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BIBLIOGRAPHY OF BUREAU OF MINES INVESTIGATIONS OF COAL AND ITS PRODUCTS 1935 to 1940

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FOREWORD

This technical paper is a bibliography of publications from 1935 to January 1, 1940, of Bureau of Mines investigations of coal and its products. Technical Paper 576 is a similar listing for 1910 to 1935. Combination of the two covers publications for 30 years, or, in fact, since the beginning of the Bureau. The time is auspicious for a survey of the interests of the Bureau in this field, especially the present trend of such interests. This brief survey will be presented in graphic form, followed by a description of the various classes of publications and papers that are issued.

SURVEY OF PUBLICATIONS ON COAL AND ITS PRODUCTS SINCE 1910

From the table of contents of this technical paper it will be noted that the publications have been classified according to subject. The number in any group is roughly indicative of the Bureau's interest in this phase of study. It must be remembered, however, that one publication may cover 10 times as much work as another, probably accounting for some of the minor fluctuations in the publication curves, which will be shown, but over a long time and for a large number of articles this effect may be expected to average out to a considerable extent.

Figure 1 shows the number of publications a year for the four most important subject classes, plotted as of the beginning of the fiscal year during which they appeared.

Methods of sampling, analyzing, and testing solid, liquid, and gaseous fuels commanded steady and continued interest up to 1923 or 1924, followed by a gradual, although rather definite, trend toward decreased interest as represented by fewer publications since that time. The earlier, active period is indicative of the development of the necessary chemical methods and tools—the development of measuring procedures—that allowed a scientific approach to understanding the origin, production, and use of coal. After this groundwork had been laid, some of the interest in sampling, analyzing, and testing naturally was diverted to other fields, especially those of greater practical importance. It is improbable, however, that this work ever can cease altogether, for there is a never-ending demand for new and better methods, which explore greater depths and study with greater accuracy the problems posed by fuels.

The second section of figure 1 shows the publications on combustion of coal. The maximum interest existed between 1918 and 1930, and during this interval was developed a clear and fundamental picture of how coal actually burns in a small, simple, domestic burner, in large industrial stokers, or in the modern powdered-coal installations. That the first concerted effort to understand combustion was made between 1910 and 1930 appears most surprising in view of the long period during which this material has been man's principal source of heat and energy. These studies have contributed greatly to the efficient utilization of coal, and it seems reasonable to believe that they may be credited with the annual conservation of millions of tons of this fuel. The decreased number of publications about combustion since 1930 does not represent lack of interest so much as a reduction in personnel resulting from curtailed appropriations during the depression years. This situation may improve in the future.

Yearly publications on gases and dusts are indicated in the third section of figure 1. They comprise investigation of (*a*) absorption, evolution, and composition; (*b*) inflammability and explosibility; and (*c*) physiological effects, protective devices, and treatment. Interest in this work has increased rather steadily throughout the history of the Bureau, for much of it has been concerned with physical well-being and industrial safety. It has resulted in the development of methods universally applicable for the prevention of coal-mine explosions and has helped to trace industrial conditions that insidiously undermine the health of miners. This field is obviously one that always can be furrowed with

profit—not necessarily measured in dollars, but in the more fundamental terms of human safety and happiness.

The section entitled "Mining" at the top of figure 1 includes, besides mining proper, (*a*) ventilation; (*b*) explosions, mine fires, and their control; (*c*) explosives; and (*d*) electricity, safety lamps, and communication. This work covers one of the major interests of the Bureau, and several of the other subjects listed in the table of contents bear directly upon it. Investigation and study on this subject have increased steadily. The drop in publications from 1932 to 1936 does not represent deviation in interest, but, as will be shown later, resulted from decreased appropriations. The curve again trends upward after additional funds were made available.

The Bureau's work has furnished a guide for the entire coal-mining industry to indicate conditions and equipment for safe and efficient operation of mines. Investigation on this subject probably will continue to expand.

Many of the other subjects listed in the table of contents have been extensively investigated by the Bureau. All of them cannot be discussed in this brief fore-

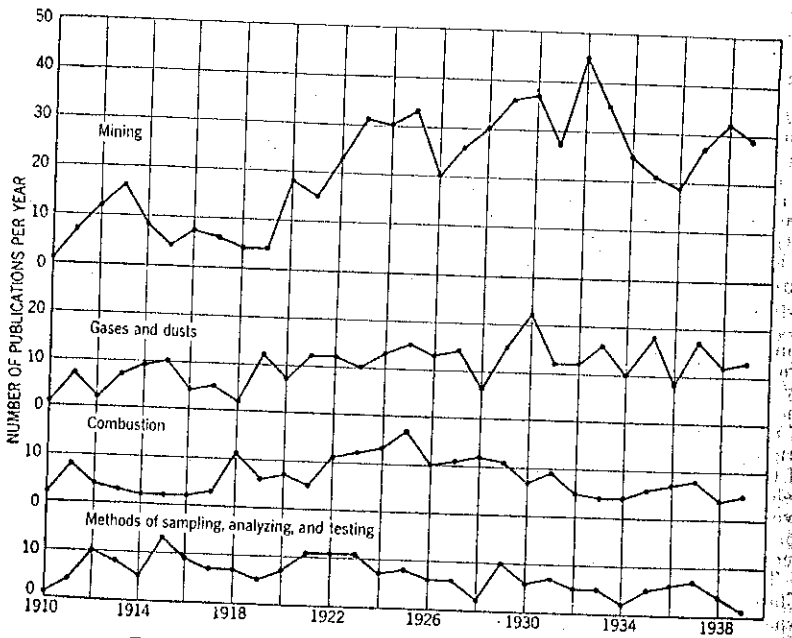

FIGURE 1.—Yearly publications on subjects of primary interest.

word, but mention should be made of the continued effort directed toward a fundamental understanding of the origin, microstructure, and classification of coal. This study has endless ramifications and is of interest to both the scientific and practical man. The work of the Bureau on hydrogenation did not begin until about 1920, but it has increased steadily since that time. This study may offer a solution to any future gasoline shortage, but even today it has shown the way to modification of fuels and oils for the production of new industrial products or improved products of widespread utility. This investigation will be pursued as fully as possible.

Figure 2 turns attention to the influence of the appropriations available for work on coal and its products on the total number of publications annually. The comparison is only approximate because of the overlapping of many investigations. Definite correlation is evident, as would logically be expected, since the appropriations control the amount of work done and thus the number of articles written to describe it. From the time the Bureau was organized until 1931 appropriations and publications followed an upward trend. Appropriations were low in

1932, and the curve of publications started downward about a year later. This lag is natural, since publications usually cannot be completed until several months after the experimental work is completed. Since 1934 appropriations have increased, and although the number of publications is increasing again, the full effect of the greater monetary expenditures will not be felt immediately. Soon, however, the effect of this increased support will be shown, and it is the purpose of the Bureau of Mines to supply to the mining industry and to the people information of the utmost value.

BUREAU OF MINES PUBLICATIONS ON COAL

Investigations of the Bureau of Mines on coal and its products are described in printed or mimeographed publications issued by the Bureau of Mines, articles by staff members printed in the technical press, and cooperative reports of work done jointly with States, colleges, and industries.

Within each subject classification the papers are separated into groups based

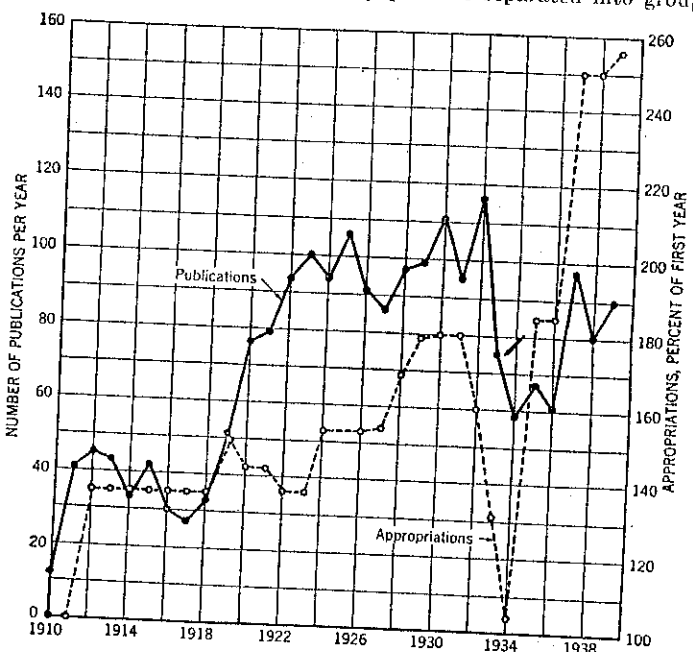

FIGURE 2.—Number of publications a year as influenced by appropriations.

on the medium of publication and arranged within each group alphabetically by authors. The Bureau of Mines issues bulletins, technical papers, economic papers, the Minerals Yearbook, miners' circulars, handbooks, schedules, the Director's annual report, charts, monographs, reports of investigations, information circulars, special reports, and various periodic economic reports detailed under section 18.

In general, *bulletins* contain original scientific or technical results of studies of major problems. *Technical papers* are similar to bulletins but are limited to definite subdivisions of major problems, and as a rule are shorter than bulletins. *Economic papers* summarize and analyze the history of production of various important minerals and discuss sources and resources. *Minerals Yearbook* presents an economic review and statistical summary of the mineral industry of the United States. It is published about August or September following the calendar year reviewed. *Miners' circulars* give data and information on the prevention of mine accidents, first-aid and rescue methods, and precautions against disease. *Handbooks* are special manuals on subjects relating to safety or efficiency. *Schedules*

indicate the requirements and procedure for testing electrical equipment, gas-detecting equipment, devices for respiratory protection, and explosives for permissibility for use in mines, mainly coal mines. *Directors' annual reports* summarize the Bureau's work in any fiscal year.

Bureau of Mines monographs give the results of cooperative investigations between the Bureau of Mines and certain organizations and industries. They are published in a style conforming to that of Bureau bulletins, but at the expense of the cooperator.

Reports of investigations, issued in mimeographed form, quickly make available important data pertaining to special phases of major problems. They are used also to outline briefly the results of original studies on minor problems. Frequently, the information contained in these papers is incorporated with additional findings and published in bulletins or technical papers. Reports of investigations are numbered serially, beginning with No. 2000, which was published in February 1919.

Information circulars are short mimeographed papers, similar in form and manner of publication to reports of investigations, that concisely present the principal facts on various subjects. The material may not represent the results of original investigative work and frequently consists of compilations, reviews, abstracts, and discussions. Information circulars are numbered serially, beginning with No. 6000, which was published in December 1925. Before that date papers of a general informational character were classified as reports of investigations.

Special reports are issued at intervals to make available data of special and immediate interest. They are not numbered, but are designated by title or subject matter.

The printed reports are sold by the Superintendent of Documents, Washington, D. C., at the price stated. Reports of investigations and information circulars are mimeographed and are distributed upon written request by the Bureau of Mines, Washington, D. C.

As there has been a liberal distribution of all publications throughout the country and to some extent in foreign countries, reports that are now out of print usually may be found in technical and larger public libraries.

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[1] Work on manuscript completed October 1941.
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