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PART TWO

Program of Research

NEED AND OPPORTUNITY FOR RESEARCH IN BITUMINOUS COAL

VIRTUAL disorganization has characterized the bituminous coal industry for well over a decade. In the face of this disturbing situation, as well as of the legal restraints imposed by the Sherman Anti-Trust Law, it has been impracticable for the industry to eliminate uneconomic practices and to adjust effectively the volume and rate of production to market requirements. The general recognition of this truth is evidenced by the passage of the Bituminous Coal Conservation Act of 1935 and the Bituminous Coal Act of 1937.

Since Congress has decided that regulation of the bituminous coal industry is essential to public welfare, research is imperative to provide guidance to those responsible for legislating and administering the principles and bases for control. Employers who must make day-to-day decisions of policy and procedure will find accurate data and interpretations of no less value.

For the economist, research in this industry should be especially fruitful. Throughout much of its history it has approached to an extraordinary degree the state of free competition—one of the basic postulates of the capitalistic system. Moreover, there are available or can be made available with reasonable expenditures for assembly and compilation, surprisingly comprehensive and, on the whole,

reliable series of quantitative data and other factual information. Especially profitable for exploration would be the period beginning with 1912, since it covers the two fairly normal pre-War years, the depression of 1914, the prosperity preceding our entrance into the War, the extraordinary expansion occasioned by the War and by the high prices that resulted from an unprecedented demand, inadequate transportation facilities, and labor controversies, the readjustments of 1921–22, the painful liquidation subsequent to 1923, the prolonged depression beginning in the autumn of 1929, and the industry's attempts with governmental sanction and assistance to stabilize conditions under the NIRA and under more recent legislation. During this quarter of a century the industry has experienced 'normalcy', periods of shortages, price control under the Lever Act, labor controversies, extensive over-development, drastic liquidation, and governmental regulation. An integrated program of research covering these eventful years should provide economists not only with illustrative material but also with a better understanding of the operation of an important natural resource industry subject to violently changing conditions.

THE COMMITTEE'S OBJECTIVES IN DEVELOPING ITS RESEARCH PROJECTS

The study of an industry may take many forms. The Conference on Price Research, for which this project has been prepared, has suggested that emphasis be placed on price research. From the standpoint of economic theory this is the logical approach, since pricing policies and price trends are of paramount importance in American economic life, regulating the flow of production and the utilization of the agents of production and affecting the well-being of investors, producers, employees, and consumers. It is also a wise choice from the point of view of the producers because price trends throw light on the effectiveness of the organization of the industry and because a study of the behavior of prices focuses attention on the forces and conditions that

determine supply and demand, thus centering research efforts on the basic problems of production, distribution, and consumption.

It is recognized that price research is but a point of attack, not an end in itself. The end desired may vary with the interests of those undertaking research and the nature and organization of the industry concerned.

For bituminous coal, it is believed the general objectives of the Conference on Price Research may best be attained by a coordinated program of research that will describe realistically the structure, organization, and functioning of the industry in production and distribution, and that will examine the effects of basic industrial and economic changes on the costs and prices of bituminous coal. Further, the program should deal with the influence of price and other factors on the production, capacity, working time, and employment of competing coal fields, the flow of coal to various markets, the consumption of bituminous coal in important markets, the shifts in consumers' buying habits and their preferences for particular sizes and kinds of coal, the increasing economies in use, and the displacement of bituminous coal by competing fuels.

PROGRAM OF STUDIES

This series of related studies has been developed after a careful examination of the price and other data available for research, the present knowledge of the organization and functioning of the industry, and the problems that are of major significance at this time and are in immediate need of research. The Committee believes that the program in its entirety represents a coordinated scheme of research, each specific project either having a bearing on some of the other studies or contributing to the appraisal of the functioning of the industry as a whole. The program has been outlined in terms of separate projects so that the Conference on Price Research may allocate parts of the program to individuals and organizations wherever this seems advisable.

Three distinct types of project are recommended:

A Regional studies in production, and in distribution and consumption
   1 Studies of major producing fields
   2 Studies of important market areas

B Studies of special functions or aspects of the industry
   1 Price structure and pricing policies
   2 The flow of capital into and out of the industry
   3 The bituminous coal industry under governmental regulation
   4 Distribution channels and the flow of coal to consuming markets
   5 Consumption of coal by use in important markets and areas
   6 Economies in the use of coals
   7 Changes in sources of energy utilized in the United States with reference to competition faced by bituminous coal

C Studies dealing with the development and improvement of the factual record of the industry
   1 Development of price series
      a Series of f.o.b. mine prices by producing areas and destination prices by markets
      b Series of retail prices by markets
   2 Preparation of source books
      a Costs, sales realization, and margins
      b Other related data including production, employment, employee output, mechanization, etc.

The Committee recommends at least two summary studies to be undertaken when the research projects suggested above have been completed. The first would bring together the results of the individual studies of important market areas and would deal with the broader aspects of the marketing and distribution of bituminous coal. The second would integrate the data and conclusions of all the studies and would discuss and interpret the economic problems of the industry as a whole. Detailed outlines of these

interpretative studies can best be prepared after the completion of the suggested program of research.

The Committee recognizes that many other aspects of the bituminous coal industry need examination. It regrets that the lack of price, production, and distribution data by grade, size, and field or market precludes at this time the inclusion of certain projects, such as the analysis of demand curves of bituminous coal, which deal with certain price problems of traditional concern to economists. It hopes, however, that, after the specific projects have been completed and the various series of data relating to the industry are improved in accordance with its recommendations and with the further suggestions that will grow out of the work on the projects submitted, such studies will be undertaken.

A REGIONAL STUDIES IN PRODUCTION, AND IN DISTRIBUTION AND CONSUMPTION

Two groups of projects fall under this heading: one is primarily concerned with the problems of the producer; the other with those of the distributor and the consumer. Both are studies of selected geographical areas and are designed to deal with the total situation in a particular field or market, that is, with the analysis and appraisal of the structure and functioning of the agencies engaged in rendering the services involved in production or distribution. In both groups of projects examination of the factors and conditions directly related to the supply and demand for bituminous coal, the procedures and problems incident to price determination, and the effects of competition and price behavior on the decisions of those concerned with the production or marketing of bituminous coal are emphasized.

1 Studies of Major Producing Fields

In projects dealing with price and related problems the ordinary approach to the study of producing fields would be from the standpoint of the demand and supply of coal, price behavior, the economic position of the selected field

relative to the fields with which it is in competition, and the economic status of investors, producers, employees, and consumers. Such a study is not possible at this time because of the lack of accurate price data by size, grade, use, and market.

The approach here suggested is to study the economic position of a given producing field in relation to the fields with which it is and has been in direct competition. Not only the present competitive relationships but also the shifts since 1923, preferably during the last 25 years, would be examined. One of the outstanding characteristics of bituminous coal has been the uneven growth or decline in the rate of production of the component fields. Since 1912 certain producing fields, especially those in Southern West Virginia, Eastern Kentucky, and Virginia, have substantially increased their share of total production, while others, notably those in Eastern and Western Pennsylvania, Maryland, and Ohio, have taken heavy losses. The rate of increase or decrease has varied from field to field.

Outline of project and procedure

Why have certain fields outstripped their competitors in the struggle for markets and what conditions make it possible for them to hold a competitive advantage today? To answer this question it is necessary to analyze the natural conditions in the fields, the economic factors at work, and the artificial barriers that interfered with the flow of coal to markets. The fields suggested for study are Eastern Pennsylvania, Western Pennsylvania, Ohio, Northern West Virginia, Maryland-Upper Potomac, Southern No. 1, Southern No. 2, Indiana, Illinois, Western Kentucky, and Alabama-Southern Tennessee-Georgia.

To determine the economic position of each field relative to the fields with which it competes, the following criteria are suggested:

The degree to which each field has been able to maintain the production level of the base period

The proportion contributed by each field to the total coal

produced by the group of fields under examination in each of the years studied

The degree to which each field was able to maintain the total sales realization level of the base period

The proportion, received by each field, of the combined sales realization of the group of fields under examination in each of the years studied

Operators' margins per net ton during 1917, 1918, 1921, 1922, and November 1933 to January 1935

The prevailing economic positions of the fields as well as the shifts during the period once determined, the same criteria should be applied to the districts or seam groups that compose the field in order to ascertain whether the decline or improvement has been restricted to a few districts or is common to all. It would be important to ascertain whether the changes in production, total value, and margins were due to special local conditions such as the working out of old seams or the opening up of new ones, or to shifts, if any, in the uses of coal or in the regional markets supplied by the several districts and by the field as a whole.

Because the factors that determine the ability of a field to produce and sell coal are reflected in either the per ton costs of production or sales income, it is suggested that the per ton expenses and receipts of the fields be analyzed in detail for the years for which data are available, namely, 1916, 1917, 1918, 1920, 1921, 1922, and especially the 15 months beginning November 1933.

With respect to mine costs, the analysis for November 1933 to January 1935, inclusive, would involve a comparative study of the per ton labor costs, supply costs, depreciation, depletion, royalties, salaries, taxes, compensation insurance, company house expense, as well as production, administrative, and selling expenses. For other years, because the data are less comprehensive, the comparison would have to be restricted to labor and supply costs, general expenses, and total costs. Once the differences that have prevailed among the fields have been established, the factors and conditions that account for them should be studied.

This will necessitate an examination of the variations among fields with respect to: (1) wage levels; (2) employee output, which in turn is materially influenced by: (a) thickness of seam, (b) other seam conditions, such as pitch, character of top and bottom, relative hardness of coal, faults; (c) degree of mechanization; (3) type of mining; (4) depth of mine; (5) number of days the mine tipple operated; (6) size of mine; (7) excess capacity; (8) various sizes of coal produced; (9) preparation given the coal; (10) obsolescence of mining equipment, etc. So far as possible each factor should be subjected to statistical analysis.

For other factors affecting prices the examination would attempt to evaluate differences in: (1) qualities of coal, including chemical, burning, and physical characteristics; (2) accessibility to markets as determined by freight rates and location; (3) competitive situation in the markets supplied; (4) shifts in specifications and sizes; (5) uses to which coal is adapted; (6) channels of distribution; (7) size of sales orders; (8) pricing policies, especially in spot and contract sales; (9) transportation facilities available, etc.

Such a study would disclose not only the difficulties that operators face but also how the many factors that influence the supply and demand for coal, and therefore prices, vary from field to field in number, intensity, and duration. The background and data thus supplied would be of immeasurable value in interpreting the detailed price data, the compilation of which is recommended in Section B, 1.

Sources of data

The basic data available include:

1) Flow of coal from producing fields to consuming states for 1917, 1918, and 1929 (see pp. 61, 114, 115)
2) Flow of coal to specific market areas (see pp. 61, 115)
3) Consumption of coal by uses (see pp. 61, 63, 114)
4) Channels of distribution (see pp. 59, 60)
5) Costs of production, sales realization, and margins (see pp. 94–106)
6) Wage rates

Data on wage rates are incomplete. For the union fields they may be obtained from the wage contracts entered into by operators' associations and the United Mine Workers of America, who maintain a file of these contracts. The Research and Planning Division of the NRA published an analysis of the union rates for selected occupations in its *Economic Survey of the Bituminous Coal Industry Under Free Competition and Code Regulation.*[1] For 1912 to January 1, 1923 wage rates for union and non-union fields were collected and published by the United States Coal Commission of 1923.[2] These data were summarized and interpreted in *Wage Rates and Working Time in the Bituminous Coal Industry.*[3] Since the union failed to negotiate collective agreements with a considerable number of producing fields that had previously dealt with it for varying periods, a continuous series of wage rates is not available except for a few union fields from 1923 to October 2, 1933. For this period the important sources are the biennial surveys of daily and hourly earnings, in some cases wage rates, by states, made by the Bureau of Labor Statistics beginning in 1919 (Table I–8). Complete data for virtually all fields are available subsequent to October 2, 1933 and may be obtained from the Bituminous Coal Code and union contracts.

7) Other data

For many years the Bureau of Mines has published, in many instances by counties, fields, and states, data on production, average value per ton, number of days worked by mines, number of men employed, output per man per day, number of mines, equipment, and methods of mining and preparation (including methods of recovery, undercutting machines, loading machines and conveyors, and mechanical cleaning), stocks of commercial consumers, capacity of

[1] Berquist and Associates, pp. 585–614. The analysis was made by Charlotte E. Warner.

[2] Part III, pp. 1037–1103, and Part V, Atlas of Statistical Tables, pp. 165–270.

[3] Waldo E. Fisher and Anne Bezanson (University of Pennsylvania Press, 1932).

mines, number of days idle, and similar factors. In some instances additional information by mines is available in the published reports of the various state bureaus or departments of mines. Data on thickness of seam were compiled by the Geological Survey during certain War years and by M. H. Schoenfeld and F. G. Tryon for 1920. The NRA collected this information for 1933 and 1934. Additional data may be obtained from the reports of state bureaus and the *Keystone Coal Catalogue*. Data on the qualities of coal have been compiled by the Geological Survey, the Bureau of Mines, various state geological agencies. as well as by several private organizations. Many of these data by coal fields have been assembled and published in *Black's Directory*.

If each of the proposed regional studies is to be conducted by a university or other research agency in or near the producing field, and if several studies are started at about the same time, it is suggested that a coordinating committee be formed. Moreover, each field study should have its own advisory committee on which members from the industry and the government who are well acquainted with the technical phases of the production and marketing of coal should be included.

2 Studies of Important Market Areas

The bituminous coal industry is harassed by many marketing problems. Who supplies the coal consumed in certain areas? Who uses coal? To what extent has the use of coal been decreased by the substitution of fuel oil, natural gas, and other fuels? How are prices determined? What factors explain why a ton of coal costs certain consumers five times the amount received by the mine operator?

The answers to these and other questions are of major importance to everyone engaged in the mining of bituminous coal, especially employees, employers, and investors. Many other groups are also concerned: distributors, competitors, and the industrial and household consumers who ultimately 'foot the bill'. In addition, those economists who are interested in making their theories fit reality need to know the

facts that can be brought out by carefully planned research.

Industry-wide studies, however, cannot provide complete answers, for each market may differ from other markets in at least four respects:

1) Sources of coal used in the market

Even though coal is consumed in every state, it does not have a national market: since freight rates are high relative to the mine price, the output from any mine can be sold only in certain markets. As a corollary, it is obvious that any market may differ from other markets with respect to the fields from which it secures coal.

2) Relative importance of different classes of users

At present relatively little is known as to the exact importance of various users of coal. It is expected that the regional production as well as the consumption and distribution studies will secure data bearing on this question, but it is a safe assumption, for example, that relatively more bituminous coal is used for heating houses in Minneapolis than in Philadelphia. In addition, certain markets have classes of users not found in all the other areas.

3) Competition between bituminous coal and other fuels

Little is known at present concerning the extent to which bituminous coal has been supplanted by other fuels in specific localities. The effect of this competition must be studied at the point of impact—the market.

4) Market organization

The same channels of distribution are not used to the same extent in all markets. To illustrate, only certain markets, especially the lake ports and New England, use docks.

Because every coal operator is *directly* affected by conditions in only a few markets and because each market shows significant variations from every other market, it is proposed that a detailed study be made of every important market, including at least: Birmingham, Boston, Chicago, Cincinnati, Cleveland, Detroit, Indianapolis, Kansas City, Mo., Minneapolis-St. Paul, New York, Omaha, Philadelphia, Pittsburgh, and St. Louis.

Outline of project

It is proposed that each of these market studies investigate the problems suggested by the following questions:

1) What is the market area? The first task is to ascertain the limits of the market. The only general rule that can be set down at this time is that each study should survey the area commonly served by dealers in the cities named above.

2) What is the relative importance of various classes of coal users? What grades and sizes of coal are used by each class? What is the relation between expenditures for coal and other expenditures? In this section it is important to separate at least four classes of consumers: (a) household, (b) apartments, office buildings, hotels, hospitals, etc., (c) industrial carload buyers, (d) government. In addition, industrial carload buyers should be subdivided into: (1) public utilities, (2) manufacturing. If possible, the consumption of coal by each of the leading industries in the area should also be segregated.

3) What is the relative importance of the various marketing agencies supplying each class of user? To what extent are they competitive or non-competitive? What are the effects of integration in the production and distribution of coal? In certain areas these studies will make it possible to compare prices of coal delivered direct from the mine to the consumer with the prices charged by dock companies and the cost of all-rail delivery with that of rail-and-water transportation.

4) What producing fields supply coal to the market? What proportion of the total does each field supply? The answers to these questions should be in terms of the grades of coal required by each class of user and the grades produced by the different fields that supply the market.

5) What is the price structure? How are prices determined at successive stages in distribution? Such questions require an examination of: (a) the bargaining power of the various distributive agencies in relation to that of the classes of consumers they serve, (b) the rate of customer-turnover for

each class of user, (c) the costs, margins, and profits of distributors at successive stages. This section of the study is designed to explain the spread between f.o.b. mine prices and the prices charged to household and industrial consumers. Any intermediate prices would also be examined.

6) To what extent do other fuels compete with bituminous coal? What factors induce consumers to shift to the use of competing fuels? Figures compiled by the Bureau of Mines show that the proportion of the entire production of energy derived from bituminous coal decreased from 69.3 per cent in 1920 to 45.1 per cent (preliminary figure) in 1935 while the share derived from domestic petroleum increased from 12.4 to 27.8 per cent (preliminary figure). This does not mean, however, that competing fuels have directly replaced bituminous coal to this extent. Much of the growth in the total supply of energy has been due to the extensive utilization of gasoline in motor vehicles and of oil and gas for uses in which they can be said to be in merely indirect competition with coal. The total decrease in coal consumption should be analyzed to show the part caused by: (a) improved methods of burning and other economies in its use, (b) changes in the *form* in which it is used—the substitution of electric power generated from coal for steam, shifts from manufacturers' power plants to central stations, and the joint production of manufactured gas and coke from coal—(c) the substitution of other fuels. It will be important to ascertain what effects these changes have had on the demand for specific grades and sizes of coal.

7) What is the seasonality in the demand for coal by each class of user? This analysis should consider not only the effect of weather conditions but also the seasonal patterns of activity in the leading industries in each market.

The answers to these specific questions will give a well-rounded description of the present situation in each market. By comparing the current condition with that of previous periods it will be possible to indicate certain trends in the marketing and consumption of coal in each area. It is desirable that periodic surveys be made in the future to deter-

mine what changes have occurred in each market. Even the first studies, however, should do more than describe the present situation; they should result also in constructive suggestions and point the way through dealer cooperation toward improving methods and channels of distribution and reducing costs of marketing coal.

Procedure and sources of data

A study along these lines has already been made in the Minneapolis-St. Paul market.[4] The proposed studies contemplate an even more intensive survey and analysis.

If it is deemed advisable that each regional study be undertaken by a university or other research agency in or near the market area, and if several of these surveys are started simultaneously by various organizations, it is desirable that a coordinating committee be formed. The members of this committee should consist of a representative from each organization undertaking the studies and a few advisers selected from the industry and other interested groups.

Some data are already available:

1) Flow of coal from producing fields to consuming states (see pp. 61, 114, 115)
2) Consumption of coal by counties (see p. 63)
3) Consumption of coal by uses (see pp. 62, 63, 114)
4) Channels of distribution (see pp. 59, 60)
5) Prices of coal

The price data are inadequate, but the revisions already made by or recommended to the Bureau of Labor Statistics will result in improved data in the future. In addition, the completion of the suggested project on the development of price indexes (Part II, C, 1) will furnish valuable material for use in these regional studies.

6) Competition with other fuels (see p. 66)

In developing material for this section, it will be advisable to cooperate with the Committee on Prices in the Petroleum

[4] Roland S. Vaile and Victor G. Pickett, *Coal Distribution in the Twin Cities* (University of Minnesota Press, 1932).

Industry. Available data are so scanty that a substantial quantity of supplementary material must be collected. It is of utmost importance, therefore, to secure early in the study the cooperation of local coal dealers' associations, leading industrial consumers, railroads, and other local agencies.

B STUDIES OF SPECIAL FUNCTIONS OR ASPECTS OF THE INDUSTRY

Under this heading are grouped seven separate studies, each dealing with phases or problems of the industry that are of especial importance at this time or that represent areas of research not yet intensively explored.

1 Price Structure and Pricing Policies

Of vital importance to research in price problems is an understanding of the price structure and the specific factors and conditions that business men take into account when they establish prices for given commodities. It is with these aspects that this project is concerned.

a Price Structure[5]

On the assumption that the studies of important marketing areas will analyze the structure of wholesale and retail prices, this project will deal primarily with mine and destination prices. It will analyze the price mechanism and structure evolved under the Bituminous Coal Code, and also the changes in the structure and the problems encountered in price fixing and administration that will undoubtedly occur under the Bituminous Coal Act of 1937 (see Part II, B, 3). The Code provided for marketing agencies that represented at least two-thirds of the commercial tonnage of a coal district or group of districts and empowered them to establish minimum prices for the different grades and sizes of coal. In those fields in which market agencies were not created, the Code Authority was given the responsibility for setting minimum prices. The prices thus agreed upon were subject to the: (a) approval of the presidential member, who could permit within limits a reduction or in-

[5] For a description of the price structure see Part I, E.

crease in the established prices: (b) review of the NRA Administrator. The marketing agencies were required to report their prices to the proper Code Authorities and the original prices as well as subsequent changes were ordered to be published. Sales below minimum prices were forbidden.

The innumerable prices established under the Code and published by the Code Authorities or other agencies would have to be compiled and analyzed to give a comprehensive description of the price structure. For each district and area the important variations in prices and the subsequent changes during the period for which data are available would be shown. Price variations due to differences in the rank or grade of coal, in the size specifications and the preparation given the coal, and in the uses to which it may be put would be examined. Consideration would also be given to price variations among market areas that result from differences in freight rates, partial absorption of freight rates by operators, location, transportation facilities, the competitive situation in the markets supplied, costs of production, and similar factors. The nature of such price variation is indicated by the example cited in Part I, E.

Other items of less importance, such as the quantity sold, the type of consumer (railroads, public utilities, domestic buyers, etc.), the period covered by the sales contract, the financial position of the operating companies, the relations between producers and buyers, and seasonality should also be studied.

The basic data for the period under the Code are those published in the Minimum Fair Price Lists for Bituminous Coal and Beehive Coke established by the Code Authorities. Monthly price lists covering October 1933 to January 1935 were made available by the several Code Authorities to their respective members. The price lists can be obtained for research purposes. The subsequent changes in the price structure and materials bearing on the pricing problems to be encountered by the National Bituminous Coal Commission of 1937 may be obtained from the proceedings of the public

hearings on coal prices held by the Commission, the releases of the Commission, the data compiled by the Office of the Consumers' Counsel of the National Bituminous Coal Commission, and the suggested price lists and other information submitted to the Commission or otherwise made available by the producers' organizations created under the Law. These data should be supplemented by those published in trade journals and newspapers, those made available by marketing agencies, and the price data collected by the United States Bureau of Labor Statistics.

b Pricing Policies

The above study will disclose the price structures that have been evolved in the various producing fields and the industry as a whole. The regional studies in production and in distribution and consumption will bring to light the relative importance of the many forces and conditions that determine price levels and trends. The project on pricing policies will deal with the particular factors that coal operators take into consideration when, in specific situations, they set prices for given sizes and grades of coal. The problem here is to determine how price decisions are arrived at—what factors are considered and their influence on price determination.

The price-setting procedures and policies of individual companies would be analyzed and the competitive trade practices of the industry ascertained. The analyses would deal with the prices for specific sizes and grades of coal. Those in charge of the project would have to secure the cooperation of executives of a group of companies sufficiently diversified to be fairly representative of the industry.

The procedures used to establish prices, the data currently compiled by the company for price-setting purposes and the use made of them would be described. The following questions indicate the approach that might be used to determine the factors considered and the relative importance of each:

a) What information concerning production costs is avail-

able to those who make price decisions for particular companies?

b) How widely does the difference between production costs and price vary from time to time? Under what conditions is the excess of price over costs substantial, small, or negative?

c) What percentage do labor costs constitute of total costs? Are labor costs considered to be rigidly fixed or subject to change? If subject to change, how are modifications brought about?

d) How important are overhead costs and how are they distributed?

e) What effect do volume of sales and days worked by the mine have on the prices quoted and the major producing costs?

f) How do the prices asked for contract sales differ from those for spot sales and what factors account for these differences?

g) What proportion of output is usually sold on iong term contracts—sales with delivery dates extending beyond 30 days?

h) What are the terms and conditions of sales?

i) Does the quantity sold affect the price; if so to what extent?

j) Do captive mines sell coal in commercial markets; if so, how do the prices charged to affiliated companies differ from those charged in commercial markets?

k) To what extent do the prices obtained for coal sold in commercial markets cover the total costs of production, including return on capital invested?

l) What effect do price changes have on the volume of coal sold?

m) How important are market factors (such as competing fuels, economies in the use of coal, storage practices, classes of users, organization, and methods of distribution) in determining prices?

n) Do prices differ for the various markets supplied; if so, what factors account for these variations?

o) Does the company attempt to establish a sales budget based on market analyses and its share of the industry's business?
p) In setting coal prices how much consideration is given to the prices charged for competing fuels?
q) How do the prices quoted compare with the prices actually received?
r) How are pricing procedures and policies altered during periods of depression?
s) To what extent does 'distress' coal en route to market affect prices?
t) Is there a heavy customer turnover or do buyers continue to purchase their coal from the same company?
u) When prices change what happens to the prices previously charged on long term contracts?
v) How much of a price differential will customers pay for quality? For sizes?
w) To what extent do competitive trade practices affect the f.o.b. mine price paid by consumers of coal?

The project is primarily a field study. Most of the information would have to be obtained directly from the cooperating companies. All published data that bear directly on price-setting should be examined. Particularly helpful would be the studies of costs, sales realizations, and margins prepared by the Bituminous Coal Section of the Research and Planning Division of the NRA, as well as similar data now being compiled by the Bituminous Coal Commission of 1937.

2 Flow of Capital into and out of the Industry

Coal mining, like other extractive industries, differs from most manufacturing industries in the utilization of capital invested. While buildings, and to some extent even equipment, used in manufacturing can sometimes be adapted to the making of a moderately different range of products, a coal mine cannot be used for any purpose except the mining and preparation of coal. Because of this relative im-

mobility there can be no return on or recovery of invested capital when a mine is not in operation.

This peculiarity of extractive industries lends particular interest to a study of capital formation in the bituminous coal industry. In addition, the generally accepted fact that this industry has suffered from overcapacity makes a study of the flow of capital into and out of it of vital concern to present and potential investors. Finally, the importance of coal as a natural resource makes a study of this problem a matter of public concern.

Outline of project

In studying capital accretions it will be necessary to measure both fixed assets and working capital. The nature and amount of fixed investment varies with the type of mining, but in general the fixed capital includes preliminary and developmental expenses in addition to equipment such as cars, tracks, tipple, screens, steam shovels, and mechanical cutters and loaders. Such investments may be made at the time of the opening of a mine or after it is in operation. In addition, a certain amount of working capital is required to finance operations.

Both the sources and the areas into which the capital is going should be ascertained. Did it come from the public sale of securities? Are companies in other industries developing captive mines? Are established coal companies reinvesting their earnings, expanding their activities, or shifting their equipment? The answer to each question should separate increases in the total capital invested in the industry from movements in capital from one area to another.

The opening of new mines and the enlarging of the equipment of old mines should be related to other developments, such as the extension of railroad facilities and highway building, union restrictions, inherent characteristics of the coal which allow screening, and the size of the seam which limits the use of loading machines.

The ordinary flow of capital out of the industry is affected by the depreciation, depletion, and maintenance policies of

the individual operators. Accordingly, their adequacy must be appraised. In addition, allowance must be made for the wastage of capital when mines are abandoned before the capital has been fully used and when the capital is written down during reorganization.

By considering the movements in each district, it should be possible also to appraise the mobility of capital in the industry as a whole and the net addition or draft. The somewhat local character of the industry makes it desirable to study the flow of capital into and out of specific areas; to know the rates at which capital formation is progressing in various districts.

Sources of data and procedure

From the records of the United States Bureau of Mines it will be possible to determine the year when each mine in the country was opened and whether it is still in operation. If it is not being operated, the year when it closed is given. This information will serve as a guide to actual data on this type of inflow and outflow of capital.

The Bureau of Mines has records also of the number of certain types of machine in use. Their value would have to be estimated.

The Census of Mines and Quarries includes a tabulation by states of expenditures for development and the cost of equipment and other machinery purchased. It should be possible to break this down by counties.

Basic data on total capital invested and, for commercial mines, the amount of depreciation and depletion charged off each year could be obtained by means of a special tabulation of income tax returns by the Bureau of Internal Revenue. These data are available only for the industry as a whole and do not apply to captive or consumer-owned mines. The Bureau tabulated the capital investments of coal companies for the use of the Coal Commission of 1922. As a supplement, some data could be secured from the annual financial statements of the large coal companies.

The manufacturers of equipment used in coal mines

constitute another important source of information on the flow of capital into the industry. From them the value of equipment purchased by coal operators could be secured.

To analyze the extent of capital formation in specific areas, the cooperation of large operators is especially essential. Most of the published data for these companies as well as their income tax returns relate to their entire operations. To establish the rates of capital formation in various areas a breakdown of capital expenditures and rate of consumption of capital by areas will have to be obtained directly from the companies operating mines in more than one district.

The study should be directed by someone acquainted with the problems involved in the measurement of the flow of capital, since adjustments will have to be made in order to express in terms of a common base the capital expenditures made at various times.

The measurement of the flow of capital into and out of the bituminous coal industry is beset with many difficulties. The Committee, while recognizing the shortcomings of the available data and the many obstacles that must be surmounted, is of the opinion that the formation and utilization of capital is one of the aspects of the industry greatly in need of research and one that should be undertaken even though the first attempts bring forth only tentative conclusions.

3 The Bituminous Coal Industry under Governmental Regulation[6]

The problems to be solved by a national policy directed toward remedying the ills of the bituminous coal industry are numerous, but the goal to be attained can be stated simply: the continuing provision of coal at as low a cost as is consistent with a livelihood for those engaged in the industry and with rational conservation of coal resources.

Because of the key importance of coal in a power econ-

[6] This project, which was prepared by Ralph J. Watkins, has borrowed heavily from *Regional Shifts in the Bituminous Coal Industry*, by W. G. Fritz and T. A. Veenstra, a publication of the Bureau of Business Research, University of Pittsburgh, of which Dr. Watkins is Director.

omy, the persistently grave disorders of the bituminous industry seem to have shaped events in the direction of greater public regulation. Most of the proposals have involved Federal action, it being more or less recognized that the distribution of the industry over many states makes state action ineffective. Moreover, the problems of bituminous coal production cannot be separated from the problems of transportation. The interstate character of most of the coal trade further complicates the problems.

For many years various activities of the Federal government have been concerned with the bituminous coal industry. The Geological Survey is engaged in determining the location and the extent of coal reserves. The Bureau of Mines studies technical problems of mining, promotes safety work, and collects statistics. These two agencies provide needed information to the industry and the public, but their activities can hardly be called regulatory.

A third Federal agency whose activities more nearly approach regulation of the coal industry is the Interstate Commerce Commission. It is not directly concerned with the mining of coal, but its decisions with respect to the reasonableness of freight rates on coal have a profound bearing on the ability of coal producing fields to compete in various markets. In addition to the regulation of freight rates, the Commission is charged with responsibility for a fair distribution of cars to mines (especially important in times of car shortages), and the regulation of the pipe lines of a competing industry, etc.

Federal interest in the industry has been expressed also by means of:

FUEL ADMINISTRATION DURING THE WAR

Because of the exceptional demand for coal arising from War activities, the United States Fuel Administration was created to regulate both prices and distribution. Its objective was not stability in the industry but the provision at 'reasonable' prices of the very large quantities of coal needed by the industries supplying war materials. When

the Fuel Administration discontinued its control, the industry returned to a highly disorganized state aggravated by conditions arising out of the War.

EMERGENCY REGULATION DURING THE STRIKE OF 1922

A serious problem of price control and regulation of distribution in the bituminous coal industry arose during the strike period, April 1 to August 17, 1922. At first, because of the expectation of an early settlement of the strike, emergency regulation was not attempted. During May, however, it became apparent that such regulation was necessary to prevent unprecedented price rises and inequitable distribution of coal. Conferences of representatives of coal operators were called for May 18 and again for May 31 by the Secretary of Commerce to consider means of avoiding undue disruption of the market. For a time the Secretary fixed prices through the cooperation of operators acting individually. Later the Interstate Commerce Commission participated in the regulation. In July the Presidential Fuel Committee was created. This Committee consisted of the Secretary of Commerce, as chairman, the Secretary of the Interior, the Attorney General, one member of the Interstate Commerce Commission, and the Federal Fuel Administrator. The Fuel Committee worked through three subordinate bodies: (1) an administrative committee; (2) district coal committees; (3) governors' fuel committees. The Federal Fuel Distributor was chairman of the administrative committee. Although his authority was not challenged, the office was without statutory provision until September 22, 1922, when the Cummins-Winslow law, which provided for stringent regulation during the emergency, went into effect. The coal strike had been terminated a month earlier. Accordingly, the Federal Fuel Distributor's function after the passage of the Act was chiefly to facilitate orderly reestablishment of normal conditions in the coal market.

UNITED STATES COAL COMMISSION

The United States Coal Commission was established in 1922 "for the purpose of securing information in connection with questions relative to interstate commerce in coal, and for other purposes." Essentially a temporary fact-finding body, it conducted investigations and made a comprehensive report covering, for the bituminous coal industry, labor relations, safety, civil liberties, waste, irregular operations, overdevelopment, and transportation. Little has been done about its recommendations.

BITUMINOUS COAL CODE UNDER THE NRA

The bituminous coal industry was regulated by agencies established under the National Industrial Recovery Act. Operators were required to abide by the Code of Fair Competition for the Bituminous Coal Industry which called for: (a) the maintenance of minimum prices; (b) the elimination of unfair competitive practices. The Code had the force of law and was binding on all operators. In addition, the operators were required: (a) to observe certain conditions regarding hours and wages; (b) to bargain with the representatives chosen by their employees; (c) not to interfere with the free choice of representatives by their employees. The Code was nominally in force from October 1933 to May 1935, when the Schechter case decision by the Supreme Court led to the abandonment of the codes. The Code imposed self-regulation on the industry rather than Federal regulation. The power of the Federal government, however, was nominally placed behind the industry to enforce compliance with the provisions of the Code. Experience under the Code was so short that scarcely any conclusion can be drawn concerning its effect on long time trends in the industry.

BITUMINOUS COAL CONSERVATION ACT OF 1935

The Bituminous Coal Conservation Act of 1935 (commonly referred to as the Guffey-Snyder Coal Act) was passed

in August to take the place of the abandoned Bituminous Coal Code. This Act shared the fate of its predecessor. The Supreme Court, on May 18, 1936, declared that the Act's regulation of wages and hours was an invasion of states' rights and thus beyond the constitutional powers of the Federal government, and held the entire Act invalid on the ground that the provisions with respect to price-fixing and determination of commercial practices in interstate trade were inextricably linked with the invalid wages and hours provisions; it reserved judgment. however, on the validity of the price-fixing and unfair-practices provisions. Although the Court's decision ended this experiment almost at its inception, we describe its provisions. The Act created a National Bituminous Coal Commission in the Department of the Interior to administer the law. To enforce compliance, a tax of 15 per cent of the sales value of coal at the mine was levied, with the proviso that 90 per cent of the tax should be refunded to operators who complied. The Act required the organization of 23 district boards of coal operators who should determine minimum prices for coal according to a prescribed formula (weighted average of production costs in the minimum price area to which, under the Act, a district belonged). Such prices were subject to approval by the Coal Commission. Sales below minimum prices were forbidden. 'Unfair methods of competition' were listed and banned by the Act. The Coal Commission could set maximum prices if it deemed such action to be in the public interest.

Collective bargaining by representatives of the miners' own choosing was explicitly provided. Furthermore, employees had "the right of peaceable assemblage", were "entitled to select their own checkweighman", and were not to be "required as a condition of employment to live in company houses or to trade at the store of the employer". A Bituminous Coal Labor Board of three members was created with: a representative of the employers; a representative of the organized employees; and an impartial chairman who had neither any financial interest in the industry

nor any connection with an organization of the employees. The Labor Board had authority to adjudicate disputes arising under the provisions of the Act. It could hold elections to determine who were the freely chosen representatives of the employees. Maximum hours of work agreed on by employers producing two-thirds of the national tonnage and by representatives of a majority of the workers were binding on all Code members. Likewise, a wage agreement negotiated in any district by producers of two-thirds of the tonnage and representatives of the majority of workers was binding on all producers in the district.

Consumers were to be represented in the National Coal Commission by a consumers' counsel, who had the right to be heard in all matters affecting their interest. He could require the Commission to furnish information or to conduct investigations that he deemed necessary.

BITUMINOUS COAL ACT OF 1937

The Bituminous Coal Act of 1937 was passed by the 75th Congress to replace the Bituminous Coal Conservation Act of 1935. Except for the fact that it confers on the Commission specific power "to prescribe for code members minimum and maximum prices, and marketing rules and regulations", and to conduct research work the 1937 Act agrees in general with the earlier Act with respect to the provisions governing the determination of costs and prices and the banning of unfair trade practices. A National Bituminous Coal Commission is created in the Department of the Interior. It is to promulgate a "Bituminous Coal Code". Producers who accept membership in the Code are required to observe the minimum and maximum prices established by the Commission. Minimum prices are to be proposed by each of 23 district boards of Code members, but the Commission may approve, disapprove, or modify them. The minima are to be set "to yield a return per net ton for each district in a minimum price area . . . equal as nearly as may be to the weighted average of the total costs, per net ton . . . of the tonnage of such minimum

price area. . . . The minimum prices so proposed shall reflect, as nearly as possible, the relative market value of the various kinds, qualities, and sizes of coal, shall be just and equitable as between producers within the district, and shall have due regard to the interests of the consuming public." Maximum prices, if the Commission finds it in the public interest to establish them, are to be set at a uniform increase above minimum prices so as to yield a reasonable return in the aggregate.

Observance of the provisions of the Code is secured by exempting producers who are members of the Code from the 19½ per cent tax on the sales price of coal or the fair market value if coal is disposed of in some other manner than by sale. All producers, Code members and non-Code members, are required to pay a tax of one cent per net ton on all coal sold or otherwise disposed of.

Labor provisions of the Act differ from those of the 1935 Act in that they constitute merely a statement of public policy. The labor provisions state that (a) employees shall have the right to bargain collectively through representatives of their own choosing; (b) employers shall not interfere with this right or discriminate against employees for exercising it; (c) employees shall not be required to join an association of employees in which the producer has any share of direction or control. To secure observance the Federal Government and its agencies may purchase coal only from producers complying with the labor provisions.

Consumers are to be represented in the National Bituminous Coal Commission by a consumers' counsel who shall have the right to be heard in any proceeding before the Commission. He is to represent the interest of the consuming public and can make independent investigations and require that necessary information be furnished by the Commission.

Plan of research

The difficulties that face the National Bituminous Coal Commission in administering the price-fixing features of

the Act are little short of appalling. Regulatory schemes designed to replace the automatic market determination of prices raise many complex problems. Market influences that affect prices are many, varied, and subject to continuous change, and all must be weighed by the regulatory group. Even under the best of circumstances, the Commission and its administrative agencies will make many mistakes, and smoothness of operation is not likely to be achieved promptly.

The framers of the law were evidently aware of these difficulties, since they have attempted to give the Commission and the consumers' counsel ample authority for the collection of pertinent data and have specifically authorized the Commission "to initiate, promote, and conduct research designed to improve standards and methods used in the mining, preparation, conservation, distribution, and utilization of coal and the discovery of additional uses for coal, and for such purposes shall have authority to assist educational, governmental, and other research institutions in conducting research in coal".

Disinterested research groups obviously have an unusually favorable opportunity for concurrent study of the operation of the Act. The statistical evidence promises to be rich, and the research obligations (i.e., specific authorization and directions) of the Commission and the consumers' counsel should make for effective working relations between the Commission and non-governmental research agencies as well as between the consumers' counsel and the latter. Moreover, sound public policy will require independent appraisals of the operations of the Act by disinterested research groups, however comprehensive the Commission's fact-finding and appraising may be. Accordingly, the Committee on Prices in the Bituminous Coal Industry recommends that the Conference on Price Research promote and coordinate a program of research designed to throw light on and provide an independent appraisal of the pricing of bituminous coal under the Bituminous Coal

Act of 1937. A tentative and summary outline for such a project follows.

Analysis of the Pricing of Bituminous Coal under the Bituminous Coal Act of 1937

a) Determination of costs of production under the Act
   Cost components
   Methods of weighting
   Cost variations among districts and producers

b) Determination of minimum prices under the Act
   Methods
   Relation to costs, market variations, changes in general wholesale prices and in prices of competitive fuels

c) Determination of maximum prices under the Act
   Rationale and methods
   Effect on market prices and production

d) Trade practice control in relation to price competition
   Customary practice in the industry
   Effects of proscription of trade practices
   Enforcement methods

e) Effects of labor organization on price competition
   Extent of unionization
   Effects on inter- and intra-regional competition
   Labor costs in relation to price

f) Consumer protection under controlled competition
   Work of the consumers' counsel
   Consumer interest in cost and price determination
   Effect of publicity

g) Influence of price determination under the Act on inter-regional and inter-company competition, competition of substitute fuels, overcapacity, and investment return

h) Appraisal of statistical controls under the Act—cost, price, and market data

i) Appraisal of the effectiveness of price determination under the Act

Analysis of basic causes of instability in the industry
Overcapacity in mines
Oversupply of labor
Geographic variations in costs
Freight rate differentials
Changes attributable to the Act
Conservation of coal resources
Social sharing of the cost of instability
Influence on competing sources of energy
Relationship to consuming industries
Influence of a coal policy on national economic policy

4 Distribution Channels and the Flow of Coal to Consuming Markets

To what markets does the bituminous coal mined by the 6,000 odd mines go? What agencies are responsible for its distribution? The answers to these questions are of major importance to shippers, distributors, and traffic men. They would reveal the important regional shifts in the distribution of bituminous coal and would supply information on the markets now open to the coals of each field and the possibilities a given field has of expanding its markets. It would also make available basic data that would add materially to the value of many of the studies proposed in this program of research.

a Channels of Distribution

Bituminous coal is distributed by sales departments of operating companies, separately incorporated sales agencies, independent wholesalers, dock companies, and retailers. From the data in the files of the Geological Survey (since transferred to the Bureau of Mines) and the information published yearly in the *Keystone Coal Catalogue*, Messrs. Kiessling and Tryon determined the important sales agency centers in the bituminous coal trade, estimated the proportion of the district output produced by mines maintaining connections with separately incorporated sales agencies and calculated the percentage of the total production sold by

these agencies during 1921. Because of the limitations of available data, this initial analysis of the "cross relations between the producing districts and sales agency centers" is only a rough approximation. The important source of information on the channels of coal distribution is the 1929 Census of Mines and Quarries. For that year the Bureau of the Census collected invaluable information on coal sales by distributing agencies. The individual mine schedules contain the number of tons shipped and the total value received for each of the six classes of sales listed on page 117. For details of sources of data see Ap. I, C, 1, c.

Outline of study

Because of the work involved and the difficulty of obtaining information, the collection of original data cannot be undertaken by a private agency. The purpose of this study is to bring together and interpret the data compiled by the Bureau of the Census in the 1929 Census of Mines and Quarries and the censuses of wholesale and retail business. Funds should be provided so that these data, especially the latter, can be brought together in a form that will ensure effective use. The data in the files of Federal bureaus or in trade publications should also be utilized.

The study should show for each district and for all mines the proportion of coal sold or assigned in 1929 to affiliated or owning corporations, to consumers invoiced by the main office of the mining company, and to independent wholesalers and jobbers, as well as the proportion of the total tonnages handled by separate or branch sales offices of the mining company and that distributed by separately incorporated sales agencies owned by the same interests as the mining company. To the extent that the census and collateral data make possible, the important coal consuming cities and market areas supplied by each field and the percentage of the total volume handled by each type of selling agency should be ascertained. The detailed information with respect to the number of tons of coal sold, dollar amount of net sales, number of employees, wages, etc.,

which was collected by the censuses of wholesale and retail business, should be compiled separately, if possible, for both bituminous coal and coke, and should be presented by cities and market areas. Both groups of data should be carefully analyzed and interpreted.

b Flow of Coal to Consuming Markets

The United States Bureau of Mines received more requests for information concerning the movement of coal from the many producing fields to the major coal markets than for any other type of information. Probably no single phase of research would interest producers and distributors as much as a study of the distribution of bituminous coal. The data made available by such an analysis would be of immeasurable value to the studies of major producing fields and of important market areas. They are also essential for an understanding of the movement and behavior of coal prices.

There are no complete data on the flow of bituminous coal from mines to particular markets (for those available from the Bureau of Mines, see Ap. I, C, 1, c). The large 'blind spots' are the all-rail movements north, south, and east from the Appalachians, the total movement from Alabama, and the total movement from the coal producing states west of the Mississippi River. The Bureau of Business Research of the University of Pittsburgh has brought together for selected fields certain collateral information derived from the data compiled by "the Pennsylvania Geological Survey, the Ore and Coal Exchange, the Ohio Bureau of Coal Statistics, the Tidewater Bituminous Coal Statistical Bureau, and the Coal Control Association of Western Pennsylvania, as well as from such publications as *The Coal Trade* (not published after 1921), *Saward's Annual,* the *Annual Statistical Report of the American Iron and Steel Institute,* and the *Monthly Summary of Foreign Commerce of the United States*".[1]

Current data on the flow of bituminous coal from produc-

[1] W. G. Fritz and T. A. Veenstra, *Regional Shifts in the Bituminous Coal Industry,* pp. 9–10.

ing fields to consuming states must be collected by a Federal agency. It is hoped that the National Bituminous Coal Commission will undertake the compilation of such data.

The Committee on Prices in the Bituminous Coal Industry believes that all existing data on the distribution of bituminous coal should be brought together and analyzed, and that the markets open to the coals of each field and the important regional shifts in production and distribution should be assembled in one or more volumes. Many of the basic data have already been compiled and published in tabular form by the United States Bureau of Mines in its supplements to the Monthly Coal Distribution Reports. Suggestive of the type of analysis and interpretation to be made is the treatment of distribution data in the chapters dealing with this subject in *Regional Shifts in the Bituminous Coal Industry*.

The study should do more than present the facts of distribution. It should delineate the market areas and analyze the special forces and conditions that determine the flow of bituminous coal to particular markets. This will involve a consideration of the freight rate structure, the influence of captive mines, transportation facilities and practices, relations between buyers and sellers, the character of the demand for coal, the use of advertising, seasonal variations, grades of coal required, the location of producing fields, trade practices, and similar factors.

5 Consumption of Coal by Use in Important Markets and Areas

The relative importance of certain classes of users is largely a matter of surmise. From the standpoint of the producer who must plan his sales budget and gauge the future possibilities of the coal market, there is urgent need for a study of the trends of consumption of bituminous coal by classes of users. For this purpose it is necessary not only to bring together in usable form the data now available but also, which is more important, to collect a wide range of consumption data by counties, markets, and trade areas. These

data are also required for the studies of important market areas (Part II, A, 2). Bureau of Mines data are described in Appendix I, C, 1, b. Other data have been compiled for certain years. Of special importance are the 1927 and 1929 Censuses of Manufactures. For 1929 the Bureau of the Census compiled by counties data on consumption by manufacturing industries and by mines and quarries. For the same year the Geological Survey in cooperation with the Bureau of Mines compiled and published by counties data on the consumption of coal by electric public utility power plants. The consumption of bituminous coal and other fuels by the Federal government is available for the year ending June 30, 1930. In 1935 the Bureau of the Census collected information concerning the consumption of fuels by manufacturing industries. but, because of the lack of funds, the questions pertaining to fuel consumption have not been edited or tabulated. Data on the consumption of coal at coal mines are available by counties for many years and similar data by coke plants could be compiled from the records of the Bureau of Mines. Consumption of coal by household and small industrial users has not been compiled since 1917.

Program recommended

The immediate task is to assemble, analyze, and interpret the various data now available. The changing requirements of the more important branches of consumption would be disclosed. The reasons for these changes and their effects upon the economic status of the various producing areas should be ascertained. For obvious reasons the collection of additional data cannot be undertaken by a private research agency. Funds, however, could be made available to certain Federal bureaus for the purpose of tabulating data that have been collected but not edited and assembled, and for special breakdowns by counties and market areas where necessary. It is especially desirable that the basic data on the consumption of fuels by manufacturing industries,

which the Bureau of the Census has in its files, be made available in usable form.

One of the most constructive steps at this time would be the preparation of a statement outlining for this industry the types of consumption data needed, the sources, the units or areas for which they should be compiled, the form in which they should be made available and the frequency of collection. This task could best be carried out by a committee composed of economists, industrialists, and representatives of the Federal bureaus that are collecting coal statistics. Such a venture might well be sponsored by the Conference on Price Research.

6 Economies in the Use of Coal

One of the principal factors accounting for the decrease in the demand for bituminous coal during the last decade and a half has been increased efficiency in the use of fuel. As previously stated, the movement began in 1909 but its effect upon national demand was not of real significance until after 1920 when the post-War price level was a powerful incentive. A study of economies in the use of coal shows that the reduction in fuel consumed per unit of product has varied from industry to industry.[8] From 1909 to 1929 these reductions in five groups of industries or services ranged from 21 to 66 per cent, the average for all industries or services included in the study being 33 per cent. Data for subsequent years indicate that the movement for fuel economy has continued, but at a much slower pace. In more recent years, economies in the use of coal have been applied to households, by means of insulation, more efficient radiation, automatic heat controls, and improved standards of furnace construction. For more detailed discussion of economies in the use of coal see Section F, 1, b, (5).

The published data relating to fuel economy are summarized herewith. They appear in the annual reports of the

[8] F. G. Tryon and H. C. Rogers, *Statistical Studies of Progress in Fuel Efficiency* (Transactions, 2d World Power Conference, Vol. 6, Sec. 12, 1930), pp. 343–65.

Bureau of Mines. The most complete statistical analysis of fuel economy was made by F. G. Tryon and H. O. Rogers (footnote 8) who measured the progress in fuel efficiency from 1900 to 1929. They have extended the data for electric public utilities back to 1902 and for steam railway locomotives back to 1904. They compiled also from various sources data for cement manufacturing and for petroleum refining, 1909–1929, for a group of manufacturing industries, 1909–27, and for all industries, 1904–29.

This project would bring up to date the admirable study of Messrs. Tryon and Rogers and would extend and perfect wherever possible the statistical record of fuel efficiency. It would then ascertain for important industries and services

SOURCE	INDUSTRY OR SERVICE	PERIOD
Federal Power Commission	Electric public utilities	1913, 1917, 1919 to date
Interstate Commerce Commission	Steam railway locomotives	1916 to date
Bureau of Mines	By-product coking [9]	1913 to date
Bureau of Mines	Iron and steel blast furnaces	1912 to date

the practices developed by the more efficient companies as well as the devices and procedures used to achieve effective utilization of fuel. In view of the balance between investment cost and operating economy beyond which the cost of power might increase depending upon particular conditions, an attempt would be made to estimate the possibilities of the general introduction of best practices for specific industries and services.

The problems of measuring average efficiency are many and complex. "To measure the change in average efficiency it is necessary to have not merely heat balances for a few individual plants but statistical records of the total quan-

[9] Coal equivalent of gas, tar, oil, and breeze recovered.*

*DIRECTOR'S COMMENT: I am glad to note that the coke industry goes the packing industry one better. The packing industry recovers only the squeal of the hog; but the coke industry recovers the 'breeze'. Yes, I looked it up in the dictionary and find it is a perfectly good technical term! Harry Jerome

tity of the fuel and energy in all forms consumed by large numbers of plants, and to analyze these records in relation to the amount of work done or the volume of product." [10]

Because of the technical nature of the subject, the project should be carried out in cooperation with a carefully selected advisory committee some of whose members are chosen for their intimate knowledge of the problems of fuel efficiency, others for their familiarity with the practices of the important fuel-consuming industries.

7 Changes in Sources of Energy utilized in the United States with reference to Competition faced by Bituminous Coal

For many years the Bureau of Mines has published data on the relative rates of growth of fuel and energy. These governmental statistics of the annual supply of energy from mineral fuels and water power in the United States cover anthracite, bituminous coal, domestic oil, imported oil, natural gas, and water power. Notwithstanding the Bureau's statements to the effect that these data cover the entire output of crude petroleum and natural gas, that "nearly half of the natural gas is used in the field for drilling or operating oil and gas wells and pipe lines and for the manufacture of carbon black", and that "more than half the oil is used in the form of gasoline, kerosene and lubricants", the statistics are frequently used to indicate the competitive position of coal with other fuels and energy. Part of the fuel oil, gasoline, natural gas, and water power used in the Bureau's calculation is not directly competitive with coal. Moreover, since the production of coal alone, or for that matter of any one of the competing forms of energy, is not necessarily a measure of the relative proportion of useful energy supplied by that fuel, the increased efficiency in the use of the fuel must also be considered.

It is, for these reasons, highly desirable that some attempt be made to develop a measure of the relative competitive position of coal with other sources of fuel and energy.

[10] Tryon and Rogers, *op. cit.*, p. 344.

Such an indicator would be of real value to producers, miners, and consumers, all of whom are affected by either an inadequate or an excess productive capacity in the industry. Moreover, any attempt to measure future demand must deal with data of this character.

Outline of project

The project should investigate and attempt to answer the following questions:

What have been and are the energy requirements of the United States and to what extent have they been and are they supplied by domestic fuels?

Of the total requirements, what proportion is furnished by coal?

Of the total requirements, what proportion is directly competitive with coal; i.e., what portion of the energy not supplied by coal could be replaced with energy derived from coal?

To what extent has the development of industries requiring or using other forms of energy so increased the total demand for energy as to result in an increased use of energy supplied by coal in other fields of activity?

The exact procedure cannot be outlined in detail but would be developed as the study progresses. It is suggested that, since a considerable amount of technical knowledge is necessary both to develop and to interpret many of the basic data, those who make the study should have experienced technical advisers.

One of the problems requiring examination would be the elimination, from the total figures of energy consumption, of the energy utilized for the manufacture of carbon black and the refining of petroleum and that portion of the gasoline, kerosene, and the other oils not competing with coal. Some consideration should also be given to the increase in energy requirements from the development of sources of energy other than coal, and the effect this has had upon the competitive situation of coal.

The basic data would have to be obtained from the published reports and the files of the Bureau of Mines, the Geological Survey, the Federal Power Commission, and the Bureau of the Census. Other possible sources are the Automobile Chamber of Commerce and the Petroleum Institute.

C STUDIES DEALING WITH THE DEVELOPMENT AND IMPROVEMENT OF THE FACTUAL RECORD OF THE INDUSTRY

The Committee's survey of available price and related data disclosed that a vast amount of quantitative information is available (see Ap. I). This material has been built up by the work of many Federal agencies, including, among others, the Bureau of Labor Statistics, the Bureau of Mines, the Geological Survey, the Bureau of the Census, the Interstate Commerce Commission, and the Federal Trade Commission. It has been estimated that over thirty bureaus in the Federal government publish some data relating to the coal industry. In addition, special agencies have operated for certain periods, such as the Fuel Administration during the War, the Coal Commission of 1922, the Bituminous Coal Code Section of the Research and Planning Division of the NRA, and the National Bituminous Coal Commission, as well as many Congressional committees. Other important sources of data bearing on the coal industry are the bureaus of mines and similar departments operated by many of the important coal producing states. Lastly, information on prices of bituminous coal is found in more than a dozen trade papers, ten of which are especially important sources of price data. (Table I–5 and Ap. I, A, 2.)

This ever increasing amount of statistical material is published in current issues of the trade papers and in a multitude of special reports by numerous Federal, state, and private agencies. Few if any libraries have a complete collection of these papers and pamphlets. Accordingly, it is virtually impossible for any student to obtain readily all the information that has been published and that he

needs. Moreover, detailed price series have never been assembled from the various issues of the trade papers or from the files of the Wholesale and Retail Price Divisions of the Bureau of Labor Statistics.

In order to provide many of the basic data needed for the studies outlined in the preceding projects, the Committee on Prices in the Bituminous Coal Industry recommends that the following studies, which deal primarily with the development and improvement of the factual record of the industry, be undertaken as soon as possible. Because of the mass of material available, four separate projects are suggested.

1 Development of Price Series

As a supplement to the study of the price structure of the bituminous coal industry (Part II, B, 1) and as a means of providing some of the price data needed in the studies of important market areas (Part II, A, 2), as well as for the purpose of making series of prices available to all students of the industry or of prices in general, the two projects outlined below are submitted to the Conference on Price Research. In connection with these it is important to point out that to secure f.o.b. mine prices for specific markets it is necessary to consult many issues of various trade journals. Moreover, the available data on destination and retail prices compiled by the Bureau of Labor Statistics have not been completely summarized, and the prices they publish, which are averages of several sizes and sometimes grades, hide many significant variations in prices caused by differences in size and quality of coal.

a Series of F.O.B. Mine Prices by Producing Areas and Destination Prices by Markets

The Wholesale Price Division of the Bureau of Labor Statistics collects monthly prices of bituminous coal from mine operators, selling agents, or large distributors in 16 cities. The prices are quoted 'f.o.b. cars destination', which is the sum of the mine price and the freight rate from the

mine to the city. All the quotations are combined into three average prices: mine run, prepared sizes, and screenings.

Outline of project

Before the price structure of the bituminous coal industry or the behavior of prices of bituminous coal can be studied adequately, it is obviously essential to secure many specific series of prices. Three average prices for the country as a whole are not sufficient. The purpose of this project, therefore, is to construct, publish, and analyze series of f.o.b. mine prices by producing areas and of destination prices by markets. If the Wholesale Price Division of the Bureau of Labor Statistics is able to carry out the revisions in its collection and publication of prices, which have been developed by it and the Committee, this project will facilitate comparisons between previous and future collections of prices made by it.

Throughout the study the emphasis should be on the construction of a large number of continuous series of prices of specific grades and sizes of coal. The resulting series of f.o.b. mine prices will show both the variations in prices attributable to differences in sizes of coal produced in the same district, and differences in the mine prices of the same size of coal produced in various districts. For destination prices similar analyses can be made. It may be possible to construct series that will not only reveal the effect of sizes of coal on prices paid by carload-lot buyers but also furnish a basis for comparing prices of the same sizes of coal produced in various areas and sold in the same market. The report should serve as a source book on f.o.b. mine prices.

Sources of data[11] *and procedure*

The Wholesale Price Division of the Bureau of Labor Statistics has preserved the original schedules of prices col-

[11] For a detailed description of prices compiled by the Wholesale Price Division see Ap. I, A, 1, a; and for those published by trade papers see Table I–5 and Ap. I, A, 2.

lected since 1923. In many instances these reports show separately the f.o.b. mine price and the freight rate from the mine to the city which, added together, give the destination price. Thus the f.o.b. mine price and the delivered price can be secured from the same schedules. In addition, these original schedules give more detailed specifications than mine run, prepared sizes, and screenings; the prices are quoted for specific sizes of coal from specified producing fields. The Bureau of Labor Statistics will make available, under certain conditions, these original schedules from which detailed price series can be developed for 16 cities and for many producing fields.

For many cities and for many producing areas f.o.b. mine prices can be secured from trade papers. Many specific sizes and grades of coal are quoted in: *American Metal Market, Black Diamond, The Commercial Bulletin, Chicago Journal of Commerce, Coal Age* (no prices published since October 1931), *Coal and Coal Trade Journal, Daily Metal Trade, Iron Age, Journal of Commerce,* and *Saward's Journal.* In addition to f.o.b. mine prices, some of these sources give dock and pier prices in certain markets.

The quotations in these papers are not regarded by the trade as authentic prices. Usually they are what the operator would like to obtain for his coal rather than the amount for which he actually sells it. In spite of this qualification, series of quotations constructed from these sources would show trends in prices as well as the relationships between prices of various sizes of coal produced in the same field and of the same size of coal from different producing fields offered for sale in the same market.

The director of this study should have had experience in the construction of price series. An expert knowledge of coal is desirable but not absolutely essential.

If the studies of the price structure or of the regional market areas are in progress at the same time as this study of f.o.b. mine prices and destination prices, the research should be coordinated.

b Series of Retail Prices by Markets

The most extensive collection of retail prices of bituminous coal is made by the Retail Price Division of the Bureau of Labor Statistics. These data are published as average prices of prepared sizes for each of 38 cities, and are available monthly for 1922, 1925, from January 1928 to July 1935 inclusive, and October 1935, January, April, July, September, and December 1936. In March 1937 data were compiled for 48 cities. Future collections will be made every three months at least. For 7 of these cities run of mine prices are also compiled. Such prices conceal variations caused by differences in specific sizes. The *Chicago Journal of Commerce* publishes a comprehensive list of retail prices in the Chicago market. In addition the *Journal of Commerce* quotes the retail price of bituminous coal in New York City. The *Commercial Bulletin* lists retail prices in Boston, and the *Black Diamond* occasionally publishes retail prices in some markets. No summary has ever been made of the retail prices published by the trade papers. The purpose of this project is to provide the detailed series of retail prices needed for the studies of important market areas (Part II, A, 2). The construction of series of retail prices for markets will be of value also to many students of the coal industry or of prices in general.

Outline of project and sources of data[12]

The original retail coal price schedules collected by the Retail Price Division of the Bureau of Labor Statistics have been preserved for 1922, 1925, and 1928 to date. From them it is possible to construct series of retail prices for specific sizes of coal. The prices published by the Retail Price Division conceal the wealth of information available, as is indicated in Appendix II. They are average prices of coal from

[12] For a detailed description of prices compiled by the Retail Price Division prior to 1937 see Ap. I, A, 1, b; for revisions made in 1937 see Ap. II, B.

B. L. S. 660
U. S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON

RETAIL PRICE
COAL

Date

Dealer's name and address

GENTLEMEN: Please enter as of the 15th of the current month *cash* retail prices per ton of 2,000 pounds of coal delivered to family trade, dumped at curb or shoveled into bin from wagon without extra handling or additional charge. Enter below the amount of any additional charge for storing.

Kindly return this form to reach Washington soon after the 15th of the month.

Very truly yours,

ISADOR LUBIN,
Commissioner of Labor Statistics.

NET *CASH* PRICES *NOT* INCLUDING STORAGE CHARGE

PENNSYLVANIA ANTHRACITE			BITUMINOUS COAL		
White Ash Coal	In 1-ton lots	In 2 or more ton lots	For Family Use	In 1-ton lots	In 2 or more ton lots
Egg	$	$	Canyon City lump	$	$
Stove			" " nut		
Chestnut			Walsenburg lump		
Pea			" nut		
Colorado OTHER ANTHRACITE			Routt Co. Pinnacle lump		
Horace anthracite	$	$	" " " nut		
Furnace, 1&2 mixed			LIGNITE Gorham lump 1st grade		
Stove, 3&5 mixed			" nut " "		
			Columbine lump 2nd grade		
			" nut " "		

Additional charge for carrying from curb to bin is .....

.....
(Name of person furnishing information)

U. S. GOVERNMENT PRINTING OFFICE 1920 14—3230

FIGURE 1

various producing fields. The original schedules, however, contain detailed specifications for which the price of coal is quoted. One dealer, for example, reports on the following sizes and grades: Canyon City lump, Canyon City nut, Walsenburg lump, Walsenburg nut, Routt Co. Pinnacle lump, and Routt Co. Pinnacle nut (Figure 1). From series of prices for many specific sizes and qualities in specific markets the variations in retail prices of different sizes of coal from a given field as well as of the different grades of coal from sev-

eral producing areas could be determined. In addition, the retail prices of the same size of coal in different markets could be compared. Prices of an identical size and quality of coal sold in two or more cities could even be compared. Supplementary data on retail prices should be compiled from the trade papers. When completed, the series should be made available in convenient form.

The Retail Price Division of the Bureau of Labor Statistics should be requested to make this analysis of the original retail coal price schedules. If this Division does not have funds for such a study, it would probably be possible for the person making the study to be appointed as a Special Officer in the Division and to have access to the original schedules. If the regional marketing studies are in progress at the same time as this study of retail prices, the research should be coordinated.

2 Preparation of Source Books

Two projects are included under this heading. The purpose of both is to bring together for ready reference the large amount of scattered data that have a bearing on research in prices and related problems. The first would assemble the data on costs, sales realization, and margins, and the second, all other related data. The preparation of these source books would prevent duplication of effort on the part of the many individuals engaged in research in this industry and would greatly facilitate the completion of the program of studies outlined in this report.

a Costs, Sales Realizations, and Margins

Data on costs, sales realizations, and margins are described in Appendix I, B, 1. Of special value are the detailed data compiled by the Research and Planning Division of the NRA for November 1933 through January 1935. Its reports give, by seam groups, fields, and combinations of fields, monthly data on per ton labor costs, supply costs, depreciation, depletion, royalties, salaries, taxes, compensation insurance, company house expense as well as production costs

and administrative and selling expenses. The form in which this information has been published needs revision for effective utilization. For other years the data are less comprehensive. The United States Coal Commission collected on a quarterly basis per ton labor and supply costs, general expenses, total costs, sales realization, and margins for 1921 and 1922, and the Federal Trade Commission compiled similar data for 1916 to 1918, inclusive, and for 1920. It is proposed to bring all the data together in compact and usable form and to combine those for the individual fields covered by the earlier studies so as to make them as nearly comparable as possible with the classification of fields adopted by the Research and Planning Division.

b Other Related Data [13]

In addition to mine, destination, and retail prices, and data on costs, sales realizations, and margins in the bituminous coal industry, there is a wealth of information that has a bearing on its pricing policies and problems. Such data collected and published by the Bureau of Mines and other Federal agencies cover production, employment, employee output, days worked by the mine, wage rates, consumers' stocks, and mechanization. The value of this information lies in its continuity and breakdown, in most cases, by states, divisions, districts, and counties. In addition to the published data of the Bureau of Mines are the reports from the departments of mines in many of the important coal producing states. Their usefulness, however, is impaired by their inaccessibility.

The purpose of this project is to assemble these materials between the covers of one book. It is not possible to foresee all the ways in which this information can be used, but this project should obviously be of concern to many persons beyond academic circles. Individual coal operators will be more likely to base their day-to-day decisions on facts, when those facts can be readily secured. In order to achieve the maximum usefulness, this project must emphasize the

[13] For a detailed description of these data see Ap. I, C.

breakdown of data by states, by divisions, by districts, and by counties. The Committee has already made a preliminary survey to determine the periods covered by the various types of data published by Federal agencies and by many of the state departments of mines. This information will serve as a guide for the development of this source book.