

**KANSAS GEOLOGICAL SURVEY  
OPEN-FILE REPORT 28-1**

**ANALYSES OF KANSAS COALS  
GEOLOGY OF THE COAL BEDS**

by

Raymond C. Moore

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ANALYSES OF KANSAS COALS

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Coal is widely distributed in Kansas, outcropping or occurring in relatively shallow depth throughout most of the eastern quarter of the State, in the north central, and locally in the southwest parts. Some coal is probably to be found at considerable depth beneath most of Kansas; the valuable deposits, however, are found only in the eastern counties, where the Pennsylvanian coal measures contain many different beds of coal, some of which outcrop for long distances. As in eastern Kansas, the strata slope gently downward to the north and west; the lowest or oldest Pennsylvanian rocks and their included coal beds are found to the south and east and the higher or younger beds at varying distances to the northwest. The coal-bearing rocks underlie virtually all of Kansas, but in the central and western parts of the State they are too deeply buried to justify development of any coal they may contain. Moreover, as many of the outcropping coal beds are too thin to be of importance, the areas of minable coal comprise but a relatively small part of the area in which coal-bearing strata outcrop.

✓ State geologist.

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The Permian system, which rests upon the Pennsylvania rocks and appears at the surface in a broad band crossing the central part of Kansas, is not known to contain any coal beds. The Permian is overlain by Cretaceous rocks which, in the north central part of the State, contain coal that is worked locally. Coal in these rocks extends westward under cover of younger strata and has been penetrated at places in borings, but it is not very important.

More than 90 per cent of the coal produced from the Kansas fields comes from the so-called Cherokee district in Cherokee and Crawford Counties, in the southeast corner of the State. The producing area, which comprises approximately 123,000 acres of workable coal, extends slightly across the line into Missouri. In this district, the coal bed that was most worked has been estimated to contain more than 295,000,000 tons originally, but more than half of it has been mined. There are three other producing districts: 1, Linn County, near Pleasanton and La Cygne; 2, Osage County, near Osage City, Scranton, and Carbondale; and 3, Leavenworth County, <sup>at</sup> Leavenworth. Some coal for local use is also mined near Fort Scott. The amount of coal produced in these fields is relatively small.

*C. 14. c. side*  
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 fig. 1. d.

Cherokee shale, Figure 1, a generalized section of the Pennsylvania rocks of Kansas, shows the position of the main coal beds. The Cherokee shale is the chief coal-bearing formation and contains the thick Weir-Pittsburg and a number of other coal beds. The lowest coal which occurs locally at the base

of the Cherokee has never been developed. A water well at Weir shows 2 feet of coal, 64 feet above the base of the shale, but this bed has not been mined. A coal bed 12 to 18 inches thick, about 150 feet above the base of the shale, lies close to the surface near Columbus, Cherokee County, and has been mined by stripping. The Weir-Pittsburg bed, which is much the most important bed of coal in the Cherokee shale of southeast Kansas, is about 250 feet above the base of the Cherokee shale. The coal is 32 to 43 inches thick. It may be present beneath Fort Scott, as a boring here records 34 inches of coal at the approximate horizon of the Weir-Pittsburg bed. *Coal area of Eastern Kansas* Figure 2 shows the ~~Weir-Pittsburg coal field~~. In the eastern part of the district, where the coal lies close to the surface, the bed is mined by stripping. At some of the strip pits as much as 40 feet of overburden is removed. Farther west, where the coal lies deeper, shafts are sunk and the coal is mined by the room-and-pillar system. At a distance above the Weir-Pittsburg coal averaging about 60 feet is another bed, known as the Lightning Creek coal. This bed is of about the same quality as the Weir-Pittsburg but is only about 2 feet thick and at present is not extensively mined. At the top of the Cherokee is the Lexington coal, well known in parts of western Missouri. It is mined in Kansas near Fort Scott and at some other places and is locally and industrially known as the Fort Scott coal. The bed ranges in thickness from about 15 to 20 inches and is mined chiefly by stripping.

The Leavenworth coal is found in the Cherokee shales. Any attempt at correlation between the Leavenworth coal and the coals of Cherokee and Crawford Counties would be largely conjectural further than to show that they all belong to the Cherokee shales.

Insert  
fig. 2  
l.d.

*c. 14 l.c. added*

Other shales—In the Bandera shale of the Marmaton formation is a coal that corresponds to the Mulberry coal of Missouri and ranges in thickness from 6 inches near Redfield, in Bourbon County west of Fort Scott, to 40 inches near La Cygne, in Linn County. It is mined by stripping near Fulton, Hammond, and Prescott, and by shallow underground mining near Pleasanton, Boicourt, and La Cygne. The limits of this coal are not known, in the district but there is probably a large supply of good coal which will be mined when the Cherokee coal is worked out.

A coal bed in the Chamute shale is mined locally west and southwest of Thayer in Neosho County. This bed, which may be designated the Thayer coal, is 12 to 20 inches thick.

In the Lawrence shale, thin but widely distributed beds of coal are found for many miles along the outcrop. The chief development is in the southwest part of Franklin County near Homewood, Ransomville, and Williamsburg, in a bed that may be called the Ransomville coal. This bed lies about 150 feet below the top of the shale and is 12 to 24 inches thick. A less important bed about 30 to 40 feet below the top of the shale is recorded. The Ransomville coal is mined by stripping and by underground mining by the long-wall method.

The coal mined in the Osage County district occurs in the Severy shale, and stratigraphically is known as the Nodaway bed; it is widely traceable in Kansas, Nebraska, Missouri, and Iowa but at most places is too thin for profitable mining. In Kansas the coal at this horizon is mined actively in Osage County only and is known as the Osage coal. It is 11 to 30 inches thick, averaging about 15 inches. This coal is about 2,000 feet higher

in the Pennsylvania series than the Cherokee bed. It is obtained by stripping and by underground mining by the longwall method. The original workable coal in this field is estimated by C. M. Young of the University of Kansas as 89,000,000 tons.

Thin beds of coal are known higher in the Pennsylvania section of Kansas. The Elmo coal, which lies a few feet below the Burlingame limestone, has been mined in the northeast corner of the State and is exploited in a small way by the only coal mine in Nebraska, just north of the Kansas line, in Richardson County. It extends as far southwest as Greenwood County but is not workable there. The Nyman coal, found just below the Table Creek limestone of Nebraska—that is, in the lower part of the Admire shale of the present stratigraphic classification in Kansas—is mostly too thin to work but was mined in Nemaha County, Kansas, in the early days before rail transportation made other fuel readily available.

10 ft or less (Cretaceous system) (lignite of fair grade) Coal is found in the Cretaceous at various points in Cloud, Ellsworth, Lincoln, Mitchell, Republic, and Russell counties and is generally mined by stripping along the outcrop. The maximum is 22 inches. This coal has never been exploited extensively and is used chiefly for local supply.

*For Kansas, title of technical paper will be*

UNITED STATES  
DEPARTMENT OF COMMERCE  
BUREAU OF MINES  
WASHINGTON

*"Analyses of  
Kansas Coals."*

OUTLINE FOR TECHNICAL PAPERS ON STATE COAL ANALYSES

As approved July 17, 1928 by O. P. Hood, Chief of Technologic Branch

- A. Preface, by Director, Bureau of Mines 1 page  
Include
1. Number and size of mines
  2. Production and total value
  3. Days worked by miners
  4. Men employed
  5. Output per man
  6. Value of coal per ton
- B. (State Name) Coal Fields, by Coal Geologist, U.S.G.S. <sup>or State Geologist</sup> 4 to 7 pages
1. Locations  
Best covered by a map showing coal districts, railroads, major rivers, streams and principal cities or towns. Map by crosshatching can show grades of coal in different districts. Map should not be too complicated or too detailed.
  2. Surface features
  3. Producing districts and beds mined in each
  4. Coal-bearing formations
  5. Coal beds
    - a. Age of coal beds
    - b. Thickness of beds as mined
    - c. Pitch of beds, and degree of folding, faults and eruptive intrusions.
    - d. Each important commercial seam should be discussed as to stratigraphic relations, kind of coals, character of rocks immediately below and above, bone and shale bands commonly found in the seam in that district. Beds not now of commercial value should be described very briefly. As the Technical Papers are revised these beds, as they become of more importance, can be more fully described. Again references should be given for those desiring more detailed information.
  6. Geologic structures  
Include a simple geologic column. Show relation of main producing coal beds to important key strata so that beds in the field can be determined. It should not be too highly technical, so that fuel engineer can readily understand. For more detailed geologic relations, reference should be made to publications of the U.S.G.S., State Surveys, etc.
  7. Coal Reserves

- C. Methods of Mining and Preparation of Coal, by Coal Mining Engineer, Bureau of Mines 5 to 11 pages  
 General statements under following heads, with special reference to features which have to do with the quality of coal
1. Mining methods
    - a. Method of development
      1. Shafts, slopes or drifts
      2. Long wall, or room and pillar system
    - b. Physical Structure of coal beds
      1. Kind of roof and floor, partings, and their influence on ash in coal
    - c. Mining and loading machines
      1. Per cent of coal loaded mechanically, general types of machines used, conveyors, etc.
      2. Per cent of coal mined with machines, as compared to pick mining
    - d. Methods of blasting
      1. Influence on quality and grade of coal produced
  2. Surface equipment, brief description of tipples, etc.
  3. Methods used in cleaning coal
    - a. Washing operations, types of machines
    - b. Hand picking
    - c. Mechanical dry preparation
- D. Production, distribution and use, by Coal Economist, Bureau of Mines 6 to 12 pages
1. Production and value
    - a. By counties and districts
    - b. By sizes shipped
    - c. Per cent of output from consumer-owned mines
    - d. Stripping operations, (if any)
  2. Transportation and destination of coal
    - a. Distribution by destinations (State or region) (From each producing district where possible)
    - b. Distribution by classes of consignees (by producing districts where possible)
  3. The relative amounts used for various purposes (quantity and/or percentage).
    - a. Used at mines
    - b. Railroad locomotives
    - c. Domestic heating
    - d. Coke
      1. Beehive
      2. By-products
    - e. Manufactured gas
    - f. Electric utilities
    - g. Bunkers
    - h. General industrial and other unspecified uses
  4. Resume of competing States or fields which serve the same markets

- E. Relation of mine samples to commercial shipments, by Fuel Engineer in Charge of Fuel Inspection 2 to 4 pages
1. Method of collecting mine samples
  2. Method of collecting delivered samples
  3. Relation between two kinds
  4. Example
- F. Analyses of delivered coal, by Fuel Engineer in Charge of Fuel Inspection 4 to 20 pages
1. Explanation of table of analyses
  2. Sources of information
  3. Fusibility of ash
  4. Table of chemical analyses of delivered samples
- G. Analyses of mine samples, by Chemists in Charge of Coal Laboratory, Bureau of Mines 20 to 100 pages
1. Explanation of table of analyses
  2. Sources of information
  3. Fusibility of ash
  4. Table of chemical analyses of mine samples (see attached example)
  5. Description and origin of samples  
Include coal sections for each sample

NOTE: The table mentioned in paragraph G-4 is the same one that was attached to the Second Revision of this outline.

UNITED STATES  
DEPARTMENT OF COMMERCE  
BUREAU OF MINES

WASHINGTON July 30, 1928.

OFFICE OF THE DIRECTOR

Dr. Raymond C. Moore, State Geologist,  
State Geological Survey of Kansas,  
Lawrence, Kansas.

SUBJECT: Technical Paper on Analy-  
ses of Kansas Coals.

Dear Dr. Moore:

The Bureau of Mines has formulated an outline for technical papers on state coal analyses, a copy of which is inclosed. The purpose of this outline is to have all our technical papers conform to a standard.

About a year ago you prepared a chapter on "Geology of the Coal Beds" for the technical paper on Kansas. This, of course, was written previous to the formulation of our outline. We are returning your manuscript, with map and columnar section, with the request that you now prepare the chapter to conform to Item B of the outline. Four to seven pages, exclusive of maps, figures, etc., have been allotted to Item B, and you can use your judgment as to the space required. We prefer at least four pages, and, if necessary in your opinion, up to seven pages will be satisfactory.

As the technical paper on Kansas coals has been most delayed of our state coal papers, we would appreciate a reply from you as to when we may expect to receive the revised chapter, so that we can coordinate the work of the other authors and publish this paper at an early date.

Cordially yours,



O. P. HOOD, Acting Director,  
For SCOTT TURNER, Director.

Inclosure No. 8955.

KGS  
CF  
28-1

September 1, 1928

Mr. O. P. Hood, Acting Director  
U. S. Bureau of Mines  
Washington, D. C.

Dear Sir:-

Your letter of July 30 asking me to undertake revision of the paper on Kansas Coal Fields came to the office while I was in the far west and unavailable. I have just returned to the office and in compliance with your request have undertaken to rewrite the discussion so as to conform to the outline submitted.

Trusting that the revised treatment is satisfactory for your use, I am

Very truly yours,