lyon and O. C. Ralston. 1919. 145 pp., 23 figs. Describes tests of leaching and volatilization methods for the recovery of zinc from low-grade and complex ores.
- †B 169. Illinois Mining Statutes, Annotated, by J. W. Thompson. 1918. 594 pp.
- B 170. Extinguishing and Preventing Oil and Gas Fires, by C. P. Bowie. 1918. 56 pp., 20 pls., 4 figs. Describes fire-fighting equipment and methods and suggests precautions necessary to prevent fires at drilling and producing wells. 20 cents.
- †B 171. Melting Brass in a Rocking Electric Furnace, by H. W. Gillett and A. E. Rhoads. 1918. 131 pp., 4 pls., 1 fig. Describes experiments and tests in the development of a rocking furnace. Information regarding the furnace given in B 202.
- †B 172. Abstracts of Current Decisions on Mines and Mining, Reported from January to April 1918, by J. W. Thompson. 1919. 160 pp.
- †B 173. Manganese: Uses, Preparation, Mining Costs, Manufacture of Ferro-Alloys, by C. M. Weld and others. 1920. 209 pp., 13 figs.
- †B 174. Abstracts of Current Decisions on Mines and Mining, Reported from May to September 1918, by J. W. Thompson. 1919. 138 pp.
- †B 175. Experiment Stations of the Bureau of Mines, by V. H. Manning. 1919. 106 pp., 29 pls., 2 figs. Describes the equipment of the different stations and the work that they are doing.
- †B 176. Recent Developments in the Absorption Process for Recovering Gasoline from Natural Gas, by W. P. Dykema. 1919. 90 pp., 20 pls., 30 figs. Describes recent progress in the use of the absorption process and points out its advantages.
- B 177. The Decline and Ultimate Production of Oil Wells, with Notes on the Valuation of Oil Properties, by C. H. Beal. 1919. 215 pp., 4 pls., 80 figs. Gives methods for estimating the future production of wells and their application to oil-land valuation; presents detailed information on the production of various oil fields. 30 cents.
- †B 178. War Work of the Bureau of Mines, by V. H. Manning. 1919. 107 pp. Published in separates, as follows:
- †B 178-A. War Gas Investigations. 39 pp. Summarizes work done on gas masks and war gases.
- †B 178-B. War Minerals, Nitrogen Fixation, and Sodium Cyanide. Pp. 41-61. Discusses the work done toward stimulating the production of necessary minerals and ores, the results of the investigation of manufacturing nitric acid from ammonia, and the construction of the plant for making sodium cyanide by the Buchner process.
- †B 178-C. Petroleum Investigations and Production of Helium. Pp. 63-88. Tells of many investigations having to do with the production of oil and natural gas, the conservation of supplies, the shipment of gasoline and other petroleum products to the war zone, and the devising of special fuels for aircraft engines. Also discusses the importance of helium as a lifting gas for balloons and airships and the plants built for producing it on a commercial scale.
- †B 178-D. Explosives and Miscellaneous Investigations. Pp. 89-107. Describes work on explosives, including the establishment of the licensing system for regulating the manufacture, sale, and use of explosives during the war. Discusses other war-time activities of the Bureau of Mines.
- †B 179. Abstracts of Current Decisions on Mines and Mining, Reported from September to December 1918, by J. W. Thompson. 1919. 166 pp.

† Out of print.

- †B 180. Bibliography of Petroleum and Allied Substances, 1917, by E. H. Burroughs. 1920. 170 pp.
- †B 181. Abstracts of Current Decisions on Mines and Mining, Reported from January to May 1919, by J. W. Thompson. 1919. 175 pp.
- B 182. Casing Troubles and Fishing Methods in Oil Wells, by Thomas Curtin. 1920. 48 pp., 3 pls., 15 figs. Describes equipment and methods. 15 cents.
- †B 183. Abstracts of Current Decisions on Mines and Mining, Reported from May to August 1919, by J. W. Thompson. 1920. 167 pp.
- †B 184. The Manufacture of Sulphuric Acid in the United States, by A. E. Wells and D. E. Fogg. 1920. 216 pp., 36 figs. Gives some of the main facts in regard to the industry in this country, discusses supplies of sulphur-bearing raw materials, technical features of the manufacture of acid, and the uses of the acid.
- †B 185. Pennsylvania Mining Statutes, Annotated, by J. W. Thompson. 1920. 1,221 pp.
- †B 186. Investigations of Zirconium, by J. W. Marden and M. N. Rich. 1921. 152 pp., 2 pls., 3 figs. Gives a historical review of the literature on zirconium and its compounds and a complete bibliography. Discusses results of experiments and describes furnace used.
- †B 187. Treatment of the Tungsten Ores of Boulder County, Colo., by J. P. Bonardi and J. C. Williams. 1921. 79 pp., 18 pls., 10 figs. Deals with the development of milling practice in the district and the methods in use. 25 cents.
- B 188. Lessons from the Granite Mountain Shaft Fire, Butte, by D. Harrington. 1922. 50 pp., 5 pls., 2 figs. Gives an account of the investigation of conditions in the mine before and after the fire and of rescue and recovery work, and presents conclusions and suggestions. 15 cents.
- B 189. Bibliography of Petroleum and Allied Substances, 1918, by E. H. Burroughs. 1921. 180 pp. 35 cents.
- B 190. Coal-Mining Problems in the State of Washington, by G. W. Evans. 1924. 79 pp., 7 pls., 34 figs. Describes methods employed at some of the mines and presents figures regarding the cost of production. 20 cents.
- †B 191. Quality of Gasoline Marketed in the United States, by H. H. Hill and E. W. Dean. 1921. 275 pp., 22 figs. Gives analytical figures and fairly complete data on the production, consumption, and quality of gasoline.
- B 192. Carbon Black: Its Manufacture, Properties, and Uses, by R. O. Neal and G. St. J. Perrott. 1922. 95 pp., 14 pls., 17 figs. Presents the results of a study of the economic factors governing the carbon-black industry, methods of manufacture now in use, and possibility of producing it by other methods and describes properties and uses. 25 cents.
- B 193. Analyses of Mine and Car Samples of Coal Collected in the Fiscal Years 1916 to 1919, by A. C. Fieldner, W. A. Selvig, and J. W. Paul. 1922. 391 pp., 2 figs. Gives analyses and describes samples. 35 cents.
- †B 194. Some Principles Governing the Production of Oil Wells, by C. H. Beal and J. O. Lewis. 1921. 58 pp., 2 pls., 8 figs. Discusses conditions affecting amount of oil in the oil sand, the factors that control the rate of production of oil wells, and effect of production of one well on that of another.
- †B 195. Underground Conditions in Oil Fields, by A. W. Ambrose. 1921. 238 pp., 23 pls., 43 figs. Points out the general method of procedure in studying underground conditions in producing oil fields to correct and prevent unnecessary losses.
- †B 196. Coal-Mine Fatalities in the United States, 1919, and Coal-Mine Statistics Supplementing Those Published in Bulletin 115, with List of Permissible Explosives, Lamps, and Motor Tests Prior to January 31, 1920, by A. H. Fay. 1920. 86 pp., 1 fig. Gives all the fatal accidents described in reports of State inspectors, by States.
- †B 197. Sampling and Examination of Mine Gases and Natural Gas (revision of Bulletin 42), by G. A. Burrell and F. M. Seibert, revised by G. W. Jones. 1926. 108 pp., 18 pls., 27 figs. Describes apparatus and methods used by the Bureau of Mines.
- †B 198. Regulation of Explosives in the United States, with Especial Reference to the Administration of the Explosives Act of October 6, 1917, by C. E. Munroe. 1921. 45 pp.

† Out of print.

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- B 199. Experimental Production of Alloy Steels, by H. W. Gillett and E. L. Mack. 1922. 81 pp., 5 pls. Gives results of tests of the various steels and discusses the recovery and the segregation of the different alloying elements. 15 cents.
- †B 200. Evaporation Losses of Petroleum in the Mid-Continent Field, by J. H. Wiggins. 1922. 115 pp., 7 pls., 61 figs. Discusses the problem, the methods of attack, and volumetric losses during handling and storage, and presents scientific data on the evaporation of petroleum.
- †B 201. Prospecting and Testing for Oil and Gas, by R. E. Collom. 1922. 170 pp., 6 pls., 12 figs. Discusses briefly some of the features of oil and gas accumulation, describes certain oil-field rocks and minerals and kinds of tools that should be used, and discusses the accurate testing of strata for oil or gas.
- B 202. Electric Brass-Furnace Practice, by H. W. Gillett and E. L. Mack. 1922. 334 pp., 25 pls., 35 figs. Records the progress made in melting brass electrically. Is intended to aid plants by pointing out the types of furnaces available; discusses their performance and possibilities. 50 cents.
- B 203. Central District Bituminous Coals as Water-Gas Generator Fuel, by W. W. Odell and W. A. Dunkley. 1924. 92 pp., 11 figs. Outlines principles involved in water-gas manufacture as they apply to the use of bituminous generator fuel and discusses the results obtained in the Streater tests and the application in other plants of the operating methods developed. 15 cents.
- B 204. Underground Ventilation at Butte, by D. Harrington. 1923. 131 pp., 3 pls., 42 figs. Presents data collected during two and one-half years of study and observation by the Bureau of Mines, in cooperation with the United States Public Health Service, at Butte, Mont. 25 cents.
- †B 205. Flotation Tests of Idaho Ores, by C. A. Wright, J. G. Parmelee, and J. T. Norton. 1921. 70 pp., 8 pls., 1 fig. Gives mining companies and others interested some idea of the possibilities in the treatment, by differential flotation, of lead-zinc ores of the Coeur d'Alene region and other districts.
- †B 206. Petroleum Laws of All America, by J. W. Thompson. 1921. 645 pp. Gives the last congressional and legislative enactments on petroleum operations, and the latest laws obtainable to the time of publication.
- B 207. The Analytical Distillation of Petroleum and Its Products, by E. W. Dean, H. H. Hill, N. A. C. Smith, and W. A. Jacobs. 1922. 82 pp., 3 pls., 33 figs. Discusses apparatus and procedure for the distillation analysis of petroleum. Intended as a guide in handling laboratory distillation problems. 15 cents.
- B 208. The Electrothermic Metallurgy of Zinc, by B. M. O'Harra. 1923. 106 pp., 2 pls., 39 figs. Describes furnaces and methods that have been used for smelting zinc ores. 15 cents.
- †B 209. Fusibility of Ash from Coals in the United States, by W. A. Selvig and A. C. Fieldner. 1922. 119 pp., 2 pls., 3 figs. Discusses gas-furnace method, fusibility values, and fusibility of coal ash from mine and car samples.
- B 210. Oil Shale: An Historical, Technical, and Economic Study, State of Colorado Cooperative Oil-Shale Investigations, by M. J. Gavin. 1922. 201 pp., 18 pls., 4 figs. Presents pertinent facts regarding oil shale and gives results of investigations to date of publication. 35 cents.
- B 211. The Chloride Volatilization Process of Ore Treatment, by Thomas Varley, E. P. Barrett, C. C. Stevenson, and R. H. Bradford, with an introductory chapter by Stuart Croasdale. 1923. 99 pp., 7 pls., 5 figs. Outlines the history of the process of chloride volatilization and describes tests of numerous ores and chloridizing furnaces developed in this study. 20 cents.
- †B 212. Analytical Methods for Certain Metals, Including Cerium, Thorium, Molybdenum, Tungsten, Radium, Uranium, Vanadium, Titanium, and Zirconium, by R. B. Moore, S. C. Lind, J. W. Marden, J. P. Bonardi, C. W. Davis, and J. E. Conley. 1923. 323 pp., 1 pl., 4 figs. Gives results of analytical work at the Rare and Precious Metals Experiment Station of the Bureau of Mines.

† Out of print.

- B 213. Tale and Soapstone: Their Mining, Milling, Products, and Uses, by R. B. Ladoo. 1923. 133 pp., 15 pls., 23 figs. Describes characteristics, occurrence, and distribution, factors influencing new tale-mining ventures, methods, and equipment. Gives an outline of uses of tale and soapstone and factors controlling their use. 25 cents.
- B 214. Tests of Marine Boilers, by Henry Kreisinger, John Blizard, A. R. Mumford, B. J. Cross, W. R. Argyle, and R. A. Sherman. 1924. 309 pp., 11 pls., 165 figs. Gives results of tests of marine water-tube boiler and Scotch marine boiler and presents data that permit comparison of the two types of boilers. 55 cents.
- †B 215. Timbering of Metal Mines, by E. A. Holbrook, R. V. Ageton, and H. E. Tuft. 1923. 72 pp., 17 pls., 43 figs. Discusses the general principles of mine timbering. Is intended chiefly for the practical miner or small operator.
- B 216. Bibliography of Petroleum and Allied Substances, 1919 and 1920, by E. H. Burroughs. 1923. 374 pp. 40 cents.
- †B 217. Preparation, Transportation, and Combustion of Powdered Coal, published through the courtesy of the Canada Department of Mines, by John Blizard. 1923. 127 pp., 4 pls., 38 figs. Gives an account of the many methods, advantages, and disadvantages of preparing and burning powdered coal.
- B 218. The Technology of Slate, by Oliver Bowles. 1922. 132 pp., 6 pls., 41 figs. Points out the most efficient methods and equipment in use in slate quarries, describes methods of utilizing the quarried material to best advantage, and outlines means to reduce the proportion of waste. 20 cents.
- †B 219. Explosives: Their Materials, Constitution, and Analysis, by C. A. Taylor and W. H. Rinkenbach. 1923. 188 pp. Does not replace former publications of the Bureau of Mines, but covers present methods employed in the industry and includes all classes of explosives and the materials used in their manufacture.
- †B 220. Bibliography of Petroleum and Allied Substances, 1921, by E. H. Burroughs. 1923. 230 pp.
- †B 221. Production and Briquetting of Carbonized Lignite, by E. J. Babcock and W. W. Odell. 1923. 82 pp., 8 pls., 4 figs. Outlines methods of lignite carbonization and briquetting and discusses commercial possibilities.
- †B 222. The Metallurgy of Quicksilver, by L. H. Duschak and C. N. Schuette. 1925. 173 pp., 29 pls., 12 figs. Discusses results of the investigation carried out through the Pacific Experiment Station of the Bureau of Mines. Describes methods and furnaces in use. Treats of the health hazards in the extraction of quicksilver.
- †B 223. An Investigation of Powdered Coal as Fuel for Power-Plant Boilers, by Henry Kreisinger, John Blizard, C. E. Augustine, and B. J. Cross. 1923. 92 pp., 48 figs. Presents the results of tests made on a 468-horsepower Edgemoor boiler fired with pulverized coal to determine what over-all boiler efficiency could be obtained with pulverized coal under various conditions of furnace operation and with coal of different fineness and moisture content.
- B 224. Surface Machinery and Methods for Oil-Well Pumping, by H. C. George. 1925. 148 pp., 32 pls., 18 figs. Presents information by photographs and drawings which are described in the text. Gives cost of development and equipment of a typical oil-well property and discusses operating costs of oil wells. 50 cents.
- B 225. Stone Dusting or Rock Dusting to Prevent Coal-Dust Explosions, by G. S. Rice. 1924. 57 pp. Presents the results of a study of the subject during an investigation of mining conditions in Europe. 10 cents.
- B 226. The Treatment of Manganese-Silver Ores, by G. H. Clevenger and M. H. Caron. 1925. 110 pp., 13 pls., 4 figs. Gives results of tests made on a working scale and describes apparatus used. 20 cents.
- †B 227. Flame Safety Lamps, by J. W. Paul, L. C. Ilsley, and E. J. Gleim. 1924. 212 pp., 32 pls., 22 figs. Relates the history of the development of the safety lamp. Gives Federal and State regulations in the United States and regulations adopted in European countries. Discusses the design, operation, and maintenance of flame lamps, describes lamp-testing stations, and gives results of tests in gaseous atmosphere, tests in internal igniters, candlepower measurements, and tests in dust-laden atmospheres. Gives reasons for the necessity of making methane tests and discusses apparatus and various methods.

† Out of print.

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- B 228. Estimation of Underground Oil Reserves by Oil-Well Production Curves, by W. W. Cutler, Jr. 1924. 114 pp., 2 pls., 26 figs. Discusses production-decline curve method for estimating recoverable underground reserves of oil and its use for solving operating problems. 20 cents.
- †B 229. Fifty-Nine Coal-Mine Fires; How They Were Fought and What They Teach, by G. S. Rice, J. W. Paul, and M. W. von Bernewitz. 1927. 156 pp., 61 figs. Covers a period of 16 years. Discusses practical methods of fire fighting in widely separated mines that differ greatly in underground conditions and range from anthracite to lignite mines. Suggests means to prevent mine fires.
- †B 230. Analyses of Samples of Delivered Coal Collected from July 1, 1915, to January 1, 1922, with a chapter on the Tidewater Pool Classifications, by N. H. Snyder. 1923. 174 pp. Gives analyses and describes samples.
- B 231. Investigations of Toxic Gases from Mexican and Other High-Sulphur Petroleum and Products, by R. R. Sayers and others. 1925. 108 pp., 17 pls., 12 figs. Presents results of field work and laboratory studies. Discusses need for respiratory protection from petroleum gases and vapors and describes masks and breathing apparatus. 30 cents.
- B 232. Manual for Oil and Gas Operations, Including Operating Regulations to Govern the Production of Oil and Gas under the Acts of February 25, 1920, June 4, 1920, March 4, 1923, and under Special Agreement by the United States, by T. E. Swigart and C. E. Beecher. 1923. 145 pp., 21 pls., 10 figs. Points out types of oil and gas wastes and suggests methods in current practice for stopping these wastes. Outlines policies of the Interior Department on field operations. 40 cents.
- †B 233. Protection of Oil and Gas Field Equipment Against Corrosion, by R. van A. Mills. 1925. 127 pp., 19 pls., 20 figs. Describes causes and effects of oil and gas field corrosion and outlines methods of combating it.
- B 234. Screen Sizing of Coal, Ores, and Other Minerals, by E. A. Holbrook and Thomas Fraser. 1925. 140 pp., 23 pls., 22 figs. Outlines present practice in screening coal and gives a brief historical résumé of the development of screening practice. Discusses coal-preparing machinery and gives data on screens for ore dressing. 30 cents.
- B 235. Mine Timber: Its Selection, Storage, Treatment, and Utilization, by R. R. Horner and H. E. Tuft. 1925. 118 pp., 17 pls., 3 figs. Discusses the benefits of the proper handling of mine timbers and timber preservation. 40 cents.
- †B 236. Plastic Magnesia, by O. C. Ralston, R. D. Pike, and L. H. Duschak. 1925. 111 pp., 13 pls., 27 figs. Gives results of tests made with Chewelah and other magnesites at the laboratories of the University of California in the endeavor to produce a plastic magnesia that would be satisfactory for making the so-called Sorel cement composition flooring, stucco, and plasters.
- B 237. Tests of a Large Boiler Fired with Powdered Coal, by Henry Kreisinger, John Blizard, C. E. Augustine, and B. J. Cross. 1925. 77 pp., 2 pls., 14 figs. Gives results of tests of a 4-pass Edgemoor boiler fired with powdered coal to determine the thermal efficiencies and capacities obtainable by burning powdered coal under large central-station boilers, and the possibility of operating such boilers continuously at high efficiency and capacity without destructive effect on the furnaces and without difficulties in refuse removal. 15 cents.
- B 238. Subsidence Due to Coal Mining in Illinois, by C. A. Herbert and J. J. Rutledge. 1927. 59 pp., 52 figs. Discusses investigations at four widely separated places where the longwall, the ordinary room-and-pillar, and the panel room-and-pillar systems were used. 30 cents.
- B 239. Iron-Ore (Hematite) Mining Practice in the Birmingham District, Alabama, by W. R. Crane. 1926. 143 pp., 87 figs. Discusses mining methods from early to recent practice and offers suggestions for improvements in mining methods. 40 cents.
- B 240. Electric Shot Firing in Mines, Quarries, and Tunnels, by L. C. Hsley and A. B. Hooker. 1926. 139 pp., 72 figs. Gives a historical résumé, describes modern shot-firing equipment, discusses selection and use of accessories, results of tests, and regulations and laws covering ignition or detonation of explosives electrically. 35 cents.

† Out of print.

- †B 241. Coal-Mine Fatalities in the United States, 1923, by W. W. Adams. 1924. 88 pp. Gives all the fatal accidents described in reports of State inspectors, by States.
- B 242. Explosion Hazards in Industrial Plants Through the Use of Pulverized Coal, by L. D. Tracy. 1925. 103 pp., 36 figs. Presents the results of a study of pulverized-fuel systems and suggests regulations for safety in their operation. 25 cents.
- B 243. Diamond Drilling, with Special Reference to Oil-Field Prospecting and Development, by F. A. Edson. 1926. 170 pp., 39 figs. Describes machinery and tools used in diamond drilling, the operation of the diamond drill, and its application to oil-field work. 35 cents.
- †B 244. Fluorspar: Its Mining, Milling, and Utilization, with a chapter on Cryolite, by R. B. Ladoo. 1927. 184 pp., 26 figs. Gives a comprehensive study of the industry as a whole.
- †B 245. Mining of Thin Coal Beds in the Anthracite Region of Pennsylvania, by D. C. Ashmead. 1927. 113 pp., 57 figs. Describes methods now in use in coal beds 5 feet and less in thickness, points out what methods have been successful or unsuccessful, and discusses the opportunity for development of new mining methods.
- †B 246. Quarry Accidents in the United States During the Calendar Year 1923, by W. W. Adams. 1925. 76 pp.
- B 247. Sources of Limestone, Gypsum, and Anhydrite for Dusting Coal Mines to Prevent Explosions, by Oliver Bowles. 1925. 70 pp., 15 pls. Gives information on the application of rock dust in mines, cost of dusting coal mines, sources of dusting materials, and analyses of quarry samples. 25 cents.
- †B 248. Metal-Mire Accidents in the United States During the Calendar Year 1923, by W. W. Adams. 1925. 90 pp.
- †B 249. Manual of Testing Methods for Oil Shale and Shale Oil, by L. C. Karrick. 1926. 70 pp., 24 figs. Discusses testing methods and the best way of applying them.
- B 250. Oil-Field Emulsions, by D. B. Dow. 1926. 112 pp., 41 figs. Deals with the cause and removal of water emulsified in crude petroleum and the colloidal theories involved. 25 cents.
- †B 251. Coal-Mine Fatalities in the United States, 1924, by W. W. Adams. 1925. 95 pp. Gives all the fatal accidents described in reports of State inspectors, by States.
- B 252. Beneficiation and Utilization of Georgia Clays, by R. T. Stull and G. A. Bole. 1926. 72 pp., 23 figs. Discusses occurrence and use of Georgia clays and source of clays tested; gives results of washing and physical tests. 20 cents.
- B 253. Possibilities for the Commercial Utilization of Peat, by W. W. Odell and O. P. Hood. 1926. 160 pp., 6 pls., 23 figs. Describes an investigation authorized by a congressional act to determine the practicability of the utilization of lignite coals and peat as a fuel and in producing commercial products. 35 cents.
- †B 254. Smoke-Abatement Investigations at Salt Lake City, Utah, by Osborn Monrett, G. St. J. Perrott, and H. W. Clark. 1926. 98 pp., 24 figs. Describes the method advocated by the Bureau of Mines for a smoke-abatement campaign in a city of the size of Salt Lake City.
- B 255. Investigations of the Preparation and Use of Lignite, 1918-1925, by O. P. Hood and W. W. Odell. 1926. 204 pp., 15 pls., 20 figs. Discusses an investigation made in compliance with the act of Congress of February 25, 1919. 50 cents.
- B 256. Garnet: Its Mining, Milling, and Utilization, by W. M. Myers and C. O. Anderson. 1925. 54 pp., 3 pls., 3 figs. Discusses the results of an investigation conducted by the Bureau of Mines. 15 cents.
- B 257. Review of Safety and Health Conditions in the Mines at Butte, by G. S. Rice and R. R. Sayers. 1925. 29 pp., 2 pls., 4 figs. Prepared from data gathered during the period 1916 to 1924, inclusive, by Daniel Harrington, supplemented by material obtained by other investigators and by the notes of the authors made during their visit to the mines in 1924. 10 cents.

† Out of print.

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- B 258. Suggestions for the Design of Electrical Accessories for Permissible Mining Equipment, by L. C. Hsley and E. J. Gleim. 1926. 47 pp., 21 figs. Discusses the good and the bad features of accessories used in permissible mining outfits. Useful in interpreting the intent of Schedule 2D of the Bureau of Mines. 15 cents.
- B 259. Placer-Mining Methods and Costs in Alaska, by N. L. Wimpler, 1927. 236 pp., 70 figs. Discusses present conditions in Alaska placer mining, the methods employed, and the costs. Helpful to placer miners, engineers, and all others interested in the industry. 20 cents.
- †B 260. The Ferric Sulphate-Sulphuric Acid Process, by O. C. Ralston, with a chapter on Producing Small Bubbles of Gas in Liquids by Submerged Orifices, by C. G. Maier. 1927. 122 pp., 71 figs. Describes the process for preparing solutions of ferric sulphate or sulphuric acid by passing a mixture of air and sulphur dioxide, preferably in the form of very small bubbles, through solutions containing varying amounts of iron as sulphate. Comprises a study of the chemistry of the process and the mechanical conditions that would have to be observed in practice.
- †B 261. Resistance of Metal-Mine Airways, by G. E. McElroy and A. S. Richardson. 1927. 145 pp., 71 figs. Describes methods used and results obtained in a series of experiments on the resistance that metal-mine airways offer to the flow of air.
- B 262. Underground Limestone Mining, by J. R. Thoenen. 1926. 100 pp., 72 figs. Intended to be of service to superintendents of limestone mines and quarry operators who contemplate adopting underground methods. 30 cents.
- †B 263. Quarry Accidents in the United States During the Calendar Year 1924, by W. W. Adams. 1926. 76 pp.
- †B 264. Metal-Mine Accidents in the United States During the Calendar Year 1924, by W. W. Adams. 1926. 98 pp.
- B 265. Leakage from High-Pressure Natural-Gas Transmission Lines, by E. L. Rawlins and L. D. Wosk. 1928. 106 pp., 32 figs. Describes methods of determining leakage from natural-gas lines and suggests remedial measures. 25 cents.
- †B 266. Technology and Uses of Silica and Sand, by W. M. Weigel. 1927. 199 pp., 50 figs. Summarizes mining or quarrying methods and uses.
- †B 267. Acid Process for the Extraction of Alumina, by G. S. Tilley, R. W. Millar, and O. C. Ralston. 1927. 85 pp. Discusses not only the sulphuric acid processes of chief interest, but also reviews all the other work with hydrochloric and nitric acids.
- B 268. Coal-Dust Explosion Tests in the Experimental Mine, 1919 to 1924, inclusive, by G. S. Rice, J. W. Paul, and H. P. Greenwald. 1927. 176 pp., 31 figs. Describes the third series of coal-dust explosion tests. See B 56 and 167. 35 cents.
- B 269. Quarry Problems in the Lime Industry, by Oliver Bowles and W. M. Myers. 1927. 93 pp., 34 figs. Describes general methods of operation and gives typical illustrations. Is intended to assist manufacturers of lime in correcting errors and establishing their industry on the most economical and efficient basis. 25 cents.
- B 270. Production of Sponge Iron, by C. E. Williams, E. P. Barrett, and B. M. Larsen. 1927. 175 pp., 48 figs. Reviews sponge-iron processes, gives fundamental data on reduction of iron oxides and results of tests, and discusses the economics of sponge-iron production. 35 cents.
- †B 271. Problems in the Firing of Refractories, by G. A. Bole, John Blizard, W. E. Rice, E. P. Ogden, and R. A. Sherman. 1927. 197 pp., 56 figs. Presents the results of an investigation begun in February 1923, by the Bureau of Mines, in cooperation with a technical committee selected by the Refractories Manufacturers' Association.
- B 272. Safeguarding Workmen at Oil Derricks, by H. C. Miller. 1927. 111 pp., 86 figs. Deals with safe principles of derrick construction and the safety devices and safeguards found on and in the derrick. See TP 369. 40 cents.
- B 273. Drilling and Blasting in Open-cut Copper Mines, by E. D. Gardner. 1927. 95 pp., 57 figs. Gives descriptions and comparisons of drilling and blasting methods at the six open-cut mines visited in Utah, Nevada, New Mexico, and Arizona during 1922, 1923, 1924, and 1925. 30 cents.

† Out of print.

- †B 274. Potash Mining in Germany and France, by G. S. Rice and J. A. Davis. 1927. 92 pp., 23 figs. Discusses methods of mining potash salts in France and Germany and the geology of the deposits. Gives a brief history of the German and French potash industry, a short description of the refining of crude salts for export, and an estimate of the cost of production. Is based on data obtained during visits to France and Germany during 1911 and 1923, supplemented by information from articles and books on the subjects.
- †B 275. Coal-Mine Fatalities in the United States, 1925, by W. W. Adams. 1926. 129 pp.
- B 276. Five Hundred Tests of Various Coals in House-Heating Boilers, by P. Nicholls, S. B. Flagg, and C. E. Augustine. 1928. 70 pp., 12 figs. Includes comprehensive analytical table annotated to show results of burning tests of coals. 15 cents.
- †B 277. Safety in Coal Mining (A Handbook), by G. S. Rice. 1928. 141 pp., 1 fig. Presents in convenient form a concise statement of practices and methods recommended by the Bureau of Mines for the increase of safety in coal mining.
- B 278. Magnetic Concentration of Iron Ores of Alabama, by Oscar Lee, B. W. Gandrud, and F. D. De Vaney. 1927. 75 pp., 18 figs. Discusses results of tests of high-silica red ores and high-silica gray hematite. Also discusses tests of flue dusts of the Birmingham district. 20 cents.
- †B 279. Limits of Inflammability of Gases and Vapors, by H. F. Coward and G. W. Jones. Revised, 1931. 114 pp., 36 figs. Presents the results of a cooperative study begun in 1924 between the Safety in Mines Research Board of Great Britain and the Bureau of Mines at the Pittsburgh Experiment Station. The results are of great value to industries handling inflammable gas and are especially valuable in problems concerning safety in coal mining, for they determine with some precision the limits of inflammability of combustible gases and vapors. Some of the tests give new figures; others confirm former determinations. (See also TP 450.)
- B 280. Petroleum Refinery Statistics, 1916-1925, by G. R. Hopkins. 1927. 141 pp., 5 figs. Records all past data presented on the recently adopted basis of barrels instead of gallons. 30 cents.
- †B 281. The Precipitation of Lead and Copper from Solution on Sponge Iron, by G. L. Oldright, H. E. Keyes, Virgil Miller, and W. A. Sloan. 1928. 131 pp., 43 figs. Presents the results of experiments on the hydrometallurgy of lead at the Salt Lake City station of Bureau of Mines and the results of experiments on the hydrometallurgy of copper at the Tuscon (Ariz.), Station.
- †B 282. Metal-Mine Accidents in the United States During the Calendar Year 1925, by W. W. Adams. 1927. 120 pp.
- †B 283. Coal-Mine Fatalities in the United States, 1926, by W. W. Adams. 1927. 121 pp.
- †B 284. Production and Development Problems in the Powell Oil Field, Navarro County, Tex., by H. B. Hill and C. E. Sutton. 1928. 123 pp., 35 figs. Presents the results of a detailed study that was made primarily to obtain a better working knowledge of the major features, involving structural conditions, the character and nature of the Woodbine pay sand, and the source of water. A complete and reliable compilation of data.
- B 285. Coal-Mine Ventilation Factors, by H. P. Greenwald and G. E. McElroy. 1929. 106 pp., 47 figs. Describes testing equipment and methods used in the Bureau's experimental mine at Bruceston and presents data on pressure losses caused by the resistance of coal-mine entries to the flow of air under various practical conditions on resistance of right-angle bends, and on resistance caused by canvas brattices. 25 cents.
- †B 286. Quarry Accidents in the United States During the Calendar Year 1925, by W. W. Adams. 1927. 98 pp.
- B 287. Gases from Blasting in Tunnels and Metal-Mine Drifts, by E. D. Gardner, S. P. Howell, and G. W. Jones. 1927. 96 pp., 14 figs. Gives the results of sampling the gases from blasting drift rounds at five mines; describes the rounds blasted and the methods of sampling and analyzing the gases. 20 cents.

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- †B 288. Quarry Accidents in the United States During the Calendar Year 1926, by W. W. Adams. 1928. 89 pp.
- †B 289. Petroleum Refinery Statistics, 1926, by G. R. Hopkins. 1927. 92 pp., 4 figs.
- B 290. Bibliography of Petroleum and Allied Substances, 1922 and 1923, by H. Britton. 1929. 667 pp. \$1.00.
- †B 291. Tabulated Analyses of Representative Crude Petroleum of the United States, by N. A. C. Smith and E. C. Lane. 1928. 69 pp. Presents the analyses of more than 300 typical crude oils, all produced within the United States. One of a series of reports, which, taken as a whole, will present a comprehensive picture of the characteristics of crude petroleum.
- †B 292. Metal-Mine Accidents in the United States During the Calendar Year 1926, by W. W. Adams. 1928. 119 pp.
- †B 293. Coal-Mine Fatalities in the United States, 1927, by W. W. Adams. 1928. 120 pp.
- †B 294. Carburetion of Combustible Gas with Butane and Propane-Butane Mixtures, with Particular Reference to the Carburetion of Water Gas, by W. W. Odell. 1929. 96 pp., 18 figs. Presents results of exhaustive investigations at manufactured-gas plants to determine the feasibility of using hydrocarbons having low boiling points and high pressures to replace gas oil in the enrichment of lean gas.
- †B 295. Subsidence and Ground Movement in the Copper and Iron Mines of the Upper Peninsula, Michigan, by W. R. Crane. 1929. 66 pp., 49 figs. Gives data on the factors that control the movement of rock. Presents information by photographs and drawings of various typical examples and describes methods of procedure in failures in and about mines.
- †B 296. Iron Oxide Reduction Equilibria, a Critique from the Standpoint of the Phase Rule and Thermodynamics, by O. C. Ralston. 1929. 326 pp., 112 figs. Presents the properties of the common oxides of iron, their combinations with each other, and reduction-equilibrium diagrams. Includes a critical discussion of existing scattered data and occasional new data that have been collected by the Bureau of Mines.
- †B 297. Petroleum Refinery Statistics, 1927, by G. R. Hopkins. 1929. 93 pp., 4 figs.
- B 298. Methods, Costs, and Safety in Stripping and Mining Coal, Copper Ore, Iron Ore, Bauxite, and Pebble Phosphate, by F. E. Cash and M. W. von Bernewitz. 1929. 275 pp., 120 figs. Gives the results of investigations of this form of mining and suggests means to prevent accidents. 70 cents.
- B 299. Metallurgical Limestone, Problems in Production and Utilization, by Oliver Bowles. 1929. 40 pp., 4 figs. Is intended for limestone operators and metallurgists. Covers distribution and transportation, production statistics, and utilization and production problems. 10 cents.
- B 300. Coal-Washing Investigations: Methods and Tests, by H. F. Yancey and Thomas Fraser. 1929. 259 pp., 48 figs. Presents the results of investigations to determine the washability of the various types of American coals and the treatment best suited to each. 50 cents.
- †B 301. Facts Relating to the Production and Substitution of Manufactured Gas for Natural Gas, by W. W. Odell. 1929. 179 pp., 35 figs. Discusses general conditions that have been studied to aid in the better utilization of our fuel resources and the production of low-priced manufactured gas as well as to disseminate information relating to the supply of natural gas, the cost of other fuels, and the approximate costs of producing and distributing different kinds of manufactured city gas.
- †B 302. Fuel-Efficiency Tests on Batch Oil Stills, by Henry Kreisinger, W. R. Argyle, and W. E. Rice. 1929. 94 pp., 48 figs. Presents in condensed form the results of cooperative tests made to determine with what efficiency fuel was being used and what could be done to improve it.
- †B 303. Tests of Strength of Roof Supports Used in Anthracite Mines of Pennsylvania, by G. S. Rice and Charles Enzian. 1929. 44 pp., 30 figs. Describes tests to determine the compressive strength of artificial roof supports of various kinds used in the mining of anthracite in Pennsylvania.

† Out of print.

- B 304. Ochers and Mineral Pigments of the Pacific Northwest: Occurrence, Possible Methods of Preparation, and Testing of Ochers, Siennas, and Colored Clays, by Hewitt Wilson. 1929. 74 pp., 18 figs. Gives a review of the nomenclature, sources, imports, statistics, common methods of preparation, and testing of mineral pigments. Discusses an investigation undertaken to determine whether the local materials had the proper characteristics to meet the competition of materials already on the market from other districts. 15 cents.
- †B 305. Inspection and Testing of Mine-Type Electrical Equipment for Permissibility, by L. C. Ilsley, E. J. Gleim, and H. B. Brunot. 1929. 26 pp., 6 figs. Discusses the theory upon which tests of equipment in explosive atmospheres are based and considers inspection and other matters pertaining to complete investigations of machines under Schedule 2D.
- B 306. Mining Methods and Practice in the Michigan Copper Mines, by W. R. Crane. 1929. 192 pp., 147 figs. Considers mining methods historically, from early to present practice. 60 cents.
- †B 307. Flow of Gases Through Beds of Broken Solids, by C. C. Furnas. 1929. 144 pp., 79 figs. Treats of the first phase of a laboratory study of blast-furnace phenomena undertaken with the intention of eventually formulating a more or less complete quantitative theory of the physical and chemical reactions within the furnace.
- B 308. Oxides in Pig Iron: Their Origin and Action in the Steel-Making Process, by C. H. Herty, Jr., and J. M. Gaines, Jr. 1929. 56 pp., 16 figs. Describes the tests. Gives tables of details, log sheets of heats, and application of the Dickinson method to the extraction of silicates from pig iron. 15 cents.
- †B 309. Rock Bursts in the Lake Superior Copper Mines, Keweenaw Point, Mich., by W. R. Crane. 1929. 43 pp., 31 figs. Discusses cause and occurrence of rock bursts and suggests protective measures.
- †B 310. Metal-Mine Accidents in the United States During the Calendar Year 1927, by W. W. Adams. 1929. 96 pp.
- †B 311. Drilling and Blasting in Metal-Mine Drifts and Crosscuts, by E. D. Gardner. 1929. 170 pp., 63 figs. Shows the results obtained and conclusions drawn from observing the blasting of 108 rounds at 13 mines in 6 different States.
- †B 312. Bauxite: Float-and-Sink Fractionations and Flotation Experiments, by B. W. Gandrud and F. D. De Vaney. 1929. 101 pp., 6 figs. Presents the results of an investigation of the physical properties and characteristics of bauxite, with special reference to the possibility of applying commercial methods of concentration to low-grade bauxite.
- †B 313. Permissible Storage-Battery Locomotives and Power Trucks, by L. C. Ilsley, E. J. Gleim, and H. B. Brunot. 1929. 120 pp., 49 figs. Gives essential data in regard to the construction of approved storage-battery locomotives and power trucks.
- †B 314. Quarry Accidents in the United States During the Calendar Year 1927, by W. W. Adams. 1929. 109 pp.
- †B 315. Construction and Operation of the Bureau of Mines Experimental Oil-Shale Plant, 1925-1927, by M. J. Gavin and J. S. Desmond. 1930. 154 pp., 59 figs. Makes particular reference to the retorts and directs attention to difficulties encountered in retorting and the best means of avoiding them. Describes the nature of the products obtained and summarizes refining studies.
- B 316. Commercial Possibilities of the Texas-New Mexico Potash Deposits, by J. S. Wroth. 1930. 144 pp., 5 figs. Describes results of Government core-drilling tests in Texas and New Mexico and offers a comprehensive schedule of costs for all phases of the mining and treatment of polyhalite. 25 cents.
- †B 317. Rock-Strata Gases of the Cripple Creek District, Colo., and Their Effect on Mining, by E. H. Denny, K. L. Marshall, A. C. Fieldner, A. H. Emery, W. P. Yant, and W. A. Selvig. 1930. 66 pp., 21 figs. Presents results of field and laboratory studies and suggests safety measures to reduce the hazards due to rock gases.
- †B 318. Petroleum Refinery Statistics, 1928, by G. R. Hopkins. 1930. 123 pp., 17 figs.

† Out of print.

Bulletins

- B 319. Coal-Mine Fatalities in the United States, 1928, by W. W. Adams. 1929. 125 pp., 20 cents.
- B 320. Metal-Mine Accidents in the United States During the Calendar Year 1928, by W. W. Adams. 1930. 102 pp., 20 cents.
- B 321. Innovations in Copper Leaching Employing Ferric Sulphate-Sulphuric Acid, by H. E. Keyes. 1930. 67 pp., 23 figs. Presents the results of experiments that were made at the Tucson station of the Bureau of Mines to complete the program of developing a cheap and efficient solvent that would meet the requirements of smaller plants. 20 cents.
- B 322. Effect of Vacuum on Oil Wells, by B. E. Lindsly and W. B. Berwald. 1931. 133 pp., 61 figs. Presents results of investigations to determine the nature, power, and action of vacuum; urges the importance of the correct application of vacuum to obtain increased recovery of oil. 35 cents.
- B 323. Gas-Lift Method of Flowing Oil Wells (California Practice), by H. C. Miller. 1931. 118 pp., 45 figs. Presents data of actual gas-lift operations. Points out operating facts and generalized practices. 30 cents.
- B 324. Zinc Smelting from a Chemical and Thermodynamic Viewpoint, by C. G. Maier. 1931. 93 pp., 19 figs. Shows, with some detail, the application of newly recalculated theoretical data to the general chemistry of zinc reduction in smelting. Also discloses the manner in which information on the statics of reduction may be used in certain cases to study a dynamic process. 20 cents.
- B 325. Quarry Accidents in the United States During the Calendar Year 1928, by W. W. Adams. 1931. 103 pp., 20 cents.
- †B 326. Explosives Accidents in the Anthracite Mines of Pennsylvania, 1923-1927, by S. P. Howell. 1931. 93 pp., 3 figs. Presents the results of a technical statistical study of all fatal and serious accidents in which explosives were involved in the anthracite region of Pennsylvania during the calendar years 1923 to 1927, inclusive, to determine the nature of explosives accidents and to devise means for preventing similar accidents in the Pennsylvania anthracite mines.
- B 327. Potash Bibliography to 1928 (Annotated), by J. F. T. Berliner. 1931. 578 pp. Review and compilation of technical literature on potash salts (including the alunites) and their foreign occurrences. 90 cents.
- †B 328. Greensand Bibliography to 1930 (Annotated), with a chapter on Zeolite Water Softeners, by R. N. Shreve. 1931. 78 pp. Includes all articles of any importance and all references of even minor importance to American occurrence.
- †B 329. Agglomeration and Leaching of Slimes and Other Finely Divided Ores, by J. D. Sullivan and A. P. Towne. 1931. 60 pp., 8 figs. Presents experimental data to show what may be expected when leaching on a large scale under conditions approximating those in practice.
- †B 330. Ventilation of the Large Copper Mines of Arizona, by G. E. McElroy. 1931. 145 pp., 42 figs. Discusses ventilation methods, practices, and costs at 11 large copper mines.
- †B 331. Permissible Methane Detectors, by A. B. Hooker, W. J. Fene, and R. D. Currie. 1931. 30 pp., 16 figs. Presents to the mining public the results of the permissibility tests of the detectors that have been approved; also gives the results of a series of tests conducted to determine their practicability.
- †B 332. Permissible Electric Mine Lamps, by L. C. Ilsley and A. B. Hooker. 1931. 39 pp., 28 figs. Gives a brief account of the introduction of electric lighting in mines and discusses the lamp-approval work of the Bureau of Mines.
- B 333. Refining of Light Petroleum Distillates, by H. P. Rue and R. H. Espach. 1931. 111 pp., 42 figs. Deals with the principal methods of refining light petroleum products, the equipment used, and the effects of the different refining agents. Discusses a study of the value of fractionation as an aid to the refining of pressure distillates. Gives the results of fractionating pressure distillates in an experimental bubble tower, dividing the gasoline into two or more fractions, and treats of the value of fractionation in facilitating the refining of the gasoline fractions. 25 cents.

† Out of print.

- B 334. A Study of Refractories Service Conditions in Boiler Furnaces, by R. A. Sherman. 1931. 144 pp., 76 figs. Describes results of preliminary survey of factors determining life of refractories, discusses in detail fuels, furnaces, and conditions of service, correlates conditions of service with service life, and covers design and construction of boiler furnaces. 50 cents.
- †B 335. Quicksilver, by C. N. Schuette. 1931. 168 pp., 56 figs. Report of the study of the production of quicksilver, the principal aspects of which include developing and mining of the ore bodies, the metallurgy of quicksilver ores, and the economics of the industry as a whole. Discusses and illustrates types of equipment and underlying principles of operation.
- B 336. Agglutinating, Coking, and Byproduct Tests of Coals from Pierce County, Wash., by S. M. Marshall and B. M. Bird. 1931. 31 pp., 13 figs. Describes one phase of a comprehensive investigation to determine whether coals from an extensive, undeveloped area of Pierce County, Wash., can be used in the manufacture of coke for the iron blast furnace. 10 cents.
- B 337. Jigging, Classification, Tabling, and Flotation Tests of Coals Presenting Difficult Washing Problems, with Particular Reference to Coals from Pierce County, Wash., by B. M. Bird and S. M. Marshall. 1931. 132 pp., 95 figs. Describes the investigation and summarizes the most important results. Gives detailed data of the best of the washing tests by each process. Describes hindered-settling classifier which was developed during this investigation. Discusses new system of riffling coal-washing tables, and method for adjusting coal-washing tables based upon the distribution of the products. 35 cents.
- B 338. Quarry Accidents in the United States During the Calendar Year 1929, by W. W. Adams. 1931. 104 pp. 20 cents.
- B 339. Petroleum Refinery Statistics, 1929, by G. R. Hopkins. 1931. 125 pp., 18 figs. 30 cents.
- B 340. Relationship Between Oxidizability and Composition of Coal, by Wilfrid Francis and H. M. Morris. 1931. 44 pp., 5 figs. Tabulates results of tests. 10 cents.
- B 341. Coal-Mine Fatalities in the United States, 1929, by W. W. Adams. 1931. 120 pp. 20 cents.
- B 342. Metal-Mine Accidents in the United States During the Calendar Year 1929, by W. W. Adams. 1931. 99 pp., 1 fig. 20 cents.
- †B 343. Permissible Coal-Handling Equipment Approved from January 1926 to December 1930, Inclusive, by L. C. Hsley, E. J. Gleim, and H. B. Brunot. 1931. 91 pp., 29 figs. Permissible loading machines and conveyors included in the Bureau's list of approved equipment are described to indicate to mine operators and manufacturers not only the types available but to show to some extent the special features employed in designing machines that minimize the hazard of gas and dust ignitions.
- †B 344. Methods and Apparatus Used in Determining the Gas-, Coke-, and Byproduct-Making Properties of American Coals, with Results on a Taggart Bed Coal from Roda, Wise County, Va., by A. C. Fieldner, J. D. Davis, R. Thiessen, E. B. Kester, and W. A. Selvig. 1931. 107 pp., 53 figs. Describes in some detail the methods and apparatus used.
- B 345. Concrete Stoppings in Coal Mines for Resisting Explosions: Detailed Tests of Typical Stoppings and Strength of Coal as a Buttress, by G. S. Rice, H. P. Greenwald, H. C. Howarth, and S. Avins. 1931. 63 pp., 41 figs. Gives the details of tests to determine the design of stoppings capable of withstanding a pressure, applied to either side, of 50 pounds per square inch, as required by section 104 (a) of the operating regulations to govern coal-mining methods on leased lands on the public domain, issued in 1921. 25 cents.
- B 346. Physical Testing of Explosives at the Bureau of Mines Explosives Experiment Station, Bruceton, Pa., by C. E. Munroe and J. E. Tiffany. 1932. 148 pp., 48 figs. Supersedes TP 186 and brings together descriptions of testing devices and the methods of using them as described in the Bureau publications cited in the text, especially B 15 and TP 234, which like TP 186 are now out of print. These devices and methods having been modified with experience, they are here described as they are at present. 35 cents.
- B 347. Gases That Occur in Metal Mines, by D. Harrington and E. R. Denny. 1931. 21 pp. Discusses investigations of various gases in metal mines and tunnels. Recommends safety measures to be applied. 5 cents.

† Out of print.

- B 348. Paraffin and Congealing Oil Problems, by C. E. Reistle, jr., with a Chapter on a Laboratory Study of Rod Waxes, by C. E. Reistle, jr., and O. C. Blade. 1932. 171 pp., 64 figs. The first part discusses the results obtained from field studies of the factors responsible for the deposition of paraffin and the congealing of oil and of practical methods of combating these problems. The second part deals with the analyses of crude waxes or paraffin obtained from different representative crude oils. 55 cents.
- †B 349. Liquid-Oxygen Explosives, by G. St. J. Perrott and N. A. Tolch. 1932. 88 pp., 36 figs. Deals with the advantages and disadvantages of L. O. X., both in the light of experimental investigations by the Bureau of Mines and the results in actual blasting, and discusses the probable future fields of usefulness for this novel type of explosive.
- †B 350. Contributions to the Data on Theoretical Metallurgy. I. The Entropies of Inorganic Substances, by K. K. Kelley. 1932. 63 pp., 1 fig. Deals with the entropies of metallurgically important substances. Gives values of the entropies at 298.1° K. (25° C.) of elements and common compounds, such as oxides and sulphides, for which the necessary data are at present available and calls attention to means of obtaining approximate values when data are lacking. Furnishes a schedule on which data that may become available in the future can be inserted.
- †B 351. Mining Petroleum by Underground Methods; a Study of Some Methods Used in France and Germany and Possible Application to Depleted Oil Fields under American Conditions, by G. S. Rice. 1932. 159 pp., 38 figs. Concludes that where conditions are favorable, mining methods in depleted oil fields may bring large financial returns and recover oil that might otherwise be lost.
- †B 352. Safety Practices in California Gold Dredging, by S. H. Ash. 1932. 31 pp., 10 figs. Discusses accident-prevention methods, tabulates accident statistics, and gives safety rules of California Industrial Accident Commission.
- †B 353. Tests of Rock-Dust Barriers in the Experimental Mine, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. 1932. 81 pp., 28 figs. Describes the tests and summarizes results. Discusses qualities of effective barriers and barrier installations in commercial mines.
- B 354. The Ignition of Firedamp by Explosives. A Study of the Process of Ignition by the Schlieren Method, by W. C. F. Shepherd. 1932. 89 pp., 35 figs. Gives results of research to develop a new method of studying the phenomena produced on firing explosives in inflammable atmospheres. Information was obtained on the behavior of the pressure waves, the flame, and the products of detonation that result from the firing of an explosive. 15 cents.
- B 355. Coal-Mine Accidents in the United States, 1930, by W. W. Adams, L. E. Geyer, and L. Chenoweth. 1932. 114 pp. 10 cents.
- B 356. Sampling and Estimation of Ore Deposits, by C. F. Jackson and J. B. Knaebel. 1932. 155 pp., 35 figs. Outlines methods employed and pitfalls to avoid, presents examples of modern practice as a guide to future work, and indicates accuracy that may be expected under various conditions. 25 cents.
- †B 357. Shaft-Sinking Practices and Costs, by E. D. Gardner and J. F. Johnson. 1932. 104 pp., 49 figs. One of a series of papers on mining practices and costs. Discusses the best methods of performing all phases of shaft sinking, with particular attention to the practices at metal mines.
- †B 358. Rubber-Sheathed Trailing Cables, by L. C. Hsley, A. B. Hooker, and E. J. Coggeshall. 1932. 53 pp., 28 figs. Records activities of the Bureau of Mines covering several years and reflects its endeavor to be of service to the coal-mining industry in procuring safer trailing cables for use on permissible machines.
- †B 359. Permissible Electric Cap Lamps and Ventilation in Certain California Mines and Water-Tunnel Construction, by S. H. Ash and J. H. Rankin. 1932. 36 pp., 12 figs. Concludes that it is safer, more efficient, and more practical to use exhaust systems of ventilation where explosive or asphyxial gas is encountered, either at the face, or particularly away from it; also that the use of portable electric cap lamps is less costly, safer, and more efficient under the circumstances described than any incandescent lighting system that involves wiring.

† Out of print.

- B 360. Removal of Soot from Furnaces and Flues by the Use of Salts or Compounds, by P. Nicholls and C. W. Staples. 1932. 76 pp., 18 figs. Gives a general summary of the conclusions reached in the investigation in a form useful to those desiring to know the possibilities in this method of soot removal; a list of the composition of compounds which have been proposed, patented, or sold; and a detailed report of the tests made and the results obtained. 10 cents.
- †B 361. Heat Transfer from a Gas Stream to a Bed of Broken Solids, by C. C. Furnas. 1932. 88 pp., 35 figs. Presents data covering a considerable range of materials, particle sizes, gas velocities, and temperatures, in a general form so that they may be used for any type of system similar to one studied.
- B 362. Metal-Mine Accidents in the United States During the Calendar Year 1930, by W. W. Adams. 1932. 99 pp. 10 cents.
- B 363. Gold Mining and Milling in the United States and Canada, Current Practices and Costs, by C. F. Jackson and J. B. Knaebel. 1932. 151 pp., 54 figs. Deals with prospecting, development, mining, and milling of lode-gold ores and contains a brief discussion of placer mining. It is the first of a series of summary bulletins, which will deal particularly with production methods, as well as costs per ton of different metallic ores mined and per unit of metal recovered. 15 cents.
- B 364. Clinker Formation as Related to the Fusibility of Coal Ash, by P. Nicholls and W. A. Selvig, with appendix by E. B. Ricketts. 1932. 71 pp., 26 figs. First part covers chemical and physical tests of average samples of coals used—chemical analysis, float-and-sink tests to determine distribution of ash, determination of forms of sulphur, chemical analysis of ash, and ash-fusibility determinations. Second part includes clinkering studies and comparisons of results with ash-fusibility and other tests. 10 cents.
- B 365. Laboratory Testing of Inflammability of Coal and Other Dusts Conducted by the Bureau of Mines, by H. P. Greenwald, with foreword by G. S. Rice. 1932. 45 pp., 14 figs. Historical review of laboratory testing of coal by Bureau of Mines. 10 cents.
- B 366. Quarry Accidents in the United States during the Calendar Year 1930, by W. W. Adams. 1932. 88 pp. 10 cents.
- B 367. Petroleum-Refinery Statistics, 1930, by G. R. Hopkins. 1932. 104 pp., 18 figs. 15 cents.
- †B 368. Static Electricity in Nature and Industry, by P. G. Guest. 1933. 98 pp., 11 figs. Although scope of this report is rather broad, it deals primarily with static electricity as a hazard. Gives casual and experimental observations for background and for purpose of suggesting hazards not yet recognized. Emphasizes electrification and possibility of spark discharge.
- B 369. Explosion Tests of Pittsburgh Coal Dust in the Experimental Mine, 1925 to 1932, inclusive, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. 1933. 44 pp., 11 figs. Second of series of bulletins dealing with subdivisions of general problem of explosibility of coal dust and prevention of explosions in coal mines. Reports tests to determine effect on explosibility of Pittsburgh coal dust of altering conditions under which tests were made. 5 cents.
- B 370. Iron Oxide Mineral Pigments of the United States, by Hewitt Wilson. 1933. 198 pp., 34 figs. Reviews occurrence of mineral pigments and allied iron ores and nomenclature and common methods of classifying and testing many commercial mineral pigments used in this country. 15 cents.
- B 371. Contributions to the Data on Theoretical Metallurgy. II. High-Temperature Specific-Heat Equations for Inorganic Substances, by K. K. Kelley. 1933. 78 pp. Second-paper on contributions to data on theoretical metallurgy (B 350 is first). Reviews available high-temperature thermal data on inorganic compounds and gives representative specific-heat equations valid at high temperatures for use in thermodynamic calculations. 10 cents.
- B 372. Accounting System and Office-Management Procedure for Medium-Size Metal Mines, by Albert E. Keller. 1933. 84 pp., 50 figs. Discusses system particularly adapted to needs of medium-size mines that ship their crude ore direct to smelters or to ore-purchasing companies without processing or treatment, and that operate under centralized home-office control plan. 15 cents.
- B 373. Coal-Mine Accidents in the United States, 1931, by W. W. Adams, L. E. Geyer, and L. Chenoweth. 1933. 104 pp. 10 cents.

† Out of print.

Bulletins

- B 374. Metal-Mine Accidents in the United States during the Calendar Year 1931, by W. W. Adams. 1933. 36 pp. 5 cents.
- B 375. Quarry Accidents in the United States During the Calendar Year 1931, by W. W. Adams. 1933. 50 pp. 5 cents.
- B 376. Quarry Accidents in the United States During the Calendar Year 1932, by W. W. Adams. 1933. 59 pp. 5 cents.
- B 377. Metal-Mine Accidents in the United States During the Calendar Year 1932, by W. W. Adams. 1933. 43 pp. 5 cents.
- B 378. Underfeed Combustion, Effect of Preheat, and Distribution of Ash in Fuel Beds, by P. Nicholls. 1934. 76 pp., 29 figs. One of series of investigations on burning of solid fuels to measure reactions in fuel beds in burning of fuel and in clinkering of its ash. Report covers studies of underfeed-type fuel bed—exemplified by underfeed stokers—and of the effect of preheated air on what transpires in both overfeed and underfeed fuel beds. 10 cents.
- B 379. Applied Methods and Equipment for Reducing Evaporation Losses of Petroleum and Gasoline, by Ludwig Schmidt. 1934. 160 pp. 63 figs. Evaporation of crude petroleum and gasoline is one of most important sources of loss to oil industry. Bulletin summarizes approved methods of equipment for reducing these losses. Discusses theory of evaporation; methods of determining evaporation losses; lease operation; transportation and storage of crude petroleum; and evaporation losses of gasoline at refineries. 20 cents.
- B 380. Coal-Mine Accidents in the United States, 1932, by W. W. Adams and L. E. Geyer. 1934. 87 pp. 10 cents.
- B 381. Lead and Zinc Mining and Milling in the United States; Current Practices and Costs, by Chas. F. Jackson, John B. Knaebel, and C. A. Wright. 1935. 204 pp., 59 figs. One of a series on mining and milling of ores of the principal metals. They summarize the results of 4 years of field study in the most important mining districts of the United States and of a series of information circulars published by the Bureau dealing with operating methods and costs at a large number of individual mines and milling plants. This bulletin combines in a single volume discussions of the winning of lead and zinc ores from the mines and of the milling of the ores with descriptions of practices at typical properties in the United States. 15 cents.
- †B 382. Permissible Coal-Cutting Equipment Approved Prior to July 1, 1932, by L. C. Ilsley, H. B. Brunot, and H. B. Freeman. 1935. 129 pp., 27 figs. The third in a series covering permissible motor-driven machinery; describes the explosion-proof features of all the coal-cutting machines (including those given in B 78) approved prior to July 1, 1932.
- B 383. Contributions to the Data on Theoretical Metallurgy. III. The Free Energies of Vaporization and Vapor Pressures of Inorganic Substances, by K. K. Kelley. 1935. 132 pp. Third paper on contributions to data on theoretical metallurgy (B 350 and 371 are nos. 1 and 2). Discusses methods used in heat and free energy of vaporization calculations; gives heat and free energy of vaporization equations for all the elements and inorganic compounds for which the necessary data are available; and summarizes vapor-pressure results for substances discussed. Contains a bibliography of vapor-pressure data, complete so far as possible up to April 1934. 10 cents.
- B 384. Contributions to the Data on Theoretical Metallurgy. IV. Metal Carbonates—Correlations and Applications of Thermodynamic Properties, by K. K. Kelley and C. T. Anderson. 1935. 73 pp. Continues the study outlined in B 350, 371, and 383. Assembles existing thermodynamic data for carbonates and correlates so far as possible the results of decomposition-pressure determinations with the calorimetrically determined heats of formation and entropy values on the one hand and with solubility and standard electrode-potential data on the other. 10 cents.
- B 385. Engineering Factors in the Ventilation of Metal Mines, by G. E. McElroy. 1935. 196 pp., 68 figs. Discusses the engineering aspects of metal-mine ventilation. Presents the subject to mine operators and students interested in mine ventilation in a practical way. Tabulates cost data for two groups of large metal mines. 25 cents.
- B 386. Quarry Accidents in the United States During the Calendar Year 1933, by W. W. Adams and V. E. Erwin. 1935. 62 pp. 10 cents.

† Out of print.

- B 387. Coal-Mine Accidents in the United States, 1933, by W. W. Adams and L. E. Geyer. 1935. 113 pp. 15 cents.
- B 388. Manufacture of Paraffin Wax from Petroleum, by Ralph H. Espach. 1936. 113 pp., 37 figs. Gives a detailed picture of the manufacturing process employed and equipment used in production. 15 cents.
- B 389. Laboratory Studies of the Inflammability of Coal Dusts: Effect of Fineness of Coal and Inert Dusts on the Inflammability of Coal Dusts, by A. L. Godbert and H. P. Greenwald. 1936. 29 pp., 4 figs. Discusses continuation of a program of laboratory studies of the inflammability of coal dust. Previous work was summarized in B 365. The purpose of the present investigation was to study the effect of variation in size of coal and inert dusts on the inflammabilities of coal dusts as determined in a laboratory apparatus and to correlate the results of these laboratory tests with those of Experimental mine tests in which similar variations were made. 5 cents.
- B 390. Stopping Methods and Costs, by Chas. F. Jackson and E. D. Gardner. 1936. 296 pp., 78 figs. One of a series dealing with mining methods, practices, and costs. Deals with stopping methods and costs and summarizes the data in earlier publications and those obtained during investigations in the field that apply particularly to stopping. 25 cents.
- B 391. Microscopic Structure and Concentratability of the More Important Iron Ores of the United States, by S. R. B. Cooke. 1936. 121 pp., 46 figs. Covers a survey of 19 ores collected from seven of the more important iron-ore districts of the United States. Is in part a general survey of iron ores with a view of collecting information concerning the nature of the minerals present and the degree and nature of the association between the economic iron minerals and the gangue minerals. 20 cents.
- B 392. Concentration of Copper Ores in North America, by Thomas G. Chapman. 1936. 169 pp., 26 figs. Summarizes and discusses copper-concentrator methods, results, and costs from 1929 to 1931 and includes an account of trends and developments in the industry. 15 cents.
- B 393. Contributions to the Data on Theoretical Metallurgy. V. Heats of Fusion of Inorganic Substances, by K. K. Kelley. 1936. 166 pp. Discusses heat-of-fusion values of inorganic substances from available freezing-point data of binary systems. The directly measured heat-of-fusion results are discussed in B 386 and 387 and several values obtained from vapor-pressure data in B 388. This bulletin discusses values derived from a wide variety of substances; they are compared, whenever possible, with results obtained by other means. 20 cents.
- † B 394. Contributions to the Data on Theoretical Metallurgy. VI. A Revision of the Entropies of Inorganic Substances, by K. K. Kelley. 1936. 55 pp. Supplements B 350 and 383. Gives new values now obtainable and makes revision in the older values as the data warrant.
- B 395. Occurrence, Properties, and Preparation of Limestone and Chalk for Whiting, by Hewitt Wilson and Kenneth G. Skinner. 1937. 160 pp., 48 figs. Gives the results of a study undertaken to encourage the use of domestic materials in the preparation of whiting. Describes chalk, limestone, and marble samples, by States. 30 cents.
- B 396. Sponge-Iron Experiments at Mococo, by Chas. G. Maier. 1937. 81 pp., 24 figs. Covers one phase of the program of the Bureau of Mines on the direct production of iron from its ores. Discusses tests with a rotary kiln to determine the possible utilization of waste iron oxide material and the potential utility of natural gas as a metallurgical reagent. 15 cents.
- B 397. Coal-Mine Accidents in the United States: 1934, by W. W. Adams, L. E. Geyer, and M. G. Parry. 1936. 108 pp. 15 cents.
- B 398. Metal-Mine Accidents in the United States: 1933-34, by W. W. Adams and M. E. Kolhos. 72 pp. 1936. 10 cents.
- B 399. Quarry Accidents in the United States During the Calendar Year 1934, by W. W. Adams and V. E. Wrenn. 1936. 62 pp. 10 cents.
- B 400. Review of Literature on Effects of Breathing Dusts With Special Reference to Silicosis, by D. Harrington and Sara J. Davenport. 1937. 305 pp. Gives information in convenient form on effects of breathing dusts, largely in the mining and allied industries. Assembles some of the more outstanding data on several aspects of the subject, especially with reference to silicosis. 25 cents.

† Out of print.

- B 403. Asbestos, by Oliver Bowles. 1937. 92 pp., 10 figs. Presents a concise, world-wide, historical, technical, and economic treatment of the asbestos industry. Covers the essential features, including occurrence, production, mining, milling, utilization, international trade, and marketing. 15 cents.

TECHNICAL PAPERS

- †TP 1. The Sampling of Coal in the Mine, by J. A. Holmes. 1911. 22 pp., 1 fig. Describes the sampling methods and the sampling outfit devised by the Geological Survey and the Bureau of Mines.
- †TP 2. The Escape of Gas from Coal, by H. C. Porter and F. K. Ovitz. 1911. 14 pp., 1 fig. Presents the results of an investigation of the rate of escape of gas from several coals while kept in bottles. Discusses the significance of the results as bearing on mine ventilation and the storage of coal.
- †TP 3. Specifications for the Purchase of Fuel Oil for the Government, with Directions for Sampling Oil and Natural Gas, by I. C. Allen. 1911. 13 pp. Gives specifications prepared by the Bureau of Mines and the methods of sampling used by the Bureau.
- †TP 4. The Electrical Section of the Bureau of Mines: Its Purpose and Equipment, by H. H. Clark. 1911. 12 pp.
- TP 5. The Constituents of Coal Soluble in Phenol, by J. C. W. Frazer and E. J. Hoffman. 1912. 18 pp., 1 pl. A preliminary technical statement of an investigation of the chemical compounds of coal. Describes the compounds obtained by extracting coal with phenol and isolating fractions by the use of different solvents. 5 cents.
- †TP 6. The Rate of Burning of Fuse as Influenced by Temperature and Pressure, by W. O. Snelling and W. C. Cope. 1919. 28 pp. Describes the kinds of fuse and the factors affecting rate of burning.
- †TP 7. Investigations of Fuse and Miners' Squibs, by Clarence Hall and S. P. Howell. 1912. 19 pp.
- TP 8. Methods of Analyzing Coal and Coke, by F. M. Stanton and A. C. Fieldner. Revised by W. A. Selvig, 1929. 47 pp. Gives methods used by the Bureau of Mines for analyzing coal and coke for determining heating value and specific gravity. 15 cents.
- †TP 9. The Status of the Gas Producer and of the Internal-Combustion Engine in the Utilization of Fuels, by R. H. Fernald. 1912. 42 pp., 6 figs. Relates the progress in the application of the gas producer to commercial uses and in the development of gas power.
- †TP 10. Liquefied Products of Natural Gas: Their Properties and Uses, by I. C. Allen and G. A. Burrell. 1912. 23 pp. Briefly discusses the liquefaction of certain constituents of natural gas, the results of some experiments, and the properties of the products obtained.
- TP 11. The Use of Mice and Birds for Detecting Carbon Monoxide After Mine Fires and Explosions, by G. A. Burrell. 1912. 16 pp. Discusses the physiological effects of carbon monoxide—a common constituent of the after-damp from mine fires and explosions—and the results of experiments showing the value of mice and birds as indicators of this poisonous gas. Of interest to miners and mine officials. 5 cents.
- †TP 12. The Behavior of Nitroglycerin When Heated, by W. O. Snelling and C. G. Storm. 1912. 14 pp., 1 pl., 2 figs. Gives results of experiments that show the true boiling point of nitroglycerin and describes the apparatus used.
- TP 13. Gas Analysis as an Aid in Fighting Mine Fires, by G. A. Burrell and F. M. Seibert. 1912. 16 pp., 1 fig. Points out the value of gas analysis in showing the composition of mine atmospheres and the conditions in fire areas in mines. Describes a portable gas-analysis apparatus. 5 cents.
- †TP 14. Apparatus for Gas-Analysis Laboratories at Coal Mines, by G. A. Burrell and F. M. Seibert. 1913. 24 pp., 7 figs. Describes easily manipulated apparatus for determining the constituents of mine air.
- †TP 15. An Electrolytic Method of Preventing Corrosion of Iron and Steel, by J. K. Clement and L. V. Walker. 1913. 19 pp., 10 figs. Gives results of experiments made to develop an electrolytic method for protecting iron and steel against the corrosive action of acid underground waters.

† Out of print.

- †TP 16. Deterioration and Spontaneous Heating of Coal in Storage, a Preliminary Report, by H. C. Porter and F. K. Ovitz. 1912. 14 pp. Superseded by B 136 and TP 172, 235, and 326.
- TP 17. The Effect of Stemming on the Efficiency of Explosives, by W. C. Snelling and Clarence Hall. 1912. 20 pp., 11 figs. Revised by S. P. Howell and J. E. Tiffany. 1928. Shows gain in efficiency by the use of stemming, demonstrated by firing small charges of explosives in boreholes in lead blocks. The pamphlet is of interest to all persons who use explosives for blasting coal or rock. 5 cents.
- TP 18. Magazines and Thaw Houses for Explosives, by Clarence Hall and S. P. Howell. 1912. 34 pp., 1 pl., 5 figs. Describes a magazine and a thaw house, each constructed of cement mortar, and gives the quantity of material required for construction. Points out the features essential for safe storage of explosives. Is of interest to persons who supervise the storage and use of large quantities of explosives. 10 cents.
- TP 19. The Factor of Safety in Mine Electric Installations, by H. H. Clark. 1912. 14 pp. Points out factors that tend to make electrical installations less safe in mines than above ground and gives some general suggestions regarding the adoption and maintenance of a high factor of safety. 5 cents.
- †TP 20. The Slagging Type of Gas Producer, with a Brief Report of Preliminary Tests, by C. D. Smith. 1912. 14 pp., 1 pl. Describes experiments to determine the value of the slagging type of gas producer in the utilization of high-ash fuels and the conditions under which this type is most satisfactory.
- †TP 21. The Prevention of Mine Explosions, Report and Recommendations, by Victor Watteyne, Carl Meissner, and Arthur Desborough. 1912. 12 pp. Gives the recommendations of three prominent coal-mining experts as to safety conditions in coal mines in the United States. Reprint of Geological Survey Bulletin 369.
- TP 22. Electrical Symbols for Mine Maps, by H. H. Clark. 1913. 11 pp., 8 figs. Points out the advantages of uniform practice in using symbols for mine maps and gives proposed symbols. 5 cents.
- †TP 23. Ignition of Mine Gas by Miniature Electric Lamps with Tungsten Filaments, by H. H. Clark. 1912. 5 pp. Summarizes briefly the results of experiments to determine the possibility of igniting an explosive mixture of gas and air by the filaments of miniature electric lamps.
- TP 24. Mine Fires, a Preliminary Study, by G. S. Rice. 1912. 51 pp., 1 fig. Gives a comprehensive summary of the causes of fires in mines and the equipment and methods to be used for preventing and extinguishing such fires. The pamphlet is addressed chiefly to mine owners and mine officials. 10 cents.
- †TP 25. Methods for the Determination of Water in Petroleum and Its Products, by I. C. Allen and W. A. Jacobs. 1912. 13 pp., 2 figs. Describes methods used by different chemists and the method adopted by the Bureau of Mines.
- †TP 26. Methods of Determining the Sulphur Content of Fuels, Especially Petroleum Products, by I. C. Allen and I. W. Robertson. 1912. 13 pp. Describes methods used by different chemists and the method adopted by the Bureau of Mines.
- †TP 27. Monthly Statement of Coal-Mine Accidents in the United States, January to August 1912, and Statistics for 1910 and 1911, compiled by F. W. Horton. 1912. 24 pp.
- TP 28. Ignition of Gas by Standard Incandescent Lamps, by H. H. Clark. 1912. 6 pp. See B 131 for later data. 5 cents.
- †TP 29. Training with Mine Rescue Breathing Apparatus, by J. W. Paul. 1912. 16 pp. Superseded by handbook entitled "Self-Contained Mine Rescue Oxygen Breathing Apparatus."
- TP 30. Mine-Accident Prevention at Lake Superior Iron Mines, by D. E. Woodbridge. 1913. 38 pp., 9 figs. Describes labor conditions at iron mines in the Lake Superior region and the general progress in accident prevention. 10 cents.
- †TP 31. Apparatus for the Exact Analysis of Flue Gas, by G. A. Burrell and F. M. Seibert. 1913. 12 pp., 1 fig. Describes apparatus devised by the Bureau of Mines. Of interest to engineers and chemists who have occasion to make combustion tests of fuels.

† Out of print.

- †TP 32. The Cementing Process of Excluding Water from Oil Wells, as Practiced in California, by Ralph Arnold and V. R. Garfias. 1913. 12 pp., 1 fig. Describes the methods of casing off water by the use of cement grouting.
- †TP 33. Sanitation at Mining Villages in the Birmingham District, Alabama, by D. E. Woodbridge. 1913. 27 pp., 1 pl., 9 figs. Describes sanitation conditions at iron- and coal-mining villages in the Birmingham district and the welfare work of the mining companies.
- †TP 34. Experiments with Furnaces for a Hand-Fired Return Tubular Boiler, by S. B. Flagg, G. C. Cook, and F. E. Woodman. 1914. 32 pp., 1 pl., 4 figs. Describes the tests. Gives suggestions as to possible methods of increasing the capacity of locomotive boilers. Reprint of Geological Survey Bulletin 412.
- †TP 35. Weathering of the Pittsburgh Coal Bed at the Experimental Mine near Bruceston, Pa., by H. C. Porter and A. C. Fieldner. 1914. 35 pp. States that results of sampling analysis show that effects of weathering extended 50 feet from outcrop. Tests shows slight improvement of coal by weathering.
- †TP 36. Preparation of Specifications for Petroleum Products, by I. C. Allen. 1913. 10 pp. Reviews the progress made in arranging for uniform specifications.
- †TP 37. Heavy Oil as Fuel for Internal-Combustion Engines, by I. C. Allen. 1913. 36 pp. Discusses the merits of the Diesel type of engine and the use of heavy oils as engine fuel.
- TP 38. Wastes in the Production and Utilization of Natural Gas, and Methods for Their Prevention, by Ralph Arnold and F. G. Clapp. 1913. 29 pp. Discusses the various causes of waste of natural gas and gives precautions and methods by which waste may be prevented. 5 cents.
- †TP 39. The Inflammable Gases in Mine Air, by G. A. Burrell and F. M. Seibert. 1913. 24 pp., 2 figs. Discusses the composition of "normal" mine air and the inflammable gases found by analysis.
- †TP 40. Metal-Mine Accidents in the United States During the Calendar Year 1911, compiled by A. H. Fay. 1913. 54 pp. Summarizes data collected through the cooperation of State mine inspectors and metal-mine operators. See also TP 61, 94, 129, 168.
- †TP 41. The Mining and Treatment of Lead and Zinc Ores in the Joplin District, Missouri, a Preliminary Report, by C. A. Wright. 1913. 43 pp., 5 figs. Summarizes the mining and milling methods used.
- †TP 42. The Prevention of Waste of Oil and Gas from Flowing Wells in California, with a Discussion of Special Methods Used by J. A. Pollard, by Ralph Arnold and V. R. Garfias. 1913. 15 pp., 2 pls., 4 figs.
- †TP 43. The Influence of Inert Gases on Inflammable Gaseous Mixtures, by J. K. Clement. 1913. 24 pp., 1 pl., 8 figs. Gives the results of experiments undertaken to determine the effect of carbon dioxide and nitrogen on the explosibility of methane in gaseous mixtures.
- †TP 44. Safety Electric Switches for Mines, by H. H. Clark. 1913. 8 pp.
- †TP 45. Waste of Oil and Gas in the Mid-Continent Fields, by R. S. Blatchley. 1914. 57 pp., 2 pls., 15 figs. Describes conditions in different pools, gives estimates of waste, and makes recommendations looking to its prevention.
- †TP 46. Quarry Accidents in the United States During the Calendar Year 1911, compiled by A. H. Fay. 1913. 32 pp.
- †TP 47. Portable Electric Mine Lamps, by H. H. Clark. 1913. 13 pp. See B 131 for later data.
- †TP 48. Coal-Mine Accidents in the United States, 1896-1912, with Monthly Statistics for 1912, by F. W. Horton. 1913. 74 pp., 10 figs. Summarizes data collected through the cooperation of State mine inspectors and mine operators.
- †TP 49. The Flash Point of Oils; Methods and Apparatus for Its Determination, by I. C. Allen and A. S. Crossfield. 1913. 38 pp., 2 pls. Discusses the need of uniform methods of determining the flash point and recommends certain forms of testers.
- †TP 50. Metallurgical Coke, by A. W. Belden. 1913. 48 pp., 1 pl., 23 figs. Discusses coke manufacture and the properties essential to good metallurgical coke.

† Out of print.

Technical Papers

- TP 51. Possible Causes of the Decline of Oil Wells, and Suggested Methods of Prolonging Yields, by L. G. Huntley. 1913. 32 pp., 9 figs. Gives a general résumé. For detailed discussion, see B 177, 194, 195, 228. 5 cents.
- †TP 52. Permissible Explosives Tested Prior to March 1, 1913, by Clarence Hall. 1913. 10 pp. Contains a list of 96 explosives considered by the Bureau of Mines as permissible for use in coal mines in the presence of inflammable dust or gas. Superseded by TP 71, 100, 159, 169, 192, 231, 259, 291, 307.
- †TP 53. Proposed Regulations for the Drilling of Gas and Oil Wells, by O. P. Hood and A. G. Heggem. 1913. 28 pp., 2 figs.
- †TP 54. Errors in Gas Analysis Due to Assuming That the Molecular Volumes of All Gases Are Alike, by G. A. Burrell and F. M. Seibert. 1913. 16 pp. Describes inquiry made to determine the errors that might arise in the combustion method of analysis by assuming that the molecular volume (the quotient of the molecular weight divided by the density) is the same for every gas.
- TP 55. The Production and Use of Brown Coal in the Vicinity of Cologne, Germany, by C. A. Davis. 1913. 15 pp. Treats chiefly of the methods used in the manufacture of brown-coal briquets. 5 cents.
- †TP 56. Notes on the Prevention of Dust and Gas Explosions in Coal Mines, by G. S. Rice. 1913. 24 pp. Discusses causes of mine explosions and methods of prevention.
- †TP 57. A Preliminary Report on the Utilization of Petroleum and Natural Gas in Wyoming, by W. R. Calvert, with a Discussion of the Suitability of Natural Gas for Making Gasoline, by G. A. Burrell. 1913. 23 pp. Briefly discusses the development of the oil and gas fields in the State and such waste as has attended this development.
- TP 58. The Action of Acid Mine Water on the Insulation of Electrical Conductors, a Preliminary Report, by H. H. Clark and L. C. Ilsley. 1913. 26 pp., 1 fig. Presents the results of tests of different insulating coverings. 5 cents.
- TP 59. Fires in Lake Superior Iron Mines, by Edwin Higgins. 1913. 34 pp., 2 pls. Contains notes on a number of min. fires, makes recommendations on preventing and subduing fires in metal mines, and presents analyses of certain black slates that take fire spontaneously. 5 cents.
- †TP 60. The Approximate Melting Points of Some Commercial Copper Alloys, by H. W. Gillett and A. B. Norton. 1913. 10 pp., 1 fig. Gives melting points of 10 alloys and describes methods used in tests.
- †TP 61. Metal-Mine Accidents in the United States During the Calendar Year 1912, compiled by A. H. Fay. 1914. 76 pp., 1 fig. Summarizes figures received from operators and prospectors and discusses them.
- †TP 62. Relative Effects of Carbon Monoxide on Small Animals, by G. A. Burrell, F. M. Seibert, and I. W. Robertson. 1914. 23 pp. Shows that canaries are best suited for use by men exploring mines after explosions or fires.
- †TP 63. Factors Governing the Combustion of Coal in Boiler Furnaces, a Preliminary Report, by J. K. Clement, J. C. W. Frazer, and C. E. Augustine. 1914. 46 pp., 26 figs. Describes tests of Pocahontas coal in a specially constructed furnace, the purpose of the tests being to determine the conditions requisite for complete combustion.
- †TP 64. Determination of Nitrogen in Coal, a Comparison of Various Modifications of the Kjeldahl Method with the Dumas Method, by A. C. Fieldner and C. A. Taylor. 1915. 25 pp., 5 figs. Describes results of tests to determine relative advantages of the various modifications.
- †TP 65. A Study of the Oxidation of Coal, by H. C. Porter and O. C. Ralston. 1914. 28 pp., 12 figs. Discusses the physical-chemical reactions between oxygen and the coal substance.
- †TP 66. Mud-Laden Fluid Applied to Well Drilling, by J. A. Pollard and A. G. Heggem. 1914. 21 pp., 12 figs. Treats use of mud for sealing gas or water sands in "dry-hole" drilling with a cable rig.
- TP 67. Mine Signboards, by Edwin Higgins and Edward Steidle. 1913. 15 pp., 1 pl., 4 figs. Recommends the use of universal symbols for signboards. 5 cents.

† Out of print.

- †TP 68. Drilling Wells in Oklahoma by the Mud-Laden-Fluid Method, by A. G. Heggen and J. A. Pollard. 1914. 27 pp., 5 figs. Discusses use of mud to seal beds in drilling by the "dry-hole" method and describes results of demonstrations at wells in Oklahoma.
- †TP 69. Production of Explosives in the United States During the Calendar Year 1912, compiled by A. H. Fay. 1914. 8 pp.
- †TP 70. Methods of Oil Recovery in California, by Ralph Arnold and V. R. Garfias. 1914. 57 pp., 7 figs. Describes use of plunger pump, air lift, and other methods of recovering petroleum at California wells. Gives details of equipment and costs.
- †TP 71. Permissible Explosives Tested Prior to January 1, 1914, by Clarence Hall. 1914. 12 pp. Gives list of explosives tested and their rate of detonation.
- †TP 72. Problems of the Petroleum Industry, by I. C. Allen. 1924. 20 pp. Presents results of conferences looking to the organization of investigations of national scope.
- †TP 73. Quarry Accidents in the United States During the Calendar Year 1912, compiled by A. H. Fay. 1914. 45 pp.
- †TP 74. Physical and Chemical Properties of the Petroleums of California, by I. C. Allen, W. A. Jacobs, A. S. Crossfield, and R. R. Matthews. 1914. 38 pp., 1 fig. Gives the results of the examination of over 300 samples from different districts.
- TP 75. Permissible Electric Lamps for Miners, by H. H. Clark. 1914. 21 pp., 3 figs. Describes methods followed by the Bureau in testing portable electric lamps for safety and discusses qualities that such lamps should have in order to be acceptable for mine service. 5 cents.
- †TP 76. Notes on the Sampling and Analysis of Coal, by A. C. Fieldner. 1914. 61 pp., 6 figs. Discusses factors affecting accuracy of sampling and analysis and outlines methods used by the Bureau of Mines.
- TP 77. Report of the Committee on Resuscitation from Mine Gases, by W. B. Cannon, G. W. Crile, Joseph Erlanger, Yandell Henderson, and S. J. Meltzer. 1914. 34 pp., 4 figs. Points out defects of some mechanical devices for causing artificial respiration and administering oxygen to persons overcome by carbon monoxide. Recommends a special device. 5 cents.
- TP 78. Specific-Gravity Separation Applied to the Analysis of Mining Explosives, by C. G. Storm and A. L. Hyde. 1914. 14 pp. Describes application of the method. 5 cents.
- TP 79. Electric Lights for Use About Oil and Gas Wells, by H. H. Clark. 1914. 8 pp. 5 cents.
- TP 80. Hand Firing Soft Coal Under Power-Plant Boilers, by Henry Kreisinger. 1916. 83 pp., 32 figs. Describes best methods of firing soft coal and handling fires and discusses losses in power generation. 10 cents.
- †TP 81. The Vapor Pressure of Arsenic Trioxide, by H. V. Welch and L. H. Duschak. 1915. 21 pp., 3 pls., 2 figs. Gives results of experiments and describes apparatus.
- †TP 82. Oxygen Mine Rescue Apparatus and Physiological Effects on Users, by Yandell Henderson and J. W. Paul. 1917. 102 pp., 5 pls., 6 figs. Discusses in detail the defects of apparatus and suggests improvements.
- †TP 83. The Buying and Selling of Ores and Metallurgical Products, by C. H. Fulton. 1915. 42 pp. Discusses methods of buying and selling, with especial reference to sampling, assaying, freight rates, smelting, and milling charges.
- †TP 84. Methods of Preventing and Limiting Explosions in Coal Mines, by G. S. Rice and L. M. Jones. 1915. 45 pp., 14 pls., 3 figs. Treats of causes and prevention of explosions and describes rock-dust barriers devised by the engineers of the Bureau.
- †TP 85. Production of Explosives in the United States During the Calendar Year 1913, compiled by A. H. Fay. 1914. 15 pp.
- †TP 86. Ore-Sampling Conditions in the West, by T. R. Woodbridge. 1916. 96 pp., 5 pls., 17 figs. Presents results of an investigation of practices at different mills and sampling plants.
- †TP 87. Methods of Testing Natural Gas for Gasoline Content, by G. A. Burrell and G. W. Jones. 1916. 26 pp., 7 figs. Describes methods and results of tests.

† Out of print.

- †TP 88. The Radium-Uranium Ratio in Carnotites, by S. C. Lind and C. F. Whittemore. 1915. 29 pp., 1 pl., 4 figs. Describes experiments to determine the value and constancy of the radium-uranium ratio in carnotite ores.
- †TP 89. Coal-Tar Products and the Possibility of Increasing Their Manufacture in the United States, by H. C. Porter, with a chapter on Coal-Tar Products Used in Explosives, by C. G. Storm. 1915. 21 pp. Discusses the possibility of increasing the production of coal tar and of developing the manufacture of dyestuffs, drugs, and chemicals derived from it.
- †TP 90. Metallurgical Treatment of the Low-Grade and Complex Ores of Utah, a Preliminary Report, by D. A. Lyon, R. H. Bradford, S. S. Arentz, O. C. Ralston, and C. L. Larson. 1915. 40 pp. Mentions the extent of the ore bodies, the chemical characteristics of the ores, and the proposed methods of treatment.
- †TP 91. A Convenient Multiple-Unit Calorimeter Installation, by J. D. Davis and E. L. Wallace. 1917. 48 pp., 6 pls., 13 figs. Describes laboratory experiments to determine thermal value of coal.
- †TP 92. Quarry Accidents in the United States During the Calendar Year 1913, compiled by A. H. Fay. 1914. 76 pp.
- †TP 93. Graphic Studies of Ultimate Analyses of Coals, by O. C. Ralston, with a preface by H. C. Porter. 1915. 41 pp., 3 pls., 6 figs. Plots carbon, hydrogen, and volatile matter by a system of trilinear coordinates.
- †TP 94. Metal-Mine Accidents in the United States During the Calendar Year 1913, compiled by A. H. Fay. 1914. 73 pp., 2 pls., 5 figs.
- †TP 95. Mining and Milling of Lead and Zinc Ores in the Wisconsin District, Wisconsin, by C. A. Wright. 1915. 39 pp., 2 pls., 5 figs. Discusses current practice in the district.
- †TP 96. Fume and Other Losses in Condensing Quicksilver from Furnace Gases, by L. H. Duschak and C. N. Schuette. 1918. 29 pp., 1 pl., 4 figs. Describes method of determining losses of quicksilver in furnace gases and suggests improvements in furnace practice.
- †TP 97. Saving Fuel in Heating a House, by L. P. Breckinridge and S. B. Flagg. 1915. 35 pp., 3 figs. Treats of hot-air, hot-water, and steam-heating plants for dwellings, the factors to be considered in heating a house, and the care of heaters.
- †TP 98. Effect of Low-Temperature Oxidation on the Hydrogen in Coal and the Change of Weight of Coal on Drying, by S. H. Katz and H. C. Porter. 1917. 16 pp., 2 figs.
- †TP 99. Probable Effect of the War in Europe on the Ceramic Industries of the United States, by A. S. Watts. 1915. 15 pp. Discusses the effect of the war in relation to the ceramic industry abroad, the kaolin resources of the United States, and the probable increase of domestic manufacture.
- †TP 100. Permissible Explosives Tested Prior to March 1, 1915, by S. P. Howell. 1915. 16 pp. Contains names of 129 permissible explosives and gives their unit defective charge and rate of detonation.
- †TP 101. Permissible Explosion-Proof Electric Motors for Mines, Conditions and Requirements for Test and Approval, by H. H. Clark. 1915. 17 pp., 2 pls., 1 fig. Presents requirements for approval of motors and a description of the motor already approved.
- TP 102. Health Conservation at Steel Mills, by J. A. Watkins. 1916. 36 pp. Discusses the need of medical supervision of employees, the construction of buildings, and standards of sanitation. 5 cents.
- †TP 103. Organizing and Conducting Safety Work in Mines, by H. M. Wilson and J. R. Fleming. 1917. 57 pp., 35 figs. Outlines organizations and discusses safety measures and equipment.
- †TP 104. Analysis of Natural Gas and Illuminating Gas by Fractional Distillation at Low Temperatures and Pressures, by G. A. Burrell, F. M. Seibert, and I. W. Robertson. 1915. 41 pp., 7 figs. Describes apparatus and methods employed and results of tests.
- †TP 105. Pulmonary Disease Among Miners in the Joplin District, Missouri, and Its Relation to Rock Dust in the Mines, by A. J. Lanza and Edwin Higgins. 1915. 48 pp., 5 pls., 4 figs. Describes mining methods, conditions injurious to miners, the methods of determining dust in mine air, character of the dust in the mine visited, and the improvement of health conditions.

† Out of print.

- TP 106. Asphyxiation from Blast-Furnace Gas, by F. H. Willcox. 1916. 69 pp., 8 pls., 11 figs. Discusses nature and causes of gas poisoning, suggests safeguards, and points out precautions to be taken. 15 cents.
- †TP 107. Production of Explosives in the United States During the Calendar Year 1914, with Notes on Coal-Mine Accidents Due to Explosives, compiled by A. H. Fay. 1915. 16 pp.
- †TP 108. Shot Firing in Coal Mines by Electricity Controlled from Outside, by H. H. Clark, N. V. Breth, and C. M. Means. 1915. 36 pp. Describes chief features of some outside firing systems in use.
- †TP 109. Composition of the Natural Gas Used in 25 Cities, with a Discussion of the Properties of Natural Gas, by G. A. Burrell and G. G. Oberfell. 1915. 22 pp.
- †TP 110. Monazite, Thorium, and Mesothorium, by K. L. Kithil. 1915. 32 pp., 1 fig. Discusses occurrences and recovery of monazite, also recovery of mesothorium from thorium residues.
- TP 111. Safety in Stone Quarrying, by Oliver Bowles. 1915. 48 pp., 5 pls., 4 figs. Calls attention to the chief causes of accidents in quarries and the measures and devices for preventing accidents. 10 cents.
- †TP 112. The Explosibility of Acetylene, by G. A. Burrell and G. G. Oberfell. 1915. 15 pp. Describes results of experiments made by the Bureau of Mines to determine the limits of complete propagation of flame in mixtures of acetylene and air.
- †TP 113. Some Properties of the Water in Coal, by H. C. Porter and O. C. Ralston. 1916. 30 pp., 3 figs. Discusses the manner in which water may be held in coal and how its properties and those of the coal are affected by the condition in which it is held.
- †TP 114. Heat Transmission Through Boiler Tubes, by Henry Kreisinger and J. F. Barkley. 1915. 36 pp., 23 figs. Third of a series with B 8 and 18. Calls attention to the ease with which heat is transmitted through boiler tubes and the possibility of greatly increasing boiler capacity by proper design.
- †TP 115. Inflammability of Mixtures of Gasoline Vapor and Air, by G. A. Burrell and H. T. Boyd. 1915. 18 pp., 2 figs. Describes experiments and gives results of tests.
- †TP 116. Miners' Wash and Change Houses, by J. H. White. 1915. 27 pp., 3 pls., 3 figs. Describes types of houses, especially those for large mines.
- †TP 117. Quantity of Gasoline Necessary to Produce Explosive Vapors in Sewers, by G. A. Burrell and H. T. Boyd. 1916. 18 pp., 4 figs. Gives the results of tests conducted in the city of Pittsburgh, Pa.
- †TP 118. Coke-Oven Accidents in the United States During the Calendar Years 1913 and 1914, compiled by A. H. Fay. 1915. 16 pp. Presents statistics compiled from reports made by coke operators. See also TP 151.
- †TP 119. The Limits of Inflammability of Mixtures of Methane and Air, by G. A. Burrell and G. G. Oberfell. 1915. 30 pp., 4 figs. Describes experiments and gives results of tests.
- †TP 120. A Bibliography of the Chemistry of Gas Manufacture, by W. F. Rittman and M. C. Whittaker, compiled and arranged by M. S. Howard. 1915. 30 pp.
- †TP 121. Effects of Temperature and Pressure on the Explosibility of Methane-Air Mixtures, by G. A. Burrell and I. W. Robertson. 1916. 14 pp., 3 figs. Describes apparatus and gives results of tests.
- †TP 122. Effects of Atmospheres Deficient in Oxygen on Small Animals and on Men, by G. A. Burrell and G. G. Oberfell. 1915. 12 pp. Issues warning against use of canaries and mice by exploring parties in mines to show when men unequipped with breathing helmets should retreat, because the atmosphere is low in oxygen.
- †TP 123. Notes on the Uses of Low-Grade Fuel in Europe, by R. H. Fernald. 1915. 37 pp., 4 pls., 4 figs. Describes use of high-ash coal and wood refuse and similar material in producers, recovery of byproducts, use of peat, results of low-temperature distillation, possibilities of slagging type of gas producer, and use of powdered fuel.
- †TP 124. Accidents at Metallurgical Works in the United States During the Calendar Years 1913 and 1914, compiled by A. H. Fay. 1915. 28 pp. Presents statistics compiled from reports of smelting and ore-dressing plants; does not include iron blast furnaces. See also TP 164.

† Out of print.

- TP 125. The Sand Test for Determining the Strength of Detonators, by C. G. Storm and W. C. Cope. 1916. 68 pp., 2 pls., 5 figs. Presents in detail the results of tests with various grades of detonators and electric detonators. 10 cents.
- †TP 126. The Casting of Clay Wares, by T. G. McDougal. 1916. 26 pp., 6 figs. Points out the procedure necessary and the precautions advisable in changing from a plastic to a casting process. Is intended especially for the practical potter.
- †TP 127. Hazards in Handling Gasoline, by G. A. Burrell. 1915. 17 pp. Shows need of care in handling and using gasoline and gives precautions to be observed.
- †TP 128. Quarry Accidents in the United States During the Calendar Year 1914, compiled by A. H. Fay. 1915. 45 pp.
- †TP 129. Metal-Mine Accidents in the United States During the Calendar Year 1914, compiled by A. H. Fay. 1915. 96 pp., 1 pl., 3 figs.
- †TP 130. Underground Wastes in Oil and Gas Fields and Methods of Prevention, by W. F. McMurray and J. O. Lewis. 1916. 23 pp., 1 pl., 8 figs. Discusses waste of oil and gas by the flooding of sands with water. Gives reasons for conservation. Describes effects of unsystematic casing of wells.
- †TP 131. The Compressibility of Natural Gas at High Pressure, by G. A. Burrell and I. W. Robertson. 1916. 12 pp., 2 figs. Calls attention to the fact that the pressure-volume relation of Boyle's law does not hold for natural gas under high pressure and points out possible errors in measuring natural gas.
- †TP 132. Underground Latrines for Mines, by J. H. White. 1916. 23 pp., 2 pls., 7 figs. Discusses need of sanitation in mines in order to prevent disease.
- TP 133. Directions for Sampling Coal for Shipment or Delivery, by G. S. Pope. 1917. 15 pp., 1 pl. Summarizes information given in B 116. 5 cents.
- †TP 134. Explosibility of Gases from Mine Fires, by G. A. Burrell and G. G. Oberfell. 1915. 31 pp., 1 fig. Presents the results of observations of gases produced during mine fires and the tendency of such gases to form explosive mixtures. Superseded by B 279 and TP 450.
- †TP 135. Bibliography of Recent Literature on Flotation of Ores, January to June 1916, compiled by D. A. Lyon, O. C. Ralston, F. B. Laney, and R. S. Lewis. 1917. 20 pp.
- †TP 136. Safe Practice at Blast Furnaces; Manual for Foremen and Men, by F. H. Willcox. 1916. 73 pp., 1 pl., 43 figs. Studies the causes of accidents and methods for their prevention.
- TP 137. Combustion in the Fuel Bed of Hand-Fired Furnaces, by Henry Kreisinger, F. K. Ovitz, and C. E. Augustine. 1916. 76 pp., 2 pls., 21 figs. Discusses feeding coal and air in four types of commercial furnaces. Describes the gas-sampling and temperature measurements at various depths in fuel bed. Shows relations between air supply and rate of combustion. 15 cents.
- †TP 138. Suggested Safety Rules for Installing and Using Electrical Equipment in Bituminous-Coal Mines, by H. H. Clark and C. M. Means. 1916. 36 pp. Superseded by TP 402.
- TP 139. Low-Rate Combustion in Fuel Beds of Hand-Fired Furnaces, by Henry Kreisinger, C. E. Augustine, and S. H. Katz. 1918. 54 pp., 19 figs. Discusses the process of combustion in fuel beds of different thicknesses for correct design of coal-burning grates to avoid clinker troubles that attend fusibility of ash. 10 cents.
- †TP 140. The Primary Volatile Products of the Carbonization of Coal; A Sequel to B 1, The Volatile Matter of Coal, by G. B. Taylor and H. C. Porter. 1916. 59 pp., 1 pl., 25 figs. Treats experiments with four different coals and the volatile products obtained by distillation at different temperatures.
- TP 141. Laboratory Determination of the Explosibility of Coal Dust and Air Mixtures, by J. K. Clement and J. N. Lawrence. 1917. 35 pp., 1 pl., 15 figs. Explains laboratory tests in which pressure developed by combustion of dust is taken as measure of inflammability. 10 cents.
- †TP 142. Vapor Pressure of Various Compounds at Low Temperatures, by G. A. Burrell and I. W. Robertson. 1916. 32 pp., 10 figs. Experiments with ethane, ethylene, propane, propylene, butane, acetylene, ammonia, sulphur dioxide, and nitrous oxide.

- †TP 143. The Ores of Copper, Lead, Gold, and Silver, by C. H. Fulton. 1916. 45 pp. Classifies ore types on a metallurgical basis.
- TP 144. The Quick Determination of Incombustible Matter in Coal and Rock Dust Mixtures in Mines, by A. C. Fieldner, W. A. Selvig, and F. D. Osgood. 1918. 36 pp., 1 pl., 10 figs. Describes use of rock dust to prevent coal-dust explosions. Explains the use of modified portable Taffanel volumeter. 10 cents.
- TP 145. Sensitiveness to Detonation of Trinitrotoluene and Tetranitromethylanilin, by G. B. Taylor and W. C. Cope. 1916. 13 pp., 1 fig. 5 cents.
- †TP 146. The Nitration of Toluene, by E. J. Hoffman. 1916. 32 pp. Discusses experiments and outlines most favorable method.
- †TP 147. The Absorption of Methane and Other Gases by Coal, by S. H. Katz. 1917. 22 pp., 4 figs.
- †TP 148. The Determination of Moisture in Coke, by A. C. Fieldner and W. A. Selvig. 1917. 14 pp.
- †TP 149. Answers to Questions on the Flotation of Ores, by O. C. Ralston. 1917. 30 pp. Gives information regarding many points not discussed at length in existing literature.
- †TP 150. Limits of Complete Inflammability of Mixtures of Mine Gases and of Industrial Gases with Air, by G. A. Burrell and A. W. Gauger. 1917. 13 pp., 2 figs. Gives explosive limits for methane, acetylene, ethane, hydrogen, carbon monoxide, illuminating gas, natural gas, and blast-furnace gas.
- †TP 151. Coke-Oven Accidents in the United States During the Calendar Year 1915, compiled by A. H. Fay. 1916. 18 pp.
- †TP 152. The Inflammability of Aluminum Dust, by Alan Leighton. 1918. 15 pp. Discusses physical and chemical properties of aluminum dust, with especial regard to inflammability, and gives precautions for preventing fire and explosions.
- TP 153. Occurrence and Mitigation of Injurious Dusts in Steel Works, by J. A. Watkins. 1917. 20 pp., 4 pls. Discusses sources of dust, injurious effects of different dusts, and methods of abatement. 10 cents.
- TP 154. Suggestions for Improved Methods of Mining Coal on Indian Lands in Oklahoma, by J. J. Rutledge and Daniel Harrington. 1918. 36 pp., 8 pls., 4 figs. Describes systems used, points out defects, and suggests improvements, especially in the use of modified panel systems. 10 cents.
- †TP 155. Gypsum Products, Their Preparation and Uses, by R. W. Stone. 1917. 67 pp., 9 pls., 10 figs. Describes methods of quarrying and dehydrating gypsum, equipment of plants, and gypsum resources of the United States.
- †TP 156. Carbon Monoxide Poisoning in the Steel Industry, by J. A. Watkins. 1917. 19 pp., 1 fig. Discusses effects and methods of reducing hazards.
- †TP 157. A Method for Measuring the Viscosity of Blast-Furnace Slag at High Temperature, by A. L. Feild. 1916. 29 pp., 1 pl., 7 figs. Describes a new method for determining viscosity and the development of a suitable electric furnace. A number of viscosity measurements illustrate application of the method.
- †TP 158. Compressibility of Natural Gas and Its Constituents, with Analyses of Natural Gas from 31 Cities in the United States, by G. A. Burrell and I. W. Robertson. 1917. 16 pp., 9 figs.
- †TP 159. Production of Explosives in the United States During the Calendar Year 1915, with Notes on Coal-Mine Accidents Due to Explosives, and a List of Permissible Explosives, Lamps, and Motors Tested Prior to May 1, 1916, compiled by A. H. Fay. 1916. 24 pp.
- †TP 160. The Determination of Nitrogen in Substances Used in Explosives, by W. C. Cope and G. B. Taylor. 1917. 46 pp., 1 pl., 4 figs. Discusses Dumas, Kjeldahl, and phosphorus iodide methods for nitrogen and use of nitrometers; contains useful tables.
- †TP 161. Construction and Operation of a Single-Tube Cracking Furnace for Making Gasoline, by C. P. Bowie. 1916. 16 pp., 10 pls. Outlines principles involved in the cracking of oils and distillate by the Rittman process; describes construction of furnace used and gives details of operations.
- †TP 162. Initial Priming Substances for High Explosives, by G. B. Taylor and W. C. Cope. 1917. 32 pp. Describes the development of primers for high explosives and explains initial priming substances and results of experiments.

† Out of print.

- †TP 163. Physical and Chemical Properties of Gasoline Sold Throughout the United States During the Calendar Year 1915, by W. F. Rittman, W. A. Jacobs, and E. W. Dean. 1916. 45 pp., 4 figs. Gives results of testing 52 samples of gasoline; also specifications for purchase and sale of gasoline.
- †TP 164. Accidents at Metallurgical Works in the United States During the Calendar Year 1915, compiled by A. H. Fay. 1916. 20 pp. This is the second report on accidents at metallurgical works. The data presented have been collected with the cooperation of the officials and managers of metallurgical companies.
- †TP 165. Quarry Accidents in the United States During the Calendar Year 1915, compiled by A. H. Fay. 1917. 77 pp., 1 pl.
- †TP 166. Motor Gasoline; Properties, Laboratory Methods of Testing, and Practical Specifications, by E. W. Dean. 1917. 27 pp., 1 pl. A concise statement of the problem of gasoline specifications, with recommendations.
- †TP 167. Men Who Received Bureau of Mines Certificates of Mine Rescue Training, July 1, 1914, to June 30, 1916, by D. J. Parker. 1917. 66 pp. Contains names and addresses of the men who received certificates.
- †TP 168. Metal-Mine Accidents in the United States During the Calendar Year 1915, compiled by A. H. Fay. 1917. 114 pp., 2 figs.
- †TP 169. Permissible Explosives Tested Prior to January 1, 1917, by S. P. Howell. 1917. 19 pp., 1 fig.
- TP 170. The Diffusion of Oxygen Through Stored Coal, by S. H. Katz. 1917. 48 pp., 1 pl., 27 figs. Discusses experiments to determine the effects of the size of the coal pieces and the proportion of voids in a coal pile on the rate at which oxygen can travel by diffusion from the air around the pile to the coal within. 10 cents.
- †TP 171. Method of Least Squares Applied to Estimating Errors in Coal Analysis, by J. D. Davis and J. G. Fairchild. 1918. 36 pp., 1 pl., 5 figs. Discusses the probable limits of error in analyzing samples of coal and shows how the method of least squares should be applied.
- †TP 172. Effects of Moisture on the Spontaneous Heating of Stored Coal, by S. H. Katz and H. C. Porter. 1917. 25 pp., 1 pl., 8 figs. Explains method of experiment and describes apparatus used.
- †TP 173. Coke-Oven Accidents in the United States During the Calendar Year 1916, compiled by A. H. Fay. 1917. 22 pp.
- †TP 174. Suggestions for the Safe Operation of Gasoline Engines in Mines, by R. H. Kudlich and Edwin Higgins. 1917. 19 pp., 3 figs. Discusses especially the conditions under which the operation of gasoline motors fouls the mine air.
- †TP 175. Production of Explosives in the United States During the Calendar Year 1916, compiled by A. H. Fay. 1917. 24 pp.
- †TP 176. Bibliography of Recent Literature on Flotation of Ores, July to December 31, 1916, by D. A. Lyon, O. C. Ralston, F. B. Laney, and R. S. Lewis. 1917. 27 pp.
- †TP 177. Preparation of Ferro-Uranium, by H. W. Gillett and E. L. Mack. 1917. 46 pp., 2 figs. Refers to importance of uranium as an alloy in steel and describes experiment in producing ferro-uranium in an electric furnace.
- †TP 178. Notes on Lignite: Its Characteristics and Utilization, by S. M. Darling. 1919. 11 pp. Reviews status of lignite utilization in the United States.
- †TP 179. Preparedness Census of Mining Engineers, Metallurgists, and Chemists, by A. H. Fay. 1917. 19 pp.
- TP 180. Firing Bituminous Coals in Large House-Heating Boilers, by S. B. Flagg. 1917. 22 pp., 1 pl., 16 figs. Describes experiments to determine best methods of firing coal and savings to be effected. 5 cents.
- †TP 181. Determination of Unsaturated Hydrocarbons in Gasoline, by E. W. Dean and H. H. Hill. 1917. 25 pp. Describes various laboratory methods studied and experiments made in the pressure-cracking process in gasoline production.
- †TP 182. Flotation of Chalcopyrite in Chalcopyrite-Pyrrhotite Ores of Southern Oregon, by W. H. Coghill. 1918. 13 pp., 1 fig. Presents a preliminary report on experiments on certain low-grade ores for the separation of sulphides by flotation.

- †TTP 183. New Views of the Combustion of the Volatile Matter in Coal, by S. H. Katz. 1918. 15 pp., 1 fig. Deals with the volatilization of the hydrocarbons in coal and the burning of the volatile matter in the combustion space of the furnace.
- †TTP 184. Weights of Various Coals, by S. B. Flagg. 1918. 14 pp.
- †TTP 185. Use of the Interferometer in Gas Analysis, by F. M. Seibert and W. C. Harpster. 1918. 18 pp., 1 pl., 5 figs. Describes the outcome of investigations made by the Bureau of Mines in connection with work on mine gases and natural gas.
- †TTP 186. Methods for Routine Work in the Explosives Physical Laboratory of the Bureau of Mines, by S. P. Howell and J. E. Tiffany. 1918. 63 pp. Describes laboratory methods used; gives precautions to be observed in handling, storage, and use of explosives, and useful tables in explosives testing.
- †TTP 187. Slag Viscosity Tables for Blast-Furnace Work, by A. L. Feild and P. H. Royster. 1918. 38 pp., 1 fig. Gives data to help blast-furnace operators to reduce losses caused by off-grade pig iron, to improve fuel economy, and to extend present-day practice to meet the increasing need of smelting lean and complex ores.
- †TTP 188. Corrosion Under Oil Films, with Special Reference to the Cause and Prevention of the After Corrosion of Firearms, by W. J. Huff. 1922. 26 pp., 4 pls. Presents the results of experiments made and discusses the prevention of after corrosion.
- TTP 189. Temperature-Viscosity Relations in the Ternary System $\text{CaO-Al}_2\text{O}_3\text{-SiO}_2$, by A. L. Feild and P. H. Royster. 1919. 36 pp., 1 pl., 16 figs. Gives properties of certain silicates at high temperatures, confined to that range of composition found in iron blast-furnace slags. Results have a direct relation to many problems outside the field of iron metallurgy. 5 cents.
- †TTP 190. Methane Accumulations from Interrupted Ventilation, with Special Reference to Coal Mines in Illinois and Indiana, by H. I. Smith and R. J. Hamon. 1918. 46 pp., 2 pls., 5 figs. Describes causes of methane accumulations in mines. Explains tests to determine the rate of accumulation when ventilation is interrupted. Suggests means to prevent accidents.
- †TTP 191. Central-Station Heating: Its Economic Features with Reference to Community Service, by J. C. White. 1918. 23 pp., 6 figs. Discusses the economies that can be effected by central heating stations.
- †TTP 192. Production of Explosives in the United States During the Calendar Year 1917, with Notes on Coal-Mine Accidents Due to Explosives and List of Permissible Explosives Tested Prior to April 30, 1918, compiled by A. H. Fay. 1918. 21 pp.
- †TTP 193. Quarry Accidents in the United States During the Calendar Year 1916, compiled by A. H. Fay. 1918. 58 pp.
- TTP 194. Report of the Committee on the Standardization of Mining Statistics, compiled by A. H. Fay. 1918. 39 pp. 5 cents.
- †TTP 195. The Tars Distilled from Bituminous Coal in Hand-Fired Furnaces, by S. H. Katz. 1918. 20 pp., 2 pls., 3 figs. Describes treatment of samples and the methods of conducting experiments.
- †TTP 196. Notes on the Black Sand Deposits of Southern Oregon and Northern California, by R. R. Hornor. 1918. 42 pp., 8 pls. Describes examinations made to determine whether deposits contain sufficient platinum and gold to be profitable and to discover if any iron minerals were present.
- TTP 197. Use of the Hydrogen-Volatile Matter Ratio in Obtaining the Net Heating Values of American Coals, by A. C. Fieldner and W. A. Selvig. 1918. 13 pp., 4 figs. 5 cents.
- †TTP 198. Sulphur Dioxide Method for Determining Copper Minerals in Partly Oxidized Ores, by C. E. van Barneveld and E. S. Leaver. 1918. 14 pp., 1 fig. Explains methods for the selective determination of the quantity of copper in the sulphide form and in the form of combined oxides, carbonates, silicates, and native or metallic copper, in partly oxidized ores and in mill products from these ores.
- †TTP 199. Five Ways of Saving Fuel in Heating Houses, by Henry Kreisinger. 1918. 13 pp., 1 fig. Briefly shows how coal can be saved.

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- †TP 200. Colloids and Flotation, by F. G. Moses. 1918. 24 pp. Discusses the properties of colloids and the relation of these properties to various problems in the flotation of ores.
- †TP 201. Accidents at Metallurgical Works in the United States During the Calendar Year 1916, compiled by A. H. Fay. 1918. 18 pp.
- †TP 202. Metal-Mine Accidents in the United States During the Calendar Year 1916, compiled by A. H. Fay. 1918. 91 pp.
- †TP 203. Labor Saving at Limestone Quarries, by Oliver Bowles. 1919. 26 pp. Points out the necessity of reducing labor costs at quarries and calls attention to various labor-saving methods and devices.
- TP 204. Economic Operation of Steam Turbo-Electric Stations, by C. T. Hirshfeld and C. L. Karr. 1918. 29 pp., 5 figs. Discusses the economies to be effected in the use of fuel through changes in operating methods at large power plants having turbogenerators. 5 cents.
- †TP 205. Saving Coal in Boiler Plants, by Henry Kreisinger. 1918. 24 pp., 3 figs. Describes methods to reduce the consumption of coal without impairing efficiency.
- †TP 206. Coke-Oven Accidents in the United States During the Calendar Year 1917, by A. H. Fay. 1918. 19 pp.
- †TP 207. Combustion Experiments with North Dakota Lignite, by Henry Kreisinger, C. E. Augustine, and W. C. Harpster. 1919. 44 pp., 1 pl., 13 figs. Gives results of combustion tests of lignite burned in two forms and suggests improvement in design of furnaces for efficient combustion.
- †TP 208. How to Improve the Hot-Air Furnace, by C. W. Baker. 1918. 20 pp. Shows how fuel can be saved in heating houses with hot air and discusses some methods of humidifying the air of rooms thus heated.
- †TP 209. Traps for Saving Gas at Oil Wells, by W. R. Hamilton. 1919. 34 pp., 3 pls., 16 figs. Discusses construction and advantages of gas traps and their effect upon the yield of oil and gas.
- †TP 210. An Analytical Method for Detecting Blown-Out Shots in Coal Mines, by G. F. Hutchinson and J. Barab. 1919. 22 pp. Shows how blown-out shots may be detected by an analysis of the products of combustion left in the borehole.
- †TP 211. Approximate Quantitative Microscopy of Powdered Ores, Including the Use of the Camera Lucida, by W. H. Coghill and J. P. Bonardi. 1919. 20 pp., 3 pls. Shows how the microscope can be an aid in the milling of ores.
- †TP 212. The Determination of Combustible Matter in Silicate and Carbonate Rocks, by A. C. Fieldner, W. A. Selvig, and G. B. Taylor. 1919. 22 pp., 1 fig. Discusses procedure for combustible matter determination and summarizes results obtained.
- †TP 213. Quarry Accidents in the United States During the Calendar Year 1917, compiled by A. H. Fay. 1919. 62 pp.
- †TP 214. Motor Gasoline; Properties, Laboratory Methods of Testing, and Practical Specifications, by E. W. Dean. 1919. 33 pp., 2 figs. See TP 323B.
- †TP 215. Accidents at Metallurgical Works in the United States During the Calendar Year 1917, compiled by A. H. Fay. 1919. 23 pp.
- TP 216. Vitiating of Garage Air by Automobile Exhaust Gases, by G. A. Burrell and A. W. Gauger. 1919. 12 pp. Points out the danger of running automobile engines in garages. 5 cents.
- TP 217. Saving Coal in Steam Power Plants, by United States Fuel Administration. 1918. 8 pp., 1 pl., 1 fig. Contains instructions for engineers and firemen. 5 cents.
- †TP 218. Boiler-Water Treatment, by United States Fuel Administration. 1919. 8 pp., 1 fig. Discusses best methods and treatment.
- TP 219. Combustion and Flue-Gas Analysis, by United States Fuel Administration. 1919. 12 pp., 5 figs. Described gas-analysis apparatus and method of use; calls attention to economies that can be effected in the use of fuel. 5 cents.
- TP 220. Burning Steam Sizes of Anthracite With or Without Admixture of Soft Coal, by United States Fuel Administration. 1919. 8 pp. Shows how the fuels can be burned most efficiently. 5 cents.

- TP 221. Saving Steam in Industrial Heating Systems, by United States Fuel Administration. 1919. 13 pp., 5 figs. Suggests improvements in the design and operation of steam-heating plants. 5 cents.
- †TP 222. Method of Administering Leases of Iron-Ore Deposits Belonging to the State of Minnesota, by J. R. Finlay. 1919. 40 pp., 1 fig. Deals with grades of ore, method of determining royalties, and the fairness of present methods to the landowner and the mine operator.
- †TP 223. Cost Keeping for Small Metal Mines, by J. C. Pickering. 1919. 46 pp. Discusses accounting methods and gives samples of forms suitable for small mines.
- †TP 224. Metal-Mine Accidents in the United States During the Calendar Year 1917, by A. H. Fay. 1919. 80 pp.
- TP 225. The Vapor Pressure of Lead Chloride, by E. D. Eastman and L. H. Duschak. 1919. 16 pp., 2 pls., 2 figs. Discusses results of experiments at the Berkeley (Calif.) station of the Bureau of Mines. 5 cents.
- †TP 226. Men Who Received Bureau of Mines Certificates of Mine Rescue Training, July 1, 1916, to June 30, 1918, by D. J. Parker. 1919. 72 pp.
- †TP 227. The Determination of Mercury, by C. M. Bouton, and L. H. Duschak. 1920. 44 pp., 2 pls., 1 fig. Describes rapid and accurate method for determination of mercury in ores and in fume from volatilization plants.
- TP 228. The Relative Safety of Brass, Copper, and Steel Gauzes in Miners' Flame Safety Lamps, by L. C. Ilsley and A. B. Hooker. 1921. 29 pp., 7 pls., 1 fig. Gives results of experiments and suggests materials to be used. 10 cents.
- †TP 229. Accident Prevention in the Mines of Butte, Mont., by D. Harrington. 1920. 59 pp., 2 pls. Describes safety systems and methods employed. Suggests means by which accidents may be prevented.
- †TP 230. Determination of Molybdenum, by J. P. Bonardi and C. P. Barrett. 1920. 35 pp. Describes the volumetric and gravimetric method for the determination of molybdenum in ores.
- †TP 231. Production of Explosives in the United States During the Calendar Year 1918, with Notes on Coal-Mine Accidents Due to Explosives and List of Permissible Explosives Tested Prior to March 31, 1919, compiled by A. H. Fay. 1919. 21 pp.
- †TP 232. Absorption as Applied to Recovery of Gasoline Left in Residual Gas from Compression Plants, by W. P. Dykema and R. O. Neal. 1920. 43 pp., 6 pls., 10 figs. Points advantage of using absorption process to recover small percentages of gasoline from residual gases.
- †TP 233. The Properties of Some Stoneware Clays, by H. G. Schurecht. 1920. 41 pp., 1 pl., 23 figs. Presents results of investigations as to the use of clays and occurrence of the clays investigated.
- †TP 234. Sensitiveness of Explosives to Frictional Impact, by S. P. Howell. 1919. 17 pp., 2 pls., 1 fig. Describes frictional impact machine used by the Bureau of Mines and points out its value for testing explosives.
- TP 235. Safe Storage of Coal, by H. H. Stoek. 1920. 10 pp. Discusses the advantages of storing coal and points out precautions to be observed. 5 cents.
- †TP 236. Abatement of Corrosion in Central Heating Systems, by F. N. Speller. 1919. 12 pp., 2 figs. Discusses corrosion and shows how it can be readily abated by a simple method of deoxidizing the water.
- †TP 237. Safe Practice in Using Wire Ropes in Mines, by O. P. Hood and R. H. Kudlich. 1919. 11 pp. Gives precautions to be observed and reasons for them.
- †TP 238. Indicators for Carbon Dioxide and Oxygen in Air and Flue Gas, by L. H. Milligan, D. O. Crites, and W. S. Wilson. 1920. 23 pp., 3 pls., 12 figs. Discusses importance of quick methods of determining the proportions of carbon dioxide and of oxygen in the atmosphere of mines and elsewhere and describes apparatus.
- †TP 239. Coke-Oven Accidents in the United States During the Calendar Year 1918, by A. H. Fay. 1919. 26 pp.
- TP 240. Boiler and Furnace Testing, by R. T. Strohm. 1920. 23 pp., 3 figs. Shows necessity for testing boilers and describes method. 5 cents.
- †TP 241. Blowholes, Porosity, and Unsoundness in Aluminum Castings, by R. J. Anderson. 1919. 34 pp., 5 pls., 1 fig. Gives results of investigations by the Bureau of Mines at its Pittsburgh Experiment Station.

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- †TP 242. Why and How Coke Should be Used for Domestic Heating, by Henry Kreisinger and A. C. Fieldner. 1919. 20 pp., 1 fig. Describes advantages of coke as a fuel and points out how coke should be burned in heating houses.
- †TP 243. Development of Liquid Oxygen Explosives During the War, by G. S. Rice. 1920. 46 pp., 2 pls., 6 figs. Gives results of experiments and describes equipment used. See TP 294.
- †TP 244. Use of Stenches as a Warning in Mines, by S. H. Katz, V. C. Allison, and W. L. Egy. 1920. 31 pp., 1 pl., 4 figs. Describes apparatus; gives results of tests and a discussion of their practical application to operating conditions. See TP 267.
- †TP 245. Quarry Accidents in the United States During the Calendar Year 1918, by A. H. Fay. 1920. 52 pp.
- †TP 246. Water-Gas Apparatus and the Use of Central District Coal as Generator Fuel, by W. W. Odell. 1921. 28 pp., 1 pl., 2 figs. Discusses tests made while considering the possibility of substituting Indiana and Illinois coal for coke in water-gas generator sets and describes apparatus.
- TP 247. Perforated Casing and Screen Pipe in Oil Wells, by E. W. Wagy. 1920. 48 pp., 6 pls., 12 figs. Describes methods of applying perforation principles and discusses their advantages and disadvantages. 20 cents.
- †TP 248. Gas Masks for Gases Met in Fighting Fires, by A. C. Fieldner, S. H. Katz, and S. P. Kinney, with a chapter on the Effects of Gases on Men and the Treatment of Various Forms of Gas Poisoning, by Yandell Henderson. 1921. 56 pp., 9 pls., 5 figs. Gives information regarding the use of the Army type of mask in mines, in mineral industries, and in fire fighting. Describes breathing apparatus other than gas masks, most of the gases met in the industries, and method of treating persons who have been gassed.
- †TP 249. The Determination of Oxides of Nitrogen, by V. C. Allison, W. L. Parker, and G. W. Jones. 1921. 13 pp., 2 figs. Describes method; discusses physiological effects of oxides of nitrogen, symptoms of poisoning by fumes and treatment.
- †TP 250. Metal-Mine Accounting, by C. B. Holmes. 1920. 63 pp. Discusses accounting methods and gives samples of forms and vouchers.
- †TP 251. Ventilation in Metal Mines, a Preliminary Report, by D. Harrington. 1921. 44 pp. Shows the advantage of good ventilation and treats of related metal-mining subjects dealing with the health and efficiency of miners.
- †TP 252. Metal-Mine Accidents in the United States During the Calendar Year 1918, compiled by A. H. Fay. 1920. 113 pp.
- TP 253. Effects of Gasoline Removal on the Heating Value of Natural Gas, by D. B. Dow. 1920. 23 pp., 2 figs. Presents data on heating values of gas before and after treatment and gives analyses of gas samples. Discusses advantages and disadvantages of gasoline plants in their effects on heating value of the gas treated, the function of such plants with respect to maintenance of pressure in gasolines, and the losses by leakage. 5 cents.
- †TP 254. The Analysis of Sulphur Forms in Coal, by A. R. Powell. 1921. 21 pp., 1 fig. Discusses methods used in experiments.
- TP 255. Chlorination of Natural Gas, by G. W. Jones, V. C. Allison, and M. H. Meighan. 1921. 44 pp., 9 figs. Describes apparatus used in experiments with the so-called "dry gases." 10 cents.
- †TP 256. Accidents at Metallurgical Works in the United States During the Calendar Year 1918, compiled by A. H. Fay. 1920. 23 pp.
- †TP 257. Waste and Correct Use of Natural Gas in the Home, by S. S. Wyer. 1920. 23 pp. 7 figs. Points out the necessity of checking natural-gas waste and gives information as to its correct use in the home.
- †TP 258. Production of Gasoline by Cracking Heavier Oils, by E. W. Dean and W. A. Jacobs. 1922. 56 pp., 5 figs. Describes in detail experiments made and gives a concise statement of important facts not generally recognized by those developing or operating cracking processes.
- †TP 259. Production of Explosives in the United States During the Calendar Year 1919, with Notes on Coal-Mine Accidents Due to Explosives and a List of Permissible Explosives Tested to March 31, 1920, by W. W. Adams. 1920. 31 pp.

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- †TP 260. Miners' Consumption in the Mines of Butte, Mont., by D. Harrington and A. J. Lanza. 1921. 19 pp. Reviews the general results of investigations of miners' consumption in the years 1916 to 1919 and recommends methods to decrease health hazards.
- TP 261. Oil-Camp Sanitation, by C. P. Bowie. 1921. 32 pp., 3 pls., 4 figs. Describes sanitation conditions at "boom" oil camps and improvements by which the working efficiency of the men would be increased. 10 cents.
- TP 262. Certain Interfacial Tension Equilibria Important in Flotation, by W. H. Coghill and C. O. Anderson. 1928. 55 pp., 1 pl., 20 figs. Discusses graphic analysis of the interfacial forces acting at the common meeting line of three immiscible fluids (a gas, such as air, being regarded as one of the fluids) in contact with each other. 10 cents.
- †TP 263. Design and Operation of a Low-Pressure Absorption Plant, by W. P. Dykema and A. A. Chenoweth. 1923. 55 pp., 1 pl., 20 figs. Deals with the main features and operation of plant at the Cushing oil field in Oklahoma and presents data on the latent heat of absorbed gases and a proposed means of overcoming the increase in temperature of the oil as it circulates through the towers.
- †TP 264. Preliminary Investigations of Storage-Battery Locomotives: Specifications, Laboratory Tests, Permissible Schedule, by L. C. Ilsley and H. B. Brunot. 1920. 35 pp., 2 pls., 4 figs. Deals with the development of specifications for Schedule 15 and gives data to assist those who are developing apparatus to meet the requirements of this schedule.
- TP 265. Mesothorium, by Herman Schlundt. 1922. 57 pp., 4 figs. Gives a review of the published investigations on mesothorium, with a list of references and results of experiments during the year 1917-18 at the Golden, (Colo.) station of the Bureau of Mines and at the plant of the Welsbach Co., Gloucester, N. J. 10 cents.
- †TP 266. Coke-Oven Accidents in the United States During the Calendar Year 1919, by W. W. Adams. 1920. 25 pp.
- †TP 267. Stenches for Detecting Leakage of Blue Water Gas and Natural Gas by S. H. Katz and V. C. Allison. 1920. 22 pp., 2 figs. Supplements information contained in TP 244.
- TP 268. Preparation and Uses of Tar and Its Simple Crude Derivatives, by W. W. Odell. 1922. 84 pp., 4 pls., 11 figs. Constitutes a general treatise on the utilization of coal tars and water-gas tar. 15 cents.
- †TP 269. Analyses of Iowa Coals. 1921. 28 pp. Gives analyses and describes samples.
- †TP 270. The Detection and Estimation of Platinum in Ores, by C. W. Davis. 1921. 27 pp. Is intended as a ready reference to assayers; summarizes methods for the detection of the metal and gives a selected method for the commercial estimation of platinum in ores.
- †TP 271. State Mining Laws on the Use of Electricity in and about Coal Mines, by L. C. Ilsley. 1920. 53 pp., 1 fig. Shows by comparison the relative attention given by the law-making bodies of the different States to safe use of electricity in coal mines, and lists and explains purpose of the more important regulations. Cites examples of regulations now in effect.
- TP 272. Permeation of Oxygen Breathing Apparatus by Gases and Vapors, by A. C. Fieldner, S. H. Katz, and S. P. Kinney. 1921. 24 pp., 4 pls., 3 figs. Gives results of tests. 10 cents.
- TP 273. Smoke Abatement, by Osborn Monnett. 1923. 31 pp., 12 pls., 4 figs. Calls attention to the need of civic interest in smoke abatement. Discusses effect of atmosphere pollution upon health, vegetation, and property and gives results of experiments. 15 cents.
- TP 274. Efficiencies in the Use of Bituminous Coking Coal as Water-Gas Generator Fuel, by W. W. Odell. 1923. 39 pp., 1 pl., 9 figs. Gives details of experiments conducted with coal generator fuel to determine the advantages of using bituminous coal. See TP 284. 10 cents.
- †TP 275. Quarry Accidents in the United States During the Calendar Year 1919, by W. W. Adams. 1921. 66 pp.
- †TP 276. Safe Mechanical Equipment for Use in Shaft Sinking, by R. H. Kudlich. 1922. 12 pp., 1 pl., 6 figs. Recommends the use of equipment and gives precautions that should be followed to reduce hoisting dangers in shaft sinking.

† Out of print.

- †TP 277. Application of the Geophone to Mining Operations, by Alan Leighton. 1922. 33 pp., 2 pls., 14 figs. Describes the geophone; gives instructions for its use and results of experiments.
- TP 278. The Sugar-Tube Method of Determining Rock Dust in Air, by A. C. Fieldner, S. H. Katz, and E. S. Longfellow. 1921. 42 pp., 2 pls., 9 figs. Describes tests and apparatus used. 10 cents.
- TP 279. The Economic Combustion of Waste Fuels, by D. M. Myers. 1922. 51 pp., 20 figs. Discusses waste fuels, methods of combustion, and describes furnaces. 10 cents.
- †TP 280. Accidents at Metallurgical Works in the United States During the Calendar Year 1919, by W. W. Adams. 1921. 31 pp.
- †TP 281. Use of Electrolytes in the Purification and Preparation of Clays by H. G. Schurecht. 1922. 47 pp., 1 pl., 25 figs. Deals with the relation between the percentage of alkali necessary to maintain minimum viscosity in clay slips. Gives results of tests. Points out precautions necessary in purification of clays and methods for changing their properties by special treatments in their preparation.
- †TP 282. Analysis of Detonating and Priming Mixtures, by C. H. Taylor and W. H. Rinkenbach. 1922. 33 pp., 1 pl., 2 figs. Describes methods used in practical work. Is intended especially for chemists analyzing explosive compositions and desirous of results that are accurate within the limits of the variation of the mixtures themselves.
- TP 283. Tests of Low-Grade and Complex Ores in Colorado, by W. H. Coghill and C. O. Anderson. 1933. 67 pp., 4 figs. Describes results of joint investigation and experimentation of the Bureau of Mines and the Colorado School of Mines. 10 cents.
- †TP 284. Coal and Coke Mixtures as Water-Gas Generator Fuel, by W. W. Odell. 1921. 32 pp., 4 pls., 2 figs. Presents the results of experiments conducted to determine the effect of a stand-over period on capacity and possibilities in the use of the blow-run method of operating with mixed fuels, coal, and coke. See TP 274.
- †TP 285. Compressed-Air Illness and Its Engineering Importance, with a Report of Cases at the East River Tunnels, by Edward Levy. 1922. 44 pp., 13 pls., 10 figs. Deals with physiological problems arising in mining and underground engineering developments.
- †TP 286. Metal-Mine Accidents in the United States During the Calendar Year 1919, by W. W. Adams. 1921. 99 pp.
- TP 287. Preparation of Light Aluminum-Copper Casting Alloys, by R. J. Anderson. 1922. 44 pp., 6 pls., 1 fig. Outlines principles involved; discusses methods employed and results of experiments. 10 cents.
- TP 288. Coal-Mine Fatalities in the United States, 1920, and Coal-Mine Statistics Supplementing Those Published in Bulletin 115, by W. W. Adams. 1921. 112 pp. 15 cents.
- TP 289. Change Houses in the Lake Superior Region, by C. E. Kindall. 1923. 31 pp., 12 pls., 9 figs. Describes types of houses and recommends improvements in construction and equipment. 15 cents.
- TP 290. Inclusions in Aluminum-Alloy Sand Castings, by R. J. Anderson. 1922. 25 pp., 7 pls. Gives analysis of information gathered from a number of aluminum-alloy foundries. Presents results of examination of samples of castings and suggests methods to prevent hard spots. 10 cents.
- †TP 291. The Production of Explosives in the United States During the Calendar Year 1920, with Notes on Mine Accidents Due to Explosives, by W. W. Adams. 1921. 44 pp., 4 figs.
- TP 292. Tests of Gas Masks and Respirators for Protection from Locomotive Smoke in Railroad Tunnels, with Analyses of Tunnel Atmospheres, by A. C. Fieldner, S. H. Katz, and S. P. Kinney. 1922. 27 pp., 3 pls., 3 figs. Describes tests made at the Pittsburgh Experiment Station of the Bureau of Mines and in tunnels. Discusses physiological effects of flue-gas constituents, symptoms of poisoning, and first-aid treatment. Describes type of mask best suited for use in tunnels. 10 cents.
- †TP 293. Coke-Oven Accidents in the United States During the Calendar Year 1920, by W. W. Adams. 1921. 32 pp.
- TP 294. Progress of Investigations on Liquid Oxygen Explosives, by S. P. Howell, J. W. Paul, and J. L. Sherrick. 1923. 91 pp., 6 pls., 18 figs. Describes tests and discusses results. See TP 243. 15 cents.

† Out of print.

- †TP 295. Quarry Accidents in the United States During the Calendar Year 1920, by W. W. Adams. 1922. 66 pp.
- TP 296. Size and Character of Grains of Nonmetallic Mineral Fillers, by W. M. Weigel. 1924. 44 pp., 14 pls., 6 figs. Gives in detail a method for the fairly rapid determination of the average particle size of finely ground minerals where the limiting range of size is so large as to make ordinary methods of microscopic measurement impracticable, also where the particles are nearly all too small for analysis by sieves. 15 cents.
- †TP 297. Accidents at Metallurgical Works in the United States During the Calendar Year 1920, by W. W. Adams. 1922. 28 pp.
- †TP 298. Methods for Testing Petroleum Products, a Handbook for Testing Laboratories, adopted by the Interdepartmental Petroleum Specifications Committee. 1922. 58 pp., 21 figs. See TP 323B for later data on methods.
- †TP 299. Metal-Mine Accidents in the United States During the Calendar Year 1920, by W. W. Adams. 1922. 99 pp.
- TP 300. The Universal and the Fireman's Gas Masks, by S. H. Katz, J. J. Bloomfield, and A. C. Fieldner. 1923. 22 pp., 2 pls., 6 figs. Describes gas masks suitable for use in metallurgical, chemical, and other industries where noxious gases or fumes occur and outlines test requirements for all gas masks used by the Bureau of Mines in its investigations. 5 cents.
- TP 301. Proposed Method for Reducing Mineral Waste in the Wisconsin Zinc District, Wisconsin, by W. H. Coghill and C. O. Anderson. 1922. 66 pp. Gives the results of an investigation to reduce waste in the mining and treatment of lead and zinc ores in the district and suggests improvements in methods of milling. 10 cents.
- †TP 302. Coal-Mine Fatalities in the United States, 1921, by W. W. Adams. 1922. 72 pp.
- †TP 303. Value of Coke, Anthracite, and Bituminous Coal for Generating Steam in a Low-Pressure Cast-Iron Boiler, by John Blizard, James Neil, and F. C. Houghton. 1922. 56 pp., 22 figs. Discusses results of tests and describes the boiler used.
- TP 304. Water-Gas Tar Emulsions, by W. W. Odell. 1923. 51 pp., 6 figs. Presents a laboratory study of tars and emulsions collected from different plants and produced under different operating conditions. 10 cents.
- †TP 305. Specifications for Petroleum Products Adopted by the Interdepartmental Petroleum Specifications Committee. Effective January 23, 1922; amended March 1, 1922. 1922. 40 pp. Superseded by TP 323B.
- TP 306. Operation and Maintenance of Electrical Equipment Approved for Permissibility by the Bureau of Mines, by L. C. Hsley. 1922. 23 pp., 2 figs. Gives detailed instructions for maintenance of permissible equipment. Calls attention to rules relating to specific schedules. 5 cents.
- †TP 307. Permissible Explosives, Mining Equipment, and Apparatus Approved Prior to March 15, 1922, by S. P. Howell, L. C. Hsley, D. J. Parker, and A. C. Fieldner. 1922. 21 pp., 1 fig. Contains names of 151 explosives that were tested by the Bureau of Mines prior to March 15, 1922, and descriptive data; also list of mining equipment and apparatus.
- †TP 308. Analyses of Kentucky Coals. 1922. 92 pp., 1 fig. Gives analyses and describes samples.
- †TP 309. Recent Progress in the Thawing of Frozen Gravel in Placer Mining, by Charles Janin. 1922. 34 pp., 5 pls., 4 figs. Describes methods evolved in Alaska and the Yukon Territory.
- †TP 310. Recovery of Gasoline from Uncondensed Still Vapors, by D. B. Dow. 1923. 53 pp., 10 pls., 11 figs. Discusses operating methods to increase gasoline yield. Presents results of studies made at 13 refineries in various refining centers.
- TP 311. Factors in the Spontaneous Combustion of Coal, by O. P. Hood. 1922. 9 pp., 8 figs. Gives a brief discussion of the factors involved. 5 cents.
- TP 312. Leaching Nonsulphide Copper Ores with Sulphur Dioxide, by C. E. van Barneveld and E. S. Leaver. 1923. 91 pp., 5 pls., 11 figs. Defines problem, gives results of tests, and discusses technique of the process. 20 cents.
- †TP 313. Production of Explosives in the United States During the Calendar Year 1921, with Notes on Mine Accidents Due to Explosives, by W. W. Adams. 1922. 25 pp.

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- TP 314. Metal-Mine Fires, by D. Harrington, B. O. Pickard, and H. M. Wolfin. 1923. 20 pp., 7 pls. Points out how metal-mine fires start and how the fire hazard can be lessened. 10 cents.
- †TP 315. Comparative Tests of Byproduct Coke and Other Fuels for House-heating Boilers, by Henry Kreisinger, John Blizard, H. W. Jarrett, and J. J. McKitterick. 1923. 21 pp., 2 pls., 8 figs. Gives results of tests made to compare byproduct coke, bituminous coal, and anthracite as fuels for small boilers.
- TP 316. Tests of a Powdered-Coal Plant; a Report of Investigations at the Power Plant of the St. Joseph Lead Co., Rivermines, Mo., by Henry Kreisinger, John Blizard, C. E. Augustine, and B. J. Cross. 1923. 22 pp., 1 pl., 9 figs. 5 cents.
- TP 317. Silver in Chloride Volatilization, by C. M. Bouton, W. C. Riddell, and L. H. Duschak. 1924. 56 pp., 3 figs. A study of the possible causes for the low extraction of silver during chloride volatilization. Gives results of experiments. 10 cents.
- †TP 318. Coke-Oven Accidents in the United States During the Calendar Year 1921, by W. W. Adams. 1922. 34 pp.
- †TP 319. Methods of Decreasing Evaporation Losses of Petroleum, by J. H. Wiggins. 1923. 57 pp., 11 pl., 22 figs. Describes in detail some up-to-date practices.
- †TP 320. The Bureau of Mines Orsat Apparatus for Gas Analysis, by A. C. Fieldner, G. W. Jones, and W. F. Holbrook. 1925. 18 pp., 1 pl., 4 figs. Describes apparatus used at the Bureau of Mines gas laboratory at Pittsburgh, Pa., for the complete and partial analysis of gas.
- TP 321. Anhydrous Aluminum Chloride, by O. C. Ralston. 1923. 38 pp., 12 figs. Gives information on various processes for aluminum chloride manufacture. 5 cents.
- †TP 322. Experiments in the Use of Back Pressures on Oil Wells, by T. E. Swigart and C. R. Bopp. 1924. 66 pp., 5 pls., 4 figs. Treats of production tests and describes mechanical details of the work.
- †TP 323. Specifications for Petroleum Products and Methods for Testing, Federal Specifications Board, Standard Specification No. 2. 1924. 88 pp., 21 figs. Superseded by TP 323B.
- †TP 323A. United States Government Specification for Lubricants and Liquid Fuels and Methods for Testing, Federal Specifications Board, Standard Specification No. 2c. 1924. 89 pp., 21 figs. Superseded by TP 323B.
- †TP 323B. United States Government Master Specification for Lubricants and Liquid Fuels and Methods for Sampling and Testing, Federal Specifications Board, Specification No. 2d. 1927. 121 pp., 33 figs. Gives specifications and data on methods.
- TP 324. Uses of Water in the Oil-Shale Industry, with Particular Reference to Engineering and Sanitary Requirements, by J. J. Jakosky, with a chapter on The Sanitation of Oil-Shale Camps, by A. L. Murray. 1923. 57 pp., 8 figs. Points out what factors must be considered and suggests methods by which they may be considered most advantageously. 10 cents.
- TP 325. Natural-Gas Manual for the Home, by R. A. Cattell. 1922. 30 pp., 8 pls., 9 figs. Discusses supply, production, and distribution of natural gas and suggests means whereby waste may be prevented. 10 cents.
- TP 326. Fires in Steamship Bunker and Cargo Coal, by H. H. Stook. 1923. 52 pp., 4 figs. Presents data of interest to steamship owners and to shippers and buyers of water-borne coal. 10 cents.
- †TP 327. Accidents at Metallurgical Works in the United States During the Calendar Year 1921, by W. W. Adams. 1923. 31 pp.
- †TP 328. The Motor-Gasoline Surveys of 1920 and 1921, a sequel to B 191, by N. A. C. Smith. 1923. 41 pp., 4 figs. Points out the changes that have taken place since the publication of B 191.
- †TP 329. Quarry Accidents in the United States During the Calendar Year 1921, by W. W. Adams. 1923. 90 pp.
- TP 330. Small Hose Streams for Fighting Mine Fires, by L. D. Tracy and R. W. Hendricks. 1925. 23 pp., 5 pls., 9 figs. Describes tests made to ascertain the equipment and pressures with which a man of average weight and strength, without assistance, could fight a mine fire most effectively. 10 cents.

- †TP 331. Metal-Mine Accidents in the United States During the Calendar Year 1921, by W. W. Adams. 1923. 96 pp.
- TP 332. Conditions Affecting the Activity of Iron Oxides in Removing Hydrogen Sulphide from City Gas, by W. A. Dunkley and R. D. Leitch. 1924. 33 pp., 9 figs. Describes tests to determine the effects of certain conditions on oxide activity. 10 cents.
- †TP 333. Permissible Explosives, Mining Equipment, and Apparatus Approved Prior to January 1, 1923, by S. P. Howell, L. C. Ilsley, D. J. Parker, and A. C. Fieldner. 1923. 22 pp., 1 fig.
- †TP 334. Mine Rescue Standards, a Tentative Study, prepared by a committee appointed at the International Mine Rescue Standardization Conference, September, 1921. 1923. 44 pp. Discusses physiological requirements for breathing apparatus, effects of gases found in mines, and appliances and methods for the quick determination of gases in mines. Also gives information as to procedure in mine fires and explosions.
- TP 335. Bituminous Coal as Generator Fuel in Large Water-Gas Sets with Waste-Heat Boilers, by W. A. Dunkley. 1925. 43 pp., 6 pls., 4 figs. Describes tests made in the plant of the Coal Products Manufacturing Co. at Joliet, Ill., up to January 1, 1923, shows the practical efficiencies obtained, and discusses economic phases of the process. 15 cents.
- TP 336. The Oxidation of Zinc Vapor by Carbon Dioxide, by B. M. O'Harra. 1924. 22 pp., 6 figs. Treats of experiments to determine accurately the ratio of carbon dioxide to carbon monoxide required to oxidize zinc under conditions approaching as nearly as possible those in the ordinary zinc condenser. 5 cents.
- TP 337. Carbon Monoxide Hazards from House Heaters Burning Natural Gas, by G. W. Jones, L. B. Berger, and W. F. Holbrook. 1923. 31 pp., 1 pl., 7 figs. Describes tests of six common types of house heaters or stoves burning natural gas and presents suggestions for minimizing the quantity of carbon monoxide emitted under certain conditions. 10 cents.
- TP 338. Smoke-Abatement Investigation at Grafton, W. Va., by Osborn Monnett and L. R. Hughes. 1924. 29 pp., 13 pls., 3 figs. Discusses atmospheric conditions in Grafton, W. Va., with special reference to smoke, and makes recommendations on methods to be employed to reduce smoke to the minimum. Is intended as a guide in campaigns to free communities suffering from smoke-laden atmosphere due to inefficient use of high-volatile coal. 15 cents.
- †TP 339. Coal-Mine Fatalities in the United States, 1922, by W. W. Adams. 1923. 97 pp.
- †TP 340. Production of Explosives in the United States During the Calendar Year 1922, with Notes on Mine Accidents Due to Explosives, by W. W. Adams. 1923. 25 pp.
- TP 341. Metallurgical Treatment of Zinc-Retort Residues, by B. M. O'Harra. 1925. 25 pp., 1 fig. Describes various methods for the treatment of zinc-retort residues and summarizes information collected by the Bureau of Mines in making the survey. 5 cents.
- †TP 342. Methods for the Recovery of Platinum, Iridium, Palladium, Gold, and Silver from Jewelers' Waste, by C. W. Davis. 1924. 14 pp. Separates methods for recovery of metals into two classes and discusses manipulations and chemical procedures.
- †TP 343. Georgia and Alabama Clay as Fillers, by W. M. Weigel. 1925. 35 pp., 2 pls., 7 figs. Describes tests to ascertain the uses to which the clays could be most efficiently put. Is intended especially for owners and operators of clay deposits.
- TP 344. Analyses of Ohio Coals. 1923. 40 pp., 2 figs. Gives analyses and describes samples. 5 cents.
- TP 345. Analyses of Utah Coals. 1925. 90 pp., 1 fig. Gives analyses and describes samples. 10 cents.
- TP 346. Properties of Typical Crude Oils from the Producing Fields of the Western Hemisphere, by A. J. Kraemer and L. P. Calkin. 1925. 43 pp. Gives the results of the examination of samples from countries other than the United States, groups crude oils of similar nature in each country, and points out analogies which indicate similarity to a typical crude oil of the United States. 5 cents.

Technical Papers

- TP 347. Analyses of Alabama Coals. 1925. 111 pp., 3 figs. Gives analyses and describes samples. 15 cents.
- TP 348. Gas Masks for Gasoline and Petroleum Vapors, by S. H. Katz and J. J. Bloomfield. 1924. 37 pp., 8 pls., 7 figs. Gives results of tests of gas masks, hose masks, and self-contained oxygen breathing apparatus to determine the degree of protection afforded against vapors of petroleum or petroleum products. 15 cents.
- †TP 349. Coke-Oven Accidents in the United States During the Calendar Year 1922, by W. W. Adams. 1923. 37 pp.
- †TP 350. Accidents in Metallurgical Works in the United States During the Calendar Year 1922, by W. W. Adams. 1924. 31 pp.
- TP 351. Electrical Manufacture of Carbon Black, by J. J. Jakosky. 1924. 42 pp., 8 pls., 10 figs. Discusses tests of the effects of electric arcs on petroleum and the production of carbon black. See also TP 375. 10 cents.
- TP 352. Detection of Small Quantities of Petroleum Vapor with the Burrell Methane Indicator, by G. W. Jones and W. P. Yant. 1924. 19 pp. 1 pl., 4 figs. Describes tests and apparatus. 5 cents.
- †TP 353. Quarry Accidents in the United States During the Calendar Year 1922, by W. W. Adams. 1924. 61 pp.
- †TP 354. Metal-Mine Accidents in the United States During the Calendar Year 1922, by W. W. Adams. 1924. 72 pp.
- TP 355. A Carbon Monoxide Recorder and Alarm, by S. H. Katz, D. A. Reynolds, H. W. Frevert, and J. J. Bloomfield. 1926. 35 pp., 3 pls., 13 figs. Describes the carbon monoxide recorder developed by the Bureau of Mines and the results of tests with this and other recorders. 10 cents.
- †TP 356. Analyses of Tennessee Coals. 1926. 94 pp., 1 fig. Gives analyses and describes samples.
- †TP 357. A Critical Study of the Burrell Indicator for Combustible Gases in Air, by L. H. Milligan. 1925. 40 pp., 1 pl., 11 figs. Discusses principle and operation, gives results of a few typical mine tests, and describes use of the indicator for other purposes.
- †TP 358. Production of Explosives in the United States During the Calendar Year 1923, by W. W. Adams. 1924. 32 pp.
- TP 359. The Purification of Copper Sulphate Solutions, by G. S. Tilley and O. C. Ralston. 1924. 45 pp., 5 figs. Reviews previous work on this subject and supplies data lacking therein. 10 cents.
- †TP 360. Vapor Pressures of the Common Metallic Chlorides and a Static Method for High Temperatures, by C. G. Maier. 1925. 54 pp., 14 figs. Presents a method to determine vapor pressures up to 1,250° C. Furnishes technical data on the vapor pressures and heats of vaporization of the metallic chlorides at high temperatures.
- †TP 361. Cleaning Tests of Illinois Coals, by Thomas Fraser and H. F. Yancey. 1925. 23 pp., 6 figs. Gives a practical illustration of methods of examination and describes tests.
- TP 362. Incomplete Combustion in Natural-Gas Space Heaters, by G. W. Jones, W. P. Yant, and L. B. Berger. 1925. 22 pp., 4 figs. Gives results of tests and suggests means for obtaining efficient combustion. 5 cents.
- TP 363. Lessons from the Fire in the Argonaut Mine, by B. O. Pickard. 1926. 39 pp., 4 pls., 5 figs. Gives data on the mine before the fire, an account of the disaster, and suggests preventive measures. 15 cents.
- †TP 364. Permissible Explosives, Mining Equipment, and Apparatus Approved to January 1, 1924, by J. E. Crawshaw, L. C. Ilsley, D. J. Parker, and A. C. Fieldner. 1924. 30 pp., 1 fig.
- †TP 365. Analyses of Virginia Coals. 1926. 75 pp., 2 figs. Gives analyses and describes samples.
- TP 366. Analyses of Missouri Coals. 1926. 41 pp., 1 fig. Gives analyses and describes samples. 10 cents.
- TP 367. Value of Bituminous Coal and Coke for Generating Steam in a Low-Pressure Cast-Iron Boiler, by C. E. Augustine, James Neil, and W. M. Myler, Jr. 1925. 45 pp., 1 pl., 19 figs. Discusses results of tests conducted during 1922 and 1923 at the Pittsburgh Experiment Station of the Bureau. 10 cents.

† Out of print.



- †TP 368. Paraffin Wax and Its Properties: Methods of Testing Wax and of Analyzing Oil-Wax Mixtures, by L. D. Wyant and L. G. Marsh. 1925. 26 pp., 4 pls., 6 figs. Reviews methods now in general use and describes a new method.
- TP 369. Mechanical Safeguards in Rotary Drilling, by H. C. Miller. 1925. 38 pp., 30 figs. Discusses safeguards used in the oil fields of California and suggests means to prevent accidents. 10 cents.
- TP 370. The Bowie-Gavin Process: Its Application to the Cracking of Tars and Heavy Oils, Also to the Recovery of Oil from Oil-Soaked Sands or Shales, or from Oil Shales, by C. P. Bowie. 1926. 42 pp., 14 figs. Gives a detailed description of the process and apparatus. 15 cents.
- †TP 371. Coke-Oven Accidents in the United States During the Calendar Year 1923, by W. W. Adams. 1924. 35 pp.
- †TP 372. Silicosis Among Miners, by R. R. Sayers. 1925. 24 pp., 10 pls., 8 figs. Discusses causes and means of prevention.
- †TP 373. The Pyrotannic Acid Method for the Quantitative Determination of Carbon Monoxide in Blood and in Air, by R. R. Sayers and W. P. Yant. 1925. 18 pp., 2 pls., 1 fig. Describes method and apparatus used.
- †TP 374. Accidents at Metallurgical Works in the United States During the Calendar Year 1923, by W. W. Adams. 1925. 31 pp.
- TP 375. Effects of Corona Discharge on Petroleum, by J. J. Jakosky. 1926. 21 pp., 10 figs. Discusses experiments to determine the effects that high-voltage alternating-current electricity in the form of the corona discharge has on petroleum vapors. Supplements TP 351. 10 cents.
- †TP 376. Permissible Explosives, Mining Equipment, and Rescue Apparatus Approved Prior to January 1, 1925, by J. E. Crawshaw, L. C. Hsley, D. J. Parker, and A. C. Fieldner. 1925. 35 pp., 1 fig. Superseded by RI 3134, IC 6494, 6538. Revised every 6 months.
- TP 377. Red Iron Ores and Ferruginous Sandstones of the Clinton Formation in the Birmingham District, Alabama, by W. R. Crane. 1926. 41 pp., 23 figs. Describes the ore in the four ore beds in Red Mountain. 10 cents.
- †TP 378. Precipitation of Gold and Silver from Cyanide Solution on Charcoal, by John Gross and J. W. Scott. 1927. 78 pp., 10 figs. Gives results of experiments and an appendix of pertinent literature.
- TP 379. Strength of Ore and Top Rock in the Red Iron Ore Mines of the Birmingham District, Alabama, by W. H. Crane. 1926. 22 pp., 9 figs. Discusses the study of the strength of the ore and top rock in the hematite mines of the Birmingham district to determine the size of pillars adequate to support the roof as the mines grow deeper. 10 cents.
- †TP 380. Production of Explosives in the United States During the Calendar Year 1924, by W. W. Adams. 1925. 35 pp.
- †TP 381. Heavy Liquids for Mineralogical Analyses, by J. D. Sullivan. 1927. 25 pp., 10 figs. Presents data on experiments to obtain better heavy liquids.
- †TP 382. Accidents in the California Petroleum Industry in 1923, by H. C. Miller and C. E. Steidel. 1926. 30 pp.
- TP 383. Blasting to Lessen Boulders in Hard-Ore Stopes, by E. D. Gardner and S. P. Howell. 1926. 22 pp., 8 figs. Summarizes results of an investigation to ascertain the most efficient grade of explosives to use and to develop an efficient method of blasting in hard-ore stopes. 10 cents.
- TP 384. Passage of Solid Particles Through Rotary Cylindrical Kilns, by J. D. Sullivan, C. G. Maier, and O. C. Ralston. 1927. 42 pp., 20 figs. Discusses the factors that influence the rate of progress of crushed materials through a kiln. 15 cents.
- TP 385. Typical Methods and Devices for Handling Oil-Contaminated Water from Ships and Industrial Plants, by F. W. Lane, A. D. Bauer, H. F. Fisher, and P. N. Harding. 1926. 64 pp., 15 figs. Discusses typical methods and devices. 15 cents.
- TP 386. Explosibility of Coal Dust From Four Mines in Utah, by H. P. Greenwald. 1927. 19 pp., 2 figs. Describes tests made at the Experimental mine of the Bureau of Mines and gives a summary of the results. 5 cents.
- †TP 387. Engine Service Tests of Internal-Combustion Engine Lubricating Oils Made from California Crude Petroleum, by M. J. Gavin and Gustav Wade. 1926. 30 pp., 9 figs. Deals with engine tests made at the San Francisco laboratory of the Bureau of Mines in cooperation with the American Petroleum Institute.

- †TP 388. Coke-Oven Accidents in the United States During the Calendar Year 1924, by W. W. Adams. 1925. 38 pp.
- TP 389. Lead Poisoning in the Mining of Lead in Utah, by A. L. Murray. 1926. 40 pp. Discusses means to reduce the lead hazards and methods of treatment. 10 cents.
- TP 390. Occurrence, Distribution, and Significance of Alkali Cyanides in the Iron Blast Furnace, by S. P. Kinney and E. W. Guernsey. 1926. 37 pp., 12 figs. Describes method developed at the furnace of the Central Iron & Coal Co., at Holt, Ala., to determine the alkali cyanide content of gases at different points in the interior of the furnace. 10 cents.
- †TP 391. Iron Blast-Furnace Reactions, by S. P. Kinney, P. H. Royster, and T. L. Joseph. 1927. 65 pp., 34 figs. Discusses method and apparatus used and gives results of tests.
- TP 392. Accidents in the Petroleum Industry of Oklahoma, 1915-1924, by H. C. Fowler. 1926. 29 pp., 15 figs. Shows the need for continued study to prevent accidents and presents data on the study of the problem in the district. 10 cents.
- TP 393. Utilization of Manganiferous Iron Ores, by T. L. Joseph, P. H. Royster, and S. P. Kinney. 1926. 28 pp., 17 figs. Discusses tests made and describes experimental blast furnace at the Bureau of Mines station, University of Minnesota. 10 cents.
- TP 394. Dust Respirators, Their Construction and Filtering Efficiency, by S. H. Katz, G. W. Smith, and E. G. Meiter. 1926. 50 pp., 49 figs. Describes representative types of dust respirators used in industry and presents the results of laboratory tests to determine their filtering efficiencies and resistances to air flow. 15 cents.
- TP 395. Accidents at Metallurgical Works in the United States During the Calendar Year 1924, by W. W. Adams. 1926. 37 pp. 10 cents.
- TP 396. Low-Temperature Carbonization of Coal, by A. C. Fieldner. 1926. 46 pp., 40 figs. Discusses carbonization processes and principles and describes three types of retort. 15 cents.
- TP 397. Composition of Materials from Various Elevations in an Iron Blast Furnace, by S. P. Kinney. 1926. 21 pp., 11 figs. Describes methods used and discusses results of tests. 5 cents.
- TP 398. Coking of Oil Shales, by W. L. Finley and A. D. Bauer. 1926. 10 pp., 6 figs. Discusses tendency of oil shales to coke when heated and describes means of preventing the formation of dense hard coke. 5 cents.
- TP 399. Recovery of Molybdenite from the Ore, by H. A. Doerner. 1926. 12 pp., 10 figs. Discusses the utilization of molybdenite. 5 cents.
- †TP 400. Accidents Due to Explosives in Metal Mines of the Southwest, as Shown by Records in Arizona, by E. D. Gardner. 1926. 28 pp. Points out the procedure necessary to prevent accidents.
- TP 401. Blast-Furnace Gas Studies, by J. F. Barkley. 1927. 9 pp., 8 figs. Deals with studies to discover relation between the amount of gas produced and the pounds of coke used per ton of iron, also to determine variations between gas actually produced and amount found by calculation from the furnace charges. 5 cents.
- †TP 402. Safety Rules for Installing and Using Electrical Equipment in Coal Mines, Sponsored by United States Bureau of Mines and American Mining Congress. 1926. 21 pp. Treats methods for safe electrical installation in coal mines.
- †TP 403. Hydraulic Classification, Its Theory, Mechanical Development, and Application to Ore Dressing, with a chapter on Methods of Determining the Densities of Liquids and Ore Pulps, by A. W. Fahrenwald. 1927. 51 pp., 20 figs. Gives results of a study of hindered-settling classification and its relation to gravity concentration.
- TP 404. Identification of Oil-Field Waters by Chemical Analysis, by C. E. Reistle, Jr. 1927. 24 pp., 3 figs. Discusses present systems of reporting analyses and shows their advantages and disadvantages; gives actual examples of how waters may be identified. 5 cents.
- †TP 405. Analyses of West Virginia Coals. 1928. 343 pp., 1 fig. Gives analyses and describes samples.

† Out of print.

- †TP 406. Production of Explosives in the United States During the Calendar Year 1925, with Notes on Mine Accidents Due to Explosives, by W. W. Adams. 1926. 39 pp.
- TP 407. Development, Mining, and Handling of Ore in Folded and Faulted Areas, Red Iron Ore Mines, Birmingham District, Alabama, by W. R. Crane. 1927. 27 pp., 27 figs. Deals with the development and handling of ore as affected by folds and faults in the ore bed and considers changes that may be desirable or necessary in future mining practice. 15 cents.
- †TP 408. Coke-Oven Accidents in the United States During the Calendar Year 1925, by W. W. Adams. 1926. 39 pp.
- †TP 409. Spontaneous Heating of Coal, by J. D. Davis and D. A. Reynolds. 1928. 74 pp., 20 figs. Presents assembled results of investigations made by the Bureau of Mines and their correlation with those of other investigators. Gives a critical review stressing the more recent laboratory studies on spontaneous combustion.
- TP 410. Falls of Roof in Bituminous-Coal Mines. Influence of the Seasons and Rate of Production, by J. W. Paul. 1928. 40 pp., 25 figs. Considers fatal accidents from falls of roof in each of the 24 States producing coal in relation to the tonnage produced, and suggests methods to prevent disintegration and consequent falls of roof. 10 cents.
- †TP 411. Analyses of Oklahoma Coals. 1928. 62 pp., 2 figs. Gives analyses and describes samples.
- †TP 412. Accidents at Metallurgical Works in the United States During the Calendar Year 1925, by W. W. Adams. 1927. 39 pp.
- TP 413. Roasting of Lead Carbonate Ores Preliminary to Gravity Concentration, by Virgil Miller and R. E. Head. 1929. 16 pp., 2 figs. Presents data on low-temperature roasting of lead carbonate ores and describes method of treatment. 10 cents.
- TP 414. Methods of Dealing with Paraffin Troubles Encountered in Producing Crude Oil, by C. E. Reistle, Jr. 1928. 39 pp., 16 figs. Deals with the factors that cause accumulations of paraffin, describes methods that have proved satisfactory in preventing them, and sets forth ways of removing paraffin after it has accumulated. 15 cents.
- TP 415. The Function of Steam in the Limekiln, by E. E. Berger. 1927. 43 pp., 5 figs. Discusses results of tests and describes apparatus used. 10 cents.
- TP 416. Analyses of Arkansas Coals. 1928. 26 pp., 1 fig. Gives analyses and describes samples. 5 cents.
- †TP 417. Analyses of Indiana Coals. 1927. 57 pp., 2 figs. Gives analyses and describes samples.
- TP 418. Electric-Furnace Cast Iron, by C. E. Williams and C. E. Sims. 1928. 48 pp., 10 figs. Discusses advantages of the electric furnace and gives results of tests. 10 cents.
- TP 419. Safe Practices at Oil Derricks, by H. C. Miller. 1927. 69 pp., 27 figs. Describes installations and use of mechanical equipment. 15 cents.
- †TP 420. Geophysical Methods of Prospecting, a Brief and Elementary Account of the Principles Involved, by A. S. Eve and D. A. Keys. 1927. 26 pp., 27 figs. Is intended especially for geologists, mining engineers, and others who desire a concise and simple explanation of the more important physical principles that underlie the various methods of geophysical prospecting.
- TP 421. State Laws Relating to Coal-Mine Timbering, by J. W. Paul and J. N. Geyer. 1928. 57 pp. 10 cents.
- TP 422. Prevention of Pipe-Tool Accidents at Drilling and Producing Wells, by H. C. Fowler. 1928. 47 pp., 19 figs. Describes use and correct handling of pipe tools. 15 cents.
- †TP 423. Cyanide Extraction of Gold and Silver Associated with Arsenic and Antimony in Ores, with Especial Reference to Those in Nevada and South Dakota, by E. S. Leaver and J. A. Woolf. 1928. 52 pp., 6 figs. Discusses results of tests.
- †TP 424. The Thermodynamic Properties of Oxygen and Nitrogen, by R. W. Millar and J. D. Sullivan. 1928. 20 pp., 2 figs. A collection of thermodynamic data on these two substances. The calculations are limited to pressures not exceeding 60 atmospheres. The report is accompanied by Mollier charts on oxygen and nitrogen.

† Out of print.

- TP 425. Production of High-Alumina Slags in the Blast Furnace, by T. L. Joseph, S. P. Kinney, and C. E. Wood. 1928. 32 pp., 6 figs. Discusses the function of blast-furnace slag and gives results of a 2-week test with a 6-ton experimental blast furnace. Gives a brief résumé of tests made in full-size furnaces on high-alumina slags and discusses economic possibilities of producing high-alumina slags in the blast furnace. 15 cents.
- †TP 426. Production of Explosives in the United States During the Calendar Year 1926, with Notes on Mine Accidents Due to Explosives, by W. W. Adams. 1927. 46 pp., 1 fig.
- TP 427. Propagation of Flame in Mixtures of Natural Gas and Air, by H. F. Coward and H. P. Greenwald. 1928. 28 pp., 13 figs. Gives the results of experiments to determine the exact differences between methane and natural gas as to the ease with which they may be ignited and the speed with which they propagate flame. 10 cents.
- †TP 428. A Study of the Less-Volatile Oils in Salt Creek (Wyo.) Crude, by H. M. Smith. 1928. 28 pp., 7 figs. Presents data to verify conclusions reached that there are two distinct groups of oils in the lubricating stock of Salt Creek petroleum—one, relatively insoluble in acetone, has low viscosity-gravity ratios, low carbon-hydrogen ratios, and relatively low unsaturation; the other, extremely soluble in acetone, has high viscosity-gravity ratios, high carbon-hydrogen ratios, and considerable apparent unsaturation.
- TP 429. Permissible Single-Shot Blasting Units, by L. C. Ilsley and A. B. Hooker. 1928. 24 pp., 18 figs. Gives essential details of the investigations of the eight single-shot units approved prior to July 1, 1927. 10 cents.
- †TP 430. Accidents at Metallurgical Works, 1926, by W. W. Adams. 1928. 38 pp.
- †TP 431. Studies in the Fractional Distillation of Crude Petroleum, by M. B. Cooke and H. P. Rue. 1928. 54 pp., 16 figs. Describes a series of experiments to demonstrate some of the most essential principles involved in the continuous distillation of crude petroleum, and presents these principles in nontechnical language.
- †TP 432. A System of Analysis for Oil-Field Waters, by C. E. Reistle and E. C. Lane. 1928. 14 pp.
- †TP 433. Experiments in Underground Communication Through Earth Strata, by L. C. Ilsley, H. B. Freeman, and D. H. Zellers. 1928. 60 pp., 35 figs. Records Bureau of Mines experiments. Greater emphasis and details are given those phases of the work that seemed to promise a possible ultimate solution of the problem.
- †TP 434. Geophysical Prospecting: Some Electrical Methods, by A. S. Eve and D. A. Keys. 1928. 41 pp., 33 figs. Includes results of tests with certain standard methods and with the new "leapfrog" method devised by the authors.
- †TP 435. Production of Explosives in the United States During the Calendar Year 1927, by W. W. Adams. 1928. 49 pp.
- †TP 436. The Sulphur Problem in Burning Coal, by J. F. Barkley. 1928. 7 pp., 1 fig. Gives analyses of sulphur content of coal samples from different districts, analyses of sulphur dioxide and sulphur trioxide content of products of combustion taken from a furnace, and effect of equipment.
- †TP 437. Coke-Oven Accidents in the United States During the Calendar Year 1926, by W. W. Adams. 1927. 40 pp.
- †TP 438. Bentonite, Its Properties, Mining, Preparation, and Utilization, by C. W. Davis and H. C. Vacher. 1928. 51 pp., 1 fig. Defines bentonite, discusses occurrence and properties, lists present and proposed uses, and gives analyses.
- †TP 439. Geophysical Investigations of the U. S. Bureau of Mines at Caribou, Colo., by C. A. Heiland, C. W. Henderson, and J. A. Malkovsky. 1929. 45 pp., 13 figs. Shows the charting of magnetic currents in ground underlain by magnetite deposits.
- †TP 440. Measuring the Variation of Ground Resistivity with a Megger, by F. W. Lee. 1928. 16 pp., 12 figs. Discusses results of tests.
- †TP 441. Factors Governing the Entry of Solutions into Ores During Leaching, by J. D. Sullivan, W. E. Keck, and G. L. Oldright. 1929. 38 pp., 15 figs. The first of a series of reports of experiments conducted by the Bureau of Mines. Covers the first step—penetration of the leaching medium into the body of the ore particles.

- TP 442. The Blast-Furnace Stock Column, by S. P. Kinney. 1929. 148 pp., 62 figs. Discusses another step in the Bureau of Mines investigations of iron blast-furnace operation. Gives results of observations made on a 700-ton furnace. 30 cents.
- †TP 443. Coke-Oven Accidents in the United States During the Calendar Year 1927, by W. W. Adams. 1929. 40 pp.
- †TP 444. Graphical Terrane Correction for Gravity Gradient, by D. C. Barton. 1929. 10 pp., 7 figs. Gives a graphical method that is as accurate as possible under the conditions of ordinary field surveying with the torsion balance. Tells how to use the charts.
- †TP 445. Specific Heats of Gases at High Temperatures, by E. D. Eastman. 1929. 27 pp., 11 figs. Presents the results of the major work on specific heats of gases at high temperatures.
- †TP 446. Terminology in Coal Research, by Reinhardt Thiessen and Wilfrid Francis. 1929. 27 pp., 15 figs. Gives the meaning of the different terms used in the literature of the several countries on the subject of the constitution of coals.
- †TP 447. Experiments on Mine-Fan Performance, by G. E. McElroy and A. S. Richardson. 1929. 61 pp., 32 figs. Describes and analyzes the tests of a fan, in place, to determine fan performance and of fans, in place, to obtain data on the ventilating system.
- TP 448. Coal-Dust Explosions in Mines, Causes, Effects, and Recommendations for Prevention, by G. S. Rice. 1929. 24 pp. Defines coal dust and states in detail what causes it to enter into explosions. Discusses the factors that tend to cause explosions. 5 cents.
- †TP 449. A Study of the Crude Oil Produced in the Salt Creek Field, Wyoming, by H. P. Rue and I. N. Beall. 1929. 27 pp., 5 figs. Gives methods of analyzing and distilling a typical intermediate-base crude of the type found throughout the Rocky Mountain and Mid-Continent fields.
- TP 450. Inflammability of Mixed Gases, by G. W. Jones. 1929. 38 pp., 6 figs. Deals with experiments made on the inflammability of gas mixtures consisting of methane, hydrogen, carbon monoxide, nitrogen, and carbon dioxide combined in varying proportions. Is a companion to B 279. 10 cents.
- TP 451. Calcium Sulphate Retarders for Portland Cement Clinker, by E. E. Berger. 1929. 35 pp., 8 figs. Discusses studies to determine whether the type of anhydrite or its degree of fineness would affect its action as a retarder for Portland cement. 10 cents.
- †TP 452. Safety Organizations in Arizona Copper Mines, by E. D. Gardner and D. J. Parker. 1929. 49 pp. Outlines safety organizations and gives accident records.
- TP 453. Factors Governing Removal of Soluble Copper from Leached Ores, by J. D. Sullivan and A. J. Sweet. 1929. 26 pp., 13 figs. The second of a series of reports of experiments conducted by the Bureau of Mines. Covers the second step—the factors governing the removal from the ore of the soluble copper salts produced by reactions in leaching. 15 cents.
- TP 454. Permissible Junction Boxes, by L. C. Hlsley and R. A. Kearns. 1929. 19 pp., 5 figs. Presents requirements for approval of junction boxes and describes two boxes already approved. 10 cents.
- TP 455. Analyses of Kansas Coals. 1929. 52 pp., 2 figs. Gives analyses and describes samples. 10 cents.
- †TP 456. Classification and Tabling of Difficult Ores, with Particular Attention to Fluorspar, by W. H. Coghill. 1929. 40 pp., 21 figs. Discusses results of tests.
- †TP 457. Centrifugal Concentration, Its Theory, Mechanical Development, and Experimental Results, by H. A. Doerner. 1929. 39 pp., 12 figs. Deals with an investigation of centrifugal concentration, especially its application to the treatment of the slime portion of tailings from mills that use gravity-concentration methods.
- †TP 458. Accidents at Metallurgical Works in the United States During the Calendar Year 1927, by W. W. Adams. 1929. 37 pp.

† Out of print.

- †TP 459. Effect of Sized Ore on Blast-Furnace Operation, by S. P. Kinney. 1930. 92 pp., 35 figs. Another of a series of reports of experiments with the blast furnace. Includes data on gas consumption, and static and velocity pressures obtained from the inwall to the center of the furnace on two planes in the shaft of the furnace.
- TP 460. Design and Operation of Gas-Well Siphons, by I. B. Williams, R. R. Brandenthaler, and Morgan Walker. 1929. 45 pp., 12 figs. Concludes that the cheapest and best method for removing water from gas wells is by means of a siphon where applicable. Includes a discussion of the fundamental physical laws involved in the study and operation of the siphon, as well as theoretical deductions which have been derived. Presents a résumé of laboratory and field work. 10 cents.
- TP 461. Salvage of Material in the Oil Industry, by C. P. Bowie. 1929. 32 pp., 25 figs. Describes the methods of salvaging used equipment as practiced by various companies. 20 cents.
- TP 462. Safety at Natural-Gasoline Plants, by G. B. Shea. 1929. 169 pp., 36 figs. The fifth of a series of reports intended to disseminate information on methods that tend to reduce accidents and monetary losses due to accidents and fire in the petroleum industry. 25 cents.
- †TP 463. Depth Attainable by Electrical Methods in Applied Geophysics, by A. S. Eve, D. A. Keys, and F. W. Lee. 1929. 58 pp., 58 figs. Includes a description of the megger, discusses theory and methods, and gives examples of successful applications.
- †TP 464. Coal-Dust Explosibility Factors Indicated by Experimental Mine Investigations, 1911 to 1929, by G. S. Rice and H. P. Greenwald. 1929. 45 pp., 4 figs. Classifies and summarizes the knowledge gained from more than a thousand experiments, the details of which have been given in previous reports. Stresses the need of efficient generalized rock dusting to prevent coal-dust explosion disasters.
- TP 465. Analyses of Maryland Coals. 1930. 89 pp. Gives analyses and describes samples. 15 cents.
- TP 466. Effect of Manganese on Distribution of Carbon in Steel, by B. M. Larsen. 1929. 31 pp., 26 figs. Discusses results of a study of the characteristics of low-carbon manganese steels and of the effect of manganese on abnormality in case-carburizing steels. 20 cents.
- TP 467. Production of Explosives in the United States During the Calendar Year 1928, by W. W. Adams and L. S. Gerry. 1930. 51 pp. 10 cents.
- TP 468. Coke-Oven Accidents in the United States During the Calendar Year 1928, by W. W. Adams and L. Chenoweth. 1930. 37 pp. 10 cents.
- TP 469. The Wire Saw in Slate Quarrying, by Oliver Bowles. 1930. 31 pp., 16 figs. Describes equipment. Discusses factors affecting special conditions that prevail at different quarries. 15 cents.
- TP 470. Results of Air Repressuring and Engineering Study of William Pool, Putnam-Moran District, Callahan County, Tex., by H. B. Hill. 1930. 69 pp., 28 figs. Records past history of the field; outlines the interpreted surface conditions; presents data, tables, curves, and diagrams showing steps involved in the application of air to the wells in the Williams pool; and gives the results obtained. 15 cents.
- †TP 471. How Leakage of Current from an Electric Shot-Firing Circuit Causes Misfires, by L. C. Hsley, A. B. Hooker, and D. H. Zellers. 1930. 16 pp., 12 figs. Gives results of tests.
- TP 472. Acceleration of Extraction of Soluble Copper from Leached Ores, by Morris Guggenheim and J. D. Sullivan. 1930. 30 pp., 10 figs. Continues the series on factors involved in the leaching of ores. See TP 453. 10 cents.
- †TP 473. Chemistry of Leaching Chalcocite, by J. D. Sullivan. 1930. 24 pp., 5 figs. Presents experimental data on the dissolution of chalcocite in various common solvents.
- TP 474. Accidents at Metallurgical Works in the United States During the Calendar Year 1928, by W. W. Adams. 1930. 34 pp. 10 cents.
- TP 475. Ignition of Natural Gas-Air Mixtures by Heated Surfaces, by P. G. Guest. 1930. 59 pp., 38 figs. Deals with an investigation undertaken with a view to throwing more light on the subject of establishing facts experimentally that might assist in answering questions concerning the possible causes of gas explosions in mines. 20 cents.

† Out of print.

- TP 476. Stock Distribution and Gas-Solid Contract in the Blast Furnace, by C. C. Furnas and T. L. Joseph. 1931. 73 pp., 47 figs. Correlates laboratory and such operating data as are available and presents the results of tests made on small models to study the effect of changes in charging upon size distribution at the stock line. Presents data on some phases of flue-dust production. Outlines some ideas regarding the most effective means of making favorable changes in size composition of burden by means of crushing and sintering. 30 cents.
- †TP 477. A Study of the Lubricant Fractions of Cabin Creek (W. Va.) Petroleum, by H. M. Smith, With Chapters on the Action of Solvents on the Heavy Constituents of Petroleum, by F. W. Lane, I. H. Nelson, J. M. Devine, and H. M. Smith. 1931. 48 pp., 25 figs. Presents a detailed study, by solvent extraction and fractional distillation, of lubricating oil prepared from Cabin Creek crude. Discusses other applications of the solvent-extraction method.
- TP 478. Production of Explosives in the United States During the Calendar Year 1929, by W. W. Adams and L. S. Gerry. 1931. 51 pp., 2 figs. 10 cents.
- TP 479. A Study of the Production of Activated Carbon from Various Coals and Other Raw Materials, by A. C. Fieldner, R. E. Hall, and A. E. Galloway. 1931. 30 pp., 11 figs. Discusses methods for producing activated carbon, the relative values of cheap raw materials for the purpose, and the properties of the activated carbons so produced. 10 cents.
- †TP 480. Intensities of Odors and Irritating Effects of Warning Agents for Inflammable and Poisonous Gases, by S. H. Katz and E. J. Talbert. 1931. 37 pp., 13 figs. Describes one phase of an investigation of warning agents for fuel gas.
- †TP 481. Re-Treatment of Mother Lode (California) Carbonaceous Slime Tailings, by E. S. Leaver and J. A. Woolf. 1931. 20 pp. Discusses process for ore treatment and tabulates results of tests.
- TP 482. Toxic Gases from 60 percent Gelatin Explosives, by G. St. J. Perrott, L. W. Babcock, C. D. Bitting, and G. W. Jones. 1931. 30 pp., 13 figs. Describes tests and tabulates results. 10 cents.
- TP 483. Re-Forming Natural Gas, by W. W. Odell. 1931. 54 pp., 16 figs. Discusses the study of re-forming hydrocarbon gases, including refinery gas, with relation to the production of gas suitable for city distribution. Also considers the possible recovery of a by-product carbon. 10 cents.
- TP 484. Analyses of Wyoming Coals. 1931. 159 pp., 2 figs. Gives analyses and describes samples. 25 cents.
- TP 485. Timbering Regulations in Certain Coal Mines of Pennsylvania, West Virginia, and Ohio, by J. W. Paul, J. G. Calverley, and D. L. Sibray. 1931. 41 pp., 19 figs. Gives the rules and regulations in force in a selected number of mines in western Pennsylvania, eastern Ohio, and northern West Virginia operating in the Pittsburgh coal bed and sketches illustrating the manner of placing roof support in the different mining operations, such as entry and room-and-pillar work. 10 cents.
- †TP 486. Chemistry of Leaching Bornite, by J. D. Sullivan. 1931. 20 pp., 7 figs. In one of a series of reports on various fundamental factors involved in the leaching of copper ores. Presents experimental data on the dissolution of bornite in various common solvents.
- †TP 487. Chemistry of Leaching Covellite, by J. D. Sullivan. 1931. 18 pp., 7 figs. Fifth of a series of papers on the chemistry of leaching copper ores. Describes procedure and results of experimental work on the effect of particle size on rate of dissolution; the effect of the concentration of ferric iron in the leaching solution; the effect of the concentration of sulphuric acid in the leaching solution; the effect of temperature; the rate of dissolution of covellite in ferric chloride solutions; the rate of dissolution of covellite in sulphuric acid; and the mechanism of dissolution of covellite in ferric sulphate solutions.
- †TP 488. Resistivity Measurements of Oil-Bearing Beds, by F. W. Lee and J. H. Swartz. 1931. 12 pp., 11 figs. Discusses results of an experiment to test the theory that oil-impregnated sands offer a very much greater resistance than salt water-impregnated sands. May serve as an experimental guide to parties interested in locating oil at shallow depths.

† Out of print.

- †TP 489. Coal-Mine Safety Organizations in Alabama, by R. D. Currie. 1931. 48 pp., 12 figs. States that effective safety organizations have been responsible for reducing accidents in many Alabama mines. Points out the methods by which good results were made possible.
- TP 490. Separation and Size Distribution of Microscopic Particles—An Air Analyzer for Fine Powders, by P. S. Roller. 1931. 46 pp., 31 figs. The present investigation was undertaken in connection with problems concerning dependence of the physical and chemical reactivity of certain substances, notably anhydrite, on the particle size. 15 cents.
- †TP 491. Analyses of Washington Coals. 1931. 203 pp., 1 fig. Gives analyses and describes samples.
- TP 492. Deoxidation of Steel with Silicon, by C. H. Herty, Jr., G. R. Fitterer, and C. F. Christopher. 1931. 42 pp., 17 figs. Discusses the more important results of cooperative laboratory and plant tests to determine the effects on the quality of steel deoxidized with silicon. 15 cents.
- †TP 493. Bibliography of United States Bureau of Mines Investigations on Coal and Its Products, 1910-1930, by A. C. Fieldner and M. V. von Bernewitz. 1931. 56 pp. Includes publications issued by the Bureau of Mines and those written by its staff for the technical press, which includes the chemical and engineering periodicals of scientific bodies. Under this head are included reports of work done jointly with States and colleges.
- TP 494. Copper and Zinc in Cyanidation Sulphide-Acid Precipitation, by E. S. Leaver and J. A. Woolf. 1931. 63 pp., 8 figs. Explains what happens during cyanidation of ores for the recovery of precious metals containing various forms of copper and zinc. Gives a proposed process that fills the need for a commercial method of recovering precious metals associated with minor copper values and is applicable to ores that are under smelting grade or ores in which the copper will not pay for a separate treatment for its recovery. 15 cents.
- †TP 495. Coke-Oven Accidents in the United States During the Calendar Year 1929, by W. W. Adams and L. Chenoweth. 1931. 35 pp.
- TP 496. Accuracy of Manometry of Explosions: Comparative Performance of Some Diaphragm-Type Explosion Manometers When Using Hydrogen-Air Mixtures, by C. M. Bouton, H. K. Griffin, and P. L. Golden. 1931. 52 pp., 48 figs. Describes a continuation of a similar cooperative investigation by the Safety in Mines Research Board of Great Britain and the United States Bureau of Mines. 15 cents.
- †TP 497. Electromagnetic Absorption by Rocks, with Some Experimental Observations Taken at the Mammoth Cave of Kentucky, by J. W. Joyce. 1931. 28 pp., 19 figs. Discusses the question of the penetration of electromagnetic fields or waves into the ground. Concludes that the fact that such waves actually penetrate rock has been definitely established. The results of this investigation show that a frequency of 500 cycles per second is well suited for electromagnetic prospecting. Absorption, although present, does not materially limit the applicability of this method.
- TP 498. II. Factors Governing the Entry of Solutions Into Ores During Leaching, by J. D. Sullivan and E. O. Ostrea. 1931. 23 pp., 3 figs. Continues the series on factors involved in the leaching of ores conducted by the Bureau of Mines. Considers measurements of the rate and distance of penetration of solutions into capillary and small-bore glass tubes filled with gases of different solubilities, measurements of the rate and volume of penetration of solutions into the voids within particles of ore as affected by (a) solubility of the gas within the voids, (b) size of the particles of ore, and (c) use of different penetrating solutions, and measurements of the rise of solutions in glass tubes filled with crushed ores. 10 cents.
- TP 499. Treating a Complex Ore; Data from Experimental Work on Ores in the Denver Laboratories of the Complex Ores Recovery Co., by G. L. Oldright. 1931. 101 pp., 1 fig. An account of the more salient features brought out in developing a process for the treatment of the ore of the Flin Flin Mine in northern Manitoba. Describes experiments on the crude ore and the tests on the zinc and copper concentrates that were made after the work on the crude ore was abandoned. 15 cents.
- †TP 500. Relationship Between Volatility and Consumption of Lubricating Oils in Internal-Combustion Engines, by Gustav Wade and A. L. Foster. 1931. 52 pp., 7 figs. Tabulates results of tests.

† Out of print.

- TP 501. Results of Electrical Resistivity and Electrical-Induction Measurements at Abana Mine, Quebec, Canada, by E. V. Potter, with Explanation of Some Factors Associated with Induction Method, by F. W. Lee. 1931. 28 pp., 22 figs. The two methods described are based on widely different principles. The resistivity method is necessarily slow, but very detailed results are obtainable from its correct use. The alternating-current method is good for rapid work, but does not reveal the details, such as depth, slope, etc., nearly so well. Suggests combination of two such methods in making a survey over new country, the alternating-current method being used for a preliminary survey and the resistivity method for a detailed survey in interesting points. 15 cents.
- †TP 502. How to Compute Tables for Determining Electrical Resistivity of Underlying Beds and their Application to Geophysical Problems, by Irwin Roman. 1931. 44 pp., 2 figs. A detailed discussion of the derivation and results, together with numerical tables, in the case of a single infinite plane separated from two adjacent media by parallel planes.
- TP 503. Accidents at Metallurgical Works in the United States During the Calendar Year 1929, by W. W. Adams. 1931. 34 pp. 10 cents.
- †TP 504. Engineering Report of Cotton Valley Field, Webster Parish, La., by J. S. Ross. 1931. 69 pp., 23 figs. Discusses history and development; geology of oil field, including stratigraphy and structure; producing horizons—the Blossom sand, Anhydrite gas horizon, Tilman and Bodeaw sand lenses, and miscellaneous sands of Davis horizon; water conditions, including discussion of main water sands, water encroachment in productive sands, and character of waters; production of oil, natural gas, and natural gasoline; development methods; and production practices in Blossom and Trinity horizons.
- TP 505. Influence of Fractionation on Distribution of Sulphur in Gasoline, by R. H. Espach and H. P. Rue. 1931. 24 pp., 11 figs. Describes results of an investigation to determine the effect good fractionation would have on the manufacture of gasoline from crude oil containing sulphur. 10 cents.
- †TP 506. Microscopic Study of Elkhorn Coal Bed at Jenkins, Lethers County, Ky., by Reinhardt Thiessen, G. C. Sprunk, and H. J. O'Donnell. 1931. 30 pp., 20 figs. Describes investigation and summarizes results.
- †TP 507. Explosions in Washington Coal Mines, by S. H. Ash. 1931. 52 pp. Presents data on conditions that bear directly on the prevention of explosions and discusses mining conditions and practices that relate to ventilation, gas, and dust at Washington mines.
- TP 508. Coke-Oven Accidents in the United States During the Calendar Year 1930, by W. W. Adams and L. Chenoweth. 1932. 33 pp. 10 cents.
- TP 509. Production of Explosives in the United States During the Calendar Year 1930, by W. W. Adams and L. S. Gerry. 1931. 51 pp. 10 cents.
- †TP 510. Results of Some Magnetic Measurements on Dikes, with Experiments Upon Geophysical Differentiation of Nickel-Ore Deposits in the Sudbury District, Ontario, Canada, by F. W. Lee. 1932. 18 pp., 20 figs. Directs attention primarily to distinguishing a nickel ore body or vein from other magnetic material existing in the same locality and gives some magnetic observations on dikes. This paper may be considered a continuation of IC 6235.
- TP 511. Carbonizing Properties of Davis Bed Coal from Garrett County, Md., and of Mixtures with Pittsburgh Bed Coal, by A. C. Fieldner, J. D. Davis, E. B. Kester, W. A. Selvig, D. A. Reynolds, and F. W. Jung. 1932. 39 pp., 33 figs. The third of a series covering a survey of the gas-, coke-, and by-product-making properties of American coals which is being conducted by the bureau in cooperation with the American Gas Association. Discusses effect of blending various percentages of low-volatile coal with high-volatile coal. 20 cents.
- TP 512. Friability, Slacking Characteristics, Low-Temperature Carbonization Assay, and Agglutinating Value of Washington and Other Coals, by H. F. Yancey, K. A. Johnson, and W. A. Selvig. 1932. 94 pp., 38 figs. A companion report to TP 491. Presents the results of special studies made to meet the demand of producers, consumers, and various organizations for information bearing upon the physical as well as other properties of coals that has not been provided in reports published by the Bureau heretofore. 25 cents.

† Out of print.

- TP 513. Studies on Determination of Sulphur in Gasoline, by R. H. Espach and O. C. Blade. 1932. 22 pp., 2 figs. Presents a study of a lamp-method test for determining amount of sulphur, by weight, contained in motor fuels. Several lamp-method tests are discussed. Results of sulphur determinations are also discussed. 5 cents.
- †TP 514. Accident Experience and Cost of Accidents at Washington Metal Mines and Quarries, by S. H. Ash. 1932. 35 pp. Includes operating statistics, industrial insurance law, accident-prevention regulations, and cost of medical aid.
- †TP 515. Safety Organizations at Lake Superior Iron Mines, by F. S. Crawford. 1932. 32 pp. Gives information on forms of organizations and the work done by safety committees of iron-mining companies in the Lake Superior region.
- †TP 516. Natural Ventilation of Michigan Copper Mines, by G. E. McElroy. 1932. 40 pp., 5 figs. Discusses methods and practices for Michigan copper mines as obtained by brief personal surveys in July 1928 and July and August 1930, supplemented by information furnished by the mine managements.
- TP 517. Transportation of Gasoline by Pipe Line, by C. P. Bowie. 1932. 24 pp., 10 figs. Treats of the design and construction of a pipe-line system. Compares cost of transportation by pipe lines with cost of barging and trucking. 10 cents.
- TP 518. Construction of Master Mechanical Oscillator for Testing Seismic Recorders and Other Allied Apparatus, by F. W. Lee and G. A. Irland. 1932. 17 pp., 15 figs. Gives specifications and discusses principle of operation, optical measuring system, measurement of constants, and elementary mathematical relations controlling vibration of table. 5 cents.
- TP 519. Carbonizing Properties and Constitution of Washed and Unwashed Coal from Mary Lee Bed, Flat Top, Jefferson County, Ala., by A. C. Fieldner, J. D. Davis, R. Thiessen, E. B. Kester, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk. 1932. 78 pp., 60 figs. The fourth of a series of papers covering a survey of the gas-, coke-, and byproduct-making properties of American coals being conducted by the bureau in cooperation with the American Gas Association. Shows the effect of washing upon the yield and quality of carbonization products of washed and unwashed coal from the Mary Lee Bed at Flat Top, Ala. 10 cents.
- TP 520. Falls of Roof and Coal in Mines Operating in the Sewickley Coal Bed in Monongalia County, W. Va., by J. W. Paul and J. N. Geyer. 1932. 31 pp., 17 figs. The second of a series of three papers devoted to mines at the Fairmont mining district of West Virginia. Gives the results of studies conducted in coal mines to ascertain the nature of the safety measures used to prevent injury to the workmen from falls of roof and coal. 5 cents.
- †TP 521. Oil Prospecting in Kentucky by Resistivity Methods, by J. H. Swartz. 1932. 23 pp., 16 figs. Summarizes results of a study of resistivity measurements as applied to petroleum prospecting.
- TP 522. Falls of Roof and Coal in Mines Operating in the Pittsburgh Coal Bed in Marion and Monongalia Counties, W. Va., by J. W. Paul and J. N. Geyer. 1932. 43 pp., 24 figs. The last of three papers covering mines in the Fairmont mining district of West Virginia. Relates to six coal mines in Marion County and three mines in Monongalia County. Summarizes the individual reports of the operators. 10 cents.
- TP 523. A Study of High-Manganese Slags in Relation to the Treatment of Low-Grade Manganiferous Ores, by C. H. Herty, jr., J. E. Conley, and M. B. Royer. 1932. 36 pp., 14 figs. Presents results of investigation for purpose of obtaining a fluid slag conforming to the requirements of a ferro-grade ore. 5 cents.
- TP 524. Carbonizing Properties and Constitution of No. 6 Bed Coal from West Frankfort, Franklin County, Ill., by A. C. Fieldner, J. D. Davis, R. Thiessen, E. B. Kester, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk. 1932. 60 pp., 35 figs. Gives results of carbonizing Orient coal at both low and high temperatures and compares the results with those obtained on the same coal in gas retorts and coke ovens. 10 cents.

† Out of print.

- TP 525. Carbonizing Properties and Constitution of Pittsburgh Bed Coal from Edenborn Mine, Fayette County, Pa., by A. C. Fieldner, J. D. Davis, R. Thiessen, E. B. Kester, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk. 1932. 60 pp., 39 figs. Describes investigation that was made primarily because this coal is being carbonized unmixed with low-volatile coal in byproduct ovens in the vicinity of Pittsburgh, and the results from these ovens were available for comparison with the Bureau test results. 10 cents.
- TP 526. Coke-Oven Accidents in the United States during the Calendar Year 1931, by W. W. Adams and L. Chenoweth. 1932. 15 pp. 5 cents.
- TP 527. Compressibility and Bearing Strength of Coal in Place: Tests of Lateral Compression of Pittsburgh Coal Bed, by H. P. Greenwald, S. Avins, and G. S. Rice. 1933. 12 pp., 8 figs. Gives results of investigation of compressibility and bearing strength of pillars needed to support important surface structures and of adequacy of barrier pillars and dams to resist water pressure from abandoned adjacent workings. 5 cents.
- †TP 528. A Magnetic Study of Some Iron Deposits, by E. F. Stratton and J. W. Joyce. 1932. 32 pp., 20 figs. Describes the operation of the magnetometer and gives possible interpretations of anomalies determined by its use which would have practical value to the geologist and mining engineer; presents as examples the results of magnetic studies in certain important iron districts east of the Mississippi River.
- TP 529. Analyses of Montana Coals. 1932. 129 pp., 2 figs. Outlines coal fields; presents data on production, markets, and transportation; analyzes coal samples and delivered coals; and describes samples. 10 cents.
- TP 530. Accidents at Metallurgical Works in the United States during the Calendar Year 1930, by W. W. Adams. 1932. 36 pp. 5 cents.
- TP 531. Carbonizing Properties and Constitution of Black Creek Bed Coal from the Empire Mine, Walker County, Ala., by A. C. Fieldner, J. D. Davis, R. Thiessen, E. B. Kester, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk. 1932. 44 pp., 27 figs. One of a series covering survey of gas-, coke-, and byproduct-making properties of American coals being conducted by the Bureau in cooperation with American Gas Association. Describes carbonization tests and states yield and quality of carbonization products in detail. Chemical and physical properties of the coal are ascertained in results of chemical analyses and tests. Results of petrographic examination of column sample of the coal are also described and illustrated. 10 cents.
- TP 532. Accidents at Metallurgical Works in the United States during the Calendar Year 1931, by W. W. Adams. 1933. 14 pp. 5 cents.
- TP 533. Statistical Microscopic Examination of Mill Products of the Copper Queen Concentrator of the Phelps Dodge Corporation, Bisbee, Ariz., by R. E. Head, A. L. Crawford, F. E. Thackwell, and Glen Burgener. 1932. 48 pp., 7 figs. A summary of results is followed by tabulated data, with a description and brief discussion preceding each table. Graphs and photomicrographs assist in visualizing conditions described in text. A more expanded discussion of various phases of the problem is assembled in appendix form under miscellaneous headings. Notes on methods of examination and information of interest and possible significance obtained during study are considered. 5 cents.
- TP 534. Falls of Roof and Coal in Mines Operating in Pittsburgh Coal Bed, Panhandle District, W. Va., by J. W. Paul and J. N. Geyer. 1932. 34 pp., 17 figs. Summarizes results of studies in six coal mines opened in Pittsburgh coal bed in Brooke, Ohio, and Marshall Counties. 5 cents.
- †TP 535. Crater Wells, Richland Gas Field, Louisiana, by H. B. Hill. 1932. 37 pp., 28 figs. Presents history of craters in Richland gas field; discusses equipment and methods of control. Photographs show surface conditions at various intervals in the life of the craters. Subsurface conditions are interpreted by graphic logs and cross-sections.
- TP 536. Pneumatic Tabling of Coal; Effect of Specific Gravity, Size, and Shape, by H. F. Yancey and C. B. Porter. 1932. 18 pp., 3 figs. Discusses investigation of fundamental principles involved in pneumatic cleaning of coal with object of assisting coal producing and consuming public to profit by advantages and economies inherent in use of clean, efficiently prepared coal. 5 cents.

† Out of print.

Technical Papers

- TP 537. Maintenance of Electrical Mine Equipment from the Viewpoint of the Safety Inspector, by E. J. Gleim and H. B. Freeman. 1932. 22 pp. Includes inspection questionnaire, outlines inspection procedure, and discusses safety aspect of more common defects in permissible mine equipment and their relation to maintenance. Examples of practices adopted by operators to promote safety by combating neglect and carelessness in maintenance of equipment are also noted. 5 cents.
- TP 538. A Survey of the High-Sulphur Crude Oils (Black Oils) Produced in Wyoming, by H. M. Thorne and Walter Murphy. 1932. 56 pp., 3 figs. This preliminary survey includes a brief history of black-oil fields in Wyoming, together with potential and actual production of each field; a Bureau of Mines Hempel analysis of each crude; and a discussion of different products that may be obtained from these crudes, as indicated by analyses. 10 cents.
- TP 539. Deviation of Natural Gas from Boyle's Law, by T. W. Johnson and W. B. Berwald. 1932. 29 pp., 7 figs. Presents part of findings based upon cooperative work of Bureau of Mines and American Gas Association. Previous authoritative reference in literature to deviation of natural gas from Boyle's law was confined largely to Technical Papers 131 and 158, but the data presented were for relatively low pressures. In the present work the pressures are of range found in high-pressure natural-gas transmission lines and in underground reservoirs. 5 cents.
- TP 540. Production of Explosives in the United States During the Calendar Year 1931, by W. W. Adams and L. S. Gerry. 1932. 42 pp. 5 cents.
- TP 541. A Study of Mine Roof of the Pittsburgh Coal Bed in the Pittsburgh Mining District, by J. W. Paul and L. N. Plein. 1932. 97 pp., 33 figs. Discusses study made by Bureau of Mines to determine to what extent system of mining, method of roof support, and regulations and practices respecting timbering influence falls of roof and coal which injure or kill miners, and calls attention to preventive measures. 10 cents.
- TP 542. Carbonizing Properties and Constitution of Chilton Bed Coal from Boone No. 2 Mine, Logan County, W. Va., by A. C. Fieldner, J. D. Davis, R. Thiessen, E. B. Kester, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk. 1932. 60 pp., 34 figs. Another of series covering survey of gas-, coke-, and byproduct-making properties of American coals being conducted by the Bureau in cooperation with American Gas Association. See TP 531. 10 cents.
- TP 543. Comparison of Small- and Large-Scale Experimental Carbonizing Apparatus; Tests of Pittsburgh Bed Coal from Allison Mine, Fayette County, Pa., and of a Coal from the Michel Mine, British Columbia, by A. C. Fieldner, J. D. Davis, E. B. Kester, W. A. Selvig, D. A. Reynolds, and F. W. Jung. 1932. 34 pp., 23 figs. Gives description and properties of coals and tabulates results of carbonizing tests. 5 cents.
- TP 544. Explosive Properties of Acetone-Air Mixtures, by G. W. Jones, E. S. Harris, and W. E. Miller. 1933. 26 pp., 11 figs. Describes one phase of an investigation conducted to determine the limits of inflammability of acetone-air mixtures at laboratory and elevated temperatures, effect of water vapor on the lower inflammable limit, pressures developed when inflammable mixtures of acetone in air are ignited at laboratory and elevated temperatures, and speed of flame propagation of acetone-air mixtures. 5 cents.
- †TP 545. Silicosis and Tuberculosis Among Miners of Tri-State District of Oklahoma, Kansas, and Missouri-I, for the Year Ended June 30, 1928, by R. R. Sayers, F. W. Meriwether, A. J. Lanza, and W. W. Adams. 1933. 30 pp., 12 figs. First of a proposed series dealing with data obtained by physical examination of men employed in lead and zinc mines of Picher mining district of Oklahoma and Kansas; describes technique of X-ray photography and explains specimens given to illustrate stages of disease. 5 cents.
- †TP 546. Theory of Torsion Balance, with Preliminary Study of Modification of Instrument to Decrease Time of Gravity Measurements, by J. W. Joyce. 1933. 46 pp., 21 figs. Presents theoretical discussion of principles and properties of gravity field and interrelation of physical quantities involved in torsion-balance equation; considers some practical features of torsion balance; and describes an investigation of problem of reducing free period of balance system.

- TP 547. Falls of Roof in Mines Operating in Pittsburgh Coal Bed, West Virginia, by J. W. Paul and J. N. Geyer. 1933. 23 pp., 10 figs. Summarizes studies in 20 mines in Pittsburgh coal bed in Fairmont and Panhandle districts, W. Va. Discusses methods and practices which afford workmen greatest protection against falls of roof and sides, with particular reference to application in other mines. 5 cents.
- TP 548. Carbonizing Properties and Constitution of No. 2 Gas Bed Coal from Point Lick No. 4 Mine, Kanawha County, W. Va., by A. C. Fieldner, J. D. Davis, R. Thiessen, E. B. Kester, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk. 1933. 52 pp., 31 figs. One of series covering survey of gas-, coke-, and byproduct-making properties of American coals being conducted by Bureau in cooperation with American Gas Association. See TP 531. 10 cents.
- TP 549. Unwatering Flooded Coal Mines in Washington, by S. H. Ash and Thomas Murphy. 1933. 18 pp., 7 figs. Discusses specific instances of successful unwatering by operators. Describes pump installations, including types, rooms, capacity, power required, electrical systems, and fire protection. A few drainage costs are given. 5 cents.
- TP 550. A Study of Roof in Pennsylvania Mines Contiguous to Monongahela River, by J. W. Paul and J. G. Calverley. 1933. 31 pp., 16 figs. Third paper on groups of representative mines in Pittsburgh coal bed in western Pennsylvania. Covers study at seven mines adjacent to Monongahela River, lists commendable features, and recommends safety measures respecting care of roof. 5 cents.
- TP 551. Safety at Petroleum Cracking Plants, by R. L. Marek. 1933. 92 pp., 26 figs. Reviews principles underlying good design of cracking equipment and outlines fundamental factors that influence design of safe cracking equipment, safe operation of cracking plants, and methods of inspection and maintenance refiners are using to assure safety of their workmen and plants. Data were obtained from study of conditions at cracking plants and have been augmented by search of related literature. 10 cents.
- TP 552. Silicosis and Tuberculosis Among Miners of the Tri-State District of Oklahoma, Kansas, and Missouri-II, for Year Ended June 29, 1929, by F. V. Meriwether, R. R. Sayers, and A. J. Lanza. 1933. 28 pp. Second of proposed series dealing with data obtained from physical examinations of men employed in lead and zinc mines of Picher field, in Oklahoma and Kansas, of Tri-State district. Deals with relation of certain infectious diseases to silicosis, production rate of silicosis, and progress in controlling silicosis and tuberculosis in Picher district. 5 cents.
- TP 553. Protection of Equipment Containing Explosive Acetone-Air Mixtures by the Use of Diaphragms, by G. W. Jones, E. S. Harris, and B. B. Beattie. 1933. 24 pp., 19 figs. Describes one phase of investigation conducted to determine explosive characteristics of acetone-air mixtures formed by use of acetone in cellulose acetate wire-coating machines. Deals with protection of equipment from effects of explosions by use of definitely rupturable diaphragms. 5 cents.
- TP 554. Solubility and Liberation of Gas from Natural Oil-Gas Solutions, by Ben E. Lindsly. 1933. 65 pp., 16 figs. Gives specific data on gas solubility in three different types of fields—Oklahoma City, Kettleman Hills, and Ventura Avenue, California—and lays groundwork for further study of this important subject in many producing areas by engineers in industry. Better oil and gas laws and regulations pertaining to conservation can be formulated on basis of this increased knowledge regarding gas which comes out of oil when pressure is reduced. 10 cents.

Technical Papers

- TP 555. Viscosity of Natural Gasoline, by W. B. Berwald and T. W. Johnson. 1933. 34 pp., 9 figs. Discusses briefly viscosity of fluids; shows from data of previous experimenters that same general laws of fluid motion apply to analysis of flow of either liquids or gases; discusses method developed from these general laws of fluid motion for measuring viscosity of natural gases accurate and practical enough for use in natural-gas engineering. Gives application of viscosity data to analysis of some gas-engineering problems in addition to experimental results obtained, results of study of published data pertaining to viscosity of pure gases and gas mixtures and effect of temperature and pressure on gas viscosities. 5 cents.
- TP 556. A Study of Some Seismometers, by G. A. Irland. 1935. 48 pp., 25 figs. Presents results of an experimental investigation of seismometers developed by the Bureau of Mines; these are especially adapted to measure vibrations caused by blasting or similar disturbances. The work presents an effort to develop a simple, lightweight, portable instrument that will measure these vibrations accurately. Explains the design of certain horizontal and vertical recorders and describes tests of the vertical recorder on a mechanical oscillator, the motion of which is accurately known, so as to show the reliability and accuracy of the instrument. 10 cents.
- TP 557. Accidents at Metallurgical Works in the United States During the Calendar Year 1932, by W. W. Adams. 1933. 15 pp. 5 cents.
- TP 558. Production of Explosives in the United States during the Calendar Year 1932, by W. W. Adams and L. S. Gerry. 1933. 26 pp. 5 cents.
- TP 559. Coke-Oven Accidents in the United States during the Calendar Year 1932, by W. W. Adams and L. Chenoweth. 1933. 15 pp. 5 cents.
- TP 560. Corrosion of Steel by Gases Containing Traces of Hydrogen Sulphide; Effect of Pressure and Moisture Conditions, by John M. Devine, C. J. Wilhelm, and Ludwig Schmidt. 1933. 20 pp., 4 figs. Gives first authentic information on a type of corrosion which, if not controlled, may necessitate large expenditures for replacement of pipe and equipment. Range of usefulness of data presented in this paper extends to entire natural-gas industry and to others who may transport gases containing traces of hydrogen sulphide. 5 cents.
- TP 561. Mechanical Equipment Used in the Drilling and Production of Oil and Gas Wells in the Oklahoma City Field, by Gustav Wade. 1935. 89 pp., 32 figs. Deals with drilling equipment and practices. Describes surface equipment used at wells and on leases for production operations and maintenance of the wells. Gives data that pertain to items required on the wells and their costs, from the time the location is staked until the well reaches the pumping stage. Includes a short description of the lay-out of the system for disposing of salt water produced with the oil in this field. Illustrations supplement the description of new or unusual equipment. 10 cents.
- TP 562. Carbonizing Properties and Constitution of Alma Bed Coal from Spruce River No. 4 Mine, Boone County, W. Va., by A. C. Fieldner, J. D. Davis, R. Thiessen, E. B. Kester, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk. 1935. 41 pp., 25 figs. The eleventh of a series of papers covering survey of gas-, coke-, and byproduct-making properties of American coals being conducted by the Bureau in cooperation with American Gas Association. Gives the yield and quality of products obtained at carbonizing temperatures of 500° to 1,100° C. and the results of chemical, physical, and petrographic studies of the coal. This high-volatile gas coal is the sixteenth in the series being tested. 10 cents.
- TP 563. A Study of Mine Roof in the Coking District of Western Pennsylvania, by J. W. Paul and L. N. Plein. 1935. 34 pp., 23 figs. Gives data on 12 mines. Shows the number of persons killed and injured by causes. Cites commendable features which have been introduced in the interest of prevention of injury from falls of roof. Lists 30 items suggested to protect further against injury from falls of roof and coal. 5 cents.

- TP 564. Microscopic and Petrographic Studies of Certain American Coals, by Reinhardt Thiessen and G. C. Sprunk. 1935. 71 pp. The object of the work described is to solve the complexity of coal and add to the knowledge of the nature of its constituents. It concerns the petrography and microscopy of six coals studied in connection with the Bureau's work on the carbonizing properties and constitution of American coals. These coals are from Green River bed, Green River mine, Muhlenberg County, Ky.; Upper Freeport bed, Wildwood mine, Allegheny County, Pa.; Pittsburgh bed, Consolidation No. 63 mine, Marion County, W. Va.; Pratt bed, Wylam No. 8 mine, Jefferson County, Ala.; Sewell bed, Summerlee mine, Fayette County, W. Va.; and Sewell bed, Cranberry mine, Raleigh County, W. Va. 10 cents.
- TP 565. Reduction of Evaporation Losses from Gasoline Bulk-Storage Stations, by Ludwig Schmidt and C. J. Wilhelm. 1935. 35 pp., 19 figs. Gives the results of evaporation tests of several typical bulk stations to determine the evaporation losses under different operating conditions and with equipment of different degrees of tightness and general upkeep, and deals primarily with the reduction of evaporation losses of gasoline from bulk storage stations equipped with tanks having a capacity of 10,000 to 12,000 gallons. 5 cents.
- TP 566. Flame-Arresting Limitations of Flat Joints and Plain Bearings in Explosion-Proof Mine Equipment, by E. J. Gleim and R. S. James. 1935. 26 pp., 6 figs. Presents data obtained in the Bureau's study of the limits of flange and bearing protection; also gives data by which to compare the protection required in natural-gas atmospheres with that required in gasoline-vapor atmospheres. 5 cents.
- TP 567. Preventing Accidents by the Proper Use of Permissible Explosives, by D. Harrington and S. P. Howell. 1936. 43 pp., 15 figs. Gives in detail present status of use of permissible explosives compared with previous years and with nonpermissible explosives for anthracite, bituminous, and all coal mines. 10 cents.
- TP 568. Hazard of Igniting Coal by Electric Circuits in Mines, by H. B. Freeman. 1936. 31 pp., 4 figs. Presents the result of the Bureau's study to determine the ease of igniting coal as a measure of the hazard of mine fires caused by electric circuits and equipment. 5 cents.
- TP 569. Analyses of New Mexico Coals. 112 pp., 1 fig. The nineteenth of a series on coal analyses. Gives analytical data showing the composition and quality of the coals of the State, description of the geologic structure of the coal basins, typical mining conditions in the different districts, and principal economic data of the industry. Presents salient facts regarding the occurrence, reserves, quality, characteristics, production, and uses of the coals of the State. 15 cents.
- TP 570. Carbonizing Properties and Petrographic Composition of Clintwood Bed Coal from Buchanan Mines nos. 1 and 2, Buchanan County, Va., by A. C. Fieldner, J. D. Davis, R. Thiessen, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk. 1936. 34 pp. 19 figs. The twelfth of a series of papers covering survey of gas-, coke-, and byproduct-making properties of American coals being conducted by the Bureau in cooperation with American Gas Association. Gives the yield and quality of products obtained at carbonizing temperatures of 500°, 600°, and 700° C., using a retort 13 inches in diameter, and at 800°, 900°, and 1,000° C., using a retort 18 inches in diameter. It also gives results of chemical, physical, and petrographic studies of the coal. 10 cents.
- TP 571. Carbonizing Properties and Petrographic Composition of Pittsburgh Bed Coal from Pittsburgh Terminal No. 9 mine, Washington County, Pa., by A. C. Fieldner, J. D. Davis, R. Thiessen, W. A. Selvig, D. A. Reynolds, G. C. Sprunk, and F. W. Jung. 1936. 33 pp. 21 figs. Gives the yield and quality of products obtained at carbonizing temperatures of 500°, 600°, and 700° C., using charges of 85 pounds, and at 800°, 900°, and 1,000° C., using charges of 185 pounds. It also gives results of chemical, physical, and petrographic studies of the coal. 10 cents.

- TP 572. Carbonizing Properties and Petrographic Composition of Millers Creek Bed Coal from Consolidation No. 155 Mine, Johnson County, Ky., and the Effect of Blending Millers Creek Coal with Pocahontas Bed and Pittsburgh Bed (Warden mine) Coals, by A. C. Fieldner, J. D. Davis, R. Thiessen, W. A. Selvig, D. A. Reynolds, G. C. Sprunk, and C. R. Holmes. 1937. 50 pp. 27 figs. The fourteenth of a series of papers covering survey of gas-, coke-, and byproduct-making properties of American coals being conducted by the Bureau in cooperation with American Gas Association. Gives the results of chemical, physical, and microscopic examination and the yield and quality of gas, coke, and byproducts obtained on carbonizing, by the BM-AGA method, high-volatile A coal (60.1 percent dry, mineral-matter-free fixed carbon and 14,380 moist, mineral-matter-free B. t. u.) from the Millers Creek bed, Consolidation No. 155 mine, in Johnson County, Ky., and blends this coal with Pocahontas No. 4 and Pittsburgh bed coals. 10 cents.
- TP 573. Origin and Petrographic Composition of the Lower Sunnyside Coal of Utah, by Reinhardt Thiessen and G. C. Sprunk. 34 pp., 20 figs. 1937. The coals thus far studied in the Bureau of Mines survey of American coals are found in the deposits of Upper Paleozoic times. Lower Sunnyside coal is from the Upper Cretaceous. It is geologically separated from the former by a long time interval. This paper discusses geology, macroscopic appearance, and microscopic appearance. 10 cents.
- TP 574. Analyses of Colorado Coals, by R. D. George, E. H. Denny, W. H. Young, N. H. Snyder, A. C. Fieldner, H. M. Cooper, and R. F. Abernethy. 1937. 327 pp., 2 figs. The twentieth of a series on coal analyses. Gives analytical data showing the composition and quality of the coals of the State, description of the geologic structure of the coal basins, typical mining conditions in the different districts, and principal economic data of the industry. Presents salient facts regarding the occurrence, reserve, quality, characteristics, production, and uses of the coals of the State. 25 cents.
- TP 575. Tests of the Compressibility and Bearing Strength of Potash Salt, by H. P. Greenwald and H. C. Howarth, with foreword by George S. Rice. 1937. 32 pp., 16 figs. Describes tests made at the Carlsbad (N. Mex.) potash mines, first, in a compression machine, second, by a hydraulic jack placed horizontally, and third, in a special hydraulic-pressure machine, from which strength of pillars can be estimated to determine suitability of any proposed method of mining. Also describes tests of roof salt, suggests possibilities of application of conclusions of tests to mining operations, and stresses importance of studies of compression of the salt. 10 cents.
- TP 576. Bibliography of United States Bureau of Mines Investigations on Coal and Its Products, 1910-35, by A. C. Fieldner, Alden H. Emery, and M. W. von Bernewitz. 1937. 145 pp. Lists nearly 2,000 reports on subject by members of Bureau of Mines personnel. Includes index by subjects and authors. 5 cents.

ECONOMIC PAPERS

- EP 1. Summarized Data of Copper Production, by C. E. Julihn and others. 1928. 32 pp., 17 figs. Presents records of world copper production for the past 127 years. 10 cents.
- EP 2. Summarized Data of Zinc Production, by E. W. Pehrson and others. 1929. 47 pp., 20 figs. Gives the consolidated data of world production of zinc from 1801 to 1927. 15 cents.
- EP 3. Historical Summary of Gold, Silver, Copper, Lead, and Zinc Produced in California, 1848 to 1926, by J. M. Hill. 1929. 22 pp., 3 figs. Presents history of metal production in California to 1926. 5 cents.
- EP 4. Strontium from a Domestic Standpoint, by R. M. Santmyers. 1929. 19 pp. Presents the economic aspects of the strontium industry in the principal producing countries—England, Germany, Canada, Sicily, and the United States. 5 cents.
- EP 5. Summarized Data of Lead Production, by L. A. Smith and others. 1929. 44 pp., 19 figs. Shows the relation of production in the United States to that of the world. 15 cents.
- †EP 6. Summarized Data of Gold Production, by R. H. Ridgway and others. 1929. 63 pp., 17 figs. Presents records of world gold production during the years 1493 to 1927, inclusive.
- †EP 7. Economics of New Sand and Gravel Developments, by J. R. Thoenen. 1929. 60 pp., 23 figs. Presents, in condensed form, the factors that require study by the new operator in establishing his business on a sound basis.
- †EP 8. Summarized Data of Silver Production, by C. W. Merrill and others. 1930. 58 pp., 17 figs. Presents records of world silver production for the past 435 years.
- †EP 9. Petroleum Coke: An Economic Survey of Its Production and Uses, by E. B. Swanson. 1930. 29 pp., 4 figs.
- EP 10. Economic Relations of Silver to Other Metals in Argentiferous Ores, by C. W. Merrill and others. 1930. 29 pp. Presents basic data, with some emphasis on important economic relations of the various metals from silver-bearing ores. 10 cents.
- †EP 11. The Economics of Strip-Coal Mining, by O. E. Kiessling, F. G. Tryon, and L. Mann. 1931. 32 pp., 7 figs.
- EP 12. The Economics of Crushed-Stone Production, by Oliver Bowles. 1931. 62 pp., 49 figs. 15 cents.
- EP 13. Summarized Data of Tin Production, by J. B. Umhau and others. 1932. 34 pp., 13 figs. Gives a statistical summary of tin production of the world from 1801 to 1930, inclusive. 10 cents.
- †EP 14. Consumption of Silver in the Arts and Industries of the United States, by C. W. Merrill and others. 1932. 18 pp., 3 figs. Shows the quantities of silver used in the various industries in 1928 and 1929.
- †EP 15. Molybdenum, by A. V. Petar. 1932. 38 pp. Discusses occurrence, production, foreign sources of supply, and uses.
- EP 16. Potash, by B. L. Johnson. 1933. 78 pp., 1 fig. Comprehensive summary of potash situation from domestic standpoint; will be valuable in view of importance of making United States independent of foreign potash monopoly. 10 cents.
- EP 17. Arsenic, by Paul M. Tyler and Alice V. Petar. 1934. 35 pp. Arsenic is a rather important mineral, as it is used in many industries; it is one of the most effective weapons in the continued warfare against insects. 5 cents.
- EP 18. Statistical Analysis of the Progress in Mechanical Cleaning of Bituminous Coal from 1927 to 1934, by L. N. Plein. 1936. 25 pp., 2 figs. Assembles accurate statistics of the present extent of mechanical cleaning and indicates causes underlying its remarkable growth. 10 cents.

† Out of print.

MINERAL RESOURCES

- Mineral Resources of the United States, 1924, F. J. Katz, engineer in charge, Division of Mineral Resources and Statistics.
 Part I, Metals. 1927. 701 pp., 15 figs. \$1.
 Part II, Nonmetals. 1927. 728 pp., 33 figs. \$1.
- Mineral Resources of the United States, 1925, F. J. Katz, engineer in charge, Division of Mineral Resources and Statistics.
 Part I, Metals. 1928. 828 pp., 4 figs. \$1.
 Part II, Nonmetals. 1928. 615 pp. \$1.
- Mineral Resources of the United States, 1926, F. J. Katz, engineer in charge, Division of Mineral Resources and Statistics.
 Part I, Metals. 1929. 774 pp., 4 figs. \$1.25.
 Part II, Nonmetals. 1929. 675 pp., 30 figs. \$1.
- Mineral Resources of the United States, 1927, F. J. Katz, engineer in charge, Division of Mineral Resources and Statistics.
 Part I, Metals. 1930. 782 pp. \$1.25.
 Part II, Nonmetals. 1930. 687 pp., 33 figs. \$1.
- Mineral Resources of the United States, 1928, F. J. Katz, engineer in charge, Division of Mineral Resources and Statistics.
 Part I, Metals. 1931. 910 pp., 1 fig. \$1.25.
 Part II, Nonmetals. 1931. 801 pp., 63 figs. \$1.25.
- Mineral Resources of the United States, 1929, F. J. Katz, engineer in charge, and O. E. Kiessling, chief economist, Division of Mineral Resources and Statistics.
 Part I, Metals. 1932. 968 pp., 1 fig. \$1.50.
 Part II, Nonmetals. 1932. 858 pp., 57 figs. \$1.25.
- Mineral Resources of the United States, 1930, O. E. Kiessling, chief economist, Division of Mineral Resources and Statistics.
 Part I, Metals. 1933. 1142 pp. \$1.50.
 Part II, Nonmetals. 1932. 876 pp., 60 figs. \$1.50.
- Mineral Resources of the United States, 1931, O. E. Kiessling, chief economist, Division of Mineral Resources and Statistics.
 Part I, Metals. 1934. 710 pp. \$1.50.
 Part II, Nonmetals. 1934. 675 pp., 53 figs. \$1.
- Minerals Yearbook, 1932-33, O. E. Kiessling, chief economist, Division of Mineral Statistics. 1933. 819 pp., 90 figs. This issue represents a change in the method of presenting statistics on economic discussions of minerals. It furnishes statistical information regarding all commercially important minerals, takes the place of "Mineral Resources of the United States," and presents a statistical and economic résumé of conditions in the mineral industries. Includes 61 chapters and presents concisely in a single volume all essential data, arranged in a form well-adapted to ready reference. \$1.25.
- Minerals Yearbook, 1932-33, Statistical Appendix, O. E. Kiessling, chief economist, Division of Mineral Statistics. 1934. 554 pp., 10 figs. The appendix is a necessary supplement to the Minerals Yearbook, as it includes figures that, up to the printing of the Yearbook were preliminary. It comprises 26 chapters containing descriptive text, charts, and tables giving final statistical data. \$1.
- Minerals Yearbook, 1934, O. E. Kiessling, chief economist, Division of Mineral Statistics. 1934. 72 chapters. 1154 pp., 106 figs. \$1.75.
- Minerals Yearbook, 1934, Statistical Appendix, O. E. Kiessling, chief economist, Division of Mineral Statistics. 1935. 17 chapters. 475 pp., 7 figs. \$1.
- Minerals Yearbook, 1935, O. E. Kiessling, chief economist, Mineral Resources and Economics Division. 1935. 75 chapters. 1293 pp., 129 figs. \$2.
- Minerals Yearbook, 1935, Statistical Appendix, O. E. Kiessling, chief economist, Mineral Production and Economics Division. 1936. 15 chapters. 442 pp. \$1.25.

Minerals Yearbook, 1936, compiled under the supervision of O. E. Kiessling and H. H. Hughes, Mineral Resources and Economics Division. 1936. 69 chapters. 1136 pp., 154 figs. \$2. Chapters listed below are also obtainable separately from the Superintendent of Documents at the price stated.

Part II. Metals:

- Copper, by J. W. Furness and H. M. Meyer. Pp. 107-135. 2 figs. 10 cents.
 Lead, by Elmer W. Pehrson and H. M. Meyer. Pp. 137-156. 1 fig. 5 cents.
 Zinc, by Elmer W. Pehrson. Pp. 157-179. 1 fig. 5 cents.
 Lead and Zinc Pigments and Zinc Salts, by Elmer W. Pehrson and H. M. Meyer. Pp. 181-192. 1 fig. 5 cents.
 Gold, Silver, Copper, Lead, and Zinc in Colorado (Mine Report), by Chas. W. Henderson and A. J. Martin. Pp. 243-279. 10 cents.
 Gold, Silver, Copper, Lead, and Zinc in New Mexico (Mine Report), by Chas. W. Henderson and A. J. Martin. Pp. 311-321. 5 cents.
 Gold, Silver, Copper, and Lead in South Dakota (Mine Report), by Chas. W. Henderson and A. J. Martin. Pp. 331-336. 5 cents.
 Gold, Silver, Copper, Lead, and Zinc in Texas (Mine Report), by Chas. W. Henderson and A. J. Martin. Pp. 337-339. 5 cents.
 Gold, Silver, Copper, and Lead in Wyoming (Mine Report), by Chas. W. Henderson and A. J. Martin. Pp. 341-344. 5 cents.
 Secondary Metals, by J. P. Dunlop. Pp. 345-363. 1 fig. 5 cents.
 Iron Ore, Pig Iron, Ferro-Alloys, and Steel, by O. E. Kiessling, H. W. Davis, and C. T. Herring. Pp. 365-394. 5 figs. 10 cents.
 Bauxite and Aluminum, by R. B. Miller and C. T. Herring. Pp. 395-412. 2 figs. 5 cents.
 Mercury, by H. M. Meyer. Pp. 413-424. 1 fig. 5 cents.
 Manganese and Manganiferous Ores, by Robert H. Ridgway. Pp. 425-441. 1 fig. 5 cents.
 Molybdenum, by J. W. Furness. Pp. 443-445. 5 cents.
 Tungsten, by Robert H. Ridgway and J. B. Umhau. Pp. 447-455. 1 fig. 5 cents.
 Tin, by Charles White Merrill. Pp. 457-474. 1 fig. 5 cents.
 Chromite, by Robert H. Ridgway. Pp. 475-486. 1 fig. 5 cents.
 Antimony, by F. M. Shore and H. M. Meyer. Pp. 487-494. 1 fig. 5 cents.
 Arsenic, by A. P. van Sieten and C. N. Gerry. Pp. 495-500. 5 cents.
 Radium, Uranium, and Vanadium, by Richard J. Lund. Pp. 501-508. 5 cents.
 Platinum and Allied Metals, by H. W. Davis. Pp. 509-518. 1 fig. 5 cents.
 Nickel, by R. B. Miller. Pp. 519-524. 5 cents.
 Minor Metals: Beryllium, Bismuth, Cadmium, Cobalt, Selenium, Tantalum and Columbium, Tellurium, Titanium, and Zirconium, by Paul M. Tyler and A. P. van Sieten. Pp. 525-541. 5 cents.

Part III. Nonmetals:

- Coke and Byproducts, by W. H. Young, H. L. Bennit, and L. N. Plein. Pp. 581-624. 8 figs. 10 cents.
 Recent Developments in Coal Preparation and Utilization, by A. C. Fieldner. Pp. 625-648. 5 cents.
 Fuel Briquets, by L. N. Plein and J. B. Clark. Pp. 649-661. 1 fig. 5 cents.
 Peat, by F. M. Shore. Pp. 663-665. 1 fig. 5 cents.
 Carbon Black, by G. R. Hopkins and H. Backus. Pp. 761-770. 2 figs. 5 cents.
 Helium, by C. W. Seibel and H. S. Kennedy. Pp. 771-773. 5 cents.
 Asphalt and Related Bitumens, by A. H. Redfield. Pp. 775-788. 1 fig. 5 cents.
 Slate, by Oliver Bowles and A. T. Coons. Pp. 833-840. 2 figs. 5 cents.
 Abrasive Materials, by Bertrand L. Johnson and A. E. Davis. Pp. 877-894. 3 figs. 5 cents.
 Phosphate Rock, by Bertrand L. Johnson and B. H. Stoddard. Pp. 931-945. 1 fig. 5 cents.
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 Fluorspar and Cryolite, by H. W. Davis. Pp. 963-979. 1 fig. 5 cents.
 Feldspar, by R. W. Metcalf. Pp. 981-987. 1 fig. 5 cents.

Mineral Resources

Part III. Nonmetals—Continued.

- Asbestos, by Oliver Bowles and B. H. Stoddard. Pp. 989-995. 1 fig. 5 cents.
- Barite and Barium Products, by Bertrand L. Johnson and M. A. Cornthwaite. Pp. 997-1006. 4 figs. 5 cents.
- Potash, by J. H. Hedges. Pp. 1007-1021. 1 fig. 5 cents.
- Magnesium and Its Compounds, by Paul M. Tyler and A. E. Davis. Pp. 1023-1035. 1 fig. 5 cents.
- Mica, by Oliver Bowles and B. H. Stoddard. Pp. 1037-1045. 1 fig. 5 cents.
- Natural Sodium Compounds and Boron Minerals, by A. T. Coons. Pp. 1047-1050. 1 fig. 5 cents.
- Gem Stones, by Sydney H. Ball. Pp. 1051-1056. 5 cents.
- Minor Nonmetals: Graphite, Greensand, Kyanite, Lithium Minerals, Mineral Wool, Monazite, Strontium Minerals, Vermiculite, and Wollastonite, by Paul M. Tyler. Pp. 1057-1073. 5 cents.

Part IV. Mine Safety:

- Employment and Accidents in the Mineral Industries, by W. W. Adams. Pp. 1075-1089. 5 cents.
- Minerals Yearbook, 1937, compiled under the supervision of H. H. Hughes, Economics and Statistics Branch. 1937. 72 chapters. 1502 pp., 120 figs. \$2.25 (in United States, Canada, and Mexico; in other countries, \$2.80). All chapters except nos. 1 and 4 are obtainable from the Superintendent of Documents at the price indicated.

Foreword, by John W. Finch. P. III.

Part I. Survey of the Mineral Industries:

1. Review of the Mineral Industry, by Richard J. Lund. Pp. 1-28. 15 figs.
2. Progress in Mine Mechanization, by O. E. Kiessling, F. G. Tryon, L. N. Plein, and F. E. Berquist. 1937. Pp. 29-52. 10 figs. 5 cents.
3. Statistical Summary of Mineral Production, by M. B. Clark. 1937. Pp. 53-97. 10 cents.
4. World Production of Minerals and Economic Aspects of International Mineral Policies, by J. S. McGrath. 1937. Pp. 99-109.

Part II. Metals:

5. Gold and Silver, by Chas. W. Henderson and J. P. Dunlop. 1937. Pp. 111-139. 10 cents.
6. Copper, by J. W. Furness and H. M. Meyer. 1937. Pp. 141-169. 10 cents.
7. Lead, by Elmer W. Pehrson and H. M. Meyer. Pp. 171-190. 3 figs. 5 cents.
8. Zinc, by Elmer W. Pehrson. Pp. 191-210. 1 fig. 5 cents.
9. Lead and Zinc Pigments and Zinc Salts, by Elmer W. Pehrson and H. M. Meyer. Pp. 211-223. 1 fig. 5 cents.
10. Gold, Silver, Copper, and Lead in Alaska, by Chas. W. Henderson. Pp. 225-231. 5 cents.
11. Gold, Silver, Copper, Lead, and Zinc in Arizona, by C. N. Gerry and Paul Luff. Pp. 233-250. 5 cents.
12. Gold, Silver, Copper, Lead, and Zinc in California, by Charles White Merrill and H. M. Gaylord. Pp. 251-298. 10 cents.
13. Gold, Silver, Copper, Lead, and Zinc in Colorado, by Chas. W. Henderson and A. J. Martin. Pp. 299-341. 10 cents.
14. Gold, Silver, Copper, Lead, and Zinc in the Eastern and Central States, by J. P. Dunlop and H. M. Meyer. Pp. 343-365. 5 cents.
15. Gold, Silver, Copper, Lead, and Zinc in Idaho, by Paul Luff. Pp. 367-403. 10 cents.
16. Gold, Silver, Copper, Lead, and Zinc in Montana, by T. H. Miller. Pp. 405-427. 5 cents.
17. Gold, Silver, Copper, Lead, and Zinc in Nevada, by Charles White Merrill and H. M. Gaylord. Pp. 429-455. 5 cents.
18. Gold, Silver, Copper, Lead, and Zinc in New Mexico, by Chas. W. Henderson and A. J. Martin. Pp. 457-475. 5 cents.
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20. Gold, Silver, Copper, Lead, and Zinc in South Dakota, by Chas. W. Henderson and A. J. Martin. Pp. 499-505. 5 cents.
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Part II. Metals—Continued.

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25. Secondary Metals, by J. P. Dunlop. 1937. Pp. 559-572. 5 cents.
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29. Nickel and Cobalt, by Richard J. Lund. Pp. 641-650. 5 cents.
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31. Bauxite and Aluminum, by Herbert A. Franke and C. T. Herring. Pp. 665-682. 2 figs. 5 cents.
32. Mercury, by H. M. Meyer. Pp. 683-695. 5 cents.
33. Tin, by R. B. Miller. Pp. 697-710. 1 fig. 5 cents.
34. Arsenic and Bismuth, by Herbert A. Franke. Pp. 711-720. 5 cents.
35. Magnesium, by Herbert A. Franke. Pp. 721-729. 1 fig. 5 cents.
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37. Platinum and Allied Metals, by H. W. Davis. Pp. 747-757. 1 fig. 5 cents.
38. Minor Metals, by Paul M. Tyler. Pp. 759-785. 5 cents.

Part III. Nonmetals:

39. Coal: Part 1. Bituminous Coal, by F. G. Tryon, L. Mann, and W. H. Young. Pp. 787-867. 11 figs. Part 2. Pennsylvania Anthracite, by F. G. Tryon, H. L. Bennit, and J. R. Bradley. Pp. 867-890. 2 figs. 15 cents.
40. Coke and Byproducts, by W. H. Young, H. L. Bennit, and M. Otero. Pp. 891-934. 7 figs. 10 cents.
41. Recent Developments in Coal Preparation and Utilization, by Arno C. Fieldner. Pp. 935-954. 5 cents.
42. Fuel Briquets, by L. N. Plein and J. B. Clark. Pp. 955-968. 2 figs. 5 cents.
43. Peat, by F. M. Shore. Pp. 969-972. 1 fig. 5 cents.
44. Crude Petroleum and Petroleum Products, by A. G. White, G. R. Hopkins, and H. A. Breakey. Pp. 973-1052. 8 figs. 10 cents.
45. Natural Gas, by F. S. Lott and G. R. Hopkins. Pp. 1055-1090. 1 fig. 10 cents.
46. Natural Gasoline, by G. R. Hopkins. Pp. 1091-1107. 3 figs. 5 cents.
47. Carbon Black, by G. R. Hopkins and H. Backus. Pp. 1109-1117. 2 figs. 5 cents.
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49. Asphalt and Related Bitumens, by A. H. Redfield. Pp. 1123-1135. 1 fig. 5 cents.
50. Cement, by Oliver Bowles and B. W. Bagley. Pp. 1137-1163. 5 cents.
51. Stone, by Oliver Bowles and A. T. Coons. Pp. 1165-1199. 4 figs. 10 cents.
52. Slate, by Oliver Bowles and M. Schauble. Pp. 1201-1209. 3 figs. 5 cents.
53. Sand and Gravel, by H. H. Hughes and M. A. Cornthwaite. Pp. 1211-1225. 4 figs. 5 cents.
54. Gypsum, by Carl A. Gnam. Pp. 1227-1237. 2 figs. 5 cents.
55. Lime, by Oliver Bowles and A. T. Coons. Pp. 1239-1254. 3 figs. 5 cents.
56. Clays: Kaolin (China Clay and Paper Clay), Ball Clay, Fire Clay, Bentonite, Fuller's Earth (Bleaching Clays), and Miscellaneous Clay, by Paul M. Tyler and R. W. Metcalf. Pp. 1255-1269. 1 fig. 5 cents.
57. Magnesite and Other Magnesium Compounds, by Paul M. Tyler and A. E. Davis. Pp. 1271-1281. 1 fig. 5 cents.
58. Abrasive Materials, by Bertrand L. Johnson and A. E. Davis. Pp. 1283-1300. 3 figs. 5 cents.

Part III. Nonmetals—Continued.

59. Sulphur and Pyrites, by Robert H. Ridgway and A. W. Mitchell. Pp. 1301-1314. 2 figs. 5 cents.
60. Phosphate Rock, by Bertrand L. Johnson and K. G. Warner. Pp. 1315-1328. 1 fig. 5 cents.
61. Tale and Ground Soapstone, by Carl A. Gnam and M. A. Cornthwaite. Pp. 1329-1335. 1 fig. 5 cents.
62. Fluorspar and Cryolite, by H. W. Davis. Pp. 1337-1351. 1 fig. 5 cents.
63. Feldspar, by R. W. Metcalf. Pp. 1353-1362. 1 fig. 5 cents.
64. Asbestos, by Oliver Bowles and M. A. Cornthwaite. Pp. 1363-1370. 1 fig. 5 cents.
65. Barite and Barium Products, by Bertrand L. Johnson and M. A. Cornthwaite. Pp. 1371-1380. 4 figs. 5 cents.
66. Potash, by J. H. Hedges. Pp. 1381-1398. 5 cents.
67. Mica, by Bertrand L. Johnson and M. A. Cornthwaite. Pp. 1399-1411. 2 figs. 5 cents.
68. Salt, Bromine, Calcium Chloride, and Iodine, by A. T. Coons and F. E. Harris. Pp. 1413-1427. 1 fig. 5 cents.
69. Natural Sodium Compounds and Boron Minerals, by A. T. Coons. Pp. 1429-1434. 1 fig. 5 cents.
70. Gem Stones, by Sydney H. Ball. Pp. 1435-1440. 5 cents.
71. Minor Nonmetals: Graphite, Greensand, Kyanite, Lithium Minerals, Mineral Wool, Monazite, Olivine, Strontium Minerals, and Vermiculite, by Paul M. Tyler. Pp. 1441-1451. 5 cents.

Part IV. Mine Safety:

72. Employment and Accidents in the Mineral Industries, by W. W. Adams. Pp. 1453-1465. 2 figs. 5 cents.
- Index, by M. E. Winslow. Pp. 1467-1502.

MONOGRAPHS

- M 1. Ventilation of Vehicular Tunnels, by A. C. Fieldner, Yandell Henderson, J. W. Paul, R. R. Sayers, and others. 1927. 171 pp., 69 figs. Report of the Bureau of Mines to the New York State Bridge & Tunnel Commission and the New Jersey Interstate Bridge & Tunnel Commission. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines.)
- M 2. Experimental Studies on the Effect of Ethyl Gasoline and Its Combustion Products, by R. R. Sayers, A. C. Fieldner, W. P. Yant, and B. G. H. Thomas. 1927. 447 pp., 42 figs. Report of the Bureau of Mines to the General Motors Research Corporation and the Ethyl Gasoline Corporation. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines.)
- M 3. Function of Natural Gas in the Production of Oil, by H. C. Miller. 1929. 256 pp., 36 figs. Report of the Bureau of Mines in cooperation with the Division of Development and Production Engineering of the American Petroleum Institute, based on data gathered and reported by the Kansas and Oklahoma, Pacific coast, Rocky Mountains, and Texas and Louisiana regional committees of the gas-conservation committee of the American Petroleum Institute. (May be obtained only from the American Petroleum Institute, 250 Park Ave., New York, N. Y. Price \$1.)
- †M 4. Warning Agents for Fuel Gases, by A. C. Fieldner, R. R. Sayers, W. P. Yant, S. H. Katz, J. B. Shohan, and R. D. Leitch. 1931. 177 pp., 31 figs. Report of the Bureau of Mines in cooperation with the American Gas Association.
- M 5. Gas-, Coke-, and Byproduct-Making Properties of American Coals and Their Determination, by A. C. Fieldner and J. D. Davis. 1934. 164 pp., 28 figs. Report of the Bureau of Mines in cooperation with the American Gas Association. (May be obtained only from the American Gas Association, 420 Lexington Avenue, New York. Price \$1.50.)
- M 6. Flow of Natural Gas Through High-Pressure Transmission Lines. A joint report by T. W. Johnson and W. B. Berwald. 1935. 120 pp., 25 figs. Based upon experimental work in cooperation with the State of Oklahoma and the natural-gas department of the American Gas Association. (May be obtained only from the American Gas Association, 420 Lexington Avenue, New York. Price \$1.)
- M 7. Back-Pressure Data on Natural-Gas Wells and Their Application to Production Practices, by E. L. Rawlins and M. A. Schellhardt. 1936. 210 pp., 66 figs. Presents a more extended discussion of the subject matter in earlier Bureau of Mines publications relating to the same study. (See RI 2929 and 2930.) Supplements the information they contain with recommended procedure for obtaining data and analyzing results that are more practical and easier to use. In addition, it includes an analysis of the application of back-pressure data to gas-production problems. (May be obtained only from the American Gas Association, 420 Lexington Avenue, New York. Price \$1.50.)

† Out of print.

HANDBOOKS

- †Advanced First-Aid Instructions for Miners, a Report on Standardization, by a Committee of Surgeons: G. H. Halberstadt, A. F. Knoefel, W. A. Lynott, W. S. Rountree, and M. J. Shields. 1917. 142 pp., 65 figs. Superseded by Manual of First-Aid Instruction for Miners.
- Rescue and Recovery Operations in Mines after Fires and Explosions, by J. W. Paul and H. M. Wolffin. 1916. 109 pp. Contains suggestions and advice on the conduct of rescue and recovery operations at coal and metal mines. 10 cents.
- †Efficiency in the Use of Oil Fuel, a Handbook for Boiler-Plant and Locomotive Engineers, by J. M. Wadsworth. 1918. 86 pp. Gives information on the design of burners, furnaces, and boilers, the properties of fuel oil and the methods of obtaining it, and shows how fuel oil can be burned most efficiently.
- †General Information and Rulings for the Enforcement of the Law Regarding the Manufacture, Distribution, Storage, Use, or Possession of Explosives and Their Ingredients, by F. S. Peabody (Assistant to the Director in Charge of Explosives). 1918. 44 pp. Gives directions for operation of law passed by Congress as Public, No. 68, 65th Congress, H. R. 3932, for wartime regulation of explosives manufacture, distribution, and use.
- Self-Contained Oxygen Breathing Apparatus, A Handbook for Miners, by D. J. Parker, G. S. McCaa, and E. H. Denny, Revised in 1933 by G. W. Grove. 1934. 307 pp., 45 figs. Corrects some slight errors in earlier editions, points out changes in apparatus previously approved, and contains information, including questions and answers, on apparatus approved since 1928. In addition to detailed information on construction, testing, use, and care of approved-type apparatus, information on Fleuss-Proto and Draeger 1916-17 apparatus is retained, as they are still being used to a limited extent, although these apparatus are not approved by the Bureau. Approved apparatus are listed in order of their approval by Bureau and nonpermissible types manufactured by same companies, immediately after approved types. 40 cents.
- Manual of First-Aid Instruction. 1930. 221 pp., 107 figs. Shows the proper way of caring for injured or sick persons. Used as a text for the guidance of the Bureau's instructors and intended as a guide and reference book for miners and others. Supersedes edition of 1921. 20 cents.
- †Questions and Answers for the Coal Fireman, by J. F. Barkley. 1930. 17 pp. Handbook written in simple language, for use of practical firemen.
- Questions and Answers for the Home Fireman, by J. F. Barkley. 1933. 34 pp. 5 cents.
- Questions and Answers on Boiler Feed-Water Conditioning, by J. F. Barkley. 1936. 121 pp. 1 fig. 20 cents.
- Manual on Geophysical Prospecting with the Magnetometer, by J. Wallace Joyce. 1937. 129 pp., 53 figs. Discusses magnetic prospecting with the Schmidt-type magnetometer; various factors that influence observations; indicates corrections to be applied to field data, and outlines certain fundamental ideas that underlie the interpretation of magnetic data. (Obtainable only from the American Askania Corporation, Houston, Tex. Price \$1.50.)

†Out of print.

MINERS' CIRCULARS

- †MC 2. Permissible Explosives Tested Prior to January 1, 1911, and Precautions to be Taken in Their Use, by Clarence Hall. 1911. 12 pp. (Superseded by MC 6.)
- †MC 3. Coal-Dust Explosions, by G. S. Rice. 1911. 22 pp. Calls attention to how coal dust is produced in mining and how coal-dust explosions originate and are propagated; summarizes means by which such explosions may be prevented. (Superseded by MC 21.)
- †MC 4. The Use and Care of Mine Rescue Breathing Apparatus, by J. W. Paul. 1911. 28 pp., 5 figs. Superseded by handbook entitled "Self-Contained Mine Rescue Oxygen Breathing Apparatus."
- MC 5. Electrical Accidents in Mines, Their Causes and Prevention, by H. H. Clark, W. D. Roberts, L. C. Ilsley, and H. F. Randolph. 1911. 16 pp., 4 figs. Presents suggestions as to measures that mine foremen, mine electricians, and miners should take to prevent electrical accidents. Also gives directions for the treatment of shock. 5 cents.
- †MC 6. Permissible Explosives Tested Prior to January 1, 1912, and Precautions to be Observed in Their Use, by Clarence Hall. 1912. 20 pp. List of explosives is superseded by lists in Coal-Mine Fatalities in the United States, 1920, and by lists in technical papers of later date.
- †MC 7. The Use and Misuse of Explosives in Coal Mining, by J. J. Rutledge. 1913. 52 pp., 8 figs. Describes precautions to be observed in handling and using permissible explosives and black blasting powder in mines.
- †MC 8. First-Aid Instructions for Miners, by M. W. Glasgow, W. A. Raudenbush, and C. O. Roberts. 1913. 67 pp., 51 figs. (Superseded by MC 23.)
- MC 9. Accidents from Falls of Roof and Coal, by G. S. Rice. 1912. 18 pp. Calls attention to the high death rate from roof falls in coal mines and the precautions to be taken by miners and mine foremen. 5 cents.
- MC 10. Mine Fires and How to Fight Them, by J. W. Paul. 1912. 14 pp. Gives common causes of fires and describes fire-fighting methods. 5 cents.
- MC 11. Accidents from Mine Cars and Locomotives, by L. M. Jones. 1912. 16 pp. Gives precautions that should be followed in traveling haulage roads and in handling mine cars. 5 cents.
- MC 12. Use and Care of Miners' Safety Lamps, by J. W. Paul. 1913. 16 pp., 4 figs. Describes proper methods of examining, cleaning, and filling safety lamps and of testing for gas in a mine. 5 cents.
- MC 13. Safety in Tunneling, by D. W. Brunton and J. A. Davis. 1913. 19 pp. Contains suggestions to superintendents, foremen, and miners on the prevention of accidents. 5 cents.
- MC 14. Gases Found in Coal Mines, by G. A. Burrell and F. M. Seibert. 1914. 23 pp. Describes the gases and their effects on men. 5 cents.
- †MC 15. Rules for Mine Rescue and First-Aid Field Contests, by J. W. Paul. 1913. 12 pp. Recommends rules that have been found satisfactory.
- MC 16. Hints on Coal-Mining Ventilation, by J. J. Rutledge. 1914. 22 pp. Mentions some of the causes of poor ventilation and states what the miner can do to insure good air. 5 cents.
- MC 17. Accidents from Falls of Rock and Ore, by Edwin Higgins. 1914. 15 pp., 8 figs. Describes causes of accidents. 5 cents.
- MC 18. Notes on Miners' Carbide Lamps, by J. W. Paul. 1915. 11 pp. Gives suggestions to the miner, mine foreman, and others on the use and care of carbide lamps. 5 cents.
- MC 19. The Prevention of Accidents from Explosives in Metal Mining, by Edwin Higgins. 1914. 16 pp., 11 figs. Gives suggestions on the storage, handling, and use of fuse, detonator, and explosives. 5 cents.
- MC 20. How a Miner Can Avoid Some Dangerous Diseases, by A. J. Lanza and J. H. White. 1916. 26 pp., 4 figs. Points out the danger from various diseases and the precautions that should be taken. 5 cents.

† Out of print.

Miners' Circulars

- MC 21. What a Miner Can Do to Prevent Explosions of Gas and Coal Dust, by G. S. Rice. 1915. 24 pp. Shows how miners can avoid careless practices. 5 cents.
- MC 22. Dangerous and Safe Practices in Bituminous Mines, by Edward Steidle. 1919. 110 pp., 181 figs. Shows, by numerous pictures, good and bad practice in coal mining, and emphasizes the measures that should be taken to increase safety. 20 cents.
- †MC 23. Elementary First Aid for the Miner, by W. A. Lynott and D. Harrington. 1916. 24 pp., 19 figs.; also printed in Italian, Polish, and Slovak. Superseded by Manual of First-Aid Instruction for Miners.
- †MC 24. Miners' Safety and Health Almanac for 1919, by R. C. Williams. 1918. 48 pp., 7 figs. Contains numerous suggestions on the preservation of health and the prevention of disease.
- MC 25. Erection of Mine Barricade During Mine Fires or After Explosions, by J. W. Paul, B. O. Pickard, and M. W. von Bernewitz. 1923. 28 pp., 3 pls., 12 figs. Shows how miners who may be trapped in a mine by an explosion or a fire may escape death by sealing themselves behind well-constructed barricades, bulkheads, or stoppings. 5 cents.
- †MC 26. Miners' Safety and Health Almanac for 1920, compiled by R. C. Williams. 1919. 51 pp., 15 figs. Contains numerous suggestions on the prevention of disease and the preservation of health.
- †MC 27. Causes and Prevention of Fires and Explosions in Bituminous Coal Mines, by Edward Steidle. 1920. 75 pp., 117 figs. A series of pictures illustrates dangerous practice and proper and safe practice. A brief description setting forth the lesson taught accompanies each picture.
- MC 28. Sanitation in Mines, by R. R. Sayers. 1924. 16 pp., 3 pls. Discusses drinking water, sewage disposal, and ventilation. 5 cents.
- MC 29. Misuse of Flame Safety Lamps and Dangers of Mixed Lights, by L. C. Iley. 1925. 12 pp., 2 pls. Shows how explosions have been caused by the abuse or misuse of flame safety lamps or by the use of open lights and safety lamps in the same mine. 5 cents.
- MC 30. Use of the Miners' Self-Rescuer, by S. H. Katz and J. J. Forbes. 1928. 26 pp., 23 figs. Tells about the construction and use of self-rescuers and describes four underground safety systems for distributing them. 10 cents.
- MC 31. Questions and Answers on Timbering Bituminous-Coal Mines, by J. W. Paul. 1928. 32 pp., 31 figs. Discusses simplified timbering practice. The questions and answers are supplemented with sketches of mine timbers, principally props, caps, wedges, and crossbars or collars for support of immediate roof in rooms and entries and on lines of pillar extraction. 10 cents.
- MC 32. Use of a Type N Miners' Gas Mask, by S. H. Katz and G. S. McCaa. 1929. 29 pp., 14 figs. Describes the gases found in mines and the all-service gas mask, and outlines the organization and methods under which crews equipped with gas masks should operate in mines. 10 cents.
- †MC 33. Advanced Mine Rescue Training, Part I.—Mine Gases and Methods for Their Detection, by J. J. Forbes and G. W. Grove. 1929. 65 pp., 20 figs. Is the first of a series of miners' circulars to be used in a course of training which will prepare mine officials to organize men for mine rescue and recovery operations. Discusses the character and occurrence of mine gases and mixtures of gases. Gives particular attention to the flame safety lamp, the Burrell methane indicator, the carbon monoxide detector, and the pyrotannic indicator.
- MC 34. Sampling Mine Gases and Use of the Bureau of Mines Portable Orsat Apparatus in Their Analysis (Revised June 1936), by W. P. Yant and L. B. Berger. 1936. 90 pp., 18 figs. The second of a series of four miners' circulars to be used in a course of training that will prepare mine officials to organize men for mine rescue and recovery operations. This part describes Bureau of Mines methods of sampling mine gases and use of the portable Orsat apparatus for analyzing mine gases and gives instructions in its manipulation. 20 cents.

† Out of print.

- MC 35. Protection Against Mine Gases, by J. J. Forbes and G. W. Grove. 1937. 52 pp., 17 figs. Revision of Miners' Circular 35, Advanced Mine Rescue Training, Part III.—Protection Against Gases Encountered in Mines; third of four miners' circulars to be used in a training course that will prepare mine officials to organize men for mine rescue and recovery work. Discusses erection of barricades during mine fires or following mine explosions, construction of refuge chambers, carbon monoxide self-rescuer, gas masks, oxygen breathing apparatus, and resuscitation. Its object is to acquaint men thoroughly with the various methods and devices used for protection against mine gases. 15 cents.
- MC 36. Advanced Mine Rescue Training, Part IV.—Suggested Procedure in Sealing and Unsealing Mine Fires and in Recovery Operations, by J. J. Forbes and G. W. Grove. 1929. 54 pp., 24 figs. Fourth pamphlet of series. Describes organization of fire-fighting crews, safety lamps, and lamps and barricades. 15 cents.

SCHEDULES

- †S 1B. Procedure for Testing Explosives Used in Metal Mines, Tunnels, Quarries, and Other Engineering Operations, with Test Requirements and Schedule of Fees. 1926. 3 pp.
- S 2D. Explosion-Proof Mine Equipment. Requirements for Approval of Storage-Battery Locomotives and Power Trucks, Junction Boxes, and Electric Motor-Driven Equipment. 1936. 19 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)
- S 3C. Fees for Analyzing Coal. 1928. 2 pp. 5 cents.
- S 4A. Procedure for Establishing a List of Permissible Electric Switches and Junction Boxes for Use at the Outer End of Trailing Cables; Fees, Character of Tests, and Conditions Under Which Tests and Inspections will be made. 1922. 5 pp.
- S 5. Fees for Testing Permissible Portable Electric Lamps, Character of Tests, and Conditions Under Which Lamps Will be Tested. 1913. 12 pp.
- S 6C. Permissible Electric Cap Lamps, Procedure in Testing, Fees Charged, and Requirements for Approval. 7 pp. 1927. 5 cents.
- S 7C. Flame Safety Lamps, Requirements for Permissibility, Tests Made, and Fees Charged. 1935. 6 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)
- S 8C. Portable Methane Detectors, Requirements for Permissibility, Tests Made, and Fees Charged. 1935. 7 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)
- S 9A. Procedure for Establishing a List of Permissible Telephones for Use in Coal Mines. 1923. 5 pp. 5 cents.
- S 10B. Miscellaneous Portable and Semiportable Electric Mine Lamps, Procedure in Testing, Fees Charged, and Requirements for Approval. 1932. 6 pp. 5 cents.
- S 11A. Permissible Electric Flashlights, Procedure in Testing, Fees Charged, and Requirements for Approval. 1936. 5 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)
- S 12B. Single-Shot Blasting Units, Requirements for Permissibility, Tests Made, and Fees Charged. 1937. 5 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)
- S 13B. Procedure for Establishing a List of Permissible Self-Contained Oxygen Breathing Apparatus, Fees, Character of Tests, and Conditions Under Which Mine Rescue Breathing Apparatus Will be Tested. 1935. 12 pp. 5 cents.
- S 14C. Procedure for Testing Gas Masks for Permissibility. 1934. 17 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)
- S 15. Procedure for Establishing a List of Permissible Storage-Battery Locomotives for Use in Gaseous Mines, Character of Tests, Conditions Under Which Storage-Battery Locomotives Will be Tested, and Fees. 1919. 10 pp. (Superseded by S 2D.)
- S 16A. Multiple-Shot Blasting Units, Requirements for Permissibility, Tests Made, and Fees Charged. 1937. 9 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)
- S 17C. Procedure for Testing Explosives for Permissibility for Use in Coal Mines, With Test Requirements, Tolerance Limits and the Schedule of Fees. 1935. 11 pp. 5 cents.
- S 19. Procedure for Testing Hose Masks for Permissibility. 1927. 8 pp. 5 cents. Supplement to S 19. 1934. 3 pp. 1 fig.
- S 20. Permissible Blasting Devices; Procedure in Testing, Fees, and Requirements for Approval. 1928. 7 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)
- S 21. Procedure for Testing Filter-Type Dust, Fume and Mist Respirators for Permissibility. 1934. 14 pp. (May be obtained without cost by applying to the Section of Publications, Bureau of Mines, Washington, D. C.)

† Out of print.

FREE PUBLICATIONS

ANNUAL REPORTS OF THE DIRECTOR, BUREAU OF MINES

- †First Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1911. J. A. Holmes, Director. 1912. 57 pp.
- †Second Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1912. J. A. Holmes, Director. 1913. 88 pp.
- †Third Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1913. J. A. Holmes, Director. 1914. 118 pp.
- †Fourth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1914. J. A. Holmes, Director. 1914. 101 pp.
- †Fifth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1915. V. H. Manning, Director. 1915. 106 pp.
- †Sixth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1916. V. H. Manning, Director. 1916. 96 pp.
- †Seventh Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1917. V. H. Manning, Director. 1917. 106 pp.
- †Eighth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1918. V. H. Manning, Director. 1918. 124 pp.
- †Ninth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1919. V. H. Manning, Director. 1919. 120 pp.
- †Tenth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1920. F. G. Cottrell, Director. 1920. 149 pp.
- †Eleventh Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1921. H. F. Bain, Director, 1921. 133 pp.
- Twelfth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1922. H. F. Bain, Director. 1922. 33 pp.
- Thirteenth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1923. H. F. Bain, Director. 1923. 21 pp.
- †Fourteenth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1924. H. F. Bain, Director. 1924. 57 pp.
- Fifteenth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1925. D. A. Lyon, Acting Director. 1925. 70 pp.
- †Sixteenth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1926. Scott Turner, Director. 1926. 46 pp.
- Seventeenth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1927. Scott Turner, Director. 1927. 48 pp.
- Eighteenth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1928. Scott Turner, Director. 1928. 57 pp.
- Nineteenth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1929. Scott Turner, Director. 1929. 63 pp.
- Twentieth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1930. Scott Turner, Director. 1930. 54 pp., 2 figs.
- Twenty-First Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1931. Scott Turner, Director. 1931. 61 pp., 2 figs.
- Twenty-Second Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1932. Scott Turner, Director. 1932. 30 pp., 2 figs.
- Twenty-Third Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1933. Scott Turner, Director. (Reprinted from the Annual Report of the Secretary of Commerce, 1933. Pp. 165-190.)
- Twenty-Fourth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1934. Scott Turner, Director. (Included in Annual Report of the Secretary of the Interior for the Fiscal Year Ended June 30, 1934. Pp. 305-340. Not reprinted.)
- Twenty-Fifth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1935. John W. Finch, Director. (Reprinted from the Annual Report of the Secretary of the Interior, 1935. Pp. 341-380.)
- Twenty-Sixth Annual Report of the Director of the Bureau of Mines, for the Fiscal Year Ended June 30, 1936. John W. Finch, Director. (Reprinted from the Annual Report of the Secretary of the Interior, 1936. Pp. 347-385.)

† Out of print.

ANNUAL REPORTS OF THE MINE INSPECTOR FOR ALASKA

- †Report of the Mine Inspector for the Territory of Alaska, for the Fiscal Year Ended June 30, 1912, by S. S. Smith. 1913. 24 pp.
- †Report of the Mine Inspector for the Territory of Alaska, for the Fiscal Year Ended June 30, 1913, by S. S. Smith. 1914. 10 pp.
- †Report of the Mine Inspector for the Territory of Alaska, for the Fiscal Year Ended June 30, 1914, by S. S. Smith. 1914. 36 pp.
- †Reports of mine inspector for Alaska, 1914 to 1921, inclusive, incorporated in the annual reports of the Director of the Bureau of Mines. See also B 142, 153.

† Out of print.

REPORTS OF INVESTIGATIONS

- 1912 2002 TNT as a Blasting Explosive, by C. E. Moore and C. D. Howell. 1912. 14 pp. Describes characteristics of TNT, gives results of tests under various conditions, and lists precautions necessary in use.
- 1912 2013 The Alabaster Pencil Industry, by E. E. Cameron. 1912. 8 pp. Gives location of Alabaster pencil deposits, lists mines, describes mining methods, and summarizes future possibilities.
- 1912 2014 The Magnesite Industry in America, by W. C. Fisher. 1912. 4 pp. Gives location and characteristics of American magnesite deposits, describes methods of mining and preparation, and summarizes conditions that make magnesite production possible.
- 1912 2015 The Potash Industry of the United States and Its Development for Future Production, by A. C. Wells. 1912. 20 pp. Lists all possible sources of potash and summarizes production methods.
- 1912 2016 The Mining in Vermont, by A. B. Leitch. 1912. 10 pp. Gives list of mines by county and describes number and nature of mines.
- 1912 2017 Explosive Hazard in Coal Mines Arising from Partially Confined Gas Dust, by L. D. Terry. 1912. 24 pp. Gives chapters of blowing and dust characteristics in various mines and describes methods to determine its explosibility.

CHARTS

- Resuscitation from Gas Asphyxiation, Drowning, and Electric Shock. 1931.
 Ringelmann's Scales for Grading the Density of Smoke. 1913.
 †Chart of Properties of Mine Gases, compiled by G. A. Burrell. 1918.

† Out of print.

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- 1912 2018 The Use of Magnesia Cement in the Construction of Mine Hoisting by W. C. Fisher. 1912. 7 pp. Explains method of applying magnesia cement to mine hoisting and describes its characteristics.
- 1912 2019 Permissibility of Oxygen Breathing Apparatus for Gasoline Vapors, by A. C. Palmer, E. H. King, and S. F. Kelsey. 1912. 4 pp. Gives results of experiments on oxygen breathing apparatus.
- 1912 2020 Federal Regulations of Hoisting Engineers in Utah, by C. A. Allen and A. J. Murray. 1912. 4 pp. Gives law and describes its operation.
- 1912 2021 Dates of a Petroleum Production Program, by A. W. Johnson. 1912. 4 pp. Lists dates and qualifications.
- 1912 2022 Comparative Hoisting Work in Wyoming, by F. B. Trench and T. H. Smith. 1912. 4 pp. Describes standard work on wells.
- 1912 2023 Electric Devices to Mine Mine Lighting, by H. S. Rice and L. C. Rice. 1912. 10 pp. Gives presentation to be observed in providing such devices.
- 1912 2024 Report on Helium Gas, by Andrew Stewart. 1912. 7 pp. Explains value of helium as lifting gas and lists various uses.
- 1912 2025 Manufacture of Chlorine from Stained Glass, by H. B. Deal. 1912. 6 pp. Describes staining process and list one method that neutral gas be used for a furnace but rather than be directed to various uses.
- 1912 2026 Receipts of Individual Wells, by A. W. Andrade. 1912. 2 pp. Gives receipts for various amounts received from all and per well.
- 1912 2027 Comparison of British and American Coal Mining Conditions, by G. S. Rice. 1912. 4 pp. Gives article in British magazine and refers many of its statements.
- 1912 2028 Analysis of Coal and Coke, by A. H. Powell. 1912. 4 pp. Gives results of analysis of various coals by Powell and Parr method.

These reports are available separately upon request at the Industrial Hygiene Bureau, Washington, D. C. Single copies returned without charge, such as possible, upon receipt, with all subsequent requests for copies and possible photographic material, subject to the following conditions:

(82)

ANNUAL REPORT OF THE MINE INSPECTOR FOR ALASKA

Report of the Mine Inspector for the Territory of Alaska for the Fiscal Year
Ended June 30, 1930, by E. W. Pehrson, Mine Inspector.

MAP

Value of 1928 Mine Production of Gold, Silver, Copper, Lead, Zinc, and Iron Ore
of the United States by Districts Yielding \$100,000 or More, by E. W.
Pehrson and Others. 1930.

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REPORTS OF INVESTIGATIONS ¹

- †RI 2003. TNT as a Blasting Explosive, by C. E. Munroe and S. P. Howell. 1919. 14 pp. Describes characteristics of TNT, gives results of tests under various conditions, and lists precautions necessary in use.
- †RI 2012. The Alsatian Potash Industry, by F. K. Cameron. 1919. 9 pp. Gives location of Alsatian potash deposits, lists mines, describes mining methods, and summarizes future possibilities.
- †RI 2015. The Magnesite Industry in Austria, by W. C. Phalen. 1919. 4 pp. Gives location and characteristics of Austrian magnesite deposits, describes methods of mining and preparation, and summarizes conditions that make profitable production possible.
- †RI 2020. The Potash Industry of the United States and Its Possibilities for Future Production, by A. E. Wells. 1919. 20 pp. Lists all possible sources of potash and summarizes production methods.
- †RI 2026. Talc Mining in Vermont, by R. B. Ladoo. 1919. 15 pp., 1 fig. Lists talc mines by owners and describes mining and milling practice.
- †RI 2054. Explosion Hazard in Steel Mills Arising from Partially Consumed Coal Dust, by L. D. Tracy. 1919. 5 pp. Cites dangers of allowing coal dust to accumulate in furnace rooms and describes tests to determine its explosibility.
- †RI 2058. Destruction of the Coal Mines and Steel Plants of Northern France, by G. S. Rice. 1919. 5 pp. Outlines extent and character of destruction of French collieries and steel and iron plants during World War and gives plans for reconstruction.
- †RI 2059. Standardization and Systematization of Mining Practice, by R. R. Hornor. 1919. 3 pp. Stresses need of standardizing mining practice and lists mines where such a program is under way.
- †RI 2064. Use of Magnesia Cement as a Protection for Mine Timbers, by W. C. Phalen. 1919. 2 pp. Explains method of applying magnesite cement to mine timbers and describes its characteristics.
- †RI 2065. Permeability of Oxygen Breathing Apparatus to Gasoline Vapors, by A. C. Fieldner, S. H. Katz, and S. P. Kinney. 1919. 4 pp. Gives results of experiments on oxygen breathing apparatus.
- †RI 2070. Physical Examination of Hoisting Engineers in Utah, by C. A. Allen and A. L. Murray. 1920. 5 pp. Quotes law and describes its operation.
- †RI 2073. Duties of a Petroleum Production Engineer, by A. W. Ambrose. 1920. 4 pp. Lists duties and qualifications.
- †RI 2074. Cooperative Petroleum Work in Wyoming, by F. B. Tough and B. H. Scott. 1920. 4 pp. Describes remedial work on wells.
- RI 2082. Electric Sparking in Mines from Lightning, by G. S. Rice and L. C. Ilsley. 1920. 3 pp. Gives precautions to be observed in avoiding such accidents.
- †RI 2087. Necessity for Helium Conservation, by Andrew Stewart. 1920. 2 pp. Emphasizes value of helium as a balloon gas and lists known sources.
- †RI 2091. Manufacture of Carbon Black from Natural Gas, by R. O. Neal. 1920. 6 pp. Describes various processes used, but recommends that natural gas be used for a domestic fuel rather than be diverted to carbon-black manufacture.
- RI 2092. Records of Individual Wells, by A. W. Ambrose. 1920. 2 pp. Voices necessity for complete, accurate records of oil and gas wells.
- †RI 2094. Comparison of British and American Coal-Mining Conditions, by G. S. Rice. 1920. 3 pp. Quotes article in British magazine and refutes many of its statements.
- †RI 2096. Sulphur in Coal and Coke, by A. R. Powell. 1920. 2 pp. Gives results of analyses of various coals by Powell and Parr method.

¹ Reports of investigations are obtainable only upon application to the Publications Section, Bureau of Mines, Washington, D. C. Missing serial numbers represent reports now obsolete, such as monthly reports of fatalities, coke-oven accidents, production of explosives, and petroleum bibliographies, published in annual reports on these subjects.

† Out of print.

Reports of Investigations

- †RI 2097. Diatomaceous (Infusorial) Earth, by W. C. Phalen. 1920. 7 pp. Defines diatomaceous earth, gives analyses, and describes preparation and uses. Lists deposits of United States.
- †RI 2101. Employee Representation in Mining Enterprises, by T. T. Read. 1920. 3 pp. Outlines and defines four systems of employee representation.
- †RI 2102. Observations with the Geophone, by Alan Leighton. 1920. 5 pp. Describes construction of geophone and conditions for satisfactory operation and names used.
- †RI 2103. Automobile Exhaust Gases in Vehicular Tunnels, by A. C. Fieldner. 1920. 3 pp. Describes tests to determine composition of automobile exhaust gases at Pittsburgh station and notes their importance to drivers.
- †RI 2103a. Weathering Test of Lignite, by J. A. Davis and John Gross. 1920. 5 pp. Describes weathering test of Alaska lignite.
- †RI 2103b. Comparative Steaming Tests of Alaska Lignite and Spruce Wood, by J. A. Davis and Paul Hopkins. 1920. 16 pp. Mentions equipment used and describes tests and results.
- †RI 2104. The Engineering Aspects of the Petroleum Industry, by E. W. Waggy. 1920. 6 pp. Emphasizes need for trained men in petroleum industry and states qualifications for production engineer, construction engineer, refinery engineer, natural-gas engineer, and oil-shale engineer.
- †RI 2105. Cooperative Petroleum Work in the Rocky Mountain Fields, by F. B. Tough. 1920. 6 pp. Describes purposes and activities of Rocky Mountain Petroleum Association, an organization of producing companies formed to promote conservation.
- †RI 2106. Oil Thieves, by A. R. Elliott. 1920. 4 pp. Discusses construction and use of devices for sampling oil.
- †RI 2107. Features of the Colombian Petroleum Law, by J. W. Thompson. 1920. 3 pp. Give résumé of law.
- †RI 2109. Safe Storage of Coal, by H. H. Stoek. 1920. 8 pp. Questions and answers on coal storage, grouped by quantity to be stored.
- †RI 2110. Talc and Soapstone, by R. B. Ladoo. 1920. 3 pp. Lists uses of talc in pottery.
- †RI 2111. Casting Losses in Aluminum Practice in the United States, by R. J. Anderson. 1920. 3 pp. Estimates amount of casting losses and mentions defects causing losses.
- †RI 2112. Milling and Flotation, by Thomas Varley. 1920. 3 pp. Defines and describes milling, flotation, and differential flotation.
- †RI 2113. The Field of Work of the United States Bureau of Mines, by V. H. Manning. 1920. 5 pp. Discusses work of Bureau as defined by its organic act and cites typical problems.
- †RI 2114. Use of Airplanes in Mine Rescue Work, by F. J. Bailey. 1920. 3 pp. Names advantages and disadvantages of airplanes to aid Bureau of Mines rescue service.
- RI 2115. Educational Agencies in Mining Communities, by T. T. Read. 1920. 4 pp. Classifies educational facilities in typical communities.
- †RI 2116. Influence of Age and Occupation on Frequency and Severity of Disability, by W. W. Adams. 1920. 5 pp., 1 fig. Places workers in 12 age groups and tabulates disability data for each.
- †RI 2117. The Efficiency of Mine Labor, with Special Consideration of Industrial Medicine and Health Conservation, by A. L. Murray. 1920. 6 pp. Points out importance of medical examinations before employment of workers, shows what industrial medicine is doing to promote labor efficiency, and notes value of hygienic working and living conditions.
- †RI 2118. Evaporation of Crude Oil in the Mid-Continent Field, by J. H. Wiggins. 1920. 5 pp. Estimates losses in storage on the lease by causes and seasons.
- †RI 2119. Notes on Spontaneous Explosions of Nitroglycerin in Oil and Gas Wells, Stephens, Palo Pinto, and Young Counties, North Texas, by R. E. Collom. 1920. 8 pp. Describes use of nitroglycerin in shooting wells, gives notes on spontaneous explosions, and suggests precautions for avoiding future accidents.
- †RI 2121. The Natural Hydrocarbons; Gilsonite, Elaterite, Wurtzilite, Grahamite, Ozokerite, and Others, by R. B. Ladoo. 1920. 12 pp. Gives sources, characteristics, and uses of these hydrocarbons, and includes brief bibliography.

† Out of print.

- †RI 2122. Collection and Examination of Rock Dust in Mine Air, by W. A. Selvig, F. D. Osgood, and A. C. Fieldner. 1920. 7 pp. Outlines method of collecting and examining dust samples.
- †RI 2123. Safe Use of Alternating-Current Type of Coal-Cutting Equipment, by L. C. Ilsley and E. J. Gleim. 1920. 3 pp. Recommends safety measures to be applied when electrical coal-cutting equipment is used.
- †RI 2124. The Relative Safety of Brass, Copper, and Steel Gauzes for Use in Miners' Flame Safety Lamps, by L. C. Ilsley and A. B. Hooker. 1920. 8 pp. Gives tables on relative safety of single and double gauzes and on heating effect, weight, and fabric of gauze.
- †RI 2125. Notes on the Magnesium Industry in the United States, by W. C. Phalen. 1920. 11 pp. Describes uses and properties of magnesium and discusses manufacture.
- †RI 2126. A Fatal Blasting Accident, by Oliver Bowles and J. E. Crawshaw. 1920. 3 pp. Gives account of blasting accident in limestone quarry and states conclusions to be drawn.
- †RI 2127. The Uses of Talc and Soapstone, by R. B. Ladoo. 1920. 9 pp. States uses in outline form.
- †RI 2128. Sulphur Dioxide as a Factor in the Smoke Problem in Salt Lake City, by G. St. J. Perrott. 1920. 6 pp. Gives results of tests of Salt Lake City atmosphere to determine presence of sulphur dioxide from smelters.
- †RI 2129. Dutch Guiana Bauxite Ordinance, by J. W. Thompson. 1920. 4 pp. Gives résumé of law.
- †RI 2130. Oil Shales and Their Economic Importance, by M. J. Gavin. 1920. 3 pp. Discusses importance of this country's oil-shale deposits as a source of petroleum.
- †RI 2131. The Durability of Electric Heaters for Gasoline Distillation, by W. A. Jacobs and E. W. Dean. 1920. 2 pp. Compares heater developed by Bureau of Mines with commercial heater.
- †RI 2133. Metal-Mine Ventilation and Its Relation to Safety and Efficiency in Mining Operations, by D. Harrington. 1920. 8 pp. Outlines conditions in metal mines making adequate ventilation necessary and stresses its value in increasing efficiency. Recommends methods of properly ventilating mines.
- †RI 2134. Stiff Hats for the Protection of Miners Against Falling Rock, by C. L. Colburn. 1920. 1 p. Describes various types of protective headgear for miners.
- †RI 2135. Methods Used in Utah for Signaling Mine Hoists from Moving Cages, by C. A. Allen. 1920. 2 pp. Tells of efficient method in use in Utah shaft.
- †RI 2136. Disposal of Used Explosive Containers, by C. L. Colburn. 1920. 1 p. Emphasizes care necessary in disposing of cases that may contain explosive.
- †RI 2137. Modified TNT as a Blasting Explosive, by C. E. Munroe and S. P. Howell. 1920. 4 pp. Describes tests of mixture of nitrostarch explosive and TNT.
- †RI 2138. The Determination of Free Calcium Oxide in Caustic-Burned Magnesium Oxide, by L. H. Duschak. 1920. 4 pp. Gives results of tests of western magnesite; largely in tabular form.
- †RI 2139. Ocher, Umber, and Sienna, by H. E. Tufft. 1920. 6 pp. States uses and specifications, describes methods of preparation and location of deposits, and gives prices and trade data.
- †RI 2140. Mica, by Oliver Bowles. 1920. 2 pp. Gives general information on location of mica deposits.
- †RI 2141. Investigation of the Fundamentals of Oil-Shale Retorting, by M. J. Gavin and L. H. Sharp. 1920. 4 pp. Describes distillation of oil from DeBeque (Colo.) shales and outlines fundamentals of detailed retorting tests.
- †RI 2142. Talc and Soapstone, by R. B. Ladoo. 1920. 5 pp. Discusses properties of talc and soapstone and stresses necessity for more thorough determination to indicate additional uses.
- †RI 2143. Coal in the British Isles, by G. S. Rice. 1920. 3 pp. Outlines briefly mining methods and costs and gives table of estimated reserves.
- †RI 2144. Precautions in the Use of Oxygen Breathing Apparatus, by G. S. Rice. 1920. 2 pp. Issues warning against attempting to extensive explorations in noxious atmospheres with breathing apparatus.

† Out of print.

Reports of Investigations

- †RI 2145. Miner's Yearly and Daily Output of Coal, by W. W. Adams. 1920. 8 pp. Summarizes production rates of miners in United States, New South Wales, Nova Scotia, British Columbia, Great Britain, Prussia, France, Austria, Belgium, Japan, and India.
- †RI 2147. Dangers from Explosives Fumes in Metal Mining, by D. Harrington and B. W. Dyer. 1920. 3 pp. Describes accidents in metal mines, indicating danger to metal-mine workers from inhaling fumes.
- †RI 2148. A Mathematical Method of Constructing Average Oil-Well Production Curves, by W. W. Cutler, Jr. 1920. 7 pp., 1 fig. Explains method in detail and gives specimen curves.
- †RI 2150. Talc in Fire-Resistant Paint, by R. B. Ladoo. 1920. 3 pp. Describes use in paint of asbestine, a fire-resistant magnesium silicate.
- †RI 2151. Cooperative Store, Ajo, Ariz., by E. D. Gardner. 1920. 2 pp. Discusses management of cooperative store in isolated mining town.
- †RI 2152. Some Physical and Chemical Data on Colorado Oil Shale, by M. J. Gavin and L. H. Sharp. 1920. 8 pp. Includes account of tests of Colorado shales and tables on specific heats of various materials, heats of combustion, and heat conductivity, with analyses of shales from Colorado, Nevada, Utah, Wyoming, Kentucky, and California.
- †RI 2153. Stench Warnings in Metal Mines, by A. C. Fieldner and S. H. Katz. 1920. 3 pp. Describes use of ethyl mercaptan and amyl acetate to give warning of metal-mine disasters.
- †RI 2154. Blasting Granite with Compressed Air, by Oliver Bowles. 1920. 3 pp. Describes use of compressed air in Georgia granite quarry.
- †RI 2156. Misfires in Metal Mining, by S. P. Howell and C. L. Colburn. 1920. 3 pp. Describes procedure when misfires occur and suggests preventive measures.
- RI 2157. Factors in Determining Gasoline Content in Natural Gas by the Absorption Method, by D. B. Dow. 1920. 5 pp., 4 figs. Discusses application of method and gives tabular data on distillation losses.
- †RI 2158. Recovery of Gold from a Magnetic Black Sand, by J. A. Davis and John Gross. 1920. 5 pp. Describes tests of black sand from Fairbanks Creek, Alaska.
- †RI 2159. Bureau of Mines Methods for Determining Water in Petroleum, by E. W. Dean and W. A. Jacobs. 1920. 3 pp. Lists and describes equipment used.
- †RI 2160. Recovery of Gold from Black Sand by Classified Concentration, by J. A. Davis and John Gross. 1920. 3 pp. Explains method of treating sand, lists results in tabular form, and gives conclusions.
- †RI 2161. The Menace of Opening Kegs of Black Blasting Powder with Wooden Tools, by S. P. Howell. 1920. 3 pp. Calls attention of dangerous practice in handling black blasting powder.
- †RI 2162. Talc Mining and Milling, Modoc, Ontario, by R. B. Ladoo. 1920. 5 pp., 2 figs. Describes methods and gives flow sheet of mill.
- †RI 2163. Data Concerning Use of Liquid-Oxygen Explosives in Germany, by G. S. Rice. 1920. 2 pp. Lists number of mines of different types where liquid-oxygen plants have been installed.
- †RI 2164. Oil Pipe Lines, by C. P. Bowie. 1920. 4 pp. Outlines procedure in installing a pipe line, describes buildings needed at a pumping station, and discusses administration.
- †RI 2165. Engineering Applied to Oil-Field Production Problems, by A. W. Ambrose. 1920. 6 pp. Stresses part played by engineering in conservation problems.
- †RI 2166. Relation of the Bureau of Mines to the Oil Industry, by F. G. Cottrell. 1920. 6 pp. Shows ways in which the Bureau of Mines is serving the oil industry.
- †RI 2167. Duties, Trials, and Difficulties of the Coal-Mine Fire Boss, and Cooperation of Officials with Him, by D. Harrington. 1920. 3 pp. Gives minimum qualifications for fire boss and a detailed schedule of duties.
- †RI 2169. Experimental Determination of Evaporation Losses from Crude Oil During Piping and Storage on Oil Leases, by A. R. Elliott. 1920. 3 pp. Gives results of experiments and draws conclusions regarding efficient storage.

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- †RI 2170. Recovery of Gold from Black-Sand Tailings, by John Gross. 1920. 2 pp. Gives tables showing results of tests and demonstrates value of hand jiggling and canvas-table concentration.
- †RI 2171. Talc Mining in New York, by R. B. Ladoo. 1920. 15 pp., 5 figs. Describes four groups of mines and plants in northern New York and gives flow sheets.
- †RI 2173. Effect of Ultra-Violet Rays on the Eye, by C. R. Kindall. 1920. 2 pp. Warns of dangers of conjunctivitis from watching electric arc-welding with unprotected eyes.
- †RI 2174. Our Future Supply of Petroleum Products, by J. O. Lewis. 1920. 9 pp. Outlines the situation as regards supply and demand and lists future sources of supply.
- †RI 2175. Danger in Using Army Gas Masks in Mines, by G. S. Rice. 1920. 2 pp. States that Army masks do not supply oxygen in atmospheres lacking it and will not remove carbon monoxide, therefore this equipment cannot be used in mines.
- †RI 2176. Possibilities of Producing Oil from Oil Shale, by M. J. Gavin. 1920. 7 pp. Discusses possible sources of oil to supply current demand and describes retorting of oil shale.
- †RI 2177. The Petroleum Experiment Station of the Federal Bureau of Mines at Bartlesville, Okla., by A. W. Ambrose. 1920. 5 pp. Describes equipment and work of station.
- †RI 2178. Uses of Sulphuric Acid, by A. E. Wells. 1920. 3 pp. Describes uses of dilute acid, concentrated acid, and fuming acid.
- †RI 2179. Asbestos in South Africa, by Oliver Bowles. 1920. 2 pp. Gives location of deposits and quarrying methods.
- RI 2180. Refining Problems, by H. H. Hill. 1920. 11 pp. Lists problems to be solved in refining petroleum and describes various types of plants.
- †RI 2181. Slate Mining in Maine, by Oliver Bowles. 1920. 3 pp., 2 figs. Describes successful use of underground methods.
- †RI 2182. Recoverable Oil in Byproduct Sands and Outcrops, by A. R. Elliott. 1920. 6 pp. Shows sources of recoverable oil near wells.
- †RI 2183. The Use of Bituminous Coal as Water-Gas Generator Fuel, by W. W. Odell. 1920. 2 pp. Shows superior value of water gas from bituminous coal over that from coke.
- †RI 2184. Coal-Washing Work at Northwest Experiment Station, Seattle, Wash., by E. R. McMillan. 1920. 2 pp. Discusses tests to show coal-washing methods that will remove dirt without losing valuable coal.
- †RI 2185. Analyses of Air from Burning Buildings, by S. H. Katz. 1920. 2 pp. Includes detailed table of analyses.
- †RI 2186. Methods for the Judging of First-Aid Contests, by R. R. Sayers. 1920. 4 pp. Gives directions for scoring contestants and shows a score card.
- †RI 2187. Sparks from Steam Shovels and Locomotives as Causes of Premature Explosions, by S. P. Howell and J. E. Crawshaw. 1920. 22 pp. Describes six accidents caused by sparks and makes recommendations for preventing future explosions.
- †RI 2189. Fuel Wastes in Oil-Field Boilers for Drilling and Production, by A. W. Ambrose. 1920. 5 pp. Describes types of boilers used in oil fields and gives suggestions for more efficient firing.
- †RI 2190. The Mining and Preparation of Tripoli, by R. B. Ladoo. 1920. 9 pp., 2 figs. Discusses methods used at mines in Missouri-Oklahoma and Illinois districts and includes flow sheets and bibliography.
- †RI 2191. Treating Natural-Gas Gasoline to Meet the "Doctor Test," by D. B. Dow. 1920. 4 pp. Describes method of getting rid of objectionable sulphur compounds.
- †RI 2192. Comparison of Methods of Gold Recovery from Black Sand, by John Gross. 1920. 4 pp. Concludes that barrel amalgamation is most efficient method of treating black sand. Gives table of results by different methods.
- †RI 2193. Globe-Miami District Mine Rescue and First-Aid Association, by J. J. Forbes. 1920. 3 pp. Lists equipment and describes organization of Arizona first-aid group.
- †RI 2194. Fire Hazards in Metal Mines, by B. O. Pickard. 1920. 2 pp. Notes 26 hazards observed in metal mines.

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- †RI 2195. Hazards of Handling and Transporting Volatile Petroleum Products, by C. P. Bowie. 1920. 2 pp. Warns against danger of igniting vapors from hydrocarbons in tanks or other storage.
- †RI 2196. Structure in Bituminous Coals, by Reinhardt Thiessen. 1920. 4 pp. Describes plant substances that compose coal.
- †RI 2199. Tests of Miners' Flame Safety Lamps in Gaseous, Coal-Dust-Laden Atmospheres, by L. C. Ilsley and A. B. Hooker. 1920. 5 pp. Gives results of tests of bonneted and unbonneted lamps, including Davy, Seippel, Clanny, Koehler, and Ackroyd & Best.
- †RI 2200. The Mining Company's Interest in the Educational Facilities of Its Community, by T. T. Read. 1920. 2 pp. Stresses value of good educational facilities as attracting desirable type of miners to a given locality.
- †RI 2201. Use of the MacMichael Viscosimeter in Testing Petroleum Products, by W. H. Herschel and E. W. Dean. 1921. 12 pp. Notes advantages and disadvantages of MacMichael viscosimeter, describes apparatus in detail, and gives directions for use.
- †RI 2202. Properties of Typical Crude Oils from the Eastern Producing Fields of the United States, by E. W. Dean. 1921. 57 pp. Gives properties of crudes from New York, Pennsylvania, West Virginia, Maryland, Kentucky, Ohio, and Illinois, with comparative data for crudes from Kansas, Oklahoma, California, and Wyoming.
- †RI 2203. Consumption of Reagents Used in Flotation, by Thomas Varley. 1921. 4 pp. Lists amounts of reagents used in flotation of gold-silver ores, graphite ore, copper ores, lead ores, lead-silver ores, zinc ores, and others.
- †RI 2205. Cyanide Treatment of an Amalgamation Tailing, by John Gross. 1921. 5 pp. Describes treatment of Alaska ore yielding gold and silver.
- †RI 2206. Investigation of Low-Grade and Complex Ores in Colorado, by R. R. Hornor and W. H. Coghill. 1921. 4 pp. Investigates possibility of reviving declining mining industry of Colorado by encouraging treatment of low-grade and complex ores.
- †RI 2207. Tests of Carbon Monoxide Detector in Mines, by D. Harrington and B. W. Dyer. 1921. 3 pp. Describes detector developed by Chemical Warfare Service.
- †RI 2208. Sand Filling in Stopes, by E. D. Gardner. 1921. 2 pp. Discusses method used in Arizona copper mine.
- †RI 2209. The Value of Oxygen Breathing Apparatus in Mine Rescue Operations, by D. J. Parker. 1921. 3 pp. Summarizes types and history of apparatus and emphasizes their value in mine disasters.
- †RI 2213. Investigations of Dust in the Air of Granite Working Plants, by S. H. Katz. 1921. 2 pp. Describes investigation conducted in connection with a study of industrial disease in a Vermont granite center.
- †RI 2214. Some Items of Investment, Expense, and Profit in Commercial Shale-Oil Production, by L. H. Sharp and A. T. Strunk. 1921. 3 pp. Briefly lists equipment needed, sources of income, and items chargeable to operating costs.
- †RI 2215. The Saybolt Furol Viscosimeter, by E. W. Dean. 1921. 4 pp. Points out features of Furol viscosimeter and notes differences between it and Universal viscosimeter.
- †RI 2217. Cooperative Mining at the Keely Mine, Dugger, Ind., by J. J. Bourquin. 1921. 3 pp. Describes cooperative methods in use at Indiana coal mine.
- †RI 2218. Explosion in High-Pressure Compressed-Air Line, by E. D. Gardner. 1921. 3 pp. Outlines causes of explosions in compressed-air lines.
- †RI 2219. The Gasoline Explosion at Memphis, Tenn., January 24, 1921, by D. B. Dow. 1921. 4 pp. Gives cause and effects of explosion and suggests safe practices in storing gasoline.
- †RI 2221. Cannel Coal in Southern Utah, by C. A. Allen. 1921. 3 pp. Describes and analyzes samples from bed of cannel coal in southern Utah.
- †RI 2223. Working for the Miner's Safety, by D. A. Lyon. 1921. 3 pp. Tells of three phases of Bureau of Mines work for mine safety.
- †RI 2224. State Regulations on Accident Prevention Covering Electric Circuits in Coal Mines, by L. C. Ilsley and R. A. Kearns. 1921. 7 pp. Abstracts State laws.

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- †RI 2225. Gasoline Losses Due to Incomplete Combustion in Motor Vehicles, by A. C. Fieldner, A. A. Straub, and G. W. Jones. 1921. 19 pp., 10 figs. Describes results of tests of motor vehicles under various conditions and includes curves.
- †RI 2226. Dangers in Using Low-Grade Foreign Detonators, by C. E. Munroe. 1921. 2 pp. Gives warning against using inferior detonators.
- †RI 2227. Method of Controlling Gas Well, Alkali Butte, Wyo., by F. B. Tough. 1921. 2 pp. Describes unusual method of controlling well with gas flow of 6,000,000 cubic feet daily.
- †RI 2228. The Estimation of Small Quantities of Gold, Silver, and the Platinum Metals in Material High in Copper, by C. W. Davis. 1921. 5 pp. Compares results of "combination" and "all-fire" methods used on oxidized ores and methods used on copper sulphide ores and copper bullion.
- RI 2229. A Convenient and Reliable Retort for Assaying Oil Shales for Oil Yield, by L. C. Karrick. 1921. 6 pp., 1 fig. Describes construction and use of apparatus and gives sketch.
- †RI 2230. Slate Dust in Asphalt Road-Surface Mixtures, by Oliver Bowles. 1921. 6 pp. Gives results of impact and compression tests and settlement and decantation tests of road mixtures made with slate flour.
- †RI 2234. Ten Years of Mine Rescue and First-Aid Training, by H. F. Bain. 1921. 8 pp. Summarizes achievements of Bureau of Mines in rescue and first-aid training.
- †RI 2235. Properties of Typical Crude Oils from the Producing Fields of the Rocky Mountain District, by E. W. Dean, M. B. Cooke, and A. D. Bauer. 1921. 50 pp. Gives properties of crudes from Colorado, Montana, and Wyoming, with comparative data on crudes from Pennsylvania, West Virginia, Ohio, Kentucky, Indiana, Illinois, Kansas, Oklahoma, and California.
- †RI 2236. Prevention of Evaporation Losses in Lease Tanks, by J. H. Wiggins. 1921. 7 pp., 3 figs. Describes tests of tanks in Oklahoma.
- †RI 2237. Some Factors Affecting Losses of Coal in Mining, by G. S. Rice. 1921. 6 pp. Stresses factors affecting percentage of coal recovered from American mines.
- †RI 2238. Iceland Spar, by Oliver Bowles. 1921. 6 pp. Lists and gives characteristics of calcite deposits in Iceland, California, Montana, Spain, and Argentina.
- †RI 2239. Losses in Aluminum and Aluminum-Alloy Melting, by R. J. Anderson. 1921. 6 pp. Includes information on types of furnaces, metal and fuel losses, and amount of aluminum melted in the United States.
- †RI 2240. Emergency Fans for Fighting Metal-Mine Fires, by B. O. Pickard. 1921. 3 pp. Explains advantages of having fan to be used solely in fighting mine fires.
- †RI 2242. Coal-Dust Hazards in Industrial Plants, by L. D. Tracy. 1921. 6 pp., 1 fig. Warns against explosibility of pulverized coal and describes tests to prove it.
- †RI 2243. Picric Acid as a Blasting Agent, by C. E. Munroe and S. P. Howell. 1921. 15 pp. Gives history, characteristics, and uses of picric acid. Describes field demonstrations.
- †RI 2244. Value of Mixtures of Coke Breeze and Bituminous Coal as Fuel for a Hand-Fired Boiler, by John Blizard and James Neil. 1921. 27 pp., 3 figs. Describes tests of mixtures of coke breeze and bituminous coal, giving data on steaming value, smoke, fuel loss, draft, etc.
- †RI 2245. The Safety and Health Campaign in the Mining Camps of Utah, by C. A. Allen and A. L. Murray. 1921. 7 pp. Outlines program for campaign, gives specimen posters and pledge cards, and states results.
- †RI 2246. Compressed-Air Blowers in Metal Mines, by D. Harrington. 1921. 5 pp. Includes temperature data for compressed-air blowers used underground.
- †RI 2247. The Chloride Volatilization Process, by Thomas Varley and C. C. Stevenson. 1921. 9 pp. Describes process especially adapted to treatment of oxidized and semioxidized and carbonate ores of copper, lead, and silver and summarizes experiments.
- †RI 2248. A Safety Cut-Out for Trolley Wires at Loading Chutes, by E. D. Gardner. 1921. 2 pp., 1 fig. Describes construction and operation of cut-out. Gives sketch.

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- †RI 2249. The Effect of Crystalline Paraffin Wax Upon the Viscosity of Lubricating Oil, by E. W. Dean and L. E. Jackson. 1921. 3 pp. Gives results of tests to determine effect of paraffin content on lubricating oil.
- †RI 2250. Petroleum Production in South America with Relation to Recent Petroleum Legislation, by J. W. Thompson. 1921. 6 pp. Lists principal producing districts in South America, by countries.
- †RI 2251. Safety Work at Ironwood, Mich., by R. V. Ageton. 1921. 4 pp. Describes safety organization at iron mine.
- †RI 2253. High-Grade Talc and the California Talc Industry, by R. B. Ladoo. 1921. 7 pp., 2 figs. Defines high-grade talc and names characteristics. Describes milling methods used by several large companies and includes flow sheets.
- †RI 2254. Nature of Shale Oil Obtained from Oil-Shale Assay Retort Used by the Bureau of Mines, by M. J. Gavin and L. C. Karriek. 1921. 11 pp. Consists largely of distillation analyses of samples.
- †RI 2255. An Unusual Hazard in Reopening Long-Flooded Timbered Metal Mines, by D. Harrington. 1921. 3 pp. Tells of ignition of gas (proved to contain methane) pocketed in flooded mines.
- RI 2256. Notes on the Oil-Shale Industry, with Particular Reference to the Rocky Mountain District, by M. J. Gavin, H. H. Hill, and W. E. Perdue. 1921. 36 pp., 2 figs. Gives résumé of status of oil-shale industry, including its history in Scotland. A comprehensive bibliography is appended.
- †RI 2257. Quantitative Microscopic Determination of Chalcoprite, Chalcocite, Bornite, and Pyrite in a Porphyry Ore, by R. E. Head. 1921. 5 pp. Describes microscopic work on copper sulphides in ore.
- †RI 2258. State Safety Regulations Governing Mine Telephones, by L. C. Ilsley and R. A. Kearns. 1921. 7 pp. Abstracts laws governing telephones in 16 mining States.
- †RI 2259. Six-Year Accident Record of Mines of the Anaconda Copper Mining Co. in Montana, by D. Harrington. 1921. 12 pp. Tabulates record for 32 mines of company from 1915 to 1920.
- †RI 2260. Safety Organization of Old Dominion Mine at Globe, Ariz., by E. D. Gardner. 1921. 4 pp. Includes account of functioning of workmen's committee, which inspects mine at regular intervals and reports to mine inspector.
- †RI 2262. Gases Produced in the Use of Carbon Tetrachloride and Foamite Fire Extinguishers in Mines, by A. C. Fieldner and S. H. Katz. 1921. 6 pp., 1 fig. States that under tests in mines, fire extinguishers produced smoke irritating to eyes and respiratory passages.
- †RI 2263. Laboratory Studies of the Trent Process, by G. St. J. Perrott and S. P. Kinney. 1921. 18 pp. Describes Bureau of Mines tests of Trent process for cleaning coal, gives history of process, and includes table on fusion temperature of ash in raw and cleaned coal.
- †RI 2264. Separation of Sphalerite, Silica, and Calcite from Fluorspar, by John Gross. 1921. 3 pp. Describes results of tests by electrostatic separation.
- †RI 2265. Sanitation in Planning and Developing Oil-Shale Camps, by A. L. Murray. 1921. 7 pp. Discusses selection of site, water supply, sewage disposal, etc.
- †RI 2266. Leaching Iron Ores for Phosphorus, by R. M. Winslow. 1921. 3 pp., 1 fig. Describes tests that showed that amount of phosphorus dissolved was always greater with high concentration of solvents.
- †RI 2267. Slate as a Permanent Roofing Material, by Oliver Bowles. 1921. 5 pp. Suggests improvements possible in manufacture and classification and emphasizes roofer's responsibility in doing honest work.
- †RI 2268. Selection of Analysts for Color Work in Chemistry, by H. R. O'Brien. 1921. 3 pp. Discusses tests given in laboratory to determine fitness of chemists for colorimetric work.
- †RI 2270. Relation of Drilling Campaign to Income from Oil Properties, by W. W. Cutler, Jr., and W. S. Clute. 1921. 11 pp. Shows how correct determination of drilling campaign may help to allow financial gain during depressed periods.
- †RI 2273. Compressed-Air-Operated Ventilation Doors in Arizona Copper Mines, by E. D. Gardner. 1921. 2 pp., 1 fig. Describes mechanism for operating doors and includes sketch.
- †RI 2274. Relation of Lead Poisoning in Utah to Mining, by A. L. Murray. 1921. 7 pp. Tabulates cases of lead poisoning, by occupations.

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- †RI 2275. Rock-Strata Gases in Mines of the East Tintic Mining District, Utah, by G. E. McElroy. 1921. 3 pp. Describes heavy gases encountered in quartzite and gives evidence indicating that they have resulted from oxidation of sulphides.
- †RI 2276. Pressure-Volume Deviation of Methane, Ethane, Propane, and Carbon Dioxide at Elevated Pressures, by G. A. Burrell and G. W. Jones. 1921. 6 pp. Discusses tests to determine pressure-volume relations of several paraffin hydrocarbons.
- †RI 2277. Selected Bibliography on Oil Shale, by E. H. Burroughs and M. J. Gavin. 1921. 66 pp. Lists 295 items and includes index.
- †RI 2278. The Coking of Utah Coals, by S. W. Parr and T. E. Layng. 1921. 13 pp. Tabulates data on low-temperature carbonization, coke, and temperature.
- †RI 2279. Natural-Gas Gasoline Blends, by D. B. Dow. 1921. 2 pp. Tells of encouraging results of using naphtha obtained by rerunning kerosene as blending material.
- †RI 2280. Storing Carbide with Explosives, by C. E. Munroe. 1921. 3 pp. Explains why it is unsafe to store carbide with explosives.
- †RI 2281. The Recovery of Unburned Fuel from Boiler-Furnace Refuse, by Thomas Fraser and H. F. Yancey. 1921. 3 pp. Describes washing tests to recover unburned fuel by crushing refuse, washing on tables, and removing slime.
- †RI 2282. Hot High-Nitrogen Gas in a Metal Mine, by G. E. McElroy. 1921. 3 pp. Gives analysis of hot, light gas resulting from rapid oxidation of finely disseminated pyrite.
- †RI 2283. The Utilization of Waste Slate as a Filler, by Oliver Bowles. 1921. 5 pp. Discusses uses of pulverized slate as filler in rubber, linoleum, window shades, plastic roofing, and flooring.
- †RI 2285. Rate-of-Production Curve and Its Application to the Valuation of Oil Properties, by W. W. Cutler, Jr. 1921. 6 pp., 1 fig. Describes application of curve devised by author in determining rate of production of wells.
- †RI 2286. Miners' Field Day, Butte, Mont., by D. Harrington. 1921. 4 pp. Gives account of annual field day instituted by mining companies in 1918.
- †RI 2288. Bureau of Mines Experimental Tunnel for Studying the Removal of Automotive-Exhaust Gas, by A. C. Fieldner and J. W. Paul. 1921. 3 pp. Describes tunnel erected in Bureau's Experimental mine for studying ventilation problems that may arise in connection with Holland Tunnels under Hudson River.
- †RI 2289. Bentonite, by R. B. Ladoo. 1921. 5 pp. Defines bentonite, discusses occurrence, names uses, and gives analyses.
- †RI 2290. Viscosities and Pour Tests of Typical Crude Oils from the Eastern and Rocky Mountain Producing Fields of the United States, by E. W. Dean, A. D. Bauer, and W. B. Lerch. 1921. 5 pp. Tabulates results of tests of crudes from New York, Pennsylvania, West Virginia, Ohio, Indiana, Illinois, Kansas, Oklahoma, Wyoming, California, Montana, and Colorado.
- †RI 2291. Dust Reduction by Wet Stoppers, by D. Harrington. 1921. 5 pp. Gives dust content of air in underground workings where drilling is done by various types of machines and describes use of wet stoppers.
- RI 2292. Present Status of Coal Carbonization at Low Temperatures, by J. D. Davis. 1921. 11 pp. Defines low-temperature carbonization, lists products and their uses, and describes various processes.
- †RI 2293. Properties of Typical Crude Oils from the Producing Fields of Northern Texas, Northern Louisiana, and Arkansas, by E. W. Dean, M. B. Cooke, and C. R. Bopp. 1921. 50 pp. Gives exhaustive data for individual samples, listed by counties and fields.
- †RI 2294. National and International Mine Rescue and First-Aid Meets, by F. J. Bailey. 1921. 2 pp. Lists first-aid and mine rescue teams competing according to States.
- †RI 2295. Precautions to be Observed in Entering Abandoned Exploratory Shafts and Pits, by B. O. Pickard. 1921. 3 pp. Stresses importance of exercising care before entering abandoned workings.
- †RI 2296. High-Speed Hoisting in Illinois and Indiana Coal Mines and Controlling Apparatus to Prevent Hoisting Accidents, by J. J. Bourquin. 1921. 2 pp. Describes operation of rapid-hoisting system and tells of safety measures to prevent accidents.

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- †RI 2297. Rock-Drilling Tests in the Tri-State District, by C. R. Forbes. 1921. 4 pp. Offers conclusions on changes in gage and length of drill steel.
- †RI 2298. Lignite Carbonization—Carbonized Residue Briquets, by W. W. Odell. 1921. 2 pp., 1 fig. Outlines cooperative experiments performed in North Dakota and describes and sketches apparatus.
- †RI 2299. A Fatal Quarry Accident from Falling Rock, by Oliver Bowles. 1921. 2 pp., 1 fig. Urges need of especial care where inclined open bedding planes occur in quarries.
- †RI 2300. Underground Loading Devices in Metal Mines, by C. L. Colburn. 1921. 19 pp. Describes 10 underground loaders and gives actual operating records.
- †RI 2301. Destructive Distillation of Mixtures of Oil and Coal, by J. D. Davis, P. B. Place, and G. S. Scott. 1921. 19 pp., 9 figs. Discusses investigations of Trent process, tabulates yields of distillation, gives analyses of tars and gases, and presents curves showing results.
- †RI 2302. Inspection and Assembly of Flame Safety Lamps at the Mine, by L. C. Isley. 1921. 3 pp. States that many accidents have been caused by use of improperly assembled lamps, points out common errors in assembling, gives rules for proper assembling, and quotes Pennsylvania mining law on use of flame safety lamps.
- †RI 2303. Methane in California Gold Mines, by B. O. Pickard and E. D. Gardner. 1921. 6 pp. Urges importance of ventilating coal mines to drive out methane given off by carbonaceous rocks and by timber decomposing under water.
- †RI 2304. The Treatment of Carbon Monoxide Poisoning, by R. R. Sayers and H. R. O'Brien. 1921. 4 pp. Outlines treatment of victims of poisoning.
- †RI 2306. Momentary Heating of Inflammable Dusts, by G. P. Taylor, H. C. Porter, and E. C. White, with a foreword by G. S. Rice. 1922. 20 pp., 3 figs. Gives results (with detailed tables) of tests with hot falling weight and of experiments using hot gas, both of which show the possibility of igniting dust clouds.
- †RI 2307. Silica, by R. B. Ladoo. 1922. 7 pp. Lists forms of silica used industrially, briefly discusses mining and milling method, and outlines uses.
- †RI 2308. Safety of Mine-Type Telephone, by L. C. Isley. 1922. 2 pp. Describes test to determine whether ordinary mine telephones are safe for use in gaseous atmospheres.
- †RI 2309. Compressed-Air Blowers as an Aid to Metal-Mine Ventilation, by R. V. Ageton. 1922. 5 pp. Concludes that compressed-air blowers, while an aid in ventilation, do not cool the air at distances greater than 50 feet from blower and in line with it.
- †RI 2310. Growing Need for Preservation of Mine Timber, by R. R. Hornor. 1922. 8 pp. Stresses need for conserving mine timber and notes saving possible by treating it before installation.
- †RI 2311. Conditions in the Feldspar Industry, by R. B. Ladoo. 1922. 10 pp., 1 fig. Points out principal factors affecting unsatisfactory conditions in industry.
- †RI 2312. Low-Temperature Distillation of Amalgams of Bituminous Non-coking Coal and Asphaltic Oils, by J. D. Davis and C. E. Coleman. 1922. 7 pp., 1 fig. States that results of tests show that amalgam yields twice as much gas as its constituents distilled separately and less than half as much tar oil.
- †RI 2313. Solubility of Oil Shales in Solvents for Petroleum, by M. J. Gavin and J. T. Aydelotte. 1922. 4 pp. Describes results of treatment of shales from Kentucky, Utah, Colorado, Wyoming, and California with carbon tetrachloride, carbon bisulphide, acetone, ether, benzol, and chloroform.
- †RI 2314. Milling Methods in the Tri-State Zinc District, by W. H. Coghill and C. O. Anderson. 1922. 14 pp. Discusses use of laboratory jig and later work in mill.
- †RI 2315. Placer-Mining Methods. 1922. 4 pp. Briefly describes use of hydraulic elevator, rubble elevator, gravel pumping, mechanical excavators, beach mining, etc., and includes bibliography.
- †RI 2318. The Unsaturated-Hydrocarbon Constituents of Gas from Destructive Distillation of a Water-Gas Tar and Coal Mixture, by R. L. Brown. 1922. 6 pp. Presents results of unsaturated hydrocarbons of gas produced by distilling water-gas tar-coal mixture in gas retort.

† Out of print.

- †RI 2319. Prevention of Illness among Miners, by R. R. Sayers. 1922. 9 pp. Describes methods of protecting miners exposed to carbon monoxide and the effect of this gas and of carbon dioxide, and stresses importance of adequate removal of floating siliceous dusts.
- †RI 2320. Performance of Fan-Pipe Installations in Metal Mines, by D. Harrington and G. E. McElroy. 1922. 4 pp. Summarizes problems to be solved in connection with use of fan-pipe installations in view of their increasing use for ventilating workings not reached by ordinary ventilating currents.
- RI 2321. Mine-Timber Preservation, by R. R. Hornor and G. M. Hunt. 1922. 19 pp., 1 fig. Covers subject presented in RI 2310 in greater detail.
- †RI 2322. Properties of Typical Crude Oils from the Producing Fields of Kansas, by E. W. Dean, M. B. Cooke, and A. D. Bauer. 1922. 2 pp. Gives average gravities, sulphur content, etc., of 27 crudes.
- †RI 2323. The Smoke Problem, by O. P. Hood. 1922. 5 pp. Defines smoke problem and discusses causes of smoke.
- †RI 2324. Some Factors Affecting Products from Destructive Distillation of Oil Shales, by L. C. Karrick. 1922. 5 pp. Discusses effect of properties and physical structure of shale, temperature lag, and rate of heat supply.
- †RI 2325. Fighting a Mine Fire with Its Own Gases, by C. A. Allen and A. C. Watts. 1922. 8 pp. Describes method and organization for fighting fire in Utah mine.
- †RI 2326. Platinum. 1922. 6 pp. Gives general information on properties, occurrence, uses, and metallurgy of platinum.
- †RI 2327. Soapstone, by R. B. Ladoo. 1922. 4 pp. Gives general information on properties, occurrence, production, and mining and milling methods.
- †RI 2329. Use of Low-Pressure Gas Burners in Oil-Field Boilers, by M. P. Youker. 1922. 8 pp. Presents operating data on firing rates, quantities of gas used, combustion, etc.
- †RI 2331. Water-Gas Tar Emulsions, by W. W. Odell. 1922. 5 pp. Defines water-gas tar and explains cause of formation of emulsions.
- †RI 2332. Analytical Distillations of Typical Shale Oils, by M. J. Gavin. 1922. 12 pp. Describes results of tests of oils distilled from Scottish, Utah, and Colorado shale.
- †RI 2333. Epsomite, by R. B. Ladoo. 1922. 5 pp. Gives properties, occurrence, production, methods of manufacture, and uses.
- †RI 2335. Tests of Hand Extinguishers on Zinc-Dust Fires, by S. H. Katz and J. J. Bloomfield. 1922. 6 pp. Shows that frothy mixtures had advantage over other extinguishers for zinc-dust fires in that no poisonous or irritating gases are evolved.
- RI 2336. Bibliography of Literature on Sampling, by W. J. Sharwood and M. von Bernewitz. 1922. 85 pp. Includes nearly 1,000 references and a list of patents.
- †RI 2337. The Northwest Experiment Station of the Federal Bureau of Mines, by C. E. Williams. 1922. 4 pp. Describes work of station at Seattle, Wash.
- †RI 2338. Physiological Effects of Exposure to Low Concentrations of Carbon Monoxide, by R. R. Sayers, F. V. Meriwether, and W. P. Yant. 1922. 6 pp. Gives results of tests made in connection with ventilation investigations for Holland Tunnel.
- RI 2339. Drilling and Dustiness of Metal-Mine Air, by D. Harrington. 1922. 6 pp. Tabulates results of tests with wet and dry drills.
- †RI 2341. Smokeless Fuel for Salt Lake City, by G. St. J. Perrott and H. W. Clark. 1922. 18 pp. Considers practicability of by-product coking of Utah coal to supply smokeless fuel for domestic consumption.
- †RI 2342. Survey of Pacific Coast Petroleum Products, by E. C. Lane. 1922. 7 pp., 2 figs. Gives analyses of aviation gasoline, motor gasoline, and petroleum spirits.
- †RI 2343. Bibliography of Articles Relating to the Preservation of Mine Timber, by R. R. Hornor. 1922. 6 pp. Lists citations by years from 1883 to 1921.
- RI 2344. Recovery of Gasoline from Uncondensed Still Vapors, by D. B. Dow. 1922. 26 pp., 6 figs. Shows possibilities of increasing yield from crude by recovering uncondensed vapors.

† Out of print.

Reports of Investigations

- †RI 2345. The Economic Relation of Accidents and Preventable Diseases to the Coal-Mining Industry, by A. L. Murray. 1922. 5 pp. Considers accidents in Utah coal mines in comparison with morbidity rates for typhoid and smallpox.
- †RI 2346. Acetylene as a Precipitant for Cyanide Solution, by John Gross. 1922. 2 pp. Concludes that acetylene is inert as a precipitant.
- †RI 2347. Garnet, by R. B. Ladoo. 1922. 16 pp., 2 figs. Discusses characteristics, occurrence, production, and mining and milling methods; includes bibliography.
- †RI 2350. The Sulphur Dioxide Leaching Process, by C. E. van Barneveld and E. S. Leaver. 1922. 15 pp., 3 figs. Describes method for treating non-sulphide copper ores.
- †RI 2351. Separation of Palladium and Platinum by Means of Dimethylglyoxime, by C. W. Davis. 1922. 2 pp. Describes tests to show that palladium can be precipitated free from platinum if the chlorides of these metals are treated with dimethylglyoxime at room temperature.
- †RI 2352. Kinds of Haulage and Cutting Machines in Coal Mines, by W. W. Adams. 1922. 4 pp. Lists haulage systems and mining machines in use, by States.
- †RI 2354. Mercury Poisoning, by R. R. Sayers. 1922. 6 pp. Gives preventive measures and advice to workmen exposed to mercury.
- †RI 2355. Determination of the Relative Comfort of Mine Working Places by Means of the Katathermometer, by D. Harrington and G. E. McElroy. 1922. 7 pp. Describes use of instrument, which gives exact numerical index of relative comfort of working places.
- †RI 2356. The Tannic Acid Method for the Quantitative Determination of Carbon Monoxide in the Blood, by R. R. Sayers and W. P. Yant. 1922. 7 pp. Describes simple method that requires little equipment or technical skill.
- †RI 2357. Mica, by Oliver Bowles. 1922. 46 pp., 3 figs. Gives data on origin and occurrence, world production, methods of mining and preparation, and uses.
- †RI 2358. Endurance Tests of Storage Batteries for Use in Permissible Mine Locomotives, by L. C. Isley and H. B. Brunot. 1922. 4 pp. Discusses tests of battery cells manufactured by four companies.
- †RI 2360. Reported Instances of Successful First-Aid Treatment by D. J. Parker. 1922. 3 pp. Cites 13 examples of efficient first-aid treatment reported by or through Bureau of Mines safety cars and stations.
- †RI 2361. The Spring Canyon Mine Rescue Association, by A. L. Murray. 1922. 3 pp. Tells of organization and activities of Utah association.
- †RI 2363. Helium, by R. B. Moore. 1922. 4 pp. Reviews history of discovery of helium and explains its value as a noninflammable lifting force for rigid airships.
- †RI 2364. Properties of Typical Crude Oils from the Producing Fields of Oklahoma, by E. W. Dean, A. D. Bauer, M. B. Cooke, and C. R. Bopp. 1922. 2 pp. Gives range of gravities and sulphur content.
- †RI 2365. Ignition of Coal Dust by Electric Arcs, by L. C. Isley and E. J. Gleim. 1922. 7 pp. Describes tests to prove that coal dust in air can be ignited by electric arcs under conditions possible in mines and pulverized-coal plants.
- RI 2366. Oklahoma Promotes Safety in Mines, by D. J. Parker. 1922. 4 pp. Includes letter of warning and suggestions sent by Oklahoma district mine inspector to mining companies in his district.
- †RI 2367. Official Approval of Burrell Methane Indicator, by L. C. Isley. 1922. 3 pp. Gives instructions for operating indicator and states scale of accuracy it had to meet in tests.
- †RI 2368. Temperature-Pressure Curves of Petroleum Products, by M. B. Cooke. 1922. 2 pp., 2 figs. Tabulates results of bomb tests of casing-head gasoline, motor gasoline, kerosene, and transformer oil.
- †RI 2371. Why Miners' Portable Electric Lights Require Safety Devices, by L. C. Isley. 1922. 9 pp., 2 figs. Gives results of five groups of tests to prove that an adequate current-interrupting safety device is needed on miners' electric lamps.

† Out of print.

- †RI 2372. Keeping Up to Date in Safety Methods in Coal Mining, by D. Harrington. 1922. 2 pp. Stresses importance of mining companies requiring superintendents, foremen, fire bosses, and shot firers to keep informed on State laws and up-to-date practice.
- †RI 2373. Fuel Economy from Old Plant Equipment, by A. R. Mumford. 1922. 4 pp. Urges tests of plant boiler equipment to check its performance and gives results of specimen tests.
- RI 2374. Summary of Investigations of Dust and Ventilation in Metal Mines, by D. Harrington. 1922. 6 pp. Includes bibliography of all Bureau of Mines reports on subject.
- †RI 2377. Storage and Transportation of Portland Cement, by W. M. Myers. 1922. 5 pp. Gives results of investigation to determine causes of deterioration in transit and in storage. Includes bibliography.
- †RI 2378. Determination of Suspended Matter in Gases by Collection on Filter Paper, by S. H. Katz and G. W. Smith. 1922. 6 pp., 1 fig. Describes use of far camera.
- †RI 2380. Use of Geophone in Locating Compressed-Air Leaks, by B. O. Pickard. 1922. 2 pp. Tells of successful use of Bureau of Mines geophone in locating leaks.
- †RI 2381. The Rate of Reduction of Hematite to Magnetite by Methane, by C. M. Bouton. 1922. 9 pp. Includes results of experiments to find under what conditions of time of contact methane becomes effective as a reducer.
- †RI 2382. The White Clay Industry in the Vicinity of Langley, S. C., by W. M. Weigel. 1922. 6 pp. Describes mining and preparation of white clays for market.
- †RI 2383. Ignition of Gas by Electric Detonators, by L. C. Ilsley and A. B. Hooker. 1922. 10 pp., 1 fig. Gives results of tests of iron and copper leg wires in natural gas, with currents of various values passed through the wires.
- †RI 2384. Failure of Center Shots in Blasting, by L. C. Ilsley and A. B. Hooker. 1922. 10 pp., 2 figs. Covers tests to discover why shots that miss in a group fired by a blasting machine are often in the center.
- †RI 2385. Tellurium, by H. A. Doerner. 1922. 3 pp. Discusses properties, sources, uses, metallurgy, and qualitative and quantitative determination.
- †RI 2386. Comminuted Smokeless Powder as a Blasting Agent, by C. E. Munroe and S. P. Howell. 1922. 19 pp., 1 fig. States that comminuted smokeless powder can be used to advantage in blasting stumps, boulders, and ditches, but is unsuitable for use in gassy or dusty atmospheres.
- RI 2390. The New Albany Shale of Indiana, by J. R. Reeves. 1922. 8 pp., 1 fig. Includes discussion of physical and chemical characteristics, map showing position of outcrop, and distillation analyses of shale oil.
- RI 2391. Underground Hygiene and Sanitation, by R. R. Sayers. 1922. 11 pp. Discusses importance of pure drinking water, sewage disposal, and adequate ventilation.
- †RI 2392. A New Instrument for Sampling Aerial Dust, by Leonard Greenburg and G. W. Smith. 1922. 3 pp. Describes impinger-bubbler apparatus.
- †RI 2393. Production of Alumina from Clay Tests on the Miguet Process, by C. E. Williams and C. E. Sims. 1922. 2 pp. Outlines process for preparing alkali aluminate by fusing clay, lime, and scrap iron with a reducing agent in the electric furnace.
- RI 2394. Gum-Forming Constituents in Gasoline, by N. A. C. Smith, and M. B. Cooke. 1922. 12 pp. Concludes that gummy and resinous deposits are caused by oxidation.
- †RI 2396. Feldspar Mining and Milling Near Keene, N. H., by R. B. Ladoo. 1922. 6 pp., 1 fig. Describes deposit and methods of mining and milling.
- RI 2397. Gunite in Metal Mines, by B. O. Pickard. 1922. 30 pp., 1 fig. Discusses uses and application of gunite, lists cost data, and includes bibliography.
- †RI 2398. Explosion-Proof Electrical Equipment, by L. C. Ilsley. 1922. 2 pp. Gives 10 reasons why permissible equipment is safer than unapproved types.
- †RI 2400. Fire and Explosion Hazards of Petroleum and Petroleum Products, by S. H. Katz and N. A. C. Smith. 1922. 11 pp., 3 figs. Explains hazards of petroleum and its products and gives general information on volatility, flash point, explosive limits, etc.

† Out of print.

Reports of Investigations

- †RI 2401. Stripping Problems in Limestone Quarries of the Shenandoah Valley, by Oliver Bowles. 1922. 6 pp. Cites difficulties experienced in removing overburden and suggests that mechanical removal of overburden might reduce stripping expense.
- †RI 2403. Use of Bituminous Coal in Househeating Furnaces, by Rudolf Kudlich. 1922. 2 pp. Gives simple directions for firing furnace, regulating drafts, etc.
- †RI 2405. State and Federal Electrical Shot-Firing Regulations, by L. C. Isley. 1922. 17 pp. Includes regulations for quarries, tunnels, metal mines, and coal mines.
- †RI 2406. Titanium, by R. J. Anderson. 1922. 12 pp. Discusses properties, uses, and preparation, and includes bibliography.
- †RI 2407. Experiments in Underground Signaling with Radio Sets, by C. L. Colburn, C. M. Bouton, and H. B. Freeman. 1922. 4 pp., 7 figs. Concludes that electromagnetic waves may be made to travel through solid strata, although no practical method of using wireless waves for underground communication was indicated.
- †RI 2408. Methods for Determining Sediment in Fuel Oils, by A. D. Bauer. 1922. 4 pp. Describes results of tests by benzol-extraction method, A. S. T. M. centrifuge method, and Dean and Lerch method.
- †RI 2410. Contraction and Shrinkage of Nonferrous Alloys as Related to Casting Practice, by R. J. Anderson. 1922. 13 pp. Defines terms, reviews history of subject, and describes effects of various factors on contraction. Includes bibliography.
- †RI 2411. Arc Regulation in Electric Furnaces and Pilot-Light Control, by C. E. Sims. 1922. 2 pp., 1 fig. Describes apparatus that furnishes an accurate and sensitive means of control at low cost.
- †RI 2412. Comparative Steaming Tests of Nenana Lignite and Matanuska Bituminous Coals, by J. A. Davis and Paul Hopkins. 1922. 9 pp. Discusses tests of Alaska coals.
- †RI 2413. Bureau of Mines Investigates Gold in Oil Shales and Its Possible Recovery, by Thomas Varley. 1922. 10 pp., 1 fig. Concludes that any gold present in shales can be determined by the fire-assay methods, but that only a small percentage of the gold shown to be present can be recovered by cyanidation and chlorination treatment.
- †RI 2415. Distillation Gases Yielded by Trent Amalgams and Ethylene Found Therein as a Source of Alcohol, by J. D. Davis. 1922. 8 pp., 2 figs. Describes tests to show that Trent amalgams yield gases intermediate between those from coal and oil in quantity and quality.
- RI 2416. Properties of Typical Crude Oils from the Producing Fields of Southern Louisiana and Southern Texas, by N. A. C. Smith, A. D. Bauer, and N. F. LeJeune. 1922. 69 pp., 1 fig. Tabulates results of tests of crudes from Texas, Louisiana, Arkansas, California, Illinois, Indiana, Kansas, Kentucky, Ohio, Oklahoma, Pennsylvania, West Virginia, and Wyoming.
- †RI 2417. The Production of Carbon Black from Natural Gas by the High-Voltage Arc, by J. J. Jakosky. 1922. 10 pp., 5 figs. Summarizes investigations to determine whether a higher recovery of carbon black from natural gas is possible.
- †RI 2419. Regulations Safeguarding Coal-Cutting Machines, by L. C. Isley. 1922. 9 pp. Quotes regulations of 11 States and United States.
- †RI 2420. Experiments on Back Pressure on Oil Wells, by T. E. Swigart. 1922. 9 pp. Describes tests of two wells in Oklahoma producing by gas pressure.
- †RI 2421. Natural Gas as a Factor in Oil Migration and Accumulation in the Vicinity of Faults, by R. van A. Mills. 1922. 6 pp. States that faulting that has yielded open fissures has strongly affected migration and accumulation of oil and gas.
- †RI 2422. The Explosibility of Methane-Air and Gasoline-Air Mixtures as Related to the Design of Explosion-Proof Electric Motors, by E. J. Gleim. 1922. 7 pp., 1 fig. Stresses fact that motors to be used where explosive mixtures of volatile gasoline vapors and air may accumulate should have twice protection against communicating explosion to outside air than where used in methane-air mixtures.
- †RI 2424. Use of the Churn Drill at Lime-Plant Quarries, by Oliver Bowles. 1922. 7 pp. Describes various types of drills, lists advantages claimed for churn drill, and gives conditions disadvantageous for use.

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- RI 2425. A Section Through the New Albany Shale, by J. R. Reeves. 1922. 5 pp., 1 fig. Discusses study of core drilled through New Albany shale, from Indiana.
- †RI 2426. Fire and Ventilation Doors in Metal Mines, by D. Harrington. 1922. 5 pp. Emphasizes importance of being able to isolate various sections of metal mines by providing substantially built doors that can be shut when necessary.
- †RI 2427. Rock-Strata Gases in Mines of a Nevada Mining District, by E. D. Gardner. 1922. 4 pp. Gives analyses of gas samples and concludes that such gases are given off as free nitrogen from rock mass.
- †RI 2429. Quarry Problems from the Engineer's Viewpoint, by Oliver Bowles. 1923. 5 pp. States that many quarry problems can be solved by application of engineering knowledge to operating practice.
- †RI 2430. Mining Diatomaceous Earth at Lompoc, Calif., by E. D. Gardner. 1923. 2 pp. Describes deposit and mining methods.
- RI 2432. Coal Analyses from Twenty-Five Laboratories Compared, by A. C. Fieldner, H. M. Cooper, and F. D. Osgood. 1923. 11 pp., 5 figs. Compares analyses of anthracite, coke, semibituminous coal, gas coal, and steaming coal.
- †RI 2433. Metallurgical Possibilities of the Descloizite Ores at Goodsprings, Nev., by H. A. Doerner. 1923. 19 pp. Concludes that to obtain a good grade of vanadium concentrate and fair recovery of vanadium, ore would have to be crushed to pass a 48-mesh or even a 60-mesh screen; principal difficulty would be to find satisfactory market.
- †RI 2434. Permissible Electric Drills, by H. B. Brunot and H. B. Freeman. 1923. 9 pp. Describes methods of conducting tests of electric drills for permissibility.
- †RI 2436. Effect of Cartridge Diameter on the Strength and Sensitiveness of Certain High Explosives, by S. P. Howell and J. E. Crawshaw. 1923. 7 pp., 3 figs. Gives results of tests of 40- and 60-percent strength explosives.
- †RI 2437. List of Publications on Ceramic Investigations, United States Bureau of Mines. 1923. 5 pp. Lists 91 reports by Bureau of Mines investigators.
- †RI 2438. Tests of Large Boiler Fired with Powdered Coal, by Henry Kreisinger and John Blizard. 1923. 2 pp. Tabulates principal results obtained.
- RI 2441. Report of Lignite-Carbonizing Experiments Conducted at Grand Forks in 1922, by W. W. Odell. 1923. 26 pp., 4 figs. Describes construction of lignite carbonizer easily constructed and operated and inexpensive and shows cost of making lignite char and briquets in curves.
- RI 2442. The Use of Vapor-Tight Tankage in the Oil Fields, by Ludwig Schmidt. 1922. 11 pp., 2 figs. Emphasizes fact that all vapor-tight equipment, such as valves, hatches, etc., needs constant attention to remain efficient.
- †RI 2443. Combustion Products from a Radiant-Type Natural-Gas Heater and Suggestions Regarding Its Operation, by G. W. Jones, W. P. Yant, and L. B. Berger. 1923. 15 pp., 1 fig. Describes and sketches testing apparatus and gives results obtained with special emphasis on liberation of carbon monoxide and directions for proper adjustment of such heaters.
- RI 2445. The Value of Oxygen Breathing Apparatus to the Mining Industry, by E. H. Denny and M. W. von Bernewitz. 1923. 6 pp. Reviews history of use of rescue apparatus in the United States, emphasizes its value at mine disasters, and lists number of disasters where it was used.
- †RI 2446. Rock Loading at Lime-Plant Quarries, by Oliver Bowles. 1923. 5 pp. Gives advantages and disadvantages of hand loading and of steam shovels.
- †RI 2447. Condensation Losses Due to Transmission of Carbureted Water Gas Under High Pressure, by W. A. Dunkley. 1923. 7 pp. Concludes that loss due to condensation is a practically negligible factor.
- †RI 2448. Preliminary Investigation of Brattice Cloth Used in Coal Mining, by G. S. Rice, J. W. Paul, and E. H. Denny. 1923. 4 pp. Tabulates data to show wide variations in conditions of use of brattice cloth, particularly with respect to quantity, cost, and life in Alabama, Pennsylvania, Utah, Indiana, Illinois, Colorado, and Nova Scotia.

† Out of print.

Reports of Investigations

- †RI 2449. Bureau of Mines Approval System as Applied to Permissible Storage-Battery Locomotives (First Complete Investigation Under Schedule 15), by L. C. Ilsley and H. B. Brunot. 1923. 8 pp. Covers the inspection and test of a storage-battery locomotive manufactured by the Geo. D. Whitcomb Co., Rochelle, Ill., to which Approval 1500 was assigned.
- †RI 2450. Petroleum Engineering in the Skull Creek Oil Pool, Northeastern Osage County, Okla., by T. E. Swigart. 1923. 9 pp., 1 fig. Includes engineering data compiled in connection with experiments to determine effect of back pressure on oil wells.
- †RI 2452. Jet, by W. M. Myers. 1923. 4 pp. Gives characteristics of jet and discusses history of industry in England; states that demand depends upon current mode in jewelry; includes bibliography.
- †RI 2453. Morbidity Studies As an Aid in Preventing Illness Among Miners, by R. R. Sayers. 1923. 6 pp. Stresses necessity of mining companies keeping records of illness among employees and their families.
- †RI 2454. Transportation Systems at Lime-Plant Quarries, by Oliver Bowles. 1923. 6 pp. Discusses trackage, quarry cars, haulage on inclines, and costs.
- RI 2455. How Steam-Production Costs Were Reduced in a Hand-Fired Return Tubular Boiler, by A. R. Mumford. 1923. 14 pp., 1 fig. Describes tests that reduced fuel costs from \$0.5287 to \$0.3540 per 1,000 pounds of steam.
- †RI 2456. Effects of Temperature and Time of Reaction in Distilling Oil Shales on the Yields and Properties of the Crude Oils, by L. C. Karrick. 1923. 8 pp. Concludes that changes in quality of crude shale oils produced by varying distillation rates may be due to temperature at which decomposition occurred and the extent to which thermal reaction progressed; also that oils produced at slow distillation rates are produced at much lower temperatures than oils formed by rapid distillation.
- †RI 2457. Putting Safety Over in a Small Mine, by A. L. Murray. 1923. 5 pp. Outlines scheme for popularizing safety measures in a mine.
- †RI 2458. Abstracts from the Literature on Treatment of Manganese-Silver Ores, by G. H. Clevenger and Alphonse Cornejo. 1923. 14 pp. Abstracts 37 reports.
- †RI 2459. A Simple Method for the Determination of Tin in Iron and Steel, by E. P. Barrett and J. D. Sullivan. 1923. 4 pp. Describes gravimetric method, volumetric method, and sulphide method, rejecting them all as being too lengthy, and suggests new modification of well-known fusion method.
- RI 2462. The Treatment of Natural-Gas Gasoline to Meet the Doctor Test, by D. B. Dow. 1923. 13 pp., 2 figs. Describes methods of testing for sulphur and of removing sulphur from gasoline.
- †RI 2463. Utilization of Waste Rock at Lime Plants, by Oliver Bowles. 1923. 5 pp. Suggests various uses for waste rock, such as in ballast and concrete aggregate, as chicken grit, agricultural limestone, and filler, etc.
- †RI 2464. Physiological Effect of High Temperatures and Humidities with and without Air Movement, by R. R. Sayers and D. Harrington. 1923. 7 pp., 1 fig. Describes results of tests of persons remaining at rest in air at various temperatures and humidities.
- †RI 2465. Mine Timber in Illinois Coal Mines, by H. E. Tufft. 1923. 5 pp. Tells of timbering methods and costs in district.
- †RI 2466. An Economic Study of the New Albany Shale, by J. R. Reeves. 1923. 19 pp. Discusses location of deposit, transportation facilities, quarrying methods, blasting practice, and retorting data.
- †RI 2468. Monel Metal as a Material for Flame Safety Lamp Gauzes, by A. B. Hooker and R. A. Kearns. 1923. 14 pp. Gives results of tests to show that Monel metal is satisfactory for flame-lamp gauzes.
- †RI 2469. The Desulphurization of Coke by Air, by A. R. Powell. 1923. 6 pp. Concludes that, if free sulphur could be completely removed, metallurgical coke could be improved by air treatment.
- †RI 2470. Combustion of Powdered Coal, by Henry Kreisinger and John Blizard. 1923. 4 pp., 2 figs. Describes tests that showed that powdered coal may be burned with greater thermal efficiency for steam raising than by any other methods.
- †RI 2473. Globe-Miami Mine Rescue Maneuvers, by E. D. Gardner. 1923. 4 pp., 1 fig. Describes "fire drill" under conditions approximating those at a mine fire.

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- †RI 2475. The Metallurgical Treatment of Zinc-Retort Residues, by B. M. O'Harra. 1923. 12 pp. Discusses direct smelting in blast furnace, burning and sintering, dry screening, magnetic separation, wet concentration, burning to produce zinc oxide, and miscellaneous processes.
- RI 2476. Dangers of and Treatment for Carbon Monoxide Poisoning, by R. R. Sayers and W. P. Yant. 1923. 11 pp. Gives properties of carbon monoxide, stresses its dangers, and describes physiological effects and treatment.
- †RI 2477. Barite and Ocher in the Cartersville (Ga.) District, by W. M. Weigel. 1923. 11 pp. Describes properties, mining and milling methods, and uses.
- †RI 2479. Quarrying to Obtain a Uniform Lime Product, by Oliver Bowles. 1923. 6 pp., 2 figs. Suggests methods of obtaining uniform selection in flat-lying and steeply inclined beds and of disposing of inferior rock.
- RI 2480. Fluorspar Mining in the Western States, by R. B. Ladoo. 1923. 35 pp., 6 figs. Describes deposits and mining and milling methods in New Mexico, Arizona, Nevada, California, Colorado, Utah, and Washington.
- †RI 2482. Survey of Pacific Coast Petroleum Products; Part 2, Lubricating Oils, by E. C. Lane and N. F. LeJeune. 1923. 26 pp. Discusses application to California lubricants of Federal Specifications Board specifications.
- †RI 2484. Why Not Scrap "the Davy," by J. W. Paul and A. B. Hooker. 1923. 3 pp. Cites instances of danger of using Davy lamps and urges that all now in use should be discarded.
- †RI 2485. The Reducation of Iron Oxides by Fuel Gases, by E. D. Eastman. 1923. 14 pp., 5 figs. Describes tests with coal gas, water gas, and producer gas.
- †RI 2486. The Pyrotannic Acid Method for the Quantitative Determination of Carbon Monoxide in Blood and Air, by R. R. Sayers, W. P. Yant, and G. W. Jones. 1923. 6 pp., 1 fig. Gives detailed description of compact apparatus for quantitative determination of carbon monoxide in blood and air.
- RI 2487. Gasoline Saved on Government Trucks by Adjusting Carburetors by Exhaust-Gas Analysis, by G. W. Jones and A. C. Fieldner. 1923. 13 pp., 3 figs. Concludes that adjustable carburetors become adjusted to give too rich a mixture to give most efficient results as time lapses and should therefore be checked every two months.
- †RI 2488. Who May Set Off Blasts in Coal Mines, by L. C. Ilsley. 1923. 9 pp. Abstracts State laws on shot-firing, grouping similar laws under appropriate headings.
- RI 2489. Comparison of Gas Masks, Hose Masks, and Oxygen Breathing Apparatus, by S. H. Katz and J. J. Bourquin. 1923. 5 pp. Compares advantages and limitations of three types of apparatus.
- †RI 2491. Hydrogen Sulphide as an Industrial Poison, by R. R. Sayers, C. W. Mitchell, and W. P. Yant. 1923. 6 pp. Describes pathological effects of hydrogen sulphide poisoning.
- RI 2492. Results of Assays of the New Albany Oil Shale, by J. R. Reeves. 1923. 11 pp., 2 figs. Gives results of analyses of numerous samples of Indiana shale.
- †RI 2494. Atmospheric Conditions and Physiological Effects Produced on Trainmen by Locomotive Smoke in the Aspen and the Wasatch Tunnels of the Union Pacific Railroad, by S. P. Kinney. 1923. 13 pp., 1 fig. Explains accidents to men in tunnels as due to asphyxiation from carbon monoxide and suggests use of air-line respirators as protection against tunnel gases.
- †RI 2496. Platinum Assays and Platinum Promotions, by S. C. Lind, C. W. Davis, and M. W. von Bernewitz. 1923. 21 pp. Issues warning to public to be wary of helping to promote projects for mining platinum ores without careful assay of specimens.
- †RI 2497. Gases Liberated by High-Voltage Insulator Testing Apparatus, by G. W. Jones and W. P. Yant. 1923. 4 pp. States that gases liberated during tests of insulators with 90,000-volt "flash-over" 60-cycle testing apparatus are mainly ozone.
- †RI 2498. Disastrous Inflammation of Coal Dust in Excavating a Mine Dump, by C. A. Herbert. 1923. 2 pp. Suggests that railway companies loading old dirt piles containing coal dust wet down such piles for several days before disturbing them.

†Out of print.

Reports of Investigations

- †RI 2499. Carbon Tetrachloride Extinguisher on Electric Fires, by S. H. Katz, E. J. Gleim, and J. J. Bloomfield. 1923. 16 pp., 2 figs. Stresses fact that gas evolved from use of carbon tetrachloride as a fire extinguisher are poisonous and highly dangerous in absence of ventilation and in close confinement.
- RI 2502. The Use of Oxygen or Oxygenated Air in Metallurgical or Allied Processes, by F. W. Davis. 1923. 48 pp., 2 figs. Presents results of study of ferromanganese manufacture by coke-furnace process, as an example of a method that might be used with other and more difficultly reducible ferroalloys.
- †RI 2503. Some General Considerations of the Gummy Meter Problem in the Gas Industry, by R. L. Brown. 1923. 8 pp. Holds that primary control for gummy deposits is in carbureting units.
- †RI 2504. Test Papers for Estimating Hydrocyanic Acid Gas in Air, by S. H. Katz and E. S. Longfellow. 1923. 4 pp., 1 fig. Describes development of series of color-test papers for detecting HCN vapor in air of tanks and apparatus and in ships and buildings after fumigation.
- †RI 2505. Sulphur Trioxide Smoke Tubes for Determining Air Currents, by S. H. Katz and J. J. Bloomfield. 1923. 1 p., 1 fig. Describes apparatus and gives sketch.
- †RI 2506. Field Investigations on Trailing Cables Used on Coal-Cutting Outfits, by L. C. Hsley and H. B. Freeman. 1923. 3 pp. States that searching field tests have shown that concentric all-rubber-covered type of cable is preferable to types covered with weatherproof braid.
- †RI 2507. Oxygen-Oil Explosions, by M. D. Hersey. 1923. 9 pp. Lists variables involved in explosions, describes heat-transfer and explosibility experiments, and includes bibliography of 41 items.
- †RI 2509. Experiments on Fan-Pipe Installations at Butte, Mont., by G. E. McElroy and A. S. Richardson. 1923. 14 pp. Discusses tests to determine friction factors in galvanized-iron and canvas-pipe installations.
- RI 2510. The Use of Highly Volatile Natural-Gas Gasoline as a Refrigerant, by L. D. Wyant. 1923. 10 pp., 2 figs. Describes results of experimental runs using gasoline as a refrigerant and installations used.
- RI 2511. Survey of Pacific Coast Petroleum Products; Part 3, Burning and Fuel Oils, by E. C. Lane and N. F. LeJeune. 1923. 2 pp. Discusses application to California burning and fuel oils of Federal Specifications Board specifications.
- †RI 2512. Graphite for Steel-Melting Crucibles, by R. T. Stull and G. A. Bole. 1923. 6 pp. Concludes, after numerous tests, that superior steel-melting pots can be made from American graphites bonded with American clays.
- †RI 2513. Preparation and Detonating Properties of Cyanuric Triazide, by C. A. Taylor and W. H. Rinckenbach. 1923. 4 pp. States that cyanuric triazide is a very efficient detonating agent but is too sensitive to handle safely in large quantities.
- †RI 2517. Comparative Engine Tests with Crude, Acid-Refined, and Silica-Gel-Refined Motor Benzol, by A. C. Fieldner and G. W. Jones. 1923. 3 pp. Describes results of tests showing that no engine trouble developed when acid-refined or silica-gel-refined motor-benzol fuel was used.
- †RI 2518. Forms of Sulphur in Steamed Coke and Their Action in the Blast Furnace, by J. H. Thompson. 1923. 7 pp. Suggests two ways of correcting sulphur trouble in blast furnaces: (1) Surface sulphur could be removed by some such process as steaming; (2) it could be prevented from entering spongy iron at this zone by dipping coke in some material that would absorb sulphur more readily than does iron.
- †RI 2519. Anthracite Substitutes, by O. P. Hood. 1923. 4 pp. Discusses use of anthracite steam sizes, bituminous smokeless, bituminous, briquets, oil, and gas.
- RI 2520. Fuels Available for Domestic Use as Substitutes for Anthracite Coal, by Rudolf Kudlich. 1923. 7 pp. Describes fuels listed in RI 2519 in greater detail.
- †RI 2521. Oxygen-Oil Explosions, by J. J. Jakosky and E. W. Butzler. 1923. 4 pp., 3 figs. Part 2 of investigation discussed in RI 2507. Covers spontaneous ignition of metals in oxygen under pressure.

† Out of print.

- †RI 2524. Progress in Blast-Furnace Research, by P. H. Royster, T. L. Joseph, and S. P. Kinney. 1923. 6 pp. Outlines status of blast-furnace metallurgy in the light of results obtained in Bureau of Mines experimental furnace at Minneapolis.
- †RI 2526. Strength and Sensitiveness of TNT as Determined by the Laboratory "Sand-Test" Bomb, by C. A. Taylor and R. D. Leitch. 1923. 5 pp. Gives results of tests that showed the fine crystals from same solvent are slightly more sensitive and that fusing TNT decreases its strength and sensitiveness.
- †RI 2527. Air-Measurement Methods for Experimental Work on Fan-Pipe Installations, by G. E. McElroy and A. S. Richardson. 1923. 2 pp. Includes estimate of value of pitot tubes and anemometers.
- †RI 2528. The Transportation of Explosives in and About Mines, by L. C. Ilsley. 1923. 8 pp. Abstracts State safety laws.
- RI 2530. Lifting Costs at Oil-Well Properties, by H. C. George. 1923. 8 pp., 1 fig. Tabulates various costs comprising total.
- †RI 2531. Effect of Cooling Systems on Evaporation Losses of Gasoline, by Ludwig Schmidt. 1923. 12 pp., 4 figs. States that unless cooling systems are installed on vaportight tanks they are ineffective, but that, if tanks are tight, water sprays have maximum cooling effect.
- †RI 2532. Drilling and Broaching in Slate Quarries, by Oliver Bowles. 1923. 6 pp. Describes new method as substitute for channeling and blasting, which is slow but damages rock so little that percentage of usable slate is increased.
- †RI 2533. The Preparation and Properties of Normal Lead Trinitroresorcinate, by C. A. Taylor and W. H. Rinkenbach. 1923. 6 pp. States that normal lead trinitroresorcinate can be prepared by following patent directions, is insensitive to friction, and cannot be used as an initiator of military high explosives, but will detonate some industrial dynamites.
- †RI 2534. Bibliography of Magnesian Cements, by G. H. West, R. L. Sebastian, and W. A. Darrow. 1923. 15 pp. Lists 211 items.
- †RI 2535. Who Pays for the Accidents, by R. V. Ageton. 1923. 4 pp. Presents data to show large proportion of accidents occur during first months of employment.
- †RI 2537. Relation of Operating Practice to Composition of Light Oil from Carbureted Water Gas, by R. L. Brown, E. F. Pohlman, and H. G. Berger. 1923. 9 pp., 2 figs. Concludes that time and contact factors in cracking are tangible control measures, that temperature at which cracking takes place affects gum-forming constituents in gas, and that gas oils of different properties give rise to different amounts of such constituents.
- †RI 2539. Carbon Monoxide Hazards from Tobacco Smoke, by G. W. Jones, W. P. Yant, and L. B. Berger. 1923. 6 pp. Describes tests that show concentrated smoke does not reach alveoli of lungs and that maximum average concentration of carbon monoxide drawn into lungs does not exceed 0.01 per cent.
- †RI 2540. Friction Factors for Fan Piping Used in Mine Ventilation, by G. E. McElroy and A. S. Richardson. 1923. 15 pp., 5 figs. Gives tabulation of test results and makes recommendations regarding installations of fan piping.
- RI 2541. Electrical Safety Inspection: Suggestions for Mine Safety Engineers, by L. C. Ilsley. 1923. 10 pp. Stresses 40 important points to be checked in inspecting mine electrical equipment.
- †RI 2542. Graphites for Brass-Melting Crucibles, by R. T. Stull and L. E. Geyer. 1923. 5 pp. While not drawing definite conclusions, states that tests indicate that American bond clays and Alabama graphite can be used to make superior brass-melting crucibles.
- †RI 2544. Lead-Zinc Separation by Volatilization, by G. L. Oldright. 1923. 11 pp. States that, in view of prospective high price of lead, increasing efforts will be made to recover it from zinc concentrates, and that the volatilization process is particularly suitable for use in zinc-retort plants.
- †RI 2545. Determination of Fineness of Powdered Coal, by W. A. Selvig and W. L. Parker. 1923. 14 pp., 1 fig. Summarizes results achieved by 17 cooperating laboratories in standardizing machine sieving.

† Out of print.



Reports of Investigations

- †RI 2546. Mine Timber in Pennsylvania Coal Mines, by H. E. Tufft. 1923. 3 pp. Mentions types of hardwood used for props, ties, and mine rails and gives average cost of timber.
- †RI 2547. A Floating Roof for Oil Tanks, by Ludwig Schmidt. 1923. 9 pp., 4 figs. Describes and gives sketches of construction of floating roof; adds that its primary function is to reduce evaporation losses by eliminating vapor space above stored oil.
- †RI 2548. Solubility of Finely Divided Rock Dusts in Water, Kerosene, and Alcohol, by W. M. Myers. 1923. 6 pp. Discusses tests of liquids to be used as collecting mediums for dust samples.
- †RI 2550. The Paraffin Problem in Oil Wells, by R. van A. Mills. 1923. 11 pp. Treats causes of paraffining and suggests preventive measures and methods of removal of paraffin from wells.
- †RI 2551. Distribution of Air in Metal-Mine Ventilation, with Especial Reference to Flexible-Tubing Methods, by D. Harrington. 1923. 11 pp. Considers advantages and disadvantages of methods used to distribute air in metal mines and stresses necessity for adequate ventilation, particularly of "blind end."
- †RI 2553. Gaseous Content of Ground Waters as an Aid to the Petroleum and Natural-Gas Prospector, by G. W. Jones, W. P. Yant, and E. P. Buxton. 1923. 15 pp., 1 fig. States that hydrocarbons present in water serve to indicate whether oil or gas sands exist in region through which waters have passed.
- RI 2554. Cooling of Mine Air, by T. T. Read and F. C. Houghten. 1923. 19 pp. Describes beneficial effects to be obtained by circulating large enough volume of air.
- †RI 2555. Oxygen-Oil Explosions, by S. H. Brooks. 1923. 4 pp., 2 figs. Presents part 3 of investigation and covers spontaneous ignition of oils in oxygen under pressure.
- †RI 2556. Ferric Sulphate and Sulphuric Acid from Sulphur Dioxide and Air, by E. S. Leaver and R. V. Thurston. 1923. 5 pp., 2 figs. Discusses process for preparing solutions utilizable in treatment of all oxidized copper minerals and in recovery of copper from concentrator tailings.
- RI 2557. Industrial Accidents in the California Oil Fields, by H. C. Miller. 1923. 22 pp. Tabulates accidents by causes and occupations.
- †RI 2558. Methods of Testing Detonators, by C. A. Taylor and C. E. Munroe. 1923. 14 pp. Emphasizes value of sand test for estimating strength and efficiency of industrial detonators and for fixing standards by which different types of detonators may be judged.
- †RI 2560. The Effect of Silica in Iron Ore on Cost of Pig-Iron Production, by T. T. Read, T. L. Joseph, and P. H. Royster. 1924. 10 pp., 2 figs. Presents data showing relation between volume of slag and weight of coke needed per ton of iron.
- †RI 2563. Effective Temperatures for Still-Air Conditions and Their Application to Mining, by F. C. Houghten, C. P. Yaglaglou, and R. R. Sayers. 1924. 10 pp., 8 figs. States that comfort of workers depends solely upon effective temperature, that at 32° the effective temperature line coincides with dry-bulb temperature line, that at about 132° the effective temperature coincides with the wet-bulb temperature, and that below 32° the effect of humidity is reversed.
- †RI 2564. Conductivity and Specific Heat of Refractories at High Temperatures, by M. D. Hersey and E. W. Butzler. 1924. 7 pp. Assembles results of investigations on thermal conductivity and specific heat at high temperatures.
- RI 2565. The Katathermometer—Its Value and Defects, by W. J. McConnell, and C. P. Yaglaglou. 1924. 12 pp., 3 figs. Describes instrument and its use, especially as an index of human comfort. Includes bibliography.
- †RI 2566. Third Mine Rescue Maneuvers at Globe, Ariz., by F. C. Gregory. 1924. 4 pp., 1 fig. Discusses method of training and testing men.
- †RI 2567. The Danger of Open Lamps in Coal Mines, by L. C. Ilsley and M. W. von Bernewitz. 1924. 3 pp. Stresses dangers and urges rigid inspection to prevent uses of open lights in gassy atmospheres.
- †RI 2569. Lignite Carbonization, by W. W. Odell. 1924. 6 pp. Estimates cost of char made from lignite of various costs.

† Out of print.



- RI 2570. A Float-and-Sink Method and Apparatus for Testing Coarse-Size Coal, by E. R. McMillan and B. M. Bird. 1924. 12 pp., 2 figs. Describes method and its application.
- †RI 2571. Ash in Anthracite, by O. P. Hood. 1924. 2 pp. Gives average ash content of 127 samples, grouped by size.
- †RI 2572. Carbon Monoxide Fatalities from Natural-Gas Heaters Investigated by the Bureau of Mines in the Pittsburgh District During the Past Year, by G. W. Jones and W. P. Yant. 1924. 4 pp. Studies circumstances attending 10 fatalities.
- †RI 2574. Underground Signaling for Mines by the Ground-Conduction or "T. P. S." Method, by J. J. Jakosky. 1924. 11 pp., 6 figs. Concludes that underground communication can only be established through the earth at a distance of two to four times the distance between ground terminals and that it does not solve underground communication problem, because telegraphic code must be used.
- †RI 2575. Tests of Lignite Char as Reduction Fuel in the Smelting of Zinc Ores, by B. M. O'Harra. 1924. 7 pp. Considers value of lignite char as reduction agent and gives extended tabulation of results obtained.
- †RI 2578. A Process for the Production of Sponge Iron, by C. E. Williams, E. P. Barrett, and B. M. Larsen. 1924. 5 pp., 1 fig. Describes process, gives costs, and mentions uses of sponge iron.
- †RI 2582. The Distribution of Sulphur in Crude Petroleum, by N. A. C. Smith and D. D. Stark. 1924. 17 pp., 3 figs. Describes a study of distribution of sulphur in products obtained from light Mexican crude.
- RI 2583. The Hazards of Nonpermissible Explosives, by S. P. Howell and M. W. von Bernewitz. 1924. 5 pp. Summarizes accidents known to have been caused by nonpermissible explosives.
- †RI 2584. Some Effects on Man of High Temperatures, by W. J. McConnell and R. R. Sayers. 1924. 13 pp., 8 figs. Treats effects of high temperatures on respiration, weight, blood concentration, etc.
- †RI 2585. Mining Limestone for Lime Manufacture, by Oliver Bowles. 1924. 9 pp. Summarizes advantages of underground work (such as cleanness of product, avoidance of delays from bad weather, etc.) and its disadvantages (including increased cost of drilling and blasting and higher percentage of fines).
- †RI 2586. The Float-and-Sink Test for Fine Coal, by B. M. Bird and H. E. Messmore. 1924. 4 pp. Describes test and apparatus used.
- †RI 2587. New Uses of Nonmetallic Minerals, by W. M. Myers. 1924. 7 pp. Describes uses of andalusite, kyanite, sillimanite, beryl, spinel, and bentonite.
- †RI 2588. Fractional "Eduction" of Oil from Oil Shale, by M. J. Gavin and L. C. Karrick. 1924. 9 pp., 3 figs. Concludes that there is no point in attempting to base commercial retort design on the disproved theory of fractional "eduction."
- †RI 2590. Development of Workmen's Compensation Insurance for Metal Mines, by B. O. Pickard. 1924. 5 pp. Reviews origin of accident compensation, gives a digest of State compensation laws, and describes types of insurance carriers.
- RI 2591. The Carbon Monoxide Self-Rescuer, by A. C. Fieldner, S. H. Katz, and D. A. Reynolds. 1924. 10 pp., 5 figs. Describes self-rescuer and its use and gives sketches.
- †RI 2593. Carbon Monoxide Poisoning in Homes and Industries, by R. R. Sayers. 1924. 8 pp. Lists sources of poisoning, describes symptoms, and outlines treatment.
- †RI 2594. Tests of a Commercial Solution Used to Reduce the Hazard of CO Poisoning in Garages, by A. C. Fieldner and W. P. Yant. 1924. 4 pp. States that tests show "compound" is useless in absorbing CO.
- †RI 2595. Properties of Typical Crude Oils from the Producing Fields of California, by A. J. Kraemer and H. M. Smith. 1924. 55 pp. Classifies crudes, gives properties, and includes detailed analyses of typical samples.
- RI 2596. The Production of Lime from Small Stone, by W. M. Myers. 1924. 9 pp. Presents advantages and disadvantages of various types of kilns when used for calcining small stone.

† Out of print.

Reports of Investigations

- †RI 2597. Present Tendencies in Electric Brass-Furnace Practice, by H. W. Gillett and E. L. Mack. 1924. 10 pp. States that two types of furnace, the rocking indirect-arc and the induction, are finding increasing favor. Includes bibliography.
- †RI 2599. Radio as a Method for Underground Communications in Mine, by J. J. Jakosky. 1924. 4 pp. Stresses three main points: (1) That in accounts of successful underground reception, the sending station was more powerful than could possibly be considered practical for underground transmission; (2) that no instances are on record of successful transmission from mine to surface; and (3) that in practically all tests metallic conductors are controlling factors.
- †RI 2602. Tests on the Leakage of Mine-Ventilating Doors, by J. W. Paul, G. E. McElroy, and H. P. Greenwald. 1924. 3 pp. Describes leakage tests and tabulates results.
- †RI 2603. Assay-Retort Studies of Ten Typical Oil Shales, by W. L. Finley, J. W. Horne, D. W. Gould, and A. D. Bauer. 1924. 9 pp., 7 figs. Presents results of study of shales from Colorado, Scotland, Utah, Kentucky, Brazil, Nevada, and Australia.
- †RI 2604. Combustibility of Coke and Rate of Combustion, by T. L. Joseph. 1924. 5 pp. Stresses need of distinguishing between combustibility and rate of combustion, defines each, and gives table showing weight rate and volume rate of combustion per tuyère.
- †RI 2606. Tentative Specifications for Rock Dusting to Prevent Coal-Dust Explosions in Mines, by G. S. Rice, J. W. Paul, and R. R. Sayers. 1924. 6 pp. Defines standard rock dust and states in detail what is meant by adequate rock dusting.
- †RI 2607. Premium Rates for Compensation Insurance for Underground Metal-Mine Workers, by B. O. Pickard. 1924. 9 pp. Discusses factors that help to determine premium rates.
- RI 2608. Properties of California Crude Oils II—Additional Analyses, by A. J. Kraemer and H. M. Smith. 1924. 55 pp. Supplements RI 2595.
- RI 2609. Firing a Hand-Fired Down-Draft Furnace, by J. F. Barkley. 1924. 6 pp. Describes method used and results obtained in testing furnace to obtain best results with a minimum of smoke.
- †RI 2611. Fatalities in the California Oil Fields, by H. C. Miller. 1924. 4 pp. Lists fatalities in California oil-producing industry, in 1923, by causes.
- †RI 2612. Effects of Extraneous Gas on the Production of Oil Wells in the Lyons-Quinn Field of Oklahoma, by M. J. Kirwan. 1924. 21 pp., 6 figs. Gives results of survey of field to determine ultimate effect on production of using gas from lower sands to stimulate yield.
- †RI 2613. Microchemical Analysis and Its Application in the Determination of Low-Grade Ores, by E. E. Fairbanks. 1924. 6 pp., 1 fig. Shows advantages of microchemical methods in determining constituents of ores.
- †RI 2615. Sand-Blast Sand, by W. M. Weigel. 1924. 6 pp. Includes general information as to grades, shape of grains, and preparation.
- RI 2616. Saving Gasoline and Increasing Mileage by Proper Carburetor Adjustment, by G. W. Jones and A. A. Straub. 1924. 9 pp., 1 fig. Describes results of tests of high-test and low-test gasoline and benzol-gasoline blend to determine effect on carburetor adjustment.
- †RI 2617. The Safety Bonus in Metal Mining, by F. C. Gregory. 1924. 3 pp. Presents four plans for earning safety bonus.
- †RI 2618. Hindered-Settling Classification in Relation to Table Concentration of Idaho Lead-Zinc Ores, by A. W. Fahrenwald. 1924. 1 p., 1 fig. Describes in detail new method of hydraulic classification, sketches apparatus, and analyzes products of various types of classifiers.
- †RI 2619. The Effect of the Temperatures of Liquid-Oxygen Explosives on Cordeau Bickford, by D. B. Gawthrop. 1924. 5 pp., 1 fig. Concludes that cordeau Bickford can be used with liquid-oxygen explosives in the same way as with other explosives, as low temperatures do not noticeably affect its rate of detonation, sensitiveness, or brittleness.
- †RI 2621. The Resistance of Coal-Mine Entries to the Flow of Air, by J. W. Paul, G. E. McElroy, and H. P. Greenwald. 1924. 3 pp. Considers resistance to flow of air in entries where there are no obstructions other than natural roughness of the ribs, roof, and floor.

† Out of print.

- †RI 2622. Filter Sand for Municipal Water Supply, by W. M. Weigel. 1924. 6 pp. Names requirements for filter sands, specifications, sources, etc. Includes bibliography.
- RI 2624. Temperatures in Cabs of Freight Locomotives Passing Through Tunnels of the Chesapeake & Ohio Railway, by S. H. Katz and E. G. Meiter. 1924. 8 pp., 6 figs. Investigates temperatures at various positions in cabs and in tunnels, and suggests ways of relieving discomfort.
- RI 2625. The Cost of Accidents in Metal Mines as Measured by Compensation Insurance Premiums, by B. O. Pickard. 1924. 9 pp. Mentions types of insurance and gives rates.
- †RI 2626. Hazards of Electric Sparks and Arcs in Coal Mines, by L. C. Isley. 1924. 3 pp. Lists accidents from 1910 to 1924 attributed to electrical apparatus and circuits and causing 499 fatalities.
- RI 2627. The Utilization of Dolomite for Refractories, by G. A. Bole. 1924. 11 pp. Concludes (1) that by using certain fluxes in proper proportions dolomite can be dead-burned to a grain that will not slake in air or under treatment in an autoclave; (2) that several satisfactory binders for ground grains are obtainable; (3) that satisfactory shapes can be made from ground sinter by semidry process and slop-mold method; and (4) that such brick have physical properties indicating that they will give good service.
- †RI 2630. Ash-Softening Temperatures and Clinkering of Coals in a Boiler Furnace, by J. F. Barkley. 1924. 12 pp. States after tests that there appears to be a general relationship between ash-softening temperatures and clinkering.
- RI 2631. Determination of Gas Distribution in Internal-Combustion Engines by Gas Analysis, by G. W. Jones, W. P. Yant, and L. B. Berger. 1924. 6 pp., 4 figs. Shows results of tests to indicate how the relative distribution of fuel to different cylinders of an internal-combustion engine can be determined by gas analysis.
- †RI 2632. An Experimental Still for the Detailed Study of Crude Petroleum, by M. B. Cooke. 1924. 21 pp., 5 figs. Describes still and its operation and gives distillation data.
- †RI 2634. Magnetic Recovery of Combustible in Boiler-Plant Refuse, by Rudolf Kudlich. 1924. 2 pp. Describes briefly process used in Europe for reclaiming combustible matter from boiler or furnace refuse.
- †RI 2637. Some Features of Ventilating Fans at 164 Coal and Metal Mines, by D. Harrington and M. W. von Bernewitz. 1924. 5 pp. Studies fan installations at 154 disasters and suggests that, though no definite rule can be given for procedure in time of disaster, the fan should be placed in running order and an attempt be made to keep main traveled roads ventilated.
- †RI 2638. The Critical Time of Day for Coal-Mine Explosions, by L. D. Tracy and M. W. von Bernewitz. 1924. 5 pp., 1 fig. Concludes from study of 256 explosions that there are two critical times of day when explosions are likely to occur—between 6 and 9 a. m. and between 3 and 7 p. m.
- †RI 2639. Improvement of the Geophone by the Use of Electrical Sound Amplifiers, by W. T. Ackley, jr., and C. M. Ralph. 1924. 5 pp., 1 fig. Describes adaptation of vacuum-tube audio-frequency amplifier to new form of geophone.
- †RI 2641. Mine Accident Statistics, by W. W. Adams. 1924. 51 pp. Considers lost-time accidents to underground workers, including data for causes, ages, occupations, nationalities, States, etc.
- †RI 2645. Revised List of Publications on Ceramic Investigations, Bureau of Mines, by L. E. Geyer. 1924. 7 pp. Lists titles and authors of bureau publications on ceramics.
- †RI 2646. Special Sands, by W. M. Weigel. 1924. 9 pp. Includes data on filter sand, sand-blast sand, engine sand, abrasive sand, fire or furnaces sand, roofing sand, and pottery-placing sand.
- †RI 2647. The Resistance of Coal-Mine Entries to the Flow of Air, by J. W. Paul, H. P. Greenwald, and G. E. McElroy. 1924. 3 pp. Comprises part 2 of study begun in RI 2621. Discusses resistance caused by mine cars.

† Out of print.

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- †RI 2648. Calcined Dolomite as a Substitute for Lime in the Recovery of Gold and Silver by the Cyanide Process, by E. S. Leaver, C. W. Davis, and J. A. Woolf. 1924. 7 pp. States that results of tests show that MgO content of calcined dolomite can not be used advantageously to neutralize acidity in regular cyanide process where cyanide solution is to be used repeatedly to extract fresh batches of ore, although it may be substituted for lime in the cyanide treatment of certain ores.
- †RI 2649. Explosion Hazards Incidental to Unwatering Coal Mines, by L. D. Tracy. 1924. 5 pp. Issues warning against possibility of presence of gas accumulations in flooded mines, indicating the precaution of using approved closed lights when working in such an area.
- RI 2651. Factors Retarding Transmission of Radio Signals Underground and Some Further Experiments and Conclusions, by J. J. Jakosky and D. H. Zellers. 1924. 10 pp., 2 figs. Points out limitations of pure radio and shows influence of earth strata in retarding pure radio signals.
- RI 2652. Zinc Used for Roofing, by C. E. van Barneveld. 1924. 10 pp., 5 figs. Shows forms in which zinc is used for roofing, pictures ways of laying zinc roofing, and states advantages and disadvantages.
- †RI 2654. Effects of Temperature and Pressure on Gypsum and Anhydrite, by Marie Farnsworth. 1924. 3 pp. Describes tests of chemical and physical properties of anhydrite with regard to its wider utilization.
- †RI 2655. Analysis of Oil-Wax Mixtures, by L. D. Wyant and L. G. Marsh. 1924. 3 pp., 1 fig. Discusses equipment used, sampling methods, and test procedure.
- RI 2656. The Production of Sponge Iron, by C. E. Williams, E. P. Barrett, and B. M. Larsen. 1924. 14 pp., 7 figs. Describes successful use of rotary kiln for large-scale continuous production of sponge iron.
- RI 2658. Pollution by Oil of the Coast Waters of the United States, by F. W. Lane, C. P. Bowie, and J. S. Desmond. 1924. 14 pp. Considers pollution of coast waters from various sources—oil-burning ships, tankers, etc.—and its effect upon marine life, public health, bathing beaches, etc. Also tells of methods of oil disposal on board ship.
- RI 2660. Health Hazards in the Mining Industry, by R. R. Sayers. 1924. 14 pp. States that principal health hazards in coal mines are due to abnormal conditions of air (presence of carbon monoxide, hydrogen sulphide, siliceous dusts, etc.). Discusses sewage disposal, water supply, etc.
- RI 2661. Exhaust Gases from Engines Using Ethyl Gasoline, by R. R. Sayers, A. C. Fieldner, W. P. Yant, B. G. H. Thomas, and W. J. McConnell. 1924. 24 pp., 3 figs. Describes extensive tests to determine whether persons operating machines on ethyl gasoline were in danger of poisoning from tetraethyl lead used in the fuel.
- †RI 2663. Friction Factors for Metal-Mine Airways, by G. E. McElroy and A. S. Richardson. 1925. 3 pp. Gives schedule of friction factors and tells how to apply them.
- †RI 2664. Hazards of Unsafe Types of Gas Masks, by S. H. Katz. 1925. 5 pp. Issues warning against using discarded military gas masks in industry.
- †RI 2668. A Test of CO₂ Recorders, by J. F. Barkley. 1925. 2 pp., 1 fig. Concludes that in general the CO₂ instruments on the market give accurate results when all elements are favorable.
- †RI 2669. The Status of Research in Ore Dressing, by E. A. Hersam. 1925. 48 pp. Discusses ore-dressing processes in use in various centers of the United States, describes the mechanism of ore dressing, and also considers separation, classification, concentration, flotation, elutriation of clays and coal, dewatering, etc.
- RI 2670. Possibilities in the Use of Helium-Oxygen Mixtures as a Mitigation of Caisson Disease, by R. R. Sayers, W. P. Yant, and J. H. Hildebrand. 1925. 17 pp., 1 fig. States that tests indicated that use of helium-oxygen mixtures as a substitute for air in diving work allows material reduction of time of decompression.
- †RI 2671. The Resistance of Coal-Mine Entries to the Flow of Air, by J. W. Paul, H. P. Greenwald, and G. E. McElroy. 1925. 4 pp. Comprises part 3 of series (see RI 2621 and 2647) and considers the resistance caused by timber sets and by cars in timbered entries.

- †RI 2674. The Ignition of Firedamp by Exposed Filaments of Electric Mine-Lamp Bulbs, by R. D. Leitch, A. B. Hooker, and W. P. Yant. 1925. 3 pp. Gives results of tests in methane and natural gas to show high percentage of ignition obtained in the former, which justify inclusion of safety device to protect lamp bulbs among specifications for permissible electric lamps.
- †RI 2677. Effect of Tank Colors on Evaporation Losses of Crude Oil, by Ludwig Schmidt. 1925. 7 pp., 4 figs. Describes tests of tanks painted black, red, gray, or aluminum and shows the light-colored paints are most effective in preventing evaporation losses from tanks containing gasoline or crude of high gasoline content.
- RI 2678. Some Common Mistakes in Operating a Stoker-Fired Furnace, by J. F. Barkley. 1925. 5 pp. Points out common errors in stoking practice.
- †RI 2679. Methods of Laboratory Grinding of Coke for Analysis, by W. A. Selvig. 1925. 5 pp. Describes methods and concludes that grinding apparatus is likely to contaminate coke by introducing iron from abrasive action of coke on rubbing surfaces.
- RI 2682. Line Radio and the Effects of Metallic Conductors on Underground Communication, by J. J. Jakosky and D. E. Zellers. 1925. 10 pp., 7 figs. Discusses chief factors affecting carrier-current transmission, describes typical underground circuits for power and lighting, and sketches apparatus used, giving results obtained.
- RI 2683. The Formation of Oil-Field Emulsions, by D. B. Dow. 1925. 9 pp. Explains formation of emulsions, tells of methods of removing them, and suggests preventive measures.
- RI 2685. Bibliography on Economic Utilization of Mine Timber, by H. E. Tuft and R. R. Hornor. 1925. 13 pp. Lists 182 references on various phases of subject.
- †RI 2686. A Convenient Method for Determining Gum-Forming Material in Gasoline, by M. B. Cooke. 1925. 4 pp., 1 fig. Describes method involving evaporation of sample in a steam-heated oven.
- †RI 2688. Methods Used for Dehydration of Oil-Field Emulsions, by D. B. Dow. 1925. 16 pp. Discusses in greater detail dehydration methods mentioned in RI 2683.
- †RI 2691. Recent Developments in the Production and Consumption of Abrasive Garnet, by W. M. Myers and C. O. Anderson. 1925. 11 pp. Treats chemical and physical properties of garnet, its occurrence, manufacture, and utilization.
- RI 2692. The Physical Chemistry of Oil-Field Emulsions, by D. B. Dow and C. E. Reistle, jr. 1925. 14 pp. Considers five important physical factors affecting recovery of gasoline from cut oil.
- †RI 2694. Present Trend in Flotation Flow Sheets and Classification of Flotation Feed, by A. W. Fahrenwald. 1925. 7 pp., 7 figs. Presents a number of flow sheets to illustrate various flotation practices.
- †RI 2697. Methods of Increasing Lump-Coal Production, with Especial Reference to Southern Illinois, by J. E. Tiffany and J. J. McKitterick. 1925. 7 pp., 7 figs. Offers a number of recommendations to operators desiring to increase production of lump coal.
- †RI 2698. Barium Polysulphide in Sulphidizing Oxidized Ores for Flotation, by E. S. Leaver and H. M. Lawrence. 1925. 4 pp. Tests possibilities of using barium polysulphide as sulphidizing reagent.
- †RI 2700. Present Status of Differential Flotation, by A. W. Fahrenwald. 1925. 12 pp. Describes apparatus and reagents used and cites typical examples of differential flotation.
- †RI 2704. Welfare and Safety in Connection with Mining in Utah, by A. L. Murray. 1925. 7 pp. Gives résumé of work being done by various mining companies.
- †RI 2705. Calcium Sulphate Retarders for Portland Cement, by E. E. Berger. 1925. 20 pp., 8 figs. Studies effect of different retarders on cement and presents results largely in form of curves. Includes bibliography.
- RI 2708. Miscellaneous Analyses of Foreign Coals. 1925. 2 pp. Includes analyses of coals from China, Japan, New Zealand, and Australia.
- †RI 2709. Consumption of Reagents Used in Flotation, 1923-24, by Thomas Varley. 1925. 6 pp. Presents results of special canvass of mill operators.

† Out of print.

Reports of Investigations

- †RI 2710. Gas Hazards in Street Manholes, by S. H. Katz, E. G. Meiter, and J. J. Bloomfield. 1925. 20 pp. Cites precautions for workers in manholes and gives first-aid directions for reviving gassed workers.
- RI 2711. Falls of Roof and Coal in Bituminous-Coal Mines, by W. W. Adams. 1925. 10 pp., 3 figs. Summarizes data from reports of 1,372 individual accidents from falls of roof.
- †RI 2712. Temperature-Control System for Dressing and Tempering Fishtail Bits, by C. H. Shapiro. 1925. 18 pp., 3 figs. Presents data to show that a proper method of heating and quenching bits will increase footage more than 50 percent and reduce drilling time.
- †RI 2718. Diatomaceous Earth, by C. W. Davis. 1925. 14 pp., 1 fig. Describes properties, uses, occurrence, and production in Nevada. Includes bibliography.
- †RI 2719. Gas Masks for Protection in Air Against All Gases, Vapors, and Smokes, by A. C. Fieldner, S. H. Katz, H. W. Frevert, and E. G. Meiter. 1925. 10 pp., 2 figs. Discusses all-service gas mask, its construction and use.
- †RI 2721. Evaporation Losses of Gasoline in the Refinery, by Ludwig Schmidt. 1925. 16 pp., 4 figs. States that evaporation losses in refineries can be reduced by proper methods of refinery construction and operation. Also considers losses of gasoline in storage.
- RI 2724. The Disposal of Petroleum Foots Oil, by L. G. Marsh and L. D. Wyant. 1926. 7 pp. Reports results of an investigation of the redistillation of foots oil.
- †RI 2725. Stream Pollution by Acid Mine Drainage, by R. D. Leitch. 1926. 7 pp. Concludes that neutralization of mine-draining wastes is the only solution of the problem.
- †RI 2726. Coal-Mining Royalties and Leasing Conditions in Williamson and Franklin Counties, Ill. (District No. VI), by L. D. Tracy. 1926. 24 pp. Presents first of series of studies on subject to attempt to assist coal-mining industry to standardize forms of leases.
- †RI 2727. Boiler-Water Conditioning, with Special Reference to High Operating Pressure and Corrosion, by R. E. Hall. 1926. 6 pp., 1 fig. Discusses scope of boiler-water conditioning, prevention of scale formation on evaporating surfaces, feed-water lines, and preheating sections, relation between chemical used in treatment and operating pressure, and prevention of corrosion on surfaces in contact with feed or boiler water.
- RI 2730. Experiences with the Combustion of Fuel Oil in Power-Plant Boilers, by J. F. Barkley. 1926. 6 pp., 1 fig. Describes tests and gives representative analyses of products of combustion.
- †RI 2731. Analysis of Copper-Palladium-Gold-Silver Concentrates, by C. W. Davis. 1926. 5 pp. Describes five methods of analyzing Alaska ore containing 40 to 50 percent copper.
- †RI 2732. Solubility and Effects of Natural Gas and Air in Crude Oils, by D. B. Dow and L. P. Calkin. 1926. 13 pp., 5 figs. Includes data obtained in investigating the effect of pressure and temperature on the amounts of natural gas and air that can be held in solution in different crude and refined oils, as well as the effect on gravity and volume.
- †RI 2733. Compensation Insurance Rates as a Measurement of Accident Prevention in Mines, by B. O. Pickard. 1926. 6 pp. Concludes that by expenditure of relatively small amount in statistical analyses causes of accidents can be determined and that a competent safety engineer can devise preventive measures for the larger portion of these accidents.
- †RI 2735. The Value of Leakage Tests on Natural-Gas Transmission Lines, by E. L. Rawlins. 1926. 9 pp. States that systematic leakage tests not only aid in conservation of gas but can be made to show direct financial returns.
- †RI 2739. Gases from Blasting in Heavy Sulphides, by E. D. Gardner, G. W. Jones, and J. D. Sullivan. 1926, 8 pp. Shows that large amounts of sulphur dioxide may be generated in blasting in heavy sulphides, as well as hydrogen sulphide.
- RI 2743. Coal-Mining Royalties and Leasing Conditions in Vermilion and Edgar Counties, Ill. (District VIII), by L. D. Tracy. 1926. 27 pp. Continues survey begun in RI 2726.

† Out of print.

- †RI 2744. Flotation of Limestone from Siliceous Gangue, by Oscar Lee. 1926. 3 pp. Points out value of lime flotation, because use is made of available lime for fluxing gangue, and recovery of iron is increased and sintered concentrate rendered self-fluxing.
- †RI 2745. Tests and Characteristics of Dust Respirators, by S. H. Katz, G. W. Smith, and E. G. Meiter. 1926. 8 pp. Gives results of tests of 13 respirators and points out advantages and disadvantages.
- RI 2746. Sanitary Survey of the Coal Mines of Alabama, by F. V. Meriwether. 1926. 20 pp. Discusses water supply, sewage disposal, industrial waste, control of communicable diseases and food supplies, housing conditions, etc.
- RI 2747. Study of the Reactions in an Iron Blast Furnace, by S. P. Kinney, P. H. Royster, and T. L. Joseph. 1926. 11 pp., 10 figs. Describes tests in Bureau of Mines 300-ton furnace at Minneapolis, Minn.
- †RI 2750. Gas Mask for Protection Against Ammonia Gas, by A. C. Fieldner, S. H. Katz, and H. W. Frevert. 1926. 3 pp. Describes construction and use of mask.
- †RI 2751. Nomographic Charts for Computing the Rate of Leakage from Natural-Gas Lines, by E. O. Bennett. 1926. 3 pp. Explains use of charts intended for ready reference when field tests are made.
- RI 2752. Methods of Testing High-Pressure Natural-Gas Lines for Leakage Losses, by E. L. Rawlins. 1926. 10 pp., 3 figs. Discusses "pressure-drop" method, "metering-in and metering-out" method, and "metering-in" method.
- RI 2755. The Sizing Action of a Coal-Washing Table, by B. M. Bird. 1926. 8 pp. Shows how coal-washing table separates according to size and to specific gravity.
- RI 2757. Extinction of Methane Flames by Helium, by H. F. Coward and G. W. Jones. 1926. 4 pp., 1 fig. Describes tests showing that helium is more extinctive of methane flames than is argon.
- RI 2758. Explosibility of Oil-Shale Dust, by V. C. Allison and A. D. Bauer. 1926. 8 pp., 1 fig. Concludes from tests in Experimental mine that oil-shale dusts tested were explosive, explosibility increasing with combustible content.
- RI 2761. Magnetic Concentration of Flue Dust of the Birmingham District, by Oscar Lee, B. W. Gandrud, and F. D. DeVaney. 1926. 16 pp. Shows by tests that high content of gangue in average flue dust of Birmingham district makes it unfit to treat like flue dusts from other ores, from which a satisfactory product can be obtained by direct sintering.
- †RI 2762. Manufacture of Lime from Small Stone with a Sintering Machine, by W. M. Myers. 1926. 16 pp., 2 figs. Studies sintering machine as means of manufacturing lime from small stone and thus recovering a salable product from material often wasted.
- RI 2766. Recent Progress in Slate Technology, by Oliver Bowles. 1926. 9 pp., 2 figs. Records changes in slate technology since publication of B 218.
- RI 2769. Gas-Making and Fuel Problems of the Gas Industry of California, by W. W. Odell. 1926. 9 pp., 1 fig. Indicates possibilities of efficiently utilizing fuels in making gas by other than oil-gas process.
- †RI 2771. Fluctuations in the Temperature of Natural Gas Flowing in Buried and in Uncovered Pipe Lines, by E. L. Rawlins. 1926. 3 pp., 1 fig. Presents results of records kept for one year on temperature of natural gas flowing through pipe lines.
- RI 2773. Accident-Severity Rates for Certain Metal Mines, by W. W. Adams. 1926. 3 pp. Compares accident-severity rates for metal mines, coal mines, and quarries and open-pit mines.
- †RI 2776. Hydrogen Sulphide Poisoning in the Texas Panhandle, Big Lake, (Tex.) and McCamey (Tex.) Oil Fields, by W. P. Yant and H. C. Fowler. 1926. 20 pp., 3 figs. Describes findings of investigation of "poison gas" encountered during development of certain Texas oil fields. Suggests protective measures.
- †RI 2777. Consumption of Reagents Used in Flotation, 1925, by Thomas Varley. 1926. 10 pp. Continues survey begun in RI 2709.
- †RI 2778. The Application of Compressed Air to the Elliott Pool, Nowata County, Okla., by B. E. Lindsly. 1926. 14 pp., 5 figs. Describes method used for artificially restoring rock pressure by air in Elliott pool.

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- RI 2779. Stream Measurement in Relation to Mine Drainage, by W. R. Crane and E. J. Maust. 1926. 5 pp., 2 figs. Tells of use of gaging rods and weirs to determine drainage from area overlying and adjacent to mines in Birmingham district, Alabama.
- RI 2780. Coal-Mine Royalties and Leasing Conditions in Macoupin, Sangamon, and Montgomery Counties, District VII, Illinois, by L. D. Tracy. 1926. 48 pp. Continues study begun in RI 2726 and 2743.
- †RI 2781. What is Known About the Effect of Smoke on Health, by W. C. White. 1926. 6 pp. Explains physiological effects of smoke.
- RI 2783. Accident-Severity Rates for Certain Coal Mines, by W. W. Adams. 1926. 6 pp. Summarizes results of analysis of accident records of 59 coal mines for the calendar year 1925.
- †RI 2784. Future Timber Supply for Coal Mines; What One Company Is Doing, by L. D. Tracy. 1926. 5 pp. Shows how one company has adopted a systematic reforestation program and is growing its own trees from seedlings, largely conifers.
- †RI 2789. Charging Explosives in Drill Holes of Drift Rounds in Metal Mines, by E. D. Gardner. 1927. 15 pp. Discusses methods of loading individual holes of the rounds, giving results of tests in Arizona copper mine.
- †RI 2790. The Blasting of Hanging Ore Columns in Chutes and Drawing Raises, by E. D. Gardner. 1927. 6 pp. Concludes that all blasts in hanging chutes, ore passes, or drawing raises should be fired with electric detonators for safety and economy in using explosives.
- RI 2793. Sources of Dust in Coal Mines, by J. J. Forbes and A. H. Emery. 1927. 17 pp., 7 figs. Determines by atmospheric sampling how much dust is raised into the air during various operations of coal mining, such as undercutting with machines, loading coal by hand, and transporting it from the working face to the surface.
- RI 2794. Some Feldspathic Materials of the Pacific Northwest, by Hewitt Wilson. 1927. 13 pp. Describes characteristics, physical tests, and preparation of samples from deposits in Idaho, Oregon, Washington, and British Columbia.
- †RI 2798. The Use of Flocculating Reagents for the Recovery of Fine Mica, by W. M. Myers. 1927. 7 pp. Reviews general features of ground-mica industry and describes tests on flocculation of mica with electrolytes, including sulphuric acid, hydrochloric acid, potash alum, aluminum sulphate, and chrome alum.
- †RI 2801. Tests with Rock Dust for Extinguishing Fire, by H. C. Howarth and H. P. Greenwald. 1927. 5 pp. Shows that rock dust is effective in controlling fires when they may be approached closely enough for it to be applied direct; moreover, it has the advantages of not generating steam or evaporating.
- RI 2802. Methods and Tools for Removing Paraffin from Flowing Wells, by C. E. Reistle, jr. 1927. 4 pp., 1 fig. Describes construction and use of paraffin hook, paraffin knife, flow devil, and special equipment for use with these tools.
- RI 2805. Known Accumulation of Gas Ignited by Unapproved Rock-Dusting Machine, by L. D. Tracy and C. W. Owings. 1927. 3 pp., 1 fig. Explains how nonpermissible rock-dusting machine ignited gas which accumulated when machine damaged door so that it would not close and short-circuited the air.
- RI 2806. The Interpretation of Crude-Oil Analyses, by N. A. C. Smith. 1927. 20 pp., 6 figs. Describes application of Bureau of Mines Hempel method of interpreting analyses and classifying crudes.
- RI 2807. Properties of Typical Crude Oils from the Producing Fields of Venezuela, by A. J. Kraemer. 1927. 7 pp. Supplements TP 346.
- †RI 2808. Analyses of Spindletop (Tex.) Crude Oils, by A. J. Kraemer and Peter Grandone. 1927. 5 pp. States that there are apparently three types of crude oil in the Spindletop field, although all belong to naphthene-base (wax-free) class.
- †RI 2811. The Flotation of Oxidized Ores, by Thomas Varley. 1927. 22 pp. Discusses sulphidizing agents, general properties of oxidized ores, and flotation plants treating oxidized ores.

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- †RI 2812. Precipitation of Lead and Copper from Solution on Sponge Iron, by G. L. Oldright, H. E. Keyes, Virgil Miller, and W. A. Sloan. 1927. 4 pp. Describes experimental work on precipitation of lead and copper from leach solutions by use of sponge iron as precipitant.
- †RI 2813. The "Breathing" Action of Electrical Equipment, by L. C. Ilsley. 1927. 3 pp., 2 figs. Describes breathing tests of a motor and the switch and fuse compartment used with the motor.
- RI 2817. Desulphurizing Action of Manganese in Iron, by C. H. Herty, jr., and J. M. Gaines, jr. 1927. 8 pp., 3 figs. Discusses relation between temperature and solubility of product, effect of oxidation on desulphurization, and desulphurizing action of manganese in transfer ladle.
- †RI 2819. Apparatus for Vacuum Distillation of Lubricating and Heavy Petroleum Oils, by M. J. Gavin and A. L. Foster. 1927. 5 pp., 2 figs. Describes apparatus devised for distillation of oils at low pressure.
- RI 2820. The Wire Saw in Slate Quarrying; Preliminary Report, by Oliver Bowles. 1927. 10 pp., 6 figs. Tells results of tests under normal quarry conditions, which indicate that the wire saw will cut about twice as fast as the channeling machine at about two-fifths of the cost per square foot of surface obtained.
- †RI 2822. The Use of Solvents for Dewaxing Paraffin-Base Crude Oil, by H. M. Smith. 1927. 4 pp., 1 fig. Notes use of secondary butyl alcohol, acetone, isopropyl alcohol, etc., as solvents.
- †RI 2824. Analyses of Crude Oils from the Seminole District, Oklahoma, by A. J. Kraemer. 1927. 18 pp. Gives detailed analyses of 11 samples by Bureau of Mines Hempel method.
- RI 2828. The Detection of Sulphur in Petroleum and Petroleum Distillates, by F. W. Lane and J. M. Devine. 1927. 7 pp. Describes sensitive new method for qualitative detection of sulphur.
- RI 2829. Progress of Fuel Economy at Petroleum Refineries in the United States, by G. R. Hopkins. 1927. 3 pp. Concludes that fuel economy has resulted largely from policy of efficient use of existing apparatus rather than installation of new apparatus.
- †RI 2832. Comparison of Oils Derived from Coal and from Oil Shale, by J. W. Horne and A. D. Bauer. 1927. 34 pp., 1 fig. Presents results of investigation of yields and properties of oils produced from oil shale, lignite, and subbituminous coal, using the standard assay method for oil-shale testing development by the Bureau of Mines.
- RI 2833. Some Methods of Producing Flowing Wells in the Salt Creek Field and Their Effect on Gas-Oil Ratios, by K. B. Nowels. 1927. 50 pp., 8 figs. Describes tests in which wells were produced through casing with flow controlled by gate valves or flow nipples, through plain tubing, through tubing with oil flow controlled, by stopcocking, by flow devices at bottom of tubing and through tubing and packer.
- RI 2834. Reduction of Breathing Losses from Vapor-tight Lease Tanks, by Ludwig Schmidt. 1927. 8 pp. Concludes that most effective way of reducing breathing losses is through a combination of light-colored paints and the holding of suitable pressures on the tanks.
- RI 2837. The Study of an Intermediate-Base Crude Oil, by H. M. Smith. 1927. 9 pp., 2 figs. Consists of two parts—separation of crude into three main fractions and detailed study of less-volatile liquid fractions.
- RI 2838. Safety Measures Save Lives in Colorado Explosion, by E. H. Denny. 1927. 6 pp. Tells of safety features adopted at Colorado coal mines.
- RI 2839. Development of Some Fundamentals in the Ferric Sulphate-Sulphuric Acid Process, by F. S. Wartman and H. E. Keyes. 1927. 11 pp. Discusses such factors as size of bubble that gives most efficient aeration, temperature of iron sulphate solution during aeration, proportion of sulphur dioxide to oxygen in roaster gas, etc.

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Reports of Investigations

- †RI 2840. The Carburetion of Combustible Gas with Butane and Propane-Butane Mixtures, with Particular Reference to the Carburetion of Water Gas, by W. W. Odell. 1927. 12 pp., 2 figs. Studies properties of low-boiling members of paraffin series and of gases of various heating values with water gas as a base and considers effect of replacing gas oil with propane, butane, or mixtures of the two.
- RI 2843. The Sulphur Content of Commercial Motor Fuels, by A. J. Kraemer, E. C. Lane, and C. S. Luce. 1927. 8 pp. Gives results of tests of samples collected by the Bureau of Mines in July, 1927, and concludes that sulphur content of most commercial gasoline is less than 0.10 percent.
- RI 2846. Properties of California Crude Oils; III, Additional Analyses, by A. J. Kraemer. 1927. 27 pp. Supplements data already given on California crudes.
- †RI 2847. Prevention of Hydrogen Sulphide Poisoning in Handling and Refining High-Sulphur Petroleums, by H. C. Fowler. 1927. 27 pp. Discusses the occurrence, physiological effects, and dangers of hydrogen sulphide, frequently a serious health and safety problem in petroleum industry; describes method for detecting gas and outlines safety measures.
- RI 2848. Accident-Severity Rates for Certain Mines and Quarries, by W. W. Adams. 1927. 14 pp. Analyzes and tabulates data submitted in National Safety Competition for "Sentinels of Safety" trophy.
- RI 2849. Analyses of Crude Oils from the West Texas District, by A. J. Kraemer, Peter Grandone, and C. S. Luce. 1927. 18 pp. Gives brief production histories of various fields in the district and detailed analyses of oil samples.
- RI 2850. Stocks of Petroleum Products Held by Exporters, by G. R. Hopkins. 1927. 11 pp. Includes statistical analysis of petroleum stocks during 1927 and of exports for 1925-26, with alphabetical list of exporting companies.
- †RI 2851. The Wire Saw in Slate Quarrying; Supplementary Report, by J. R. Thoenen. 1928. 8 pp. Shows results of successful tests in Pennsylvania quarries of novel device introduced from Europe. Supplements RI 2820.
- RI 2852. Consumption of Reagents Used in Flotation, 1926, by Thomas Varley. 1928. 4 pp. Presents annual statistical summary, with explanatory comment, covering a wide variety of chemicals and oils used in the flotation process in metallurgical plants of the United States.
- RI 2853. The Resistance of Coal-Mine Entries to the Flow of Air, by H. P. Greenwald and G. E. McElroy. 1928. 4 pp. Deals with fourth phase of extensive investigation of coal-mine ventilation factors, referring especially to the resistance caused by right-angle bends.
- RI 2855. Chambering Cut Holes of Drift Rounds in a Western Metal Mine, by E. D. Gardner. 1928. 4 pp., 1 fig. Describes tests to show that chambering cut holes of drift rounds in silicified and chalcedonic quartz made possible decided reduction in cost per foot of drift and increased rate of advance of headings.
- †RI 2856. Status of Rock Dusting in the United States, by D. Harrington, J. J. Forbes, and F. Feehan. 1928. 8 pp. Shows that use of rock dusting is increasing, but that present record is not impressive or even satisfactory in view of large number of bituminous mines in operation.
- †RI 2857. Comparison of Ground Temperatures at Different Depths and Temperature Fluctuations of the Atmosphere, by E. L. Rawlins and T. W. Johnson. 1928. 3 pp., 2 figs. Gives results of tests to obtain information as to proper depth for burying natural gas pipe lines to minimize temperature fluctuations and thus prevent excessive leakage of gas due to expansion and contraction of the pipe joints.
- †RI 2858. Tests of Atmospheres in Chesapeake & Ohio Railway Tunnels Between Clifton Forge, Va., and Hinton, W. Va., by R. R. Sayers, L. B. Berger, and W. P. Yant. 1928. 19 pp., 1 fig. Reports results of several tests made to determine temperature, humidity, and composition of tunnel atmospheres and their physiological effects on enginemen.
- †RI 2859. Portable Electric Cap Lamps in Alabama, by F. E. Cash. 1928. 13 pp. Reviews progress made in Alabama in introduction of permissible portable electric cap lamps. Gives list of lamps used, with description and suggestions on use and maintenance.

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- †RI 2860. Flotation of Low-Grade Phosphate Ores, by H. M. Lawrence and F. D. DeVaney. 1928. 4 pp. Presents results so far attained in use of flotation to obtain higher recoveries of phosphate rock than are now being achieved in Florida district.
- RI 2862. A Rapid Corrosion Test for Gasoline, by H. P. Rue. 1928. 5 pp. Describes mercury corrosion test which offers possibilities in the proper control of gasoline-treating plants.
- RI 2863. Explosibility of Sulphide Dusts in Metal Mines, by E. D. Gardner and Edmund Stein. 1928. 11 pp. Points out that massive sulphides in metal mines are inflammable and furnish fuel for many mine fires.
- RI 2865. Rock-Strata Gases in the Cripple Creek District and Their Effect on Mining, by E. H. Denny, K. L. Marshall, and A. C. Fieldner. 1928. 24 pp. States that Bureau of Mines tests show that the Cripple Creek gases are of combined atmospheric and rock origin and are essentially air depleted of a certain amount of oxygen and contain irrespirable carbon dioxide.
- RI 2866. A Comparison of the Results Obtained with the Oxygen Bomb and Carius Methods in Determining Sulphur in the Heavier Petroleum Oils, by J. M. Devine and F. W. Lane. 1928. 3 pp. Concludes that for routine work and often for research the oxygen-bomb method of determining sulphur is entirely adequate, the more tedious Carius method being necessary only when results of highest accuracy are essential.
- RI 2867. Titanium in Bauxite Ores and Sludges, by W. H. Coghill. 1928. 4 pp. Studies possibility of recovering titanium from lixiviated bauxite ores, and comes to conclusion that much of it is too disseminated for concentration.
- RI 2868. Insulated Mine-Car Couplings, by F. E. Cash and C. W. Owings. 1928. 3 pp., 4 figs. Describes construction of four insulated couplings, with sketches to illustrate report.
- †RI 2869. The Production of High-Alumina Slags in the Blast Furnace for the Manufacture of Alumina Cement, by T. L. Joseph. 1928. 7 pp., 2 figs. Discusses value and composition of alumina cements and describes tests in a 6-ton blast furnace.
- RI 2870. The Occurrence of Jarosite Minerals in Oxidized Lead Ores as a Factor in Metal Losses, by R. E. Head and Virgil Miller. 1928. 13 pp. Emphasizes the importance of recognizing the occurrence of jarosite minerals in the oxidized ores of lead and silver, and suggests modified methods to prevent losses in the treatment of these ores.
- RI 2871. Flue Dusts from Copper Smelters of the Southwest; Composition and Methods of Treatment, by W. A. Sloan. 1928. 40 pp. Discusses the feasibility of substituting hydrometallurgical processes in the treatment of flue dusts for the present method of returning the dusts to the furnaces for retreatment.
- RI 2872. The Use of Brattice Cloth in Coal Mines, by G. S. Rice and C. W. Owings. 1928. 8 pp. Presents data on materials employed, cost, use, treatment, and deterioration.
- †RI 2873. Notes on Extraction and Recovery of Radium, Vanadium, and Uranium from Carnotite, by H. A. Doerner. 1928. 12 pp. Presents details of a modified nitric acid method that gives high extraction of radium and vanadium from a variety of ores and is more economical than the original method advocated by the Bureau.
- †RI 2874. Milling Baboquivari Ores, by E. S. Leaver and J. A. Woolf. 1928. 2 pp. Outlines a method for cyanide extraction of silver and gold from ores in Baboquivari mining district, Arizona.
- †RI 2875. Accident Severity Rates for Certain Mines and Quarries in 1927, by W. W. Adams. 1928. 14 pp. Analyzes and tabulates data submitted in National Safety Competition, 1927, for "Sentinels of Safety" trophy.
- †RI 2876. Use of the Acetylene Tetrachloride Method of Porosity Determination in Petroleum Engineering Field Studies, by C. E. Sutton. 1928. 10 pp., 1 fig. Describes method and tabulates results of tests.
- †RI 2877. Flotation of Fluorspar Ores for Acid Spar, by W. H. Coghill and O. W. Greeman. 1928. 3 pp. Stresses importances of converting some of the gravel spar that glutts the market into acid spar and gives results of one of the flotation runs.

† Out of print.

Reports of Investigations

- †RI 2878. Copper-Milling Research in Michigan, by A. W. Fahrenwald. 1928. 5 pp. Considers treatment of amygdaloid copper and states advantages of the flotation over the all-gravity process. Tabulates screen analyses of typical table feeds.
- †RI 2880. Crushing and Grinding Studies of Quartz, by John Gross and S. R. Zimmerley. 1928. 10 pp., 2 figs. Discusses dissolution method of surface measurement and tabulates results of tests.
- †RI 2881. Review of Fatalities in the California Petroleum Industry During the Calendar Year 1927, by G. B. Shea. 1928. 20 pp. Supplements data given in RI 2814 and suggests measures to prevent accidents.
- RI 2882. Shaft Fires—Magma Mines, by E. D. Gardner and D. J. Parker. 1928. 8 pp. Lists recommendations for preventing shaft fires.
- †RI 2883. The Re-Treatment of Comstock Tailings, by E. S. Leaver and J. A. Woolf. 1928. 7 pp. Tabulates results of tests.
- †RI 2884. Desirable Characteristics of Coke: Chemical, by J. D. Davis. 1928. 8 pp. Discusses fuel value and impurities of coke without attempting to fix close limits of chemical composition.
- †RI 2885. Standardizing the Open Flow from Natural-Gas Wells, by R. R. Brandenthaler, E. L. Rawlins, and T. W. Johnson. 1929. 6 pp., 3 figs. Describes tests performed in the Chickasha field. Recommends that this method be used until a practical field method can be developed.
- †RI 2886. Notable Increase in Fuel Economy Recorded at Petroleum Refineries in 1927, by G. R. Hopkins. 1928. 3 pp. States that the credit for the success attending fuel economy in 1927 may be attributed to the pipe still. Tabulates fuel used at refineries in the United States, 1926-27.
- †RI 2888. Utilization and Prevention of Molybdenum Waste in Oxidized Lead Ore Treatment, by R. E. Head and Virgil Miller. 1928. 3 pp. Gives results of tests made on a 100-gram sample of wulfenite ore from the Star district near Milford which had for their object the separation and recovery of the lead and molybdenum in separate products.
- †RI 2889. Observations on Acid Mine Drainage in Western Pennsylvania, by R. D. Leitch. 1928. 18 pp., 2 figs. Discusses some of the factors contributing to formation of acid mine waters, the yearly variations in quantity and quality of drainage, and effect of mining methods; gives some attention to economic phases.
- †RI 2890. Determining the Air-Flow Resistance of a Small Shaft Mine by Natural Draft, by G. E. McElroy and A. S. Richardson. 1928. 15 pp., 2 figs. Presents data on the rate of air-temperature changes in the mine openings under low-velocity flow conditions, on the determination of natural draft pressures by direct observation of pressure differences on stoppings, and on the correlation of calculated resistance factors for mines with factors determined from natural draft experiments. Shows the difference between single-lever and multilever ventilation effected by natural draft.
- RI 2892. A Visible-Action Continuous-Distillation Apparatus for Laboratory Study of Fractionation, by R. H. Espach. 1928. 7 pp., 9 figs. Describes apparatus and tests. Gives distillation curves.
- RI 2893. Volumetric and A. P. I. Gravity Changes Due to the Solution of Gas in Crude Oils, by R. van A. Mills and R. E. Heithecker. 1928. 15 pp., 5 figs. Includes data obtained during the determination of volume and gravity correction factors to be applied in the oil-recovery investigations of the Bureau of Mines.
- †RI 2894. The Relations Between Specific Volume, Voids, and Size Composition in Systems of Broken Solids of Mixed Sizes, by C. C. Furnas. 1928. 10 pp., 9 figs. Outlines a method whereby the composition of maximum density for systems of broken solids of mixed sizes may be accurately predicted.
- RI 2895. A Comparison of the Acidity of Waters from Some Active and Abandoned Coal Mines, by R. D. Leitch and W. P. Yant. 1928. 8 pp. Concludes that the acidity of waters from abandoned and sealed mines is lower than that from active mines.
- †RI 2896. The Production of Magnesia and Silica Crucibles in the Induction Furnace, by C. N. Schuette. 1928. 6 pp., 2 figs. Describes equipment and method that produced crucibles of greater wall thickness than could be readily fabricated from commercial fused silica, and for heavy-walled magnesia crucibles.

† Out of print.

- †RI 2897. Methods of Preparing and Cleaning Some Common Heavy Liquids Used in Ore Testing, by R. G. O'Meara and J. B. Clemmer. 1928. 6 pp. Outlines methods for the preparation and care of some of the more common heavy liquids.
- RI 2898. Ferrous Oxide from Iron and Magnetite, by C. T. Anderson. 1928. 7 pp., 2 figs. Discusses results of repeated interaction between partly reduced magnetite and iron, and the calculations which may be made from such results.
- †RI 2899. Determination of Flakiness of Ores, by W. H. Coghill, O. W. Holmes, and A. B. Campbell. 1928. 7 pp. Outlines a positive and mechanical method for determining the flakiness of ores and similar investigations.
- RI 2901. The Reaction Between Magnetite and Ferrous Sulphite, by F. S. Wartman and G. L. Oldright. 1928. 14 pp., 7 figs. Gives results of studies to explain apparent inconsistencies, to determine more exactly the rate of reaction of magnetite with ferrous sulphide under the conditions obtaining in copper-smelting furnaces, and to ascertain the nature of the resulting products.
- RI 2902. Preliminary Ore-Dressing Tests to Recover Manganese in Rhodochrosite Ores, by F. D. DeVaney and W. H. Coghill. 1928. 4 pp. Tabulates results of tests of rhodochrosite obtained at Butte, Mont.
- RI 2903. Commercial Possibilities in the Use of Synthetic Hydrocarbon Processes in the Gas Industry, by W. W. Odell. 1928. 15 pp., 5 figs. Discusses the practicability of employing synthetic processes as a part of the gas-making scheme in a city gas plant.
- †RI 2904. The Flow of Gases Through Beds of Broken Solids, by C. C. Furnas. 1928. 20 pp., 22 figs. A brief summary of experimental work done at the North Central Experiment Station with the object of formulating a more or less complete quantitative theory of the workings of the iron blast furnace.
- RI 2905. The Explosibility of Suspensions of Soap Dust in Air, by D. F. Smith and F. A. Hartgen. 1928. 3 pp. Suggests preventive measures and urges importance of humidifying the atmosphere or providing metallic conduction in order to ground static charges.
- †RI 2906. Preliminary Examination of Low-Grade Bauxite with Particular Reference to Flotation, by B. W. Gandrud and F. D. DeVaney. 1928. 8 pp. Tabulates results of flotation tests to determine the possibility of removing excessive quantities of silica and iron.
- †RI 2908. Carbon Monoxide from Automobiles Using Ethyl Gasoline, by W. P. Yant and L. B. Berger. 1929. 8 pp. Describes equipment and tabulates results of test.
- RI 2909. A Preliminary Investigation of Rubber-Sheathed Concentric-Type Trailing Cables for Mining Machines, by L. C. Iisley and A. B. Hooker. 1929. 11 pp. Points out 16 different factors that are apparent in the physical make-up of cables and tells how they affect the behavior of the cables in one or more of the tests.
- †RI 2910. Potash from New Jersey Greensand, Preliminary Report, by J. R. Thoenen. 1929. 54 pp. Concludes that at present no large-scale successful process is in operation for the extraction of potash from New Jersey greensands and that foreign potash fertilizer products can be distributed at seaboard and in interior points at lower freight rates than similar products from New Jersey. Recommends further laboratory study of extraction processes.
- RI 2911. Study of Quarry Costs, by J. R. Thoenen. 1929. 12 pp. Tabulates compilations of quarry costs. Solicits suggestions from quarry operators as to alterations or additional groupings so that the final report will present the greatest possible amount of information.
- RI 2912. The 1, 3 Dimethyl-2-Phenoxyacetic Acid, by R. L. Brown and B. F. Branting. 1929. 2 pp. Tells how the hydroxyacetic acid derivative of 1, 3 dimethyl-2-hydroxybenzene was prepared and notes properties. Tabulates the physical characteristics of the hydroxyacetic derivatives of 5 xylenols.
- RI 2913. A Study of Gauze Heating in Miners' Flame Safety Lamps, by E. J. Gleim, A. B. Hooker, and P. G. Guest. 1929. 7 pp. Gives results of tests and urges importance of giving the utmost attention to every detail in the correct assembling and maintenance of flame safety lamps.

Reports of Investigations

- RI 2914. Control of a Small Mine Fire with Rock Dust, by H. C. Howarth and George McCaa. 1929. 3 pp. Describes in detail the method by which the fire was extinguished.
- RI 2917. The Melting Point of Potassium Chromate, by D. F. Smith and F. A. Hartgen. 1929. 3 pp. Gives results of test.
- †RI 2918. The Wire Saw in Slate Quarrying, by Oliver Bowles. 1929. 7 pp., 1 fig. Describes the equipment in the quarry. Covers results attained during the summer of 1928. Supplements RI 2851.
- †RI 2919. Laboratory and Field Tests of the Martiensen Permissible-Type Methane Detector, by A. B. Hooker, W. J. Fene, and R. D. Currie. 1929. 10 pp., 1 fig. Presents the results of tests and recommends that existing mining codes should be revised, where necessary, to allow the use of any permissible-type methane detector in testing for gassy atmospheres, except in special places or cases where it may be necessary to test for carbon dioxide.
- RI 2920. A New Permissible Blasting Device, by J. E. Tiffany. 1929. 8 pp., 2 figs. Describes device and method of conducting tests for permissibility.
- RI 2921. Coarse Sand Flotation, Classification, and Table Concentration, by A. W. Fahrenwald and Clarence Thom. 1929. 7 pp., 2 figs. Discusses a concentration process embodying flotation, classification, and tabling in the order named.
- RI 2923. Relative Ageing Properties of Gelatin Dynamites Containing Nitroglycerin and Ethylene Glycol Dinitrate, by A. B. Coates and G. St. J. Perrott. 1929. 7 pp., 1 fig. Discusses results of tests undertaken to determine the relative effects on rate of detonation, propulsive strength and sensitiveness produced on low-freezing gelatin dynamite containing ethylene glycol dinitrate and regular dynamites containing nitroglycerin by long periods of storage.
- RI 2924. Batch Classification in the Laboratory, by A. W. Fahrenwald and Clarence Thom. 1929. 5 pp., 1 fig. Describes and illustrates a batch laboratory classifier and elutriator and gives an application of the apparatus to grinding studies.
- †RI 2925. Losses of Phosphate in the Land-Pebble District of Florida, by H. M. Lawrence. 1929. 5 pp. Gives results of a study of the debris bank sands now accumulating in the land-pebble phosphate district of Florida.
- †RI 2926. The Reduction of Cuprous Oxide by Carbon Monoxide, by C. G. Maier. 1929. 7 pp. Deals with the calculation of gas concentrations in the reduction of the cuprous oxide which have a bearing on the bright annealing of copper.
- RI 2927. A New Type of Laboratory Dust-Explosion Apparatus, by C. M. Bouton, C. H. Gilmour, and Garnet Phillips. 1929. 10 pp., 4 figs. Describes apparatus developed by the Bureau of Mines for use in studying explosibility of industrial dusts, particularly coal dusts.
- †RI 2929. The Study of a Fundamental Basis for Controlling and Gaging Natural-Gas Wells. Part 1. Computing the Pressure at the Sand in a Gas Well, by H. R. Pierce and E. L. Rawlins. 1929. 14 pp., 11 figs. Gives a series of charts and explains use.
- †RI 2930. The Study of a Fundamental Basis for Controlling and Gaging Natural-Gas Wells. Part 2. A Fundamental Relation for Gaging Gas-Well Capacities, by H. R. Pierce and E. L. Rawlins. 1929. 21 pp., 4 figs. Presents results of the process to date on the problem of gaging gas-well capacities to deliver gas under different pressure conditions.
- RI 2931. Consumption of Reagents Used in Flotation, 1927, by A. M. Gaudin. 1929. 17 pp. Includes statistics regarding tonnage of ore treated by flotation and reagent consumption in treatment of various types of ores.
- RI 2932. A Staining Method for Distinguishing Cerussite and Anglesite in Ores, Concentrates, and Tailings, by R. E. Head and A. L. Crawford. 1929. 3 pp. Treats of a method for quickly identifying finely crushed minerals of the type named under a microscope.
- RI 2933. Effect of Sieve Motion on Screening Efficiency, by A. W. Fahrenwald and S. W. Stockdale. 1929. 14 pp., 21 figs. Gives results of study of effect of vibration of sieve surface on passage of grains of ore through screens, and discusses relative effectiveness of various motions employed in screen operation.

† Out of print.

- †RI 2934. Dissolution of Various Oxidized Copper Minerals, by J. D. Sullivan. 1929. 9 pp. Gives data regarding time required to dissolve various copper minerals in ores in sulphuric acid and ferric sulphate solutions, and consumption of reagents used in dissolving the minerals. Has bearing on recovery of copper by leaching methods from low-grade disseminated ore.
- †RI 2935. The Effect of Substituting Ethylene Glycol Dinitrate in Permissible Explosives, by G. St. J. Perrott and J. E. Tiffany. 1929. 5 pp. Gives results of tests to determine effect on safety and physical properties of permissible explosives of substituting ethylene glycol dinitrate for nitroglycerin or mixture of nitroglycerin and nitropolyglycerin.
- RI 2936. Beneficiation of Oxidized Manganese Ores by Magnetic Separation of Roasted Jig Concentrates, by F. D. DeVaney and W. H. Coghill. 1929. 4 pp. Discusses method by which some of the ores too high in iron to make ferromanganese may be brought up to ferro grade.
- †RI 2937. Gravity Concentration of Alabama Oolitic Iron Ore, by F. D. DeVaney, B. W. Gandrud, and W. H. Coghill. 1929. 7 pp., 1 fig. Gives results of method for gravity concentration of ores of excessive silica content, of which the Birmingham district contains large reserves hitherto not amenable to successful treatment.
- RI 2938. The National Safety Competition of 1928, by W. W. Adams. 1929. 17 pp. Gives names of winners and statistical details of an accident-prevention contest participated in by 284 mines and quarries.
- RI 2939. Gas-Solid Contact in the Shaft of a 700-Ton Blast Furnace, by S. P. Kinney and C. C. Furnas. 1929. 10 pp., 8 figs. Outlines result of investigation of interior of shaft of a large iron blast furnace and gives data of actual size-distribution of solid particles in a typical furnace, and of efficiency contact between the gas and solid phases.
- RI 2940. A Method for Studying Factors Influencing the Rate of Burning or Pressure Development of Black Blasting Powder, by A. B. Coates and J. E. Crawshaw. 1929. 9 pp., 2 figs. Describes method and gives results of tests.
- †RI 2942. Flow of Natural Gas Through High-Pressure Transmission Lines, by T. W. Johnson and W. B. Berwald. 1929. 18 pp., 3 figs. Gives results of tests made on 25 operating pipe lines in Kansas, Oklahoma, Louisiana, Arkansas, Texas, and California; a table of the results obtained on 24 of the lines tested; and a discussion of representative tests and results.
- RI 2943. Tests of Bituminous Coking Coal in a Large Low-Pressure Heating Boiler, by P. Nicholls, C. E. Augustine, and B. A. Landry. 1929. 8 pp. Describes tests and tabulates results.
- RI 2944. Accidents in Metal Mines Due to Falls of Men and Material, by F. D. Cannon. 1929. 9 pp. Urges need of careful supervision, the use of safety devices and safety clothing, and strict enforcement of safety regulations.
- RI 2945. The Disposal of Oil-Field Brines, by Ludwig Schmidt and J. M. Devine. 1929. 17 pp. Deals with the four general methods now used in the disposal of oil-field brines.
- †RI 2946. Some Operating Results on Small Heating-Plant Stokers, by J. F. Barkley. 1929. 2 pp., 3 figs. Gives results of tests.
- †RI 2948. Crushing Resistance of Minerals, by S. R. Zimmerley and John Gross. 1929. 4 pp. Gives results of tests to determine crushing resistance of quartz, pyrite, sphalerite, calcite, and galena.
- RI 2949. The Relation of Table Feed Preparation to Table Efficiency, by A. W. Fahrenwald and W. F. Meckel. 1929. 15 pp., 23 figs. Outlines results of tests with quartz, silica, galena, magnetite beach sand, and siderite to determine relationship of specific gravity, size, and shape of table feeds to efficiency.
- RI 2950. The Rôle of Stratification in the Separation of Coal and Refuse on a Coal-Washing Table, by B. M. Bird and H. S. Davis. 1929. 19 pp. Demonstrates that stratification does not account for the separation effected by the coal-washing table and that cross-flowing water has an important selective action.
- †RI 2951. A Method for the Sizing of Ore by Elutriation, by John Gross, S. R. Zimmerley, and Alan Probert. 1929. 8 pp., 4 figs. Describes new method of elutriation for sizing material finer than 200-mesh to determine metallurgical recovery and surface in calculation of grinding efficiency.

† Out of print.

Reports of Investigations

- RI 2952. Efficiency of Grinding Mills, by John Gross and S. R. Zimmerley. 1929. 23 pp., 4 figs. Gives results of tests made with galena, sphalerite, and pyrite to develop a method whereby surface figures are obtained on a ground ore.
- †RI 2954. Smelting in the Lead Blast Furnace. I.—A Method for Approximating the Form of the Lead in Slag and Other Products of the Lead Blast Furnace, by G. L. Oldright and Virgil Miller. 1929. 8 pp. The first of a series intended to determine conditions within the lead blast furnace by direct experimentation.
- RI 2955. Some Important Factors in Sponge-Iron Production, by E. P. Barrett. 1929. 4 pp. Discusses progression of sponge iron to steel, reduction of iron oxides, elimination of gangue, and absorption of sulphur.
- †RI 2956. Review of Fatalities in the California Petroleum Industry During the Calendar Year 1928, by G. B. Shea. 1929. 23 pp. Summarizes fatalities in petroleum operation by groups.
- †RI 2957. Smelting in the Lead Blast Furnace. II.—The Gases from the Top of the Lead Blast Furnace, by G. L. Oldright and Virgil Miller. 1929. 18 pp. The second paper of the series on smelting in the lead blast furnace referred to under RI 2954.
- RI 2960. Temperatures for Rapid Self-Heating of Powdered Coal and the Semicoke Made Therefrom, by F. A. Hartgen and D. F. Smith. 1929. 5 pp., 18 figs. Discusses experimental results as shown in heating curves and curves of densities and chemical analyses of different screen sizes of powdered coal and semicoke.
- RI 2961. A Preliminary Investigation of Rubber-Sheathed, Parallel Duplex-Type Cables for Mining Machines, by L. C. Ilsley and A. B. Hooker. 1929. 10 pp. Discusses test procedure and results, describing smash, stretch, tearing, bending, and splicing tests.
- RI 2963. Smelting in the Lead Blast Furnace. III.—Rate of Descent of Stock Column and Formation of Accretions, by G. L. Oldright and Virgil Miller. 1929. 17 pp., 2 figs. The third of a series of papers on smelting in the lead blast furnace referred to under RI 2954. Discusses measurements of rate of subsidence, location, composition, formation, and removal of accretions and conditions in crucible.
- RI 2964. Survey of Fuel Consumption at Refineries in 1928, by G. R. Hopkins. 1929. 3 pp. Summarizes consumption of fuel oil, coal, natural gas, refinery gases, coke, and electricity as fuel at petroleum refineries in the United States, by regions.
- RI 2965. Smelting in the Lead Blast Furnace. IV.—Composition and Temperature of the Gases at the Tuyère Zone, by G. L. Oldright and Virgil Miller. 1929. 27 pp., 7 figs. The fourth paper of a series referred to under RI 2954. Discusses sampling of gases at the tuyère zone, conditions necessary for reduction of metallic lead, effect of tapping, determination of temperature, and gas sampling.
- RI 2966. Smelting in the Lead Blast Furnace. V.—Effect of Conditions at Various Tuyères on the Form of Lead and Composition of the Slag, by G. L. Oldright and Virgil Miller. 1929. 7 pp., 1 fig. The fifth of a series of reports on investigation to determine conditions within the lead blast furnace by direct experimentation.
- RI 2967. The Dissolution of Cuprite in Sulphuric Acid and in Ferric Sulphate Solutions, by J. D. Sullivan and G. L. Oldright. 1929. 9 pp., 3 figs. Second of a series of papers on the dissolution of copper minerals in various agents. Describes procedure and results of experimental work on the effect of particle size on rate of dissolution.
- †RI 2968. Xylenols and Higher Phenols That Have Been Found in Primary Tars, by E. J. Schneider and J. B. Shohan. 1929. 20 pp. Presents information obtained from a study of the literature concerning the properties of possible pure constituents of low-temperature tar.
- RI 2969. The 1, 3-Dimethyl-5-Phenoxyacetic Acid and the 1, 2-Dimethyl-3-Phenoxyacetic Acid, by E. J. Schneider and J. B. Shohan. 1929. 10 pp. Report of further investigation of the constituents of low-temperature tar, describing the synthesis of two known xylenols and their hydroxyacetic acid derivatives.

† Out of print.

- RI 2970. Reaction of Metallic Iron and Copper Sulphate in the Flotation of Sphalerite, by F. D. DeVaney and C. W. Ambler, Jr. 1929. 9 pp. Describes flotation tests in which well-known reaction is applied to treatment of zinc ore.
- RI 2971. A System of Accounts for the Slate Industry, by Oliver Bowles. 1929. 25 pp., 1 fig. Study of accounting methods used by slate-quarry operators, presenting in detail a simple double-entry cost-accounting system.
- †RI 2973. Re-Forming Natural Gas in Water-Gas Generators, with Substantially Complete Elimination of Entrained Carbon, by W. W. Odell. 1929. 10 pp., 3 figs. Describes satisfactory method of re-forming natural gas into a product having virtually the same properties as other readily generated gases.
- RI 2974. Abnormal Pressures in Explosion-Proof Compartments of Electrical Mining Machines, by E. J. Gleim. 1929. 6 pp. Describes conditions under which high pressures were encountered in mining machines and the means used to reduce the pressures.
- RI 2975. Dynamites: Their Propulsive Strength, Rate of Detonation, and Poisonous Gases Evolved, by N. A. Tolch and G. St. J. Perrott. 1929. 16 pp., 5 figs. Presents results of ballistic-pendulum, Bichel-gage, and other tests of straight, ammonia, and gelatin dynamites, black blasting powder, and kieselguhr.
- RI 2976. Permissible Explosives: A Study of Test Data, by G. St. J. Perrott and N. A. Tolch. 1929. 7 pp. Summarizes results of testing explosives for permissibility and shows effect of composition upon success or failure to pass tests.
- RI 2977. Rock-Dust Barriers for Coal Mines, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. 1930. 14 pp., 5 figs. Explains purpose of barriers, limitations of use, and qualities of successful barriers. Describes three types of barriers selected for general use.
- RI 2978. Flow of Gas in Blast-Furnace Shaft, by S. P. Kinney. 1929. 4 pp., 9 figs. Results of investigation of a furnace operating on Lake Superior ores in the Chicago district.
- RI 2979. Odor Intensity and Symptoms Produced by Commercial Propane, Butane, Pentane, Hexane, and Heptane Vapor, by F. A. Patty and W. P. Yant. 1929. 10 pp., 6 figs. Study of warning properties of fuel gas perceptible in advance of accumulations dangerous to health and safety. Advises addition of warning agent to fuel gas used in confined spaces.
- †RI 2980. Coke as a Domestic Heating Fuel, by P. Nicholls and B. A. Landry. 1929. 18 pp., 11 figs. Discusses composition, quality, and favorable characteristics. Gives instruction for burning coke and describes investigations carried out in domestic furnaces.
- RI 2981. Leaching Silver in Unroasted Tailings with Ferric Salts in Saturated Brine, by G. L. Oldright. 1929. 4 pp. Outlines the history of brine leaching and describes leaching tests of ore from Park City, Utah.
- RI 2982. Method for Comparison of the Size of Materials Used in Blast-Furnace Burdens, by S. P. Kinney. 1930. 4 pp. Briefly describes method employing screen analysis for measuring the average size of particle in a mass of finely ground material.
- RI 2983. Ore Size and Blast-Furnace Economy, by S. P. Kinney. 1930. 4 pp., 3 figs. Points out the beneficial effect of gas-solid contact of decreasing over-all size of ore charged in layers of coarse and of fine material.
- †RI 2984. A Diaphragm or "Breather" Roof for Oil-Storage Tanks, by Ludwig Schmidt. 1930. 9 pp., 7 figs. Describes design and operation of a new type of tank roof which practically eliminates the movement of air-vapor mixtures from an oil-storage tank and is of especial value on tanks storing oil over long periods.
- RI 2985. The Form of Copper in Converter Slag, by F. S. Wartman and W. T. Boyer. 1930. 16 pp., 1 fig. Authors conclude that use of the flotation process to clean slowly cooled slag produced from converting low or medium grade matte is technically practicable.
- RI 2986. Experience with Electrical and Other Means of Firing Shots of Explosives in the Anthracite Region of Pennsylvania, by S. P. Howell. 1930. 13 pp. Records fatalities and other accidents connected with shot firing in anthracite mines, citing individual instances as examples of careless practice.

† Out of print.

Reports of Investigations

- RI 2987. Sensitization of Ammonium Nitrate by Nitrostarch, by G. St. J. Perrott, D. B. Gawthrop, and C. A. Taylor. 1930. 7 pp., 4 figs. Presents data showing that addition of nitrostarch increases sensitivity to explosion and completeness and speed of detonation.
- RI 2989. Grinding and Classification. I.—Batch Grinding, by A. W. Fahrenwald. 1930. 9 pp., 4 figs. Describes batch-grinding technic designed for studying the rate of out put of finished product in a ball mill.
- RI 2990. Grinding and Classification. II.—Batch Closed-Circuit Grinding, by A. W. Fahrenwald. 1930. 11 pp., 5 figs. Laboratory closed-circuit technic to stimulate plant closed-circuit grinding practice is outlined; numerous experimental data are given.
- †RI 2991. Cracking Natural Gas in Water-Gas Generators with Recovery of Carbon Black, by W. W. Odell. 1930. 10 pp., 5 figs. Brief outline of the experimental cracking of natural gas in a water-gas generator at Louisville, Ky.
- RI 2993. Some Phases of the Relative Responsibility of Management and Workers for Accidents in Mines, by D. Harrington. 1930. 17 pp. Directs attention to careless practices of both officials and workers, to which many mine accidents are attributable.
- RI 2994. Effect of Sealing on Acidity of Mine Drainage, by D. R. Leitch, W. P. Yant, and R. R. Sayers. 1930. 11 pp. Discusses theory of acid formation in coal mines and describes effects of sealing eight mines in Indiana.
- †RI 2996. Apparatus for Vacuum Distillation of Lubricating and Heavy Petroleum Oils, by M. J. Gavin and A. L. Foster. 1930. 5 pp., 2 figs. A revision of RI 2819, issued in 1927. The present form of the vacuum-distillation apparatus, in which several changes have been made since 1927, is described.
- †RI 2997. Engineering Study of the Seminole Area, Seminole and Pottawatomie Counties, Oklahoma, by R. R. Brandenthaler, W. S. Morris, and C. R. Bopp. 1930. 181 pp., 35 figs. An exhaustive study of an important oil-producing area, showing methods adopted to handle the peculiar conditions encountered.
- †RI 2998. Re-Treatment of Mother Lode Carbonaceous Slime Tails, by E. S. Leaver and J. A. Woolf. 1930. 6 pp. Presents summary of data to be printed in full later. Describes flotation methods and roasting and cyanidation of concentrates.
- †RI 2999. The Roasting of Chromite Ores to Produce Chromates, by H. A. Doerner. 1930. 30 pp. Gives results of a study of possibility of producing chrome from domestic deposits.
- †RI 3001. Nine Years of Smoke-Abatement Work at Salt Lake City, by Austin Gudmundsen. 1930. 17 pp., 5 figs. A history of the smoke-abatement campaign of 1919-20 conducted by the bureau in cooperation with Salt Lake City and the University of Utah. Smoke from industrial plants has been reduced 90 percent, but residence smoke still constitutes a problem.
- †RI 3002. A Study of the Properties of Texas Polyhalite Pertaining to the Extraction of Potash, by H. H. Storch and Loyal Clarke. 1930. 19 pp., 4 figs. Outlines two possible industrial processes, one producing K_2SO_4 and $K_2SO_4 \cdot MgSO_4$ and the other producing K_2SO_4 only.
- †RI 3003. Check Determinations of Fusibility of Coal Ash with the De Graaf Electrical Coal-Ash Fusion Furnace, by W. A. Selvig. 1930. 17 pp., 2 figs. Determines how closely different laboratories can check in calculating fusibility of coal ash, how well duplicate determinations by the same laboratory will check, and how the results with the De Graaf furnace compare with those of the standard gas-furnace method of the American Society for Testing Materials.
- †RI 3004. Flotation Reagents, 1928, by T. H. Miller and R. L. Kidd. 1930. 19 pp. Continues series of annual reviews on consumption of flotation reagents.
- †RI 3005. Sulphur Dioxide in the Air at the Pittsburgh Experiment Station of the United States Bureau of Mines, by E. G. Meiter and C. E. Traubert, 1930. 5 pp. Discusses tests made to obtain data for use in interpreting screen-corrosion experiments, conducted simultaneously by the Bureau and the committee on screen-wire cloth of the American Society for Testing Materials.
- †RI 3006. The Power Consumed by Rotating Disks and Other Shaped Objects in Fluid Mediums, by A. W. Fahrenwald and W. W. Staley. 1930. 7 pp., 23 figs. Presents data obtained in an investigation to determine the effect of certain physical properties of the pulp upon power required to operate certain forms of pulp agitators. Two sets of experiments are given.

† Out of print.

- RI 3007. Use of Ethyl Mercaptan to Detect Leaks in Natural-Gas Distribution Systems, by R. R. Sayers, A. C. Fieldner, W. P. Yant, R. D. Leitch, and S. J. Pearce. 1930. 13 pp., 1 fig. Describes experiments conducted to discover leaks in natural-gas lines by introducing ethyl mercaptan, a highly odorous substance.
- RI 3008. Laboratory and Field Tests of a Permissible Indicating Methane Detector, by A. B. Hooker, W. J. Fene, and R. D. Currie. 1930. 14 pp. Shows results of a series of tests made under different conditions and in various atmospheres, and concludes that this detector is suitable for use by fire bosses in making daily inspections because it is quick and reasonably accurate.
- RI 3009. The Sand and Gravel Safety Contest of 1929, by W. W. Adams. 1930. 24 pp. Compares the safety records of the 29 plants participating in the 1929 safety contest conducted by the Bureau and the National Sand and Gravel Association.
- RI 3010. Cooperative Research Between the United States Bureau of Mines and the Safety in Mines Research Board, by R. V. Wheeler and G. S. Rice. 1930. 4 pp. Present summary of work conducted jointly during the past calendar year by the two organizations.
- †RI 3011. A Study of the Marshall-Bird Test for Determining the Agglutinating Value of Coal, by K. A. Johnson and H. F. Yancey. 1930. 7 pp., 3 figs. Presents a study of some of the important variables affecting agglutinating value and compares results obtained in different laboratories by different persons.
- †RI 3012. Washability Studies of the Mary Lee Seam at Lewisburg, Ala., by B. M. Bird, B. W. Gandrud, and E. B. Nelson. 1930. 32 pp., 15 figs. Gives data obtained from screen-sizing and float-and-sink tests of the raw coal.
- †RI 3013. Toxicity of Dichloro-Difluoro Methane: A New Refrigerant, by R. R. Sayers, W. P. Yant, John Chornyak, and H. W. Shoaf. 1930. 15 pp., 1 fig. Concludes that possibility of health and accident hazards from exposure to dichloro-difluoro methane used as a refrigerant is remote.
- †RI 3014. Washability Studies of the Clark Seam at Marvel, Ala., by B. M. Bird, B. W. Gandrud, and N. L. Kozlinsky. 1930. 17 pp., 10 figs. The second of a series of papers on the washability of Alabama coals. Contains results of screen-sizing and float-and-sink tests of a representative sample of raw slack, and slotted-screen tests showing the proportions of flaky particles in certain selected sizes.
- RI 3015. Rock-Dusting in Coal Mines of the State of Washington, by S. H. Ash and John G. Schoning. 1930. 11 pp., 1 fig. Points out the need of rock-dusting in the bituminous-coal mines of the State where methane is generated and the explosibility factor of the dry coal dust is high. Describes rock-dusting methods and equipment used in the Roslyn field and at Bellingham. Shows a rock-dusting machine for use where compressed air is available.
- †RI 3016. The Lower Limits of Inflammability of Natural Gas-air Mixtures in a Large Gallery, by J. E. Crawsh-w. 1930. 13 pp., 1 fig. Reports results of tests made (1) to determine the lower limit of natural gas in mixtures that ignite and propagate violently under turbulence produced by explosives fired from a cannon; (2) to observe the behavior of mixtures containing less than this low limit; and (3) to determine how turbulence produced by a fan effects this limit.
- †RI 3017. A New Flame Safety Lamp Testing and Demonstration Apparatus, by W. P. Yant, L. B. Berger, and G. S. McCaa. 1930. 10 pp., 2 figs. Describes a simple and efficient testing box for examination of a flame safety lamp for defects permitting propagation of flame to the surrounding atmosphere. Determines the ability of certain combustible liquids to propagate flame through a protecting gauze punctured with holes of a given size.
- †RI 3018. Gravity Concentration on Certain Florida Phosphatic Sands, by H. M. Lawrence and R. G. O'Meara. 1930. 8 pp. Reports that concentrates with higher phosphate content than the minimum commercial grade were produced by gravity concentration of certain types of low-grade phosphatic sands now regarded as waste. States that the recoveries were sufficient to justify consideration.

† Out of print.

Reports of Investigations

- RI 3019. The National Safety Competition of 1929, by W. W. Adams. 1930. 19 pp. Presents the general results of the contest. Gives tables showing general scope of competition, scale of time losses for weighing deaths and permanent injuries to show severity of accidents, and accident rates for mines and quarries.
- RI 3020. Influence of Washing Coal on Coke Properties and on Gas and By-Product Yields, by A. C. Fieldner. 1930. 13 pp., 1 fig. Tells what results may be expected from use of washed coal in a carbonized plant. Discusses growth and methods of coal cleaning.
- †RI 3022. The Use of Boiler Feed-Water Heaters With Steam-Powered Rotary Drilling Equipment, by E. C. Reistle, Jr. 1930. 14 pp., 5 figs. Compares and describes types of heaters and gives results of field tests of open and closed types. Operating suggestions for open-type heaters are given. Of equal importance with the ability of the heaters to decrease fuel consumption is the fact that they effect water economy by recovering water suspended in exhaust steam and condensed from the exhaust steam while heating the cold feed water. Heating the feed water also causes the precipitation of a part of the scale-forming material and modifies set-up in the boiler adjacent to the feed-water intake.
- †RI 3023. Increased Recoveries of Phosphate in the Land-Pebble District of Florida, by H. M. Lawrence. 1930. 9 pp. Summarizes results of study of typical phosphate ores and of the material rejected by washing plants. States that difference in ore characteristics markedly affects recoveries by washing and screening, and that increased recoveries are obtained by re-treatment of washer rejects. Discusses present washing practice, typical phosphate ores, decreased losses of commercial fractions in washer rejects and developments of washer operations to obtain increased recoveries of phosphate rock.
- †RI 3024. Dissolution of Various Manganese Minerals, by C. W. Davis. 1930. 11 pp., 1 fig. The first of a series of papers being prepared during a study of the hydrometallurgy of manganese which is being carried on in an endeavor to make possible the utilization of low-grade domestic manganese ores. The reagents used for dissolution and the ores and minerals treated are given. Experimental data are discussed.
- RI 3026. A Survey of the Sulphur Content of Commercial Motor Fuels—1930, by A. J. Kraemer. 1930. 11 pp. Reviews results of previous work on sulphur content of motor fuels and gives results of examination of 153 samples for sulphur content, doctor test, copper-strip corrosion, and color.
- †RI 3027. Acrolein as a Warning Agent for Detecting Leakage of Methyl Chloride from Refrigerators, by W. P. Yant, H. H. Schrenk, F. A. Patty, and R. R. Sayers. 1930. 11 pp., 1 fig. Summarizes results obtained to date in experiments being made to test the efficacy and suitability of acrolein for use as a warning agent in poisonous gases.
- RI 3028. Some Experiments on the Initiation of Coal-Dust Explosions by Gas Explosions, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. 1930. 9 pp., 2 figs. Describes preliminary tests at the Bureau's Experimental mine to determine, under conditions that may prevail in a bituminous coal-mine heading, how small a quantity of fire damp when ignited may bring coal dust into suspension and ignite it. Tests show that the explosion of as little as 150 cubic feet of gas-air mixture containing 9 percent gas may start a disastrous explosion of coal dust.
- RI 3030. Test of Ampoules Filled with Palladium Salt Solution for Detecting Carbon Monoxide, by L. B. Berger and W. P. Yant. 1930. 9 pp. Reports results of sensitivity and reliability tests of the palladium chloride-filled ampoule type of carbon monoxide detector manufactured under license of U. S. Patent 1644014. Tests were made at various temperatures and sensitivity was found to decrease at low air temperatures. A difference was found in detectors from two manufacturers. It was observed that gasoline vapor, ethylene, hydrogen, and hydrogen sulphide produced a color change in the ampoules similar to that produced by CO.
- †RI 3031. Acrolein as a Warning Agent for Detecting Leakage of Methyl Chloride from a Multiple Refrigeration System, by H. H. Schrenk, F. A. Patty, and W. P. Yant. 1930. 7 pp., 1 fig. Describes investigation undertaken in cooperation with a manufacturer of refrigerators on the use of acrolein for detecting leakage of refrigerant from a multiple system, as installed in an apartment house.

† Out of print.

- RI 3032. A Study of the Properties of Texas Polyhalite Pertaining to the Extraction of Potash. Part II. The Rate of Decomposition of Polyhalite by Water and by Saturated Sodium Chloride Solutions, by H. H. Storch. 1930. 11 pp., 3 figs. Describes results obtained by a study of the rate of decomposition of polyhalite by water and saturated salt solutions.
- †RI 3033. The Action of Sulphur Dioxide on Manganese Oxides at Elevated Temperatures, by C. W. Davis. 1930. 16 pp., 1 fig. Second in a series of reports on hydrometallurgy which, it is hoped, will make possible the utilization of large deposits of low-grade manganese ores.
- †RI 3034. Effectiveness of Different-Size Rock Dusts in Preventing Coal-Dust Explosions in Mines, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. 1930. 10 pp., 1 fig. Reviews past investigations in Experimental mine and reviews recent series of tests with rock dust of various sizes. Discusses present status of rock-dusting.
- †RI 3035. Recovery of Oil from Sands by the "Gas-Drive," by Joseph Chalmers I. H. Nelson, and D. B. Taliadro. 1930. 12 pp., 6 figs. Describes method of stimulating production of oil by injecting gas or air into wells.
- RI 3036. Tests of the Strength of Concrete Stoppings Designed to Resist the Pressure of Explosions in Coal Mines, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. 1930. 11 pp., 5 figs. Gives results of tests of strength of stoppings to resist explosion pressures and concludes from these tests that (1) sudden or impact pressure is no more severe in disruptive effects than static pressure caused by compressed air or hydraulic means; (2) buttressing increases strength of concrete stopping; (3) the stopping must have a ratio of thickness to span of 1 to 10 to resist a 50 pounds per square inch pressure; and (4) additional strength is obtained by recessing and anchor bolts.
- RI 3038. Survey of Fuel Consumption at Refineries in 1929, by G. R. Hopkins. 1930. 11 pp., 2 figs. Presents information obtained in a special canvass of refining companies. Considers consumption by fuels and by districts, and gives a table showing these data in condensed form. Discusses new methods and equipment that have promoted fuel efficiency.
- RI 3039. The Trauzl Block Strength Test of Dynamites, by N. A. Tolch and G. St. J. Perrott. 1930. 10 pp., 3 figs. Presents strength data on dynamites as determined with the Trauzl lead block and compares the results with those obtained by means of the ballistic pendulum.
- RI 3040. The Response of Japanese Waltzing Mice and Canaries to Carbon Monoxide and to Atmospheres Deficient in Oxygen, by W. P. Yant, F. A. Patty, H. H. Schrenk, and L. B. Berger. 1930. 12 pp. Compares response of Japanese waltzing mice and of canaries to such atmospheres and correlates the results obtained with the response of man. Concludes that, although waltzing mice appear to be slightly more sensitive to atmospheres deficient in oxygen than canaries and the latter slightly more sensitive than man, the margin of time between serious response of man and observable response of these animals is not wide enough for either canaries or waltzing mice to be of practical use for avoiding harmful exposure of man.
- †RI 3041. Review of Fatalities in the California Petroleum Industry During the Calendar Year 1929, by R. L. Marek. 1930. 31 pp. Describes fatalities in four divisions of petroleum industry, analyzes causes, and gives suggestions for avoiding repetition.
- †RI 3042. Extinction of Methane Flames by Dichloro-Difluoro-Methane, by G. W. Jones and G. St. J. Perrott. 1930. 4 pp., 1 fig. Finds that extinctive effect is almost identical with that of carbon tetrachloride on a volumetric basis.
- †RI 3043. The Use and Value of Air Analyses in Illinois Mines, by A. U. Miller. 1930. 19 pp. Reviews recommendations of Mine Safety Board and their application to conditions in Illinois.
- †RI 3044. Coal-Dust Explosions in Mines Caused by Direct Electrical Ignition, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. 1930. 7 pp., 3 figs. Gives test showing disaster that results when coal dust is ignited by an arc in a mine and emphasizes the need of rock-dusting on haulageways.
- †RI 3045. Concentration Tests on the Manganiferous Iron Ores, by F. D. Devaney and J. B. Clemmer. 1930. 9 pp. Describes results of tests of Cuyuna ores to determine the possibility of applying the flotation process to their treatment and to learn whether table concentration of classified feeds might be feasible.

† Out of print.

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- RI 3047. Method of Measuring Voids in Porous Materials, by J. D. Sullivan, G. L. Oldright, and W. E. Keck. 1930. 8 pp. Description of a method which measures the penetration of solutions into the voids within porous materials and the volume of these voids, without concern for interstitial space between particles.
- †RI 3048. Study of High-Manganese Slags in Relation to the Treatment of Low-Grade Manganiferous Ores, by C. H. Herty, Jr., J. E. Conley, and M. B. Royer. 1930. 4 pp. Reports results of basic study of properties of high-manganese slags to determine whether it is possible to produce fluid slags by proper selection of composition or by addition of cheap flux, introducing no new difficulties in the subsequent process.
- †RI 3049. Concentration of Chromite, by H. A. Doerner. 1930. 8 pp. States that after proper grinding and classification tabling will generally produce a satisfactory separation of chromite from the minerals with which it is usually associated. The presence of low-grade chromite is responsible for most of the limitations of concentration.
- RI 3050. Leaching Copper Ores: Advantages of Wet-Charging, by J. D. Sullivan and A. P. Towne. 1930. 26 pp., 2 figs. Reports results of study to determine a way by which slimes can be handled in percolation leaching. States that the method of charging the ore into leaching vats governs the distribution of the fines and consequently the rate of extraction of copper.
- †RI 3051. Hauling Coal Safely with Permissible Storage-Battery Locomotives, by C. W. Owings. 1930. 18 pp. Concludes from a comparison of permissible and nonpermissible haulage equipment that the permissible storage-battery locomotive can gather and haul coal as cheaply as the nonpermissible types and is safer to operate if maintained in safe condition, trolley wires are adequately guarded, and cables are connected through permissible junction boxes.
- †RI 3052. Concentration Tests on Tailings from the Washing Plants of the Mesabi Range, Minn., by F. D. DeVaney and W. H. Coghill. 1930. 21 pp. Describes ores and washing practice of the Mesabi range district, outlines and gives results of magnetic and gravity concentration tests to recover the iron content of two sludge-pond samples.
- RI 3054. Fundamental and Applied Research on the Physical Chemistry of Steel Making, by C. H. Herty, Jr. 1930. 12 pp., 3 figs. Outlines a series of fundamental studies on the action of oxygen in liquid steel and the application of the findings to open-hearth operation.
- RI 3055. Accelerated Laboratory Test for Determination of Slacking Characteristics of Coal, by A. C. Fieldner, W. A. Selvig, and W. H. Frederic. 1930. 24 pp., 3 figs. Describes preliminary experiments, sampling, method of test, and results of tests and check tests. Discusses slacking, relation of bed moisture to slacking, and to slacking indices, and relation of slacking indices to rank of coal. Classifies coals in order of slacking tendency.
- RI 3056. A Device for Determining Work Input to a Laboratory Ball Mill, by John Gross and S. R. Zimmerley. 1931. 3 pp., 2 figs. Describes power-recording apparatus for measuring the work input at the ball mill itself in order to eliminate the factor of motor efficiency and transmission losses. Calibration of the integrator with a Prony brake and by means of a static load is given, and the use of the calibration curve is explained.
- †RI 3057. Process for Extracting Radium from Carnotite, by H. A. Doerner. 1930. 35 pp., 4 figs. States that a modification of the nitric acid process seems to be best adapted to treatment of slime concentrates, although a new method involving volatilization of the silica as fluoride, especially adapted to the treatment of slime, has interesting possibilities.
- †RI 3059. Development and Production History on the Salt Flat and Other Fault Fields of East Texas, by H. B. Hill, E. V. H. Bauserman, and C. B. Carpenter. 1931. 46 pp., 13 figs. Gives amounts and comparative data of water production for leases and wells in Salt Flat, Luling, and surrounding fields.
- RI 3060. Rock-Dusting a Pennsylvania Coal Mine, by C. W. Owings. 1931. 12 pp. Describes rock-dusting practices of one of the most thoroughly rock-dusted mines in the United States. Gives analyses of the road-dust samples and compares chemical analysis and volumeter determination of incombustible matter in the samples.

† Out of print.

- †RI 3061. A Study of the Properties of Texas Polyhalite Pertaining to the Extraction of Potash. III. Calcination of Polyhalite in a Rotary Kiln of Laboratory Size, by Loyal Clarke, J. M. Davidson, and H. H. Storch. 1931. 12 pp., 2 figs. Describes construction and operation of rotary kiln. Gives results of study of the variables and of factors affecting extraction procedure. Discusses results of calcination extraction experiments on 10- to 100-mesh Polish polyhalite and on such polyhalite of other degrees of fineness.
- †RI 3062. A Study of the Properties of Texas Polyhalite Pertaining to the Extraction of Potash. IV. Experiments on the Production of Potassium Chloride, by the Evaporation of Leach Liquors from Decomposition of Uncalcined Polyhalite by Boiling Saturated Sodium Chloride Solutions, by H. H. Storch and F. Fraas. 1931. 7 pp. Reports that evaporation of 90 percent of the water of the leach liquors interspersed with three crystallization steps will yield 78 percent of the potash as crude KCl which may be readily refined to produce pure KCl. The preliminary production cost estimate is about \$20 per ton. The possibility of industrially workable deposits of sylvinites in Texas and New Mexico is mentioned.
- RI 3064. Oxygen as an Aid in the Dissolution of Silver by Cyanide from Various Silver Minerals, by E. S. Leaver, J. A. Woolf, and N. K. Karchmer. 1931. 15 pp. Presents results of tests made to show the rate of dissolution of silver from each of the common silver minerals in cyanide solution. The effect of oxygen on the dissolution of silver is shown by comparing the results of the different methods of supplying oxygen. Concludes that oxygen is helpful in treatment of silver minerals by cyanidation, particularly for refractory minerals slow of dissolution. Warm solutions increase the dissolution rate. A preliminary low-temperature roast will usually produce a calcine amenable to cyanidation.
- RI 3065. Trends in the Production and Uses of Granite as Dimension Stone, by Oliver Bowles and Paul Hatmaker. 1931. 21 pp., 11 figs. Describes general economic conditions from 1906 to 1928, and outlines trends in the industry by States, discusses its problems, and suggests means of improvement and expansion.
- †RI 3066. The Use of Aluminum for Oil Lease Tanks: Part I, Field Tests, by Ludwig Schmidt, J. M. Devine, and C. J. Wilhelm. 1931. 17 pp., 3 figs. Presents results of a 1-year test of an all-aluminum stock tank of 500 barrels capacity and of a "composite" tank of equal capacity having a steel bottom and bottom ring and an aluminum top and top ring. Under certain operating conditions aluminum was shown to have promising possibilities for use in building lease tanks because of its resistance to the corrosive action of hydrogen sulphide gas. The limitation of aluminum for this use are listed.
- RI 3067. Washability Studies of the Mary Lee Bed at Hull Mine, Dora, Ala., by B. M. Bird, A. C. Richardson, and G. D. Coe. 1931. 24 pp., 13 figs. Contains results of screen-sizing and float-and-sink tests of a representative sample of run-of-mine coal, and flakiness and crushing tests of certain sizes of the coal.
- RI 3068. Flotation Tests on Converter Slag, by F. S. Wartman. 1931. 7 pp. Describes experimental flotation work undertaken to test conclusions derived from a previous study of samples of converter slag. These tests show that it is possible to recover by flotation about 90 percent of the copper content of a converter slag containing 3 percent copper, and to obtain flotation concentrates which have a copper content of 35 percent.
- †RI 3070. A Study of Falls of Roof and Coal in Mines in the No. 8 Field of Eastern Ohio, by J. W. Paul and L. N. Plein. 1931. 32 pp., 37 figs. Notes fatalities which have resulted from falls of roof in mines of the No. 8 bed and gives a brief description of the field and its geology. The mining methods, regulations, and timbering practices, together with supervision and discipline, are presented and discussed, since all of these factors affect control of roof accidents.
- RI 3072. The Reaction Between Magnetite and Ferrous Sulphide, Part II, by F. S. Wartman and G. L. Oldright. 1931. 10 pp., 7 figs. Reports results of a study of the effect of silica, magnesium, lime, alumina, and cuprous sulphide on the rate of the ferrous sulphide-magnetite reaction.
- RI 3073. Extraction of Soluble Copper from Ores in Leaching by Percolation, by J. D. Sullivan and K. O. Bayard. 1931. 43 pp., 20 figs. Describes and discusses experiments with various ores to determine the factors governing the rate of removal of water-soluble copper from leached ores.

† Out of print.

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- RI 3074. Properties of California Crude Oils. IV. Additional Analyses, Compiled by A. J. Kraemer. 1931. 12 pp. One of a series of reports. Gives individual analyses of eight crudes and discusses results of analyses.
- RI 3076. Absorption of Nitrogen by Steel, by R. S. Dean. 1931. 8 pp., 2 figs. Points out the necessity for controlling the nitrogen content of steel, with the control of impurities suggested as a first step. Notes need of data on effect of impurities and of denitrifiers on nitrogen absorption.
- RI 3077. Note on Copper-Constantan Thermocouple Calibration below 0° C., by R. H. Wiebe and M. J. Brevoort. 1931. 7 pp., 1 fig. Outlines experimental work and gives results which show that each thermocouple must be calibrated individually to secure an accuracy of about 0.05° C.
- RI 3078. Diatomite as a Filler in Battery Boxes, by Paul Hatmaker. 1931. 2 pp. Briefly discusses this use of diatomite, and lists manufacturers of battery boxes.
- †RI 3079. Recent Developments in Byproducts from Bituminous Coal, by A. C. Fieldner. 1931. 13 pp., 7 figs. Reviews trends in value of by-products, considers their present economic status and discusses competitive sources of gas for industrial and domestic use, chemical utilization of coke-oven gas, competition between synthetic and byproduct ammonia, use of sulphur in gas for making ammonium sulphate, sulphur recovery processes, production of phenols from still wastes, production of benzol and light oils, production of resins from light-oil compounds, tar and tar products, and the hydrogenation of coal tar.
- RI 3080. The Production of High-Manganese Slag in the Electric Furnace, by T. L. Joseph, C. E. Wood, and E. P. Barrett. 1930. 9 pp., 2 figs. Describes tests made to determine the possibilities of the electric furnace in this problem and to study the fluxing effect of aluminum on high-manganese slags.
- RI 3081. Laboratory Studies of the Deoxidation of Steel with Manganese-Silicon Alloys, by C. H. Herty, Jr., and G. R. Fitterer. 1930. 14 pp., 3 figs. Discusses present use of deoxidizers, rate of elimination of inclusions, factors affecting particle size, the system FeO-MnO-SiO₂, and formation of iron-manganese silicates in steel. Outlines experimental procedure and results.
- RI 3083. Washability Studies of the Black Creek Bed at Bradford Mine, Dixiana, Ala., by B. M. Bird, B. W. Gandrud, and C. B. Barmore. 1931. 12 pp., 9 figs. The fourth paper in a series on the washability of Alabama coals. Contains screen-sizing and float-and-sink tests of a representative sample of the raw coal, and flakiness tests showing the proportions of flaky particles in certain selected sizes. Crushing tests have not been considered necessary.
- RI 3084. The Propulsive Strength and Rate of Pressure Development of the Cardox Blasting Device, by N. A. Tolch and G. St. J. Perrott. 1930. 7 pp., 5 figs. Describes device and gives procedure and results of tests to observe the effect of variables determining the strength of Cardox, and of tests to determine the rate of pressure development of the Cardox model G shell.
- †RI 3085. Separation of Kyanite and Mica from Quartz, Feldspar, and Other Gangue Minerals of a Mica Schist, by T. F. Hintze and L. H. Lange. 1930. 6 pp. States object of experimental work, outlines method of analysis for kyanite, describes preliminary tests and quantitative tests, and gives results of screen analysis of minus 20-mesh material and of tabling tests.
- RI 3086. Note on Julius Suspensions, by M. J. Brevoort. 1931. 2 pp., 1 fig. Describes construction and adjustment of a modified form of the Julius suspension used to protect high-sensitivity galvanometers at the Amarillo helium plant.
- RI 3088. Smelting in the Lead Blast Furnace. Handling Rich Ores, VI. Conditions and Problems Introduced by Increasing Ratio of Concentration, by G. L. Oldright and Virgil Miller. 1931. 7 pp. One of a series of studies of lead blast-furnace problems. Gives history of operations at the Bunker Hill smelter, and discusses influence of flotation on increasing grade of concentrates, other processes that may influence grade of product received by smelters, difficulties introduced by flotation and suggested changes, and changes in operation of blast-furnace plants.
- RI 3091. Reduction of Zinc Oxide by Methane or Natural Gas, by H. A. Deorner. 1931. 14 pp., 7 figs. Gives results of work to determine whether or not the reaction rates between zinc oxide and methane are such that reaction 1 ($ZnO + CH_4 = Zn \text{ (gas)} + CO + 2H_2$) will predominate and take place with sufficient speed for commercial application.

† Out of print.

- RI 3094. Smelting in the Lead Blast Furnace. Handling Rich Charges: Part VII. Methods of Charging, Rate of Subsidence of the Charge, and Accretions Made, by G. L. Oldright and Virgil Miller. 1931. 11 pp., 2 figs. One of a series of papers on problems of smelting in the lead blast furnace. Describes conditions of operation and method of charging. Gives results of observations of rate of subsidence of charge column during smelting and of accretions.
- RI 3095. Smelting in the Lead Blast Furnace. Handling Rich Charges: Part VIII. The Gases from the Top of the Furnace, by G. L. Oldright and Virgil Miller. 1931. 19 pp., 1 fig. One of a series of papers on smelting in the lead blast furnace.
- RI 3096. Smelting in the Lead Blast Furnace. Handling Rich Charges: Part IX. Conditions at the Tuyère Zone, by G. L. Oldright and Virgil Miller. 1931. 21 pp., 5 figs. One of a series of papers on problems of the lead blast furnace. Pertains to distribution of air between tuyères, sampling gases at the tuyère zone, temperatures of slags and lead bullion in the crucible, general appearance of tuyère zone, cleaning of dirty slags, and slags made both at tuyères and later.
- RI 3097. The Acidity of Bennett Branch of Sunnemahoning Creek, Pa., During Low Water, by R. D. Leitch. 1931. 6 pp., 2 figs. Reports results of a study of the effect of a period of extreme low water on the acidity of Bennett Branch.
- RI 3098. General Review of the United States Bureau of Mines Stream-Pollution Investigation, by R. D. Leitch. 1931. 7 pp. Presents general facts on coal-mine drainage that have been gathered during the past five years.
- RI 3101. Re-Treatment of Sayreton Jig Middlings on Coal-Washing Tables, by A. C. Richardson and B. W. Gandrud. 1931. 6 pp., 1 fig. Discusses results of tests.
- RI 3102. The Acidity of Black Lick, Two Lick, and Yellow Creeks, Pennsylvania, During Low Water in 1930, by R. D. Leitch. 1931. 7 pp., 1 fig. Another of the series on the effect of drought and low water on the pollution of streams by coal-mine drainage.
- RI 3104. The Overheating of Rubber-Sheathed Trailing Cables, by L. C. Isley and A. B. Hooker. 1931. 10 pp., 4 figs. A report of a study of the general performance of factors that determine the heating of trailing cables. Points out need of larger conductor cables and more efficient power distribution. Gives data on general performance of trailing cables and on factors determining their heating. Points out need of larger conductor cables and more efficient power distribution.
- RI 3105. Flotation of Low-Grade Phosphate Ores—II, by H. M. Lawrence and E. Rota. 1931. 9 pp. Discusses certain features of laboratory study of flotation of ground and unground phosphatic sands. Gives further study of combinations of reagents for flotation and evolves a relatively inexpensive method, including period of conditioning with sodium sulphite followed by flotation with oleic acid.
- RI 3106. Leaching Oxidized Copper Ores: Effect of Strength of Acid in Leaching Solvent, by J. D. Sullivan and G. L. Oldright. 1931. 9 pp., 4 figs. Considers rate of dissolution of copper from ores of the Southwest in sulphuric acid of varying strengths and the rate of sulphuric acid consumed to copper dissolved.
- RI 3107. A Practical Method of Solving the Emergency Manganese Problem, by C. H. Herty, Jr. 1931. 7 pp. Presents results of work on deoxidation of steel with manganese-silicon alloys which may be produced from domestic manganese ores. This would effect a substantial reduction in this country's requirements of manganese.
- RI 3109. Gases in Manholes: A Survey of a Utility in Boston, Mass., by G. W. Jones and G. St. J. Perrott. 1931. 16 pp., 3 figs. Reports results of survey, extending over a year, to determine the general hazards of combustible gases and vapors in manholes and other underground openings under conditions considered typical of any public utility in the electric-light and power field.
- RI 3110. A Study of Falls of Roof and Coal in Mines of Harrison County, W. Va., by J. W. Paul and J. N. Geyer. 1931. 30 pp., 14 figs. One of three papers giving results of a study of safeguards employed in coal mines to protect workmen from falls of roof and coal. Features and practices found to promote protection are summarized, and additional safeguards are suggested.

† Out of print.

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- RI 3111. The Effect of Certain Operating Variables on the Efficiency of the Coal-Washing Tables, by H. F. Yancey and C. G. Black. 1931. 13 pp., 3 figs. Gives results of tests to establish the relationship which energy input, distribution, and rate of feed or tonnage treated bear to the efficiency of the separation on a coal-washing table. Contains data on the amount of water required in tabling coal.
- RI 3112. Flotation Reagents, 1929, by T. H. Miller and R. L. Kidd. 1931. 20 pp. Seventh of a series of yearly reviews presenting flotation reagent, consumption data, and other milling information of value to the milling industry and to manufacturers of flotation reagents.
- RI 3113. Roof Support in Coal Mines in the Irwin, Greensburg, and Latrobe Basins, Westmoreland County, Pa., by J. W. Paul, H. Tomlinson, and S. J. Craighead. 1931. 77 pp. 17 figs. Presents results of study of 12 mines operating in the Pittsburgh bed. Includes tabulation of accidents, tonnages, and other data for each mine, with information on mining methods, lists of commendable practices, and recommendations for improvement.
- RI 3114. Some Experimental Data on the Influence of Dry and Wet Cleaning on Coke Properties and on Gas and Byproduct Yields of Pittsburgh and Mary Lee Coals, by A. C. Fieldner. 1931. 9 pp., 6 figs. Contains comparative laboratory results obtained with a sample of Pittsburgh coal, raw and air-cleaned; comparative coke-oven results with $\frac{3}{4}$ -inch lump unwashed Pittsburgh bed coal, and water-washed coal from the same bed, but only in part from the same group of mines; and laboratory carbonization tests on the same 2-ton sample of Mary Lee coal, part unwashed and part washed on wet tables.
- RI 3116. A Study of the Properties of Texas-New Mexico Polyhalite Pertaining to the Extraction of Potash. V. Suggested Processes for the Production of Syngenite and Byproduct Magnesia, by H. H. Storch and N. Fragen. 1931. 19 pp., 2 figs. Commercially feasible processes producing potassium sulphate or syngenite or both are suggested and flow diagrams given. Points out that precipitation of magnesium ammonium carbonate followed by thermal decomposition may be of value in developing a process having MgO as a byproduct.
- RI 3117. Cooperative Research Between the United States Bureau of Mines and the Safety in Mines Research Board. Report for 1929, by R. V. Wheeler and G. S. Rice. 1931. 6 pp. Annual report of the cooperative mine-safety research program undertaken by the organizations named. Bibliography of publications on cooperative work.
- RI 3118. Explosive Crushing of Minerals, by R. S. Dean and John Gross. 1932. 5 pp., 5 figs. Discusses nature of expandable substances; the effect of pressure, varying amount of water, and time of soaking; and explosive experiments on ores.
- RI 3119. The Acidity of Several Pennsylvania Streams During Low Water, by R. D. Leitch. 1931. 10 pp., 5 figs. Compares the results obtained for extreme low water of 1930 and for other years.
- RI 3120. Determination of Magnetite in Copper Slags, by L. E. Roberts and R. I. Nugent. 1931. 14 pp., 1 fig. Reports results of tests to determine whether possible sources of error in the Hawley method actually introduce great error and compares results obtained by the Hawley method with those by the use of the magnetic balance. Introduces an advantageous modification of the Hawley method.
- RI 3121. Comparison of Storage-Battery and Cable-Reel Locomotives in a West Virginia Coal Mine, by C. W. Owings. 1931. 10 pp. Comparison indicates that the two types of locomotives are about equal in performance; however, storage-battery locomotives are more economical, safer, and in event of power failure can continue to operate.
- RI 3122. Tests on Brick Kilns with a Stoker, by W. E. Rice and R. E. Faller. 1931. 20 pp., 2 figs. Results of tests to determine whether it is feasible to fire a large kiln with a single stoker, whether the use of a single furnace simplifies control, and whether the admission of all the hot gas at the center of the kiln will give symmetrical distribution of heat.
- RI 3126. The National Safety Competition of 1930-31, by W. W. Adams. 1931. 12 pp. Names winners of awards in the various groups and gives accident data for classified mines of 1931.

† Out of print.

- RI 3127. A Novel Method of Ventilating a Pennsylvania Coal Mine, by C. W. Owings. 1931. 8 pp. Describes a simplified system of ventilation applicable to any panel system of mining or to mechanized mining.
- RI 3128. Hydrogen Sulphide Content of the Gas in Some Producing Oil Fields, by J. M. Devine and C. J. Wilhelm. 1931. 15 pp., 1 fig. Report of continued work on hydrogen sulphide problem. Gives results of analyses for hydrogen sulphide of samples from 165 wells representative of typical gas production in 15 different fields in Illinois, New Mexico, and Texas.
- RI 3130. Properties of Typical Crude Oils from the East Texas Field, by E. L. Garton. 1931. 7 pp. Contains analyses of oil samples from the east Texas and the east-central Texas districts.
- RI 3131. The Use of Aluminum for Oil Lease Tanks, Part II. Laboratory Tests, by L. Schmidt, J. M. Devine, and C. J. Wilhelm. 1931. 16 pp., 3 figs. Gives results of laboratory corrosion studies made in connection with a 1-year test on aluminum oil lease tanks conducted by the bureau.
- RI 3132. Experiments to Determine the Minimum Amount of Coal Dust Required for Propagation of a Mine Explosion, by G. S. Rice and H. P. Greenwald. 1931. 3 pp. Reviews experiments leading to the conclusion that no coal mine can be clean enough to be free of the hazard of dust explosions if a source of ignition is introduced.
- RI 3133. Sand and Gravel Contest of 1930, by W. W. Adams. 1931. 10 pp. Gives tables showing accident data for individual plants, scale of time losses for weighting, deaths and permanent injuries to show severity of accidents, and causes of accidents at sand and gravel plants. Lists and fully describes accidents, giving number of days lost reported by sand and gravel plants.
- RI 3134. Active List of Permissible Explosives and Blasting Devices Approved Prior to June 30, 1931. 1931. 15 pp. Reviews list of permissible explosives tested under Schedule 17B, describes classes of permissible explosives, and gives permissible blasting devices tested under Schedule 20.
- RI 3135. Apparatus for Determination of Hydrogen Sulphide in Gases, by J. W. Horne and W. B. Shirey. 1931. 6 pp., 2 figs. Deals with apparatus and methods used in determining amount of hydrogen sulphide evolved in laboratory experimental cracking stills from cracking of gases produced by distillation of oil shale under pressure.
- RI 3138. Reduction of Evaporation Losses from Gasoline Bulk Storage-Station Tanks, by Ludwig Schmidt and C. J. Wilhelm. 1931. 11 pp., 5 figs. Describes tanks and gasoline used in tests, showing that light-colored paints, tank housing, and increased operating pressures reduce evaporation losses.
- RI 3139. Added Recovery by Hydraulic Sizing of Fine Material in the Land-Pebble Phosphate District of Florida, by R. G. O'Meara. 1931. 5 pp., 1 fig. Gives results of tests on classification and tabling of phosphatic sands which show that the sizing obtained by a hydraulic classifier makes possible the recovery of phosphate formerly sent to waste.
- RI 3143. The Production of Motor Fuels from Natural Gas. I. Preliminary Report on Pyrolysis of Methane, by H. M. Smith, Peter Grandone, and H. T. Rall. 1931. 12 pp., 13 figs. Describes experimental procedure and apparatus and outlines results of tests pointing to possible commercial application of pyrogenic synthesis of gaseous, liquid, and solid hydrocarbons from methane.
- RI 3145. Survey of Fuel Consumption at Refineries in 1930, by G. R. Hopkins. 1931. 12 pp., 2 figs. A review of the production and consumption of refinery fuels by districts, touching on developments that have reduced fuel consumption. Gives data on fuel used at refineries in the United States from 1925 to 1930 and in 1929 and 1930.
- RI 3146. Acidity of Drainage from High-Pyritic Coal Areas in Pennsylvania, by R. D. Leitch. 1932. 15 pp., 1 fig. Gives results of analyses of samples of water draining from high-pyritic mines to determine what effect such coal has on the acidity of water.
- RI 3148. Concentration of the Rake Discharge from a Bowl Classifier in a Washing Plant of the Mesabi Range, Minnesota, by F. D. DeVaney and W. H. Coghill. 1932. 7 pp. Describes tests showing that fines from ores of the jigging type are readily concentrated by classification and tabling.

† Out of print.

Reports of Investigations

- RI 3149. Salts in the Tri-State Mill Waters: Their Ill Effect on the Flotation of Blende, and Their Removal, by A. B. Campbell, W. Howes, and W. H. Ode. 1932. 24 pp., 6 figs. Suggests removal of ferrous and ferric iron and free acid by alternate aeration and neutralization. Neutralization may be by upward percolation through high-grade limestone.
- RI 3151. Micropyrometer for High-Temperature Melting Point, by G. R. Fitterer and M. B. Royer. 1932. 17 pp., 2 figs. Discusses the melting phenomenon, high-temperature melting-point methods, the micropyrometer, temperature calibration, melting points of standard samples and of refractory oxides and slags, precautions, and the system FeO-SiO_2 as an example of the application of the micropyrometer.
- †RI 3153. Factors Influencing the Flow of Natural Gas Through High-Pressure Transmission Lines, by W. B. Berwald and T. W. Johnson. 1931. 27 pp., 7 figs. Reviews pipe-line flow formulas and gives methods and results of making flow tests.
- †RI 3154. The Splicing of Rubber-Sheathed Trailing Cables, by L. C. Ilsley and A. B. Hooker. 1932. 7 pp., 3 figs. Contains instructions for splicing and vulcanizing broken cable.
- RI 3156. Review of Fatalities in the California Petroleum Industry During the Calendar Year 1930, by R. L. Marek. 1931. 28 pp., 1 fig. Shows that the majority of the fatalities were in the drilling and producing divisions of the industry and that most of the accidents were preventable.
- RI 3157. Washability Data on Certain Coal Beds of Alabama, with Special Reference to Sulphur Elimination, by B. W. Gandrud, G. D. Coe, and M. F. Thomas. 1932. 28 pp., 11 figs. Gives results of an attempt, on the basis of float-and-sink data, to determine approximately the ash and sulphur reduction obtainable under given conditions in coals from various mines.
- RI 3159. Laboratory Batch Still and Fractionating Column for Production and Study of Lubricating Distillates Under Vacuum, by Boyd Guthrie and Ralph Higgins. 1932. 18 pp., 5 figs. Shows construction of laboratory-size batch still and fractionating column; presents data on operation of apparatus under vacuum to produce lubricating distillates.
- RI 3160. The Effect of Oxygen on Gaseous Hydrogen Sulphide Corrosion of Steel, by J. M. Devine, C. J. Wilhelm, and Ludwig Schmidt. 1932. 19 pp., 8 figs. Gives results of laboratory tests, describing apparatus and methods of corrosion of steels under gaseous hydrogen sulphide conditions.
- RI 3164. Selecting and Training the Refinery Personnel to Prevent Accidents, by R. L. Marek. 1932. 29 pp., 1 fig. Presents results of a study, made at various refineries in the United States, of the success of accident and fire prevention work effected by coordinated effort of the different departments.
- RI 3165. Re-Treatment of Fine Washed Coal from the Black Creek and Mary Lee Beds on Coal-Washing Tables, by A. C. Richardson, G. D. Coe, H. J. Hager, and R. Q. Shotts. 1932. 12 pp., 13 figs. Reports progress of study to determine whether fine washed coal from jigs can be economically retreated on coal-washing tables.
- RI 3166. Determination of Iron Oxide in Liquid Steel, by C. H. Herty, Jr., Hyman Freeman, and M. W. Lightner. 1932. 10 pp. Describes a method of deoxidizing liquid steel by the addition of aluminum. The killed steel is analyzed for Al_2O_3 , from which the FeO in the steel may be calculated.
- RI 3167. A Study of the Properties of Texas Polyhalite Pertaining to the Extraction of Potash. VI. A Study of the Calcination of Polyhalite in a 6- by 132-Inch Rotary Kiln. Density Measurements as Control Tests for Efficiency of Calcination, by J. E. Conley, F. Fraas, and J. M. Davidson. 1932. 17 pp., 7 figs. Describes calcination of Polish and New Mexico polyhalite in 6- by 132-inch rotary kiln, development of tests for measuring and controlling the degree of calcination, and extraction of 20-pound batches of polyhalite calcined in the rotary kiln.
- RI 3168. Determination of Volatile Matter in Low-Temperature Cokes, Chars, and Noncoking Coals, by H. M. Cooper, F. D. Osgood, and R. E. Solomon. 1932. 17 pp., 3 figs. A study of some of the factors affecting volatile matter determinations in those types of fuel which give erroneous results due to mechanical losses.

† Out of print.

- RI 3169. Absorbents for Liquid-Oxygen Explosives: Their Relation to Sensitiveness to Impact and Other Properties of L. O. X., by L. V. Clark. 1932. 21 pp., 7 figs. Deals with examination of absorbents for L. O. X. to determine their most desirable and undesirable characteristics, to find means of desensitizing absorbents to mechanical shock, and to determine the effect that such desensitization of absorbents has on the explosive characteristics of L. O. X.
- RI 3170. Washability Studies of the Brookwood Bed at the Warrior View Mine, Tuscaloosa, Ala., by A. C. Richardson, G. D. Coe, and H. L. Anthony. 1932. 14 pp., 12 figs. Contains screen-sizing and float-and-sink tests of a representative sample of run-of-mine coal, and flakiness and crush tests on certain sizes.
- RI 3171. Analytical Distillation of Coal Tar, by E. B. Kester, W. D. Pohle, and L. P. Rockenbach. 1932. 11 pp., 2 figs. Points out that distillation and fractionation of tar in one operation at atmospheric pressure may introduce large differences in duplicate determinations. Describes satisfactory double distillation method for reducing deviations resulting from cracking and improper fractionation, and shows that repeated distillations of low-temperature tar from a Hempel flask do not alter its composition materially.
- †RI 3172. Inflammability of Mixed Gases: Mixtures of Methane, Hydrogen, and Nitrogen, by G. W. Jones and R. E. Kennedy. 1932. 12 pp., 3 figs. Limits of inflammability were both determined and calculated on test mixtures of complex gases. The results showed that actual limits of inflammability can be closely approximated by calculation.
- RI 3173. Some Methods of Separating Oil and Water in West Texas Fields and the Disposal of Oil-Field Brines in the Hendricks Oil Field, Texas, by R. E. Heithecker. 1932. 16 pp., 7 figs. Discusses the comparative merits of the water-trap and hay-tank methods of separation. Notes various ways of disposing of waste water.
- RI 3174. Properties of Crude Oil from the Greasewood Flat Area in Colorado, by H. P. Rue. 1932. 3 pp. Contains results of analysis, by the Bureau of Mines Hempel method, of two crude-oil samples.
- RI 3176. The National Safety Competition of 1931, by W. W. Adams. 1932. 18 pp. Presents results of the 1931 competition and gives tables showing accident rates and relative standing of the competing companies.
- RI 3177. Migration of Injected Gas Through Oil and Gas Sands of California, by H. C. Miller. 1932. 29 pp., 9 figs. Gives summary of preceding literature; general discussion of gas-injected methods, pressures and volumes injected, pressure gradient between injection and producing well, and spread of injected gas in reservoir sands; examples of gas-injection projects; and effect of gas injection to increase gasoline production.
- †RI 3178. The Use of Lime in a Salt Solution for Removing Hydrogen Sulphide from Natural Gas, by H. P. Rue. 1932. 8 pp., 2 figs. Reports that hydrogen sulphide can be removed economically from wet natural gas by means of a salt and lime solution by contacting the gas and solution in the proper scrubbing device. Notes the possibility that certain natural oil-field waters can be converted to the proper treating solution by adding relatively small amounts of certain chemicals.
- RI 3179. Do Fuses Protect Against Methane Ignition? by A. B. Hooker and E. J. Coggeshall. 1932. 13 pp. Gives results of tests of different-size fuses under various conditions. Smaller fuses were shown to give better protection against ignition of gas, but larger fuses are necessary for protection against overloading and excessive damage to the cable.
- RI 3180. Analyses of Crude Oils from the Oklahoma City Field, Okla., by E. L. Garton. 1932. 29 pp. Analyses of 21 representative crude oils from various producing zones of the Oklahoma City field.
- RI 3182. Review of Fatalities in the California Petroleum Industry during the Calendar Year 1931, by R. L. Marek. 1932. 22 pp., 2 figs. Describes causes and conditions which resulted in accidents in the various divisions of the industry. Notes that approximately 50 percent of the accidents are in drilling and producing division.
- RI 3183. Smelting in Lead Blast Furnace. Handling Rich Charges. X. Preparation of the Charge, by G. L. Oldright and Virgil Miller. 1932. 50 pp., 12 figs. The tenth of a series of papers on smelting in lead blast furnace and the fifth on modifications brought about by introduction of richer charges.

† Out of print.

Reports of Investigations

- RI 3184. Sanitary Surveys of Coal-Mining, Metal-Mining, and Smelter Towns of Utah, by A. L. Murray. 1932. 28 pp. A report on conditions that affect health, efficiency, and contentment of employees.
- RI 3185. Toxicity of Dichlorotetrafluoroethane, by W. P. Yant, H. H. Schrenk, and F. A. Patty. 1932. 10 pp. Notes chemical and physical properties of a new organic fluoride suitable for a refrigerant and gives results of tests in which animals were exposed to atmospheres containing various proportions of the substance.
- RI 3186. Sand-and-Gravel Safety Contest of 1931, by W. W. Adams. 1932. 8 pp. Gives results of contest for 1931, with tables showing accident and severity rates at plants and names of winning plants.
- RI 3187. Protection against Mercury Vapor Afforded by Canister Gas Masks, by W. P. Yant and C. E. Traubert. 1932. 11 pp. Describes procedure and presents detailed results, including preparation and sensitivity of selenium sulphide test papers for mercury vapor and tests of 2 charcoal-filled gas-mask canisters, 3 type-N gas-mask canisters, and 2 charcoal-filled respirator cartridges.
- RI 3188. A Study of Roof and Coal in Mines of Lincoln County, Wyo., by H. Tomlinson. 1932. 18 pp., 12 figs. One of a series presenting results of study of causes and methods of preventing accidents from falls of roof and coal in western coal mines.
- RI 3189. Falls of Roof and Coal in the Book Cliffs and Wasatch Plateau Coal Fields of Utah, by Herbert Tomlinson. 1932. 24 pp., 16 figs. Summarizes data obtained at 12 mines, representative of the various physical characteristics of principal coal beds. Notes physical and operative features influencing falls.
- RI 3190. Economics of Potash Recovery from Wyomingite and Alunite, by J. R. Thoenen. 1932. 78 pp., 8 figs. Contains data from a field survey of deposits as to accessibility for exploitation, probable location of treatment plants, source and cost of raw materials, and probable markets for products. Gives information obtained from study of patents concerning operating costs and processes having attractive financial possibilities.
- RI 3191. The Effect of the Crimped-Paper Ends on Cartridges of Permissible Explosives in Propagating Detonation, by D. B. Gawthorp. 1932. 7 pp., 1 fig. Describes the halved-cartridge gap test by which is determined the sensitivity of explosives to detonation over an air gap. Gives results of tests of seven samples of similar components but varying physical character.
- RI 3192. Investigations During 1931 of Gases in Manholes in Boston, Mass., by G. W. Jones. 1932. 32 pp., 2 figs. Reports results of continued survey of explosion hazards in manholes, using specially designed test car and employing charcoal-filter test in addition to usual procedure.
- RI 3193. Character of Drainage from Mines in the Thick Freeport Coal Bed, Pa., by R. D. Leitch, W. P. Yant, and R. R. Sayers. 1932. 29 pp., 1 fig. Gives character of samples of outflow and inside mine waters, with general information available.
- RI 3194. Inflammable Gases Produced by Thermal Decomposition of Plastic Insulators in an Electric Arc, by J. B. Littlefield and W. P. Yant. 1932. 7 pp., 2 figs. Describes insulating materials investigated and presents results of tests made in presence and in absence of oxygen.
- RI 3195. Selective Oiling and Table Concentration of Phosphatic Sands in Land-Pebble District of Florida, by R. G. O'Meara and J. W. Pamplin. 1932. 6 pp. Discusses briefly table concentration of material previously given a selective oil treatment. Laboratory and pilot-plant tests have shown this method to be successful when applied to underground phosphatic sands from land-pebble district of Florida.
- †RI 3196. Compressed Air for Operating Modern Coal-Mining Equipment, by R. D. Currie. 1932. 14 pp., 7 figs. Describes conditions, compressed-air system and equipment, and costs at mine under discussion.
- RI 3197. Composition of the Fractions of Primary and High-Temperature Tar, by E. B. Kester and W. D. Pohle. 1932. 11 pp., 3 figs. Reports results of pyrolysis of primary products of coal decomposition in high-temperature coking practice, both as to total quantities of chemically similar constituents and as to their distribution throughout boiling range.

† Out of print.

- RI 3199. A Study of Falls of Roof and Coal in Northern Colorado, by H. Tomlinson. 1933. 20 pp., 22 figs. Gives a general description of five mines in northern Colorado field, and discusses methods of roof support and types of accidents in those mines. Suggests remedies in practice to aid the prevention of falls.
- RI 3200. Washability Studies of Blue Creek Bed at Connellsville Mine, Connellsville, Ala., by B. W. Gandrud, A. C. Richardson, and W. G. Payne. 1933. 10 pp., 18 figs. Reports results of tests of coal from Blue Creek bed to determine washing characteristics and possibilities of reducing its ash content on coal-washing tables.
- RI 3201. Explosive Shattering of Minerals, by R. S. Dean and John Gross. 1933. 19 pp., 17 figs. Present study of mechanism of shattering process and reports results obtained in tests on a selected group of ores.
- RI 3203. Places of Occurrence of Injury from Falls of Roof, by J. W. Paul and D. L. Sibray. 1933. 13 pp., 3 figs. Shows by review of data on 80 mines that greatest percentage of accidents from roof falls occurs at working face. Enumerates practices which if followed would materially reduce such accidents.
- †RI 3204. Washability Studies of Mary Lee Bed at Powhatan Mine, Powhatan, Ala., by A. C. Richardson and W. H. Carrington. 1933. 15 pp., 26 figs. Gives results of tests to determine washing characteristics of coal from Mary Lee bed at Powhatan and shows how coal from top bench differs from rest. Presents data from which may be determined approximate extent of ash reduction obtainable on various sizes of run-of-mine coal.
- †RI 3205. The Development of an Electrolytic Method for the Determination of Inclusions in Plain Carbon Steels, by G. R. Fitterer, B. E. Sockman, E. A. Krockenberger, R. B. Meneilly, E. W. Marshall, Jr., and J. F. Eckel. 1933. 69 pp., 8 figs. Briefly describes electrolytic procedure for plain and low-carbon steels and gives results of work done in a study of factors affecting accuracy of electrolytic determinations, sources of contamination of electrolytic residue affecting analytical results, determination of manganese hydroxide precipitation by electrolysis of oxygen-free steels, determination of SiO₂, and extraction of alloy oxides and sulphides from alloy steels.
- RI 3206. Washability Studies of Coal from the Mary Lee Bed at the Bankhead Mine, Bankhead, Ala., by A. C. Richardson and B. W. Gandrud. 1933. 9 pp., 3 figs. Contains results of screen-sizing and float-and-sink tests of a representative sample of run-of-mine coal, and results of tests made to show amount of coal liberated from impurities by crushing the coarser sizes.
- RI 3207. A Study of Falls of Roof and Coal, Rock Springs Coal District, Sweetwater County, Wyo., by H. Tomlinson. 1933. 23 pp., 9 figs. Third of series devoted to study of conditions influencing falls of roof and coal in western coal mines. Safety conditions in general are discussed and suggestions made for additional safeguards.
- †RI 3208. Review of Fatalities in the California Petroleum Industry during the Calendar Year 1932, by R. L. Marek. 1933. 21 pp., 1 fig. Reports accidents in various divisions of the industry and compares year's record with that of other years.
- RI 3209. The Cleaning of Fine Coal from the Mary Lee Bed at the Porter Mine, by A. C. Richardson and B. W. Gandrud. 1933. 8 pp., 9 figs. Gives results of tests to determine washing characteristics of minus $\frac{1}{16}$ -inch raw coal and extent to which ash might be reduced by means of coal-washing tables.
- RI 3210. Study of Properties of Texas-New Mexico Polyhalite Pertaining to the Extraction of Potash. VII—Effect of Particle Size, Sodium Chloride Concentration, and Temperature upon Hot Extraction by a Multistage Process, by J. E. Conley and F. Fraas. 1933. 29 pp., 2 figs. Reports experiments performed to ascertain whether continuous countercurrent extraction of calcined polyhalite by hot water will yield satisfactory recoveries and concentrations of potassium sulphate in top liquor. Good results were obtained by minus 35-plus 100-mesh, minus 20-mesh, and minus 10-mesh sizes.
- †RI 3211. A Study of Subsurface Pressures and Temperatures in Flowing Wells in the East Texas Field and Application of These Data to Reservoir and Vertical Flow Problems, by C. E. Reistle, Jr., and E. P. Hayes. 1933. 30 pp., 14 figs. Describes tests with pressure-temperature recording instruments and develops data to indicate sand performance and minimum reserve pressure necessary to produce the wells by natural flow through different sizes of tubing.

† Out of print.

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- †RI 3212. A Study of "Bottom-Hole" Samples of East Texas Crude Oil, by B. E. Lindsly. 1933. 22 pp., 7 figs. Describes "bottom-hole" sampling device and "flash" and differential methods of gas liberation from reservoir oil samples; also liquid compressibility tests. Concludes that East Texas oil is "undersaturated" and points out effects of solubility phenomena in that field.
- †RI 3213. Investigations During 1932 of Combustibles in Manholes in Boston, Mass., by G. W. Jones, John Campbell, and F. M. Goodwin. 1933. 17 pp., 1 fig. Gives results of investigation to determine general hazards of combustible gases and vapors in manholes and other underground openings and to develop methods of eliminating these hazards.
- †RI 3214. Identification of Cerussite and Anglesite, and Flotation with Galena, by F. D. DeVaney and R. E. Evans. 1933. 2 pp., 2 figs. Describes ore used in investigation and gives results of concentration, gravity concentration, and flotation tests.
- †RI 3215. Comparison of Methods for Determining Friability of Coal, by H. F. Yancey and R. E. Zane. 1933. 24 pp., 19 figs. Compares various methods previously brought forth for estimating friability of coal and coal products. Investigates relative friability of 4 sizes of 6 different coals as determined by 5 methods.
- †RI 3216. Limits of Inflammability of Natural Gases Containing High Percentages of Carbon Dioxide and Nitrogen, by G. W. Jones and R. E. Kennedy. 1933. 23 pp., 2 figs. Gives data obtained on extinction of propane and butane flames by addition of nitrogen and carbon dioxide. Contains curves and tables showing information enabling limits of inflammability of natural gases containing one or more constituents of methane, ethane, propane, and butane to be calculated.
- †RI 3217. Estimate of Gas Reserves of the Oklahoma City Oil Field, Oklahoma County, Okla., by H. B. Hill and E. L. Rawlins. 1933. 54 pp., 15 figs. Deals with geology of Oklahoma City field gas-producing horizons and gas reserves of Pennsylvania formation, gas withdrawal in Pennsylvania zone, reservoir conditions in pre-Pennsylvania formations, and utilization of natural gas.
- RI 3218. Volatilization of Impurities from Zinc Concentrates, by G. L. Oldright, W. E. Keck, and F. K. Shelton, with a section on Thermodynamic Calculations—Further Theoretical Study of the Separation of Cadmium and Zinc, by Chas. G. Maier. 1933. 51 pp., 5 figs. Discusses nature and analysis of zinc concentrates now made, new experiments on removal of lead and cadmium from zinc concentrate by volatilization as oxides, and volatilization of cadmium from calcined zinc concentrate. Gives results of further critical studies of specific heats at low and high temperatures.
- RI 3219. The National Safety Competition of 1932, by W. W. Adams. 1933. 17 pp. Gives names of companies that won trophies and those that received honorable mention for safety achievement. Reports accident data by types of mines and compares data for all groups.
- RI 3221. Consumption Trends in the Roofing-Slate Industry, by Oliver Bowles. 1933. 3 pp., 3 figs. Influences that tend to dwarf long-established slate industry are analyzed briefly.
- RI 3223. Progress Reports—Metallurgical Division. 1. Mineral Physics Studies, by R. S. Dean, V. H. Gottschalk, John Gross, J. Koster, C. W. Davis, and C. E. Wood. 1934. 37 pp., 21 figs. Includes the following five reports: Magnetic Separation of Minerals; Deformation of Solids; Progress in Explosive Shattering; Measurement of Crushing Resistance of Minerals by the Scleroscope; and Preliminary Report on Dust Settling.
- RI 3224. Classification and Tabling of Alabama Red Iron Ores, by B. W. Gandrud, A. C. Richardson, and B. S. Followill. 1934. 8 pp., 1 fig. Proposes simple flow sheet using only standard methods of gravity concentration for low-grade Alabama red iron ores. Method is believed to be more economical than any process proposed heretofore.
- RI 3225. The Flotation of Alabama Graphite Ores, by B. W. Gandrud, G. D. Coe, C. S. Benefield, and I. N. Skelton. 1934. 20 pp. Describes results of investigation undertaken to develop concentrating process capable of recovering at low cost maximum amount of graphite meeting requirements for manufacture of dry batteries.

† Out of print.

- RI 3226. Progress Reports—Metallurgical Division. 2. Gold Recovery Studies, by E. S. Leaver, J. A. Woolf, and R. E. Head. 1934. 31 pp. Embodies four papers, as follows: Recovery of Refractory Gold in Milling Ores; Flotation of Metallic Gold—Relation of Particle Size to Floatability; Depressing Primary Slime During the Flotation of Gold in Milling Ores; and Form and Occurrence of Gold in Pyrite from a Metallurgical Viewpoint.
- RI 3227. Trade Trends in the Lime Industry, by Paul Hatmaker. 1934. 18 pp., 13 figs. Presents what is believed to be first attempt to correlate many business data on current markets for lime.
- †RI 3228. Progress Reports—Metallurgical Division. 3. Studies in the Metallurgy of Copper, by R. S. Dean, F. S. Wartman, A. J. Thompson, E. K. Pryor, J. D. Sullivan, G. L. Oldright, A. F. Hallet, S. L. Brown, W. A. Sloan, and C. W. Davis. 1934. 57 pp. Includes chapters on Outlook for Profitable Research in the Metallurgy of Copper; Preparation and Properties of Copper Ferrite; Leaching Copper Ores—Study of Oxidation of Iron Solutions Used as a Solvent; Regeneration of Ferric Sulphate in Copper-Leaching Solutions; Hydrometallurgy of Copper Sulphide Ores and Its Relation to Mineral Structure; and Comparison of Western Methods for Determination of Oxidized Copper in Ores.
- †RI 3229. Progress Reports—Metallurgical Division. 4. Studies in Direct Production of Iron and Steel from Ore, by R. S. Dean, S. R. B. Cooke, John Gross, C. W. Davis, C. G. Maier, S. B. Thomas, E. P. Barrett, T. L. Joseph, C. E. Wood, G. R. Fitterer, H. Freeman, V. H. Gottschalk, and Donald Doan. 1934. 65 pp., 55 figs. Includes reports on Amenability of Various Iron Ores to Rigorous Concentration; Explosion Shattering of Iron Ores; Alternating-Current Magnetic Separation of Iron Ores; Methods of Reducing Pure Iron Ore; Nitrogen Content of Sponge Iron and of Metal Obtained by Melting Sponge Iron; Use of Sponge Iron in the Production of High-Quality Steels in the Electric Arc Furnace; and Study of Reduced Ferberite as a Substitute for Ferrotungsten.
- †RI 3230. Solubility of Carbon in Iron-Manganese-Silicon Alloys, by C. H. Herty, Jr., and M. B. Royer. 1934. 22 pp., 6 figs. Describes work done to supply definite information as to which composition of manganese and silicon within a certain manganese-silicon ratio and when alloyed with iron would have an allowable carbon content for particular type of steel on which deoxidizer is used.
- RI 3231. Dry Cells and Their Application to Mining, by A. B. Hooker and E. J. Coggeshall. 1934. 8 pp. Discusses application of dry cells in four fields of electric shot firing, auxiliary lighting, signaling, and testing.
- †RI 3232. Temperature-Viscosity Measurements in the System CaO-SiO_2 and $\text{CaO-SiO}_2\text{-CaF}_2$, by C. H. Herty, Jr., F. A. Hartgen, G. L. Frear, and M. B. Royer. 1934. 31 pp., 17 figs. Describes construction and results obtained with viscometer, apparatus for determination of viscosity of high-melting materials at temperatures corresponding to those in pig-iron and steel making.
- RI 3233. The Occurrence of Gases in Coals, by R. F. Selden. 1934. 64 pp., 2 figs. Reviews recent literature on occurrence of gas in coals and discusses present status of situation critically.
- †RI 3234. Table Cleaning of Fine Coal from the Thompson and Woodstock Beds of the Cahaba Field, Alabama, by A. C. Richardson, B. W. Gandrud, and W. D. Musgrove. 1934. 19 pp., 28 figs. Describes investigation to determine influence of rash upon efficiency of coal-washing tables. Results indicate that when table is operated correctly there is little difficulty in eliminating rash and that trouble is due mainly to bony impurities in material finer than 100-mesh.
- RI 3235. Some Physical Properties and Characteristics of Fuse, by N. A. Tolch and J. E. Tiffany. 1934. 21 pp., 2 figs. Presents results of survey of properties and characteristics of brands of fuse manufactured in United States; 25 samples were procured from 4 manufacturers, representing all brands on the market when investigation was begun.
- RI 3236. Detailed Statistical Microscopic Analyses of the Ores and Mill Products of the Silver King Flotation Concentrator, Park City, Utah, by R. E. Head, A. L. Crawford, F. E. Thackwell, and G. Burgener. 1934. 70 pp., 9 figs. Gives eight groups of analyses of lead concentrate, zinc concentrate, and tailings from Silver King mill, with illustrative graphs.

Reports of Investigations

- †RI 3237. A Study of the Properties of Texas-New Mexico Polyhalite Relating to the Extraction of Potash. VIII. Removal of Sodium Chloride from Crude Polyhalite by Washing, by J. M. Davison and F. Fraas. 1934. 25 pp., 6 figs. Small-scale engineering tests have demonstrated that sodium chloride content may be reduced to as low as 1 percent with a loss under 5 pounds of K_2SO_4 per 100 pounds of sodium chloride removed when diluted waste liquors containing about 1 gram of sulphate and 8 grams of $MgSO_4$ per 100 grams of water are used as washing medium.
- RI 3238. Summary of Experimental Data on Laboratory Oxidation of Crude Oils, with Particular Reference to Air Repressuring, by Sam S. Taylor and H. M. Smith. 11 pp. 1934. Gives results of study of air-repressuring problems through laboratory-scale investigation of direct oxidation of crude oil.
- †RI 3239. Progress Reports—Metallurgical Division. 5. Ore-Dressing Studies, by W. H. Coghill, F. D. DeVaney, J. Bruce Clemmer, and R. G. O'Meara. 1934. 26 pp., 1 fig. Includes reports on grinding tests for easy interpretation of results and flotation and depression of nonsulphides—calcite, silica, and silicate, fluorspar, barite, apatite, and tungsten minerals.
- RI 3240. Progress Reports—Metallurgical Division. 6. Size Preparation of Iron Ores and Desulphurization Studies, by T. L. Joseph and W. F. Holbrook. 1934. 25 pp., 10 figs. Includes results of reduction tests on sinters and artificial fayalite and tests on the desulphurizing action of manganese and slag.
- †RI 3241. Formulas for Designing Natural-Gas Pipe-Line Systems Consisting of Parallel Lines, by T. W. Johnson and W. B. Berwald. 1934. 11 pp., 1 fig. Deals with part of study during past several years of flow of natural gas through high-pressure pipe lines, and involves investigation of design of pipe-line systems consisting of lines laid parallel to each other.
- †RI 3242. Progress Reports—Metallurgical Division. 7. Studies in Lead Metallurgy; Résumé on Smelting in the Lead Blast Furnace—Handling Zinciferous Charges, by G. L. Oldright and Virgil Miller. 1934. 11 pp. Summarizes data given in five papers describing operations at large smelter at Trail, British Columbia, equipped to produce electrolytic zinc, lead, copper, silver, bismuth, cadmium, sulphuric acid, and commercial fertilizers.
- †RI 3243. Smelting in the Lead Blast Furnace. Handling Zinciferous Charges. XI. Preparation of the Charge by Sintering, by G. L. Oldright and Virgil Miller. 1934. 60 pp., 4 figs. Covers operations at plant of Consolidated Mining & Smelting Co. of Canada, Ltd., Trail, B. C., the third important smelter to be described in this series; other papers covering various phases of smelting practice at this plant will follow. Interesting feature is production of chemicals, chiefly agricultural fertilizers, marking an epoch in mining industry.
- †RI 3244. Smelting in the Lead Blast Furnace. Handling Zinciferous Charge. XII. The Gases Within the Blast Furnace at Top and Tuyères, by G. L. Oldright and Virgil Miller. 1934. 22 pp., 1 fig. The second in the third series of papers on the lead blast furnace; deals with gases evolved in smelting a charge containing large proportion of zinc.
- †RI 3245. Smelting in the Lead Blast Furnace. Handling Zinciferous Charges. XIII. Accretions at Various Elevations Within the Blast Furnace, and Factors Governing the Manner and Rate of Descent of the Stock Column, by G. L. Oldright and Virgil Miller. 1934. 15 pp. Includes measurements of rate of descent of charge, study of accretions in shaft of furnace, discussion of removal of accretions from walls of furnace, and information regarding accretions in crucibles.
- †RI 3246. Smelting in the Lead Blast Furnace. Handling Zinciferous Charges. XIV. Methods of Charging the Blast Furnace; Their Effect on Furnace Operation, by G. L. Oldright and Virgil Miller. 1934. 12 pp., 7 figs. Outlines study of blast-furnace gases at Trail, B. C., which indicates that various ingredients in stock column segregate themselves into vertical zones. Practice was studied in detail.
- RI 3247. Beneficiating Cement Raw Materials by Agglomeration and Tabling, by F. P. Diener, J. Bruce Clemmer, and S. R. B. Cooke. 1935. 6 pp. Presents results of study of problem of separating flint from cherty limestone by agglomeration and tabling, thus permitting use of material hitherto wasted and increasing amount of rock economically available.

† Out of print.

- †RI 3248. Dewatering Clay Suspensions by Spray Evaporation, by Hewitt Wilson, George A. Page, and Vance S. Cartwright. 1935. 42 pp., 25 figs. Reviews commercial practice with spray evaporators for miscellaneous products; considers capacity of disk rotors, velocity of clay particles falling in air, and heat and air necessary for evaporation; and gives experimental work with laboratory evaporators using atomizers and sprayers.
- †RI 3249. Chemical Method for Removing Mud Sheaths in Oil Wells, by H. C. Miller and G. B. Shea. 1934. 19 pp., 3 figs. Outlines procedure and results of laboratory investigation of chemical method for removing mud sheaths in oil wells.
- †RI 3250. A Thermal Conductivity Apparatus for Continuous Determination of the Helium Content of Natural Gas, by Allen S. Smith. 1934. 11 pp., 4 figs. Describes apparatus used at Bureau's helium plant, Amarillo, Tex., in determining helium content of natural gas after it has been processed.
- †RI 3251. Engineering Studies and Results of Acid Treatment of Wells, Zwolle Oil Field, Sabine Parish, La., by R. E. Heithecker. 1934. 35 pp., 14 figs. Gives results of study undertaken by Bureau of Mines in June 1930 at request of operators and Louisiana Department of Conservation. Discusses results of investigation in field where oil horizons are marl and chalk rock. Unusually detailed cross sections of wells are given.
- †RI 3252. Tabulated Analyses of Texas Crude Oils, by Gustav Wade. 1934. 40 pp., 1 fig. Assembles all analyses made by Bureau of Mines on Texas oils, grouped by fields.
- †RI 3253. Analyses of Crude Oils from Some Fields of Southern Louisiana, by A. J. Kraemer and E. L. Garton. 1934. 36 pp. Gives analyses of 26 representative crude oils from various producing formations of southern Louisiana.
- †RI 3254. The National Safety Competition of 1933, by W. W. Adams. 1934. 18 pp. States basis for award of trophies in 1933 contest, with records of all companies that participated (332 mines and quarries in 35 States). In all, 73 of the mines and quarries operated with no lost-time accidents.
- †RI 3255. Lag, Spread, and Sustained Ignition in Electric Detonators, by A. B. Hooker and E. J. Coggeshall. 1934. 9 pp., 9 figs. Covers results of tests to determine the lag, spread, and sustained-ignition characteristics of seven regular makes of electric detonators, also to determine the timing of a multiple-shot, generator-type blasting unit.
- RI 3256. Progress Reports—Metallurgical Division. 8. Studies in Zinc Metallurgy, by H. A. Doerner, G. L. Oldright, Thomas B. Brighton, and Carl L. Dice. 1934. 43 pp., 21 figs. Includes two papers, the first on reduction of zinc ores by natural gas, and the second on the recovery of zinc from ferrite compounds in the electrolytic zinc process.
- RI 3257. Production of Explosives in the United States During the Calendar Year 1933, by W. W. Adams, E. V. Walters, and V. E. Erwin. 1934. 12 pp. Gives statistical data on annual production of explosives in the United States. Ordinarily issued as a technical paper.
- †RI 3258. Isolation and Study of the Humic Acids from Peat, by Chester L. Arnold, Alexander Lowy, and Reinhardt Thiessen. 1934. 9 pp., 1 fig. Presents results of study of peat from Hawk Island Swamp, Manitowoc County Wis., which involved an attempt to remove, without drastic action, many contaminating substances before humic acids were isolated and to separate latter unchanged so as to avoid impurities.
- †RI 3260. Investigations during 1933 of Combustibles in Manholes in Boston Mass., by G. W. Jones, John Campbell, and F. M. Goodwin. 1934. 25 pp. Gives results of investigation to determine general hazard of combustible gases and vapors in manholes and other underground openings. (See also R. I. 3109, 3192, and 3213.)
- RI 3261. Use of Rock Dust in Bituminous-Coal Mines During 1930, 1931, and 1932 (a Statistical Survey), by W. W. Adams. 1934. 9 pp., 4 figs. A survey conducted by the Demographical Division, Bureau of Mines, and based upon reports from operating companies.
- RI 3262. Progress Reports.—Metallurgical Division. 9. Thermodynamic Data on Some Metallurgically Important Compounds of Lead and the Antimony-Group Metals and Their Application, by Charles G. Maier. 1934. 54 pp. Presents assembled data on thermodynamic calculations of compounds of lead and antimony, which, it is hoped, will answer certain practical problems presented by operating metallurgists.

† Out of print.

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- †RI 3263. Froth Flotation of Coal; Sulphur and Ash Reduction, by H. F. Yancey and J. A. Taylor. 1934. 20 pp., 4 figs. Describes application to treatment of coal of method ordinarily used in ore dressing.
- †RI 3264. Smelting in the Lead Blast Furnace. Handling Zinciferous Charges. XV. Slags from the Trail Blast Furnace, by G. L. Oldright and Virgil Miller. 1934. 19 pp. The last of a group of papers on operation at a large blast furnace in British Columbia which manufactures chemicals and fertilizers as byproducts. Conclusions are reached that highly zinciferous charges may be smelted with small amount of coke and at a rate comparable to that obtained in excellent practice with charges commonly considered easily smelted and that highly zinciferous slags rather than barren diluents are more profitable where such slag may be soon treated to recover both lead and zinc.
- †RI 3265. Assay of Black Sands, by Paul Hopkins. 1934. 5 pp. Reports findings of several methods of assaying placer concentrates.
- RI 3266. Recent Trends in Man-Hour Production at Iron-Ore Mines, by H. W. Davis, W. W. Adams, and O. E. Kiessling. 1935. 6 pp., 3 figs. Correlates data on hours of labor and other detailed employment information with statistics on production reported annually by producers.
- †RI 3267. Bumps in Coal Mines of the Cumberland Field, Kentucky, and Virginia—Causes and Remedy, by George S. Rice. 1935. 36 pp. 12 figs. Describes geological and mining conditions in field, reviews history of some of most disastrous bumps, and suggests procedure that may take stresses off pillars and help to avoid further catastrophes.
- †RI 3268. Progress Reports—Metallurgical Division. 10. Mineral Physics Studies, by R. S. Dean and others. 1935. 107 pp., 49 figs. Embodies papers on applied mineral physics, including explosive shattering, electrical properties of mineral aggregates, apparatus for determining the magnetic constants of mineral powders, magnetization curves for magnetite powders, coercive force, magnetic properties of mineral powders, and practical aspects of alternating-current magnetic separation.
- RI 3269. Special Multiple-Shot Blasting Units, by A. B. Hooker and E. J. Coggeshall. 1935. 10 pp., 5 figs. Concludes that safety from electric ignition of gas when multiple shots are fired with generator-type units is obtainable not by using units that will not produce igniting sparks but by having the firing circuit dead before disturbance at the face occurs.
- †RI 3270. Survey of Fuel Consumption at Refineries in 1933, by G. R. Hopkins. 1935. 6 pp., 2 figs. Gives consumption of various refinery fuels by kinds and districts.
- †RI 3271. Concentration of the Potash Ores of Carlsbad, N. Mex., by Ore-Dressing Methods, by Will H. Coghill, F. D. DeVaney, J. B. Clemmer, and S. R. B. Cooke. 1935. 13 pp., 1 fig. Describes experiments conducted at the Bureau's Mississippi Valley Experiment Station, in which it was found that by maintaining a closed circuit of brine saturated with the constituents of the ore, the sylvinitic ores of Carlsbad, N. Mex., may be concentrated by ore-dressing methods. Any one of three procedures will yield high-grade concentrates and high recoveries.
- †RI 3272. Effect of Soot on Heat Transmission in Small Boilers, by P. Nicholls and C. E. Augustine. 1935. 14 pp., 2 figs. Gives results of study of small boilers operating at low rates of burning to determine the reduction in efficiency resulting from the insulating effect of deposits of soot. Investigation shows that soot deposits decreased the heat absorbed by the boilers 2 to 7 percent, depending on the thickness of the deposits, instead of the large proportionate decrease (sometimes as high as 50 percent) suggested in statements previously issued.
- RI 3273. Coke-Oven Accidents in the United States During the Calendar Year 1933, by W. W. Adams and V. E. Erwin. 1935. 15 pp., 1 fig.
- RI 3274. Accuracy of Manometry of Explosions: General Survey of the Problem and Comparison of Piston-Type with Diaphragm-Type Manometers, by H. F. Coward and M. D. Hersey. 1935. 39 pp., 18 figs. Gives general outline of problem, classifies various types of explosion manometers, and gives results of tests comparing six manometers of piston and diaphragm type.

† Out of print.

- †RI 3275. Progress Reports—Metallurgical Division. 11. Studies on the Recovery of Gold and Silver, by E. S. Leaver, M. B. Boyer, J. A. Woolf, R. E. Head, B. W. Gandrud, R. E. Evans, and F. W. Thackwell. 1935. 65 pp., 10 figs. Includes papers on amalgamation and cyanidation; amalgamation during fine grinding of gold ores; flotation of gold; effect of sodium sulphide; form and occurrence of gold in pyrite from a metallurgical standpoint—coated gold; investigations on southern gold ores; auriferous black sand of the Pacific coast; flotability of lead and silver jarosites.
- †RI 3276. A Detector for Quantitative Estimation of Low Concentrations of Hydrogen Sulphide, by J. B. Littlefield, W. P. Yant, and L. B. Berger. 1935. 13 pp., 1 fig. Describes especially hydrogen sulphide detector based on color-change reaction on surface of sensitized granules placed in glass tube through which atmosphere to be examined is aspirated with a rubber bulb or hand pump. Method is especially adapted to use by nontechnical men in industry or the field.
- RI 3277. The National Safety Competition of 1934, by W. W. Adams and T. D. Lawrence. 1935. 20 pp. Names winners and reviews records achieved in five classes of mineral establishments in 1934—anthracite mines, bituminous-coal mines, metal mines, nonmetallic mines, and open-cut mines and quarries. Winners are awarded trophy "Sentinels of Safety."
- RI 3278. Limits of Inflammability of Diethyl Ether and Ethylene in Air and Oxygen, by G. W. Jones, W. P. Yant, W. E. Miller, and R. E. Kennedy. 1935. 5 pp. Determines widest limits of inflammability in two designs of test apparatus. Describes apparatus and experimental procedures and cites references.
- RI 3279. "Base" of a Crude Oil, by E. C. Lane and E. L. Garton. 1935. 12 pp. Defines the seven "bases" of crude petroleum and gives illustrative Hempel analyses.
- RI 3281. Survey of Fuel Consumption at Refineries in 1934, by G. R. Hopkins. 1935. 5 pp., 2 figs. Annual review of fuel consumption for past calendar year.
- RI 3282. A Procedure for the Removal and Determination of Small Amounts of Benzene in Biological Material, by W. P. Yant, H. H. Schrenk, and P. H. Mautz. 1935. 7 pp., 1 fig. Describes method for removal and determination of small amounts of benzene present in tissues or excretions after exposure to conditions that ultimately will produce chronic benzene poisoning.
- RI 3283. Quality of Anthracite as Prepared at Breakers Operated by Members of the Anthracite Institute in 1935. 1935. 2 pp. Gives weighted average analyses, by sizes, of 268 samples of anthracite taken from collieries in Pennsylvania during February, March, and April 1935.
- RI 3284. The Ignition Temperature of Diethyl Ether and Ethylene in Air and Oxygen, by G. W. Jones, W. P. Yant, W. E. Miller, and R. E. Kennedy. 1935. 6 pp., 2 figs. Describes determination of diethyl ether and ethylene in air and oxygen primarily for comparison with similar determinations of other compounds in the same apparatus, using same laboratory technique.
- RI 3285. Production of Explosives in the United States during the Calendar Year 1934, by W. W. Adams and V. E. Erwin. 1935. 12 pp., 2 figs. Gives statistics on output of explosives by kinds and by consuming industries.
- †RI 3287. A Microcolorimetric Method for the Determination of Benzene, by H. H. Schrenk, S. J. Pearce, and W. P. Yant. 1935. 11 pp., 1 fig. Describes method used to fill need for simple, accurate determination of benzene vapor in air; it is suitable for making industrial hygiene surveys.
- †RI 3288. Detailed Statistical Microscopic Analyses of Ore and Mill Products of the Utah Copper Co., by R. E. Head, A. L. Crawford, F. E. Thackwell, and Glen Burgener. 1935. 93 pp., 18 figs. Presents and analyzes 16 groups of tables of microscopic analyses on products of two mills (Arthur and Magna) of Utah Copper Co. Gives additional data on plant records from 1910 to 1931, and analyzes constituents of ore.
- RI 3289. The Microprojector for Determining Particle-size Distribution and Number Concentration of Atmospheric Dust, by Carlton E. Brown and William P. Yant. 1935. 8 pp., 3 figs. Describes apparatus and methods for examining samples of atmospheric dust by projecting images of the dust particles at a high known magnification onto a ruled translucent screen. Determination can be made with less eye strain, time, and effort than by direct visual microscopic methods.

† Out of print.

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- RI 3290. Statistical Microscopic Study of Ores and Mill Products From the Anyox Plant of the Granby Consolidated Mining, Smelting & Power Co., Ltd., Anyox, British Columbia, by R. E. Head, Arthur L. Crawford, F. E. Thackwell, and A. Lee Christensen. 1935. 18 pp., 11 figs. The fourth of a series of careful microscopic studies of samples from representative milling operations; approximately 150,000 particles were examined and measured. The entire copper content of the ore concerned is present in chalcopyrite.
- RI 3291. Bureau of Mines Multiple-Diaphragm Recording Subsurface-Pressure Gage, by W. B. Berwald, H. A. Buss, and C. E. Reistle, Jr. 1935. 19 pp., 16 figs. Describes instrument devised by Bureau of Mines petroleum engineers for measurement of subsurface pressures.
- RI 3292. Factors That Decrease the Light of Electric Cap Lamps, by A. B. Hooker and D. H. Zellers. 1935. 10 pp. Tells users of electric cap lamps that to get greatest available efficiency servicing instructions provided by the manufacturer should be followed. These include daily inspection of lamps to observe defects that may impair their usefulness, and monthly photometric inspection of specimen lamps.
- †RI 3293. Benzene in Natural Gas, by H. H. Schrenk, W. P. Yant, and S. J. Pearce. 1935. 2 pp. Describes results of colorimetric method devised by the authors for determining benzene, in the course of which it was found that benzene does occur in natural gas, an interesting discovery.
- RI 3294. A Study of the Occurrence and Amenability to Leaching of the Phosphorus Compounds in Some Red Iron Ores of Alabama, by Ellis S. Hertzog. 1935. 9 pp. Suggests use of leaching to remove phosphorus from Alabama iron ores, inasmuch as gravity concentration has proved of little value.
- RI 3295. Rock Dust in Bituminous-Coal Mines During 1930-33, by W. W. Adams, L. E. Geyer, and M. G. Parry. 1935. 7 pp., 4 figs. Presents data in same form as in Report of Investigations 3261, issued last year. Summarizes reports for 382 mines in 1933, with total production of 96,691,-753 tons of bituminous coal.
- RI 3296. Classification Chart of Typical Coals of the United States (Showing B. t. u. Per Pound on the Moist, Mineral-Matter-Free Basis, Plotted Against Fixed Carbon on the Dry, Mineral-Matter-Free Basis), by A. C. Fieldner, W. A. Selvig, and W. H. Frederic. 1935. 22 pp., 3 figs. Gives specifications for classification of coals by rank, with charts showing the B. t. u. of typical coals of the United States, as well as a list of 316 coal samples given in the charts and their source and rank.
- RI 3297. Preliminary Report of the Disposal of Oil-Field Brines in the Ritz-Canton Field, McPherson County, Kans., by C. J. Wilhelm and Ludwig Schmidt. 1935. 20 pp., 6 figs. Gives survey of quantity of brine produced and method in use at time in disposing of brine, and efficiency of these methods in preventing mineralization of fresh-water-bearing formations and surface streams.
- †RI 3298. Charts for Determining the Performance of Centrifugal Fans, by G. E. McElroy. 1936. 30 pp., 35 figs. Presents types of charts adapted to aid in graphic solution of fan-performance problems of selection and operation.
- †RI 3299. Anhydrous Sodium Sulphate from Saline Deposits or Brines by a Four-Stage Process, by J. E. Conley and E. P. Partridge. 1936. 18 pp., 5 figs. Discusses feasibility of recovering or producing anhydrous sodium sulphate from plant-waste liquors or from natural brines of suitable composition. Expansion of the kraft-paper industry has brought about a larger demand for sodium sulphate, which the process described may help to supply.
- RI 3300. Flotation of Langbeinite from the Potash Field of New Mexico and Texas, by F. D. DeVaney and S. R. B. Cooke. 1936. 4 pp. Demonstrates ease and speed with which langbeinite may be treated by flotation, using same type of collectors as in separation of sylvite to separate it from halite and using saturated brine as flotation medium.
- RI 3301. Check Determination of Grindability of Coal by Various Methods, by W. A. Selvig. 1936. 16 pp. Describes tests conducted under Subcommittee on Coal and Coke of American Society for Testing Materials with a view to evaluating various laboratory procedures for testing grindability of coal.

† Out of print.

- RI 3302. Microcolorimetric Determination of Benzene in Blood and Urine, by S. J. Pearce, H. H. Schrenk, and W. P. Yant. 1936. 8 pp., 2 figs. Attempts to fill need for simple very sensitive, accurate method for determination of benzene in blood and urine evident throughout recent study of chronic benzene poisoning.
- RI 3303. Comparison of Output and Intake Characteristics of Natural-Gas Wells in the Texas Panhandle Field, by M. A. Schellhardt and E. L. Rawlins. 1936. 25 pp., 11 figs. Gives results of study in Texas Panhandle field during past several years to determine delivery capacities of wells under different pressure and operating conditions and to determine relationships between pressures and rates of delivery from gas wells.
- RI 3304. Permissible Electric Mine Lamps (Supplement to Bulletin 332), by L. C. Ilsley and A. B. Hooker. 1936. 11 pp. Covers electric cap lamps, electric hand lamps, and lamps for miscellaneous uses approved between May 1930 and July 1935. New types include a portable floor lamp for throwing direct light on working face, semiportable lamp for room lighting applicable where compressed-air supply is available, animal lamp for attachment to collar of horse or mule, and dry-cell-type signal lamp especially useful in mines where battery-charging facilities are not available.
- RI 3305. Investigations During 1934 of Combustibles in Manholes in Boston, Mass., by G. W. Jones, John Campbell, F. M. Goodwin, and W. P. Yant. 1936. 14 pp., 1 fig. Continues series of investigations of manholes in Boston and vicinity already described in Reports of Investigations 3109, 3192, 3213, and 3260. Describes and tabulates results of tests of manholes owned by Edison Electric Illuminating Co. and New England Telephone and Telegraph Co.
- RI 3306. Progress Reports—Metallurgical Division. 12. Annual Report of the Metallurgical Division, Fiscal Year 1935, by R. S. Dean. 1936. 39 pp., 7 figs. Describes work done by each of the sections of the division during past fiscal year. These sections are: Metallurgical fundamentals, special studies, copper metallurgy, ore dressing, precious metals, lead and zinc, and iron and steel.
- †RI 3307. Ventilation of Manholes. I. Effect of Holes in Covers on Natural Ventilation, by G. W. Jones, W. E. Miller, John Campbell, and W. P. Yant. 1936. 5 pp., 2 figs. Continues study of manholes, various phases of which have already been described in Reports of Investigations 3109, 3192, 3213, 3260, and 3305.
- RI 3308. The National Safety Competition of 1935, by W. W. Adams, T. D. Lawrence, and D. R. White. 1936. 20 pp. Names winners and reviews records achieved in five classes of mineral establishments in 1935—anthracite mines, bituminous-coal mines, metal mines, nonmetal mines, and open-cut mines and quarries. Winners are awarded trophy, "Sentinals of Safety."
- RI 3309. Permissible Electrically Operated Air Compressors, by L. C. Ilsley, E. J. Gleim, and H. B. Brunot. 1936. 18 pp. 3 figs. Describes in detail features of air compressors approved by the Bureau of Mines as "permissible." These include the Sullivan Machinery Co. type WK-26 compressor, the Sullivan Machinery Co. type WK-39 compressor, the General Electric Co. types CP-26D, G and E compressors, the Ingersoll-Rand type 20 compressor, and the Sullivan Machinery Co. type WK-22 compressor.
- RI 3310. Extraction Methods for Determining Tar Acids and Bases, and Variables Affecting Their Accuracy, by C. H. Fisher and Abner Eisner. 1936. 34 pp. 1 fig. Studies and compares several modifications of contraction method of analyzing tar oils and shows general conditions under which tar acids and bases can be extracted accurately.
- RI 3311. Cooperative Fuel Research Motor-Gasoline Survey, Winter 1935-36, compiled by E. C. Lane and A. J. Kraemer. 63 pp. First publication in proposed series of reports on properties of commercial motor fuels. Gives results of analyses in oil-company laboratories of gasoline samples obtained from service-station pumps in 18 marketing areas.
- RI 3312. The Improved Permissible Flame Safety Lamps, by L. C. Ilsley, A. B. Hooker, and E. J. Coggeshall. 10 pp. 2 figs. Describes improvements made by Bureau engineers on flame safety lamps, which make them effective and easily used in dim light and by persons without keen eyesight.

† Out of print.

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- RI 3313. Extent and Availability of Natural-Gas Reserves in Michigan "Stray" Sandstone Horizon of Central Michigan, by E. L. Rawlins and M. A. Schellhardt. 1936. 139 pp. 16 figs. Describes work done at request of Department of Conservation, State of Michigan, in estimating reserves of natural gas in central Michigan. Estimates total proved and semiproved reserves at 28,200,000,000 cubic feet, of which about 6,000,000,000 cubic feet have already been withdrawn. (Printed by the Michigan Department of Conservation in cooperation with the Michigan Public Utilities Commission.)
- RI 3314. Flotation of Vermont Talc-Magnesite Ores, by J. Bruce Clemmer and S. R. B. Cooke. 1936. 12 pp. Talc concentrates and tailings rich in magnesite were obtained in experimental concentration of Vermont talc-magnesite ores. Magnesite is considered in report because of possible market value.
- RI 3315. Washability Studies of Coal from the Henry Ellen Bed at Acmar No. 5 Mine, Acmar, Ala., by B. W. Gandrud and G. D. Coe. 1936. 23 pp. 21 figs. Is fourteenth in series of reports of investigations describing results of washability studies of coal from commercially important beds of Alabama.
- RI 3316. Petroleum Engineering Report; Big Spring Field and Other Fields in West Texas and Southeastern New Mexico, by Charles B. Carpenter and H. B. Hill. 1936. 223 pp. 40 figs. Gives geology and production history of East and West pools, Howard and Glasscock Counties; Yates oil field, Pecos County; Hendrick oil field, Winkler County; Church-Fields-McElroy oil field, Crane and Upton Counties; Big Lake oil field, Reagan County; Penn oil field, Ector County; and Westbrook oil field, Mitchell County—all in Texas. Also gives similar data for Hobbs oil field, Lea County, N. Mex.
- RI 3317. Production of Explosives in the United States during the Calendar Year 1935, by W. W. Adams and V. E. Wrenn. 1936. 13 pp. 2 figs. Gives data showing that 308,381,250 pounds of explosives were produced in 1935, 2 percent less than in 1934.
- RI 3318. Disposal of Oil-Field Brines in the Arkansas River Drainage Area in Western Kansas, by C. J. Wilhelm, H. M. Thorne, and M. F. Pryor. 1936. 28 pp. Presents the results of a study of the oil-producing fields within the Arkansas River drainage area west of Hutchinson, Kans., with reference to the disposal of oil-field brines.
- RI 3319. Earth Vibrations Caused by Quarry Blasting, by F. W. Lee, J. R. Thoenen, and S. L. Windes. 1936. 19 pp. 11 figs. Gives results of investigation made possible by cooperation of seven New England quarries. Includes bibliography of other work on same subject.
- RI 3320. Diesel Mine Locomotives—Development and Use in Four European Countries, by George S. Rice and F. E. Harris. 1936. 52 pp. Describes use of and experience with Diesel locomotives in Germany, Belgium, France, and Great Britain. Summarizes reasons why Diesel locomotives have not been adopted in this country and points out their advantages.
- †RI 3321. Investigations During 1935 of Combustibles in Manholes in Boston, Mass., by G. W. Jones, John Campbell, F. M. Goodwin, and W. J. Huff. 1936. 19 pp. Sixth annual report of investigations conducted in Boston in cooperation with Edison Electric Illuminating Co. of Boston and Boston Consolidated Gas Co. Reduction in amount of combustibles discovered has occurred steadily since work was initiated.
- †RI 3322. Metallurgical Division—Progress Reports. 13. Electrometallurgical Investigations. Studies on the Treatment of Domestic Chrome Ores, by J. Koster. Electrolysis of Manganese Solutions, by S. M. Shelton. Electrometallurgical Studies on the Treatment of Alunite, by R. G. Knickerbocker and J. Koster. 1936. 64 pp. 4 figs. Reviews work of electrometallurgical section for fiscal year 1936; describes process for continuous electrolysis of manganese that offers potential use for extensive deposits of domestic manganese-bearing ores.
- RI 3323. A Microcolorimetric Method for the Determination of Toluene, by W. P. Yant, S. J. Pearce, and H. H. Schrenk. 1936. 12 pp. 2 figs. Describes a method to determine small quantities of toluene that was developed recently by the Bureau of Mines at its Pittsburgh experiment station.
- RI 3324. Active List of Permissible Explosives and Blasting Devices Approved Prior to July 31, 1936. 20 pp. Gives changes in list during last year. Lists characteristics of 170 permissible explosives now on active list. Annual report.

† Out of print.

- RI 3325. A Study of Oxidation of the Oil in Two Air and Air-Gas Repressuring Projects, by T. W. Johnson and S. S. Taylor. 1937. 24 pp. 1 fig. Gives results of laboratory experiments to determine effect of air on crude oils and of a study of oxidation of oil in two commercial repressuring projects in which air and air-gas mixtures were used as repressuring media, in Martha field, Ky., and Delaware-Childers field, Okla.
- RI 3326. Permissible Electrically Operated Room Hoists, by L. C. Ilsley, E. J. Gleim, and H. B. Brunot. 1937. 12 pp. 4 figs. Describes seven room hoists and one car-spotting hoist, now being constructed by four manufacturers.
- RI 3327. Behavior of Flame Safety Lamps in Mine Atmospheres Deficient in Oxygen, by A. B. Hooker, E. J. Coggeshall, and G. W. Jones. 1937. 6 pp. 2 figs. Reports results of investigation on behavior of permissible flame safety lamps in mine atmospheres deficient in oxygen and effects of methane on miner's ability to detect oxygen deficiency.
- RI 3328. Progress Reports—Metallurgical Division. 16. Ore-Testing Studies. Ore-Dressing Tests and their Significance, by W. F. Dietrich, A. L. Engel, and Morris Guggenheim. The Analysis of Molybdenum, by A. C. Rice and L. A. Yerkes. Report of Tests, by C. W. Davis and staff of ore-testing section. 1937. 161 pp. 27 figs. Gives first report of ore-testing section established July 1, 1935, which works on following objectives: (1) Standardization of important testing method of interest to mining industry; (2) analyses and routine tests incident to other Bureau investigations and those of other Government agencies; and (3) chemical and microscopic analyses of representative samples from mining districts and determination of recommended metallurgical practice.
- RI 3329. Mineral Economics Series I. Consumption of Ferrous Scrap and Pig Iron in the United States in 1935, by Richard J. Lund and H. W. Davis. 1936. 16 pp., 2 figs. Begins new series of publications to be prepared by Bureau's Economics Branch. Reviews consumption of ferrous scrap and pig iron in 1935 at open-hearth furnaces, bessemer converters, electric-steel furnaces, cupolas, air furnaces, and blast furnaces.
- †RI 3330. Engineering Report on Oklahoma City Oil Field, Oklahoma, by H. B. Hill, E. L. Rawlins, and C. R. Bopp. 1937. 243 pp. 69 figs. Describes productive structures in field, reviews production methods and practices, analyzes performance data on groups of wells in three strips across field, and discusses field and economic problems. Includes comprehensive bibliography.
- †RI 3331. Progress Reports—Metallurgical Division. 14. Annual Report of the Metallurgical Division, Fiscal Year 1936, by R. S. Dean and others. 1937. 49 pp. 21 figs. Reviews projects undertaken during year by the copper metallurgy, electrometallurgical, iron and steel, lead and zinc, metallurgical fundamentals, ore-dressing, ore-testing, precious-metals, and special studies sections.
- RI 3332. Survey of Fuel Consumption at Refineries in 1935, by G. R. Hopkins. 1937. 6 pp. 2 figs. Annual review of fuel consumption.
- †RI 3333. Progress Reports—Metallurgical Division. 15. Ore-Dressing Studies. Use of Wetting Agents in Flotation, by R. S. Dean, J. Bruce Clemmer, and S. R. B. Cooke. Flotation of Complex Molybdenum-Vanadium Ores from Mammoth, Ariz., by J. Bruce Clemmer and S. R. B. Cooke. 1937. Short-Column Hydraulic Elutriator for Subsieve Sizes, by S. R. B. Cooke. 50 pp. 19 figs. Reviews ore-dressing studies that have been under way during the past year.
- RI 3334. Application of Sand Filters to Oil-Field Brine-Disposal Systems, by Sam S. Taylor and L. F. Christianson. 1937. 28 pp. 2 figs. Another paper representing results of work done under a cooperative agreement with the Kansas State Board of Health. This report submits data, observations, and conclusions from experiments using a pressure sand-filter system and brine from a siliceous limestone formation.
- RI 3335. Cooperative Fuel Research Motor-Gasoline Survey, Summer, 1936, compiled by E. C. Lane. 1937. 61 pp. Second of series of reports on properties of commercial motor fuels made pursuant to an agreement between the Cooperative Fuel Research Committee and the Bureau of Mines.
- RI 3336. Beneficiation of Spodumene by Decrepitation, by Foster Fraas and Oliver C. Ralston. 1937. 13 pp. Describes inexpensive process that may be used to treat spodumene to extract lithium compounds.

† Out of print.

Reports of Investigations

- RI 3337. Annual Report of the Explosives Division for the Fiscal Year 1936, by Wilbert J. Huff. 1937. 34 pp. 9 figs. Reviews organization of the Explosives Division and describes work during past year, including chemical and physical tests of explosives and blasting devices, investigations of inflammability of gases and vapors, and study of kinetics and mechanism of gaseous explosions.
- RI 3338. Estimate of Natural-Gas Reserves from the Layton, Oolitic, and Oswego-Prue Horizons in the Oklahoma City fields, by R. E. Heithecker. 35 pp., 11 figs. Gives an estimate of gas reserves in the Layton, Oolitic, and Oswego-Prue horizons of Pennsylvanian age measured by pressure-volume method. No attempt was made to outline productive acreage of these formations.
- RI 3339. Progress Reports—Metallurgical Division. 17. Fixation of Sulphur from Smelter Smoke. Present Status of Sulphur Fixation and Plan of Investigations, by R. S. Dean. Vapor Pressure and Thermodynamic Properties of Ammonium Sulphites, by Hillary W. St. Clair. 1937. Recovery of Sulphur in Solid Compounds by the Addition of Ammonia and Water Vapor to Smelter Gas, by G. W. Marks and P. M. Ambrose. Diethylene Triamine and Other Amines as Agents for the Recovery of Sulphur Dioxide, by G. W. Marks and P. M. Ambrose. Oxidation of Ammonium Sulphite Solution, by Frank S. Wartman. 51 pp. 19 figs.
- RI 3340. Progress Reports—Metallurgical Division. 18. Studies of the Metallurgy of Copper. Distribution of Manganese Between Matte and Slag in the Smelting of Copper, by F. S. Wartman, G. M. Potter, and M. D. Schmid. Graphic Representation of the Ratio of Manganese Distribution Between Matte and Slag, by M. D. Schmid. Experiments in the Flash Roasting of Copper Concentrates, by F. S. Wartman and others. 19 pp., 5 figs. Summarizes briefly results of work on copper metallurgy carried out by Bureau staff since appearance of previous report (RI 3228) in May 1934.
- RI 3341. Progress Reports—Metallurgical Division. 19. Thermodynamic Studies. Calculation of the Specific Heats and Entropies of Metal Vapors from Spectroscopic Data, with Special Reference to Gaseous Iron and Copper, by K. K. Kelley. 1937. 18 pp. 1 fig. Method of calculating specific heat and entropy from spectroscopic data which has been successfully developed by Prof. W. F. Giaque is applied in this paper to iron and copper vapors.
- RI 3342. Low-Temperature Distillation Tests of Subbituminous Coal from the Denver Region Coal Field, Colorado, by W. H. Ode and W. A. Selvig. 1937. 7 pp. Gives results of low-temperature distillation tests of a subbituminous coal from Boulder County, Colo. (Highway mine), and another from Weld County, Colo. (Puritan mine), at 200°, 350°, and 500° C.
- RI 3343. Ventilation of Manholes. 2. Effect of the Size of the Manhole on Natural Ventilation, by G. W. Jones, W. E. Miller, John Campbell, and W. P. Yant. 1937. 8 pp. 3 figs. Natural-ventilation tests made in three manholes of varying sizes and design warrant the general conclusion that as area of openings in manhole cover is increased, ventilation is also increased; and that manhole of any given size will be ventilated by increasing number of ventilation openings in cover.
- RI 3344. Chloride Volatilization of Lithium from Spodumene, by Foster Fraas and Oliver C. Ralston. 1937. 11 pp. 4 figs. Need for cheaper lithium salts for air conditioning and dehumidification and for lithium feldspar to be used in glass and ceramic trades prompted work described in this report on making available lower-grade spodumene deposits by improved beneficiation and extraction.
- RI 3345. Permissible Electrically Operated Rock-Dust Distributors, by L. C. Ilsley, E. J. Gleim, and H. B. Brunot. 1937. 16 pp., 4 figs. Describes in detail permissible rock-dust distributors developed by Mine Safety Appliance Co., Diamond Machine Co., and American Mine Door Co.
- RI 3346. Analyses of Crude Oils from Some Fields in Michigan, by E. L. Garton. 1937. 28 pp. 1 fig. Discusses briefly oil fields of Michigan and characteristics of crude oils produced from them. Gives analyses of 15 samples of crude.
- RI 3347. Importance of Adequate Voltage for Distribution Systems in Coal Mines, by E. J. Gleim. 1937. 12 pp. 3 figs. Discusses effects of low voltage in coal mines.
- RI 3348. Cooperative Fuel-Research Motor-Gasoline Survey, Winter 1936-37, Compiled by E. C. Lane. 1937. 56 pp. Third in series of reports on properties of commercial motor fuels, made in accordance with a cooperative agreement between the Cooperative Fuel Research Committee and the Bureau of Mines.

INFORMATION CIRCULARS ²

- †IC 6000. The Legendary "White Metal" and Its Ore, by C. W. Davis. 1925. 4 pp. Describes work done by Bureau of Mines to explode the legend that an "ore" existed in the Southwest United States, which yielded a "white metal" having the property of making other metals "glass hard."
- IC 6002. Progress in Use of One-Inch Steel in the Tri-State Lead and Zinc District, by C. R. Forbes. 1926. 2 pp. Supplements RI 2997, which gives results of tests to determine the practicability of 1-inch in preference to 1¼-inch steel in the district.
- †IC 6003. The Gasoline Situation, by H. H. Hill. 1926. 11 pp. States that the oil industry has been able to meet demands for gasoline in the past by developing new fields, by improving drilling and production practices, by recovering increasing amounts of gasoline from natural gas, and by more general use of the cracking process for manufacturing gasoline from heavier oils.
- IC 6004. Record of the Pittsburgh Testing Station Standard Dynamite, by S. P. Howell. 1926. 4 pp. Includes résumé of physical and chemical characteristics of 40-percent straight nitroglycerin dynamite.
- †IC 6005. Bureau of Mines Safety Labels, by L. C. Isley. 1926. 14 pp. Explains the importance of Bureau of Mines safety labels to each employee and executive of a mining company.
- IC 6006. Manufacture and Characteristics of Gasoline, by A. J. Kraemer. 1926. 6 pp. Notes characteristics of crudes from various districts of the United States, discusses "asphalt"- and "naphthene"-base oils, and describes manufacture of gasoline.
- †IC 6007. The Quicksilver Situation from a Domestic Standpoint, by J. W. Furness and R. M. Santmyers. 1926. 13 pp., 2 figs. Gives general résumé of the quicksilver situation, including uses, consumption, and world resources; includes map showing geographical distribution of deposits and chart giving history of mercury mining in the United States.
- IC 6008. Rock-Dust Material for Coal Mines. 1926. 1 p. Concludes that rock dust prepared from limestone, dolomite, and gypsum should be suitable for use in coal mines. Gives directions for sending samples to be tested by the Bureau.
- IC 6009. Gases Commonly Used in the Industries and the Home and Their Hazards, by A. C. Fieldner. 1926. 13 pp. Considers hazards of principal combustible gases—natural gas, coal gas, water gas, producer gas, blast-furnace gas, and gasoline, petroleum, and benzol vapors; also includes gases used in refrigeration and miscellaneous gases. A detailed bibliography is appended.
- IC 6010. Leakage Losses from Pipe Lines Carrying Natural Gas Under High Pressures, by E. L. Rawlins. 1926. 10 pp. Presents results of leakage study briefly and makes recommendations.
- IC 6011. The Movement of Oil Through the Panama Canal, by G. R. Hopkins. 1926. 10 pp. Shows how Panama Canal acts as supply valve for oil industry by preventing overaccumulation of stocks on one coast. Gives statistics on shipments.
- IC 6013. The Meaning of Specifications for Gasoline and Kerosene, by A. J. Kraemer. 1926. 12 pp. Shows how the Federal specifications system for petroleum products was developed.
- †IC 6014. Analyses of Panhandle and Big Lake (Tex.) Crude Oils, by N. A. C. Smith. 1926. 11 pp. Gives detailed analyses of eight samples.

² Information circulars are obtainable only upon application to the Publications Section, Bureau of Mines, Washington, D. C. This list does not include obsolete material, such as the semiannual list of approved equipment and permissible explosives. These are covered by appropriate schedules. A complete list of geophysical abstracts is given in the index.

† Out of print.

Information Circulars

- IC 6015. The Motor-Fuel Situation, by A. J. Kraemer. 1927. 5 pp. States that, in spite of the fact that demands for motor fuel are increasing, the decline of crude-oil production, when it comes, will be gradual and that the petroleum industry will be prepared to meet it by substitution of such alternative products as shale oil, alcohol, coal distillates, etc.
- †IC 6016. Survey of Petroleum Pipe Lines and Storage Capacity for Crude Oil and Refined Products, by G. R. Hopkins and A. B. Coons. 1927. 6 pp. Tabulates oil pipe-line mileage and capacity, by States, and capacity of storage for crude petroleum and refined products, as of May 1926.
- IC 6017. Railroad Fuel-Oil Consumption, by E. B. Swanson. 1927. 7 pp. Groups railroads by districts and gives amount of oil consumed by each; notes increased efficiency in oil burning on certain lines.
- †IC 6018. The Tin Situation from a Domestic Standpoint, by J. W. Furness. 1927. 23 pp., 4 figs. Presents general résumé of tin situation, including chemical properties and uses of tin; data on production, stocks, and consumption; and domestic and foreign resources. Includes list of pig-tin agencies.
- †IC 6019. Consumption of Tin in the United States, 1925, by J. W. Furness. 1927. 3 pp., 2 figs. Gives data on consumption of tin and includes charts showing uses of tin in 1917 and in 1925.
- IC 6020. One Hundred Percent of the Employees of Two Large Illinois Coal Mines Trained in First Aid, by A. U. Miller. 1927. 5 pp. Describes method of organizing classes for first-aid training at two mines where 1,332 men were trained in a little more than 3 weeks.
- †IC 6022. Reduction Mills in Oregon in 1925, by J. M. Hill. 1927. 9 pp. Tabulates name and location; process, ore, and when operated; equipment and power; and capacity in tons per day.
- †IC 6023. Reduction Mills in California in 1925, by J. M. Hill. 1927. 35 pp. Presents data in same form as in IC 6022.
- †IC 6024. Reduction Mills in Washington in 1925, by C. N. Gerry. 1927. 6 pp. Tabulates name, location, and when built; process, character of ore, when operated, and custom work; equipment and power used; and capacity in tons per day.
- †IC 6025. Reduction Mills in Montana in 1925, by C. N. Gerry. 1927. 18 pp. Presents data in same form as in IC 6024.
- †IC 6026. Reduction Mills in Idaho in 1925, by C. N. Gerry. 1927. 29 pp. Presents data in same form as in IC 6024.
- †IC 6027. Reduction Mills in Utah in 1925, by V. C. Heikes. 1927. 12 pp. Presents data in same form as in IC 6024.
- †IC 6028. Reduction Mills in Nevada in 1925, by V. C. Heikes. 1927. 29 pp. Presents data in same form as in IC 6024.
- †IC 6029. Reduction Mills in Arizona in 1925, by V. C. Heikes. 1927. 28 pp. Presents data in same form as in IC 6024.
- †IC 6030. Rock Dusting in Coal Mines, by G. S. Rice, R. R. Sayers, and D. Harrington. 1927. 3 pp. Gives report of sectional committee of American Engineering Standards Committee embodying recommended practice for rock-dusting coal mines to prevent coal-dust explosions.
- IC 6031. Sources and Distribution of Major Petroleum Products, Atlantic Coast States—1925, by E. B. Swanson. 1927. 14 pp. Contains fundamental data for year 1925 on receipts of crude along Atlantic coast from domestic and foreign sources, and distribution and similar information for gasoline, fuel oil, and other petroleum products.
- IC 6032. Stop, Look, and Listen! The Roof is Going to Fall, by J. W. Paul. 1927. 3 pp. Stresses value of systematic roof support and systematic inspection as a means of preventing accidents from falls of roof.
- IC 6033. Some Economic Phases of the Carbon-Black Industry, by G. R. Hopkins. 1927. 5 pp., 3 figs. Includes production and distribution statistics, with charts to illustrate text. Also discusses uses of carbon black.
- †IC 6034. The Manganese Situation from a Domestic Standpoint, by J. W. Furness. 1927. 21 pp., 2 figs. Gives general features of manganese situation, including uses, consumption, and world resources. Includes map of world deposits of manganese and list of buyers of manganese alloys, manganese ore, and manganese ores.
- IC 6035. How Are Men Killed in Mines by Falls of Roof and Coal? by J. W. Paul. 1927. 2 pp. Shows dangers of leaving roof unsupported and necessity of making a study of roof materials in each mine to determine type of support needed.

- IC 6036. Questions and Answers on Bureau of Mines Approvals of Electrical Equipment. 1927. 11 pp. Lists 57 questions and answers covering all phases of Bureau of Mines approval system.
- †IC 6037. One Hundred and One Questions on Electrical Inspection in and about Mines. 1927. 7 pp. Stresses points to be noted in inspecting circuits, power plants, hoists, and fans.
- IC 6038. The Chromium Situation from a Domestic Standpoint, by J. W. Furness. 1927. 12 pp., 2 figs. Gives résumé of chromium situation, including properties, metallurgy, uses, consumption and production, and world resources. Includes map showing world deposits and list of chromite agencies.
- IC 6039. Effective Rock-Dusting of Coal Mines, by G. S. Rice. 1927. 7 pp. States that to insure safety in all mines except anthracite every accessible part should be kept rock-dusted.
- †IC 6040. Area of Unsupported Roof in Coal Mines, Conditions and Factor for Consideration, by J. W. Paul. 1927. 3 pp. Urges detailed study of area of unsupported roof at the working face to allow a safe program of roof support to be adopted.
- †IC 6041. Metallurgical Limestone, by Oliver Bowles. 1927. 16 pp. Discusses distribution and transportation of limestone, production statistics, and utilization and production problems.
- †IC 6042. Timbering Along the Robbing Line; Factors Influencing Falls of Roof in Coal Mines, by J. W. Paul. 1927. 2 pp. States that timbering along the robbing line should consist of posts with cap pieces and that when the roof is scaly or cut by cracks and slips crossbars should be used.
- †IC 6043. Fatal Accident from Entering Unventilated Raise after Blasting, by E. D. Gardner. 1927. 3 pp. Shows that, although accident was result of unusual combination of circumstances, it probably would have been prevented had there been an independent method of ventilating the raise.
- †IC 6044. Mica, by W. M. Myers. 1927. 26 pp., 1 fig. Supplies essential information on mica industry, including characteristics of mica, occurrence, methods of mining and preparation, uses, and data on foreign countries.
- IC 6045. Coal-Mine Safety Organization. 1927. 7 pp. Outlines scheme of organizing efficient safety program and suggests activities for members of group.
- IC 6046. Wanted: More Detailed Reports on Electrical Accidents, by L. C. Ilsley. 1927. 9 pp. Indicates what information is necessary in adequate reports of electrical accidents. Gives 10 specimen reports.
- †IC 6048. Instructions for Sampling Atmospheric Dust by the Impinger Method, by A. H. Emery. 1927. 9 pp., 2 figs. Describes apparatus and laboratory technic in detail.
- IC 6049. Railroad Fuel-Oil Consumption in 1926, by A. H. Redfield. 1927. 6 pp. Presents data in same form as IC 6017.
- †IC 6050. Sources and Distribution of Major Petroleum Products, Atlantic Coast States—1926, by E. B. Swanson. 1927. 12 pp. Presents data in same form as IC 6031.
- †IC 6051. Permissible Explosives Defined, by C. E. Munroe. 1927. 2 pp. Emphasizes fact that use of a permissible explosive involves adoption of carefully specified system in which the explosive itself is but one factor.
- IC 6052. Mine Safety as Affected by Electrification, by K. L. Marshall. 1927. 3 pp. Supplements RI 2541. Points out features leading to safety in the use of electricity in mine operation, with special emphasis on its relation to mining methods and ventilation.
- †IC 6053. Regulations and Inspection Prevent Accidents from Falls of Roof, by J. W. Paul. 1927. 3 pp. States that records prove that number of accidents resulting from falls of roof can be very materially reduced if suitable mining regulations and practices are supported by proper inspection and supervision.
- IC 6054. Practical Underground Education of the Coal Miner, by G. W. Grove. 1927. 7 pp. Describes features of an underground educational system, believed to be the first of its kind, developed by one mining company.
- †IC 6055. Some Phases of Accident Prevention in Industry, by A. L. Murray. 1927. 4 pp. Shows that to be successful, safety work of an organization must begin at top and obtain enthusiastic cooperation of executives before program is carried down the ranks, and that responsibility for accident prevention rests upon every person employed.

Information Circulars

- IC 6056. Prevention of Accidents with Explosives in the Tri-State Zinc and Lead Ore Producing District, by S. P. Howell. 1928. 5 pp., 1 fig. Gives results of observations of blasting practice in Missouri-Kansas-Oklahoma district, with special reference to the prevention of misfires and accidents during firing and of premature explosions.
- †IC 6057. The Determination of Carbon Monoxide in Mines with the "Iodine Pentoxide" Detector, by G. S. McCaa and John A. Davis. 1928. 5 pp., 1 fig. Describe a device and method which determine the amount of carbon monoxide in mine air quickly, simply, and with reasonable accuracy.
- IC 6059. Accident-Prevention Measures at the Moctezuma Copper Co., by E. D. Gardner. 1928. 4 pp. Outlines safety measures used by a mining company at Pilares, Mexico, which is making a noteworthy record in the prevention of accidents.
- IC 6060. Work of the Experiment Stations of the Bureau of Mines, by A. C. Fieldner and A. H. Emery. 1928. 29 pp. Outlines the technologic investigations being conducted at the experiment stations and offices of the bureau.
- IC 6061. Sources and Distribution of Major Petroleum Products, Central United States—1926, by E. B. Swanson and A. H. Redfield. 1928. 19 pp. Completes a series of regional studies on the distribution of petroleum products.
- IC 6062. Natural-Gasoline Plants in the United States, by G. R. Hopkins and E. M. Seeley. 1928. 32 pp. Lists 1,155 natural-gasoline plants, giving type and daily capacity.
- IC 6063. Mine Rescue Organization in the Coeur d'Alene Mining District, Idaho, by W. J. Fene and Hugh McDermott. 1928. 4 pp. Describes housing facilities, equipment, and rescue-training program.
- IC 6064. Accident-Prevention Work of the Midwest Refining Co., by E. H. Denny. 1928. 4 pp., 2 figs. Describes accident-prevention methods that resulted in a definite accident reduction and stresses the importance of intensive supervision.
- †IC 6065. Petroleum Refineries in the United States, by G. R. Hopkins. 1928. 19 pp. Lists petroleum refineries as of January 1, 1928, by States, gives daily capacity and type of plant.
- IC 6066. Form of Report for Underground Accidents, by E. D. Gardner and D. J. Parker. 1928. 4 pp. Gives an outline to aid mine officials in obtaining knowledge of the causes of accidents.
- IC 6067. Touch Paper, by D. J. Parker. 1928. 2 pp. Issues warning against touch-paper system of blasting and the use of lamp wicking. Recommends single-shot electric blasting, the safety features of which far outweigh additional expense.
- IC 6068. Development and Safety of the Storage-Battery Locomotive, by L. C. Hsley. 1928. 3 pp. Discusses advantages of storage-battery locomotive over trolley type in gassy mines.
- †IC 6069. The Mining of Gilsonite in Utah, by W. J. Fene. 1928. 6 pp. Gives history, characteristics, and uses of gilsonite, describes mining methods, and gives names of companies.
- IC 6070. Hazards in Connection with Concentrated Coal Mining, by D. Harrington. 1928. 11 pp. Points out pitfalls likely to be encountered and recommends measures to make the system safe.
- IC 6071. Exports of Mineral Oils from Gulf Coast Ports in 1927, by A. H. Redfield. 1928. 3 pp. Lists exports by countries for the years 1923-1927.
- †IC 6072. Russian Papers on Measurements of Terrestrial Radioactivity, by L. N. Bogoiavlensky, A. A. Lomakin, and A. Cherepenikov, with a supplementary chapter on Radioactive Substances and Method for Locating Them, by F. W. Lee. 1928. 27 pp., 5 figs. Discusses methods and apparatus and tabulates and plots results.
- IC 6073. Fires and Fire Prevention in Lake Superior Mines, by F. C. Gregory. 1928. 17 pp. Describes causes of fires, fire-prevention measures, and fire-fighting methods.
- IC 6074. Survey of Cracking Plants, January 1, 1928, by G. R. Hopkins. 1928. 14 pp. Tabulates results of survey by districts, States, and processes.
- †IC 6075. Recent Developments in the Production of Motor Fuels from Coal, by A. C. Fieldner. 1928. 18 pp. Reviews status of process for obtaining motor fuel from coal up to September, 1925, and discusses the developments that have taken place since that time.

† Out of print.

- †IC 6076. How Fires Start in Mines, by K. L. Marshall. 1928. 4 pp. Discusses causes of fires under two general heads, foreign heat ignitions, and spontaneous ignitions.
- IC 6078. Railroad Fuel-Oil Consumption in 1927, by A. H. Redfield. 1928. 7 pp. Presents data in same form as IC 6049.
- †IC 6079. Notes on the Determination of Molybdenum, by H. A. Doerner. 1928. 2 pp. Outlines a simple, reliable method for such occasional determinations as are encountered in custom analysis.
- IC 6080. Source and Distribution of Major Petroleum Products, Atlantic Coast States, 1927, by E. B. Swanson. 1928. 11 pp., 3 figs. Presents data in same form as IC 6050.
- †IC 6081. Recovery of Fine Gold by Amalgamation, by E. S. Leaver. 1928. 4 pp. Cites textbooks and articles, and outlines procedure for the recovery of fine gold.
- IC 6082. Safeguarding Electrical Equipment Used in Gassy Mines, European Practice: I—Great Britain, by L. C. Ilsley. 1928. 12 pp. Deals with safe principles of equipment in gassy mines and regulations covering electrical installation and use of electricity in mines.
- IC 6083. Are Flame Safety Lamps Suitable for Detecting Petroleum Vapors? by A. B. Hooker, W. P. Yant, and D. H. Zellers. 1928. 6 pp., 1 fig. Describes tests and concludes that the flame safety lamps are not suitable for determination of inflammable vapor content in the atmospheres in and around tanks.
- IC 6084. Consumption of Primary or Virgin Tin in the United States, 1927, by J. B. Umhau. 1928. 2pp. Tabulates results based on thereports of 1,050 concerns.
- IC 6085. Mine Explosions in the United States During the Fiscal Year Ending June 30, 1928, by D. Harrington. 1928. 4 pp. Lists explosions and recommends safety measures to be applied to prevent explosions.
- IC 6086. Why, When, and How to Make Ventilation Surveys of Metal Mines, by G. E. McElroy. 1928. 12 pp. Stresses the importance of ventilation surveys and maps for studying ways and means of improving comfort conditions and working efficiencies in metal mines.
- IC 6087. Rock-Dusting by Hand Method, by D. Harrington and C. W. Owings. 1928. 7 pp. Points out the procedure necessary to adequately rock-dust exposed surfaces of all accessible places in bituminous and lignitic coal mines.
- IC 6088. The Third Annual West Virginia State Safety Day Meet, Bluefield, W. Va., September 22, 1928, by J. J. Forbes and Jesse Redyard. 1928. 4 pp. Tells of Bureau of Mines safety educational campaign.
- †IC 6089. Physiological Factors of Mine Ventilation, by R. R. Sayers. 1928. 16 pp. Stresses importance of a system of ventilation that will admit large quantities of fresh air to the face of mine and dilute and force dusty air out as soon as formed.
- IC 6090. How the United States Bureau of Mines Conducts Its National or International First-Aid Contests, by J. J. Forbes. 1928. 18 pp. Gives a typical set of rules and tabulates the teams that participated and the States represented in past national or international contests.
- IC 6091. Recommendations of the Bureau of Mines on Certain Questions of Mine Safety, by the Mine Safety Board. 1928. 12 pp. Includes 9 decisions already published and gives decision 10, which relates to way of escaping from a mine. Explains the 10 decisions.
- †IC 6092. Method and Cost of Mining Magnetite in the Mineville District, New York, by A. M. Cummings. 1928. 12 pp., 12 figs. Is the first of a series of papers dealing with mining methods and costs in the metal mines of the United States. These papers are being prepared by officials and engineers of mining companies, in cooperation with the Bureau of Mines.
- †IC 6093. Factors Affecting Falls of Roof and Coal, by J. W. Paul. 1929. 4 pp. Analyzes undesirable conditions in mines and suggests that operators collect all details of the circumstances that caused accidents from falls of roof.
- †IC 6094. The Classification of North American Coals, by A. C. Fieldner. 1929. 13 pp., 4 figs. Discusses the work of the technical committee on scientific classification, the technical committee on use classification, and the technical committee on marketing practice which was organized by the American Society for Testing Materials at the request of the American Engineering Standards Association because a system for the use of classification of coal had been referred to the association by the Coal Mining Institute of America.

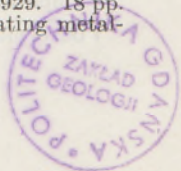
† Out of print.

Information Circulars

- IC 6095. Work of the Holmes Safety Association at Baton Rouge, Louisiana, by F. E. Cash. 7 pp., 1 fig. Outlines organization and tabulates effect of safety campaigns.
- IC 6096. State Regulations Governing Explosion-Proof Type Electric Motors in Coal Mines, by L. C. Ilsley. 1929. 7 pp. Gives abstracts from and analyzes the regulations of four States.
- IC 6098. Electrical Safety Inspection: Suggestions for Mine-Safety Engineers, by L. C. Ilsley. 1929. 15 pp. Is a revision of RI 2541.
- IC 6099. "Muditing" in Coal Mines, by D. Harrington and F. E. Cash. 1929. 9 pp. Describes the use of "mudite."
- IC 6100. Electrical Accident Prevention, by L. C. Ilsley. 1929. 8 pp. Urges importance of guarding circuits and discusses advantages of permissible equipment.
- IC 6101. Safety Letters, by D. Harrington and C. W. Owings. 1929. 9 pp. Treats of the letter method of spreading safety propoganda and gives examples.
- IC 6102. Mining Laws of Rumania, by J. W. Frey. 1929. 1 p. Is a digest of Rumanian mining legislation and court decisions relative to the rights of American citizens to explore for minerals and to own and operate mines in Rumania.
- IC 6103. Mining Laws of Czechoslovakia, by J. W. Frey. 1929. 3 pp. Is the second of a series of digests of foreign mining legislation and court decisions. Presents data in same form as Circular 6102.
- IC 6104. Mining Laws of British India, by J. W. Frey. 1929. 3 pp. Presents data in same form as in IC 6102.
- IC 6105. Mining Laws of British Africa, by J. W. Frey. 1929. 17 pp. Presents data in same form as in IC 6102.
- †IC 6106. Auxiliary Power Units for Fan Operation, by F. E. Cash. 1929. 4 pp. Gives a brief description of several typical installations in gassy mines in Alabama.
- †IC 6107. Mining Practice at Morenci Branch, Phelps Dodge Corporation, Morenci, Ariz., by McHenry Mosier and Gerald Sherman. 1929. 33 pp., 17 figs. Is the first of a series of a dozen or more reports on caving methods of copper mining.
- †IC 6108. State Regulations Governing Inspection and Maintenance of Electrical Equipment in Coal Mines, by L. C. Ilsley and R. A. Kearns. 1929. 13 pp. Tabulates results of surveys and gives abstracts from the codes of the various States.
- IC 6109. The National Safety Competition to Assist in the Reduction of Mine and Quarry Accidents, by W. W. Adams. 1929. 6 pp. Describes annual safety contest conducted under the auspices of the Bureau of Mines in which 300 mines and quarries participated.
- IC 6110. Review of State Mine Inspectors' Reports as They Relate to Accidents from Falls of Roof, by J. W. Paul. 1929. 12 pp. Summarizes reports of mine inspectors of 19 States and gives specimens of forms for use in the preparation of publications of mine accidents.
- IC 6111. Mining Laws of China, by J. W. Frey. 1929. 6 pp. Presents data in same form as in IC 6105.
- †IC 6112. What Do We Know About Explosibility of Coal Dust in Mines, by H. P. Greenwald. 1929. 7 pp. Is a brief summary of results of research over a period of 17 years in the Bureau's Experimental mine.
- †IC 6113. Method and Cost of Mining Zinc and Lead at No. 1 Mine, Tri-State Zinc and Lead District, Pieher, Oklahoma, by W. F. Netzeband. 1929. 11 pp., 7 figs. Is the second of a series of publications dealing with mining methods and costs in the metal mines of the United States. Discusses an operation employing open stopes with pillar supports.
- IC 6114. Survey of Gravities of Domestic Crudes, by G. R. Hopkins and A. B. Coons. 1929. 26 pp. Gives data on specific gravities of 78 crude petroleum from different fields of the United States.
- IC 6115. Fusain, by J. D. Davis. 1929. 10 pp. Defines fusain and discusses its occurrence, properties, and importance.
- †IC 6116. Petroleum Refineries in the United States, January 1, 1929, by G. R. Hopkins and E. W. Cochrane. 1929. 21 pp. Lists 413 refineries, gives information regarding location, daily capacity, and type of plant in each case. Includes recapitulations by State, district, and type of process employed.

- IC 6117. Activities of the Holmes Safety Association in Florida, by F. E. Cash. 1929. 6 pp. Reviews activities of the association in Florida.
- †IC 6118. Graphite, by P. M. Tyler. 1929. 45 pp. Gives information regarding occurrence, properties, and uses of graphite. Discusses prospecting, mining, concentrating and refining methods, and presents data on domestic and world production and consumption, imports, exports, tariff duties, market grades, and prices.
- †IC 6119. Method and Cost of Mining the Thick Freeport Coal in a Western Pennsylvania Mine, by J. W. Paul and H. Tomlinson. 1929. 18 pp., 18 figs. Describes method in detail and gives data on costs, safety, and conservation.
- †IC 6121. Method and Cost of Mining Zinc and Lead at Mine No. 2, Tri-State District, Picher, Okla., by W. F. Netzeband. 1929. 11 pp., 6 figs. Discusses the mode of ore occurrence and the methods and costs of mining at one of the zinc-lead mines in the Tri-State zinc and lead district, Oklahoma.
- †IC 6122. Graphite, Part II. Domestic and Foreign Deposits, by P. M. Tyler. 1929. 25 pp. Briefly describes graphite deposits in 21 States and Alaska and in various countries in North and South America, Europe, Asia, and Africa.
- †IC 6123. Graphite, Part III. Utilization of Graphite, by P. M. Tyler. 1929. 20 p.p. Contains information in regard to consumption of graphite in various industries and on graphite substitutes.
- †IC 6124. Graphite, Part IV. Status of the American Graphite Industry, by P. M. Tyler. 1929. 14 pp. Outlines competitive conditions that affect the domestic graphite industry, and gives production costs and lists of graphite mines and producers.
- †IC 6125. The Free Energy of Water, Carbon Monoxide, and Carbon Dioxide, E. D. Eastman. 1929. 15 pp. Incorporates newer information on the subject and presents an estimate of the reliability of the resulting figures.
- IC 6126. Some Phases of Coal-Mine Ventilation, by J. J. Forbes and M. J. Ankeny. 1929. 18 pp. Stresses importance of proper coal-mine ventilation and summarizes recommendations of Bureau of Mines regarding ventilating equipment and methods.
- †IC 6127. Survey of Cracking Plants, January 1, 1929, by G. R. Hopkins. 1929. 15 pp. Lists oil-cracking plants in United States, gives location, number of units, daily charging capacity, and type of process used.
- †IC 6128. The Holmes Safety Association, Its Objectives and Its Work in the Uniontown-Brownsville Region of Pennsylvania, by G. W. Grove. 1929. 7 pp. Gives details relating to the formation, operation, and achievements of the Holmes Safety Association which operates in the Uniontown-Brownsville bituminous coal district of Pennsylvania. Its objective is the improvement of health and safety conditions.
- IC 6129. Sampling Dust in Rock-Dusted Mines, by C. W. Owings. 1929. 8 pp. Discusses methods of sampling dusts to determine percentage of incom-bustible material as a guide to adequate rock-dusting.
- IC 6130. The Unusually Good Safety Record of a Coal Mine and of a Coal-Mine Foreman, by E. H. Denny. 1929. 5 pp. Discusses the practices that are standard in the coal operations of the company mentioned.
- IC 6131. Mining Laws of Colombia, by A. D. Garman. 1929. 77 pp. Presents data in same form as in IC 6102.
- †IC 6132. Ocher and Ochery Earths, by R. M. Santmyers. 1929. 20 pp. Supplies information on uses, specifications, and color variations of ocher, methods of mining and treatment, and domestic deposits. Discusses French ocher industry.
- IC 6134. Safeguarding Electrical Equipment Used in Gassy Mines. European Practice: I—Great Britain, by L. C. Ilsley. 1929. 12 pp. Summarizes British regulations covering installation and use of electrical equipment in mines and outlines tests and requirements for electric motor and flame-proof equipment.
- †IC 6135. Safeguarding Electrical Equipment Used in Gassy Mines. European Practice: II—Belgium, by L. C. Ilsley. 1929. 8 pp. Outlines Belgian requirements for explosion-proof electrical machinery and methods used in testing electrical mine equipment.
- †IC 6136. Progress in Metal-Mine Ventilation, by D. Harrington. 1929. 18 pp. Summarizes recent developments in cooling of mine air, combating metal-mine dusts and preventing and controlling metal-mine fires.

† Out of print.



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- IC 6137. Work of the Holmes Safety Association in the State of Washington, by J. G. Schoning. 1929. 7 pp. Outlines of the work of the safety chapters in the isolated coal-mining communities of the State of Washington.
- †IC 6138. Method and Cost of Mining Hard Specular Hematite on the Marquette Range, Michigan, by Lucien Eaton. 1929. 14 pp., 7 figs. Discusses methods of prospecting and exploration, sampling and estimating tonnage and values and development methods. Gives data regarding percentage of ore extraction and costs in units of labor, fuel, and supplies.
- IC 6139. Recommendation for Safety in Coal Mining Relating to Placing Main Haulage in Intake Air, by the Mine Safety Board. 1929. 2 pp. Discusses formal decision of the Bureau of Mines recommending that in coal mines haulage and hoisting be kept in intake air as far as possible.
- IC 6140. Mining Laws of Bolivia, by A. D. Garman. 1929. 16 pp. Summarizes laws dealing with mineral prospecting, mine taxation, export duties on various minerals and mineral concessions.
- †IC 6141. Tentative Method for Making Resistivity Measurements of Drill Cores and Hand Specimens of Rocks and Ores, by M. W. Pullen. 1929. 10 pp., 8 figs. Presents tentative method and results of tests from the Mineville magnetite district and of hand specimens of serpentine and chromite.
- †IC 6142. Mineral Wool, by J. R. Thoenen. 1929. 13 pp. Contains information as to the nature and use of mineral wool.
- IC 6143. Safeguarding Electrical Equipment Used in Gassy Mines. European Practice: III—Germany, by L. C. Ilsley. 1929. 15 pp. Presents data in same form as in RI 6134 and 6135.
- IC 6144. Report of a Gas Explosion in a Rock-Dusted Mine, by G. S. McCaa. 1929. 5 pp. Discusses factors involved in the explosion and recommends safety measures.
- †IC 6145. Mining Methods at Minas de Matahambre, Pinar Del Rio, Cuba, by G. I. Richert. 1929. 18 pp. Discusses methods and tabulates costs at only copper mine in Cuba.
- IC 6146. Safeguarding Electrical Equipment Used in Gassy Mines, European Practice: IV—France, by L. C. Ilsley. 1929. 9 pp. Presents data in same form as in RI 6134, 6135, and 6143.
- †IC 6147. Hazards in the Use of Delay-Action Detonators in Coal Mines, by D. Harrington and S. P. Howell. 1929. 2 pp. Issues warning against use of delay-action detonators in any kind of blasting in a coal mine while any persons, including shot firers, are in the mine.
- †IC 6148. Selected Bibliography of Minerals and Their Identification, by Oliver Bowles. 1929. 4 pp. Includes the simpler texts, which present the subjects in nontechnical language.
- †IC 6149. Mining Methods of the Tennessee Copper Company, Ducktown, Tennessee, by C. H. McNaughton. 1929. 17 pp., 9 figs. Discusses methods and tabulates costs.
- †IC 6150. Mining Methods and Costs in the Waco District, by L. M. Banks. 1929. 10 pp., 12 figs. Describes mining methods employed at Acme zinc mine, Waco, Mo. Gives details regarding ore deposits, methods of exploration, development and ore mining, and mining costs.
- IC 6151. Method and Cost of Mining the Upper and Lower Freeports and the Lower Kittanning Coal in a Group of Mines in Western Central Pennsylvania, by J. W. Paul and H. Tomlinson. 1929. 14 pp., 11 figs. Another issue in the series of reports on coal-mining methods and costs designed to make available a knowledge of mining methods in representative mines in the various coal-producing districts.
- IC 6152. Method and Cost of Mining the Thick Freeport Coal in a Second Western Pennsylvania Mine, by J. W. Paul and T. Tomlinson. 1929. 19 pp., 15 figs. See IC 6151.
- †IC 6153. Safety in Mines as Affected by First-Aid and Mine Rescue Contests, by W. D. Ryan. 1929. 11 pp. Gives concrete examples of benefits derived by mining industry as result of first-aid and mine rescue contests.
- IC 6155. Clay, by P. M. Tyler. 1929. 63 pp. Summarizes information on clay deposits, mining and preparation methods, manufacture of clay products, imports and exports, market and prices. General bibliography on clays.

† Out of print.

- †IC 6156. Special Features of Core Drilling in the Salt Beds of Western Texas and New Mexico, by J. S. Wroth. 1929. 13 pp., 4 figs. Describes results obtained with improved type of core barrel used in drilling potash test wells in territory mentioned.
- †IC 6157. Marketing of Gypsum Products, by R. M. Santmyers. 1929. 26 pp., 4 figs. Presents statistical data regarding sales of crude gypsum and gypsum building materials and other gypsum products.
- IC 6158. Explosions and Other Accidents from Mud-Capped Shots in Coal Mines, by D. Harrington and C. W. Owings. 1929. 5 pp. Points out hazards attending firing of mud-capped shots in coal mines.
- †IC 6159. Method and Cost of Mining at Barr Mine, Tri-State Zinc and Lead District, by O. W. Keener. 1929. 9 pp., 5 figs. Outlines prospecting, mining, and safety methods, and wage, contract, and bonus system employed.
- †IC 6160. Method and Cost of Mining at No. 8 Mine, St. Louis Smelting & Refining Co., Southeast Missouri District, by R. H. Poston. 1929. 22 pp., 15 figs. Discusses early and later methods of development and mining, underground loading and transportation, pumping and percentage of extraction of ores, safety organization and wage, contract and bonus system.
- IC 6161. Signaling from Cages at Rest or in Motion, by D. J. Parker and R. I. C. Manning. 1929. 7 pp., 2 figs. Stresses need of practical system of signaling from the mine cage as demonstrated in two metal-mine fires.
- †IC 6162. The Canadian Gypsum Industry, by R. M. Santmyers. 1929. 27 pp., 1 fig. Describes producing districts and discusses methods and costs of production, shipping, and handling, prices, and labor and wages.
- IC 6163. Gypsum: Its Uses and Preparation, by R. M. Santmyers. 1929. 28 pp., 1 fig. Summary of the history, mining methods, preparation, and uses of gypsum. States advantages of gypsum building materials.
- †IC 6165. Consumption of Tin in the United States During 1928, by J. B. Umhau. 1929. 8 pp. Statistical data regarding primary and secondary tin used in the United States for various purposes in 1937 and 1928, and tin stocks in hands of consumers manufacturing specified commodities.
- IC 6166. Accident Cost and Mine Safety, by E. H. Denny. 1929. 6 pp. Contains statistics on industrial losses due to mine accidents, and summarizes Bureau of Mines recommendations as to the lessening of mining accidents.
- †IC 6167. Mining Practice at Ray Mines, Nevada Consolidated Copper Co., Ray, Ariz., by R. W. Thomas. 1929. 27 pp., 16 figs. Gives history and geology of district, outlines methods used in prospecting and exploration, sampling and estimation, development and mining, ventilation, mine drainage, and accident prevention.
- †IC 6168. Mining Methods and Costs at the Magma Mine, Superior, Ariz., by F. W. Snow. 1929. 32 pp., 17 figs. Describes methods used in mining ore, primarily for copper, but containing associated silver and gold. Same type of material presented as in IC 6167.
- †IC 6169. Mining Practice and Methods at Inspiration Consolidated Copper Co., Inspiration, Ariz., by A. C. Stoddard. 1929. 23 pp., 14 figs. Same type of material as in IC 6167.
- †IC 6170. Methods of Mining Disseminated Lead Ore at a Mine in the Southeast Missouri District, by C. F. Jackson. 1929. 21 pp., 8 figs. IC 6168, 6169, and 6170 present information regarding conditions at the mines covered which is similar to that given in IC 6167.
- †IC 6171. Some Earth Resistivity Measurements, by F. W. Lee, J. W. Joyce, and Phil Boyer. 1929. 16 pp., 25 figs. Describes experimental work and sets forth some of the difficulties encountered in interpreting the results.
- †IC 6173. Development of the Gypsum Industry by States, by R. M. Santmyers. 1929. 44 pp. Summary of production and sales of gypsum in the United States from the beginning of the industry to the present. Bibliography.
- †IC 6174. Method and Cost of Mining Zinc and Lead at No. 3 Mine, Tri-State District, Crestline, Kans., by W. F. Netzeband. 1929. 10 pp., 6 figs. Similar in nature to IC 6167-6170.
- IC 6176. Effect of a Bonus on the Accident Record of the Southwestern Portland Cement Co., by Emory Smith. 1929. 5 pp. Presents the excellent record of a mine where the bonus system and the all-employee safety committee system are in effect.

† Out of print.

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- IC 6177. Colorado Mine Fatalities, by E. H. Denny, C. W. Owings, and D. Harrington. 1929. 11 pp. Contains data compiled from the annual reports of the State inspection department for the period 1913 to 1928.
- †IC 6178. Mine Explosions in the United States During the Fiscal Year Ended June 30, 1929, by D. Harrington and C. W. Owings. 1929. 15 pp. A statistical summary of frequency, causes, and time of occurrence of explosions. Notes importance of correct rock-dusting.
- †IC 6179. Mining Soft Hematite at Mine No. 2 of the Marquette Range, Mich., by Lucien Eaton. 1929. 15 pp., 7 figs. Outlines history, geology, methods of prospecting, and estimation of tonnages and values, methods of development and mining, contract system, ventilation system, fire-prevention methods, and safety work.
- †IC 6180. Mining Soft Hematite by Open Stopes at Mine No. 1, Menominee Range, Mich., by Lucien Eaton. 1929. 10 pp., 6 figs. Outlines history, geology, and physical characteristics of ore, methods of prospecting, sampling, and estimation of tonnage. Describes methods of development, underground transportation, and ventilation.
- †IC 6181. Mining Laws of the Federated Malay States, by J. W. Frey. 1929. 5 pp. One of a series of digests of foreign mining laws. Gives synopsis of laws and legislation pertaining to leases, especially to petroleum and oil-shale reservations.
- †IC 6182. Mining Laws of Mexico, by P. M. Lineberger. 1929. 14 pp. Presents information on classification of mineral industries in Mexico.
- †IC 6183. Mining Laws of Yugoslavia, by P. M. Tyler. 1929. 6 pp. Contains information on sources of laws, right of Americans, prospecting licenses, mining rights in general, mining concessions, rents and royalties, and general mining conditions.
- †IC 6184. Mining Laws of Guatemala, by A. D. Garman. 1929. 14 pp. Contains synopsis of laws concerning mines and mining property.
- †IC 6185. Mining Laws of New Zealand, by J. W. Frey. 1929. 4 pp. See IC 6184.
- †IC 6186. Mining Methods and Costs, Alaska-Juneau Gold Mining Co., Juneau, Alaska, by P. R. Bradley. 1929. 18 pp., 6 figs. Gives details of development and describes stoping methods, use of explosives, underground transportation, and wage, bonus, and contract systems employed.
- IC 6187. Sources and Distribution of Major Petroleum Products, Atlantic Coast States, 1928, by E. B. Swanson. 1929. 9 pp. Contains statistics on domestic and foreign crude oils, gasoline, kerosene, gas oil, and fuel oil.
- †IC 6188. Mining Laws of Turkey, by J. W. Frey. 1929. 1 p. Another issue in the series of digests of foreign mining legislation and court decisions.
- IC 6189. Electrical Blasting in Sinking Montreal No. 5 Shaft; Also Some Safety Practices at the Montreal Mine, by F. S. Crawford and C. W. Owings. 1925. 8 pp. Detailed description of the equipment, methods, and precautions used in safely sinking a shaft by carefully controlled electric blasting.
- †IC 6190. Beryllium and Beryl, by A. V. Petar. 1929. 20 pp. Summarizes literature on the properties, uses, history, and occurrences of beryllium and beryl. Bibliography.
- IC 6191. Accident Reduction in Alabama Coal Mines, by F. E. Cash. 1929. 9 pp. Summarizes measures taken during the past 4 years toward reduction of fatal accidents in Alabama coal mines, with special reference to prevention of falls of roof and coal.
- IC 6192. Mining Laws of Persia, by J. W. Frey. 1929. 2 pp. Outlines regulations concerning prospecting, taxation, and the relation of concessionaire and landowner.
- IC 6193. Mining Ore in Open Stopes, Central and Eastern United States, by C. F. Jackson. 1929. 36 pp., 13 figs. Progress report for first half of 1929 on the study of mining methods and costs in the Eastern and Central States; summarizes data on mining methods and costs from 20 mines using open-stope methods.
- IC 6194. Safety as Affected by Supervision and Discipline, by A. U. Miller. 1929. 6 pp. Emphasizes the need of intensive supervision and strict enforcement of safety rules in the mining industry.
- IC 6195. Notes on Precautions to be Taken When Drilling Oil or Gas Wells Through Workable Coal Beds or Through Mine Workings, by C. A. Herbert. 1929. 8 pp. Stresses importance of carefully surveying and mapping tracts of land on which the coal rights and the oil and gas rights have been separately leased. Advises rigorous keeping of well logs and records.

† Out of print.

- IC 6196. Physiological Factors of Mine Ventilation, by R. R. Sayers. 1929. 17 pp. Summarizes recent work of various countries on investigations of silicosis, abnormal air conditions, and gases found in mines.
- IC 6197. Mining Laws of Portugal, by J. W. Frey. 1929. 5 pp. Summarizes laws dealing with applications for mining concessions, relation of concessionaire and landowner, and costs of concessions.
- IC 6198. Recommendations of the Bureau of Mines on Certain Questions of Mine Safety as of August, 1929. 23 pp. Discusses decisions of the Mine Safety Board. Contains tentative recommendations on methods of shot-firing in coal mines and use of electric equipment in gassy or slightly gassy mines.
- IC 6199. Mining Laws of Portuguese Possessions, by J. W. Frey. 1929. 8 pp. Synopsis of laws.
- †IC 6200. Method and Cost of Mining the Pittsburgh, or No. 8, Coal Beds in a 100 Per Cent Mechanized Mine in Eastern Ohio, by W. F. Hazen and E. U. Christy. 1929. 21 pp., 8 figs. Describes character of coal bed and mine conditions, methods of development and mining, mechanical equipment used, and plan of wage payment.
- IC 6201. Hazards from Low or Under Voltage, by L. C. Ilsley. 1929. 2 pp. Emphasizes the necessity of providing enough copper and maintaining rails used for return circuits so as to insure a safe working voltage.
- †IC 6202. Distillation-Amalgamation Methods for the Determination of Mercury in Ores, by C. W. Davis. 1929. 8 pp. Discusses estimation of mercury content in ores by practical methods of visual inspection and panning.
- IC 6204. Survey of Fuel-Oil Distribution, Central United States, 1928, by A. T. Coumbe, jr. 1929. 14 pp. Contains tabulated data of consumption in heating of buildings; consumption by industries and marketing areas; exports by customs districts; and distribution by States, years, and uses.
- †IC 6205. Mica. Part I, General Information, by W. M. Myers. 1929. 37 pp., 1 fig. Describes types of mica, their characteristics and uses, and methods of mining and preparation. Gives data on production, exports, and imports.
- IC 6206. Industrial Gas Masks Abroad, by S. H. Katz, 1929. 13 pp., 1 fig. Describes types of gas masks used in industries in Great Britain, Germany, France, and Belgium.
- †IC 6207. Mining Laws of Paraguay, by A. D. Garman. 1929. 5 pp. Contains synopsis of the laws concerning prospecting, mining concessions, loss of title, taxes, and mining companies.
- †IC 6208. Method and Cost of Mining the Pittsburgh, or No. 8, Coal Bed in Four Eastern Ohio Mines, by J. W. Paul and H. Tomlinson. 1929. 21 pp., 9 figs. Another paper on coal-mining practice in the various districts of the United States.
- IC 6210. Mining Laws of Venezuela, by A. D. Garman. 1929. 10 pp. Lists minerals covered by the law of mines and outlines legislation concerning them.
- IC 6211. Methods of Some Progressive Mining Companies in Placing Responsibility for Mine Accidents, by D. Harrington, C. W. Owings, and F. E. Cash. 1929. 11 pp. Cites accidents and contributing conditions in various mines, illustrating present methods of establishing responsibility and meting out punishment.
- †IC 6212. Present-Day Knowledge of the Chemical Constitution of Coal, by J. B. Shohan. 1929. 14 pp. Outlines recent accomplishments in the chemistry of coal and reports progress in the study of coal substance. Contains bibliography.
- IC 6213. Mining Laws of Rumania, by E. P. Youngman. 1929. 18 pp. Summarizes the new mining law. Supersedes IC 6102, prepared from Mining Law of July 3, 1924 (Royal Decree No. 2294).
- †IC 6214. Mining Laws of Honduras, by A. D. Garman. 1929. 10 pp. Synopsis of regulations concerning prospecting, mineral zones, rentals, surface rights, etc.
- IC 6215. Caesium, Rubidium, and Lithium, by R. M. Santmyers. 1930. 17 pp. Describes the minerals and ores and gives tests for identification. Presents data on uses, sources, imports and exports, and markets and prices. Bibliography.
- †IC 6216. Mining Laws of Peru, by A. D. Garman. 1929. 17 pp. Deals mainly with laws pertaining to mining property, salines, and mica, garnet, and analogous substances.

† Out of print.

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- †IC 6217. Bureau of Mines Instruction in First Aid, and Value of 100-Percent First-Aid Training to Employees of Mining and Oil Companies, by A. L. Murray. 1930. 32 pp. Reviews history of Bureau of Mines first-aid training, cites examples of prompt application of first aid, and presents letters from executives commenting favorably on new 100-percent training course.
- IC 6218. Electrical Motored Equipment: Approvals and Extensions, by L. C. Ilsley and M. W. Means. 1929. 5 pp. Explains procedure followed in having new electrical devices and modifications of permissible devices formally approved by the bureau.
- †IC 6219. Mining Laws of Spain, by E. P. Youngman. 1930. 16 pp. Gives legislation bearing upon rights of foreigners, classification of mineral substances, ownership of soil and subsoil, exploration, and concessions.
- IC 6220. State Regulations Governing the Use of Trolley Wires in Mines, by L. C. Ilsley and R. A. Kearns. 1929. 7 pp. Discusses the major hazards—shock and initiation of explosions and fires—presented by a trolley circuit. Presents a composite code embodying the essential requirements of all the codes considered.
- †IC 6221. Barite and Barium Products. Part I.—General Information, by R. M. Santmyers. 1930. 55 pp., 4 figs. Statistical history of the distribution, production, imports and exports, and consumption of barite in the United States and the world.
- †IC 6223. (Revised.) Barite and Barium Products. Part II.—Barium Products, by R. M. Santmyers. 1930. 26 pp., 5 figs. Completes the history of barite and barium products. Deals especially with the preparation, uses, production, marketing, and imports and exports of ground barite, lithopone, and barium chemicals.
- IC 6225. (Revised.) Reducing Accidents from Falls of Roof in Coal Mines, by J. W. Paul, H. Tomlinson, and C. W. Owings. 13 pp. In three parts: 1. Six Essentials for Mine Roof Support, by J. W. Paul. Points out importance of definite system of timbering. 2. Methods and Importance of Roof Testing, by H. Tomlinson. Advises testing roof by vibration method. 3. Accidents in Coal Mines Due to Falls of Roof, by C. W. Owings. Presents statistics and suggests remedies.
- IC 6226. Automatic Derailing Switch at Roslyn No. 3 Mine, Northwestern Improvement Co., Roslyn, Wash., by S. H. Ash and R. H. Kudlich. 1930. 3 pp., 3 figs. Describes safety device for derailing runaway trips where haulage is on slopes.
- IC 6227. Activity of the Holmes Safety Association in Reducing Accidents in Alabama, by C. E. Saxon and C. W. Owings. 1930. 7 pp., 3 figs. Effect of the Holmes chapters on accident reduction in Alabama is shown in tables and curves collected from three coal-mining companies.
- IC 6228. Railroad Fuel-Oil Consumption in 1928, by A. H. Redfield. 1930. 12 pp. Presents data, by districts, covering consumption of fuel oil for various uses by railroads.
- IC 6229. Teaching Safety Through the Approval Plate, by L. C. Ilsley. 1930. 5 pp. Illustrates how compliance with the provisions of the "Caution" section of the approval plate helps to maintain equipment in condition safe for use.
- IC 6231. Mining Laws of France, by E. P. Youngman. 1930. 13 pp. The twentieth of the series of papers outlining the mining laws of various countries. Includes information on the basic mining law of France and on ownership, rights of foreigners, prospecting, exploitation, taxes, and arbitration of labor disputes.
- †IC 6232. Mining Methods and Costs at the Hecla and Star Mines, Burke, Idaho, by C. H. Foreman. 1930. 21 pp., 12 figs. Describes mining practices and lists costs at two large lead mines.
- †IC 6234. Mining Methods and Costs of the Utah Copper Co., Bingham Canyon, Utah, by A. Soderberg. 1930. 23 pp., 11 figs. Describes practice at large, low-grade, open-cut copper mine.
- †IC 6235. Comparative Advantages of Applying Several Geophysical Methods of Prospecting to the Same Territory, by F. W. Lee. 1930. 11 pp., 27 figs. Compares results obtained by applying three different methods of geophysical prospecting. Points out the restrictions and advantages of each method.

† Out of print.

- †IC 6236. Milling Practice at the Alaska-Juneau Concentrator, by P. R. Bradley. 1930. 16 pp., 2 figs. The first of a new series of reports describing milling methods and costs in the various districts of the United States. Gives an account of methods used in coarse crushing and sorting, disposal of waste, fine grinding, concentrating, and retreatment.
- †IC 6237. Mining Methods at the Old Dominion Mine, Globe, Ariz., by A. H. Shoemaker. 1930. 21 pp., 11 figs. Describes mining practices, methods, and costs at Arizona copper mine.
- †IC 6238. Mining Methods at the Morning Mine of the Federal Mining & Smelting Co., Mullan, Idaho, by C. E. Wethered and L. J. Coady. 1930. 13 pp., 7 figs. Describes mining methods at lead-zinc-silver mine.
- †IC 6239. Mining Methods and Costs, American Zinc Co. of Tennessee, Mascot, Tenn., by H. A. Coy. 1930. 11 pp., 14 figs. Describes mining methods at a large Tennessee zinc mine, with special attention to millholing, a unique feature of mining at this operation.
- †IC 6240. Mining Practice at Harmony Mines Co., Baker, Idaho, by E. D. Gardner. 1930. 8 pp., 4 figs. Gives information on location of mine, geology, and development methods.
- IC 6241. Concentrator Methods and Costs at the Hayden Plant of the Nevada Consolidated Copper Co., Arizona, by W. I. Garms. 1930. 25 pp., 4 figs. Includes flow sheets, description of concentrator methods, and account of method of dewatering concentrates, disposal of tailings, and moving ore through plant.
- IC 6242. Safety in Utah Coal Mining as Affected by Haulage, by D. J. Parker. 1930. 8 pp. Discussion of causes of haulage accidents and the means of preventing them. The coal-mining fatality rates for the various States are compared.
- IC 6243. Safety in Connection with Haulage Practices in Alabama Coal Mines, by F. E. Cash. 1930. 11 pp. Natural conditions in Alabama mines, methods of transportation used, and types of equipment employed are described.
- IC 6244. Practical Application and Cost of Proper Rock-Dusting, by G. M. Kintz. 1930. 7 pp. Discusses present methods and costs of rock-dusting at the Swastika mine of the St. Louis, Rocky Mountain & Pacific Co., Raton, N. Mex.
- IC 6245. Effect of Abnormal Air Conditions on Mine Workers, by R. R. Sayers. 1930. 22 pp. Summarizes recent investigations of silicosis, abnormal air conditions, and toxic gases found in mines.
- †IC 6246. Data on Metal-Mine Ventilation in 1929, by D. Harrington. 1930. 22 pp. Deals with occurrence of gases: effect of blasting on air; fires, their causes and the methods of preventing and handling them; air conditioning; health as affected by ventilation; and up-to-date methods of forwarding and controlling air flow.
- †IC 6247. Mining Methods, Practices, and Costs of the Cananea Consolidated Copper Co., Sonora, Mexico, by William Catron. 1930. 41 pp., 25 figs. Contribution to the series of papers on mining methods at principal copper mines.
- †IC 6248. Methods and Costs of Stripping and Mining at the United Verde Open-Pit Mine, Jerome, Ariz., by E. M. J. Alenius. 1930. 34 pp., 13 figs. Describes operating methods at open-pit copper mine.
- †IC 6249. World Reserves and Resources of Tin, by C. W. Merrill. 1930. 8 pp. Discusses character of reserves as related to methods of mining, and the placer and lode reserves of the principal tin-mining countries of the world.
- †IC 6250. Mining Practice and Methods at the United Verde Extension Mining Co., Jerome, Ariz., by R. L. D'Arcy. 1930. 11 pp., 20 figs. Discusses in detail methods at mine working massive, high-grade deposits of copper sulphides containing some gold and silver.
- †IC 6251. Mining Laws of Argentina, by A. D. Garman. 1930. 11 pp. Continues a series of papers on mining laws, etc., of foreign countries.
- †IC 6252. Mining Laws of Chile, by A. D. Garman. 1930. 6 pp. See IC 6251.
- †IC 6254. The Methods of Underground Mining of Iron Ore in the District of Krivoy Rog. Translated by W. Ayvazoglou from the original Russian of A. K. Bouldovsky. 1930. 48 pp., 123 figs. Presents features of Russian mining practice and describes variations in standard methods that might be applicable in this country.

† Out of print.

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- †IC 6255. Sillimanite, Kyanite, Andalusite, and Dumortierite, by A. V. Petar, 1930. 19 pp. Describes new nonmetallics that are beginning to be used commercially, with notes on occurrence.
- †IC 6256. Phosphate Rock. Part I. General Information, by B. L. Johnson. 1930. 64 pp., 3 figs. Supplies information regarding the character, origin, and occurrence of phosphate rock in the United States. Presents data on prospecting, mining, treatment, uses, world production and consumption, imports and exports.
- †IC 6257. The Work of the United States Bureau of Mines. 1930. 55 pp. Contains a series of articles outlining the work of the Bureau as a whole and of its different divisions.
- IC 6258. Safety Achievements of a Pennsylvania Bituminous Coal Mine and of a Coal-Mine Superintendent, by Francis Feehan. 1930. 12 pp. Outlines safety policy of operating company, describes mine, and reviews its unusual safety history.
- †IC 6259. Mining Laws of Panama, by A. D. Garman. 1930. 7 pp. Places special emphasis upon the definition of minerals under the laws of Panama.
- †IC 6260. Mining Methods and Costs at the Engels Mine, Plumas County, Calif., by W. I. Nelson. 1930. 22 pp., 24 figs. Describes copper mine operated since late seventies.
- IC 6261. Milling Methods and Costs at the Concentrator of the Cananea Consolidated Copper Co., Cananea, Sonora, Mexico, by A. T. Tye. 1930. 21 pp., 3 figs. One of the series of papers on milling methods of typical concentrators.
- †IC 6262. Proposed Standard Smoke Ordinance. 1930. 6 pp. Tentative draft of a standard smoke-abatement ordinance prepared by a joint committee of representatives of interested organizations.
- IC 6263. Performance Tests for Trailing Cables, by L. C. Ilsley. 1930. 2 pp. Gives information designed to make the use of trailing cables less hazardous.
- IC 6264. Electrical Blasting Practice at Some Coal Mines in the State of Washington, by S. H. Ash. 1930. 9 pp. Describes explosives used, blasting practice, lighting shots in gassy mines, and advantages of electrical blasting.
- †IC 6265. Mining Laws of Esthonia, by E. P. Youngman. 1930. 8 pp. One of series of articles on foreign mining laws.
- †IC 6266. Mining Laws of French Morocco, by E. P. Youngman. 1930. 11 pp. See IC 6265.
- †IC 6267. Points to be Considered in the Design of Covers for Explosion-Proof Compartments, by L. C. Ilsley. 1930. 4 pp. Discusses covers and means of fastening them, showing features necessary to combine safety with ease of inspection.
- IC 6268. The Granite Industry—Dimension Stone, by Oliver Bowles. 1930. 10 pp. Gives important data on occurrence, uses, quarrying, imports, production, and prices.
- IC 6269. Suggested Safety Rules for Installing and Using Electrical Equipment in Coal Mines, by L. C. Ilsley and C. M. Means. 1930. 22 pp. Detailed suggestions for safe installation and operation of various types of electrical equipment.
- †IC 6270. Mining Laws of the Belgian Congo, by E. P. Youngman. 1930. 3 pp. A digest of mining laws, defining rights of foreigners, ownership, prospecting, and concessions.
- †IC 6271. Mining Laws of Germany (Prussia), by E. P. Youngman. 1930. 3 pp. Presents principal features of Prussian mining code, including data on classification of minerals, rights of foreigners, ownership, prospecting, and concessions.
- †IC 6272. Mining Laws of Ecuador, by A. D. Garman. 1930. 7 pp. Another of the series of digests of foreign mining laws and court decisions; includes definitions of minerals and mines.
- †IC 6274. Selected Bibliography and Map of Manganese Deposits of the United States by Districts, by M. V. Healey and A. L. Johns. 1930. 19 pp., 1 fig. Contains list of references to reports dealing with geology of manganese deposits in 35 States.
- IC 6275. Mine Safety and Accident Economy, by E. H. Denny. 1930. 5 pp. Stresses cost of accidents to the miner and to the operator.
- †IC 6276. Mining Method and Costs at the Black Butte Quicksilver Mine, Lane County, Oreg., by W. W. Elmer. 1930. 8 pp., 3 figs. Shows mining practice and costs in successful treatment of a low-grade quicksilver deposit.

† Out of print.

- IC 6277. Driving Rock Slopes at the New Peerless Mine, by Robert Howard. 1930. 8 pp., 5 figs. Describes unusual method of opening and developing a coal mine in Price Canyon, Utah.
- †IC 6278. Mining Laws of Belgium, by E. P. Youngman. 1930. 8 pp. One of the series of digests of foreign mining legislation and court decisions.
- †IC 6279. Natural-Gasoline Plants in the United States, by G. R. Hopkins and E. M. Seeley. 1930. 28 pp. Annual figures; lists natural-gasoline plants by States, with their location and capacity.
- IC 6280. Methods and Costs of Concentrating Tungsten Ore at the Nevada-Massachusetts Mill, Mill City, Nev., by O. F. Heizer. 1930. 13 pp., 1 fig. Describes the ore treated and explains methods of breaking, crushing, and screening, gravity concentration, roasting and magnetic separation, dewatering and disposal of tailings, conveying, and sampling.
- †IC 6281. Some Check In and Out Systems for Mines, by R. D. Currie. 1930. 5 pp. Describes systems in common use and states advantages and disadvantages of each.
- IC 6282. The Miner's Ounce of Prevention—the Operator's Pound of Cure, by W. D. Ryan. 1930. 8 pp. Gives advice to miners and operators on necessity of practicing safety first.
- IC 6283. Safety Committees in the Coal Mines of the State of Washington, by S. H. Ash. 1930. 9 pp. Shows the beneficial effect of the observance of the laws on the accident record of the State.
- †IC 6284. Method and Cost of Mining Tungsten Ore at the Nevada-Massachusetts Mines at Mill City, Nev., by O. F. Heizer. 1930. 13 pp., 7 figs. One of a series of papers on mining methods and costs at typical operations.
- †IC 6285. Milling Methods and Costs at the Harmony Mines, Baker, Idaho, by R. D. Gardner, 1930. 18 pp., 3 figs. Describes milling practice similar in most respects to the usual practice at the average copper flotation concentrator producing bulk flotation concentrates.
- †IC 6286. Methods and Costs of Mining at the Hartley-Grantham Mine, Tri-State Zinc and Lead District, by O. W. Keener. 1930. 8 pp., 8 figs. Describes methods and costs of mining at zinc mine in operation about 3 years.
- †IC 6288. Automatic Power Releases for Shutting Off Power from Mines and Indicating by Signal Alarm When Fan Stops or Doors Are Left Open, by W. J. Kane and R. F. Dalrymple. 1930. 4 pp., 6 figs. Describes automatic power releases and includes diagrams that would enable them to be made by any interested company.
- †IC 6289. Mining Methods of the Campbell Mine of the Calumet & Arizona Mining Co., Warren, Ariz., Including Cut-and-Fill and Semishrinkage, by H. M. Lavender. 1930. 18 pp., 13 figs. Describes mining practice and costs at the Campbell mine, handling a direct-smelting ore mined for its copper content and associated gold and silver values.
- †IC 6290. Mining Methods and Costs at the Park Utah Mine, Park City, Utah, by E. A. Hewitt. 1930. 18 pp., 22 figs. Describes mining of siliceous silver ore and lead-zinc-silver ore by the square-set-and-fill method.
- IC 6291. Study of Quarry Costs. Trap Rock, Sandstone, Granite, by J. R. Thoenen. 1930. 24 pp. Summarizes costs, based on sales tonnage irrespective of preparation, as reported in questionnaires covering the calendar year 1927.
- †IC 6292. Petroleum Refineries in the United States, January 1, 1930, by G. R. Hopkins and E. W. Cochrane. 1930. 18 pp., 1 fig. Lists 412 refineries and gives information regarding location, daily capacity, and type of plant. Includes recapitulations by years, States, districts, and types of process employed.
- †IC 6293. Shrinkage Stopping, by C. F. Jackson. 1930. 54 pp., 23 figs. Assembles data obtained at a large number of mines in the United States and Canada as well as from the literature on other mines.
- IC 6294. Method and Cost of Mining Fluorspar at Rosiclare, Ill., by E. C. Reeder. 1930. 10 pp., 10 figs. Gives history of important fluorspar district, with description of methods and cost sheets. Is one of a series on mining methods at various typical operations.
- †IC 6295. Mining Laws of Costa Rica, by A. D. Garman. 1930. 5 pp. One of a series of digests of foreign mining laws relative to the rights of American citizens to explore for minerals and to own and operate mines in various foreign countries.

† Out of print.

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- IC 6296. Danger to the Public from Abandoned Mine Workings and Other Property, by F. S. Crawford. 1930. 4 pp. Calls attention to the need of safeguarding persons and animals from dangers of both active and abandoned mine properties by filling in, blasting in, or covering and fencing in test pits and shafts, guarding properties temporarily idle, and securely sealing abandoned mines from entrance of persons or admission of air.
- †IC 6297. Mining Laws of Japan, by A. D. Garman. 1930. 9 pp. Another of the series of digests of foreign mining laws.
- †IC 6298. Mining Laws of Brazil, by A. D. Garman. 1930. 10 pp. Presents data in same form as in IC 6295.
- IC 6299. Hazards and Protection of Underground Transformer Installations, by D. J. Parker. 1930. 3 pp. Emphasizes the importance of fireproof construction, efficient grounding, periodic and careful inspection, and proper maintenance of installations.
- IC 6300. Some Hazards of Conveyor Loading in Coal Mines, by C. W. Jeffers. 1930. 6 pp. Points out dangers attending the use of mechanical loading equipment, recommends the proper guarding of moving parts and periodic stoppage of machinery for making tests of roof, and discusses work plans, signalling system for starting and stopping room conveyor, use of water and rock-dust to control dust, adequate distribution of ventilation, shooting one hole at a time in blasting, careful storage and handling of explosives underground, sufficient timbering, examination for methane at regular intervals, and proper care of power cables.
- †IC 6301. An Automatic Electric Man Hoist for Slopes or Inelines, by S. H. Ash and E. M. Brooks. 1930. 3 pp., 1 fig. Describes an automatic electric man hoist of which the special features are that no hoistman is required and its operation is always under the control of the person or persons riding the trip.
- †IC 6302. Mining Laws of Nicaragua, by A. D. Garman. 1930. 7 pp. Presents data in same form as in IC 6295.
- †IC 6303. Leaching Practice and Costs at the New Cornelia Mine of the Calumet and Arizona Mining Co., Ajo, Ariz., by G. A. Bell. 1930. 29 pp., 5 figs. First of a series of papers on leaching practice and costs in various typical mining districts.
- IC 6304. Privately Owned Mine Rescue Stations, by R. D. Currie and C. W. Owings. 1930. 5 pp. Stresses the importance of properly storing mine rescue equipment, maintaining it in a safe condition at all times, and retraining rescue crews each month. Gives minimum list of equipment necessary for station.
- †IC 6305. Survey of Cracking Plants, January 1, 1930, by G. R. Hopkins. 1930. 16 pp. A recapitulation of operations by years, districts, States, and types of process used. A list of cracking plants in operations as of Jan. 1, 1930, is given, showing location, number of units, total daily charging capacity, and type of process.
- †IC 6306. Nomographs for Calculating the Second Derivatives of the Force of Gravity Potential Obtained by Observations Made with a Torsion Balance at Five Azimuths, by W. Ayvazoglou, translated from the Original Russian of A. Stepanoff. 1930. 5 pp., 10 figs. Gives formulas for and examples of the construction of nomographs, using torsion balance 563.
- †IC 6307. Mining Methods and Costs at the Pilares Mine, Pilares, Sonoro, Mexico, by Everard Leland. 1930. 34 pp., 23 figs. One of a series of papers on mining methods and costs. Describes methods used in mining the ore at the Pilares mine. The ore is valuable for its copper and contains silver in small quantities. Stopping methods used are the flat cut-and-fill and inclined cut-and-fill or rill; shrinkage methods are used where adaptable; pillars and badly fractured areas are extracted by the square-set system.
- †IC 6308. Mining Laws of Latin America, by A. D. Garman. 1930. 29 pp. General summary; shows points of similarity and essential differences, for use of mining engineers and investors whose interests extend over the borders of a single country.
- IC 6310. Selected List of Bureau of Mines Publications Covering Safety Studies and Activities of the Electrical Section, by L. C. Ilsley. 1930. 9 pp. Convenient list, gives data applicable to present-day practice.

† Out of print.

- †IC 6311. Mining Methods and Costs at the Argonaut Mine, Amador County, Calif., by W. O. Vanderburg. 1930. 14 pp., 10 figs. Describes methods used in exploiting low-grade ores in the heavy and swelling ground of the Mother-lode belt. The square-set-and-fill method of mining is employed.
- †IC 6312. Radium, by P. M. Tyler. 1930. 55 pp., 1 fig. Prepared from material available in the Bureau files and from other dependable sources to bring together facts of industrial significance and popular interest. Radioactivity, radon, uses of radium, biological effect of exposure, the atom, and radium manipulation are discussed. Treats of occurrence, mining, preparation, and the world industry.
- IC 6313. Marble, by Oliver Bowles and D. M. Banks. 1930. 20 pp. Gives information regarding the composition, origin, kinds, and uses of marble. Describes physical properties and qualities affecting workability and use. Discusses prospecting, economic conditions, and quarrying. Gives statistics on production, distribution in United States, marketing, and imports and exports. Quotes rates of duty and prices. Contains bibliography.
- †IC 6314. Milling Methods and Costs at the Northern Idaho Mills of the Bunker Hill & Sullivan Mining & Concentrating Co., by J. S. Handy. 1930. 53 pp., 21 figs. Describes and compares the general features of the five mills operated by the company to recover lead, silver, copper, zinc, and gold from northern Idaho ores by flotation and gravity concentration.
- †IC 6315. What the Coal Miner Can Do to Prevent Injury from Falls of Roof, by J. W. Paul. 1930. 4 pp. Tells how to determine the soundness of a mine roof, and points out some of the necessary precautions with which the miner must comply to insure his safety from falls of roof.
- †IC 6316. Systematic Timbering Rules at the Washington Coal Mines, by S. H. Ash. 1930. 8 pp. Cites the results obtained in Washington by the use of systematic timbering rules; points out advantages and disadvantages. Makes appeal for general adoption of systematic timbering rules, irrespective of roof conditions, and their enforcement by adequate supervision and discipline.
- †IC 6317. Selenium and Tellurium, by R. M. Santmyers. 1930. 23 pp. Describes occurrence, tests for identification, properties, preparation, and uses. Gives figures covering domestic production and sales, imports and exports, and market prices.
- †IC 6318. The Grounding of Electric Systems in and Around Mines, by L. C. Hsley. 1930. 34 pp., 3 figs. Compilation of the best available rules and suggestions on grounding, prepared especially for the information of mine electricians and those having to do with electrical installations in and about mines.
- †IC 6319. Milling Methods and Costs at the Concentrator of the Magma Copper Co., Superior, Ariz., by J. H. Rose and J. C. McNabb. 1930. 20 pp., 2 figs. Describes methods and equipment used in treating ore containing bornite, pyrite, and chalcopyrite, each carrying gold and silver.
- †IC 6320. Mining Methods and Costs at the Concentrator of the Chief Consolidated Mining Co., Eureka, Utah, by G. H. Wigton. 1930. 18 pp., 3 figs. One of a series of papers on concentrator practice. The ores treated by the company named are oxidized siliceous ores containing lead, silver, gold, and small amounts of copper.
- †IC 6321. Monazite, Thorium, and Cerium, by R. M. Santmyers. 1930. 43 pp. Describes monazite, thorium, and cerium minerals and ores, tests for identification, occurrence, distribution, mining, and preparation. Gives information concerning the status of the industries and contains bibliography.
- IC 6322. Mining Methods and Costs at the Teck-Hughes Gold Mines (Ltd.), Kirkland Lake, Ontario, by R. J. Henry. 1930. 21 pp., 4 figs. Another of a series of papers on mining practice and costs, describes shrinkage stoping methods used and costs involved in mining gold ore.
- IC 6323. Fire-Fighting Equipment and Organization of the Madison Coal Corporation, Glen Carbon, Madison County, Ill., by A. U. Miller. 1930. 8 pp. Describes surface and underground equipment and organization for handling fires and explosions.
- †IC 6325. Underground Mining Practice and Costs at a Mesabi Range (Minn.) Mine Using the Top-Slicing System, by W. D. Haselton. 1930. 11 pp., 10 figs. Presents data in same form as in IC 6322.

† Out of print.

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- †IC 6326. Some Notes on Underground Transportation in Metal Mines, by C. F. Jackson. 1930. 40 pp., 33 figs. Progress report prepared from papers already issued in the series being prepared on mining methods and costs. Discusses the various types of haulage and compares costs. Gives data on track installation, loading from chutes, and use of scrapers. Describes methods of hoisting.
- †IC 6327. Mining Methods and Costs at the Consolidated Cortez Silver Mine, Cortez, Nev., by G. W. Hezzelwood. 1930. 15 pp., 13 figs. One of a series of papers being prepared on mining methods and costs in the various mining districts of the United States. Follows usual outline of discussion.
- †IC 6328. Tantalum (and Columbium), by E. P. Youngman. 1930. 37 pp. Describes the element; gives information concerning its uses, history, minerals, identification, extraction, production, sources of supply, and consumption. Includes list of producers and dealers, names of possible buyers, and a short bibliography. Discusses columbium.
- IC 6329. Sulphur—General Information, by R. H. Ridgway. 1930. 55 pp., 5 figs. Describes properties of sulphur; gives data on occurrence, world sources, chief deposits, and methods of production employed; production, reserves, and resources; uses, manufacture, and substitutes; consumption, marketing and imports and exports. Includes bibliography.
- IC 6330. Some Hazards of Transporting Explosives in Automobile Trucks, by C. W. Owings and J. M. Harrington. 1930. 8 pp., 1 fig. Points out dangers of hauling explosives by motor vehicle, and gives safety rules as promulgated by the Hercules Powder Co., the Institute of Makers of Explosives, and the Bureau of Mines.
- IC 6331. Cobalt, by P. M. Tyler. 1930. 33 pp. Reviews the cobalt industry; gives information on the uses, mode of occurrence, identification, and metallurgy of cobalt. Discusses world and domestic production and deposits, imports and exports, market grades and prices. Includes lists of dealers and bibliography.
- †IC 6332. Mining Laws of Trinidad, by J. W. Frey. 1930. 3 pp. One of a series of digests of foreign mining legislation and court decisions relative to the rights of American citizens to explore for minerals and to operate mines in various foreign countries.
- IC 6333. The Cost of Accidents to Industry, by F. S. Crawford. 1930. 10 pp. Summarizes costs of accidents and discusses each cost separately to show that efficient safety work pays for itself many times in benefit to humanity and in dollars and cents to employer and employee.
- †IC 6334. Mining Laws of Australia, by J. W. Frey. 1930. 13 pp. One of a series of digests of foreign mining laws.
- IC 6335. Notes on the Determination of Molybdenum, by H. A. Doerner. 1930. 3 pp. Revision of paper published in August 1928. Gives method for quantitative and qualitative determinations of molybdenum.
- †IC 6336. Mining Laws of Salvador, by A. D. Garman. 1930. 10 pp. Another of the series of digests of foreign mining laws.
- †IC 6337. Specific Heat of Water Vapor at High Temperatures Derived from Explosion Experiments, by E. D. Eastman. 1930. 16 pp., 3 figs. Compares the direct results of previous investigators as obtained by calculation from their primary observations. Discusses the possible effect of dissociation of hydrogen and water, the possible inherent errors of the explosion method, and theoretical possibilities leading to specific heats.
- †IC 6338. Mining Laws of Uruguay (1884-1913), by A. D. Garman. 1930. 7 pp. Presents data in same form as in IC 6336.
- †IC 6339. Safety at the Mines of the Ford Collieries Co., Curtisville, Pa., by C. W. Jeffers. 1930. 8 pp., 1 fig. Discusses the contributing factors of the excellent safety record of the Ford Collieries Co. Stresses the effect of the good example set by the mine officials.
- †IC 6340. Mining Laws of Haiti, by A. D. Garman. 1930. 5 pp. Presents data in same form as in IC 6336.
- †IC 6342. Milling Practice at the Netta Mine of the Eagle-Picher Lead Co. at Picher, Okla., by F. W. Sansom. 1930. 13 pp., 4 figs. Continues a series of articles dealing with milling methods and costs at metal mines in the United States. Describes treatment of ore, mostly from the Oklahoma section of the Tri-State district, for the recovery of lead and zinc. The flow sheets of the various mills are given.

† Out of print.

- †IC 6343. Milling Methods and Costs at the Concentrator of the United Verde Copper Co., Clarksdale, Ariz., by C. R. Kuzell and L. M. Barker. 1930. 28 pp., 6 figs. Describes reasons for installing concentrator at this establishment, discusses methods used, and gives flow sheets of various operations in plant.
- IC 6344. What the Mine Foreman Can do to Prevent Injury from Falls of Roof in Coal Mines, by J. W. Paul. 1930. 7 pp. Lists 37 suggestions that should aid materially in maintaining working places in a safe condition.
- IC 6345. What the Superintendent of a Coal Mine Can do to Prevent Injury from Falls of Roof, by J. W. Paul. 1930. 5 pp. Describes obligations of superintendent as commanding officer of a mine to take precautions that will safeguard life of miners.
- †IC 6346. Mining Laws of Canada, by J. W. Frey. 1930. 45 pp. Presents data in same form as in IC 6336.
- IC 6348. Method and Cost of Mining Hematite at the Eureka-Asteroid Mine on the Gogebic Range, Gogebic County, Mich., by O. M. Schaus. 1930. 13 pp., 6 figs. Describes geology and prospecting methods, and discusses mining methods and costs at a property that has been operated 40 years.
- IC 6349. Industrial Safety Training at a Mining School, by E. H. Denny and G. M. Kintz. 1930. 12 pp. Describes intensive training course given to prospective mining and petroleum engineers at Colorado School of Mines.
- †IC 6350. Undercut Block-Caving Method of Mining in Western Copper Mines, by E. D. Gardner. 1930. 44 pp., 35 figs. Comprehensive study of application of method at a number of large mining operations.
- †IC 6351. Safety at the Morenci Branch of the Phelps Dodge Corporation, Morenci, Ariz., by R. I. C. Manning and Thomas Soule. 1930. 28 pp. Describes safety work at the Morenci branch, which won the company trophy for the best accident records in 1928 and 1929. Gives questions men must answer before employment is made permanent.
- †IC 6352. Explosions in Alabama Coal Mines, by F. E. Cash and H. B. Humphrey. 1930. 8 pp. Studies and analyzes records of coal-mine explosions in Alabama from 1900 to 1929.
- †IC 6353. Milling Practice at the White Bird Concentrator, Canam Metals Corporation, Picher, Okla., by E. H. Crabtree, jr. 1930. 10 pp., 1 fig. Describes history of concentrator operations and reviews present methods in detail.
- IC 6354. Fatalities in Alabama Coal Mines, by F. E. Cash and H. B. Humphrey. 1930. 14 pp., 1 fig. Groups data by fatality rates and by causes, covering years 1900 to 1929, and notes that careful supervision is winning results in decreasing number of accidents.
- †IC 6356. Method and Cost of Quarrying Limestone at the Speed Quarry of the Louisville Cement Co., Speed, Ind., by H. D. Baylor. 1930. 12 pp., 6 figs. Deals with methods employed and costs obtained.
- †IC 6357. Methods and Costs of Treatment at the Calumet & Hecla Reclamation Plant, by C. H. Benedict. 1930. 11 pp., 3 figs. Describes milling methods evolved during 15 years of operation. Plant discussed is one of the largest devoted to treatment of concentrator wastes.
- †IC 6358. Milling Methods and Costs at the Nacozari Concentrator of the Phelps Dodge Corporation, Nacozari, Sonora, Mexico, by E. H. Rose and W. B. Cramer. 1930. 38 pp., 6 figs. Describes the concentrator practice of the Moctezuma Copper Co. A 3-unit concentrator and an all-flotation process are used.
- IC 6359. Milling Methods and Costs at the Black Hawk Concentrator, Hanover, N. Mex., by I. L. Wright. 1930. 15 pp., 3 figs. Another of series of papers on milling practice. Comprises a detailed description of the plant, the ore treated, and the methods used.
- †IC 6360. Mining Methods and Costs at Tintic Standard Mine, Tintic District, Utah, by J. W. Wade. 1930. 21 pp., 26 figs. Describes the operation of a mine where the square-set-and-fill method is used to mine lead-silver ore.
- †IC 6361. Mining and Engineering Methods and Costs of the Hanover Bessemer Iron & Copper Co., Fierro, N. Mex., by L. M. Kniffin. 1930. 20 pp., 14 figs. Describes a property mining iron ores where economical methods make operation profitable in spite of long-distance hauling.

† Out of print.

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- IC 6362. List of Permissible Self-Contained Oxygen Breathing Apparatus, Gas Masks, and Hose Masks. 1930. 2 pp. Supersedes IC 6230 and brings up to date list of apparatus tested for permissibility.
- IC 6363. Mining Laws of Italy, by E. P. Youngman. 1930. 3 pp. Another in a series of compilations of material collated from mining codes of various countries, showing rights of American citizens to explore, own, and operate mines.
- †IC 6364. Milling Method and Cost at the Conglomerate Mill of the Calumet & Hecla Consolidated Copper Co., by C. H. Benedict. 1930. 22 pp., 11 figs. Gives detailed account of various steps in milling practice at establishment with capacity of 33,000 tons of ore daily.
- †IC 6365. Titanium, by E. P. Youngman. 1930. 39 pp. Summarizes the titanium industry, with special reference to its economic aspects, and offers a survey of current trade literature and of material in the Bureau files.
- IC 6367. Connection between Physical Condition and Liability to Accidents of Metal Miners, by R. R. Sayers. 1930. 25 pp. Shows how accidents are encouraged by unfavorable physical conditions, such as bad atmospheres and poor illumination.
- †IC 6368. Mining Practice at the Pecos Mine of the American Metal Co. of New Mexico, by J. T. Matson and C. Hoag. 1930. 21 pp., 15 figs. Describes a mine that is operated chiefly by the square-set and cut-and-fill methods and produces about 18,000 tons per month of zinc-lead-copper ore. Outlines accounting methods.
- †IC 6369. Mining Methods and Costs at the Montreal Mine, Montreal, Wis., by O. M. Schaus. 1930. 29 pp., 51 figs. Describes conditions of occurrence of iron ore in a particular property and presents details of equipment and production methods used.
- †IC 6370. Methods and Cost of Mining at the Black Rock Mine, Butte & Superior Mining Co., Butte District, Mont., by D. B. McGilvra and A. J. Healy. 1930. 16 pp., 9 figs. Describes methods of development, mining, hoisting, and ventilation at mine producing chiefly zinc. Explains wage system used.
- †IC 6371. Mining Methods and Costs of the Silver King Coalition Mines Co., Park City, Utah, by M. J. Dailey. 1930. 12 pp., 9 figs. Describes a mine at which lead-silver-zinc ore is mined by stringer sets, stulls, and filling, and the surface plant at which most of the ore is treated by flotation.
- †IC 6372. Mining Methods at the Page Mine of the Federal Mining & Smelting Co., Page, Idaho, by J. E. Berg. 1930. 8 pp., 8 figs. Gives history of development and describes geology, deposits, and method of production and operation. Tabulates mining costs.
- †IC 6373. The Mineral Industry and the Young Engineer, by Scott Turner, Director. 1930. 9 pp. Discusses certain beliefs as to college training and social and political responsibilities of the engineer in maintaining the best traditions of the mining profession.
- †IC 6374. Recent Developments in the Mining Industry, by Scott Turner, Director. 1930. 7 pp. Reviews recent progress in the mining industry and touches on the general advancement of engineering science as applied to mining.
- IC 6375. Specially Recommended Trailing Cable, by L. C. Ilsley. 1930. 2 pp. States that a No. 2 parallel duplex "Hazacord" cable manufactured by the Hazard Insulated Wire Works, Wilkes-Barre, Pa., has met the requirements of Schedule 2D, as given in this paper, and will appear in the semi-annual list as "No. BM-1 cable, especially recommended for use with permissible mining machines."
- †IC 6376. Method of Mining a Thick Coal Bed in Eastern Utah, by H. Tomlinson. 1930. 12 pp., 7 figs. Another of the series of papers on mining methods used in the United States. Presents a detailed description of methods employed, equipment used, and results obtained in mining a thick coal bed, pitching 12 per cent under cover ranging in depth from 200 to 1,100 feet.
- †IC 6377. Mining Methods and Costs at the Ground Hog Unit, Asarco Mining Co., Vanadium, N. Mex., by F. A. Richard. 1930. 13 pp., 6 figs. Describes practice and equipment used in mining lead-zinc-copper ore by the timbered rill method.
- †IC 6378. Shaft Sinking at the Sevier Valley Coal Co. Mine, by H. Tomlinson, 1930. 9 pp., 8 figs. Describes method of sinking and lining a shaft 182 feet below ground level, 17 feet wide, and 25 feet long, finished into three compartments and lined from top to bottom with reinforced concrete.

† Out of print.

- †IC 6379. Milling Methods of the American Zinc Co. of Tennessee, Mascot, Tenn., by C. B. Strachan. 1930. 12 pp., 4 figs. Another of a series of papers on milling methods. Outlines the operation of the Mascot concentrator, which treats 1,900 tons of zinc ore per day by gravity concentration and flotation.
- †IC 6380. Mining Practices, Methods, and Costs at Mine No. 5 of the Marquette Range, Mich., by W. W. Graff. 1930. 10 pp., 5 figs. Describes operation of mining hematite by top-slicing system. Discusses methods of prospecting, developing, mining, and haulage.
- IC 6381. Feldspar, by Oliver Bowles and C. V. Lee. 1930. 21 pp., 2 figs. Briefly outlines the occurrence and properties of feldspar, its preparation, uses, and marketing, the economic problems of production and consumption, modern trends, and other matters of general interest.
- †IC 6382. Mine Ventilation in the Coeur d'Alene District, Idaho, by G. E. McElroy. 1931. 37 pp., 5 figs. One of a series of papers presenting methods and costs of ventilating metal mines. Gives detailed data regarding mining and ventilation conditions in three mechanically ventilated mines—the Bunker Hill & Sullivan, the Morning, and the Hecla, and three naturally ventilated mines—the Gold Hunter, Page, and Dayrock. Summarizes mining and ventilation conditions of the district as a whole.
- †IC 6383. Mining Bituminous Coal by Stripping Methods, by Scott Turner, Director, and Bureau of Mines Staff. 1930. 23 pp., 8 figs. Part I. Economic analysis; deals with the rapid growth of strip mining, the ratio of overburden to coal, and prospects of future expansion. Part II. Description of present engineering practice, contains a map showing strip-mining districts. Describes stripping methods, mining and transportation of coal, and gives costs of equipment, stripping, and mining.
- IC 6384. Mining Methods of the Rosiclare Lead & Fluorspar Mining Co., Rosiclare, Ill., by A. H. Cronk. 1930. 13 pp., 8 figs. Gives history and development of a property where fluorspar is mined by shrinkage and open-timbered stope methods.
- IC 6385. Nitrogen and Its Compounds, by B. L. Johnson. 1931. 33 pp., 4 figs. Gives a general summary of the nitrogen industry to date with statistical tables and graphs.
- †IC 6386. Deposits of Titanium-Bearing Ores, by E. P. Youngman. 1930. 41 pp. Reviews in detail domestic and foreign deposits of rutile, ilmenite, and titaniferous iron ore.
- IC 6387. Bromine and Iodine, by P. M. Tyler and A. B. Clinton. 1930. 26 pp. Discusses uses, occurrence, methods of extraction, history, production, imports, industry in various producing countries, and markets and prices.
- †IC 6388. Possible Utilization of Natural Gas for the Production of Chemical Products, by H. M. Smith. 1930. 5 pp., 1 fig. Briefly describes the principal reactions by which natural gas may be transformed into other chemical products, and indicates the more important application of these products.
- IC 6389. Platinum, by P. M. Tyler and R. M. Santmyers. 1931. 69 pp., 3 figs. Discusses at great length production, uses, and occurrence of platinumiferous ores.
- †IC 6390. Mining Practices, Methods, and Costs, Mine No. 4 of the Marquette Range, Mich., by W. W. Graff. 1930. 8 pp., 3 figs. Describes mining methods used for semihard hematite ore.
- †IC 6391. Diatomite, by Paul Hatmaker. 1931. 20 pp., 1 fig. A general review of the diatomite industry. Describes diatomite, its distribution, properties, and uses. Discusses mining and marketing. Gives list of producers and a bibliography.
- †IC 6392. Conservation of Natural Gas in Relation to Some Recent Developments, by Scott Turner, Director. 1930. 4 pp. An address delivered before the American Gas Association at Atlantic City, N. J., on October 14, 1930. Notes the progress made in producing and distributing natural gas.
- †IC 6394. Milling Methods at the Hurley Plant of the Nevada Consolidated Copper Co., Hurley, N. Mex., by Fred Hodges. 1931. 16 pp., 8 figs. Describes methods of concentrating, disposal of tailings, dewatering of concentrates, sampling, water supply, and distribution of power.

† Out of print.

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- IC 6395. Use of Thermodynamic Data to Study the Chemical Reactions of Metallurgical Processes, by R. S. Dean. 1930. 12 pp. States that calculation of equilibrium concentrations of reactions between metallurgically important compounds at any temperature and pressure is possible by determining the heat of formation, free energy at a single temperature, and the specific heat over a wide range. Examples show how by the application of thermodynamic results new methods are proposed for deoxidation of copper, production of zinc, and separation of zinc and cadmium.
- †IC 6396. Sources and Distribution of Major Petroleum Products, Atlantic Coast States, 1929, by E. B. Swanson. 1930. 9 pp. A statistical report of the consumption of petroleum products within the Atlantic Coast States. Gives receipts and distribution of domestic and foreign crude oils; production, receipts, and distribution of gasoline and kerosene; distribution of gas oil and fuel oil; and separation of gas and fuel oils.
- †IC 6397. Mining Methods of the Ducktown Chemical & Iron Co., Mary Mine, Isabella, Tenn., by V. L. Kegler. 1931. 9 pp., 8 figs. Outlines history of mine and describes mining of ore containing pyrrhotite and chalcopyrite as principal minerals, by means of open stopes with pillar support. Gives operating costs.
- IC 6398. Holmes Safety Certificate Presentation, by Scott Turner. 1930. 3 pp. Address delivered at Pittsburgh, Pa., on September 29, 1930, before the general annual convention of the National Safety Council, on the occasion of the presentation of the Joseph A. Holmes Safety Association certificate of honor to the Lehigh Portland Cement Co.
- †IC 6399. Construction of the Wachusett-Coldbrook Tunnels, by D. C. Corner. 1931. 6 pp., 5 figs. The first of a series of papers dealing with modern tunnel-driving methods, compiled in accordance with an outline prepared by engineers of the Bureau of Mines. Covers some of the practices employed in constructing 14 miles of a tunnel for the purpose of diverting additional water into the Wachusett reservoir.
- IC 6400. Work of the Safety Division of the United States Bureau of Mines, Fiscal Year 1930, by D. Harrington. 1930. 10 pp. Describes activities of the Bureau's Safety Division and notes progress made during the fiscal year 1929-30.
- IC 6401. Gallium, Germanium, Indium, and Scandium, by A. V. Petar. 1930. 7 pp. Gives history of these four rare metals and describes their properties, occurrence, uses, and metallurgical treatment. Notes markets and prices, lists dealers and importers, and includes bibliography.
- †IC 6402. Mining Methods and Costs at the Spring Hill Mine, Montana Mines Corporation, Helena, Mont., by A. L. Pierce. 1931. 11 pp., 6 figs. Summarizes improved methods whereby lower costs have recently been obtained at this gold mine.
- †IC 6404. Milling Methods and Costs at the Copper Queen Concentrator of the Phelps Dodge Corporation, Bisbee, Ariz., by E. Wittenau and W. B. Cramer. 1931. 29 pp., 10 figs. Describes concentrator practice at a plant where copper ore is treated by preferential flotation, which floats the copper sulphides and depresses the iron pyrite.
- IC 6405. Mining and Crushing Methods and Costs at the Monocacy Quarry of the John T. Dyer Quarry Co., Monocacy, Pa., by J. A. Conway. 1931. 29 pp., 12 figs. One of a series of papers dealing with the mining and crushing methods and costs of the nonmetallic industries. Presents history of development of a trap-rock quarry, explains methods used, and gives detailed explanation of costs.
- †IC 6406. Magnesium Compounds (Other than Magnesite), by P. M. Tyler. 1931. 19 pp., 1 fig. Discusses the production and uses of magnesium carbonate, calcined magnesia, and the chloride, sulphate, and other salts of magnesium. Data are given on imports, markets, and prices.
- †IC 6407. Mining Methods of the Bunker Hill & Sullivan Mining & Concentrating Co., Kellogg, Idaho, by U. E. Brown. 1931. 9 pp., 17 figs. Describes methods of development and equipment used in mining lead-silver ore at the Bunker Hill and Sullivan mines. Gives detailed costs.
- †IC 6408. Milling Methods and Costs at the Homestake Mine, Lead, S. Dak., by A. J. Clark. 1931. 25 pp., 5 figs. Reviews history, describes ore treated, and discusses milling methods in detail. Gives tables of plant data and costs.

† Out of print.

- IC 6409. Accident Prevention in Coal Mining, by W. H. Forbes. 1930. 5 pp. Directs attention to the fact that a well-organized accident prevention program will materially reduce production costs by increasing efficiency, lowering labor turnover, lessening delays due to accidents, keeping workmen better satisfied, and bring about a direct saving in compensation and other costs.
- †IC 6410. Mining by the Top-Slicing Method, with Some Notes on Sublevel Caving, by C. F. Jackson. 1931. 51 pp., 32 figs. Prepared from a field study of top-slicing practice in the Lake Superior region. Specially notes changes in method during the past decade.
- †IC 6411. Milling Methods and Costs at the Spring Hill Concentrator of the Montana Mines Corporation, Helena, Mont., by L. A. Grant. 1931. 8 pp., 6 figs. Describes concentration of gold ore by bulk flotation methods.
- †IC 6412. Mining Practice at the Chino Mines, Nevada Consolidated Copper Co., Santa Rita, N. Mex., by H. A. Thorne. 1931. 28 pp., 14 figs. Gives history of development, and describes methods of operating an opencut copper mine with power shovels.
- †IC 6413. Mining Methods at the Eighty-Five Mine, Calumet and Arizona Mining Co., Valedon, N. Mex., by R. B. Youtz. 1931. 26 pp., 17 figs. Describes practices used in mining siliceous copper-gold-silver ore by shrinkage and cut-and-fill methods.
- IC 6414. Some Coal-Mine Safety Organizations in the Pennsylvania Bituminous Field, by R. D. Currie. 1931. 41 pp. A review of methods followed by companies with good safety records, designed to aid in organizing for safety or in modifying moderately successful organizations.
- IC 6415. Observations and Notes on the Effect of Methanol Antifreeze on Health, by R. R. Sayers and W. P. Yant. 1930. 7 pp. Outline scope of investigation being made to determine the toxicity of methanol, and gives results obtained to date.
- IC 6416. Mining Methods at the Block P Mine of the St. Joseph Lead Co., Hughesville, Mont., by William O. Vanderburg. 1931. 14 pp., 10 figs. Gives costs and describes the location and development of a mine at which ore is recovered by the horizontal cut-and-fill method.
- †IC 6417. Some Safety Records in Illinois Coal Mines, by A. U. Miller. 1931. 23 pp. Reviews the excellent records of a number of Illinois coal mines to show that with the proper attention to accident-prevention work, on the part of both operators and employees, coal mining can be made as safe as any other industry.
- †IC 6418. Men and Mines, by Scott Turner, Director. 1930. 6 pp. A radio talk which points out our dependence on the work of the miner and briefly describes the studies conducted and the services performed by the bureau.
- IC 6419. Mine Explosions, Mine Fires, and Miscellaneous Accidents in the United States During the Fiscal Year Ended June 30, 1930, by D. Harrington and C. W. Owing. 1931. 33 pp. A review of the accident record of coal and metal mines during the past fiscal year.
- IC 6420. Mining, Treatment, Methods, and Costs, Menantico Sand & Gravel Co., Millville, N. J., by Hugh Haddow, Jr. 1931. 11 pp., 8 figs. Describes methods of recovery and treatment of sand and gravel at a plant that uses hydraulic classification for fine sand sizing, and tells of the preparation of these materials for a number of special markets.
- IC 6421. Methods and Costs of Dredging Sand and Gravel by the Ohio River Sand Co., Louisville, Ky., by J. H. Duffy. 1931. 17 pp., 6 figs. The first of a series of papers describing dredging methods and costs in recovering sand and gravel from the beds of rivers throughout the United States. Deals directly with a plant that operated two ladder-type dredges in recovering sand and gravel from the bed of the Ohio River in the vicinity of Louisville, Ky.
- †IC 6423. Compendium on Limes in Hydrometallurgy and Flotation, by R. G. O'Meara, A. M. Gow, and W. T. Schrenk. 1931. 54 pp. Deals with the use of lime in water treatment, cyaniding, amalgamating, and flotation.
- IC 6424. Explosions in Tennessee Coal Mines, by H. B. Humphrey. 1931. 6 pp. Gives explosion record of Tennessee coal mines for the years from 1891 to 1929.

† Out of print.

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- IC 6425. Factors Involved in the Heap Leaching of Copper Ores, by J. D. Sullivan. 1931. 12 pp., 3 figs. Presents a résumé of the results obtained in heap-leaching studies and gives the general conclusions that have been drawn.
- †IC 6426. Twenty Live Reasons for First-Aid Training, by Emory Smith. 1931. 8 pp. Lists and describes 20 cases where first aid was successfully administered. Shows that first-aid training benefits the community as well as the mine or plant.
- †IC 6427. Safety Consciousness, by F. S. Crawford. 1931. 6 pp. Advice written in popular style on necessity of developing safety consciousness in industry. Shows importance of plant executives taking active interest in safety measures.
- IC 6428. The Paramount Issue, by W. D. Ryan. 1931. 7 pp. Discusses in popular style the increasing number of deaths caused by preventable accidents and the paramount importance of educating public opinion to demand more effective accident prevention.
- †IC 6429. Method and Cost of Recovering Quicksilver from Low-Grade Ore at the Reduction Plant of the Sulphur Bank Syndicate, Clearlake, Calif., by Worthen Bradley. 1931. 17 pp., 6 figs. Describes the ore treated and the present method of reduction. Gives detailed cost data.
- †IC 6430. Milling Methods and Costs at the Concentrator of the Treadwell Yukon Co. (Ltd.), at Tybo, Nev., by W. H. Blackburn. 1931. 14 pp., 4 figs. Describes milling practice at a concentrator that uses an all-flotation process to produce lead and zinc concentrates.
- IC 6431. Street Paving in Representative American Cities, by A. H. Redfield. 1931. 30 pp. Gives statistics on city street paving, particularly asphalt paving, in 201 representative cities of the United States from 1925 to 1929.
- IC 6432. Requirements for Bolts and Similar Fastenings for Permissible Electrical Equipment, by L. C. Ilsley. 1931. 2 pp. Discusses minimum size of bolts, protection of bolt heads, spacing of bolts, projecting studs, length of cap screws and studs, and the securing of nuts.
- †IC 6433. Amalgamation Practice at the Porcupine United Gold Mines (Ltd.), Timmins, Ontario, by R. A. Vary. 1931. 5 pp., 1 fig. Describes economical milling practice and costs at a small property in a northern climate.
- IC 6434. Supervision as a Means of Preventing Accidents from Falls of Roof and Coal, by W. H. Forbes. 1931. 7 pp. Sets forth conditions proving the need of efficient supervision; discusses what comprises effective supervision and what kind of men make the best supervisors.
- IC 6435. Safety Cars of the United States Bureau of Mines, by J. J. Forbes and M. J. Ankeny. 1931. 5 pp., 3 figs. Describes construction, equipment, and functions of the mine rescue cars used by the Bureau of Mines.
- IC 6436. Some Runaway Car Trips on Inclines at Coal Mines, by J. J. Forbes and M. W. von Bernewitz. 1931. 11 pp., 4 figs. Comprises a study of the mechanical and physical features of car trips and of the metal of couplings and ropes. Lists a number of outstanding occurrences of runaway trips and discusses each case.
- †IC 6437. Magnesite, by P. M. Tyler. 1931. 53 pp. Gives information on uses, methods of mining and treatment, brickmaking, production, imports and exports, consumption and supply, and markets and prices. Contains bibliography and lists domestic producing manufacturers of magnesite brick, and magnesite importers and dealers.
- IC 6438. Index to Geophysical Abstracts No. 1 to No. 20, compiled by Palmer Larsen. 1931. 38 pp. Indexes authors and articles, patents, and books.
- †IC 6439. Effect on Workers of Air Conditions, by R. R. Sayers. 1931. 31 pp. Summarizes recent literature on exposure to dusts, on exposure to toxic or noxious gases, and on abnormal temperatures and humidities.
- †IC 6440. Mining Methods and Practices at the United Verde Mine, Jerome, Ariz., by T. W. Quayle. 1931. 31 pp., 46 figs. Describes underground methods at a mine where work is being done both underground and by electric shovels in an open pit. The underground method comprises horizontal cut-and-fill, shrinkage with delayed filling, horizontal square-set, inclined square-set, and top slice.
- IC 6442. Specially Recommended Trailing Cables, by L. C. Ilsley. 1931. 1 p. Gives a complete list of specially recommended twin-type cables.

† Out of print.

- IC 6444. Mining Laws of the Dominican Republic, by Irene Aitkens. 1931. 8 pp. One of a series of digests of foreign mining laws, concerned essentially with the regulations applying to foreigners.
- IC 6445. Resistivity Measurements upon Artificial Beds, by J. H. Swartz. 1931. 9 pp., 14 figs. Presents results of a series of experimental investigations on artificial strata, undertaken to determine the effect of topography on the character of the curves and the depths attained, and the ratio of true depth to certain radii.
- IC 6446. Mining and Crushing Methods and Costs at the West Penn Cement Co. Limestone Mine, West Winfield, Pa., by George A. Morrison. 1931. 21 pp., 6 figs. Mining is done by a system of rooms and entries leaving ribs for pillars. The operation of the crushing plant is explained in detail.
- †IC 6447. Milling Methods at the Hughesville Concentrator of the St. Joseph Lead Co., Hughesville, Mont., by W. O. Vanderburg. 1931. 15 pp., 5 figs. Describes methods used at a mill using an all-flotation process to produce lead and zinc concentrates.
- †IC 6448. Mining, Crushing, and Grinding Methods and Costs at the Reliance Cement-Rock Quarry of the Giant Portland Cement Co., by S. G. McAnally. 1931. 16 pp., 5 figs. Describes practices in use more or less throughout the Lehigh Valley cement district.
- IC 6449. Bibliography of the Metallurgical Work of the U. S. Bureau of Mines in 1930, by R. S. Dean. 1931. 7 pp. Groups papers under the various phases of metallurgical work discussed.
- IC 6450. Mining Laws of Hungary, by E. P. Youngman. 1931. 7 pp. Another of a series of papers on mining legislation relative to the rights of American citizens to own and operate mines in various foreign countries.
- IC 6451. Mining Laws of the Netherland East Indies, by E. P. Youngman. 1931. 20 pp. See IC 6450.
- IC 6453. Thallium, by A. V. Petar. 1931. 6 pp. Presents information on history, occurrence, uses, production, and marketing.
- IC 6454. Revision of the Free Energy of Formation of Sulphur Dioxide, by E. D. Eastman. 1931. 6 pp. Describes recalculations and gives revised equations.
- IC 6455. Zirconium. Part I. General Information, by E. P. Youngman. 1931. 30 pp. Discusses economic features and gives general information regarding the metal and its compounds.
- IC 6456. Zirconium. Part II. Domestic and Foreign Deposits, by E. P. Youngman. 1931. 63 pp. Summarizes data upon occurrences of zircon and baddeleyite. Eudyalite and cryolite are also discussed.
- †IC 6457. Hafnium, by P. M. Tyler. 1931. 11 pp. Discusses occurrences, identification and analysis, properties, separation of zirconium and hafnium, preparation of the pure metal and of pure hafnium salts, and production and trade.
- IC 6458. Mining Laws of Cuba, by I. Aitkens. 1931. 11 pp. One of a series of digests of foreign mining laws pertaining to the operating and mining rights of American citizens.
- †IC 6459. Emeralds, by I. Aitkens. 1931. 18 pp. Describes properties, occurrence, mining, and preparation of emeralds. Gives data concerning production, markets, and prices. Bibliography.
- IC 6460. Concentrating Methods and Costs at the Morenci Concentrator of the Phelps Dodge Corporation, Morenci, Greenlee County, Ariz., by Arthur Crowfoot. 1931. 36 pp., 7 figs. Describes the treating of copper ore by primary tabling followed by two stages of flotation treatment.
- IC 6462. Methods and Costs by Mining Quicksilver at the New Idria Mine, San Benito County, Calif., by W. R. Moorehead. 1931. 14 pp., 8 figs. Describes the mining of quicksilver by the open-cut method, and summarizes costs.
- IC 6463. Suggestions for Wiring Permissible Equipment, by L. C. Hsley and H. B. Brunot. 1931. 12 pp. Describes and discusses some of the methods used for external wiring on permissible machines. Suggestions for improvement are offered and necessary precautions mentioned.
- IC 6464. Methods and Costs of Mining Copper Ore at the Verde Central Mines (Inc.), Jerome, Ariz., by R. H. Dickson. 1931. 13 pp., 7 figs. Describes equipment and practices used in mining by the shrinkage method.

† Out of print.

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- †IC 6465. Zircon (the Gem), by E. P. Youngman. 1931. 20 pp., 1 fig. Reviews history of the gem; describes properties, color, cutting, and substitutes; gives data on distribution, mining, production, and prices; contains list of dealers.
- IC 6466. Bismuth, by P. M. Tyler. 1931. 19 pp. Summarizes information as to the nature, production, uses, and marketing of bismuth. Gives lists of producers, dealers, and consumers.
- IC 6467. Milling Methods and Costs at the Concentrator of the Old Dominion Co., Globe, Ariz., by D. L. Forrester and W. B. Cramer. 1931. 30 pp., 9 figs. Describes equipment and operation of plant for treatment of copper ores. Summarizes costs.
- †IC 6468. Iceland Spar and Optical Fluorite, by H. H. Hughes. 1931. 17 pp. Summarizes data pertaining to properties and uses, geology, production methods, consumption and prices, markets, and occurrences.
- IC 6469. Progress in Metal-Mine Ventilation in 1930, by D. Harrington. 1931. 17 pp. Cites examples of mine disasters traceable to faulty ventilation, both in this country and abroad, and reviews past accomplishments of countries, States, and mining companies in making working conditions safer.
- IC 6470. Mining Methods and Costs at the Porcupine United Gold Mines' Rochester Mine at Timmins, Ontario, by J. D. Tolman. 1931. 6 pp., 2 figs. Deals with the operation of a small gold property in the exploration and development stage and indicates mining costs under northern climatic conditions at a property where the small rate of production results in disproportionate overhead costs.
- †IC 6471. Rubies and Sapphires, by I. Aitkens. 1931. 11 pp. Reviews history of mining and occurrence of these gems, describes manufacture of substitutes, and gives status of industry at present.
- IC 6472. Quartz and Silica. Part I. General Summary, by R. M. Santmyers. 1931. 15 pp., 1 fig. Presents material introductory to three papers on occurrence and uses of quartz and silica.
- †IC 6473. Quartz and Silica. Part II. Quartz, Quartzite, and Sandstone, by R. M. Santmyers. 1931. 20 pp. Presents data on uses, market, prices, and producers of optical quartz, piezo-electric quartz, fused-quartz glass, agate, ferrosilicon, fluxing quartz, quartz for acid towers, fillers, refractories, ceramics, the abrasive industry, and dimension stone.
- IC 6474. Quartz and Silica. Part III. Sand and Miscellaneous Silicas, by R. M. Santmyers. 1931. 17 pp. Gives uses, market prices, and other information on fused-silica glass, silicon carbide, building sand, paving sand, sand-lime brick, molding sand, glass sand, fire or furnace sand, abrasive sand, filter sand, engine sand, roofing materials, tripoli, and diatomite.
- IC 6475. Rhenium (and Masurium), by Paul M. Tyler. 1931. 17 pp. Gives information on properties, identification, and analysis, occurrence, extraction and preparation, production and trade, and prospective uses. Bibliography.
- †IC 6476. Milling Methods and Costs at the Argonaut Mill, Jackson, Calif., by S. E. Woodworth. 1931. 12 pp., 3 figs. Describes equipment and operation of a plant treating quartz for the recovery of gold.
- IC 6477. Mining Laws of the Netherlands, by E. P. Youngman. 1931. 3 pp.
- IC 6479. Milling Methods and Costs at the Arthur and Magna Concentrators of the Utah Copper Co., by H. S. Martin. 1931. 25 pp., 8 figs.
- IC 6480. Tunnel-Driving Methods Used at the Ojuela Unit of the Compañia Minera de Peñoles, S. A., Ojuela, Durango, Mexico, by J. P. Savage. 1931. 8 pp., 6 figs. Describes construction and operation of project and gives costs.
- IC 6481. Organization Plan of the Holmes Safety Association, by J. J. Forbes and M. J. Ankeny. 1931. 7 pp. Gives information on origin of association and suggestions as to organization and activities of district councils and local chapters.
- IC 6482. Chalk, Whiting, and Whiting Substitutes, by Oliver Bowles. 1931. 13 pp. Describes geological origin of chalk, discusses occurrence by States, tells details of manufacture of whiting and its uses, and concludes with data on prices, production, imports, exports, and tariff.
- IC 6483. Significant Features of Wire-Saw Operation in Europe, by Oliver Bowles. 1931. 3 pp. Notes extent to which wire saws are used in Europe and gives data on cost and rate of sawing.

† Out of print.

- IC 6484. State Mine Inspectors; Their Appointment, Qualifications and Remuneration, by J. A. Huff and V. V. Baker. 1931. 17 pp. Contains a statement of the statutory provisions of the several States regarding State mine inspectors. States making no specific provisions are omitted.
- IC 6486. The Significance of Solvent Analysis as Applied to Coal, by E. B. Kester. 1931. 17 pp. Notes that fair comparison of systems so far evolved for solvent analysis of coal is almost impossible, due to wide variations in samples, conditions, and methods employed. Moreover, little stress has been laid on correlation of coal extracts with properties of parent substance other than its coking properties. Bibliography containing 27 citations is appended.
- IC 6487. A New Signaling Device for Shaft Mines, with Comments and Suggested Modifications, by L. D. Stewart and E. V. Potter, Jr. 1931. 10 pp., 7 figs. Describes new induction system of signaling from the cage, devised to increase safety and to effect economies in the operation of cage and skip hoists. A list of equipment and working diagrams are provided.
- †IC 6488. Methods and Costs of Milling Feldspar at the Minpro Plant, Tennessee Minerals Products Corporation, Spruce Pine, N. C., by B. C. Burgess. 1931. 22 pp., 13 figs. Describes latest practices in an up-to-date grinding plant and gives producing costs.
- IC 6489. Milling Methods and Costs at the Verde Central Concentrator, Jerome, Ariz., by R. H. Dickson and E. M. Smith. 1931. 12 pp., 3 figs. Describes practice on mill treating copper ore.
- †IC 6490. Mining Methods of Kirkland Lake Gold-Mining Co. (Ltd.), at Kirkland Lake, Ontario, by J. C. Dumbrille. 1931. 12 pp., 3 figs. Third paper on practice at Ontario gold mines.
- †IC 6491. Turquoise, by I. Aitkens. 1931. 17 pp. One of a series of papers on gems and precious stones. Gives general information on properties, uses, history, occurrence, mining and preparation, domestic production, industry in foreign countries, and markets and prices. Concludes with bibliography.
- IC 6492. Milling Methods at the Midvale Concentrator of the U. S. Smelting, Refining & Mining Co., Midvale, Utah, by R. A. Pallanch. 1931. 17 pp., 2 figs. Describes operations at concentrator, treating quarterly nearly 90,000 tons of lead-zinc ore by selective flotation, with flow sheets to show each phase of practice.
- †IC 6493. Opals, by I. Aitkens. 1931. 9 pp. Describes physical and chemical characteristics of opals, with data on uses, occurrence, mining, preparation for market, domestic deposits, foreign industry, and prices.
- IC 6494. List of Permissible Self-Contained Oxygen Breathing Apparatus, Gas Masks, and Hose Masks. 1931. 3 pp. Includes all equipment tested and approved up to and including April 1, 1931.
- IC 6495. Underground Chute Gates in Metal Mines, by C. F. Jackson and J. B. Knaebel. 1931. 22 pp., 40 figs. One of a series of papers dealing with special mining problems. Describes the different types of gates and their installation under suitable conditions.
- †IC 6496. A Comment upon Present-Day Geophysics, by F. W. Lee. 1931. 5 pp. A simple explanation of fundamental aims and methods of science of geophysics.
- IC 6497. Milling Methods and Costs at the Montana Mine Concentrator of the Eagle-Picher Lead Co., Ruby, Ariz., by D. E. Andrus. 1931. 14 pp., 2 figs. Describes a plant using differential flotation methods to produce lead and zinc concentrates from an ore composed of mixed sulphide minerals and quartz gangue.
- IC 6498. Method and Cost of Quarrying Limestone and Shale at the Quarry of the Trinity Portland Cement Co., Dallas, Tex., by J. W. Ganser. 1931. 12 pp., 6 figs. One of a series of papers on quarrying; describes practice and equipment and general costs at various plants in the United States.
- IC 6499. Boron and its Compounds, by R. M. Santmyers. 1931. 37 pp., 1 fig. Describes and notes occurrence of boron minerals and gives a detailed history of the production, distribution, and consumption of borax, boric acid, and boron.
- IC 6501. Essential Factors Influencing Subsidence and Ground Movement, by W. R. Crane. 1931. 14 pp., 13 figs. Report of a study of the effect of joint planes on subsidence.

† Out of print.

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- †IC 6502. Topaz, by Irene Aitkens. 1931. 11 pp. Describes properties, occurrence, and mining methods. Gives statistics concerning domestic and foreign production and deposits.
- IC 6503. Mining Methods and Costs at Metal Mines of the United States, by C. W. Wright. 1931. 39 pp., 34 figs. Presents preliminary results of Bureau's study of mining methods; shows relative importance of each method in terms of tonnages mined and man-hours consumed; indicates changes now in progress and presents suggestions for improvements in mining methods.
- IC 6504. UMBER, SIENNA, and Other Brown Earth Pigments, by R. M. Santmyers. 1931. 14 pp. Discusses properties, uses, and substitutes, and gives data on sources, preparation, production, imports and exports, marketing, and the industry in foreign countries.
- IC 6505. How and Why Fatalities Occurred in Pennsylvania Coal Mines During 1926-1930, by W. J. Fene. 1931. 26 pp., 1 fig. Reviews fatality record of bituminous-coal mines and suggests precautionary measures.
- IC 6506. Lost-Time Accidents in Some Alabama Coal and Iron Mines During 1930, by F. E. Cash and H. B. Humphrey. 1931. 7 pp. Data obtained from a group of mines which produced nearly three-quarters of the tonnage for the State for 1930.
- IC 6507. Safety Inspections in and Around Iron Mines in the Lake Superior District, by F. S. Crawford. 1931. 7 pp., 14 figs. Briefly describes safety-inspection methods of some iron-mining companies and gives a number of forms used for reporting inspections.
- IC 6508. Milling Practice of the Kirkland Lake Gold Mines (Ltd.), Kirkland Lake, Ontario, by John Dixon. 1931. 13 pp., 3 figs. Describes operation and equipment at a plant treating gold ore by all sliming in cyanide solution and continuous countercurrent decantation followed by filtration.
- †IC 6509. Survey of Cracking Plants, January 1, 1931, by G. R. Hopkins. 1931. 14 pp. Lists plants by States; gives location, number of units, daily charging capacity, and type of process used.
- IC 6510. Safety Standards and Safety Suggestions at Iron Mines in the Lake Superior Region, by F. S. Crawford. 1931. 24 pp. Reviews safety standards and suggestions which have been arrived at in the Lake Superior mines.
- IC 6512. Mining Methods and Costs at Central-Eureka Mine, Amador County, Calif., by James Spiers. 1931. 12 pp., 18 figs. Describes methods typical of those employed to mine low-grade gold ores under extremely heavy and swelling ground conditions of Mother-lode belt of California.
- IC 6513. Method and Cost of Quarrying Limestone at Quarry of Trinity Portland Cement Co., Fort Worth, Tex., by J. W. Ganser. 1931. 13 pp., 5 figs. Describes practice, equipment, and costs at cement-plant quarry.
- IC 6514. Mining Methods of the Molybdenum Corporation of America at Questa, N. Mex., by J. B. Garman. 1931. 15 pp., 5 figs. Describes mining equipment and methods and gives costs of operation.
- IC 6515. Mining Methods and Costs at the Champion Mine, Painesdale, Mich., by Albert Mendelsohn. 1931. 16 pp., 17 figs. Describes practice and equipment at a property mining copper ore by inclined cut-and-fill, partly from sublevels, on retreat.
- IC 6516. Mining Laws of Great Britain, by E. P. Youngman. 1931. 15 pp. One of a series of digests of mining laws, giving regulations pertaining to rights of American citizens to own and operate mines in foreign countries.
- IC 6517. Fatalities in Tennessee Coal Mines, by H. B. Humphrey and F. E. Cash. 1931. 13 pp. Presents tables of statistics of fatal accidents in Tennessee and the United States for purposes of comparison and to indicate important points of attack in the reduction of accidents.
- †IC 6518. Garnets (Gem Stones), by I. Aitkens. 1931. 11 pp. Reviews history of gem garnet giving data concerning occurrence, mining methods, domestic deposits, and production, and industry in foreign countries. Selected bibliography.
- IC 6519. Fatal Accidents in Alabama Coal Mines During 1930, by F. E. Cash and H. B. Humphrey. 1931. 8 pp. Gives tables for 1930 showing fatality rates, production, and labor, in tons of coal mined per fatality, fatality rates in Alabama coal mines, causes of fatalities, causes of coal-mine fatalities, and fatalities in Alabama classified by causes and occupations.

† Out of print.

- IC 6520. Safety Education in and around Iron Mines in the Lake Superior Region, by F. S. Crawford. 1931. 15 pp. Reviews safety-education methods of some Lake Superior companies and outlines a course in safety as taught at the Bessemer Township schools on the Gogebic iron range of Michigan.
- IC 6521. Safety in Iron Mines of Menominee Range, Michigan, by F. S. Crawford. 1931. 28 pp. A study of safety methods used by various companies.
- IC 6522. Method and Cost of Quarrying, Crushing, and Grinding Limestone at Catskill Plant of North American Cement Corporation, Catskill, N. Y., by W. J. Fullerton and A. W. Cox. 1931. 15 pp., 3 figs. Describes practice and equipment and gives costs at cement-plant quarry.
- IC 6523. Pyrites. General Information, by R. H. Ridgway. 1931. 26 pp., 2 figs. Outlines salient facts regarding the pyrites industry of the United States and the world.
- IC 6524. Utilization of Dolomite and High-Magnesian Limestone, by Paul Hatmaker. 1931. 18 pp. Gives description and discusses uses, occurrence, production, prices, and imports and duties. Bibliography.
- IC 6525. Mining Practice and Costs of the Vipond Mine, Timmins, Ontario, by R. E. Dye. 1931. 11 pp., 12 figs. Describes practice and equipment at Canadian gold mine.
- IC 6526. Deep Mining Methods, Conglomerate Mine of the Calumet & Hecla Consolidated Copper Co., by Harry Vivian. 1931. 20 pp., 18 figs. Deals with an application of retreating method of mining at great depth.
- IC 6527. Practical Rules for the Use of Magnetometer in Geophysical Prospecting. Translated by W. Ayvazoglou from the original French of M. C. Alexanian. 1931. 19 pp., 1 fig. Shows the different sources of error by which the work of an operator may be affected and discusses the means by which the carrying out of a magnetic survey may be improved.
- IC 6529. Accident Experience and Cost of Accidents in Washington Coal Mines, by S. H. Ash. 1931. 18 pp. Discusses from various angles the items of accident cost that have a direct bearing on economic losses in coal mining.
- IC 6530. Accident Experience of the Coal Mines of Utah for the Period 1918 to 1929, by A. L. Murray and D. Harrington. 1931. 26 pp. Reviews Utah's accident record for the period mentioned, comparing Utah with other States, contrasting Utah company records, describing safety practices, and giving recommendations for further improvement.
- IC 6531. Mining and Crushing Methods and Costs at Tiffin Limestone Quarry of Thurber Earthen Products Co., Fort Worth, Tex., by D. C. Bolin. 1931. 18 pp., 7 figs. Describes equipment and operation at limestone quarry.
- IC 6532. Methods and Costs of Concentrating Tungsten Ores at Atolia, San Bernardino County, Calif., by W. O. Vanderburg. 1931. 12 pp., 4 figs. Describes equipment and practice.
- †IC 6533. Feldspar Gems (Amazon Stone, Moonstone, Sunstone), by I. Aitkens. 1931. 10 pp. Gives description and properties of feldspar gems, and describes mining methods. Summarizes production. Bibliography.
- IC 6534. Mining Laws of Palestine, by E. P. Youngman. 1931. 22 pp. One of a series of digests of foreign mining laws pertaining to the rights of American citizens to explore for minerals and to own and operate mines in various countries.
- IC 6535. Mining Laws of Austria, by E. P. Youngman. 1931. 12 pp. See Circular 6534.
- IC 6536. Mining Laws of Ethiopia (Abyssinia), by E. P. Youngman. 1931. 15 pp., 1 fig. See Circular 6534.
- †IC 6537. Mining Treatment Methods and Costs at East Texas Gravel Co.'s Deposits near Bois D'Arc, Tex., by W. W. Hyde. 1931. 7 pp., 3 figs. Describes equipment and variety of markets supplied and a method of removing waste materials while mining.
- †IC 6539. Tourmaline, by I. Aitkens. 1931. 8 pp. A review of the sources and production of tourmaline. Bibliography.
- IC 6540. Mine Explosions and Fires in the United States during the Fiscal Year Ending June 30, 1931, by D. Harrington. 1931. 9 pp. Compares explosions by years, causes, and States.

† Out of print.

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- IC 6541. Milling Methods and Costs of Coniaurum Mines (Ltd.), Schumacher, Ontario, by John Redington. 1931. 5 pp., 1 fig. Discusses milling practice at Canadian gold mine.
- IC 6542. Mining Laws of Latvia, by E. P. Youngman. 1932. 5 pp. See Circular 6534.
- IC 6543. Mining Practices, Methods, and Costs at Elkoro Mines, Jarbidge, Nev., by J. F. Park. 1931. 12 pp., 4 figs. Describes equipment and practices used in mining gold ore by shrinkage stoping.
- IC 6544. Milling Methods and Costs of the Minas de Matahambre, S. A., Concentrator, by A. R. Kirchner, J. V. Galloway, and W. P. Schoder. 1931. 11 pp., 9 figs. Outlines practice and equipment used in milling copper ore by selective flotation.
- IC 6545. The Bureau of Mines Coal-Sampling Truck, by R. H. Kudlich. 1931. 4 pp., 4 figs. Describes a sample truck and accessory equipment designed to accelerate handling of samples for analysis and inspection.
- IC 6546. Safety at the Old Dominion Copper Mine, Globe, Ariz., by R. I. C. Manning and Albert Tallon. 1931. 41 pp., 7 figs. Review of a safety organization and the results obtained by it.
- IC 6548. List of Motors Available to Prospective Builders of Permissible Outfits, by L. C. Ilsley and M. W. Means. 1932. 5 pp. Gives lists of a. c. and d. c. motors judged suitable for incorporation in permissible outfits.
- †IC 6549. Physical-Chemical Properties of Methane, by H. H. Storch. 1932. 14 pp. A brief critical review of important data on the physical-chemical properties of methane, designed to act as an introduction to further research on the utilization of natural gas.
- IC 6550. Milling Methods and Costs at the Superior Concentrator of the Engels Copper Mining Co., Plumas County, Calif., by W. I. Nelson. 1932. 22 pp., 4 figs. Describes practice and equipment and gives costs.
- IC 6551. Milling Methods at the Questa Concentrator of the Molybdenum Corporation of America, Questa, N. Mex., by J. B. Carman. 1932. 14 pp., 4 figs. Describes equipment and operation of plant which treats molybdenum ore by flotation methods.
- IC 6552. Mining Laws of Egypt, by E. P. Youngman. 1932. 16 pp. One of a series of papers presenting digests of foreign mining laws.
- †IC 6553. Crushing and Grinding Limestone at the Howes Cave (N. Y.) Plant of the North American Cement Corporation, by W. J. Fullerton and A. W. Cox. 1932. 7 pp., 1 fig. Deals with reduction of raw material to the degree of fineness required for the cement raw mix.
- IC 6554. Method and Cost of Quarrying, Crushing, and Grinding Limestone at the Security Quarry of the North American Cement Corporation, Security, Md., by A. W. Cox. 1932. 14 pp., 3 figs. Discusses methods of quarrying, crushing, and grinding raw materials for the cement mill.
- †IC 6555. Milling Methods at the Concentrator of the Walker Mining Co., Walkermine, Calif., by M. R. McKenzie and H. K. Lancaster. 1932. 11 pp., 3 figs. Describes equipment, procedure, and costs in treating gold and silver bearing chalcopyrite-magnetite-quartz ore.
- IC 6556. 250 Versus 500 Volts or More for Circuits in Gassy Coal Mines, by L. C. Ilsley. 1932. 16 pp. Contains statements, received in answer to questionnaires, expressing the opinion of State inspection departments, manufacturers, and operators. Concludes that the operator who uses a 500-volt system must be willing also to double his vigilance in regard to safety.
- IC 6557. Hazards to Underground Workers from Inflammable Surface Structures near Mine Openings, by D. Harrington and M. W. von Bernewitz. 1932. 7 pp. Points out hazardous conditions that may lead to loss of life from fire, and suggests remedies.
- IC 6558. The Importance of Discipline in Mine Safety, by D. Harrington. 1932. 10 pp. A plea for a better mining record, for intensive safety supervision and well-directed discipline, and for better cooperation between officials and workmen.
- IC 6560. Pumice and Pumicite, by Paul Hatmaker. 1932. 23 pp. Review of sources, production, uses, and marketing of pumice and pumicite.
- †IC 6561. Quartz Gem Stones, by I. Aitkens. 1932. 15 pp. Discusses properties, identification, substitutes, and occurrence in the United States and foreign localities; lists names of species and gem varieties. Bibliography.

† Out of print.

- †IC 6562. Abrasive and Industrial Diamonds, by P. M. Tyler. 1932. 25 pp. Contains a general description of types of industrial diamonds and discusses occurrences, mining, production, uses, and marketing. Gives lists of dealers and consumers.
- IC 6563. Soapstone, by H. H. Hughes. 1932. 18 pp. Presents briefly a description of the properties, uses, and methods of quarrying and manufacturing soapstone, and discusses general conditions in the industry.
- IC 6564. Consumption of Primary Tin in the United States during 1930, by J. B. Umhau. 1932. 7 pp. Comparative review of tin consumption by all industries.
- IC 6565. Mining Methods and Costs at the Braden Copper Co.'s Mines, Sewell, Chile, by J. S. Webb and T. W. Skinner. 1932. 13 pp., 14 figs. Describes equipment and practice used in producing copper ore by block undercutting.
- IC 6566. Chromium. General Information, by L. A. Smith. 1931. 31 pp., 6 figs. Summarizes the domestic chromium industry and discusses the salient features of the world situation.
- IC 6567. Medical Service Accident Reports, Compensation, and Welfare at Iron Mines in the Lake Superior Region, by F. S. Crawford. 1932. 10 pp., 33 figs. A study of the safety and welfare facilities of the mines of the Lake Superior region, giving a statement of the individual methods and equipment of each company.
- †IC 6570. How to Prevent Death and Injury from Falls of Roof in Coal Mines, by J. W. Paul. 1932. 13 pp. Points out the good results to be obtained by proper discipline and supervision in connection with employment of successfully tried safety measures.
- †IC 6571. Fuels Consumed by the Federal Government during the Fiscal Year Ended June 30, 1930, by F. M. Shore, A. G. Charles, and R. W. Metcalf. 1932. 25 pp. Gives tables showing quantity and kind of fuel consumed by the Government departments and their principal branches in each State and Territory.
- †IC 6572. Vanadium, by F. L. Hess. 1932. 8 pp., 1 fig. Gives data concerning occurrence, resources, uses, ferrovanadium and vanadium oxide, and markets.
- IC 6573. Milling Methods and Costs at the Concentrator of the Miami Copper Co., Miami, Ariz., by H. D. Hunt. 1932. 25 pp., 11 figs. Contains data on operation, equipment, and costs.
- IC 6574. Milling Methods at the Balmat Mill of the St. Joseph Lead Co., Balmat, St. Lawrence County, N. Y., by J. B. Knaebel. 1932. 28 pp., 4 figs. Describes operation and equipment at a plant producing lead, zinc, and pyrite concentrates from a sulphide ore by flotation.
- †IC 6576. A Tabular Review of State Laws Relating to Taxation and Inspection of Gasoline and Other Petroleum Products, by A. L. Foster. 1932. 9 pp., 19 figs. Presents data in convenient form for ready reference.
- †IC 6577. Guarding Trolley Wires in Mines, by E. J. Gleim. 1932. 11 pp., 1 fig. Gives costs of installing trolley guards; shows importance of compliance with approved standards for installation and maintenance of trolley system and of placing wires in correct relation to trackage and haulage.
- †IC 6578. Good Rock-Dusting and Ventilation Practice in Two Alabama Coal Mines, by F. E. Cash. 1932. 12 pp., 6 figs. Shows how adequate ventilation, thorough rock-dusting, and use of water on cutter bars and cars can reduce explosion hazards in bituminous-coal mines.
- IC 6579. Sodium and Potassium Metals, by P. M. Tyler. 1932. 7 pp. A brief review of the history, production, and uses of sodium and potassium metals. Includes list of manufacturers and dealers.
- IC 6580. Methods and Costs of Mining and Preparing Sand and Gravel at the Plant of the Ward Sand & Gravel Co., Oxford, Mich., by F. L. Ward. 1932. 16 pp., 12 figs. Describes a dredging operation with many unique features.
- †IC 6581. Methods and Costs of Mining and Preparing Sand and Gravel at the Cloudy Plant of the Dallas Washed & Screened Gravel Co., Dallas, Tex., by R. L. Windrow. 1932. 10 pp., 6 figs. Describes methods and equipment used and summarizes costs.
- †IC 6582. Sand and Gravel Dredging Methods and Costs of J. K. Davidson & Bro., Pittsburgh, Pa., by G. H. Williamson. 1932. 10 pp., 6 figs. Contains description of methods and equipment used, and gives costs of operation.

† Out of print.

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- †IC 6584. Notes Pertaining to Safety Inspection of Permissible Electric Mine Equipment, by E. J. Gleim. 1932. 5 pp. Gives an inspection questionnaire intended as a guide for the inspector of equipment, and outlines inspection procedure.
- IC 6585. Economic Size of Metal-Mine Airways, by G. E. McElroy. 1932. 21 pp., 4 figs. Presents formulas and charts for determination of correct airway design when conditions of service are known or can be approximated.
- IC 6586. Mining Practice at the Edwards Mine of the St. Joseph Lead Co., St. Lawrence County, N. Y., by J. B. Knaebel. 1932. 25 pp., 15 figs. Describes practice and equipment at a mine recovering ore by employing open stopes with pillars and also some shrinkage stoping.
- †IC 6587. Milling Methods and Costs at the Morning Concentrator of the Federal Mining & Smelting Co., Mullan, Idaho, by M. P. Dalton. 1932. 11 pp., 6 figs. Describes equipment and costs of producing lead and zinc concentrates from a complex ore by flotation methods.
- IC 6588. Sinking Practice and Costs at the Pim Shaft, St. Louis Smelting & Refining Works, National Lead Co., St. Francois, Mo., by R. H. Poston. 1932. 13 pp., 7 figs. Describes geology, preliminary work, drilling, blasting, timbering, and concentrating.
- IC 6589. Index to Geophysical Abstracts No. 21 to No. 32, by Palmer Larsen. 1932. 34 pp.
- IC 6590. Milling Methods and Costs at the Page Concentrator of the Federal Mining & Smelting Co., Kellogg, Idaho, by G. S. Price. 1932. 6 pp., 4 figs. Gives costs of extracting lead and zinc from a sulphide ore by all-flotation process.
- IC 6591. The Cost of Developing to the Operating State and Equipping a Small or Medium-Sized Mine in the Tri-State Lead and Zinc District, by J. R. Reigart. 1932. 18 pp., 3 figs. Describes locality and facilities, gives its mining history, and reckons costs that may be expected under normal business conditions.
- IC 6592. Methods and Costs of Mining and Preparing Gravel and Sand for Market at the Plant of the Seaboard Sand & Gravel Corporation, Port Jefferson, N. Y., by Anderson Dana. 1932. 12 pp., 10 figs. Describes organization and equipment and gives methods of recovery.
- IC 6594. Sampling and Exploration by Means of Hammer Drills, by J. B. Knaebel. 1932. 29 pp., 3 figs. Summarizes experience in hammer-drill sampling and exploration at North American mines, discusses applicability of method, and compares it with other methods as to technical results and costs.
- †IC 6595. Data in Reference to Installation of Cables in Shafts and Boreholes, by L. C. Ilsley and E. J. Gleim. 1932. 13 pp., 6 figs. Compilation of helpful data presenting experience of engineers, mining companies, and cable manufacturers.
- IC 6596. Rock Dust Does Stop or Limit Explosions, by D. Harrington. 1932. 6 pp. Gives instances where rock-dusting and wetting have stopped explosions.
- IC 6597. Public Service for the Identification of Mineral Specimens, by P. M. Tyler. 1932. 12 pp. Gives the amateur prospector an idea of what to look for. Contains list of public laboratories which will examine samples.
- IC 6598. A Mechanically Driven Level Rock Tunnel, by W. D. Bryson. 1932. 4 pp., 5 figs. Outlines practices in use at a certain property and gives costs.
- IC 6599. Quarrying Methods and Costs at the Sloan Quarry of the United States Lime Products Corporation, Sloan, Nev., by R. E. Tremoureaux. 1932. 8 pp., 5 figs. Discusses methods at lime-plant quarry.
- †IC 6600. Milling Methods and Costs at the Lead Concentrator of the Hecla Mining Co., Gem, Idaho, by W. L. Zeigler. 1932. 16 pp., 3 figs. Describes milling of silver-bearing lead-zinc ores by combined gravity and flotation methods.
- IC 6601. Mining Methods and Costs at the Mount Hope Mine of the Warren Foundry & Pipe Corporation, Mount Hope, N. J., by J. R. Sweet. 1932. 31 pp., 14 figs. Describes the working of a mine producing magnetite ore by shrinkage stoping.
- IC 6602. Shaft-Sinking Methods, Practices, and Costs of the Consolidation Coal Co. at Its No. 261 Mine, Caretta, McDowell County, W. Va., by L. E. Kelley. 1932. 15 pp., 6 figs. One of a series of papers on shaft-sinking methods and costs at individual operations.

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- IC 6603. Method and Cost of Quarrying Limestone at the Milltown Quarry of the Louisville Cement Co., Milltown, Ind., by H. D. Baylor. 1932. 9 pp., 4 figs. Gives history of operations and describes equipment and methods.
- IC 6604. Methods and Costs of Concentrating Scheelite Ore at the Silver Dike Mill, Mineral County, Nev., by W. O. Vanderburg. 1932. 12 pp., 3 figs. Outlines practices connected with treatment in tabling followed by magnetic separation to clean the table concentrates.
- †IC 6605. Milling Methods and Costs at the Pecos Concentrator of the American Metal Co., Tererro, N. Mex., by H. D. Bemis. 1932. 23 pp., 2 figs. Explains methods of treatment and describes equipment at a plant which treats complex silver and gold bearing lead-zinc-copper ore by selective flotation to produce lead concentrates and zinc concentrates.
- IC 6607. Mining, Treatment Methods, and Costs at Plant of Consolidated Rock Products Co., Durbin, Calif., by H. D. Jumper. 1933. 21 pp., 6 figs. Describes mining, methods of treatment, and equipment.
- IC 6608. Methods and Costs of Quarrying Crushing, and Grinding Limestone at Plant of Southwestern Portland Cement Co., El Paso, Tex., by R. T. Mann. 1933. 14 pp., 6 figs. Presents details of treatment and equipment.
- IC 6609. Quarrying and Crushing Methods and Costs at the Santa Catalina Island Quarry of Graham Bros., Inc., Santa Catalina Island, Calif., by G. A. Roalfe. 1932. 15 pp., 9 figs. Describes operation, equipment, and costs at crushed-stone plant.
- †IC 6610. Method and Cost of Quarrying Limestone at Plant of Calaveras Cement Co., San Andreas, Calif., by R. H. Townsend. 1933. 11 pp., 5 figs. Discusses mining, transportation, and crushing methods.
- IC 6611. Small-Scale Placer-Mining Methods, by C. F. Jackson and J. B. Knaebel. 1932. 17 pp., 25 figs. Discusses possibility of successfully operating small placer deposits, geology, and type of placer deposits, minerals associated with placer gold, size of gold particles, prospecting, and placer-mining methods. Bibliography.
- †IC 6612. Gold Mining and Milling Methods and Costs at the Vallecito Western Drift Mine, Angels Camp, Calif., by Don Steffa. 1932. 13 pp., 4 figs. History and discussion of drift mining, describing methods and equipment.
- †IC 6613. Factors Governing the Selection of the Proper Level Interval in Underground Mines, by W. O. Vanderburg. 1932. 17 pp., 1 fig. Deals primarily with the influence of level spacing on mining costs.
- IC 6614. A Ventilation Study of the Graceton Coal & Coke Co. Mine, Graceton, Pa., by R. D. Currie and E. R. Maize. 1932. 10 pp., 2 figs. Describes an unusual ventilation system used successfully in a gassy mine.
- IC 6615. Methods and Costs of Mining and Crushing Gypsum at the Mine of the Blue Diamond Corporation, Ltd., Arden, Nev., by W. G. Bradley. 1932. 10 pp., 10 figs. Includes characteristics of ore, mining methods used, and costs of operation. Describes crushing plant.
- IC 6616. Mica-Mining Methods, Costs, and Recoveries at No. 10 and No. 21 Mines of the Spruce Pine Mica Co., Spruce Pine, N. C., by H. M. Urban. 1932. 16 pp., 3 figs. Deals with methods now used in the principal mica mines of the Southern Appalachian States.
- IC 6617. Falls of Roof and Coal in Washington Mines, by S. H. Ash. 1932. 6 pp. The unusually dangerous features of the Washington coal-mining district are described. Suggestions are made for outlining a system of timbering, to be rigidly enforced.
- IC 6618. Accident Experience and Cost in Pennsylvania Anthracite and Bituminous Mines, 1926-1930, by W. J. Fene. 1932. 29 pp. A study of compensation laws and accident costs, pointing out the advantages, financial and humanitarian, of holding accidents to a minimum.
- IC 6619. Milling Methods and Costs at the Concentrator of the Britannia Mining & Smelting Co. (Ltd.), Britannia Beach, B. C., by A. C. Munro and H. A. Pearse. 1932. 24 pp., 3 figs. Describes procedure and equipment at a plant which treats copper ore by selective flotation to produce copper concentrates and pyrite concentrates.
- †IC 6621. Milling Methods and Costs at the Hillside Fluorspar Mines, Rosiclare, Ill., by E. C. Reeder. 1932. 20 pp., 6 figs. Outlines history, operating practice, and costs.

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- IC 6622. Employee-Timekeeping System and Mechanical Pay-Roll Methods at Britannia Mining & Smelting Co. (Ltd.), Britannia Beach, B. C., by A. E. Keller and E. C. Gillingham. 1932. 6 pp., 10 figs. Gives a general description of the property, and explains timekeeping and pay-roll system.
- IC 6623. Procedure for the Purchasing and Supply Departments of the Miami Copper Co., Miami, Ariz., by F. L. Bishop and A. E. Keller. 1932. 12 pp., 22 figs. Describes a system of handling supplies which involves a minimum of inventory expense and operating expense.
- IC 6624. Magnetic Concentration Methods and Costs of Witherbee, Sherman & Co., Mineville, N. Y., by F. T. Myners. 1932. 27 pp., 12 figs. Describes concentration practice or mill handling magnetite ore associated with gneiss and apotite.
- IC 6625. Bonuses to Encourage Safe Work and for Work Safely Done, by D. Harrington. 1932. 17 pp. Notes various types of bonus systems used to promote safety in both coal and metal mines.
- IC 6626. Method and Cost of Dredging Sand and Gravel, Portland Gravel Co., Portland, Oreg., by H. F. Puariea. 1932. 7 pp., 3 figs. Deals with methods employed in operating a clamshell dredge on the Willamette River and a pump dredge on the Columbia River.
- IC 6627. Iron Oxide Pigments and Mortar Colors, by R. M. Santmyers. 1932. 26 pp. Describes properties, uses and substitutes, sources, mining and preparation, production, imports and exports, marketing and prices. Outlines status of industry in foreign countries and gives list of domestic producers, dealers, and importers.
- IC 6629. Mining Laws of Poland, by E. P. Youngman. 1932. 7 pp. Pertains to such phases of Polish mining law as affect the rights of the American citizen to prospect and to operate mines in Poland.
- IC 6630. Mining Laws of the Republic of Liberia, by E. P. Youngman. 1932. 11 pp. Summarizes legislation relative to the right of American citizens to explore for minerals and to own and operate mines in Liberia.
- IC 6631. Mining Laws of Denmark and Danish Possessions, by E. P. Youngman. 1932. 6 pp. See IC 6630.
- IC 6632. Mining Laws of Haiti, by E. P. Youngman. 1932. 10 pp. Supersedes IC 6304; based on a law that has been repealed.
- IC 6633. Mining Laws of the Unfederated Malay States, by E. P. Youngman. 1932. 39 pp. See IC 6630.
- IC 6634. Mining Laws of Greece, by E. P. Youngman. 1932. 9 pp. See IC 6630.
- IC 6635. Natural-Gasoline Plants in the United States, January 1, 1932, by G. R. Hopkins and E. M. Seeley. 1931. 28 pp. Gives data concerning the number, location, daily capacity, type, and operating company of natural-gasoline plants in the United States.
- IC 6636. Mining Laws of Finland, by E. P. Youngman. 1932. 12 pp. See IC 6630.
- †IC 6637. Research Activities in the Mineral Industries of the United States, by A. C. Fieldner and A. H. Emery. 1932. 285 pp. Lists problems engaging attention of mineral industries, compiled from answers to questionnaires sent to industrial, institutional, university, and Government research departments and prepared under sponsorship of committee on correlation of research of the American Institute of Mining and Metallurgical Engineers.
- IC 6639. Economic Factors Influencing the Domestic Demand for Gasoline, by H. A. Breakey and E. B. Swanson. 1932. 14 pp. 6 figs. Discusses the increased use of city and intercity busses as factors in gasoline consumption and the purchase of gasoline. Gives data showing average miles traveled, gallons of gasoline consumed, miles traveled per gallon of gasoline, and gallons of gasoline used per bus-mile for city and intercity busses. Shows seasonal variations in gasoline consumption. The gasoline consumed in the United States by revenue busses is shown for 1928-31.
- IC 6640. Shaft Sinking at the Morton Salt Co. Mine at Grand Saline, Tex., by M. Taylor. 1932. 8 pp., 5 figs. Describes the lining and sinking of a shaft to and into the salt of a typical dome of the Gulf States region.
- IC 6642. Mining Laws of Newfoundland, by E. P. Youngman. 1932. 20 pp. Presents a digest of laws pertaining to rights of American citizens to prospect or mine in Newfoundland. Lists statutes affecting mining.

† Out of print.

- IC 6643. The Mining Industry, by Scott Turner. 1932. 13 pp. 7 figs. Epitome of an address delivered before the Royal Canadian Institute at Toronto, Ontario, Canada, on April 16, 1932, in which the industry in Canada and the United States is compared and the difficulties under which mining labors are set forth.
- IC 6644. Mining Laws of Siam, by E. P. Youngman. 1933. 13 pp. Résumé of laws touching upon mining and prospecting rights.
- IC 6645. Physiological Factors in Mine Ventilation, by R. S. Sayers. 1932. 66 pp. Summarizes recent literature, by countries, concerning effects on workers of exposure to dusts.
- IC 6647. Silver Consumption in the Arts and Industries of the United States in 1930 and 1931, by C. W. Merrill. 1932. 7 pp. Reviews consumption over a 4-year period. Gives amounts of silver used by industries making products for ultimate consumption, by years, and shows the amount of silver bought by each industry and its disposal.
- †IC 6649. Mining and Technology Graduates and Their Problems, by Scott Turner. 1932. 9 pp. Excerpts from an address to graduating class at Michigan College of Mining and Technology, Houghton, Mich., delivered June 2, 1932. Points out difficulties and opportunities awaiting graduate and emphasizes fundamentals required.
- IC 6650. Management of Labor in Successful Metal-Mine Operations, by C. W. Wright. 1932. 35 pp., 4 figs. Discusses organization, responsibility, supervision, pay systems and their application, and welfare work. Contains statements on labor by mine managers and engineers.
- IC 6651. Abstracts of Recent Articles on Mine Support, by W. R. Crane. 1932. 23 pp. Deals with papers on testing of materials of support, failure, and movement of rocks above workings, effect of excessive pressure on rock masses, and application of timber, metal, concrete, packing, and filling support.
- IC 6652. Mining Methods and Costs at the Hart Spur Pit of the Fort Worth Sand & Gravel Co., Inc., Fort Worth, Tex., by T. E. Popplewell. 1932. 12 pp., 5 figs. Gives history of plant; describes equipment and treatment.
- IC 6653. Mining Statutes of the State of Pennsylvania, by J. A. Huff and V. V. Baker. 1932. 106 pp. Summarizes laws concerning the operation of anthracite and bituminous-coal mines and of oil and gas wells.
- IC 6654. Mining Laws of Norway, by E. P. Youngman. 1932. 16 pp. Outlines phases of law relating to rights of American citizens to carry on mining activities in Norway.
- IC 6656. Mining Methods and Costs at the Interstate Zinc & Lead Co.'s Hartley Mine, Tri-State Zinc and Lead District, by C. N. Anderson. 1932. 16 pp., 10 figs. Deals with methods employed in mining horizontal zinc-lead ore bodies in west Baxter area of Tri-State zinc and lead district.
- IC 6657. Clay-Mining Methods and Costs at the Carunna (Mich.) Pit of the Aetna Portland Cement Co., by O. A. Dibble. 1932. 6 pp., 2 figs. Describes open-pit recovery of clay and cites costs.
- IC 6658. Milling Methods and Costs at a Flat River (Mo.) Mill, by W. H. Coghil and R. G. O'Meara. 1932. 36 pp., 11 figs. Describes equipment, operation, and costs at a mill which treats 5,000 tons of lead ore daily by table flotation and concentration.
- †IC 6659. Methods and Costs of Dredging Auriferous Gravels at Lancha Plana, Amador County, Calif., by C. G. Patmon. 1932. 16 pp., 3 figs. Gives brief history and describes deposit, dredge, and gold-saving equipment.
- †IC 6660. Description of the Property and Operations at the Lewiston Dredge, Lewiston, Calif., by L. K. Requa. 1932. 14 pp., 5 figs. Touches upon history and character of dredging area. Gives methods of prospecting and sampling, dredge construction and gold-saving equipment and operation.
- IC 6661. Mining Methods and Costs at Fresnillo, Zacatecas, Mexico, by A. Livingston. 1932. 31 pp., 17 figs. Describes character of ore bodies worked, and methods used in recovering metals. Outlines plan of organization.
- †IC 6662. Mining Methods and Costs at the Vanadium Mine of the United States Vanadium Corporation, Rifle, Colo., by Blair Burwell. 1932. 9 pp., 9 figs. Describes character of ore, mining practice, and equipment.
- IC 6663. Pressure Losses Due to Bends and Area Changes in Mine Airways, by G. E. McElroy. 1932. 34 pp., 12 figs. Correlates existing data, determined mainly on small-duct systems, according to uniform methods that facilitate their use in pressure-loss computations.

† Out of print.

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- IC 6664. Accident Experience and Cost in Tennessee Coal Mines, by F. E. Cash. 1932. 8 pp. Explains Tennessee workmen's compensation law. Analyzes accident experience from data obtained in 13 representative mines. Discusses accidents relative to production and costs, cause, frequency, and severity.
- IC 6665. The Significance of the Bureau of Mines Gas Masks. 1932. 1 p. Explains that the Bureau approval plate is a certification that device bearing it has been found to meet Bureau's published minimum requirements for safety, durability, and satisfactory performance.
- IC 6666. Mining Methods and Costs at New Cornelia Branch of Phelps Dodge Corporation, Ajo, Ariz., by G. R. Ingham and A. T. Barr. 1932. 17 pp., 17 figs. Gives practice and costs at a property where copper ore is mined from an open pit and treated in a concentrator.
- IC 6667. Radium in Medical Use in the United States, by R. R. Sayers. 1932. 6 pp., 2 figs. Outlines history of production and use of radium. Dwells particularly on distribution of radium for medical use in the United States.
- †IC 6668. Prospecting and Exploration for Sand and Gravel, by J. R. Thoenen. 1932. 52 pp., 13 figs. Points out necessity for proper prospecting and exploration of a deposit before exploitation, reasons for such advance work, information to be gained, and application of such information in valuing material.
- IC 6669. Geophysical Abstracts No. 41, by F. W. Lee. 1932. 34 pp. No. 41 of a series of monthly summaries of articles on geophysical prospecting classified according to method, with lists of new books and patents. Last of series to be published as information circular. Published as separate periodical report, "Geophysical Abstracts," from this date through June 1936. See index under "geophysical abstracts" for complete list of information circulars in this series.
- IC 6670. International Conference on Mine-Safety Research at Buxton England, July 1931, by G. S. Rice. 1932. 19 pp., 2 figs. Outlines program of conference. Gives argument and discussion of addresses on subjects of multiple shot firing, testing of explosives for permissibility, igniting power of explosives, and applications of Schlieren photography in research on explosives.
- †IC 6671. Safety Progress in Anthracite and Bituminous-Coal Fields, by D. Harrington. 1932. 10 pp. Reviews progress as indicated in accident statistics for 1931.
- IC 6672. Ten Years of Fatal Accidents and Two Years of Accident Costs in Indiana Coal Mining, by C. A. Herbert. 1932. 12 pp., 1 fig. Stresses importance of keeping accident records. Gives data on compensable and fatal accidents by causes and occupations over a period of years.
- †IC 6673. Methods and Costs of Mining Ferberite Ore at Cold Springs Mine, Nederland, Boulder County, Colo., by W. O. Vanderburg. 1932. 15 pp., 2 figs. Gives details of operation at a property using cut-and-fill stoping system with selective mining and hand-sorting to recover ferberite ore.
- †IC 6674. Shaft-Sinking Methods and Costs of Plant and Equipment at Macassa Mine, Kirkland Lake, Ontario, by G. A. Howes and C. F. Jackson. 1932. 10 pp., 3 figs. Notes geological conditions, describes preparatory work, plant, buildings, and shaft sinking and presents costs.
- †IC 6675. Safety Practices at Mine 1, Spring Canyon Coal Co., Utah, by D. J. Parker. 1932. 10 pp., 1 fig. Describes mining methods, equipment, and working conditions. Points out safety measures that have been applied.
- IC 6676. Method and Cost of Mining Sand and Gravel at the Farmington (Conn.) Plant of the Atlas Sand, Gravel & Stone Co., by J. S. Dunning. 1933. 9 pp., 4 figs. Gives history of plant and describes mining methods.
- IC 6677. Working an Underground Mine without Lost-Time Accidents, by C. A. Herbert. 1933. 5 pp. Describes equipment, practices, working conditions, and discipline at a mine which has been worked 6 years without lost-time accidents.
- IC 6678. Metal-Mine Fires and Ventilation, by D. Harrington. 1933. 31 pp. Describes number of mine fires to show the many ways in which they originate and stresses the precautions which must be taken to prevent fires, particularly emphasizing the importance of the reversing feature in ventilation systems. Bibliography.

† Out of print.

- †IC 6679. Supplementary Notes on Core Drilling in the Salt Beds of Western Texas and New Mexico: Tests 13 to 24, by E. P. Hayes. 1933. 11 pp. Supplements IC 6156. Contains data on the last 12 potash tests drilled by the Bureau.
- IC 6680. Mine Explosions and Fires in the United States during the Fiscal Year Which Ended June 20, 1932, by D. Harrington. 1933. 13 pp. Summarizes data by States, ignition origin, fatalities, electrical causes, and type of lighting in mines and compares record with those of previous years.
- †IC 6681. Method and Cost of Exploring, Equipping for Development, and Developing the Central Patricia Group of Claims, Northern Ontario, by A. J. Keast and C. F. Jackson. 1933. 13 pp., 5 figs. Tells of difficulties overcome and costs involved in developing 18 claims in a remote district.
- †IC 6682. The Present Status of the Mineral Industry, by Scott Turner. 1933. 4 pp. Speech at annual convention of American Mining Congress, Mayflower Hotel, Washington, D. C., December 15, 1932. Gives comparative data interpreted relative to present trends of mineral production.
- IC 6683. Mining Laws of Iraq, by E. P. Youngman. 1933. 17 pp. Discusses political status and mineral industry of Iraq, rights of foreigners, monopolies, administration of laws, Turkish mining law, and history of Iraq oil companies.
- IC 6684. Mining Laws of Switzerland, by P. M. Tyler. 1933. 4 pp. Outlines basic principles of the Cantonal laws, noting particularly legislation affecting American citizens.
- IC 6685. Methods and Costs of Milling Ferberite Ore at the Wolf Tongue Concentrator, Nederland, Boulder County, Colo., by W. O. Vanderburg. 1933. 15 pp., 3 figs. Gives general description of property and ore treated and briefly outlines history of the concentrator operations. Metallurgical data and milling costs are shown in tables. Flow sheets accompany article.
- IC 6686. Mining Laws of Cyprus, by E. P. Youngman. 1933. 12 pp. Summarizes Cyprus mining laws pertaining to rights of foreigners to prospect for minerals and to operate mines.
- †IC 6687. Growth and Development of Nonmetallic Mineral Industries, by Oliver Bowles and C. W. Justice. 1933. 50 pp., 3 figs. Statistical history of nonmetallic mineral industries, touching upon growth and classification, industrial demands for products, and relation of certain nonmetals to construction industries.
- †IC 6688. Cut-and-Fill Stopping, by C. H. Johnson and E. D. Gardner. 1933. 58 pp., 26 figs. Discusses use of cut-and-fill method of mining and touches upon its modifications and combinations.
- IC 6689. Development of Sand and Gravel Deposits, by J. R. Thoenen. 1933. 51 pp., 6 figs. Deals with problems of bringing prospect deposit to development stage and considers factors affecting various methods of development.
- IC 6690. An International Viewpoint on Safeguarding Electrical Equipment Used in Gassy Mines, by L. C. Ilsley, E. J. Gleim, and F. Craven. 1933. 16 pp. Comparative review of regulations of England, Belgium, Germany, and France pertaining to use of electricity in mines.
- †IC 6691. Square-Set System of Mining, by E. D. Gardner and W. O. Vanderburg. 1933. 73 pp., 48 figs. Discusses history, factors affecting use, construction, development work, stopping practices with square-set system, and cost of mining by square-set methods.
- IC 6692. Mining, Treatment, Methods, and Costs at Western Indiana Gravel Co.'s Plant No. 1, La Fayette, Ind., by Denis Dwyer. 1933. 13 pp., 4 figs. History of operations, describing geology of deposit and methods used.
- †IC 6693. Some Notes on Methods and Costs of Equipping and Developing Prospects, by C. F. Jackson. 1933. 24 pp. Gives data and cites examples indicating costs of transportation, exploration, and plant equipment and unit costs of underground development under conditions peculiar to northern Ontario and Quebec.
- IC 6694. Mining Laws of Tunisia, by R. M. Santmyers. 1933. 10 pp. Cites sources of data given; contains information concerning ownership and property rights, rights of foreigners, prospecting and exploitation permits, concessions, and taxes.
- IC 6695. Mining Laws of British North Borneo, by E. P. Youngman. 1933. 14 pp. Summarizes regulations having particular bearing on rights of foreigners.

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- IC 6696. Dredging Methods and Costs of Ross Island Sand & Gravel Co., Portland, Oreg., by O. E. Perkins. 1933. 11 pp., 2 figs. Describes equipment and operation, wage system, and safety methods. Shows chart of administrative organization. Summarizes costs.
- IC 6697. Mining Laws of Syria, by P. M. Tyler. 1933. 10 pp. Cites sources of laws; gives data on ownership and property rights, prospecting permits, concessions, relations with landowners and other miners, mine inspection, jurisdiction and penalties, market control, and oil, gas, and asphalt.
- IC 6698. Mining Laws of French Indochina, by E. P. Youngman. 1933. 7 pp. Deals with phases of mining laws which relate to rights of American citizens to operate and prospect for mines.
- †IC 6700. Mining Laws of Chosen (or Korea), by E. P. Youngman. 1933. 5 pp. Presents information on features of laws that directly or indirectly affect foreigners.
- IC 6701. Saving Life by Barricading in Mines and Tunnels at Times of Disaster, by D. Harrington and M. W. von Bernewitz. 1933. 5 pp. Reviews instances in which lives have been saved by barricading and gives instructions as to methods of erecting such safeguards in various localities.
- IC 6702. Mining Laws of Luxemburg, by E. P. Youngman. 1933. 6 pp. Digest of Grand Ducal Order of April 26, 1930. Deals particularly with phases of law bearing on right of American citizens to own and operate mines and to prospect for minerals in Luxemburg.
- IC 6703. Mining Laws of Sweden, by E. P. Youngman. 1933. 5 pp. Résumé of mining laws, with particular reference to legislation bearing on rights of American citizens.
- IC 6704. Mining Laws of French Guiana, by P. M. Tyler. 1933. 8 pp. One of series of papers giving in condensed form mining regulations of various countries.
- IC 6705. Mining Methods and Costs at Plant C, Eliot, Calif., of the Pacific Coast Aggregates, Inc., by E. B. Kendall. 1933. 12 pp., 11 figs. Gives history; describes excavation, haulage, and screening equipment; and outlines storage system, distribution of power and water, and plant organization.
- †IC 6706. Milling Methods and Costs at the San Guillermo Concentrator of the Compania Industrial "El Potosi," S. A., San Guillermo, Chihuahua, Mexico, by C. A. Mehring, F. C. Bacon, and Oba Wiser. 1933. 23 pp., 1 fig. Describes milling practice and equipment of plant treating lead-zinc-silver ore and producing lead concentrate and zinc concentrate.
- †IC 6707. Methods and Costs of Developing and Equipping the Ashley Gold Mine, Matachewan Gold District, Ontario, by W. H. Emens and C. F. Jackson. 1933. 28 pp., 5 figs. Describes exploration by trenching and diamond drilling, shaft sinking, and lateral development.
- †IC 6708. Diamond Drilling at the United Verde Mine, by M. G. Hansen. 1933. 18 pp., 17 figs. Discusses geology of the area, drilling methods and equipment, diamonds, rock or ledge drilling, and deflection of holes.
- †IC 6709. Mining Methods and Costs at Granada Gold Mines, Ltd., Rouyn, Quebec, by R. F. Loofbourow. 1933. 15 pp., 4 figs. Describes methods and equipment used in mining gold by open-stope method.
- IC 6710. Explosions in Pennsylvania Coal Mines, 1870-1932, by J. J. Forbes and H. B. Humphrey. 1933. 28 pp. Reviews explosions of gas or dust or both in Pennsylvania coal mines to show the hazard of gas and dust; emphasizes efficacy of explosion-preventive measures.
- IC 6711. Mining Laws of New Caledonia and French Oceania, by P. M. Tyler. 1933. 9 pp. Gives information concerning regulations relating to classification of minerals, ownership and property rights, rights of foreigners, prospecting permits, etc.
- †IC 6712. Portable Electric Lamps for Animal Haulage in Alabama, by F. E. Cash and C. E. Saxon. 1933. 5 pp. Sets forth advantages gained by the use of mule lamps in various mines and makes a plea for general adoption of such equipment.
- IC 6713. Accident Experience and Costs in Colorado Metal Mines, by E. H. Denny and E. A. Anundsen. 1933. 23 pp. Discusses cost and causes of Colorado metal-mine accidents in 1926-30, inclusive.
- IC 6714. Flotation Processes for Cleaning Fine Coal, by H. F. Yancey and J. A. Taylor. 1933. 31 pp. Describes and compares froth-flotation and Trent processes. Lists patents pertaining to coal flotation.

- IC 6715. Mining Laws of Ceylon, by E. P. Youngman. 1933. 17 pp. Briefly reviews laws relating to rights of foreigners, ownership of minerals, registration monopolies, and exploitation of minerals and gems.
- IC 6716. Mining Laws of French Equatorial Africa, West Africa, Cameroun, and Togo, by P. M. Tyler. 1933. 12 pp. Gives general outline of laws having to do with rights of foreigners, prospecting permits, property rights, concessions, rents, and royalties.
- IC 6717. Mining Laws of Surinam (Dutch Guiana), by E. P. Youngman. 1933. 14 pp. Summarizes laws pertaining to the mining rights of foreigners, mining in general, and exploitation of petroleum, coal, and bauxite.
- IC 6718. Mining Laws of Madagascar, by R. M. Santmyers. 1933. 9 pp. Abstract of regulations relating to all aspects of mining, in which particular note is made of legislation bearing upon rights of foreigners.
- IC 6719. Mining Laws of Bulgaria, by R. M. Santmyers. 1933. 8 pp. Digest of mining legislation of Bulgaria, noting particularly regulations affecting rights of American citizens to own and operate mines in that country.
- IC 6720. Vermiculite, by A. V. Petar. 1933. 10 pp. Presents briefly description of properties, uses, domestic deposits, mining, and treatment. Lists producers and buyers. Bibliography.
- IC 6721. Accident Experience of Four Louisiana Petroleum Refineries, by F. E. Cash. 1933. 7 pp. Compares industrial injury rates and gives accident frequency and severity data for four Louisiana refineries by plants, years, months, cause, and part of body injured.
- †IC 6722. Timber Withdrawing and Devices Used for This Purpose in Some Coal Mines, by J. W. Paul and J. G. Calverley. 1933. 15 pp., 8 figs. Presents results of observations in 41 representative mines, noting improper methods which have caused loss of life and describing and illustrating practical methods designed to lessen the danger of timber withdrawals.
- IC 6723. Limestone, by Oliver Bowles and D. M. Banks. 1933. 21 pp. Furnishes information on various branches of limestone quarrying and their economic importance. Refers to dimension stone and discusses uses, quarry methods, and processes of preparation of crushed and broken limestone.
- IC 6724. Protective Clothing in the Mining Industry, by R. D. Currie and W. J. Fene. 1933. 15 pp. Points out advantages gained by miners, company, and public by use of protective clothing and equipment.
- IC 6725. Explosives Accidents in California Metal Mines, by S. H. Ash. 1933. 18 pp. Analyzes explosives accidents as to cause, severity, cost, and size of mine. Especially stresses need of substituting electrical blasting for unsafe blasting methods, using fuse and detonators.
- IC 6726. Safety Practices in Tunneling Operations at the Hetch Hetchy Water-Supply Project, City and County of San Francisco, Calif., by S. H. Ash and C. R. Rankin. 1933. 15 pp., 6 figs. Shows general conditions under which work was carried on, hazards encountered, and means used to insure safety and reduce accident costs.
- IC 6727. Factors and Conditions That Aid in Alinement of Pillar-Extraction Lines in Coal Mining, by J. N. Geyer. 1933. 23 pp., 15 figs. Discusses best engineering practices to employ under various conditions in removing pillars.
- IC 6728. Petroleum Refineries, Including Cracking Plants, in the United States, January 1, 1933, by G. R. Hopkins and E. W. Cochrane. 1933. 28 pp. Lists refineries by years, districts, types, and States; pipe stills by districts; and cracking plants by years, districts and States, and types of process.
- †IC 6729. Manganese. General Information, by R. H. Ridgway. 1933. 31 pp., 4 figs. Outlines salient facts regarding manganese-ore industry of the United States and world. Bibliography.
- †IC 6730. Design, Equipment, and Construction Costs of Davis-Dunkirk Concentrator, Prescott, Ariz., by E. L. Sweeney. 1933. 5 pp., 1 fig. Describes plant designed to treat gold-silver-copper ore and make a single gold-silver-copper concentrate for shipment to a copper smelter.
- †IC 6731. Accident Prevention at the New Black Diamond Coal Mine, Wash., by S. H. Ash and R. W. Smith. 1933. 20 pp. Shows results accomplished by safety work at one mine where management decided that avoidable accidents must be prevented and that essentially all accidents are avoidable.

† Out of print.

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- †IC 6732. Recommendations of the United States Bureau of Mines on Certain Questions of Safety as of February 3, 1933, by the Mine Safety Board. 1933. 43 pp. Lists decisions to date in order of approval, gives reasons for their formulation, and explains their application.
- IC 6733. Evolution of Methane-Detecting Devices for Coal Mines, by L. C. Ilsley and A. B. Hooker. 1933. 12 pp. Discusses some steps in development of methane detection and specially notes more accurate detectors now available.
- IC 6734. Metal-Mine Ventilation, by D. Harrington. 1933. 11 pp. Points out reasons why metal mines must be adequately ventilated and explains what constitutes an efficiently ventilated mine.
- †IC 6735. Cost of Equipping and Developing a Small Gold Mine in the Bradshaw Mountains Quadrangle, Yavapai County, Ariz., by D. C. Minton, Jr. 1933. 10 pp., 3 figs. Gives location and general geological features. Describes prospecting and development, equipment, and operating practice.
- †IC 6736. Mining Methods and Costs at the Teziutlan Copper Mine of the Mexican Corporation, S. A., Teziutlan, Puebla, Mexico, by E. Ph. Herivel. 1933. 16 pp., 2 figs. Describes mining of massive sulphide ore by open-stope-and-pillar and cut-and-fill methods and milling by selective flotation.
- †IC 6737. Petroleum and Natural-Gas Studies of the United States Bureau of Mines, by H. C. Fowler. 1933. 20 pp. Reviews problems studied and research procedure followed in Bureau's early work on oil and gas, notes changes in scope of work concurrent with development in industries, and describes studies being undertaken at present.
- IC 6738. Blasting Practices as They Affect the Roof of Coal Mines in Ohio, Pennsylvania, and West Virginia, by J. N. Geyer. 1933. 11 pp., 4 figs. Describes coal beds and roof in the various States, notes State blasting regulations, and points out methods of protecting roof and advantages gained by improved blasting practices.
- †IC 6739. Milling Methods and Costs at the Golden Cycle Mill, Colorado Springs, Colo., by L. S. Harner. 1934. 18 pp., 4 figs. Presents methods of treating three classes of ore produced at this plant, but deals mainly with processes followed in treating average-grade ore. Gives cost data.
- †IC 6740. Economic Aspects of Gold and Silver, by Scott Turner. 1933. 13 pp., 3 figs. Reviews Government publications giving data on gold and silver and includes reprints of three journal articles on subject by Director of Bureau of Mines.
- †IC 6741. Mining Methods and Costs at the McIntyre Porcupine Mines, Ltd., Schumacher, Ontario, by H. G. Skavlem. 1933. 19 pp., 19 figs. Gives conditions and operating practice at property mining and treating gold ore.
- †IC 6742. Milling Methods and Costs at the Concentrator of the Premier Gold Mining Co., Ltd., Premier, British Columbia, Canada, by D. L. Pitt, W. J. Asselstine, and D. L. Coulter. 1933. 18 pp., 17 figs. Gives location and history of plant, describes operating practice and equipment, and notes costs.
- †IC 6743. Safety Practices and Achievements at the Columbia Mine of the Columbia Steel Co. (subsidiary of the United States Steel Corporation), by D. J. Parker. 1933. 10 pp. Shows results obtained by carefully planned and executed safety program.
- †IC 6744. Methods and Costs at the Granite Quarry and Crushed-Stone Plant of the Weston & Brooker Co., Cayce, S. C., by T. I. Weston. 1933. 13 pp., 13 figs. Shows properties of rock and explains operating methods.
- †IC 6745. About Helium, by Andrew Stewart. 1933. 46 pp. Tells of the discovery of helium and other rare gases and describes their properties. Discusses sources, production, and uses of helium and reviews work of cryogenic laboratory of Bureau. Bibliography.
- IC 6746. A Review of Coal-Mine Fatalities in Indiana during the Fiscal Year October 1, 1931, to September 30, 1932, by C. A. Herbert. 1933. 16 pp. Notes causes of fatalities and makes recommendations for their prevention.
- IC 6747. Use of Electric Power in Castle Gate No. 2 Mine, Utah Fuel Co., by D. J. Parker. 1933. 8 pp. Describes surface and underground electrical installations at a mine where unusual precautions have been taken to safeguard life and property from electrical hazards.
- †IC 6748. Essentials for a Preliminary Report on a Small Lode-Gold Mine or Prospect with Notes on Sampling, by Charles Will Wright. 1933. 12 pp., 1 fig. Written to aid owner of a small gold mine or prospect in preparing a report on his property for purpose of interesting capital.

- IC 6749. Markets for Residential Stone, by Paul Hatmaker. 1933. 14 pp., 1 fig. Outlines in general possibilities open to stone producers or contractors in residential market. Gives physical requirements, dimensions, and data on depreciation and maintenance of such stone, describes construction methods, and points out sales problems.
- IC 6750. Mining Laws of the Irish Free State, by E. P. Youngman. 1933. 12 pp. Presents digest of regulations relative to all phases of prospecting, mining, and administration of mining laws.
- †IC 6751. Onyx Marble and Travertine, by Oliver Bowles and D. M. Banks. 1933. 11 pp. Defines onyx and travertine and describes occurrence and uses.
- IC 6752. Explosions in Utah Coal Mines, 1900-1932, by D. J. Parker. 1933. 15 pp. Summarizes explosion data for 33 years and stresses possible means of prevention.
- IC 6753. Explosions in Colorado Coal Mines, 1833-1932, by G. M. Kintz and E. H. Denny. 1933. 20 pp. Tabulates 119 explosions in Colorado coal mines over a 40-year period, causing death of 797 miners. Suggests measures that might have prevented these explosions and that may avoid further disasters.
- IC 6754. Explosions in Kentucky Coal Mines, January 1, 1884-June 30, 1934, by J. F. Davies and H. B. Humphrey. 23 pp. Analyzes 73 explosions that occurred during 49½-year period and caused 344 deaths and 123 injuries, suggests preventive measures, and cites recommendations of Mine Safety Board.
- IC 6755. The Experimental Mine of the United States Bureau of Mines, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. 1933. 21 pp., 1 fig. Traces history of the Experimental mine, describes property and equipment, and gives brief account of investigations carried on there, chief of which are studies of the explosibility of coal dust. Bibliography.
- IC 6756. Limestone. Part II—Dimension Stone, by Oliver Bowles. 1933. 16 pp. Gives data on prospecting, requisite qualities and uses, quarrying and milling methods and costs, and marketing.
- †IC 6757. Review of Fine Grinding in Ore Concentrators, by A. M. Gow, M. Guggenheim, and W. H. Coghill. 1934. 29 pp., 3 figs. Summarizes and compares data on fine-grinding practice in ore-concentrating plants throughout United States, Alaska, Canada, Mexico, and Cuba, as reported in previous information circulars.
- †IC 6758. Milling Methods at the Lead-Zinc Concentrator of the International Smelting Co., Tooele, Utah, by W. J. McKenna. 1933. 13 pp., 3 figs. Gives an account of ores treated and outlines concentrator operations.
- †IC 6759. Milling Methods at the Oxide Concentrator of the International Smelting Co., Tooele, Utah, by J. J. Bean. 1933. 8 pp., 2 figs. All operations are outlined and metallurgical results shown.
- IC 6760. Explosions in New Mexico Coal Mines, by G. M. Kintz. 1934. 7 pp. Gives circumstances surrounding 17 coal-mine explosions in New Mexico that cost 476 lives, states what might have prevented disasters, and recommends measures to forestall repetitions.
- †IC 6761. Mine Explosions and Fires in the United States during the Fiscal Year Ended June 30, 1933, by D. Harrington and W. J. Fene. 1934. 19 pp. Shows results of studies of 22 explosions in 10 States during fiscal year. Although conditions in a number of States with explosion hazards due to gassy and dusty coal mines have improved unbelievably in past 5 years, new NRA code makes no provision for safety practices, and extreme vigilance will be necessary to avoid serious disasters.
- IC 6762. Operating Coal Mines Without Accidents, by D. Harrington and W. J. Fene. 1934. 8 pp. States that in spite of feeling of many old-school mining men to contrary it is possible to operate coal mines for months at a time without lost-time accidents. Cites 12 mines that operated a year or more without lost-time accidents.
- IC 6763. Accident Experience and Cost in Virginia Coal Mines, 1929 to 1933, Inclusive, by Joseph F. Davies and H. B. Humphrey. 1934. 15 pp. Explains administration of workman's compensation law of Virginia. Reviews accident record of Virginia and compares it with that of other States producing about same amount of coal.

† Out of print.

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- IC 6764. Explosions in Illinois Coal Mines, 1883 to 1932, by C. A. Herbert. 1934. 13 pp. Reviews history of coal-mine explosions in Illinois for 50 years, pointing out that in this half century 764 fatalities were caused thereby. Exhaustive table states causes of explosions and any other known contributory factors, with recommendations for avoidance of future disasters.
- IC 6765. Wyoming Coal-Mine Explosions, 1881 to 1931, by G. M. Kintz. 1934. 20 pp. Presents data covering half century of coal mining in Wyoming, gathered from State inspector's reports and Bureau of Mines publications. Includes tables giving available information on cause, number killed and injured, and possible means of prevention of 68 explosions and gas ignitions.
- IC 6766. Explosions in Virginia Coal Mines, 1893 to 1933, by Joseph F. Davies and H. B. Humphrey. 25 pp. Reviews history of explosions in Virginia coal mines virtually as far back as authentic records exist. In that period 29 explosions took 531 lives, worst disaster being in 1884, with 112 lives lost, and second worst in 1867, with 69 lives lost. Suggests possible means of prevention and quotes Mine Safety Board recommendations.
- IC 6767. Use of Airplanes in Mining and Petroleum Operations—Abstract from an Unpublished Bulletin Manuscript, by Hugh M. Wolfen. 1934. 28 pp. Describes briefly what has been accomplished by use of aircraft in mining and petroleum industries, records costs, and presents available information and suggestions to assist in solving further air-transportation problems in industries under consideration.
- †IC 6768. Manganese, Its Occurrence, Milling, and Metallurgy. Part I, by R. S. Dean, Fred D. DeVaney, and Will H. Coghill. 1934. 98 pp., 7 figs. Comprises following sections: Chapter 1, Physical Properties and Preparation of Metallic Manganese; chapter 2, Manganese in Nonferrous Alloys; chapter 3, Compounds of Manganese; and chapter 4, Occurrence and Ore-Dressing Possibilities of Ores of Manganese in the United States.
- †IC 6769. Manganese, Its Occurrence, Milling, and Metallurgy. Part II, by C. G. Maier. 1934. 68 pp., 10 figs. Includes chapter 5, Thermodynamic Properties of Manganese, and Its Metallurgically Important Compounds. Presents review of literature as well as original calculations for metallic manganese, oxides of manganese, manganese sulphide, manganese carbonate, manganese sulphate, manganese chloride, manganese carbide, and manganese nitride.
- †IC 6770. Manganese, Its Occurrence, Milling, and Metallurgy. Part III, by R. S. Dean, Edmund S. Leaver, and T. L. Joseph. 1934. 90 pp., 17 figs. Includes chapter 6, General Metallurgy of Manganese; chapter 7, Hydrometallurgy of Manganese; and chapter 8, Pyrometallurgical Treatment of Manganese Ores.
- †IC 6771. Manganese, Its Occurrence, Mining and Metallurgy. Part IV. Chapter 9, Ferrous Alloys of Manganese and Their Use in the Steel Industry, by G. R. Fitterer and M. B. Royer. 1934. 59 pp. 19 figs. Discusses manganese in liquid-steel metallurgy, manganese steels (pearlitic, martenitic, and austenitic), and manganese in cast iron.
- †IC 6772. Manganese, Its Occurrence, Milling, and Metallurgy. Part V. Bibliography and Indexes, by M. E. Winslow. 1934. 47 pp. Contains all bibliographic references cited throughout first four parts of report and indexes of report by authors and subjects.
- IC 6773. Silver Yield from Copper Ores and the Effects of 64.64-cent Silver on the Value of Copper Ores Produced in the United States, by Elmer W. Pehrson. 1934. 15 pp., 2 figs. Presents analysis of basic statistical data concerning relation of silver price to value of copper ores mined in the United States, concluding that new silver price is not expected to cause much change in sources of copper production in this country or to increase greatly production of byproduct silver from copper ores.
- IC 6774. Leasing System As Applied to Metal Mining, by W. O. Vanderburg. 1934. 9 pp. Defines leasing, gives brief history of system, discusses advantages and disadvantages, and gives terms ordinarily included in leases.
- IC 6775. How Can the Bureau of Mines Best Serve Mining? (The Bureau and the South), by Milton H. Fies. 1934. 8 pp. Reprint of article from Mining Congress Journal, describing work Bureau of Mines has done for southern mining industry.

† Out of print.

- †IC 6776. Lead and Zinc Mining and Milling in the United States—Current Practices and Costs, by Chas. F. Jackson, John B. Knaebel, and C. A. Wright, abstracted by Chas. F. Jackson. 1934. 50 pp. Abstract of comprehensive bulletin. Discusses modes of occurrence of lead and zinc ores, with descriptions of typical mining and milling practices in United States.
- IC 6777. Mining Laws of British Guiana, by E. P. Youngman. 1934. 30 pp. Outlines ordinances concerned with right to prospect for minerals and to own and operate mines.
- IC 6778. Mining Laws of British Honduras, by E. P. Youngman. 1934. 29 pp. General résumé of mining law and provisions relating to its administration.
- †IC 6779. The Iron Blast Furnace, by T. L. Joseph. 1934. 29 pp. 14 figs. Gives information of more general character than that in detailed Bureau of Mines reports and covers in a broad way important features of blast-furnace investigations.
- †IC 6780. Meerschbaum, by Alice V. Petar. 1934. 6 pp. Describes properties, occurrence, uses, mining and preparation, world production, domestic production and deposits, imports, prices, tariff, and industry in foreign countries; bibliography.
- †IC 6781. Calcium Chloride, by Paul M. Tyler. 1934. 16 pp. Shows commercial importance and uses of calcium chloride, a byproduct in Solvay process for manufacture of sodium carbonate, as a joint product for natural salt brines.
- IC 6782. Greensand, by Paul M. Tyler. 1934. 8 pp. States that, although application of greensand as fertilizer has diminished since latter part of nineteenth century, huge deposits in eastern United States still remain a potential source of potash as well as of a water-softening agency.
- IC 6783. Mining Anthracite without Roof-Fall Accidents at Colonial Colliery, Colonial Colliery Co., Natalie, Pa., by R. D. Currie. 1934. 9 pp. 2 figs. Reviews well-planned safety campaign at large anthracite colliery which has resulted in a remarkable record for reduction of falls-of-roof accidents.
- †IC 6784. Ore-Dressing Bibliography, 1931-32, by T. H. Miller and R. L. Kidd. 1934. 89 pp. Includes 423 items covering all phases of ore-dressing, collated from articles in 75 journals.
- †IC 6785. Summary of Ore-Mining Cost Data, by Chas. F. Jackson. 1934. 47 pp. Presents tabulations of cost from a number of earlier information circulars giving methods and costs at ore-mining operations.
- †IC 6786. Placer Mining in the Western United States. I. General Information, Hand-Shoveling, and Ground-Sluicing, by E. D. Gardner and C. H. Johnson. 1934. 73 pp., 9 figs. Includes detailed information for prospective placer miners on such subjects as the history of placer mining in the West, the general geology of placer deposits, the minerals associated with gold, the location of placer claims on public land, prospecting outfits and provisions, sampling and estimation of placers, classification of mining methods, description of hand-shoveling and ground-sluicing.
- †IC 6787. Placer Mining in the Western United States. II. Hydraulic Mining, Treatment of Placer Concentrates, and Marketing of Gold, by E. D. Gardner and C. H. Johnson. 1934. 89 pp., 16 figs. Describes hydraulic mines in operation in 1932, with detailed account of practices in use, discusses sluice boxes and riffles, and tells how gold and platinum-group metals are separated from concentrates. Laws regulating buying of ore are appended.
- †IC 6788. Placer Mining in the Western United States. III. Dredging and Other Forms of Mechanical Handling of Gravel, and Drift Mining, by E. D. Gardner and C. H. Johnson. 1935. 8 pp., 11 figs. Includes examples of excavation by teams or power equipment, dredging, and drift mining.
- †IC 6789. Amber, by Alice V. Petar. 1934. 13 pp. Gives history, uses, and sources of amber.
- †IC 6790. Asbestos, by Oliver Bowles. 1934. 24 pp. Presents descriptions of principal occurrences of asbestos, first by States and then by countries with notations as to varieties and production data.
- IC 6791. Accident Experience and Cost in Wyoming Coal Mines, by D. J. Parker. 1934. 13 pp. Presents records for Wyoming coal mines that are believed to compare favorably with those of most coal-producing States and are perhaps better than those of most Western States. Shows how improvements can be effected.

† Out of print.

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- †IC 6792. Trends in Practice and Costs of Concentrating Copper Ores, by T. G. Chapman. 1934. 45 pp. Abstract of forthcoming Bureau bulletin on the concentration of copper ores in North America.
- IC 6793. A Million Tons of Anthracite Mined Without a Fatality, by R. D. Currie. 1934. 16 pp., 11 figs. Gives in detail safety-code and safety-organization features at anthracite collieries which have had a remarkable record for safe operation.
- †IC 6794. Consumption and Prices of Nonmetallic Minerals, by Paul M. Tyler. 1934. 50 pp. Summarizes consumption data for pre-war and post-war periods, discusses trend toward national self-sufficiency, background of prices, effects of depression, and price trends, and gives individual tables for principal nonmetallic commodities listing domestic production, imports, apparent consumption, and indexes of consumption and unit value.
- †IC 6795. Mining Limestone by a Caving Method at Crestmore Mine of the Riverside Cement Co., Crestmore, Calif., by C. A. Robotham. 1934. 20 pp., 10 figs. Describes unusual method of mining limestone for cement manufacture, based upon technique employed in copper mining at Ray and Globe-Miami districts, Ariz.
- IC 6796. An Apparatus and Method for the Determination of Helium in Natural Gas, by C. C. Anderson. 1934. 11 pp., 1 fig. Describes apparatus and procedure for rapid and accurate determinations of helium content of natural gas and gaseous mixtures derived from that source.
- IC 6797. The Use of Treated Mine Ties and Timbers in Illinois and Indiana Coal Mines, by C. A. Herbert. 1934. 6 pp. States experience of mining companies using treated mine ties, as far as known, and shows how treatment prolongs the useful life of mine timber.
- †IC 6798. Sand and Gravel Excavation. Part 1. The Power Shovel, the Drag-line Excavator, and the Excavator Crane, by J. R. Thoenen. 1934. 43 pp., 2 figs. Study of the problems arising in the excavation of sand and gravel and their delivery to the treatment plant.
- †IC 6799. Mining Methods and Costs at Herron & Laster Lease, Superior, Ariz., by E. D. Gardner. 1934. 9 pp. Describes methods employed and costs of working small gold mine leased from Magma Copper Co.; it was formerly the Lake Superior & Arizona workings. Emphasis is placed on the fact that equipment of the mine has been improved by utilizing reconditioned second-hand material.
- IC 6800. Mining and Milling Practices at Small Gold Mines, by E. D. Gardner and C. H. Johnson. 1934. 31 pp., 14 figs. Discusses small-scale lode-gold mining and milling.
- IC 6801. Explosions in Indiana Coal Mines, 1878 to 1933, by C. A. Herbert. 1934. 20 pp. Lists coal-mine explosions in Indiana and their causes, as far as information is available. Notes that an unusually large percentage of fatalities are ascribed to this cause and lists decisions of Mine Safety Board that apply to situation.
- IC 6802. Coal-Mine Explosions in West Virginia, 1883-1933, by J. J. Forbes and C. W. Owings. 1934. 51 pp. Analyzes 287 coal-mine explosions, causing death of 2,060 persons, states recommendations, and shows what factors are necessary to prevent these disasters.
- †IC 6803. Value of the Cooperative Method in First-Aid Training, by J. J. Forbes. 1934. 20 pp., 4 figs. Outlines the plan followed in training all employees, the instructor's first-aid course, the seven fundamentals of first aid, and the advantages of cooperative first-aid training.
- †IC 6804. Mining Methods and Costs at El Potosi Mine, El Potosi Mining Co., Chihuahua, Mexico, by Harlan A. Walker. 1934. 38 pp., 20 figs. Describes methods found successful at large Mexican mine, with up-to-date equipment and low labor turn-over, mining silver-lead-zinc sulphide ore.
- †IC 6805. The Explosion and Fire Hazards of Hydrocarbon-Carbon Tetrachloride Mixtures, by G. W. Jones and R. E. Kennedy. 1934. 8 pp. Presents results of tests to determine amount of carbon tetrachloride which must be added to hydrocarbons to make such mixtures nonflammable.
- †IC 6806. Mining Methods and Costs at the Cresson Mine, Cripple Creek, Colo., by A. H. Beebe and C. H. Johnson. 1934. 14 pp., 2 figs. Describes methods employed at mine, which has been most important gold mine in Cripple Creek district in past 2 years, as it shipped an average of 230 tons daily carrying \$10 in gold.

† Out of print.

- IC 6807. Petroleum Refineries, Including Cracking Plants, in the United States, January 1, 1934, by G. R. Hopkins and E. W. Cochrane. 1934. 30 pp. Lists refineries by years, types, and States; pipe stills by districts; cracking plants by years, districts, States, and types of process.
- IC 6808. Natural-Gasoline Plants in the United States, January 1, 1934, by G. R. Hopkins and E. M. Seeley. 1934. 25 pp. Gives data concerning the number, location, daily capacity, and type of natural-gasoline plants as of January 1.
- IC 6809. Coal-Mine Fatalities in Kentucky in 1931, 1932, and 1933, by J. F. Davies and H. B. Humphrey. 1934. 12 pp. Compares fatality ratings for principal coal-mining States from 1931-33 and analyzes causes of deaths in Kentucky, with especial emphasis on 1933.
- IC 6810. Progress in Safety in Coal Mining in the United States, by D. Harrington. 1934. 8 pp. Reprint of article published in the Mining Congress Journal for May 1934. Shows progress made in accident prevention since the Bureau of Mines was first established and lists safety and health requirements under which the mining industry should operate.
- IC 6811. Safety in Mining in 1933, by D. Harrington. 1934. 21 pp. Gives preliminary figures for 1933 on fatal and nonfatal accidents in the coal, metal, and nonmetallic mineral, quarrying, and petroleum industries.
- †IC 6812. Safety Conditions in Liberty Mine, Liberty Fuel Co., Latuda, Utah, by D. J. Parker. 1934. Gives results of examination of mine, showing how management has installed intelligent safety practices.
- IC 6813. Review of Illinois Coal-Mine Fatalities for 1933, by A. U. Miller. 1934. 35 pp. Study of the fatal injuries reported by district coal-mine inspectors in 1933.
- †IC 6814. Sand and Gravel Excavation. Part 2. Power Scraper, Slackline Cableway Excavator, and Hydraulic Giant, by J. R. Thoenen. 1934. 95 pp., 6 figs. Discusses the use of the power scraper, slackline cableway excavator, and hydraulic monitor.
- †IC 6815. The Mining Operation at the Property of the Britannia Mining and Smelting Co., Ltd., Britannia Beach, B. C., by C. V. Brennan. 1934. 36 pp., 27 figs. Describes methods particularly applicable to ore bodies mined.
- †IC 6816. Waste Filling of Stopes, by Charles F. Jackson. 1935. 24 pp., 31 figs. Describes purpose of waste filling, filling materials, and methods of procuring, storing, transporting, and handling such material. Summarizes data contained in a number of previous information circulars.
- IC 6817. Asbestos—General Information, by Oliver Bowles. 1935. 21 pp. Gives sources of supply, origin, mode of occurrence, physical properties, composition, uses, mining methods, world production and consumption, and foreign trade in asbestos.
- IC 6819. Coal-Mine Explosions and Fires in the United States During the Fiscal Year Ended June 30, 1934, by D. Harrington and W. J. Fene. 1935. 16 pp. Reviews and analyzes record for year from July 1, 1933, to June 30, 1934, during which only 28 deaths were caused by explosions.
- IC 6820. Some Suggestions as to Safety Rules to be Printed or Mimeographed for the Guidance of Bituminous-Coal-Mine Employees, by D. Harrington, J. J. Forbes, and W. J. Fene. 1935. 46 pp., 2 figs. Not only gives general rules applicable to all employees but also carefully phrased regulations for employees of all occupations concerned with bituminous-coal mining.
- †IC 6821. Tungsten—Part I, by William O. Vanderburg. 1935. 30 pp., 1 fig. Abstract of bulletin to be printed later. Presents general study of domestic tungsten industry, reviews uses of tungsten, and its importance as a war mineral.
- †IC 6822. Mica, by F. W. Horton. 1935. 56 pp., 10 figs. Covers salient features of occurrence and mining of sheet mica in the United States and preparation of mica for market; presents results of study of properties of domestic and foreign micas; and discusses mica-trade outlook and future of domestic mica industry.
- †IC 6823. Mining Methods and Costs at the Mine of the St. Joseph Lead Co., Atlanta, Idaho, by E. D. Gardner. 1935. 7 pp.
- †IC 6824. Mining and Milling Methods at the Big Jim Mine, Oatman, Ariz., by C. H. Johnson. 1935. 12 pp., 1 fig. Gives data on mining and milling methods; also describes shaft repair, surface plant, and underground development at small gold mine and mill.

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- †IC 6825. Summary of Drifting and Crosscutting Cost Data, by C. F. Jackson. 1935. 14 pp., 17 figs. Tabulates information collated from 33 information circulars covering as many mines.
- †IC 6826. Sand and Gravel Excavation. Part 3. Hydraulic Dredge, Clamshell Dredge, Ladder Dredge, and Dipper Dredge, by J. R. Thoenen. 1935. 36 pp., 8 figs. Discusses the use of types of dredges named.
- IC 6827. Safety Posters at the Calumet & Hecla Mine, by F. S. Crawford. 1935. 9 pp., 2 figs. Stresses value of education in safety work, showing two posters used by the Calumet & Hecla Co. as a method of making the workers safety conscious.
- IC 6828. A Review of Coal-Mine Fatalities in Indiana During the Last 3 Months of 1932 and the Calendar Year 1933, by C. A. Herbert. 1935. 22 pp. Reviews cause of 50 coal-mine fatalities in Indiana during 15 months.
- IC 6829. Bituminous-Coal-Mine Safety Inspection Outline, by G. W. Grove and W. J. Fene. 1935. 26 pp. Gives outline used by Bureau of Mines Safety Division field engineers in inspecting coal mines with regard to safety practices and equipment.
- †IC 6830. Minor Mineral Fertilizer Materials, by Bertrand L. Johnson. 1935. 35 pp. Discusses uses of calcium, copper, iron, magnesium, manganese, sulphur, and zinc to remedy soil deficiencies and prevent diseases peculiar to various crops.
- IC 6831. The Joseph A. Holmes Safety Association and Its Awards, by D. Harrington. 1935. 100 pp. Reviews history of organization of Joseph A. Holmes Safety Association, and prints all citations that have accompanied rewards bestowed to date.
- IC 6832. Maintaining the Permissibility of Electric Cap Lamps, by D. H. Zellers and A. B. Hooker. 1935. 12 pp. Gives directions for keeping permissible electric lamps in such condition that they will afford maximum light and protection for miners.
- †IC 6833. Sodium Sulphate, by Paul M. Tyler. 1935. 39 pp., 1 fig. Describes uses, domestic deposits, foreign industry, and manufacture of sodium sulphate, which is particularly in demand by paper and glass industries. Its three commercial forms are anhydrous sodium sulphate, salt cake, and Glauber's salt.
- †IC 6834. The Fertilizer Industries, by Paul M. Tyler. 1935. 41 pp., 1 fig. Supplies need for general paper devoted to fertilizer industry, which will be both an introduction and a supplement to four specialized reports already issued.
- IC 6835. Review of Literature on Effects of Breathing Dusts, with Special Reference to Silicosis. Part I, by D. Harrington and Sara J. Davenport. 1935. 68 pp. First of series in which literature on dust diseases is collated, with special reference to mining and allied industries.
- †IC 6836. Milling Methods and Costs at the Concentrator of the St. Joseph Lead Co., Atlanta, Idaho, by E. D. Gardner. 1935. 10 pp., 4 figs. Principal metal produced from the ore treated is gold. Ore also contains an appreciable amount of silver.
- IC 6837. Blasting Practices and Explosives Accidents in Utah Coal Mines, by D. J. Parker. 1935. 15 pp. Commends excellent practices in use in Utah and reviews accidents incident to blasting, with suggestions as to future avoidance.
- IC 6838. A Few of the Opportunities for Obtaining Accident-Prevention Information Available to Mine Management and Employees Through the United States Bureau of Mines, by C. A. Herbert. 1935. 6 pp., 3 figs. Outlines an accident-prevention program based on premise that most mine accidents are preventable. Gives as example methods used at one corporation's mine in Indiana.
- IC 6839. Essentials in Developing and Financing a Prospect into a Mine, by Charles Will Wright. 1935. 22 pp. Is of interest to those who are actually developing a mineral prospect or planning to do so, as well as to investors who are considering problem of financing development of the prospect, so that they may know what risks are and what capital expenditures are necessary before a prospect may become a mine.
- IC 6840. Review of Literature on Effects of Breathing Dusts, with Special Reference to Silicosis. Part II-A, by D. Harrington and Sara J. Davenport. 1935. 49 pp. Continues series begun with Information Circular 6835 and includes abstracts from literature on prevention of dust diseases.

† Out of print.

- †IC 6841. Procedure for Testing Explosives for Acceptability for Use in Forest Service Work, by C. E. Munroe. 1935. 7 pp. Describes use of Bureau of Mines explosives-testing facilities to test explosives for U. S. Forest Service.
- †IC 6842. Gold and Silver Custom Plants, by E. D. Gardner. 1935. 4 pp. Briefly reviews methods of treatment used at plants handling gold and silver ores and includes partial list of custom plants visited by writer in Arizona, California, Colorado, Nevada, and New Mexico, with data on their capacity and rates.
- IC 6843 (Revised). Prospecting for Lode Gold, by E. D. Gardner, supervising engineer, Bureau of Mines, and Locating Claims on the Public Domain, by Fred W. Johnson, Commissioner of the General Land Office. 1935. 18 pp. Discusses methods used and equipment needed in prospecting for lode gold, and lists principal laws and regulations pertaining to location of lode claims on public lands. (Supersedes issue of June 1935.)
- †IC 6844. Jade, by Alice V. Petar. 1935. 16 pp. Includes information on properties, history, geographical distribution, mining methods, and industry in foreign countries.
- †IC 6846. Placer-Mining Methods of E. T. Fisher Co., Atlantic City, Wyo., by Charles L. Ross and E. D. Gardner. 1935. 10 pp. 1 fig. Describes successful placer where about 2,800 cubic yards of gravel is dug daily and washed in movable plant with gold-dredge trommel and standard-dredge sluice boxes at a total cost of about 12 cents per cubic yard.
- †IC 6847. The Rare Earths, by Alice V. Petar. 1935. 45 pp. Describes properties of rare earths; gives their history, occurrence, chemical separation, uses, and minerals; summary of the industry in the United States and foreign countries; imports, exports, tariff, and markets and prices; and a bibliography.
- IC 6848. Review of Literature on Effects of Breathing Dusts, with Special Reference to Silicosis. Part II-B. Chapter 4. Prevention of Dust Diseases. Sections 3-5, by D. Harrington and Sara J. Davenport. 1935. 93 pp. Presents balance of material comprising chapter 4 in series presenting abstracts and quotations from literature on dust diseases collected from many sources. Includes bibliography of all references cited. This is the third circular of series.
- IC 6849. List of Standard Starters Available to Prospective Builders of Permissible Outfits, by H. B. Brunot and M. W. Means. 1935. 8 pp. Lists starters that have been tested in accordance with Schedule 2D.
- IC 6850. Petroleum Refineries, Including Cracking Plants, in the United States, January 1, 1935, by G. R. Hopkins and E. W. Cochrane. 1935. 32 pp. Gives annual tabulation of refineries in operation during calendar year 1934, by States, listing operating company, location, railroad facilities, type of refining apparatus, and capacity.
- †IC 6851. Mining Methods and Costs at the Eureka Standard Mine, by E. D. Gardner. 1935. 14 pp., 1 fig. Gives location; geology of ore deposits; history; surface equipment; methods of development; stoping, hoisting, underground haulage, pumping, ventilation, fire protection, and surface trucking; labor, smelting, and other costs.
- †IC 6852. Mining and Milling Tungsten Ores, by Wm. O. Vanderburg. 1935. 47 pp., 17 figs. Second part of a general study of the domestic tungsten industry; general information in IC 6821. Includes study of types of deposits, prospecting, mining methods; concentration of ores; determining WO_3 content; and conservation of resources.
- †IC 6853. Questions and Answers on First-Aid Training, by J. J. Forbes and M. J. Ankeny. 1935. 19 pp. Gives 171 questions and answers compiled from the Bureau's Manual of First-Aid Instruction for use in first-aid training.
- †IC 6854. Induction Prospecting for Shallow Ore Deposits and Small Metallic Objects, by J. W. Joyce. 1935. 18 pp., 22 figs. Inquiries received by the Bureau concerning application of geophysical methods to prospecting for small buried metallic objects are answered as nontechnically as possible.
- IC 6855. Accident Costs and Safety Dividends, by D. Harrington. 1935. 29 pp. Gives figures showing progress made in past 24 years in prevention of accidents in mining in the United States and resultant savings.

† Out of print.

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- IC 6856. Sand and Gravel Excavation. Part 4. Car and Locomotive Haulage; Hoist and Rope Haulage; Remote-Control Haulage, by J. R. Thoenen. 1935. 46 pp., 4 figs. Discusses haulage equipment in general, particularly the use of industrial cars with locomotives or hoists as the motive power.
- IC 6857. Review of Literature on Effects of Breathing Dusts, with Special Reference to Silicosis. Part III-A, by D. Harrington and Sara J. Davenport. 1935. 55 pp. The fourth of a series of compilations of articles on the subject of dust diseases.
- †IC 6858. Tabular Index of Bureau of Mines Information Circulars on Mining and Milling Methods, by J. R. Thoenen. 1935. 105 pp. Tabulates, by subjects, data discussed in nearly 250 information circulars on mining and milling methods and costs in metal and nonmetal mines and concentrators, prepared by Bureau's Mining Division.
- IC 6859. Mine Safety Decision 27, by the Mine Safety Board. 2 pp. 1935. Reviews decision of Board, approved by Bureau of Mines Director, that lining of all mine shafts be fireproof, smooth, and without projections.
- IC 6860. Accident Experience and Direct Cost in Some Colorado Coal Mines, 1929-33, by E. H. Denny and F. R. Jennings. 1935. 22 pp. Presents searching analysis of accidents and their costs in Colorado coal industry over a 5-year period.
- IC 6861. Accident Experience and Cost in California Metal Mines, by S. H. Ash. 32 pp. 1935. Points out certain factors in accident experience and mining practice that affect cost to metal-mining industry of California.
- IC 6862. Some Observations as to Safety Hazards in 47 Northern Colorado Subbituminous-Coal Mines, by E. H. Denny. 1935. 15 pp. Describes hazards noted in 47 coal mines where samples were being taken to assist code authorities in classifying coals.
- IC 6863. Falls of Coal and Rock on Man-Trips in Bituminous-Coal Mines, by C. W. Owings. 1935. 7 pp. Describes a number of accidents involving man-trips and indicates probable causes. Shows way of preventing similar accidents.
- IC 6864. Accidents in Tennessee Coal Mines, by Frank E. Cash. 16 pp. 1935. Analyzes fatal accidents in coal mines of Tennessee and gives pertinent factors in tabular and descriptive form, with suggestions to operators, workers, and State Division of Mines for reduction of accidents.
- IC 6865. Electric Cap Lamps in Alabama Mines, 1935, by Frank E. Cash. 1935. 6 pp. Gives results of recent survey of electric-lamp installations in Alabama mining district; shows misuse, increase in use, and relation to certain classes of accidents of these installations.
- IC 6866. Recent Trends in Design and Construction of Copper Concentrators in the Southwest, by C. E. Rork. 1935. 15 pp., 3 figs. Discusses mechanical improvements that have gradually been incorporated in copper-milling plants of the Southwest in past 14 years, power requirements for concentrators, use of large units of equipment, and effect of plant capacity on cost.
- IC 6867. Silicosis as Affecting Workmen and Operations, by D. Harrington. 1936. 14 pp. Reprint of speech given at fall meeting of American Institute of Mining and Metallurgical Engineers in San Francisco; emphasizes fact that prevention of ill health in mining is just as definitely an engineering problem as prevention of accidents.
- IC 6868. Coal-Mine Fatalities in Kentucky in 1934, by Joseph F. Davies and H. B. Humphrey. 1936. 14 pp. Summarizes information compiled from reports on fatal accidents in Kentucky coal mines during 1934, giving data on causes of accidents and suggesting measures for future prevention.
- †IC 6869. Asbestos—Milling, Marketing, and Fabrication, by Oliver Bowles. 1936. 26 pp., 2 figs. Third report in series on asbestos. This report deals chiefly with milling and marketing, although fabrication is so important brief references to principal processes are included.
- IC 6870. Coal-Mine Explosions and Fires in the United States During the Fiscal Year Ended June 30, 1935, by D. Harrington and W. J. Fene. 17 pp. 1936. Stresses fact that although there were fewer explosions in 1935 than in 1934 there were more deaths—an evidence of carelessness. Record is, however, much better than record for 20 years preceding 1929, when there was an average of 265 persons killed yearly in mine explosions.
- IC 6871. How to Use Permissible Explosives Properly, by D. Harrington and S. P. Howell. 1936. 43 pp. Describes permissible explosives and gives careful directions for using them with a maximum of safety.

† Out of print.

- IC 6872. Methods of Development and Pillar Extraction in Mining the Pittsburgh Coal Bed in Pennsylvania, West Virginia, and Ohio, by J. W. Paul and L. N. Plein. 1936. 31 pp., 22 figs. Deals with engineering problems as they influence the development of varied plans of mining, and describes general types of mining plans that with a minimum of mine development give high recovery ratios and low accident rates.
- †IC 6873. A Note on the Use of Ultraviolet Lamps in Mines for Rapid Determination of Scheelite in Ores by Fluorescence, by William O. Vanderburg. 1936. 3 pp., 1 fig. Gives in simple language description of application of fluorescence in tungsten-mining industry. Ultraviolet-radiation apparatus is illustrated.
- †IC 6874. Methane-Indicating Detectors Prove Dependable in Sampling Air in Anthracite Mines, by R. D. Currie. 1936. 24 pp., 3 figs. Shows practicability of two permissible methane-indicating detectors as proved by extensive tests in return airways of mines in anthracite region, in most of which samples and readings were taken.
- †IC 6875. Sand and Gravel Excavation. Part 5. Motor-Truck Haulage, Pumps and Pipelines, Barges and Towboats, Aerial Trams, by J. R. Thoenen. 1936. 74 pp., 8 figs. Summarizes the technical problems involved in the use of motor trucks, conveyor belts, pumps and pipelines, barges and towboats, and aerial trams for transportation, with especial reference to sand and gravel.
- †IC 6876. Mineral Industries Survey of the United States—Idaho, Shoshone County, Coeur d'Alene District. The Silver Belt and the Sunshine Mine of the Coeur d'Alene District, by C. E. Julihn and F. W. Horton. 1936. 16 pp., 6 figs. First paper of series that will give results of mineral industries survey initiated by Bureau of Mines. Is based upon reconnaissance of prospects, mines, and plants in Shoshone County, Idaho.
- IC 6877. Progress Report on Investigation of Detachable Rock-Drill Bits, by McHenry Mosier. 1936. 9 pp., 1 fig. Attempts to determine field for use of detachable bits in metal mines of United States by correlating data developed through experience in mines using these bits.
- IC 6878. Notes on Testing and Explosibility of Coal Dusts and a Proposal to Have an International Test Method, by George S. Rice and H. P. Greenwald. 1936. 8 pp., 1 fig. Presents essentially paper read by senior author at international conference on mine safety research, Dortmund, Germany, in September 1935.
- †IC 6879. Sand and Gravel Excavation. Part 6. Mining Methods, by J. R. Thoenen. 1936. 46 pp., 1 fig. Concludes series of papers on sand and gravel excavation with explanation of mining methods as applied to production of these materials. Includes comprehensive bibliography of references to entire subject of sand and gravel excavation.
- †IC 6880. Mining Methods and Costs at the Park City Consolidated Mines Co., Park City, Utah, by Gloyd M. Wiles. 1936. 13 pp., 5 figs. This company during the first 10 months of 1935 produced 62,193 tons of ore averaging 0.0364 ounce of gold and 12.85 ounces of silver to the ton.
- †IC 6881. Trends in White Pigment Consumption, by Paul M. Tyler. 1936. 15 pp., 3 figs. Visualizes substantial expansion in use of paint and consequently in aggregate demand for paint materials, but with respect to products of mining industry calls attention to rapid rise of titanium pigments, a slightly upward trend for white lead, and possibly even a downward trend for lithopone.
- †IC 6882. Alums and Aluminum Sulphate, by John B. Umhau. 1936. 32 pp., 1 fig. Describes alums with their uses and substitutes, reviews history, discusses methods of production, and includes data on imports, exports, tariff history, consumption, markets, and prices. Gives list of producers, and bibliography.
- IC 6883. Patents on Geophysical Prospecting Issued in the United States, England, Canada, Australia, Germany, France, and Russia, by W. Ayvazoglou. 1936. 136 pp. Gives abstracts of 545 patents, with author, title, number, and date of each.
- IC 6884. Lime, by Oliver Bowles and D. M. Banks. 1936. 37 pp. Defines lime and describes varieties and properties; reviews history of industry; names raw materials; relates uses; reviews production data; relates method of quarrying limestone for lime manufacture; gives methods of manufacture; and includes information on storage and shipment, markets and prices, and foreign trade, as well as a bibliography.

† Out of print.

Information Circulars

- IC 6885. Mining and Grinding Methods and Costs at the Claycraft Co. Shale Pit, Taylor Station, Columbus, Ohio, by E. J. Lintner. 1936. 10 pp., 8 figs. Describes procedure at efficiently managed shale pit in Middle West.
- † IC 6886. The Shifts in Sources of Chromite Supply, by R. H. Ridgway. 1936. 11 pp., 3 figs. Includes discussion of economic factors affecting chromite industry in all countries that are sources of chromite. Includes two "pie" charts and maps of the world, with percentage of world supply shown by countries.
- IC 6887. Mining and Grinding Methods and Costs at the L. W. Camp Co. Shale Pit, Akron, Ohio, by E. J. Lintner. 1936. 10 pp., 4 figs. Describes geology of region and early shale-mining operations there. Discusses methods and costs at this shale pit.
- IC 6888. Ringelmann Smoke Chart, by Rudolf Kudlich. 1936. 3 pp. Discusses development and history of Ringelmann smoke chart and describes its use in this country.
- IC 6889. Mining and Grinding Methods and Costs at the Camp Bros. Co. Shale Pit, Mogadore, Ohio, by E. J. Lintner. 1936. 11 pp., 4 figs. Gives history and geology of the district, gives data on firing behavior of brick made from clay, describes drilling and blasting methods, with information on grinding, a flow sheet, and costs of operation.
- IC 6890. Coal-Mine Fatalities in Alabama, 1931-34, by Frank E. Cash. 1936. 33 pp. Describes circumstances surrounding and suggests responsibility for all fatal accidents in Alabama coal mines from 1931 to 1934, inclusive.
- † IC 6891. Design and Operation of a 4-Ton-Per-Hour Gold and Silver Ore-Sampling Plant, by E. D. Gardner and W. A. Leddell. 1936. 40 pp., 12 figs. Describes erection of sampling plant and gives lists of materials required to build and operate it. Includes large working drawings of plant and its parts.
- IC 6892. Review of Literature on Effects of Breathing Dusts with Special Reference to Silicosis. Part III-B. Chapter 5. Economic and Legal Aspects of Dust Diseases in Industry (sections 3 and 4), by D. Harrington and Sara J. Davenport. 1936. 68 pp. Concludes series of information circulars issued by Bureau presenting abstracts of literature connected with subject of silicosis.
- IC 6893. Longwall Mining Methods in Some Mines of the Middle Western States, by Albert L. Toenges. 1936. 62 pp., 15 figs. Describes longwall methods used in 12 mines in Illinois, Kansas, Missouri, Arkansas, Oklahoma, and Iowa. This paper is the first to be prepared by the recently revived coal-mining section of the Mining Division.
- IC 6894. Electrical Viewpoint in a Complete Safety Survey of a Coal Mine, by E. J. Gleim. 1936. 18 pp. Gives suggestions for safety rules both on surface (at transformer stations, tipples, cleaning plants, hoist rooms, substations, fan houses, shops, lamp houses, oil houses, and overhead circuits) and underground (at transformer rooms, substations, pump rooms, compressor stations, locomotives, portable equipment, electric heaters, and trolley, feeder, and lighting circuits).
- IC 6895. Explosions of Coal Dust in Tipples and Cleaning Plants and Some Suggestions on Preventing Them, by W. J. Fene and C. W. Owings. 1936. 9 pp. Shows that circumstances often favor explosions of coal dust in tipples and cleaning plants, gives examples of such explosions, and shows how they may be prevented.
- IC 6896. Accident-Cost Data on Most of the Bituminous Coal Mined East of the Mississippi River from April 1, 1934, to January 31, 1935, by J. J. Forbes and C. W. Owings. 1936. 17 pp. Compares cost of accidents in bituminous-coal mines and margin between receipts and cost of producing and selling coal. Shows that in some districts cost of accidents "eats up" any possible profit.
- IC 6897. Natural-Gasoline Plants in the United States, January 1, 1936, by G. R. Hopkins and E. M. Seeley. 1936. 23 pp. Gives data on number, location, daily capacity, and type of natural-gasoline plants as of January 1. Total number has decreased from 869 on January 1, 1934, to 793.

† Out of print.

- IC 6898. Costs of Trucking and Packing Ore in Western Gold-Mining Districts, by E. D. Gardner. 1936. 17 pp., 4 figs. Describes methods of transporting ore and concentrate and tabulates cost; operations described are in Nevada, Colorado, Utah, New Mexico, Montana, Idaho, and Oregon. Includes discussion of comparative efficiency of trucks, burros, mules, and horses.
- IC 6899. Geophysical Prospecting for Underground Waters in Desert Areas, by F. W. Lee. 1936. 27 pp., 27 figs. Describes work done in locating underground waters in Humboldt River Valley, Nevada, by a field party working under the direction of the FERA. Concludes with summary of history of divining rod.
- IC 6900. Mining and Milling Methods and Costs at the Yellow Aster Mine, Randsburg, Calif., by Corwin L. Cooper. 1936. 21 pp., 2 figs. Describes reclaiming of old tailings and milling and cyanidation methods and costs at efficiently operated California gold mine.
- †IC 6901. Gold Mining and Milling in the Black Mountains, Western Mohave County, Ariz., by E. D. Gardner. 1936. 59 pp., 12 figs. Reviews geology and historical background in the Oatman, Katherine, Pilgrim, Virginia, Mocking Bird, Gold Bug, and Eldorado Pass districts and describes individual gold-mining operations, many visited in 1935.
- IC 6902. Reconnaissance of Mining Districts in Pershing County, Nev., by William O. Vanderburg. 1936. 57 pp. 7 figs. Describes the 36 districts within Pershing County and gives up-to-date information on active and inactive mining properties and their production.
- IC 6903. The New Bureau of Mines Southern Experiment Station at the University of Alabama, Tuscaloosa, Ala., by Milton H. Fies. 1936. 7 pp. Reprint of address made at dedication, suggesting problems suitable for research.
- IC 6904. Milestones in Mine-Safety Legislation, by L. C. Ilsley. 1936. 12 pp. Reviews the history of laws in Great Britain and the United States that were necessitated by the dangerous conditions under which miners work.
- IC 6905. Gold Mining and Milling in the Black Canyon Area, Yavapai County, Ariz., by Jos. R. Guiteras. 1936. 51 pp., 9 figs. Describes briefly mining and milling of gold and silver ores in Black Canyon and neighboring mining districts in Yavapai County, Ariz.
- †IC 6906. Petroleum Refineries, Including Cracking Plants, in the United States January 1, 1936, by G. R. Hopkins and E. W. Cochrane. 1936. 33 pp. States that on January 1, 1936, 647 refineries were completed or under construction compared with 638 in 1935, with a total daily capacity of 4,163,946 barrels compared with 4,072,400 barrels in 1935.
- IC 6907. Hot Milling of Rock-Drill Bits at the Mines of the Vinegar Hill Zinc Co., Platteville, Wis., by Wing G. Agnew. 1936. 2 pp., 1 fig. Describes simple method of hot-milling drill bits suitable for mines that do not have enough steel to sharpen to warrant equipping an elaborate shop.
- IC 6908. Underground Mill at the Doyle Mine, Shullsburg, Wis., by Wing G. Agnew. 1936. 4 pp. Describes unique method of working and preparing concentrates at a small lead-zinc mine employing 17 men.
- IC 6909. Some Factors Affecting an Accident-Prevention Program in Metal Mining in California, by S. H. Ash and Emory Smith. 8 pp. 1936. Describes safety plan worked out by Bureau of Mines, California State Industrial Accident Commission, and mineral committee of California State Chamber of Commerce, under which mining companies are allowed reduction on insurance rate by complying with certain safety requirements.
- IC 6910. Mining, Treatment, Methods, and Costs at the Gifford Hill & Co. Sand and Gravel Plant at Hoot Spur near Texarkana, Tex., by J. W. Higgs. 1936. 11 pp., 7 figs. Plant combines some features of dredging and some of dry-pit operation, as material is excavated in a dry pit with a dragline, hauled to the plant in cars, and pumped.
- IC 6911. Progress Report No. 2 on Investigation of Detachable Rock-Drill Bits, by McHenry Mosier. 1936. 20 pp., 3 figs. Gives results of investigations at following 10 mines: Geneva, Soudan, Greenwood, Bates, Montreal, Vulcan, Calumet & Hecla, Champion, Homestake, and Cleveland-Cliffs.
- IC 6912. Quarrying and Crushing Methods and Costs at the Avon Mountain Trap-Rock Quarry of the Atlas Sand, Gravel & Stone Co., West Hartford, Conn., by John S. Dunning. 1936. 7 pp., 2 figs.

† Out of print.

Information Circulars

- IC 6913. Mining and Grinding Methods and Costs at the Clay City Pipe Co. Clay Mine, Uhrichsville, Ohio, by E. J. Lintner. 1936. 16 pp., 10 figs. Describes procedure and equipment at efficiently managed clay mine.
- IC 6914. Mining and Milling Methods and Costs, Hog Mountain Gold Mining & Milling Co., Alexander City, Ala., by N. O. Johnson. 1936. 23 pp., 2 figs. Describes methods of mining and milling used at property where gold was first discovered in 1839. Gold is obtained from sulphide ores.
- †IC 6915. Some Problems of Respiratory Protection in the Petroleum Industry, with Suggestions for Their Solution, by G. M. Kintz and H. C. Fowler. 1936. 12 pp. Describes dangerous atmospheres likely to be encountered by workers in the petroleum industry, and the various types of equipment available that give respiratory protection.
- †IC 6916. Competitive Conditions in the International Coal Trade, by J. R. Bradley. 1936. 42 pp., 1 fig. Discusses coal trade in different countries of the world and laws regulating the movement of coal from one country to the other.
- IC 6917. Pebble-Phosphate Accident Experience, by Frank E. Cash and Claud P. Dempsey. 1936. 10 pp. Analyzes accident record of Florida pebble-phosphate district for benefit of phosphate-mining companies.
- †IC 6918. List of Devices for Respiratory Protection Approved by the U. S. Bureau of Mines, by W. P. Yant. 1936. 6 pp. Brings up to date list of approved respiratory devices last published in IC 6845.
- IC 6919. Some Suggestions on the Prevention of Electrical Accidents in Coal Mines, by D. Harrington, C. W. Owings, and E. R. Maize. 1936. 14 pp. Gives a number of carefully prepared rules for avoiding accidents in connection with electrical coal-mine equipment.
- IC 6920. Quarrying and Crushing Methods and Costs at the Plainville (Conn.) Trap-Rock Quarry of the New Haven Trap Rock Co., by A. L. Worthen. 1936. 23 pp., 9 figs. Describes methods used at quarry, long established, with unusually good accident record and doing much for welfare of employees.
- IC 6921. Mining and Grinding Methods and Costs at the Dennison Sewer Pipe Co. Clay Mine, Dennison, Ohio, by E. J. Lintner. 1936. 16 pp., 10 figs. Describes practice at clay mine in Tuscarawas County, Ohio, a center of the ceramic industry.
- IC 6922. Some Suggestions on the Safe Handling of Electric-Shovel Trailing Cables in Open-Pit Mines, by F. S. Crawford. 1936. 10 pp. Describes methods used to protect workmen whose duties involve work in the neighborhood of trailing cables, in Florida phosphate field, Pennsylvania quarries, Illinois, Iowa, and Indiana coal fields, and operations in Western States and Lake Superior district.
- IC 6923. Shaft Sinking with a Shot Drill, Idaho Maryland Mine, Grass Valley, Calif., by J. B. Newson and C. F. Jackson. 1936. 10 pp., 1 fig. Describes sinking of shaft 60 inches in diameter with a shot drill, as employed at the Idaho Maryland mine.
- IC 6924. Bureau of Mines Activities in the Field of Building Materials, compiled by D. M. Banks. 1937. 51 pp. Collates all publications by members of Bureau personnel on subject of building materials.
- IC 6925. Suggested Methods for the Reduction of Mine Accidents, from the Viewpoint of the Safety Engineer, by E. H. Denny. 1936. 6 pp. Reprint of address delivered before Mine Inspectors' Institute of America, Denver, Colo., in June. Summarizes various features of mine safety that may engage attention of conscientious mine safety engineer.
- †IC 6926. Open Schedules for Gold and Silver Ores and Concentrates at Western Custom Smelters, by E. D. Gardner and Paul T. Allsman. 1936. 25 pp. One of series of papers designed for assistance of operators of small gold and silver mines in West; discusses smelting schedules, smelting practices that have a bearing on rates, and reasons for penalties or credits for certain constituents of ores.
- IC 6927. Coal-Mine Explosions and Coal- and Metal-Mine Fires in the United States During the Fiscal Year Ended June 30, 1936, by D. Harrington and W. J. Fene. 1936. 17 pp., 1 fig. Summarizes mine explosions by States, gives causes, compares lighting in mines where explosions have occurred, and discusses mine fires.

- IC 6928. Mining Methods Used in the Grundy Coal Field of Buchanan County, Va., by Albert L. Toenges and Robert L. Anderson. 1936. 43 pp., 10 figs. Describes equipment and mining practice in coal field now in process of development and discusses methods used at nine mines. Gives tables on hours of labor and mine costs.
- IC 6929. Mining and Grinding Methods and Costs at the Evans Pipe Co. Clay Mine, Uhrichsville, Ohio, by E. J. Lintner. 1936. 18 pp. 11 figs. One of series being issued by Bureau describing clay mining, crushing, and grinding methods at typical operations in Tuscarawas County (Ohio) clay center.
- IC 6930. Consumption of Primary and Secondary Tin in the United States in 1935, by E. W. Pehrson, John B. Umhau, and M. E. Trought. 1936. 12 pp. Gives statistical data regarding tin used in the United States by industries; includes stocks, purchases, plant losses, and plant scrap.
- †IC 6931. Mineral Industries Survey of the United States: California, Kern County, Mojave District—the Golden Queen and Other Mines of the Mojave District, California, by C. E. Julihn and F. W. Horton. 1937. 42 pp., 13 figs. Describes the district and its geology, and tells of discoveries that led to finding of rich deposits on Soledad Mountain, Bowser's Hill, and Tropico Hill. It includes description of operating mines and mills and methods of mining and milling employed. Illustrations include excellent aerial views of region.
- IC 6932. Dust-Prevention Treatment of Solid Fuels, by L. D. Schmidt. 1937. 10 pp. Presents information to answer numerous inquiries received by Bureau as to dust-prevention treatment of coal and coke. Material is based upon publications by others and on communications to the writer.
- IC 6933. Curves for the Classification of Coal, by J. F. Barkley and L. R. Burdick. 1937. 6 pp. 6 figs. Summarizes results of Sectional Committee on Classification of Coals of American Society for Testing Materials and includes curves that can be used for solving formulas quickly.
- IC 6934. Résumé of Work of the Nonmetals Division, Calendar Year 1936, by Oliver C. Ralston and A. George Stern. 1937. 12 pp. Describes technologic investigations of the Bureau on nonmetallic minerals under four headings: 1, Occurrence, composition, and properties; 2, purification, preparation, and beneficiation; 3, processing and utilization; 4, new facilities for new problems.
- IC 6935. Résumé of Research and Technologic Work Relating to Coal Conducted by the Technologic Branch during 1936, by Arno C. Fieldner. 1937. 14 pp. Describes work of various divisions of Technologic Branch of the Bureau during past calendar year on fuel inspection and coal analyses, agglutinating value, grindability, constitution, weathering, and plasticity of coal, coal-mining methods, fires in anthracite mines, toxic gases from explosives, investigation of gallery tests for permissible explosives, "strength" of explosives, tests of permissibility of explosives, permissible electrical equipment, Experimental mine, movement of strata in coal mines, preparation of coal, coal utilization, etc.
- IC 6936. Progress Report No. 3 on Investigation of Rock-Drill Bits, by McHenry Mosier. 1937. 27 pp. 1 fig. Presents comparative costs of drilling with conventional and detachable bits and describes the operating practice in rock-drilling and the reconditioning of drill steel and bits at 10 mines, located in Tennessee, the Tri-State district, Oklahoma, Kansas, southeastern Missouri, Colorado, Utah, and California.
- IC 6937. Mining and Milling Methods and Costs at the Glass-Sand Plant of P. J. Weisel, Inc., Corona, Calif., by Edmund Shaw. 1937. 16 pp. 6 figs.
- IC 6938. Some Causes of Blow-Outs during Drilling and Means of Prevention, with Special Reference to the Gulf Coast Region, by Charles B. Carpenter. 1937. 27 pp. Paper read at meeting of American Petroleum Institute in Dallas April 2; gives information on causes of blow-outs and methods employed to prevent them.
- IC 6939. Report of Work of the Mining Division, U. S. Bureau of Mines, for calendar year 1936, and program for 1937, by Chas. F. Jackson. 1937. 16 pp. Relates work of seven sections of Mining Division and lists publications.
- IC 6940. Mining Methods at the Carson Hill Mine, Calaveras County, Calif., by John A. Burgess. 1937. 17 pp. 11 figs. Describes mining methods at gold mine on the Mother lode of California.

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- IC 6941. Reconnaissance of Mining Districts in Mineral County, Nev., by William O. Vanderburg. 1937. 79 pp. 6 figs. Gives results of a reconnaissance of mining districts of Mineral County, Nev., made during month of June and first 10 days in October 1936.
- IC 6942. List of Permissible Mine Equipment, by L. C. Ilsley. 1937. 23 pp. Lists permissible mine equipment approved by the Bureau to January 1, 1937, and includes 6 mining machines, 80 loading machines and conveyors, 14 coal drills, 69 mining machines, 9 room hoists, 20 mine pumps, 1 concrete mixer, 9 rock-dusting machines, 6 electric switches and junction boxes, 5 electric cap lamps, 9 flame safety lamps, 15 miscellaneous electric mine lamps, 3 electric flash lamps, 5 methane detectors, 1 mine telephone, 8 single-shot blasting units, 20 storage-battery locomotives, 1 main-line haulage locomotive, 8 power trucks, and 1 tandem locomotive.
- IC 6943. The Design of Small Wooden Head Frames, by W. W. Staley. 1937. 37 pp. 17 figs. Discusses design of small head frames that will fill the needs of prospectors and small operators whose operations are conducted through shafts.
- IC 6944. Bureau of Mines Apparatus for Demonstrating Ignition of Mine Gas, by E. J. Gleim. 1937. 5 pp. 1 fig. Describes types of apparatus that can be used to demonstrate hazards of ignition of explosive gas by electrical equipment (1) in the Bureau of Mines Pittsburgh station and (2) in the field.
- † IC 6945. Mining and Milling Methods at the Pilgrim Mine, Chloride, Ariz., by Earle F. Hastings. 1937. 18 pp. 3 figs. Describes operations at 96-ton gold mine with total force of 54 men.

† Out of print.

PERIODICAL REPORTS

- Weekly Crude-Oil Stock Reports.**³ Weekly reports showing stocks of crude petroleum by grades at the close of the week specified and comparing these figures with those of the previous week. Discussion includes brief summary of supply and demand of crude oil for the current week.
- Weekly Coal Reports.** Latest available data for period indicated on production of anthracite, bituminous coal, and beehive coke, and on tidewater and lake shipments. (Published by National Bituminous Coal Commission beginning with July 3, 1937, issue.)
- Weekly Anthracite-Beehive Coke Reports.** Continues available data on anthracite, semianthracite, lignite, peat, coke and fuel briquets, as well as international trade in coal.
- Coal-Mine Fatalities.**³ Monthly reports describing causes of fatal accidents in coal mines and the relationship between production and accidents.
- Monthly Cement Statements.**³ Current statistics on output and proportion of capacity utilized, for the country as a whole and for individual producing districts; includes comprehensive current figures on the distribution of cement, by States, and the latest available data on exports.
- Crude Refinery Reports.**³ Monthly reports showing State data on refinery stocks of crude oil, runs to stills, and receipts and deliveries of crude oil segregated on the basis of intrastate, interstate, and foreign sources.
- International Coal Trade.**³ Monthly summaries of latest information on the international coal trade of the world.
- International Petroleum Trade.**³ Special data on foreign imports and exports of petroleum products, international refining, and trade in petroleum products, together with special items from foreign representatives of the Department of State and the Commerce Department on production, trade, demand, tariffs, quotas, and trade restrictions and new refineries.
- Monthly Coal-Distribution Reports.**³ Summaries of the distribution of bituminous coal and anthracite shipments by water and rail. (Discontinued as a Bureau of Mines publication May 31, 1937. Issued by the National Bituminous Coal Commission.)
- Monthly Coke Reports.**³ Production of beehive and byproduct coke by States and consumption of coal in the manufacture of coke.
- Monthly Petroleum Statements.**³ Data on the production, imports, exports, stocks, and demand for crude petroleum, refined petroleum products, and natural gasoline. An annual summary is also issued.
- Monthly Forecast Reports.**³ Give estimates on domestic and export demand for motor fuel; set forth crude-oil requirements with allowances for imports and stock changes; and give recommended break-down of required production by States.
- Mineral Trade Notes.** Review of current data on metals and industrial minerals (nonmetallics) and include statistical and general items that cannot readily be classified by individual commodities.
- Special Supplements.** Supplements to Mineral Trade Notes, published at irregular intervals, relate to minerals in a specific country or to a specific mineral commodity.
1. Italy's Metal Industries, by Charles Will Wright. November 20, 1935. 15 pp.
 2. Russia's Gold Production, by M. W. von Bernewitz. May 20, 1936. 7 pp.
 3. Germany's Nonferrous Mineral Industries—Present Situation and Future Possibilities, by Charles Will Wright. September 19, 1936. 28 pp.
 4. Germany's Capacity to Produce and to Consume Metals, Fuels, and Minerals, by Charles Will Wright. November 20, 1936. 35 pp., 2 maps.
 5. Poland's Raw-Mineral Surplus and Requirements, by Charles Will Wright in collaboration with the staff of the American consulate at Warsaw. February 20, 1937. 11 pp.

³ Obtainable only from the Information Division, Bureau of Mines, Washington, D. C.

Periodical Reports

6. Italy's Ability to Produce and Capacity to Consume Mineral Raw Materials in 1936, with Comments Concerning Government Assistance to Mining Industries, by Charles Will Wright. March 20, 1937. 21 pp.
 7. Present Situation in the Nonferrous Industries in Poland, by Charles Will Wright. April 20, 1937. 10 pp.
- Monthly Natural Gasoline Reports. Show production, stocks, exports, receipts, and deliveries of natural gasoline, by districts and shipments to jobbers, retailers, and refinery-owned bulk plants, by States. Compare production and stocks with those of the previous months.
- Preliminary Estimates of Production of Coal and Beehive Coke. Monthly statement issued on the fifth of the month for use of financial editors and business statisticians who desire monthly data. Include tentative figures for current month, revised figures for the preceding month, and comparative figures for the same month last year.
- California Petroleum Statements.⁴ Monthly review of supply, demand, and stocks of petroleum in the Pacific coast area.
- Geophysical Abstracts. Monthly reviews of American and foreign literature on geophysical prospecting. (As the Bureau's geophysical prospecting activities were transferred on July 1, 1936, to the Geological Survey the publication of Geophysical Abstracts was discontinued after June 1936.)
- Commercial Stocks of Anthracite and Bituminous Coal.³ Quarterly reports giving data on stocks of anthracite, bituminous coal, and coke in the hands of consumers, with comparative data for previous years. (Discontinued on July 1, 1932, and now published as stock supplements to Weekly Coal Reports.)
- Consumption of Explosives. Monthly reports presenting data showing the quantity of explosives used in mining and other industries, with special reference to increasing the use of permissible or safety explosives in coal mines. (For reasons of economy, these reports were discontinued after the publication of the June 1933 issue.)
- Petroleum Bibliographies.⁵ Monthly reviews of American and foreign literature on petroleum and its products.
- Quarterly Gypsum Report. Presents data on production of crude and calcined gypsum, imports of crude gypsum, and sales of calcined gypsum and gypsum products.
- Foreign Minerals Quarterly. Regional review of foreign mineral resources, production, and trade.
- World Retail Prices and Taxes on Gasoline, Kerosene, and Motor Lubricating Oils. Quarterly publication comprising tables showing retail prices and taxes on gasoline, kerosene, and motor lubricating oils in representative cities in various countries of the world.

MINERAL MARKET REPORTS³

Mineral Market Reports.³ Statistical data as to production, consumption, and markets during a previous year for some mineral commodity, issued as soon after the close of the year as the data are available.

ACCIDENT STATISTICS³

Accident Statistics.³ Brief reports describing some phase of the bureau's work to improve working conditions and promote safety in the mining industry.

¹ Obtainable only from the Information Division, Bureau of Mines, Washington, D. C.

⁴ Obtainable from the Petroleum Field Office, Bureau of Mines, 506 Customhouse, San Francisco, Calif.

⁵ Publication suspended April 1933.

COOPERATIVE PUBLICATIONS

The following reports and papers, resulting from investigations conducted cooperatively by the Bureau of Mines and the agencies noted, have been written either wholly or in part by members of the bureau and published otherwise than by the bureau or by journals of various technical societies or by the technical press.

Publications marked with daggers are out of print and unobtainable from any source. Copies may be consulted in many of the larger technical libraries.

WITH THE AMERICAN PETROLEUM INSTITUTE

- †National Survey of Fuel-Oil Distribution, 1926, by E. B. Swanson. 1927. 22 pp., 2 figs.
†National Survey of Fuel-Oil Distribution, 1927, by E. B. Swanson. 1928. 27 pp., 2 figs. Obtainable from the Bureau of Mines, Washington, D. C. Free.
†National Survey of Fuel-Oil Distribution, 1928, by E. B. Swanson. 1929. 28 pp., 2 figs. Obtainable from the Bureau of Mines, Washington, D. C. Free.
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WITH THE AMERICAN PETROLEUM INSTITUTE AND THE SPECIAL LIBRARIES ASSOCIATION

- †Recent Articles on Petroleum and Allied Substances, compiled monthly by Melissa Spear.

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- †Petroleum Engineering in the Hewitt Oil Field, Carter County, Okla., by T. E. Swigart and F. X. Schwarzenbek. 1921. 132 pp., 41 figs.

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- †Hazards Involved in the Transportation of Natural-Gas Gasoline, by D. B. Dow. 1922. 10 pp., 7 figs.

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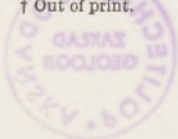
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⁶ Copies of these publications that are not out of print may be obtained from the Secretary, Mining and Metallurgical Advisory Boards, Carnegie Institute of Technology, Pittsburgh, Pa., at the prices stated.

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- †B 25. The Effect of Phosphorus on the Resistance of Low-Carbon Steel to Repeated Alternating Stresses, by F. F. McIntosh and W. L. Cockrell. 1925. 33 pp., 24 figs.
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⁸ Obtainable from the Geological Survey of Georgia, 425 State Capitol, Atlanta, Ga.

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A Bureau of Mines Study of a "Bottom-Hole" Sample from the Crescent Pool, Oklahoma, with Regard to Liberation of Gas, Expansion of the Oil-Gas Mixture, and Energy Relations Involved in Flow, by Ben E. Lindsly. 1936. 28 pp., 16 figs. (Reprinted from *The Petroleum Engineer*.)³

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³ Obtainable from the Information Division, Bureau of Mines, Washington, D. C.

⁹ Obtainable from the Kansas State Board of Health, Room 2, Marvin Hall, Lawrence, Kans.

¹⁰ Obtainable from University of Nevada, Reno, Nev., at the price indicated.

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- †B 91. Subsidence Resulting from Mining, by L. E. Young and H. H. Stoek. 1916. (See Min. Inves. Bull. 17 and Bureau of Mines Bull. 238.)
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WITH THE U. S. PUBLIC HEALTH SERVICE¹⁴

- †B 85. Miners' Consumption. A Study of 433 Cases of the Disease Among Zinc Miners in Southwestern Missouri, by A. J. Lanza, with a chapter on Roentgen Ray Findings in Miners' Consumption, by Samuel B. Childs. 1917. 39 pp., 16 figs.
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- †B 150. Carbon Monoxide Literature, by R. R. Sayers and S. J. Davenport. 1925. 54 pp.
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- B 211. Studies in Asphyxia, by W. P. Yant, John Chornyak, H. H. Schrenk, F. A. Patty, and R. R. Sayers. 1934. 61 pp., 86 figs.
- †Public Health Reports, Reprint 639. A Preliminary Study of the Physiological Effects of High Temperatures and High Humidities in Metal Mines, by R. R. Sayers and D. Harrington. 1921. 16 pp.
- †Public Health Reports, Reprint 728. The Treatment of Carbon Monoxide Poisoning, by R. R. Sayers and H. R. O'Brien. 1922. 5 pp.
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- †Public Health Reports, Reprint 863. Collection and Preservation of Blood Samples for Determination of Carbon Monoxide, by R. R. Sayers, H. R. O'Brien, G. W. Jones, and W. P. Yant. 1923. 8 pp., 3 figs.
- †Public Health Reports, Reprint 865. The Elimination of Carbon Monoxide from Blood, by Treatment with Air, with Oxygen, and with a Mixture of Carbon Dioxide and Oxygen, by R. R. Sayers and W. P. Yant. 1923. 24 pp., 5 figs.
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- †Public Health Reports, Reprint 1349. Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds. I.—Ethylene Dichloride, by R. R. Sayers, W. P. Yant, C. P. Waite, and F. A. Patty. 1930. 16 pp., 5 figs.

¹⁴ Copies of these publications that are not out of print may be obtained free from the Public Health Service, Washington, D.C.

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- †Public Health Reports, Reprint 1371. Observations on the Possibility of Methyl Chloride Poisoning by Ingestion with Food and Water, by W. P. Yant, H. W. Shoal, and J. Chornyak. 1930. 9 pp., 2 figs.
- †Public Health Reports, Reprint 1379. Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds. II.—Ethyl Benzene, by W. P. Yant, H. H. Schrenk, C. P. Waite, and F. A. Patty. 1930. 10 pp., 1 fig.
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- †Public Health Reports, Reprint 1401. Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds. IV.—Ethylene Oxide, by C. P. Waite, F. A. Patty, and W. P. Yant. 1930. 12 pp., 4 figs.
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- Public Health Reports, Reprint. Vol. 47, No. 3. Jan. 15, 1932. Studies of Asphyxia: II.—Blood Chemistry Resulting from Comparatively Rapid Asphyxia by Atmospheres Deficient in Oxygen, by H. H. Schrenk, F. A. Patty, and W. P. Yant. 1932. 11 pp.

WITH WORKS PROGRESS ADMINISTRATION—NATIONAL RESEARCH PROJECT;
MINERAL TECHNOLOGY AND OUTPUT-PER-MAN STUDIES¹⁵

- Technology and the Mineral Industries, by F. G. Tryon, K. C. Heald, T. T. Read, G. S. Rice, and Oliver Bowles. 63 pp., 12 figs. This report is the first in the series of "Mineral Technology and Output-per-Man Studies" conducted under a cooperative arrangement between the National Research Project of the Works Progress Administration and the Bureau of Mines. Is intended to serve as an introduction to the forthcoming reports which will deal with the principal technological changes in the various extractive industries and the effect of these changes on the output per man. Includes "The double task of mineral technology", "The technique of exploration", "Technology in coal mining", "Petroleum and natural gas", "Nonmetallic materials", "The major metals", "The lesser mineral industries", "Technology and mine safety", and "Social effects of pending technologic change."
- Small-Scale Placer Mines as a Source of Gold, Employment, and Livelihood in 1935, by Charles White Merrill, Chas. W. Henderson, and O. E. Kiessling. 52 p., 43 figs. This report is the second in the series of "Mineral Technology and Output-per-Man Studies" conducted under a cooperative arrangement between the National Research Project of the Works Progress Administration and the Bureau of Mines. Demonstrates conclusively the futility of encouraging large numbers of people to become gold miners as a means of solving the unemployment problem. Makes available detailed factual material on aggregate production and employment in the small-scale placer gold mining industry.

MANUSCRIPT REPORT¹⁶

- MS 1. Underground Scraping in Metal Mines, by Chas. F. Jackson. 1933. 88 pp., 49 figs. Discusses development of underground scraping practice, describes equipment used, cites numerous examples of practice, and gives costs at individual operations.

¹⁵ Obtainable only from the Works Progress Administration, 1734 New York Avenue, Washington, D. C.
¹⁶ May be consulted at Bureau of Mines libraries at Washington, D. C.; Pittsburgh, Pa.; and San Francisco, Calif. Reprinted by Sullivan Machinery Co., Chicago, Ill. Free on request.

† Out of print.

INDEX OF BUREAU OF MINES PUBLICATIONS

ABBREVIATIONS

A	Director, Bureau of Mines, Annual Report.	MS	Manuscript Report.
ACO	Ardmore Chamber of Commerce and the State of Oklahoma.	MTN	Mineral Trade Notes, Special Supplement.
API	American Petroleum Institute.	MY	Minerals Yearbook.
APS	American Petroleum Institute and Special Library Association.	MYA	Statistical Appendix, Minerals Yearbook.
ARK	State of Arkansas.	NC	National Coal Association.
B	Bulletin.	NGM	Association of Natural Gasoline Manufacturers.
BAH	Self-Contained Oxygen Breathing Apparatus.	NRC	National Research Council.
BS	National Bureau of Standards.	NTG	North Texas Geological Survey.
BSA	National Bureau of Standards and American Petroleum Institute.	NUN	State of Nevada and University of Nevada.
BWH	Questions and Answers on Boiler Feed-Water Conditioning.	OBC	State of Oklahoma and Bartlesville Chamber of Commerce.
CB	City of Buffalo.	OGS	Oklahoma Geological Survey.
CFH	Questions and Answers for the Coal Fireman.	OH	Ohio State University.
CIT	Carnegie Institute of Technology and the Mining and Metallurgical Advisory Board.	OIA	Office of Indian Affairs.
CN	City of Newburgh.	OIK	Office of Indian Affairs and State of Oklahoma.
COL	State of Colorado.	OKL	State of Oklahoma.
EDC	El Dorado Chamber of Commerce.	PHS	United States Public Health Service.
EP	Economic Paper.	PTG	Pennsylvania Topographic and Geological Survey.
ERH	Enforcement of the Law Regulating the Manufacture, etc., of Explosives.	R	Reprint.
FAH	Advanced First-Aid Instructions for Miners.	RI	Report of Investigations.
FAM	Manual of First-Aid Instruction.	RMP	Rocky Mountain Petroleum Association.
FOH	Efficiency in the Use of Oil Fuel.	RRH	Rescue and Recovery Operations in Mines after Fires and Explosions.
GGG	Geological Survey of Georgia.	S	Schedule.
GS	United States Geological Survey.	SLA	State of Louisiana.
HCP	Four Heavy-Clay Products Associations.	SMR	Safety in Mines Research Board of Great Britain.
HFH	Questions and Answers for the Home Fireman.	TEN	Tennessee Division of Geology.
IC	Information Circular.	TP	Technical Paper; Technologic Paper.
IDC	Interdepartmental Committee.	UAC	University of Alabama and United States Coal Commission.
IOA	Office of Indian Affairs, the State of Oklahoma, and the Ardmore Chamber of Commerce.	UAL	University of Alabama.
KBH	Kansas State Board of Health.	UAR	University of Arizona.
M	Monograph.	UIG	University of Illinois and Illinois Geological Survey.
MC	Miners' Circular.	UN	University of Nevada.
MH	Manual on Geophysical Prospecting with the Magnetometer.	UO	University of Oklahoma Press.
MIA	Mine Inspector for Alaska, Annual Report.	USC	United States Coal Commission.
MIN	Minnesota School of Mines Experiment Station.	UUT	University of Utah.
MIS	Missouri School of Mines and Metallurgy.	UWA	University of Washington.
MR	Mineral Resources of the United States.	UWY	University of Wyoming.
		VE	Federal Board for Vocational Education.
		WPA	Works Progress Administration—National Research Project.

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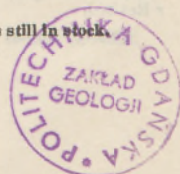
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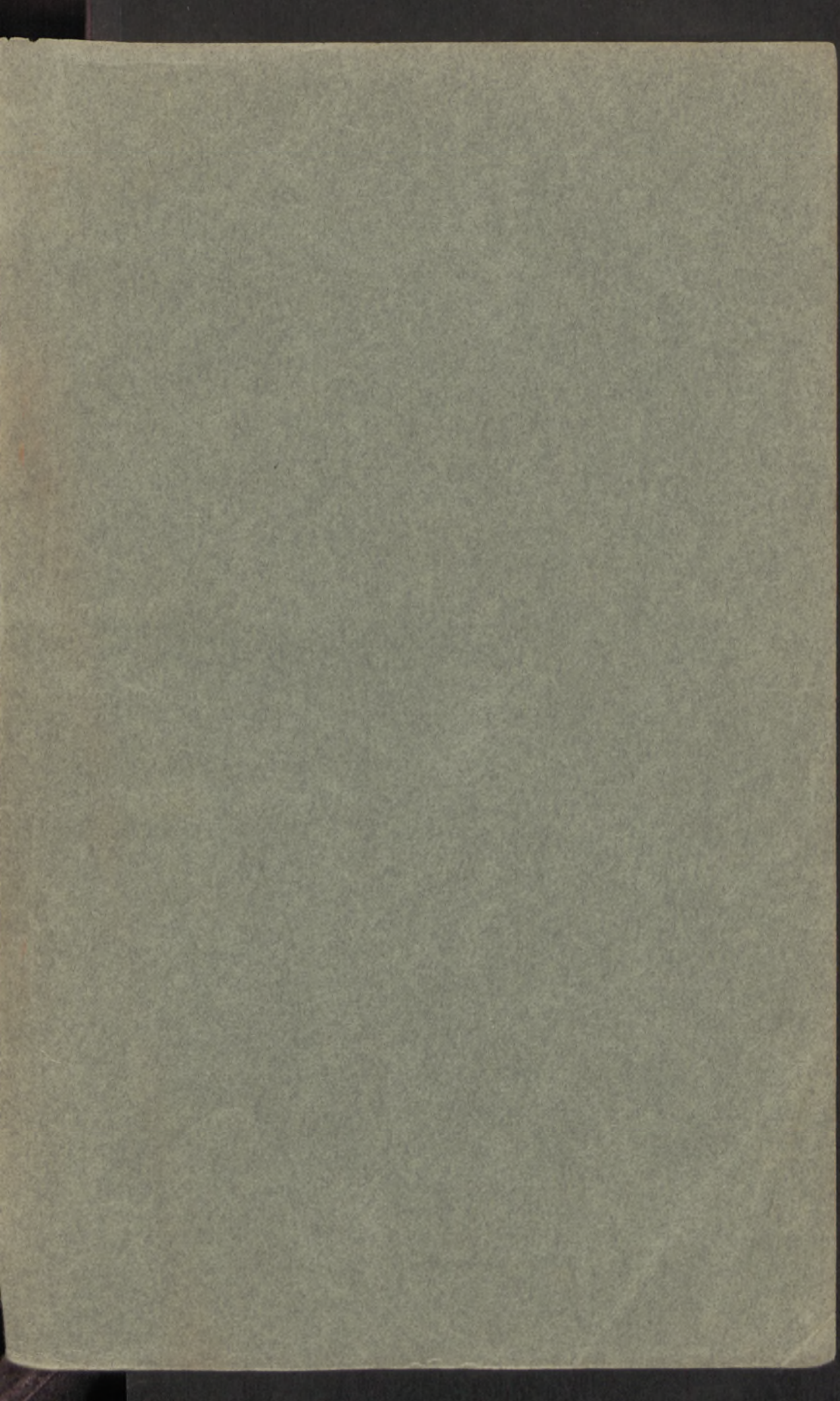


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