Administrative Report

For the (Sixth)

Kentucky Geological Survey

(Years 1926 and 1927)

By
WILLARD ROUSE JILLSON
Director and State Geologist

KENTUCKY GEOLOGICAL SURVEY
FRANKFORT, KENTUCKY
1927

The

Kentucky Geological Survey

WILLARD ROUSE JILLSON
Director and State Geologist

SERIES VI
PAMPHLET XX

Administrative Report

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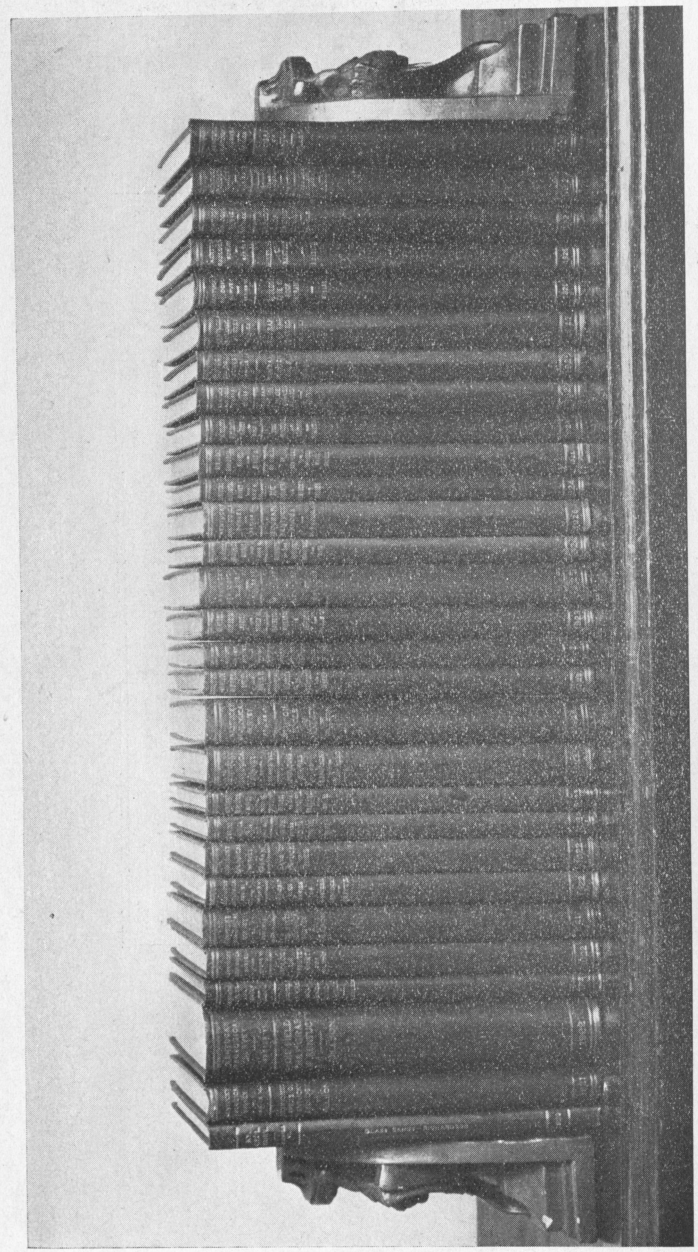
1927



PUBLICATIONS OF THE (SIXTH) KENTUCKY GEOLOGICAL SURVEY
(1920-1927)

ADMINISTRATIVE REPORT

For the (Sixth)

KENTUCKY GEOLOGICAL SURVEY

YEARS 1926 AND 1927

By
WILLARD ROUSE JILLSON
Director and State Geologist; Curator, Kentucky State Museum

PREPARED FOR THE GOVERNOR
AND THE LEGISLATURE

Thirty Illustrations and Topographic Index Map of Kentucky

KENTUCKY GEOLOGICAL SURVEY
FRANKFORT, KENTUCKY
1927

THE STATE JOURNAL COMPANY
Printer to the Commonwealth
Frankfort, Ky

Administrative Report

(1926-1927)

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KENTUCKY GEOLOGICAL SURVEY

Years 1926 and 1927

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GOVERNING STATUTES

The acts creating and governing the (Sixth) Kentucky Geological Survey and making appropriations for same are four and are entitled as follows:

I. "An act creating the Kentucky Geological Survey, designating its chief executive officer and his duties, and providing funds for its maintenance."[1]

II. "An Act appropriating money for the operation and maintenance of the various departments, boards, commissions, institutions and agencies of the State government, . . . ending June 30, 1927."[2]

III. "An Act appropriating money for the operation and maintenance of the various departments, boards, commissions, institutions and agencies of the state government . . . ending June 30, 1928."[3]

These Acts provided an annual total of $90,000.00 for the maintenance of the various activities of the Kentucky Geological Survey. The appropriation is divided into two funds: (1) Co-operative topographic mapping fund of $50,000.00, and (2) General geological fund of $40,000.00. In accordance with the stat-

[1] Acts of the General Assembly of the Commonwealth of Kentucky, Chapter 34, p. 141. 1920.

[2] Acts of the General Assembly of the Commonwealth of Kentucky, Chapter 11, Section 35, p. 47; and Section 41, p. 52. 1926.

[3] Acts of the General Assembly of the Commonwealth of Kentucky, Chapter 12, Section 35, p. 73; and Section 41, p. 78. 1926.

ute the first fund was to have been used in a "dollar for dollar" co-operation with the U. S. Geological Survey in an extension of the topographic base map of Kentucky. Unfortunately the appropriation of $50,000.00 was made available from the revenues of the State Department of Public Roads at the discretion of the State Highway Commission. After much insistence by the State Geologist the $50,000.00 available during the fiscal year 1926-27 was released for the purpose of topographic base mapping in Kentucky, but the continued effort of the State Geologist to get these funds released for the following fiscal year, 1927-28, has been entirely unavailing to the date of this writing. The topographical base mapping outlined in the governing statute, therefore, could not be carried forward during the last part of the two-year period provided for by the legislature. The second or general fund of $40,000.00 annually was appropriated in the two budget bills of 1926 and has been used for the maintenance of the Kentucky Geological Survey proper, payment of salaries, field expense, and miscellaneous charges, including all kinds of printing.

IV. "An Act to repeal, amend and re-enact section 3 of chapter 34 of the Acts of the General Assembly of Kentucky, 1920 session, touching the Kentucky Geological Survey." [1]

This act amending section 3, chapter 34, of the Acts of 1920, relating to the Kentucky Geological Survey has operated to give the Director of the Survey a broader field of service to the people of Kentucky. By virtue of this act he became the Curator of the mineral and fossil collections of the Kentucky Geological Survey in the custody of the University of Kentucky at Lexington, and is authorized to arrange them for proper public preservation. He is given further authority to lecture on subjects pertaining to the geology, mineral and natural resources of Kentucky. The provisions of this Act have been complied with during the past biennium, as will be outlined later in the report.

PERSONNEL OF THE SURVEY

The personnel of geological assistants and trained office workers employed on the (Sixth) Kentucky Geological Survey

[1] Acts of the General Assembly of the Commonwealth of Kentucky. Chapter 140, pp. 485-86. 1924.

during the past biennium is given below. All of these assistants, with the exception of the Director's Secretary and Chief Clerk, are classified as "temporary employees" having been engaged for the summer field season of two or three months to do a special piece of geological or mineral resource investigation:

DIRECTOR AND STATE GEOLOGIST

WILLARD ROUSE JILLSON, B. S., M. S., Sc. D., Frankfort, Kentucky.[2]

ASSISTANT GEOLOGISTS—TEMPORARY

CHARLES HENRY RICHARDSON, Ph. D., Head of the Department of Mineralogy, Syracuse University, Syracuse, New York.

STUART WELLER, Ph. D., Head of the Department of Paleontology, University of Chicago, Chicago, Illinois.

LEONIDAS CHAMBERS GLENN, Ph. D., Head of the Department of Geology, Vanderbilt University, Nashville, Tennessee.

ARTHUR C. MCFARLAN, Ph. D., Head of the Department of Geology, University of Kentucky, Lexington, Ky.

FRANK LEVERETT, B. S., U. S. Geological Survey and Lecturer on Pleistocene Geology, University of Michigan, Ann Arbor, Michigan.

WILBUR GREELEY BURROUGHS, M. S., Head of the Department of Geology, Berea College, Berea, Kentucky.

JAMES S. HUDNALL, B. S., Bowling Green, Ky.

JAMES MARVIN WELLER, Ph. D., University of Chicago, Chicago, Illinois.

CHARLES VERNON THEIS, Ph. D., University of Cincinnati, Cincinnati, Ohio.

EUGENE S. PERRY, M. S., University of Montana, State School of Mines, Butte, Montana.

LEWIS CASS ROBINSON, S. M., University of Kentucky, Lexington, Ky.

ARLE HERBERT SUTTON, Ph. D., University of Illinois, Urbana, Ill.

JOSEPH KENT ROBERTS, Ph. D., University of Virginia, Charlottesville, Virginia.

DAVID B. CHISHOLM, M. A., Columbia University, New York City, N. Y.

WILLIAM C. EYL, E. M., Lexington, Kentucky.

RAYMOND MILLER, B. S., Cecilia, Kentucky.

CHESTER K. WENTWORTH, Ph. D., U. S. Geological Survey, Washington, D. C.

RICHARD FOSTER FLINT, Ph. D., Yale University, New Haven, Conn.

JOHN GRANT WOODRUFF, B. S., Culver Military Academy, Culver, Indiana.

GEORGE W. PIRTLE, B. S., Elizabethtown, Kentucky.

SAMUEL M. MAYFIELD, B. A., Berea College, Berea, Kentucky.

SPENCER WITHERS, B. S. Powderly, Kentucky.

[2] Permanent employee.

GEOLOGIC AIDES—TEMPORARY

CHARLES W. WILSON, JR., B. A., Mayfield, Kentucky
ROBERT CECIL LANE, A. B., Clinton, Kentucky.
LAWRENCE FREEMAN, B. S., No. 134 Claire St., Louisville, Kentucky.
HUGH TIM RICHARDSON, A. B., Tompkinsville, Kentucky.
LUCIEN BECKNER, Winchester, Kentucky.
EDGAR M. PILKINGTON, A. B., Gallatin, Tennessee.
DON L. CARROLL, B. S., No. 5607 University Avenue, Chicago, Illinois.

GEOGRAPHERS—TEMPORARY.

CARL O. SAUER, Ph. D., Head of the Department of Geography, University of California, Berkeley, California.
SAMUEL N. DICKEN, Ph. D., Department of Geography, University of California, Berkeley, California.
C. WARREN THORNTHWAITE, A. B., University of Oklahoma, Norman, Oklahoma.

VARIOUS ASSISTANTS—TEMPORARY

W. D. FUNKHOUSER, Ph. D., Archaeologist, Head of Department of Zoology, University of Kentucky, Lexington, Kentucky.
EARL SHERWOOD, B. S. in M. E., Engineer, Ewing, Kentucky.
COLEMAN D. HUNTER, B. S., Engineer, c/o Louisville Gas & Electric Co., Louisville, Kentucky.
WILLIAM H. GILL, Draftsman, 802 Mills Bldg., Washington, D. C.
SILAS T. WILSON, B. S. in C. E., No. 201 E. Fourth St., Frankfort, Ky.
CHARLES STEVENS CROUSE, M. S., Professor of Metallurgy, University of Kentucky, Lexington, Kentucky.
CHARLES WILSON LOGAN, Transitman, Frankfort, Kentucky.
M. E. SLAGEL, Field Engineer, Lexington, Kentucky.
F. HARVEY DOUGLAS, Field Assistant, Elizabethtown, Kentucky.
EUGENE COWLES, JR., Field Assistant, Shelbyville, Kentucky.
LOWELL HENRY, Field Assistant, Frankfort, Kentucky.
EVANS CHANCE MCGRAW, Engineer, 415 Clifton, Ave., Lexington, Ky.
W. E. BACH, Assistant Engineer, Frenchburg, Kentucky.
ROBERT SCHUYLER LANSING, Assistant Engineer, Wanakena, New York.

W. S. WEBB, Archaeologist, Head of Department of Physics, University of Kentucky, Lexington, Kentucky.
ALEX MONTGOMERY, Asssitant Engineer, 2104 W. Hill St., Louisville, Ky.
RUSSELL O. BISHOP, Assistant Engineer, Bardwell, Kentucky.
PHIL ASMERUS, Rodman, Dry Ridge, Kentucky.
GEORGE R. WESLEY, Assistant Engineer, Middleburg, Kentucky.
CATHERINE B. MCNAMARA, Frankfort, Kentucky, Secretary.[1]
HATTIE M. SCOTT, Frankfort, Kentucky, Chief Clerk.[1]
WM. B. SAMUELS, Porter and Janitor, Frankfort, Ky.

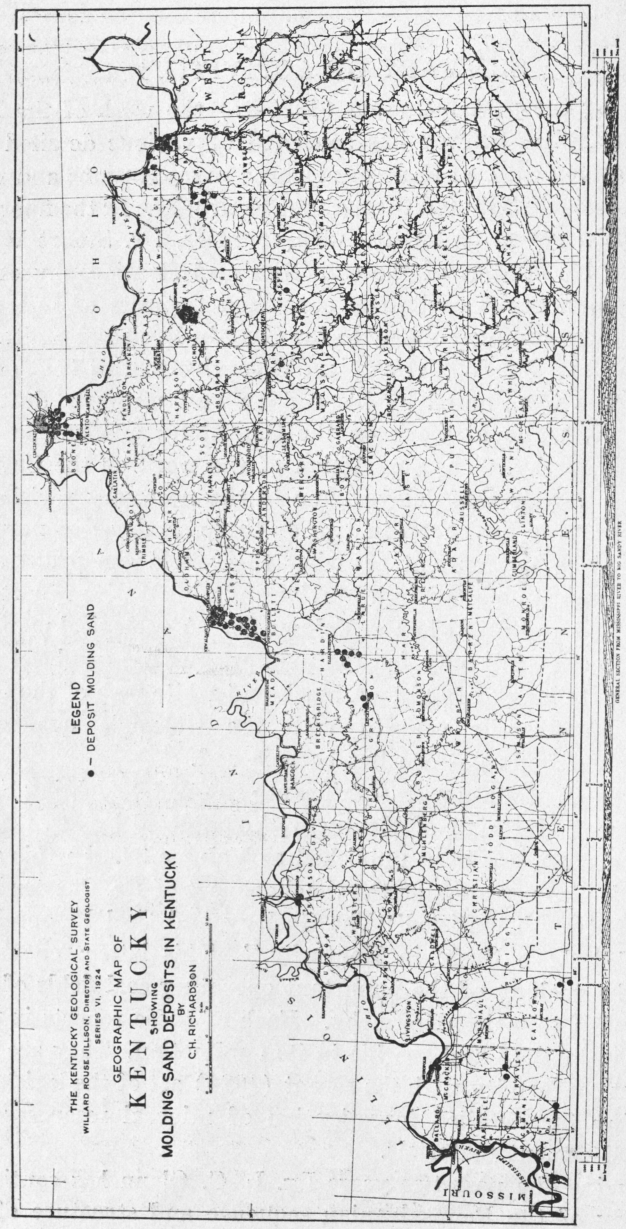
[1] Permanent employees.

SUMMARY OF ACTIVITIES

During the past biennium (1926-27) the work of the Kentucky Geological Survey has consisted of various detailed and general geological and mineral resource investigations and mapping projects distributed throughout Kentucky. In the fluorspar field of Livingston and Crittenden counties, Dr. Stuart Weller continued his studies of the structure and stratigraphy of the Mississippian rocks and their contained deposits of fluorspar. His work was confined chiefly to the Cave-in-Rock and Smithland Quadrangles. Dr. Weller's splendid service in this field of the Survey was terminated by his sudden and untimely death in July, 1927, while at work on the Smithland quadrangle near Salem, Kentucky. The completion of the work on the Cave-in-Rock quadrangle was delayed due to the necessary revision of the topographic base map in two or three small areas north of Marion. The manuscript covering this work, the preparation of which was announced in a previous administrative report, has been revised and published as Volume 26. A geological map prepared in colors is ready for the printer, but has not been published due to lack of funds. A black and white map of the Cave-in-Rock quadrangle coupled with the Golconda quadrangle showing the fault pattern has been issued.

A report of state-wide significance entitled, "Molding Sands and Cement Materials of Kentucky," completed by Dr. Charles H. Richardson, has been published as Volume 29. In this same volume is also represented the timely report of Dr. Chester Kenneth Wentworth, entitled "The Geology and Coal Resources of the Middlesboro Basin in Kentucky." This latter report discusses the geology of the important operating coal fields of Bell and Harlan counties, Kentucky. Each of these reports is thoroughly up-to-date and specific in its application. They are both in direct conformity with the recent (1924) act of the legislature providing for detailed investigation of mineral resources and road and cement materials.

During the past two years Dr. L. C. Glenn has continued his study of the Pennsylvanian sequence and structure of the entire Western Kentucky Coal Field. The work outlined has



involved the mapping of the various important commercial coals of this field and the delineation of the outcrops of the major stratigraphic units, the Pottsville, Allegheny, Conemaugh and Monongahela. Field work in 1926 and 1927 completed this part of the program. Dr. Glenn is now engaged in writing the manuscript of this important and comprehensive report. During the field season of 1927 he executed the areal and structural geology of the Pennsylvanian area in Butler. This manuscript has been completed in colors and awaits the availability of funds for publication.

During the latter part of the past field season—summer of 1927—Dr. Glenn was engaged in a study of structural and seismic geological conditions in the Gulf Embayment area of Western Kentucky (the Jackson Purchase Region) west of the Tennessee river. In accordance with specific authority given by Governor W. J. Fields for this work, and in conformity with excellent co-operative arrangements effected with the State Geological Surveys of Tennessee, Arkansas, Missouri, and Illinois, these investigations were extended somewhat into these adjacent states in order to allow a fuller and more accurate comprehension of the geological principles involved. The area is one presenting great difficulty due to the unconsolidated nature of the sediments. A similar study of the Paleozoic belt surrounding, planned as a second division of this investigation, and in progress by Dr. Stuart Weller at the time of his sudden death last summer in Livingston County, will be undertaken anew during the field season of 1928.

A reconnaissance report entitled "The Pleistocene of Northern Kentucky" prepared as a result of field work executed by Professor Frank Leverett, geologist of the U. S. Geological Survey, during the field seasons of 1924 and 1925 is now being published and will soon be available as Volume 31.

During the field season of 1925 Professor Arthur C. McFarlan, Head of the Department of Geology, University of Kentucky, Lexington, Kentucky, assisted by Mr. George W. Pirtle, carried forward areal and structural investigations in the mapping of the geology of Jessamine County. Throughout the past field season Professor McFarlan assisted by Mr. Hugh Tim Rich-

ardson, of Tompkinsville, Kentucky, and Mr. Lawrence Freeman, of Louisville, Kentucky, mapped the geology of northern Garrard County, including the complexly faulted area in the vicinity of Burdettes Knob. Later in the season, Professor McFarlan and Mr. Richardson mapped the structural geology (fault pattern) of Lincoln County and the areal geology of the Mississippian outcrops of southern Butler County. This work completed the mapping of Butler County, the geology of the northern part or Pennsylvanian area of Butler County having been executed at about the same time by Professor L. C. Glenn. This manuscript map is ready for publication. Both the Lincoln and Garrard County maps have been published.

Professor Wilbur Greeley Burroughs, head of the Department of Geology, Berea College, Berea, Kentucky, has been engaged at various times during the past biennium in the preparation of two manuscript reports entitled I. Directory of Kentucky Mineral operators, and II. Economic Geography of the Mississippian Plateau. The first of these was completed in 1926 and awaits funds for publication. The second is still in process of manuscript preparation, the field work having been completed.

Mr. James S. Hudnall, formerly of Bowling Green, Kentucky, but now of Brownwood, Texas, has completed with the assistance of Mr. George W. Pirtle, surface and subsurface structural geological maps of Lawrence County. These plats have been published separately at the scale of 1 inch to the mile with 10 foot contour interval. They are now available for the public. The surface structure was done on the Fire Clay Coal, while the sub-surface work was based upon the top of the Sunbury Shale (Mississippian).

Dr. James Marvin Weller, of Urbana, Illinois, was engaged during a brief part of 1927 in the review of his manuscript of the areal, structural and economic geology of Edmonson County. This report is now published as Volume 28.

Professor Charles Vernon Theis, Department of Geology, University of Cincinnati, Cincinnati, Ohio, has been engaged during the past two years in the execution of the areal, structural and economic geology of Henderson County. The field work for this report has been completed as has also the manuscript. The structural map has been published in black and white and is now available. Publication of the areal map and report awaits provision of funds for printing.

Professor Eugene S. Perry, formerly of Lexington, Kentucky, but now head of the Department of Geology, University of Montana, State School of Mines, Butte, Montana, completed in 1926 the structural geology of Owsley County. This structural geological map has been published and is now available.

Professor Lewis Cass Robinson, Department of Geology, University of Kentucky, Lexington, was engaged early in 1926 with Professor McFarlan in the execution of the areal and structural geology of Fayette County. This map has been published in two colors, scale 1:62500. Later Professor Robinson undertook alone the areal and structural geology of Morgan County; the map scale, 1 inch to the mile, of this Eastern Kentucky county, has been published as has also a brief report of Morgan County appearing in Volume 26. Professor Robinson has now in hand a field study to be followed by a written report entitled "The Vein Ores of Central Kentucky."

Dr. Arle Herbert Sutton, Department of Geology, University of Illinois, Urbana, has been engaged, under the direction of Dr. Stuart Weller, in the areal and structural mapping of the Mississippian formations in Western Kentucky, particularly the southern part of the Dawson Springs and Nortonville quadrangles. The Dawson Springs quadrangle has been published in black and white showing the structural and areal geology, but funds for the publication of a much more desirable colored areal and structural map of this quadrangle have not been available. It is planned to publish a color map later. Work on the Nortonville quadrangle has not been completed, but will be finished during the early part of the field season of 1928. This work was stopped during the middle of the past field season due to the sudden and untimely death of Dr. Stuart Weller necessitating the transfer of Dr. Sutton to the Smithland quadrangle on which Dr. Weller was engaged at the time of his death. The geology of the Smithland quadrangle was completed with the assistance of Professor Samuel M. Mayfield, Department of Geology, Berea College, Berea, Kentucky; and Don L. Carroll, of the University of Chicago, formerly assistant to Dr.

Weller. The Smithland quadrangle is now in the vault of the Survey awaiting funds for its publication.

Dr. Joseph Kent Roberts, formerly of Nashville, Tennessee, but now of the University of Virginia, Charlottesville, has been engaged in the delineation of the Cretaceous outcrop in Western Kentucky and in Trigg, Lyon and Livingston counties and preparation of a report on same. Reconnaissance maps showing this outcrop for Lyon and Livingston counties have been issued in black and white, but the Trigg County work though ready has not been published due to lack of funds. A written report is now in the hands of the printer and will appear in Volume 31.

Dr. Roberts has also been engaged in the preparation of a manuscript on the Cretaceous and the Eocene paleontology of Western Kentucky which will appear in the symposium entitled "Paleontology of Kentucky," Volume 36. Dr. Roberts' manuscript for this volume is now complete.

During the past two years Professor T. E. Savage of the Department of Geology, University of Illinois, Urbana, Illinois, has been engaged at various times in the writing of a broad report entitled: "The Devonian Rocks of Kentucky." The field work for this study was done during 1924-25. This important manuscript was completed July 5, 1927, and awaits funds for publication.

Mr. David B. Chisholm, formerly of Cincinnati, Ohio, but now of Columbia University, New York City, has mapped the structural geology of Whitley County to the scale of 1 inch to the mile, and this map has been published in black and white. Mr. Chisholm also assisted in the execution of a portion of the new structural map of Bell County which was completed during the past summer and is now ready for drafting and printng as soon as funds are available. During the past field season Mr. Chisholm has been engaged in a study of "The Cannel Coals of Eastern Kentucky," and is at the present time preparing a manuscript on this study.

Mr. W. C. Eyl, of Lexington, Kentucky, has been engaged during the past biennium in a study of the areal and structural geology of Jackson, Lee, Rockcastle, Warren and a part of Ohio counties. The Lee County map has been published as has the Jackson County map, but the Rockcastle map though completed

for some time awaits funds for publication. The Warren County map is incomplete, but the structural geology of the Bell's Run Anticline, a portion of Northern Ohio County, and a relatively small map, has been published.

Mr. Raymond Miller, of Cecelia, Kentucky, together with Mr. Spencer, Withers of Powderly, Kentucky, completed, with Mr. Chisholm, the structural geology of Bell County as has been previously indicated. Mr. Withers and Mr. Miller completed together the structural geology of Harlan County; both of these projects were undertaken under the direct supervision of the State Geologist.

Dr. Chester K. Wentworth, formerly of the U. S. Geological Survey, but now of Joliet, Illinois, spent the field season of 1925 in a stratigraphic and structural study of the geology of the Middlesboro basin. A written manuscript covering this work was prepared in 1926, and this together with maps and suitable illustrations has been published as a part of Volume 29.

Professor John Grant Woodruff, formerly of Cadiz, Kentucky, but now of Culver Miltary Academy, Culver, Indiana, was engaged during the summer of 1926 in preparing base maps of Lyon County and parts of Caldwell. During the field season of 1927 he was engaged in the execution of the areal and structural geology of Daviess County. An areal geological manuscript map of Daviess County has been completed, but funds are not available for its publication. A preliminary ozalid base map of Daviess County has been issued and has had a wide circulation.

Professor Samuel M. Mayfield, Department of Geology, Berea College, Berea, Kentucky, was engaged during the summer of 1926 in base mapping of Southern Livingston County, and later as an assistant to Professor Weller in the mapping of the Chester formations of this part of Western Kentucky. During the season of 1927 he mapped the areal geology of southern Garrard County, and later the southern portion of the Smithland quadrangle. The latter work was done under the supervision of Dr. Stuart Weller and Dr. A. H. Sutton.

Mr. Charles W. Wilson, Jr., of Mayfield, Kentucky, was engaged during the summer of 1926 as assistant to Dr. L. C.

Glenn, Department of Geology, Vanderbilt University, Nashville, Tennessee, in his work in the western Kentucky coal field. Mr. Robert Cecil Lane, of Clinton, Kentucky, was engaged in mapping studies in Eastern Kentucky, particularly in Carter and Rowan counties. Mr. Lawrence Freeman, of Louisville, beside his work as an assistant on the Garrard County map, prepared a new base map with the assistance of Evans C. McGraw for Estill County. Later Mr. Freeman executed a portion of the areal geology of this district.

Mr. Lucien Beckner, of Winchester, Kentucky, spent a short time in making a reconnaisance archaeological study in the vicinity of Fullerton, Greenup County. His brief report has been published in Vol. 26.

Professor Samuel N. Dicken, formerly of Saltlick, Kentucky, but now of the Department of Geography, University of California, Berkeley, California, has been engaged in a geographic study of the Karst and Barren Region of Kentucky. This study and work has been carried on during the summers of the past biennium. The manuscript report covering this investigation is now being written by Mr. Dicken.

Professor C. W. Thornthwaite, of the Department of Geology, University of Oklahoma, Norman, Oklahoma, has been engaged for two years in a geographic study of the Louisville, Kentucky, and surrounding district. This report is now being written, and will be soon available for publication.

Dr. Carl O. Sauer, of the Department of Geography, University of California, Berkeley, California, has been engaged in the completion of his geographic studies of the Pennyroyal of Kentucky, this including principally the revision of his manuscript and its publication. This report is now available for the public as Volume 25.

Dr. W. D. Funkhouser, Department of Zoology, University of Kentucky, Lexington, Kentucky, together with Professor W. S. Webb, Department of Physics of the University of Kentucky, have been engaged during the last several years in the preparation of a manuscript entitled, "Ancient Life in Kentucky," which is in part paleontological and in part archaeological. This study, the first of its kind to be prepared by this Survey, is a detailed and exhaustive one, richly illustrated by original

photographs prepared by Professor Webb. It is written in a popular and interesting but none the less scientifically accurate way by these two well known Kentucky students of Archaeology This report will soon be available as Volume 34.

WORK BY THE DIRECTOR

The State Geologist, Dr. Willard Rouse Jillson, in addition to his administrative and executive duties as Director of the Kentucky Geological Survey, has found time to carry forward considerable geological and some historical research during the past biennium. He has published a number of shorter articles on economic, physiographic and administrative geology of Kentucky. Several of these papers were originally presented by him as addresses before educational, scientific and lay bodies in Kentucky and elsewhere. A considerable amount of field work has been done by the Director in various parts of the State the result of these efforts being indicated in several of the map entries below. A list of these publications, books and maps follows:

1925

Administrative Report (1924-1925). Covering the activities of the Sixth Kentucky Geological Survey. Prepared for the Governor and the Legislature. 6 illus., 1 topographic index map of Kentucky. Kentucky Geological Survey, Series VI., 1925 54

1926

Recent Geological Investigations in Kentucky. The Kentucky Outlook, Vol. II, No. 2, p. 6, Jan. 9, 1926 1

The Fireclays of Northeastern Kentucky. The Manufacturer's Record, Jan. 28, 1926, pp. 62-63. Reprinted with revisions and additions by Ky. Geol. Survey, Series VI, Pamphlet VIII, 9 pp., illustrated, map, 1926 9

Natural Resources of Kentucky. Address before Ninth Annual Meeting of the Kentucky Association of Public Utilities, Jan. 15, 1926, at the Brown Hotel, Louisville, Ky. Kentucky Outlook, pp. 4-5, Feb. 13, 1926, Lexington, Ky. 2

Major Drainage Modifications of the Big Sandy Valley. Paper read before the Kentucky Academy of Science. The Pan-American Geologist, Vol. XLVI, No. 1, pp. 49-52, August, 1926 4

Review of the Mineralogy of Kentucky by Chas. H. Ricardson, and other papers Nos. 1531, 1532 and 1533, p. 531, Geologisches Zentralblatt, Band 33 Nr. 12, Aug. 1, 1926 (Leipzig, Germany) 1

The Clays of Kentucky. The Ceramist, Trenton, N. J., Feb., 1926. Reprinted with revisions and additions by the Ky. Geol. Survey, Series VI, Pamphlet IX, illustrated, 15 pp. 1926 15

Oil Domes of Ashland. The Pan-American Geologist, Vol. XLVI, No. 2, September, 1926, illustrated, pp. 121-122 3

Map of Edmonson County, Kentucky. Showing Position of Beds of Bituminous Sandstone (Rock Asphalt). Ky. Geol. Survey, Series VI, Scale 1:62,500. Correct to Aug. 1, 1926..... 1

Map of Grayson County, Kentucky, Showing Approximate Distribution of Bituminous Sandstone Outcrop, Fault Pattern, and Oil and Gas Wells. Ky. Geol. Survey, Series VI. Scale 1 inch=1 mile. Correct to Sept. 1, 1926..... 1

OFFICE OF THE STATE GEOLOGIST

Geology of the Oil Shales of the Eastern United States. Ky. Geol. Survey, Series VI, Pamphlet X. Presented before the Fourteenth International Geological Congress by the writer, May 26, 1926, at Madrid, Spain. Ky. Geol. Survey, Series VI, Pamphlet X, 8 illustrations, 1 map, 18 pp., Jan., 1927..... 18

New Oil Pools of Kentucky. An indexed collection of twelve separate papers on Oil and Gas, Kentucky's Mineral Resources, Progress of Topographic Mapping and Geological Survey Administration in 1922 and 1923. Ky. Geol. Survey, Vol. 12, Series VI, 400 pp. (Includes Administrative Report of State Geologist for years 1922-1923.) Dec. 1926.

Geology of the Pellville Oil Pool (Hancock, Daviess and Ohio Counties, Ky.). Ky. Geol. Survey, Series VI, Vol. 12, Paper No. 1, pp. 1-32, illustrated. Dec., 1926..... 32

Oil and Gas Geology of the Williamsburg Region (Whitley County, Ky.). Ky. Geol. Survey, Series VI, Vol. 12, Paper No. II, pp. 33-88, illustrated with photographs and map, Dec., 1926 55

Resume' of Kentucky's Mineral Resources. Ky. Geol. Survey, Series VI, Vol. 12, Paper No. III, pp. 90-97, illustrated, 1 map, Dec., 1926. (Revised K. G. S. Pamphlet No. 7. This Bib. No. 121) 8

Comparative Values of Kentucky Petroleums. Ky. Geol. Survey, Series VI, Vol. 12, Paper No. IV, pp. 99-111, Dec. 1926..... 12

Explorations for Oil and Gas in Boyd County, Kentucky. Ky. Geol. Survey, Series VI, Vol. 12, Paper No. V, pp. 113-188. Illustrated with photographs, map and diagrams, Dec., 1926 76

Morton's Gap Oil Pool (Hopkins County, Ky.). Ky. Geol. Survey, Series VI, Vol. 12, Paper No. VI, pp. 189-211. Illustrated with photographs, map and graphs. Dec., 1926..... 23

Geology of the Rockcastle River Uplift (Laurel and Clay Counties, Ky.). Ky. Geol. Survey, Series VI, Vol. 12, Paper No. VII, pp. 213-255. Illustrated with photographs and map. Dec. 1926 44

New Oil and Gas Pools of Owsley County, Ky. Ky. Geol. Survey, Series VI, Vol. 12, Paper No. VIII, pp. 257-290. Illustrated with photographs and maps, Dec. 1926..... 34

Recent Production of Petroleum in Kentucky. Ky. Geol. Survey, Series VI, Vol. 12, Paper No. IX, pp. 291-342. Production graphs, Dec., 1926 42

Natural Gas Production in Kentucky, During Years 1923-24-25. Ky. Geol. Survey, Series VI, Vol. 12, Paper No. X, pp. 343-346, 1 photograph, Dec., 1926..... 4

Topographic Base Mapping in Kentucky. Ky. Geol. Survey, Series VI, Vol. 12, Paper No. XI, pp. 347-361. Illustrated with photographs and topographic maps, Dec., 1926..... 14

State Parks in Kentucky. Ky. Geol. Survey, Series VI, Pamphlet VI. 6 illustrations and 1 map. 1926..... 14

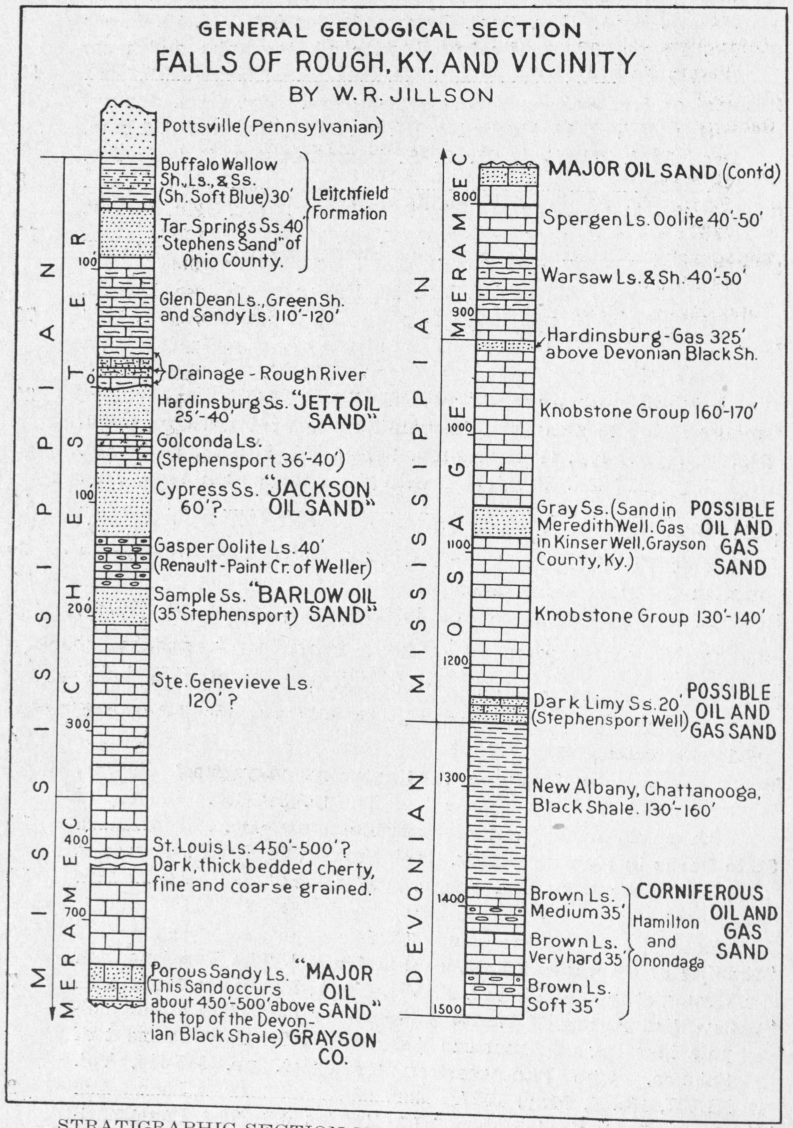
1927

"Shading of Contoured Topographic Maps." The Pan-American Geologist, pp. 11-14, Vol. XLVII, No. 1, February, 1927..... 7

"Valley-filled Areas of Western Kentucky Coal-field." Philadelphia Meeting of American Association for Advancement of Science. The Pan-American Geologist, pp. 315-316, Vol. XLVII, No. 4, May, 1927..... 2

"Kentucky Geological Survey." (Activities of). The Pan-American Geologist, pp. 235-240, Vol. XLVIII, No. 3, October, 1927 5

"Geology of Oil Shales of Eastern United States." Pan-American Geologist, Vol. XLVIII, No. 4, pp. 162-172, Des Moines, Iowa, November, 1927 10



STRATIGRAPHIC SECTION NEAR FALLS OF ROUGH CREEK

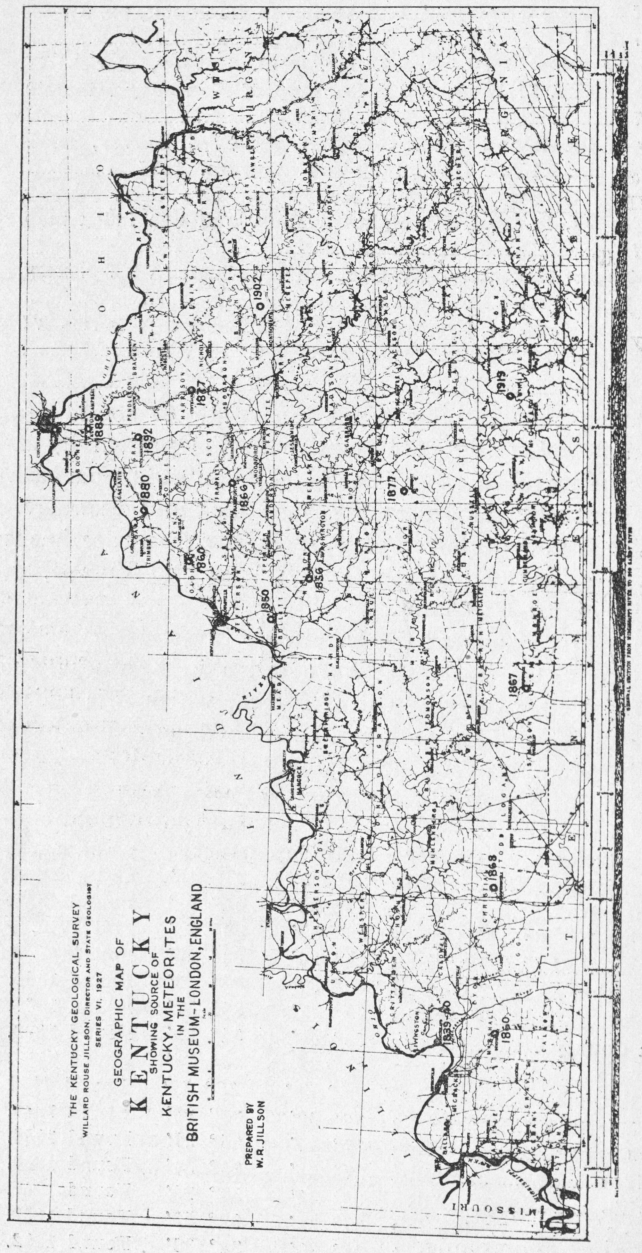
During the past two years there has been considerable activity in oil and gas prospecting in both Breckinridge and Grayson Counties. This section showing oil and gas sands was prepared following field investigations to aid in this exploratory work.

During the past biennium the State Geologist has been engaged in collecting data relative to the present location of Pleistocene vertebrate fossils originally collected from such celebrated Kentucky sources as Big Bone Lick and elsewhere. This list which is now quite complete, including many specimens contained in collections of the British Isles and Europe, will be published separately later.

As a first result of the Director's investigation relative to the known meteorites which have fallen in Kentucky, there is presented here a locating list of fifteen, which it is believed, is fairly complete. This work will be treated, according to present plans, in pamphlet form at a later date.

KNOWN KENTUCKY METEORITES

Kentucky	County	Latitude	Longitude West	Remarks
Bath Furnace	Bath	38° 2′	83° 37′	Fell 1902, Nov. 15.
Casey County	Casey	37° 20′	84° 55′	Found 1877.
Cumberland Falls	McCreary	36° 55′	84° 22′	Fell 1919, Apr. 9.
Cynthiana	Harrison	38° 24′	84° 16′	Fell 1877, Jan. 23.
Eagle Station	Carroll	38° 37′	85° 0′	Found 1880.
Frankfort	Franklin	38° 7′	84° 57′	Found 1866.
Kenton County	Kenton	38° 40′	84° 29′	Found 1889.
La Grange	Oldham	38° 37′	85° 25′	Found 1860.
Marshall County	Marshall	36° 50′	88° 17′	Found 1860
Mount Vernon	Rockcastle	36° 50′	87° 28′	Found 1868.
Nelson County	Nelson	37° 40′	85° 27′	Found 1856.
Salt River	Bullitt	37° 56′	85° 54′	Found 1850.
Scottsville	Allen	36° 45′	86° 10′	Found 1867.
Smithland	Livingston	37° 18′	88° 17′	Found 1839.
Williamstown	Grant	38° 38′	84° 30′	Found 1892.



MINERAL COLLECTIONS

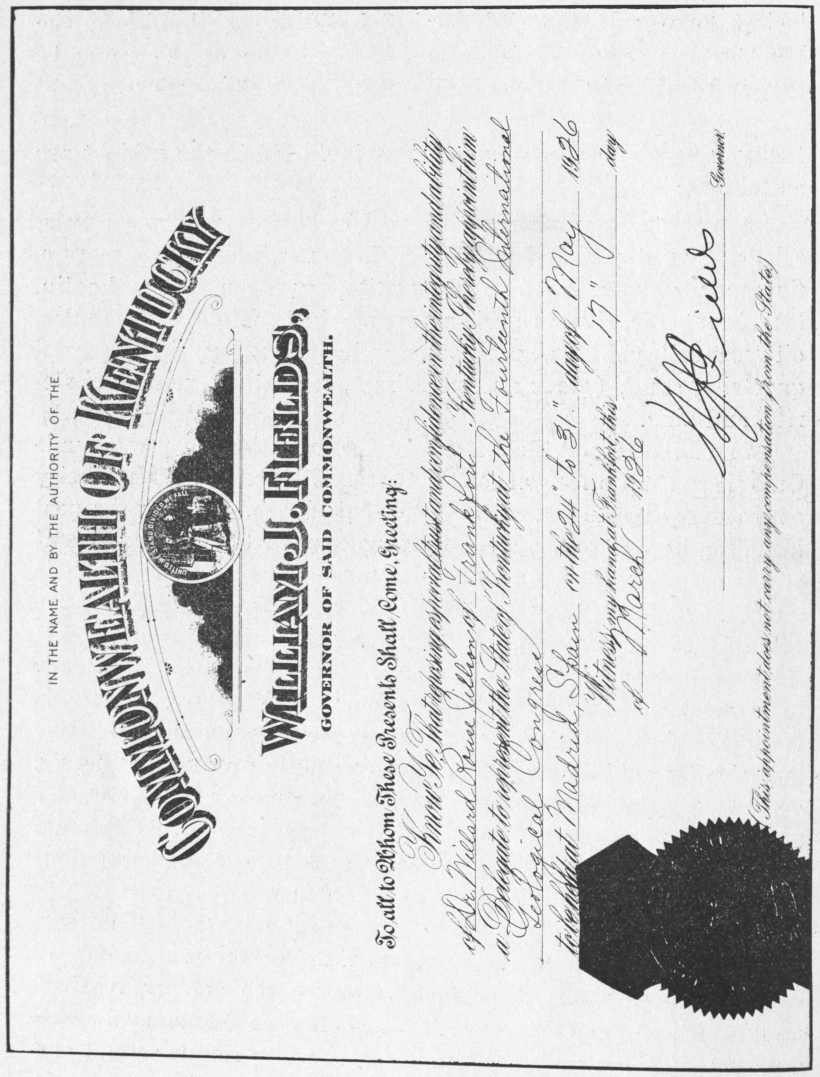
In the mineral room of the offices of the Kentucky Geological Survey in the Old Capitol building at Frankfort, the Director has arranged an economic collection of the minerals, ores and rocks of the Commonwealth. With these are displayed some of the State's representative fossils. The principal Kentucky minerals, ores and rocks now included in the cabinet are as follows:

Aragonite, asphalt (native rock), barite, calcareous tufa, calcite, cave onyx, chert, clay, coal, concretions, conglomerate, fluorspar, galena, geodes, glauconite, gypsum, iron, kaolin, lead, limetsone, lithographic stone, marble, manganese, nodules, oil "sand," pebbles, peridotite, phosphate, pyrite, quartz, quartzite, sand, (glass and molding), sandstone, shale, sphalerite, and zinc.

The Director of the Kentucky Geological Survey was made Curator of the Collections of the Survey lodged at the University of Kentucky by an act of the 1924 legislature. During the past biennium he has taken steps looking toward the rearrangement of these important mineral collections so as to enhance their specific, comparative and educational value to the people of the State. This work is now going forward and will be completed it is hoped during the coming summer. Plans have also been made in cooperation with the Commissioner of Agriculture, Honorable Newton Bright, whereby the Survey will prepare and have available for exhibit a collection of Kentucky produced minerals, geological maps and models of topography at the Kentucky State Fair. The exhibit will be placed in the new Merchants and Manufacturers' Building, and will be of a permanent nature.

INTERNATIONAL GEOLOGICAL CONGRESS.

On March 17, 1926, the Director of the Survey received appointment from Governor W. J. Fields as delegate to represent the Commonwealth of Kentucky at the Fourteenth International Geological Congress at Madrid, Spain. Accordingly the affairs of the Survey were so arranged as to allow of an administrative absence of about 90 days, and on April 16, 1926 the Director accompanied by his wife, sailed from New York on



IN THE NAME AND BY THE AUTHORITY OF THE

COMMONWEALTH OF KENTUCKY

WILLIAM J. FIELDS,

GOVERNOR OF SAID COMMONWEALTH.

To all to Whom These Presents Shall Come, Greeting:

Know Ye, That reposing especial trust and confidence in the integrity and ability of Dr. Willard Rouse Jillson of Frankfort, Kentucky, I have appointed him a Delegate to represent the State of Kentucky at the Fourteenth International Geological Congress to be held at Madrid, Spain on the 24th to 31st days of May 1926

Witness my hand at Frankfort this 17th day of March 1926

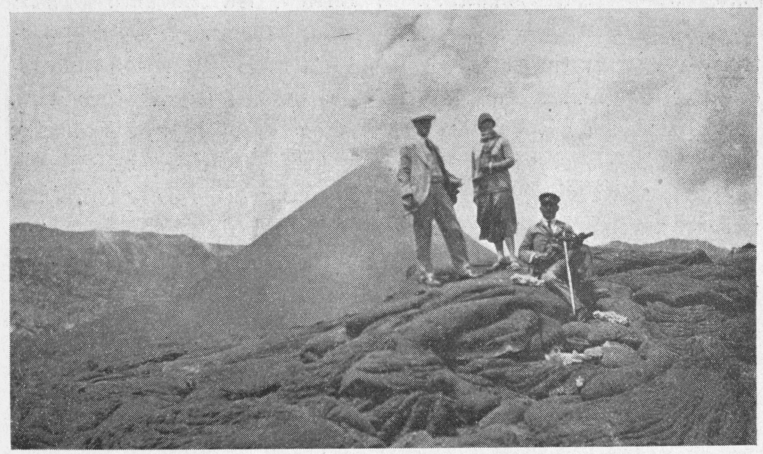
By the Governor

Secretary of State

(This appointment does not carry any compensation from the State)

Official Appointment of State Geologist to International Geological Congress

the Cunarder Andania. Disembarkment was made at Hamburg, Germany following an uneventful voyage overseas. After traversing central Europe and the Balkans as far southeastward Bucharest, Roumania (May 8, 1926), a western Mediterranean-Alpine course was taken, Madrid being reached at the



IN THE CRATER OF VESUVIUS

The Director and Mrs. Jillson were the only two in a party of about seventy-five who made the descent into the explosive pit of this active volcano. Note the ropey lava near the guide.

opening of the Congress—May 24 to 31, 1926. At this time—May 26th—the Director presented a paper supsequently published by this Survey as Pamphlet 10, and later in volume 30 of Series VI., the "Geology of the Oil Shales of the Eastern United States."

After the disbanding of the Congress, the return trip was made through France, Belgium and Holland to England, where some time was spent in the British Museum and British Geological Survey. The Royal Geographical Society in London, of which the Director is a member, was also visited. Many Geological Surveys and Geological Museums throughout Europe were visited during the Continental tour, these investigations being somewhat alternated with numerous geological field excursions. Of outstanding importance among the latter were an examination of the oil fields of Rumania in the vicinity of Ploesti, the climbing of the Jungfrau (13,670 feet) in Switzer-

land, and a descent into the actively explosive crater of Vesuvius at Naples, Italy. The journey down the Danube River valley from Vienna to Bucharest was made by airplane with stops at Budapest and Belgrade. Later the air journey was continued from Nuremburg to Munich, Germany and thence by plane over Lake Constance to Zurich, Switzerland. These several flights totaling about 1,200 miles gave an excellent opportunity to study the topography of central-southern Europe including the great arc of the Carpathians and the Western Alps.

Sailing from Liverpool shortly after the middle of June, the Director and Mrs. Jillson landed again in America, at Montreal, Canada, and arrived at Frankfort shortly after July 1st. Altogether seventeen separate countries and dependencies were visited during this trip abroad which was made without expense to the State of Kentucky.

STRUCTURAL MAPS OF EASTERN KENTUCKY.

During the past biennium there has been brought to completion a notable program of structural geology involving all of the Eastern Kentucky coal field. In the fall of 1918 when the present Director first became associated with the Kentucky Geological Survey in the capacity of assistant geologist in charge of oil and gas, there were available no inch to the mile geological oil and gas maps portraying structure in ten foot intervals. No map of this character had ever been prepared or published by the State though oil and gas development and production was rapidly assuming immense proportions in this part of Kentucky.

As soon as it was possible to execute field work to advantage in the Spring of 1919 work of this character was started in Magoffin County under the direction of the State Geologist by Mr. I. B. Browning. The oil and gas structural geological work thus inaugurated has been carried steadily forward with the result that at the present time the entire Eastern Kentucky coal field—an area of about 10,500 square miles—is mapped structurally at a unit scale of one inch to the mile and on a unit surface key-bed*—the Fire Clay coal (No. 4 of the Hazard Field). It is the largest single area thus mapped in the world.

*Floyd and Pike Counties excepted, these being mapped on the somewhat lower Van Lear coal. Lee County was mapped on the Corniferous.

This group of structural maps is presented as a complete series totaling thirty-four—six of which are of subsurface structure and two regional surface structure. The names of the separate maps follow:

Surface Structure—(1) Bell County, (2) Boyd County, (3) Breathitt County, (4) Carter County, (5) Clay County, (6) Elliott County, (7) Floyd County, (8) Greenup County, (9) Harlan County, (10) Jackson County, (11) Johnson County, (12) Knott County, (13) Knox County, (14) Laurel County, (15) Lawrence County,(16) Leslie County, (17) Letcher County, (18) Magoffin County, (19) Martin County, (20) McCreary County, (21) Morgan County, (22) Owsley County, (23) Perry County, (24) Pike County, (25) Whitley County, and (26) Wolfe County.

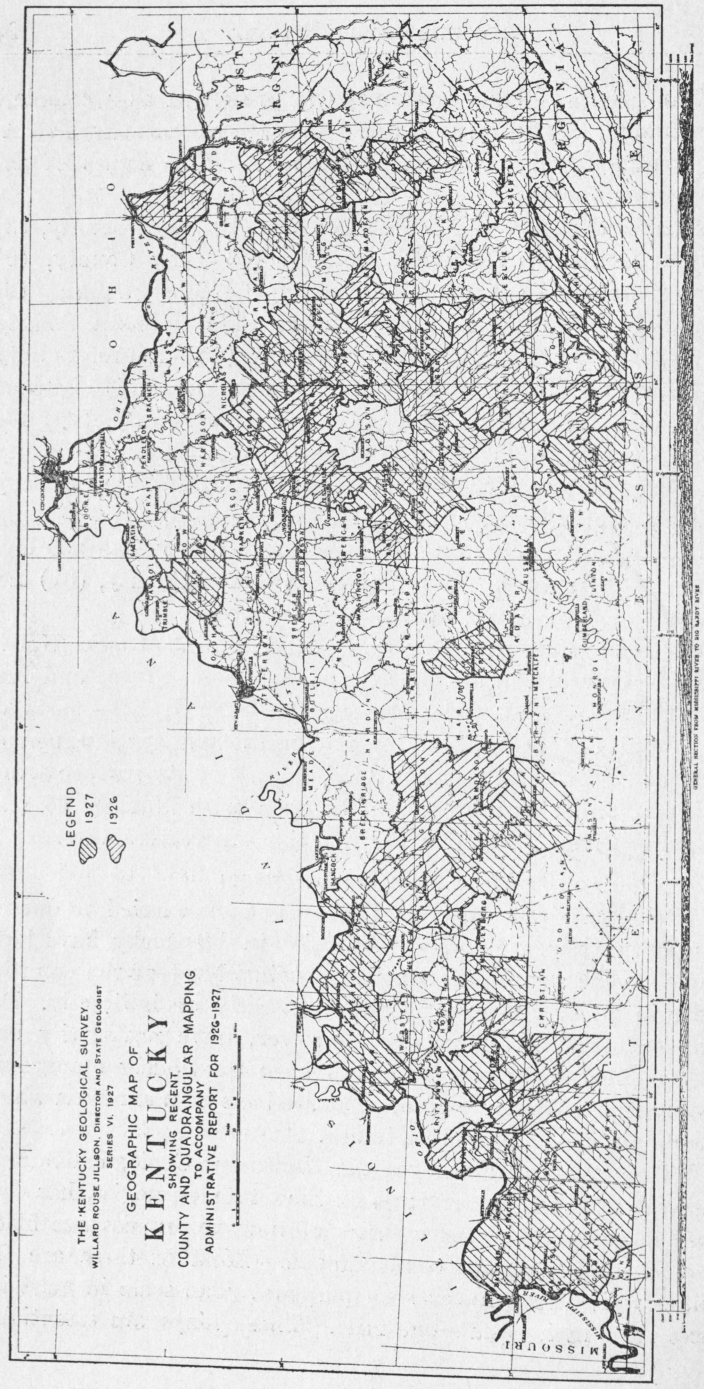
Subsurface Structure—(27) Boyd County, (28) Floyd County, (29) Johnson County, (30) Lawrence County, (31) Lee County, and (32) Martin County.

Regional Surface Structure—(33) Paint Creek Uplift, parts of Morgan, Elliott, Lawrence, Johnson, Floyd, and Magoffin Counties, and (34) Rockcastle River Uplift—parts of Laurel and Clay Counties. A northeastward continuation of this structure may be seen on the Owsley County surface structural map, and this map should be used with Number 35 (the Rockcastle River Uplift) to portray this entire structure.

NEW MAPS OF COUNTIES

In the course of the several investigations carried on during the past two years all of the counties in Kentucky have been included, some generally, some in detail. Most of the counties appear in all of the reports either directly or indirectly. Detailed geological investigations, however, have necessarily had to be confined to areas which had been previously topographically base mapped, as no other accurate base map exists on which accurate elevations are to be found.

Within the last biennium the Kentucky Geological Survey under the personal supervision of the State Geologist, has continued its preparation of a series of new reconnaissance black and white geographical county maps. Most of these are for counties which have never been mapped. The scale in most instances is: 1 inch equals one mile. These maps are essentially



INDEX TO COUNTY AND QUADRANGULAR MAPPING 1926 AND 1927

road and stream maps. They do not carry elevations, and are not suitable for detailed geological work, but are suitable for and much in demand by tourists, farmers, road engineers, sanitary engineers, contractors, geologists and many others. The counties so mapped were Hickman, Henry, Marshall, Graves, Ballard, McCracken, Calloway.

Oil and gas maps were prepared for Bath, Montgomery, Wayne, Lincoln, Green, Floyd, Powell and Warren Counties. With the exception of Floyd and Warren Counties which were prepared to the scale 1:62,500, all other maps were scaled one inch equals one mile.

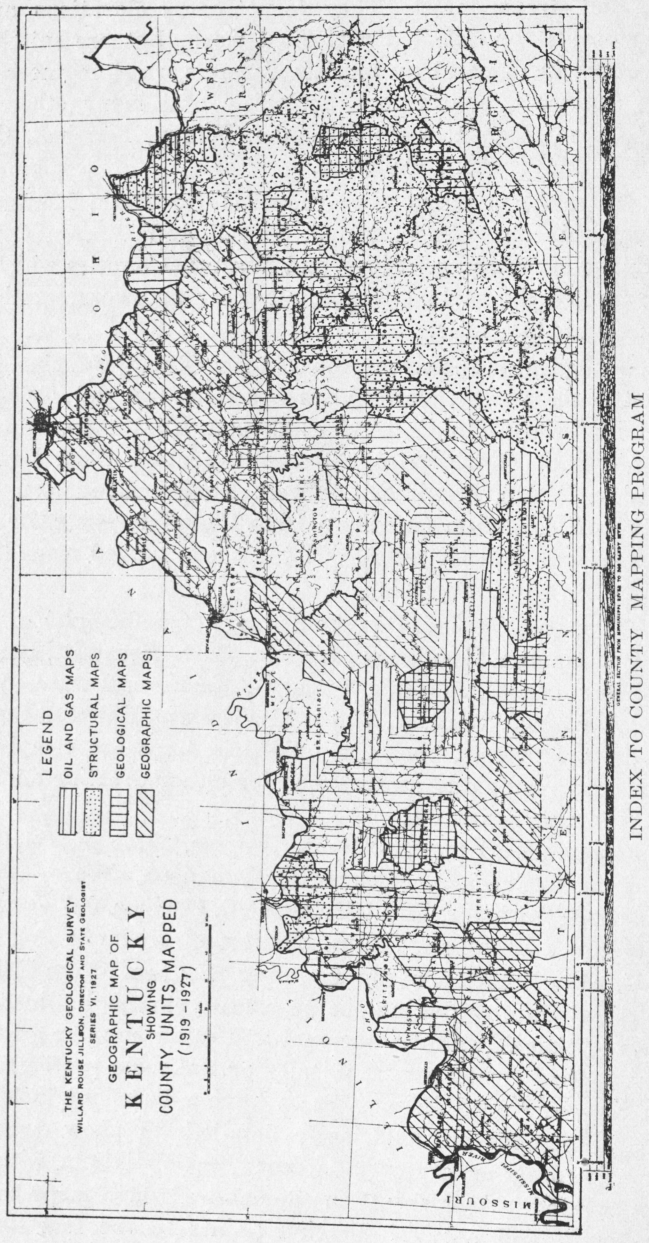
Geological maps were prepared for Ohio, Jessamine, Floyd, Elliott, Lee, Owsley, Dawson Springs (Quadrangle), Trigg, Garrard, McCreary, Union, Daviess, Harlan, Rockcastle, Edmonson, Cave-in-Rock (Quadrangle), Jackson, Laurel, Clay, Lawrence, Whitley, Wolfe, Menifee, Caldwell, Butler, Henderson, Estill, Bells Run Anticline (northern Ohio County), Trigg, Breathitt, Johnson and Bell Counties. Of the above named maps the following have been issued:

Ohio, Lee, Owsley, Dawson Springs (Quadrangle), Garrard, Ballard, Harlan, Henderson, Lincoln, Bath, Breathitt, Bells Run Anticline (northern Ohio County), Jackson, Laurel, Wayne, Clay, Lawrence, Whitley, Wolfe, Menifee and Caldwell Counties.

At the present time the following maps are completed as manuscript maps and await funds for either drafting and printing, or simply printing:

Jessamine, Floyd, Elliott, Carter, Rowan, McCreary, Bourbon, McCracken, Rockcastle, Edmonson, Warren, Green, Montgomery, Butler, Estill, Trigg, Bell, Carlisle, Johnson, Calloway, Graves, Marshall, Union, Henry and Hickman Counties.

A recapitulation of the mapping program of the Kentucky Geological Survey during the past two years as outlined above indicates that 43 county, regional and quadrangular areas have been mapped either geographically or for some particular mineral, the scale used in most cases having been one inch to the mile. The maps are sufficiently detailed to show practically every dwelling or other important locational item within the areas covered. As a result the demand of these maps has been very great, and every indication points to the fact that this



demand will increase. The total area mapped in detail is 16,659.15 square miles, or about 40% of the area of Kentucky.

At the present time the Sixth Geological Survey of Kentucky under the supervision of the present Director has completely mapped in the field 115 of the 120 counties in Kentucky. This work started in 1920 and has been consistently carried on down to the present date.

In addition to the activities as outlined above, the Kentucky Geological Survey has continued its cooperation with the U. S. Geological Survey in the matter of water resource work, and has now available from this survey for publication records of stream gauging and flow measurements of the Big Sandy, Green, Kentucky and Cumberland Rivers. The work of gauging has been done by the U. S. Geological Survey. The Kentucky Geological Survey has also cooperated with the U. S. Bureau of Mines and the U. S. Bureau of the Census in securing information relative to some of the important mineral resources produced in Kentucky.

PROPOSED PUBLICATIONS

The following new publications have been prepared or revised during the past biennium, 1926-1927. Those starred are in press at the present time and will soon be available. At the present time this Survey has issued a total of 30 separate volumes with the exception of volume 17 which has been completed in manuscript for some time and awaits funds for publication. The following volumes now exist as manuscripts, ready for the State Printer:

(Mss.)

Vol. 17.—Mineral Resources of Kentucky. W. R. Jillson. 1925.
*Vol. 31.—Pleistocene of Northen Kentucky. F. Leverett. 1928.
Vol. 32.—Mineral Operators of Kentucky. W. G. Burroughs. 1928.
Vol. 33—Devonian Rocks of Kentucky. T. E. Savage. 1928
*Vol. 34.—Ancient Life in Kentucky. Webb and Funkhouser. 1928.
Vol. 35.—Geology of the Western Coal Field. L. C. Glenn.
Vol. 36.—Paleontology of Kentucky (A Symposium). 1928.
Vol. 37.—Geology of Henderson County. C. V. Theis. 1928.
Vol. 38.—Geology of the Smithland Quadrangle. A. H. Sutton. 1928.
Vol. 39.—Dynamic Geology of Western Ky. L. C. Glenn and A. H. Sutton. 1928.
Vol. 40.—Economic Geography of the Mississippian Plateau. W. G. Burroughs. 1928.

*Now in press.

PUBLISHED REPORTS

SIXTH GEOLOGICAL SURVEY

(1920-1927)

The record of published reports of the Sixth Kentucky Geological Survey is interesting because of the broad field of investigations covered. Up to the present time this Survey has issued twenty-nine separate volumes totaling 7,431 pages, exclusive of the fifteen pamphlets which issued in paper covers total 405 pages. The titles of these reports, some of which are already exhausted in edition, are given in the next table. Following this is presented a tabulation of the pages of the new published geological reports of each of the several State Geological Surveys of Kentucky, from 1838 to 1927. These total altogether 7,836 pages.

BOUND VOLUMES ON KENTUCKY GEOLOGY

	Year	Vol. No.	No. Pages
1. Glass Sands of Kentucky—Richardson	1920	I.	149
2. Economic Papers on Kentucky Geology —Jillson	1921	II.	304
3. Oil Field Stratigraphy of Kentucky—Jillson	1922	III.	738
4. Geology of the Golconda Quadrangle—Weller	1921	IV.	148
5. Geology and Coals of Webster County—Glenn	1922	V.	249
6. The Sixth Geological Survey—Jillson	1921	VI.	291
7. Mississippian Series of Eastern Ky.—Butts	1922	VII.	188
8. Clay Deposits of Kentucky—Ries	1922	VIII.	241
9. Geography of the Jackson Purchase—Davis	1923	IX.	185
10. Geology of Princeton Quadrangle—Weller	1923	X.	163
11. Building Stones of Kentucky—Richardson	1923	XI.	355
12. New Oil Pools of Kentucky—Jillson	1926	XII.	394
13. Fluorspar Deposits of Kentucky—Currier.	1923	XIII.	189
14. Surface Waters of Kentucky—King	1923	XIV.	190
15. Geological Research in Kentucky—Jillson	1923	XV.	228
16. Wild Life in Kentucky—Funkhouser	1925	XVI.	385

	Year	Vol. No.	No. Pages
17. Geography of the Mountains of Kentucky—Davis	1923	XVIII.	180
18. Geography of the Kentucky Knobs—Burroughs	1926	XIX.	284
19. Coal Industry in Kentucky—Jillson	1924	XX.	164
20. Oil Shales of Kentucky—Thiessen, White and Crouse	1925	XXI.	242
21. Road Materials of Kentucky—Richardson	1924	XXII.	209
22. Geography of the Blue Grass—Davis	1927	XXIII.	215
23. Geography of the Western Coal Field—Burroughs	1925	XXIV.	211
24. Geography of the Pennyroyal—Sauer	1927	XXV.	303
25. Geology of Cave-in-Rock Quad.—Weller	1926	XXVI.	282
26. Mineralogy of Kentucky—Richardson	1925	XXVII.	170
27. Geology of Edmonson County—Weller	1927	XXVIII.	246
28. Molding Sands and Cement Materials of Kentucky—Richardson	1927	XXIX.	240
29. Topography of Kentucky—Jillson	1925	XXX.	288
Total number of pages published in bound volumes			7,431
Total number of pages published in pamphlets			405
Grand total			7,836

BOUND REPORTS OF THE STATE GEOLOGICAL SURVEYS OF KENTUCKY

(1838-1925)

Survey	Period	Duration	Pages New Reports
W. W. Mather	1838	1 year	39
D. D. Owen	1854-1860	7 years	2012
N. S. Shaler	1873-1880	7 years	2886
J. R. Procter	1880-1892	12 years	1684[1]
C. J. Norwood	1904-1912	8 years	2761
J. B. Hoeing	1912-1918	6 years	4280
W. R. Jillson	1918-1925	7 years	9609[2]

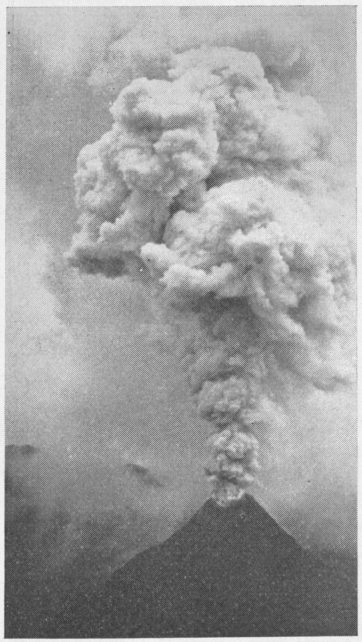
[1] During this same time Procter reprinted 1,336 pages of geological reports prepared by N. S. Shaler.

[2] This figure includes 1,773 pages prepared under the supervision of the present State Geologist and published by the Dept. of Geology and Forestry of Kentucky from 1918-1920.

LIST OF MAPS PREPARED BY THE KENTUCKY GEOLOGICAL SURVEY UNDER THE DIRECTION OF DR. W. R. JILLSON
1919-1928

	Name and Type of Map	Yr. Pub.
1.	Adair County, Geology of	1924
2.	Allen County, Geology of	1919
3.	Anderson County, Reconnaissance of	1924
4.	Barren County, Geology of	1919
5.	Barren County, Oil and Gas of	1925
6.	Bath County, Oil and Gas of	1927
7.	Ballard County, Geographic of	1927
8.	Bell County, Structural Geology of (Mss.)	1928
9.	Boone County, Reconnaissance of	1923
10.	Bourbon County, Reconnaissance of	1923
11.	Bourbon County, Geographic of (Mss.)	1928
12.	Boyd County, Structural Geology of	1923
13.	Boyd County, Sub-surface Structural Geology	1925
14.	Boyd County, Oil and Gas of	1925
15.	Boyle County, Geographic of	1926
16.	Bracken County, Oil and Gas of	1926
16-A.	Bracken and Pendleton, Geographic	1923
17.	Breathitt County, Structural Geology	1927
18.	Bullitt County, Geographic of	1925
19.	Butler, Geology of (Mss.)	1928
20.	Caldwell County, Geology of	1927
21.	Calloway County, Geographic of (In press)	1928
22.	Carroll and Gallatin Counties, Reconnaissance of	1923
23.	Carlisle County, Geographic of (Mss.)	1928
24.	Carter County, Structural Geology of	1925
25.	Casey County, Geographic of	1924
26.	Clark County, Geographic of	1926
27.	Clay County, Structural Geology of	1926
28.	Clinton County, Oil and Gas of	1925
29.	Cumberland County, Oil and Gas of	1922
30.	Cumberland, Monroe and Clinton, parts of, Structural Geology of	1924
31.	Dawson Springs Quadrangle, Geology of	1927
32.	Daviess County, Oil and Gas	1928
33.	Eastern Kentucky Coal Field, Carbon Ratio of	1924
34.	Edmonson County, Asphalt of	1926
35.	Edmonson County, Geology of (In press)	1928
36.	Elliott County, Oil and Gas of	1925
37.	Elliott County, Structural Geology of (In press)	1928
38.	Elm Lick—Aberdeen Coal Bed, Outcrops of	1925
39.	Estill County, Oil and Gas of (In press)	1928
40.	Fayette County, Geology of	1926
41.	Fleming County, Oil and Gas of	1925

		Yr. Pub.
42.	Floyd County, Structural Geology of	1922
43.	Floyd County, Oil and Gas of	1928
44.	Floyd County, Coal Outcrops of (Mss.)	1928
45.	Floyd County, Sub-surface Structure of	1928
46.	Franklin County, Geographic of	1924

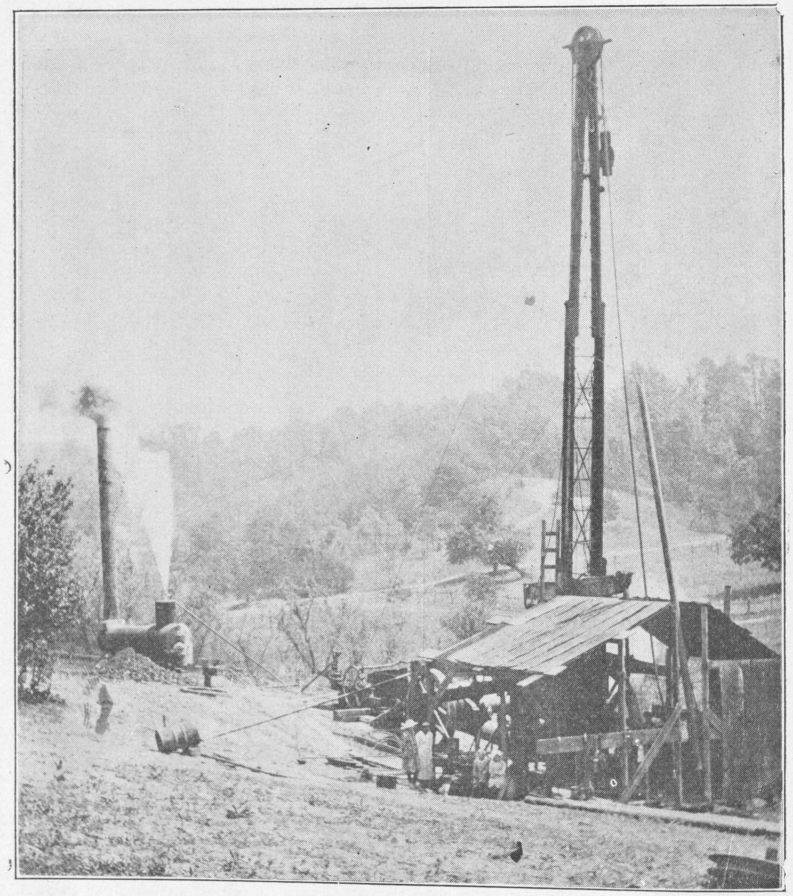


Vesuvius in Explosion
Naples, Italy

Faulted Ordovician Slates
Aberystwyth, Wales

47.	Fulton County, Geographic of	1925
48.	Garrard County, Geology of	1927
49.	Golconda and Cave in Rock Quadrangles, Fault Pattern	1925
50.	Golconda and Cave-in-Rock Quadrangles, Geology of (In press)	1928
51.	Grant County, Geographic of	1926
52.	Graves County, Geographic of (In press)	1928
53.	Grayson County, Asphalt, Oil and Gas of	1926
54.	Green County, Oil and Gas of (In press)	1928
55.	Greenup County, Oil and Gas of	1925
56.	Greenup County, Structural Geology of	1926
57.	Greenup and Carter, Farm Map of Parts of	1925
58.	Haddix—Coalburg Geo.—Syncline	1928
59.	Hancock County, Oil and Gas of	1924

		Yr. Pub.
60.	Hardin County, Geographic of	1925
61.	Harlan County, Structural Geology	1927
62.	Harrison County, Reconnaissance of	1923



TYPICAL DRILLING IN KENTUCKY OIL FIELDS

63.	Hart County, Oil and Gas of	1925
64.	Hartford Quadrangle, Geology of	1925
65.	Henry County, Geographic of	1928
66.	Henderson County, Structural Geology of	1927
67.	Hickman County, Geographic (In Press)	1928
68.	Hopkins County, Geology of	1924
69.	Irvine and Berea Region, Structural Geology of	1924

		Yr. Pub.
70.	Isonville Oil Pool, Structural Geology of	1924
71.	Jackson County, Geology of	1927
72.	Jeptha Knob, Geology of	1923
73.	Jessamine County, Geology of (In press)	1928
74.	Johnson County, Structural Geology of	1921
75.	Johnson County, Oil and Gas and Coal of	1928
76.	Johnson County, Sub-surface Structural	1928
77.	Kenton and Campbell, Reconnaissance of	1923
78.	Knott County, Structural Geology of	1919
79.	Knox County, Structural Geology of	1925
80.	Larue County, Geographic of	1924
81.	Laurel County, Structural Geology of	1927
82.	Lawrence County, Structural Geology of	1926
83.	Lawrence County, Sub-surface Structural Geology of	1927
84.	Lee County, Geology of	1927
85.	Leslie County, Structural Geology of	1927
86.	Letcher County, Structural Geology of	1926
87.	Lewis County, Geology of	1925
88.	Lincoln County, Fault Pattern of	1927
89.	Livingston County, Geology of	1926
90.	Livingston and Lyon Counties, Reconnaissance of	1923
91.	Logan County, Oil and Gas of	1924
92.	Lyon County, Geology of	1926
93.	Magoffin County, Structural Geology of	1921
94.	Mammoth Cave Region, Cave and Surface Features	1927
95.	Marshall County, Geographic of (In press)	1928
96.	Martin County, Structural Geology of	1923
97.	Martin County, Sub-surface Structural Geology of	1924
98.	Mason County, Geographic of	1926
99.	McCracken County, Geographic of (In press)	1928
100.	McCreary County, Reconnaissance of	1925
101.	McCreary County, Geology of (Mss.)	1928
102.	McLean County, Oil and Gas of	1924
103.	Menifee County, Geology of	1927
104.	Metcalfe County, Geographic of	1924
105.	Monroe County, Geographic of	1923
106.	Montgomery County, Oil and Gas of (In press)	1928
107.	Morgan County, Geology of	1925
108.	Muhlenberg County, Topography of	1924
109.	North Eastern Kentucky, Fire Clays of (Mss.)	1928
110.	Ohio County, Northeastern Part, Geographic	1925
111.	Ohio County (Bells Run Anticline) Sub-surface Structure	1927
112.	Ohio County, Geologic of	1927
113.	Oldham County, Geographic of	1925
114.	Owen County, Reconnaissance of	1923
115.	Owsley County, Structural Geology of	1927
116.	Paint Creek Uplift, Structural Geology	1924

		Yr. Pub.
117.	Pendleton and Bracken, Reconnaissance of	1923
118.	Perry County, Structural Geology	1924
119.	Pike County, Structural Geology	1923
120.	Powell County, Oil and Gas of	1927
120-A.	Princeton Quadrange, Geologic	1928
121.	Pulaski County, Oil and Gas of	1924
122.	Robertson and Nicholas, Geographic of	1925
123.	Rockcastle River Uplift, Map of	1923
124.	Rockcastle County, Geology of (Mss.)	1928
125.	Rowan County, Geographic of	1925
126.	Russell County, Geographic of	1924
127.	Scott County, Reconnaissance of	1923
128.	Simpson County, Oil and Gas of	1925
129.	Smithland Quadrangle, Geology of (Mss.)	1928
130.	Station Camp Creek, Structural Geology of	1924
131.	Taylor County, Oil and Gas of	1925
132.	Todd County, Geographic of	1924
133.	Trigg County, Geographic of	1924
134.	Trigg County, Fault Pattern of (Mss.)	1928
135.	Trimble County, Geographic of	1925
136.	Union County, Geology of	1928
137.	Warren County, Oil and Gas of (Mss.)	1928
138.	Wayne County, Oil and Gas of	1927
139.	Webster County, Geology of	1923
140.	Whitley County, Structural Geology of	1927
141.	Wlliamsburg Anticline, Map of	1923
142.	Wolfe County, Geology of	1927
143.	Woodford County, Geology of	1924
144.	Kentucky, Geologic Map of	1927
145.	Kentucky, Geographic Map of	1924
146.	Kentucky, Coal Field Map of (small)	1923
147.	Kentucky, Geographic Map of (small)	1924
148.	Kentucky, Geographic Map of (small)	1922
149.	Kentucky, Oil and Gas Pools (small)	1924
150.	Kentucky, Geologic Map of (small)	1927
151.	Kentucky, Topographic Map of (1:1,000,000)	1927
152.	Kentucky, Geographic (1:500,000) (In press)	1928
153.	Kentucky, Topographic (1:500,000) (In press)	1928
154.	Kentucky, Geological (1:500,000) (Mss.)	1928
	Total county, regional and State maps	156

TOPOGRAPHIC MAPS

Issued under the direction of Dr. W. R. Jillson

155.	Big Clifty	1926	170.	Lillydale	1922
156.	Big Stone Gap	1926	171.	Mammoth Cave	1921-1922
157.	Byrdstown	1924-1926	172.	Middlesboro	1926
158.	Bowling Green	1920-1921	173.	Mound City	1926
159.	Brownsville	1919-1920	174.	Mount Eden	1923-1925
160.	Cave-in-Rock	1921-1924	175.	Paducah	1926
161.	Cub Run	1922-1924	176.	Scottsville	1923-1924
162.	Frankfort	1922	177.	Spring Lick	1923
163.	Greenup	1926	178.	Smithland	1926
164.	Golconda	1921	179.	Sneedville	1926
165.	Hagan	1926	180.	Taylorsville	1926
166.	Jeptha Knob	1922	181.	Tompkinsville	1925-1926
167.	La Grange	1928	182.	Index map showing progress of topographic survey to Nov. 1, 1927.	
168.	Leitchfield	1922			
169.	Lexington	1928			

Total topographic sheets 27

Total of all maps 184

TOPOGRAPHICAL BASE MAPPING

Unfortunate circumstances have operated to embarrass the Kentucky Geological Survey in the completion of what was projected to be one of the most important periods of topographical mapping ever entered into in this Commonwealth. The legislature of 1926 provided in each of the Budget Acts of the State Highway Department as follows:[1]

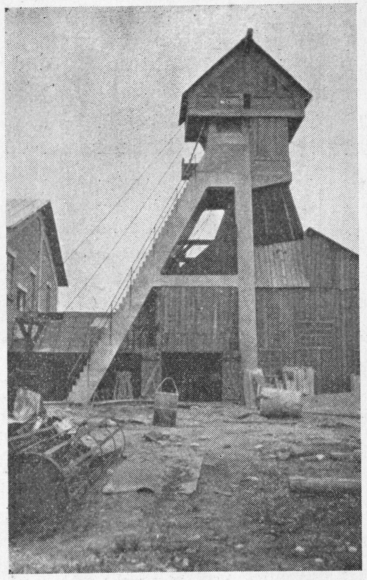
(a) "And in addition to the $500,000.00 herein specifically set apart, the Highway Commission may in its discretion expend out of its revenues not to exceed $50,000.00 for topographic mapping under the direction and supervision of the Director of the Geological Survey."

(b) "And in addition to the $500,000.00 herein specifically set apart, the Highway Commission may in its discretion expend out of its revenues not to exceed $50,000.00 for topographic mapping under the direction and supervision of the Director of the Geological Survey."

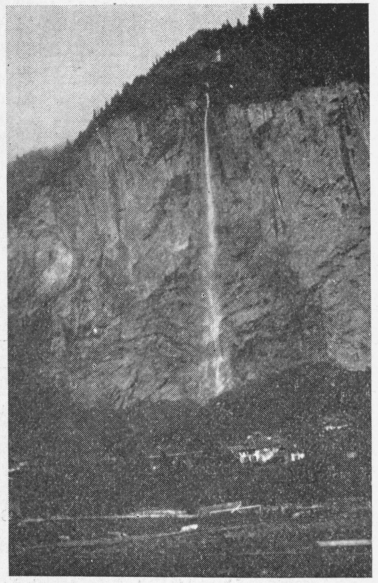
This appropriation came following the preparation of resolutions by the State Highway Commission consisting of W. C. Montgomery, Chairman; W. C. Hanna, R. W. Owen, and E. S. Helburn drawn and approved on October 27, 1925, requesting

[1] (a) Acts of the General Assembly of the Commonwealth of Kentucky, 1926, Chapter 11, Art. 35, p. 47.
(b) Acts of the General Assembly of the Commonwealth of Kentucky, 1926, Chapter 12, Art. 35, p. 73.

the Kentucky State Budget Commission to appropriate the sum of $75,000.00 for cooperative topographic mapping through the Kentucky Geological Survey. The need of the completion of



Oil Mine Near Ploesti, Rumania



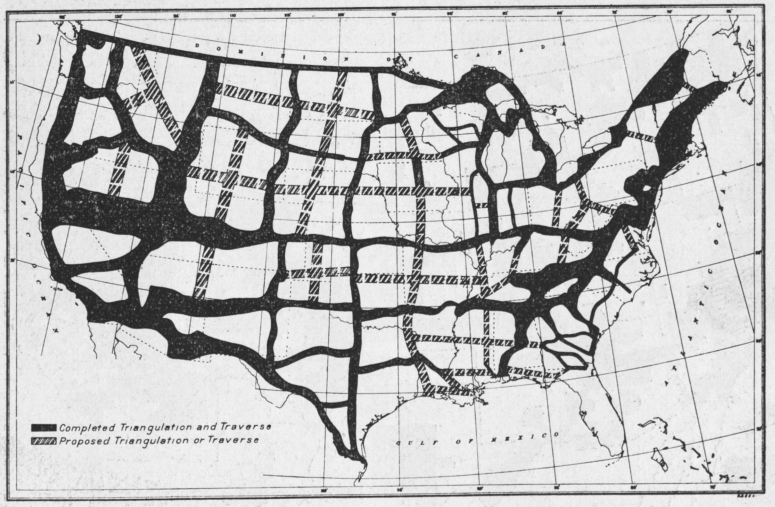
Contorted Cretaceous Limestone
Interlaken, Switzerland

the cooperative topographical base map and its value to engineers in the construction of State highways was clearly enunciated by the Highway Commission in this resolution. The State Geologist added to these recommendations a similar recommendation urging the completion of the topographic base map according to a definite plan.[1]

During the spring of 1926 favorable action by the State Highway Commission was secured whereby $20,000.00 of the total appropriation of the $50,000.00 made available in the Budget Act for the fiscal year 1926-1927 was released for the purpose of cooperative topographic mapping under the direction of the State Geologist in cooperation with the U. S. Geological Survey. Plans were formulated and specifications were laid out whereby the new topographical work was to be confined

[1] Administrative Report for the Sixth Geological Survey, 1924-1925, Kentucky, Series VI, Pamphlet No. 5, pp. 35-36-37-38.

to certain quadrangles, it being indicated in advance by the State Geologist that the program was too large to allow of completion even with the entire sum of $50,000.00. During the summer an additional appropriation of $30,000.00 completing the entire allotment was secured by favorable action of the State Highway Commission, and the field force then engaged in

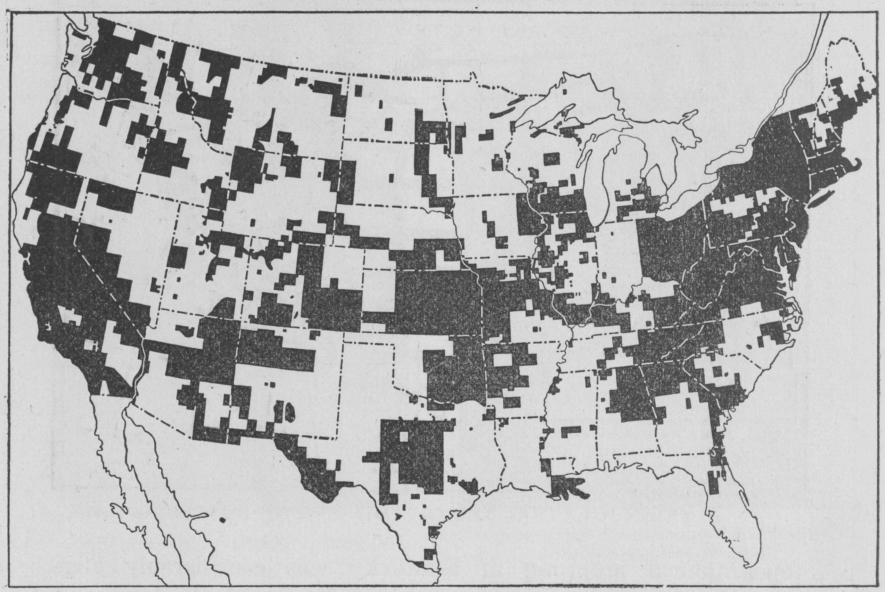


TRIANGULATION NET OF THE UNITED STATES

topographical mapping in Kentucky was considerably augmented. The work was at once speeded up with the hope and determination to complete as much of the program desired by the State Highway Commission as possible during the field season in order to make the maps available for utilization by the department early in the following year. This was done. Beginning in November and continuing through to February the following topographical sheets were released as photographic copies: Mound City, Paducah, Tompkinsville, Lillydale, Byrdstown, Middlesboro, Hagen, Sneedville, Big Stone Gap, Smithland, Greenup, Taylorsville, Big Clifty and La Grange. The Scottsville and Mt. Eden engraved quadrangles had immediately preceded these making a total of sixteen new sheets altogether.

Early in the year 1927 an appeal was made to the Highway Commission to release the second appropriation of $50,000.00 provided by the legislature in the Acts of 1926 for the continu-

ance of the cooperative topographical program up to June 30, 1928. The matter was laid before the Highway Commission by the State Geologist in person but without favorable results. This appeal was again presented in February and again in March. When the matter was presented for the third time to the attention of the State Highway Commission, the Governor was sitting



EXTENT OF TOPOGRAPHIC MAPPING IN THE UNITED STATES, 1926-27

with the members of the board. The State Highway Commission refused at all three of these meetings to appropriate any money for this purpose indicating that funds were not available, though at the same time the State Highway Commission in a broad campaign of publicity declared itself to be functioning entirely on a cash basis. Further efforts of the State Geologist to secure the release of these moneys made available by the legislature were without avail, even though these efforts were continued throughout the spring and summer seasons. At the present writing not one dollar of the second appropriation of $50,000.00 has been released for the purposes specified in Chapter 12 of the Acts of the Kentucky General Assembly of 1926.

As a result of this unfortunate status of financial and appropriative affairs the Kentucky Geological Survey was able to

function during only one field season in the past biennium in the important decision of cooperative topographical mapping. Fourteen sheets and part sheets, some of them embracing the most difficult and rugged mapping in the State of Kentucky were completed, however, during the summer and fall of 1926. Parts of the following counties were mapped: Ballard, McCracken, Livingston, Marshall, Lyon, Breckinridge, Hardin, Grayson, Monroe, Cumberland, Clinton, Wayne, Harlan, Bell, Greenup, Spencer, Fayette, Bourbon, Clark, Shelby and Oldham Counties. During the field season of 1927—without any funds from the appropriation indicated by the legislature of 1926—the Survey withdrew from its geological appropriations sufficient money to finish the field work of the incomplete Lexington quadrangle. Mr. R. L. Harrison of the U. S. Geological Survey, Topographic Branch, who so skillfully administered the large program of topographic field work in 1926, executed this quadrangle alone. Typical in every respect of the singularly fine Blue Grass area it covers, it is one of the best pieces of modern topography in Kentucky.

United States Department of the Interior,
Geological Survey, Washington.

November 26, 1927.

Dr. W. R. Jillson,
State Geologist,
Frankfort, Ky.

Dear Dr. Jillson:

In reply to your letter of November 22:

There remains unmapped in the State of Kentucky 18,180 square miles, and it is estimated that the total cost of mapping this area would be approximately $730,000. If Kentucky cooperates with the U. S. Geological Survey on the same basis as during past years, that is, on a dollar for dollar basis, the State's share would be approximately $365,000.

You are aware of course that there has been considerable control executed in the State which will be available for future work, and I firmly believe that if an appropriation is made available which will allow this Survey to undertake the mapping in

the area already having control that there will be considerable saving from the estimate I am submitting.

I wish to state now that any work in the future executed under an appropriation as large as you had last year should be planned to extend over the whole year, and under no circumstances should an attempt be made to expend it during a limited number of months, as this always entails an excessive expense and is not an economical way to proceed.

The U. S. Geological Survey will be in a position to meet any appropriation which the State of Kentucky may provide at the coming session of the legislature, and it will also be in position to place its engineers in the field early in the spring if such an appropriation is available at that time.

Very truly yours,
GLENN S. SMITH,
Division Engineer in Charge,
Atlantic Division.

VALUE OF PHYSICAL PROPERTIES

At the request of the State Auditor, the Director of the Kentucky Geological Survey has inventoried the physical properties of this state department and estimated their cost and value. These have been tabulated by groups and total $48,853.00, the investment period as indicated below extending from 1920 to 1925 inclusive, except in the item of library, a portion of which is probably fifty years old.

Estimates of Values and Expenditures for Improvements and Printing, Kentucky Geological Survey, since 1920-1927, inclusive:

Office furniture, including typewriters, etc.	$2,650.00
Instruments, field and drafting	2,150.00
Permanent improvements including stock filing devices, etc.	6,835.00
Mineral and fossil collections for cabinet	8,500.00
Reports, maps, publications, etc.	54,720.00
Kentucky Geol. Survey Library 6750 vols., pamphlets and maps*	9,870.00
Total	$84,725.00

*Number of cloth bound volumes, paper pamphlets and maps is an estimate.

MINERAL RESOURCE PRODUCTION

During the last several years mineral resource development has been very active in Kentucky. This has been particularly true in coal, oil, natural gas, fluorspar and rock asphalt. Other materials such as building stones, clays, sands, gravels, etc., have had a slower, though steady, increase. The total yearly value of Kentucky's mineral resources and mineral products now is estimated to be about $200,000,000, but due to the fact that many minerals and mineral resources are not advanced for state or interstate commerce compiled records show considerably less. It is estimated that the 1927 mineral production will total about $165,000,000. Figures for 1925 and 1926 follow:

STATISTICAL SUMMARY OF KENTUCKY'S MINERAL RESOURCES

Calendar Year of 1925*

Name	Volume	Value
Asphalt (natural rock)	286,850 tons	$2,493,360.00
Carbon Black	7,309,378 lbs.	372,067.00
Clay (raw)	121,917 tons	548,015.00
Clay products		7,853,355.00
Coal	55,068,670 tons	94,825,000.00
Fluorspar	44,826 tons	833,794.00
Gasoline (from natural gas)	7,685,000 gals.	884,000.00
Iron (pig)	153,935 tons	3,640,584.00
Lead	152 tons	26,448.00
Lime	9,433 tons	71,300.00
Natural gas	14,275,000 M. cu. ft.	4,282,500.00
Petroleum	6,759,000 bbls.	15,682,000.00
Sand and gravel	2,402,982 tons	1,770,458.00
Stone	1,703,010 tons	2,127,504.00
Zinc	429 tons	65,208.00
Miscellaneous (Abrasives, Artificial Gas, Barite, Calcite, Coke, Cement, Mineral Fertilizers, Mineral Waters, Phosphate Rock, etc.		7,718,442.00
Total		$143,194,035.00

*All figures secured from U. S. Bureau of Mines and U. S. Dept. of Census except those for natural gas which are estimated by the writer. These estimates and totals of Kentucky mineral production supersede all previously published lists.

STATISTICAL SUMMARY OF KENTUCKY'S MINERAL RESOURCES

Calendar Year of 1926[1]

Name	Volume	Value
Asphalt (natural rock)	320,430 tons	$2,530,480
Carbon Black	6,309,826 lbs.	322,642
Clay (raw)	128,585 tons	706,776
Clay products		7,804,824
Coal	63,630,955 tons	110,081,552
Fluorspar	63,616 tons	1,167,129
Gasoline (from natural gas)	7,689,000 gals.	914,000
Iron (pig)	143,053 tons	3,505,216
Lime	8,550 tons	55,663
Natural gas	15,000,000 M. cu. ft.	4,500,000
Petroleum	6,264,502 bbls.	15,190,844
Sand and gravel	3,214,487 tons	2,234,586
Miscl. (Abrasives, artificial gas, barite, calcite, coke, gravel, lead, cement, mineral fertilizers, mineral waters, sand, stone, zinc, etc.		6,500,000
Total		$155,513,712

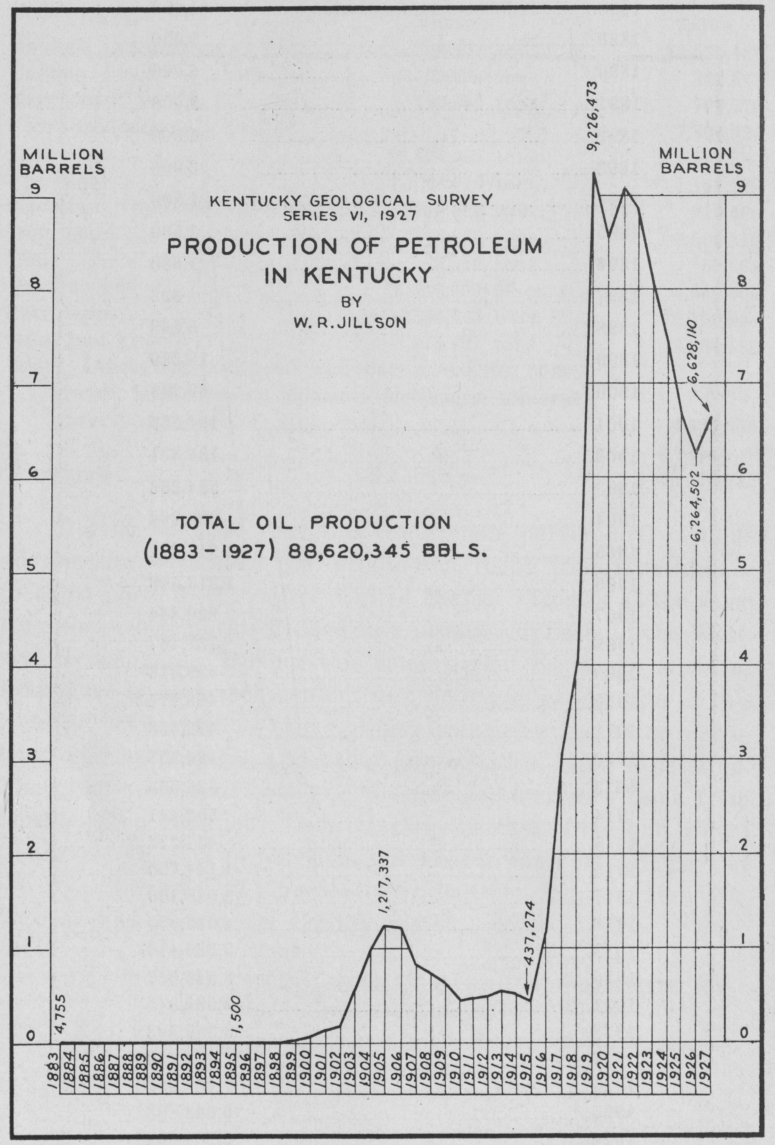
During the past year this State made particularly notable advances in bituminous coal production, rising from fourth place to third place in the entire United States. This is at the same time equivalent to third place on a production basis in the Western Hemisphere. During this same period Kentucky stood at first place in both rock asphalt and fluorspar production in this country, while various other mineral resources including petroleum and natural gas and other non-metallics were expanding. The great volume of coal and natural gas increases came from Southeastern Kentucky from Harlan, Letcher, Pike and Floyd Counties; while oil production increased in the northern part of the Western coal field principally in the Ohio, Daviess, Hancock, McLean and Henderson County region.

PRODUCTION OF PETROLEUM IN BARRELS IN KENTUCKY

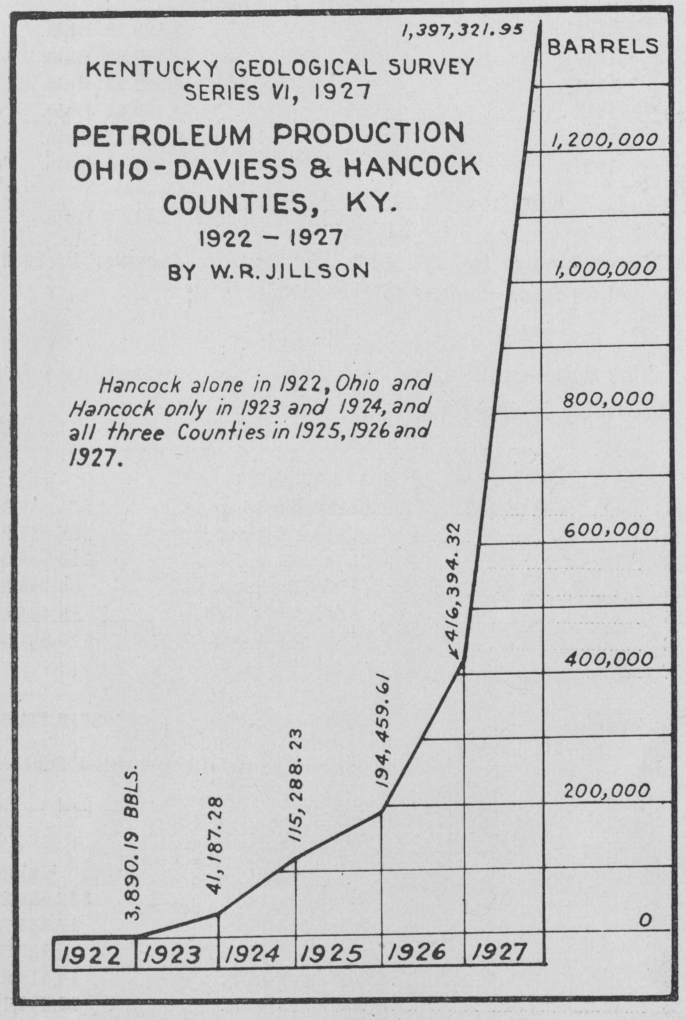
From 1883 to 1927, inclusive.

Year	Bbls.
1883	4,755
1884	4,148
1885	5,164
1886	4,726
1887	4,791
1888	5,096
1889	5,096
1890	6,000
1891	9,000
1892	6,500
1893	3,000
1894	1,500
1895	1,500
1896	1,680
1897	322
1898	5,568
1899	18,280
1900	62,259
1901	137,259
1902	185,331
1903	554,286
1904	998,284
1905	1,217,337
1906	1,213,548
1907	820,844
1908	727,767
1909	639,016
1910	468,774
1911	472,458
1912	484,368
1913	526,568
1914	502,441
1915	437,274
1916	1,144,750
1917	3,088,160
1918	4,035,950
1919	9,226,473
1920	8,546,027
1921	9,080,845
1922	8,889,303
1923	8,087,250
1924	7,437,232
1925	6,658,803
1926	6,264,502
1927	6,628,110
Total	88,620,345

[1] All figures secured from U. S. Bureau of Mines and U. S. Dept. of Census except those for natural gas which are estimates of the writer.



CURVE OF PETROLEUM PRODUCTION IN KENTUCKY



TRI-COUNTY PETROLEUM PRODUCTION

PETROLEUM PRODUCTION—OHIO, DAVIESS AND HANCOCK COUNTIES, KY.*

1922-1927

1922	3,890.19 Bbls.
1923	41,187.28 Bbls.
1924	115,288.23 Bbls.
1925	194,459.61 Bbls.
1926	416,394.32 Bbls.
1927	1,397,321.95 Bbls.
	2,168,541.58 Bbls.

Hancock alone in 1922, Ohio and Hancock together in 1923 and 1924, and all these counties in 1925, 1926 and 1927.

The volume and value of a few of the outstanding minerals of Kentucky is given herewith:

COAL PRODUCTION IN KENTUCKY†

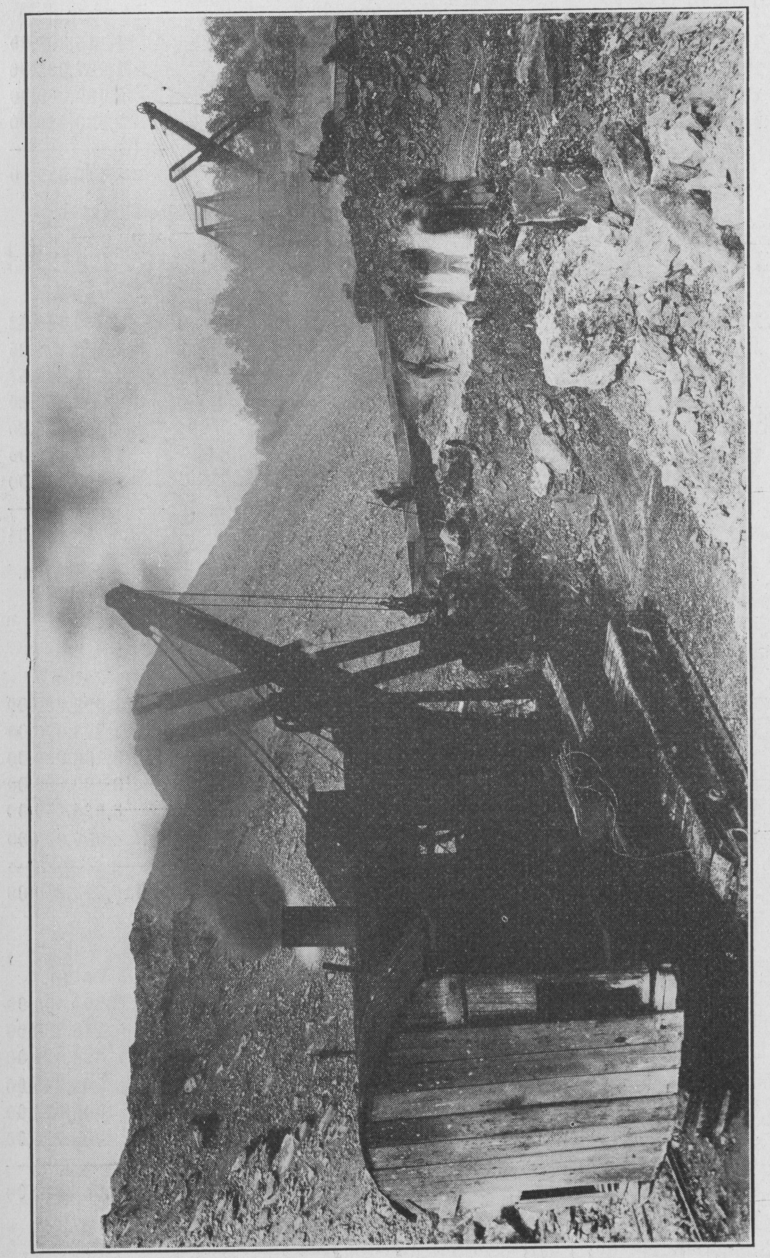
	Volume	Value
1921	30,282,659 tons	$81,460,352.00
1922	42,134,175 tons	127,037,000.00
1923	43,149,962 tons	113,542,000.00
1924	43,387,732 tons	88,745,968.00
1925	54,689,932 tons	89,404,450.00
1926	63,630,955 tons	110,081,552.00
1927	72,626,000 tons	
Total	349,901,435 tons	$610,271,322.00

In coal produced Kentucky is now third in the United States.

OIL PRODUCTION IN KENTUCKY

	Volume	Value
1921	9,080,845 bbls.	$33,556,241.00
1922	8,889,303 bbls.	17,532,766.00
1923	8,087,250 bbls.	15,189,916.00
1924	7,437,232 bbls.	14,418,982.00
1925	6,658,803 bbls.	15,290,167.00
1926	6,264,502 bbls.	15,190,844.00
1927	6,628,110 bbls.	10,315,276.00
Total	53,046,045 bbls.	$121,494,192.00

*Statistics compiled from Kentucky State Tax Commission Record.



TYPICAL COAL STRIPPING OPERATION IN WESTERN KENTUCKY

ROCK ASPHALT

	Tons	Value
1923	139,401	$1,115,208.00
1924	245,929	1,967,932.00
1925	286,850	2,500,000.00
1926	320,430	2,530,480.00
Total	992,610	$8,113,620.00

In rock asphalt production Kentucky leads the United States.

FLUORSPAR PRODUCTION IN KENTUCKY

	Volume	Value
1921	18,670.11 tons	$369,146.42
1922	63,322.20 tons	1,170,194.25
1923	56,803.34 tons	1,181,509.47
1924	46,728.07 tons	965,869.20
1925	44,826.00 tons	833,794.00
1926	62,495.00 tons	1,167,129.00
1927	57,495.00 tons	1,040,338.00
Total	350,339.72 tons	$6,718,980.34

In Fluorite production, Ca F_2, Kentucky leads the United States.

NATURAL GAS PRODUCTION IN KENTUCKY

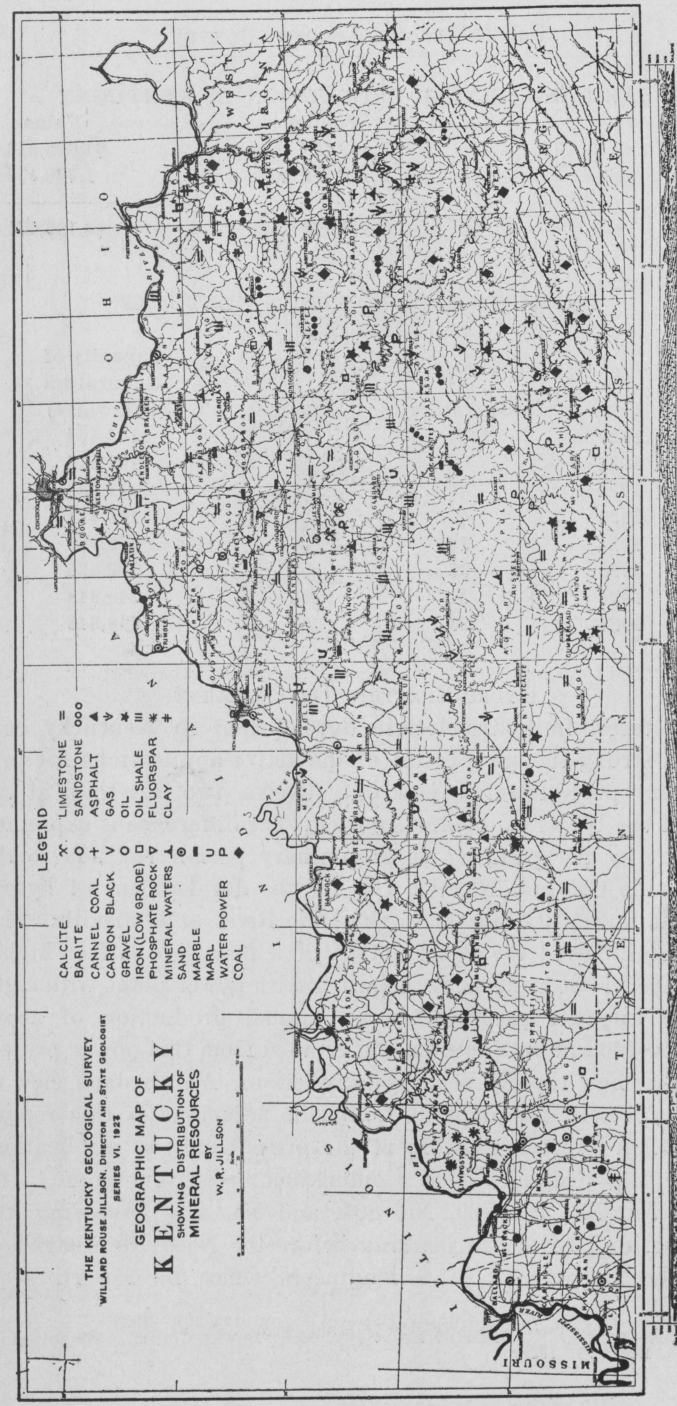
M. Cu. Ft.

	Volume	Value
1921	4,820,000	$1,597,000.00
1922	5,872,000	1,879,000.00
1923	11,953,000	3,156,000.00
1924	12,875,000	3,432,000.00
1925*	14,275,000	3,924,250.00
1926**	15,800,000	4,355,000.00
	65,595,000	$18,343,250.00

CLAY PRODUCTION IN KENTUCKY

	Volume	Value
1921	35,591 tons	$204,400.00
1922	67,591 tons	270,858.00
1923	102,195 tons	428,021.00
1924	115,644 tons	500,349.00
1925	121,917 tons	548,015.00
1926	128,585 tons	706,776.00
	571,523 tons	$2,658,419.00

*From the State Inspector of Mines records.
**Estimated.



INDEX TO DISTRIBUTION OF KENTUCKY MINERAL RESOURCES

SAND AND GRAVEL PRODUCTION IN KENTUCKY

	Volume	Value
1924	3,442,457 tons	$1,629,973.00
1925	2,402,982 tons	1,770,458.00
	5,845,439 tons	$3,400,431.00

PUBLIC UTILITY POWER IN KENTUCKY[1]
1920-1927

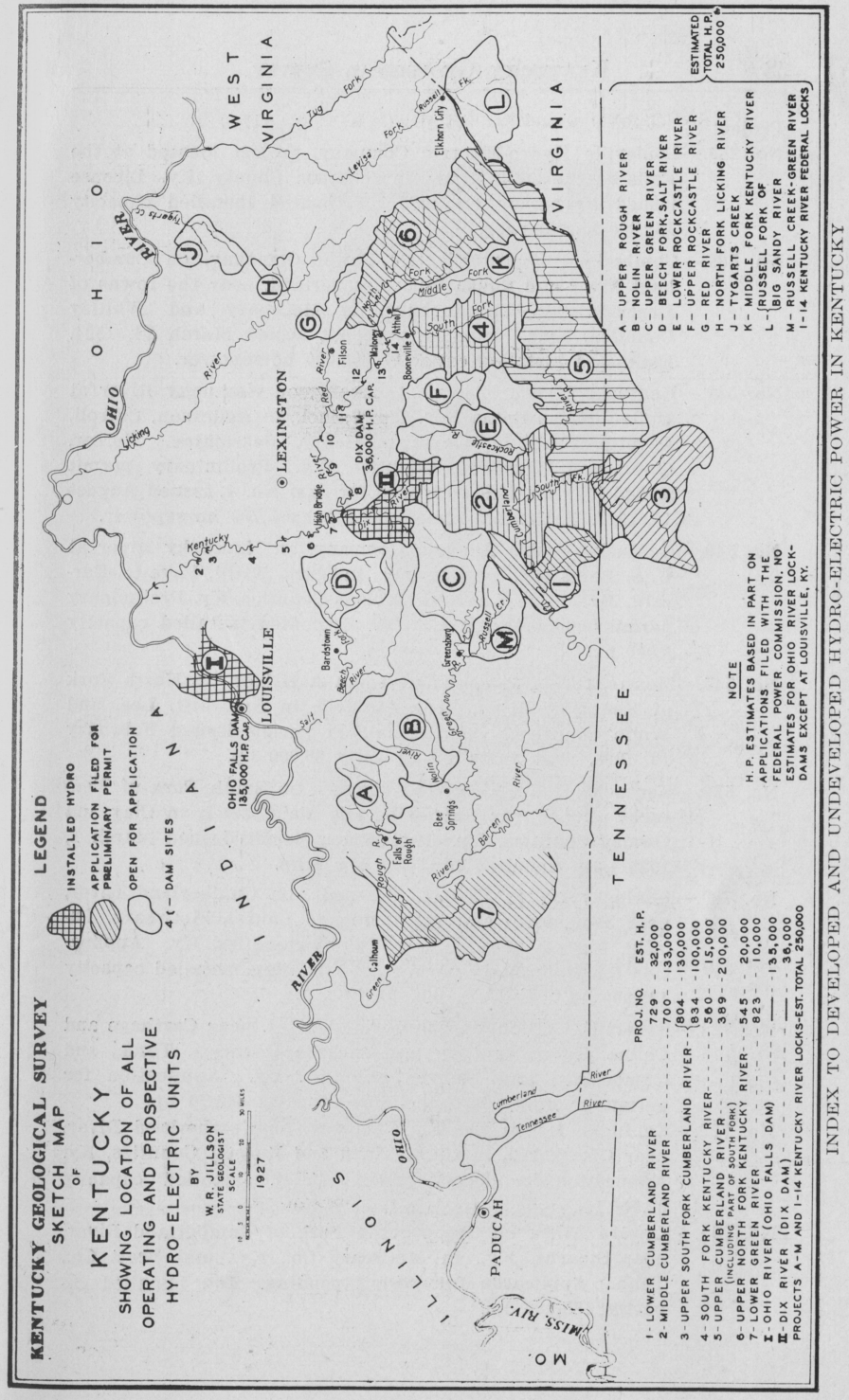
Year	Operators	Plants	Capacity of Generators (Kilowatts)
1920	44	62	103,404
1921	41	59	109,574
1922	40	60	112,693
1923	41	59	121,911
1924	39	59	179,966
1925	33	59	203,226
1926	31	52	244,848
1927	28	50	249,648

HYDRO-ELECTRIC DEVELOPMENT

Interest in hydro-electric development in Kentucky continues strong though a count of the active applications for preliminary projects totals now only twelve, two less than at the end of the 1924-1925 biennial period. The difference is explained in part by the granting of preliminary permit No. 289 to the Louisville Gas and Electric Co. for the development of hydro-electric power at Dam 41 in the Ohio River at Louisville. This project involved the construction of a new dam 6 feet higher than the previous structure together with power plant with eight 10,000 kilowatt generators. An annual production of about 350,000,000 kilowatt-hours is anticipated from this power project which is now rapidly nearing completion. An airplane view of this hydro-electric plant at Louisville accompanies this report.

Other projects existing at the present only as applications before the Federal Power Commission are given below.[2] Of these No. 700, No. 729, No. 804, and No. 834 involving the Cumberland River are pending before the Nashville district of the War Department, U. S. Engineers' Office, for report.

[1] U. S. G. S., Water Supply Paper 579, pp. 199-202. 1928.
[2] Data from O. C. Merrill, Ex. Secy. Fed. Power Comm., Washington, D. C., Dec. 15, 1925.



INDEX TO DEVELOPED AND UNDEVELOPED HYDRO-ELECTRIC POWER IN KENTUCKY

Project

No. 289.—Louisville Hydro-Electric Company, project located at the Falls on the Ohio River, in Jefferson County, Ky. License issued November 11, 1925. Estimated installed capacity 135,000 horsepower.

No. 389.—Cumberland Hydro Electric Power Company, on Cumberland River and South Fork Cumberland, near the towns of Burnside and Williamsburg, in McCreary and Whitley Counties, Ky. Preliminary permit issued March 24, 1924. Estimated installed capacity 200,000 horsepower.

No. 539.—Kentucky Hydro Electric Company, on Kentucky River at United States Dams Nos. 1 to 7, incl., in Anderson, Carroll, Fayette, Franklin, Garrard, Henry, Jessamine, Mercer, Owen, and Woodford Counties, Ky. Preliminary permit issued May 28, 1925. License for dam No. 7, issued August 19, 1927. Estimated installed capacity 3,700 horsepower.

No. 540.—Kentucky Hydro Electric Company, on Kentucky River at U. S. Dams Nos. 8 to 14 incl., in Clark, Estill, Fayette, Garrard, Jessamine, Lee and Madison Counties, Ky. Preliminary permit issued March 1, 1926. Estimated installed capacity 3,000 hp.

No. 545.—Messrs. Offutt, Loughridge, Gunn & Hifner, on North Fork of Kentucky River, near Airedale, in Breathitt, Lee, and Wolfe Counties, Ky. Preliminary permit issued February 10, 1926. Est. installed capacity 20,000 hp.

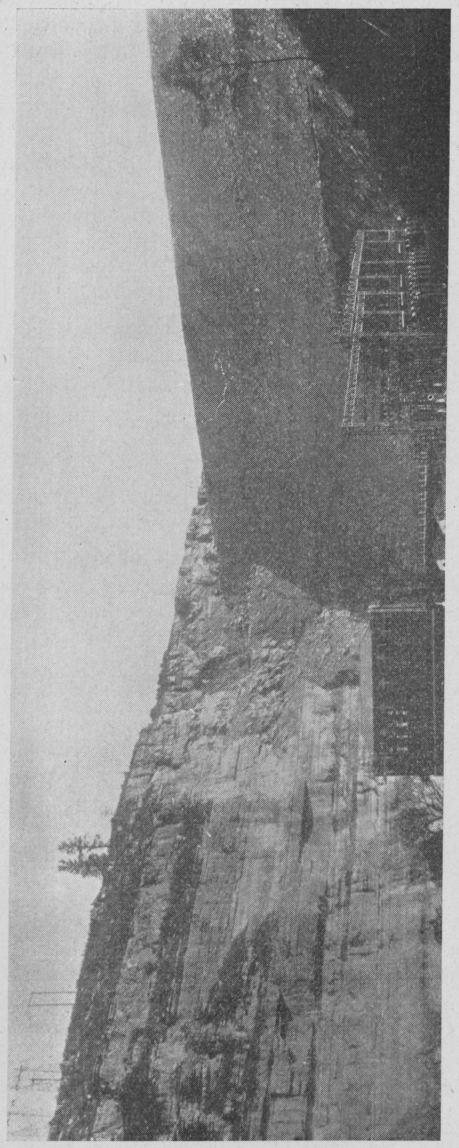
No. 566.—Kentucky Hydro Electric Company, on South Fork of Kentucky River, near Booneville and Manchester, in Clay and Owsley Counties, Ky. Preliminary permit issued March 1, 1926. Est. installed capacity 15,000 hp.

No. 700.—Kentucky Hydro Electric Company, on Cumberland River, near Jamestown and Monticello, in Laurel, McCreary, Pulaski, Russell, Wayne, and Whitley Counties, Ky. Application for preliminary permit pending. Est. installed capacity 133,000 hp.

No. 728.—Robert G. Gordon, on Cumberland River, near Carthage and Celina, Tenn., in Clay and Jackson Counties, Tenn., and Cumberland and Monroe Counties, Ky. Application for permit pending. Est. installed capacity 64,000 hp.

No. 729.—Kentucky Hydro Electric Company, on Cumberland River, near Creelsboro, in Cumberland and Russell Counties, Ky. Application for permit pending. Est. installed capacity 32,000 hp.

No. 804.—Edward Allen, on Great South Fork of Cumberland River, near Stearns, Ky., in McCreary Co., Ky., and Scott Co., Tenn. Applicaton for permit pending. Est. installed capacity 130,000 hp.



DIX DAM AND POWER HOUSE, MERCER AND GARRARD COUNTIES, KY.

No. 823.—General Power & Light Company, on Green River, near Calhoun and Rumsey, in McLean Co., Ky. Application for permit pending. Est. installed capacity not stated.

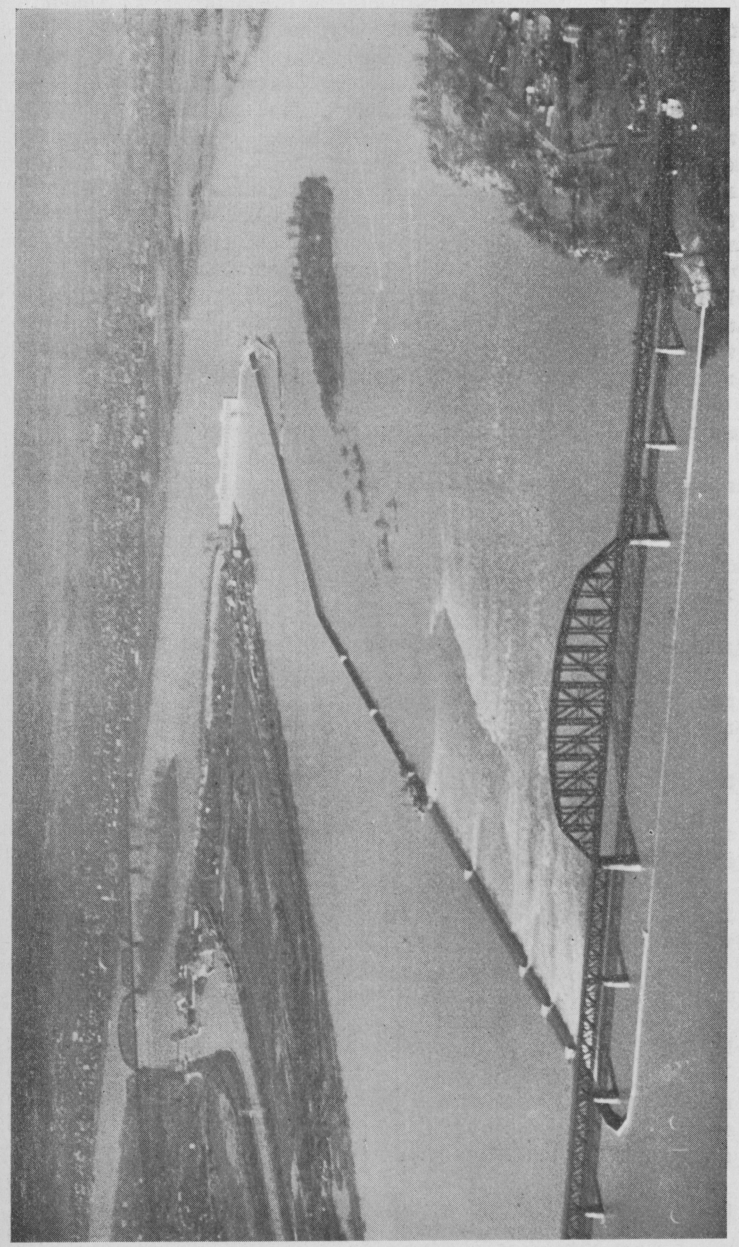
No. 834.—B. G. Slining, on Big South Fork of Cumberland River, near Stearns, Ky., in McCreary County, Ky., and Scott County, Tenn. Application for permit pending. Est. installed capacity 100,000 hp.

Considering the United States as a unit in comparison to Kentucky, there is now available in this country as a whole all types of power-generating equipment included except automobiles—something in excess of 230,514,000 H. P. In 1923—the latest figures available—there were 684,044,000 H. P. used in automobiles. At the present time this widely distributed source of power alone must be in excess of 1,000,000 H. P. or about 80 or 90 servants per citizen of the United States. This tremendous amount of cheap mobile machine power explains to a very great degree the considerable leisure, prosperity and the high plane of living enjoyed in this country. In a similar way the development in this State of large amounts of latent hydro-electric and steam-electric power of low cost will similarly increase the leisure, the prosperity, and the richness of human life in Kentucky.

MINERAL PRODUCTION OF THE UNITED STATES, 1926*

State	Principal Mineral Products	Amount
Pennsylvania	Coal, cement, clay products, natural gas	$1,055,766,000
Oklahoma	Petroleum, natural gas, zinc	569,519,000
California	Petroleum, natural gas, cement	523,352,000
Texas	Petroleum, sulphur, natural gas	420,587,000
West Virginia	Coal, natural gas, petroleum, clay products	395,942,000
Ohio	Clay products, coal, natural gas, petroleum	253,884,000
Illinois	Coal, clay products, petroleum, cement	237,242,000
Kansas	Petroleum, zinc, natural gas, coal	165,061,000
Kentucky (ninth)	**Coal, petroleum, clay products, gas, asphalt, fluorite, stone**	**155,513,712**
Michigan	Iron ore, copper, cement, salt	130,861,000
Indiana	Coal, cement, stone, clay products	118,692,000
Minnesota	Iron ore, stone, cement, clay products	118,361,000
Arizona	Copper, gold, silver, lead	115,048,000
New York	Clay products, gypsum, cement, stone	112,016,000
Utah	Copper, lead, silver, coal	98,985,000
Missouri	Lead, clay products, cement, coal	90,004,000

*U. S. Bureau of Mines and Census.



FALLS OF THE OHIO DAM AND POWER HOUSE, LOUISVILLE, KY.

State	Principal Mineral Products	Amount
Arkansas	Petroleum, natural gas, coal	84,486,000
Alabama	Coal, iron ore, cement, clay products	83,710,000
Montana	Copper, zinc, petroleum, silver	79,763,000
Wyoming	Petroleum, coal, natural gas	78,988,000
New Jersey	Clay products, zinc, cement, stone	77,066,000
Colorado	Coal, gold, lead, petroleum	65,597,000
Louisiana	Petroleum, natural gas, sulphur	62,204,000
Virginia	Coal, clay products, stone, cement	46,136,000
Tennessee	Coal, cement, clay products, stone	39,297,000
Iowa	Coal, cement, gypsum, clay products	35,972,000
Idaho	Lead, silver, zinc, stone	31,753,000
New Mexico	Copper, coal, petroleum, zinc	28,514,000
Nevada	Copper, silver, gold, lead	27,613,000
Maryland	Coal, clay products, cement, sand and gravel	24,067,000
Washington	Coal, cement, clay products, sand and gravel	21,257,000
Wisconsin	Stone, zinc, sand and gravel, iron ore	20,712,000
Florida	Phosphate rock, stone, sand and gravel, fuller's earth	19,752,000
Alaska	Copper, gold, coal, silver	17,607,000
Georgia	Clay products, stone, cement, fuller's earth	17,480,000
Massachusetts	Stone, clay products, sand and gravel, lime	16,787,000
Vermont	Stone, slate, lime, talc	14,955,000
North Carolina	Clay products, stone, sand and gravel, feldspar	10,993,000
Connecticut	Clay products, stone, lime, sand and gravel	7,695,000
South Dakota	Gold, cement, stone, sand and gravel	7,595,000
Oregon	Stone, cement, sand and gravel, clay products	6,941,000
Maine	Stone, lime, slate, clay products	5,786,000
New Hampshire	Stone, clay products, sand and gravel, feldspar	4,145,000
South Carolina	Clay products, stone, sand and gravel, barite	3,677,000
Nebraska	Clay products, sand and gravel, cement, stone	3,322,000
North Dakota	Coal, sand and gravel, clay products	2,805,000
Mississippi	Clay products, sand and gravel, stone	1,883,000
Rhode Island	Stone, clay products, sand and gravel, lime	1,339,000
Dist. of Columbia	Sand and gravel, clay products, sand-lime brick, stone	987,000
Delaware	Stone, clay products, sand and gravel	378,000

OFFICE WORK OF THE SURVEY

The office routine of the Kentucky Geological Survey has been carried forward during the past biennium by a small staff of three regular or full-time employees, including the State Geologist. The statutes do not provide for an Assistant State Geologist, and for this reason the burden of a very considerable general correspondence service to the people of the State is carried by the Director of the Survey. During the two-year period covered by this report, a total of 13,428 letters have been received, or an average of twenty-four per day. In reply 13,056 have been sent, giving an average of 23½ per day. The smaller number of letters sent out as compared to those received is accounted for by the fact that a portion of the correspondence calls for certain reports and maps and does not require other official reply. A detailed statement by months is given in the following statement:

CORRESPONDENCE THROUGH U. S. POST OFFICE AT FRANKFORT, KY., FOR THE TWO FISCAL YEARS

July 1st, 1925, to June 30, 1927, inclusive.

Year	Month	Letters Received	Letters Sent
1925	July	558	681
	August	512	560
	September	615	520
	October	609	487
	November	582	454
	December	526	428
1926	January	523	513
	February	575	512
	March	706	735
	April	539	374
	May	311	137
	June	368	194
	Total July 1, 1923, to June 30, 1926, inclusive	6,424	5,595
1926	July	581	875
	August	632	764
	September	598	614
	October	578	618
	November	530	522
	December	530	525

Year	Month	Letters Received	Letters Sent
1927	January	569	634
	February	535	454
	March	682	676
	April	624	595
	May	549	605
	June	596	579
	Total July 1, 1926, to June 30th, 1927, inclusive	7,004	7,461
	Grand total for the two fiscal years ending June 30, 1927	13,428	13,056
	Daily average	24 letters	23½ letters

One of the chief activities of the Kentucky Geological Survey is the furnishing of detailed and accurate geological and scientific information concerning the geology, mineral and natural resources of Kentucky. In this state, and international service during the past biennial period 21,883 geological reports and maps, an average of 35 per day, have been sent from this office in response to written or personal requests accompanied by separate amounts of postage as required by law as shown by the following statement:

KENTUCKY GEOLOGICAL SURVEY PUBLICATIONS DISTRIBUTED BY REQUEST

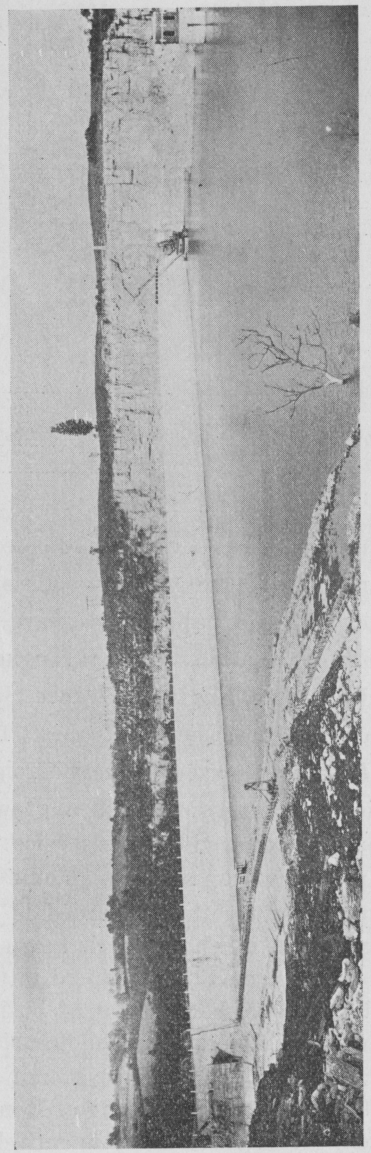
July 1st, 1925, to June 30, 1926, inclusive.

Year	Month	No. Mailed	Carried Away	Total	
1925	July	531	109	640	
	August	892	155	1,047	
	September	395	159	554	
	October	596	177	773	
	November	610	116	726	
	December	645	69	714	
1926	January	939	266	1,205	
	February	762	114	876	
	March	993	271	1,264	
	April	645	180	825	
	May	342	98	440	
	June	356	212	563	
		7,706	1,926	9,632	
	Total for fiscal year 1926				9,632

July 1, 1926, to June 30, 1927, inclusive.

Year	Month	No. Mailed	Carried Away	Total	
1926	July	1,131	109	1,240	
	August	966	156	1,122	
	September	754	125	879	
	October	720	130	850	
	November	818	155	973	
	December	826	108	934	
1927	January	590	207	797	
	February	482	163	645	
	March	1,402	199	1,601	
	April	1,147	218	1,365	
	May	620	134	754	
	June	884	207	1,091	
		10,340	1,911	12,251	
	Total for fiscal year 1926-1927				12,251
	Grand total for two fiscal years				21,883
	Daily average				35

The reports and maps dsitributed as indicated above pertain to every subject relative to the geology, soils and mineral resources of Kentucky. These publications have been sent, not only to every place in Kentucky, but throughout the United States; also Canada, Mexico, England, France, Spain, Germany, Russia, Japan, China and elsewhere. Requests for publications of the Kentucky Geological Survey through foreign libraries, industrial corporations and institutions is a growing one. The total amount of postage received in this service was re-used directly during the past biennium and has amounted to $1,428.12. Since this amount of postage thus obtained is in effect, a revolving unit being used as quickly as it is taken in, amounts in excess of a few dollars are never maintained in the office of the Survey. Of all the considerable amount of business which has proceeded through the U. S. post office for first-class correspondence and second-class mail or publications, not one penny has been drawn from the treasury of the state of Kentucky. In this respect the Kentucky Geological Survey is entirely self-supporting. The monthly and annual totals of postage received by the Kentucky Geological Survey follows:



DIX DAM AND LAKE HERRINGTON, GARRARD AND MERCER COUNTIES

RECEIPTS FOR POSTAGE FOR BIENNIUM

First Fiscal Year

July 1, 1925, to June 30th, 1926, inclusive.

1925	July	$50.00	
	August	55.00	
	September	40.00	
	October	30.00	
	November	30.00	
	December	50.00	
1926	January	55.00	
	February	50.00	
	March	45.00	
	April	35.00	
	May	15.00	
	June	20.00	
	Total		$550.00

Second Fiscal Year

July 1, 1926, to June 30, 1927, inclusive.

1926	July	$75.00	
	August	60.00	
	September	80.00	
	October	60.00	
	November	25.00	
	December	40.00	
1927	January	25.00	
	February	55.00	
	March	86.00	
	April	58.00	
	May	15.00	
	June	38.00	
	Total		$617.00

Grand total used in mailing parcel post packages, special delivery and registration	$1,167.00
Letters mailed first year @ 2c	111.90
Letters mailed second year @ 2c	149.22
Total postage used during the two fiscal years 1925, 1927	$1,428.12

CREDITS AND EXPENDITURES OF THE KENTUCKY GEOLOGICAL SURVEY

(July 1, 1925—June 30, 1927.)

For the year beginning July 1, 1925, and ending June 30, 1926.

Annual appropriation		$40,000.00
Credits (by refunds)		440.00
Total		$40,440.00
Permanent salaries	$6,580.00	
Temporary salaries	18,804.65	
Field and traveling expense	6,060.45	
Printing	5,574.01	
Departmental repairs	13.05	
Maps	591.18	
Books	227.97	
Miscellaneous	1,278.53	
Telephone, telegraph, express	413.06	
Furniture and equipment	893.56	
Total expenditures	$40,436.46	
Balance unexpended	3.54	
	$40,440.00	

For the year beginning July 1, 1926, ending June 30, 1927.

Appropriation		$40,000.00
Credits (by refund)		1,249.00
Total		$41,249.00
Permanent salaries	$6,740.00	
Temporary salaries	20,086.37	
Field and traveling expenses	2,951.53	
Printing and stationery	6,256.04	
Departmental repairs	878.98	
Maps	2,346.64	
Books	298.17	
Miscellaneous	622.23	
Telephone, telegraph and express	397.10	
Furniture and equipment	665.23	
Total expenditures	$41,242.29	
Balance unexpended	6.71	
	$41,249.00	

CO-OPERATIVE TOPOGRAPHICAL SURVEY

(State Road Department Funds, Budget of 1926-1927.)

Appropriation		$50,000.00
Balance unexpended		1.70
Total expenditures		$49,998.30
Disbursements—		
Salaries and services	$47,883.75	
Expenses	2,114.55	
	$49,998.30	

As shown by vouchers in the Auditor's office none of the appropriation for Topographical Mapping was used directly or indirectly for the use and benefit of the Geological Survey.

E. H. MARRS, Clerk, Auditor's Office

RECOMMENDATIONS TO THE GOVERNOR AND LEGISLATURE

The great natural and mineral wealth of Kentucky justifies continued and increased activity of a scientific nature leading towards its development. The following definite program for the Geological Survey is recommended:

1. New legislation providing departmental funds: A small emergency appropriation is needed to bring out Nos. 2 and 3 as below. General legislation is needed to bring out No. 6 as below.
2. Immediate publication of large number of county and regional geological and mineral resource maps, now completed in manuscript form.
3. Rapid publication of all manuscript reports (about eight), some of which are a year or more old now.
4. A definite and enlarged plan for the completion of topographic base maps of Kentucky: 56% of the State's area now done, 44% still to be mapped.
5. General and specific advancement of mineral investigations, including possible hydro-electric power sites.
6. Curative legislation is necessary—legal authority to put the Geological Survey on a business and partly self-supporting basis through sale of publications at figures approximating the printing and mailing or express costs to the Survey. Direct appropriation from State Treasury for continuance and expansion of co-operative topographic mapping instead of uncertain appropriations from other departmental budgets at option as at present.

IN MEMORIAM

During the past biennium, Kentucky geology has suffered greatly through the loss of a former Director of the Geological Survey, Professor Charles Joseph Norwood,[1] Lexington, Kentucky, and an illustrious Assistant Geologist of the present Geological Survey, Dr. Stuart Weller[2] of Chicago, Illinois.

Death came to Professor Norwood in the fulfillment of his years quietly and peacefully in his home surrounded by his family and well within the circle of his friends who were legion. In contrast, the death of Dr. Weller occurred unexpectedly at a rather remote point in the field—Western Kentucky—while engaged in executing the areal and structural geology of the Smithland Quadrangle.

In the grip of reflective thoughts occasioned by the passing of these two really notable geologists, one feels the impulse to record separately in some detail the personal qualifications and scientific achievements of each—those attainments which have contributed so much to the advancement of geology in Kentucky. The requirements of brevity, however, imposed upon this official document make it impossible to here set out adequately or in any way do justice to either of these remarkable men. With no attempt at completeness, therefore, there is given here only the most important facts of biography and scientific labor in Kentucky.

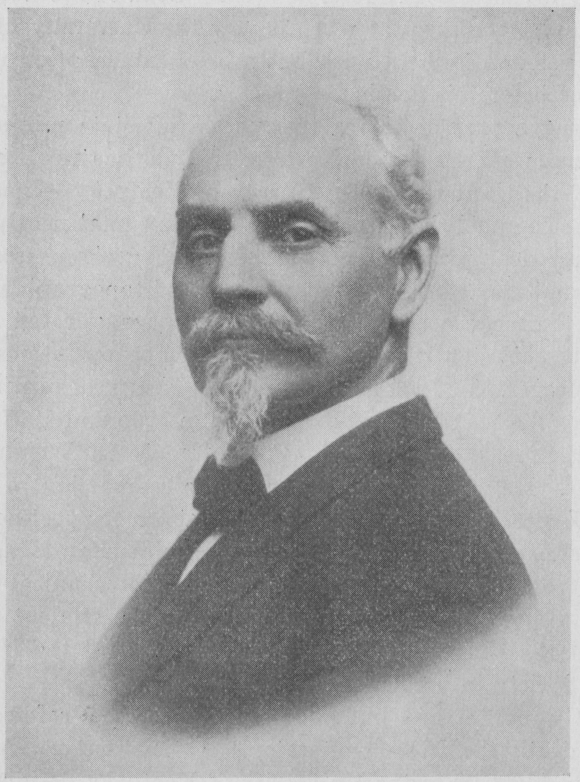
CHARLES JOSEPH NORWOOD

Prof. Charles J. Norwood was born at New Harmony, Indiana, September 17, 1853, the son of Dr. Joseph Granville and Mary Frances (Pugh) Norwood. His death caused by paralysis occurred after a brief illness January 20, 1927, at his home 339 Aylesford Place, in Lexington. During his early childhood his parents moved to Columbia, Missouri where his father was Dean of the Medical Department of the University of Missouri. Professor Norwood received his early education from private tutors. Later during the year 1868-72 he attended

[1] See for detailed sketch of Prof. Norwood life, Geological Research in Kentucky. Ky. Geol. Surv., Vol. 15, pp. 24-29 and 65-70; also, Bull. Geol. Surv. of Am., Vol. 39, No. 1, pp. 40-47. 1928.

[2] Obituary notes and sketches concerning Dr. Stuart Weller and his work have been published as follows: Memorial, Bull. Am. Ass'n of Pet. Geol., Vol. 111, No. 12, pp. 1347-48, Dec. 1927. Sketch, The Minute Man, Chicago, Ill., Vol. XVII, No. 5, pp. 4-6. Memorial, The University Record, Vol. XIII, No. 4, pp. 311-14 with photo, Oct. 1927. Editorial, Journal of Geology, Vol. XXXV, No. 8, pp. 743-4, Nov.-Dec. 1927.

the University of Missouri but did not complete his course though he was an assistant in Physics. In 1872 he became assistant geologist of Missouri and for two years worked under Raphael Pumpelly and later under G. C. Brodhead until the



PROF. CHARLES J. NORWOOD

discontinuance of the survey in 1874. During that time he specialized on the coals of Missouri.

Closely following the closure of work on the Missouri Survey, Professor Norwood came to Kentucky as assistant geologist on the second Kentucky Geological Survey under Dr. N. S. Shaler. He served in this capacity until 1880 expending his energies principally on the coals of Eastern and Western Kentucky although some investigations into the metaliferous ores were conducted at the same time. From 1881 to 1884 he was en-

gaged in silver mining in the west. Subsequently (1884-1887) he served as Chief Inspector of Mines in Kentucky. Again from 1902-1920 he filled this position, and altogether occupied this office for 31 years—a record unapproached in any appreciable degree by his successors. 1902 he became Dean of the College of Mining and Metallurgy at what is now the University of Kentucky a posiiton he held with but a brief interruption until a short time before his death.

During a part of this active period of State mining and educational work Professor Norwood found time to direct the affairs of the third Geological Survey of Kentucky—from 1904 to 1912. The published works of this survey total nearly 3,000 pages and deal principally with economic geology—coal, oil, fluorite and clay. The present program of topographic, mapping at the modern scale of 1:62,500 was inaugurated at this time and consistently advanced though appropriations were always meager. In 1904 he prepared the Kentucky mineral collection for the St. Louis Exposition and in 1906 and 1907 represented Kentucky at the National Conference in Weights and Measures. He was also a member of the commission in charge of the Kentucky exhibits at the Jamestown Exposition. Of honors he had many receiving the honorary degree of Master of Science from the Kentucky Agricultural and Mechanical College now the University of Kentucky. In 1918 the student mining group at the University of Kentucky was named the Norwood Mining Society in his honor.

Early in 1927 and but a few days prior to Professor Norwood's death the Mine Opperator's Association of Kentucky presented $1000.00 to the University of Kentucky designated as the Norwood Scholarship Fund for deserving students in mining engineering. His interests were wide as evidenced by membership in many geological, scientific and fraternal organizations.

Professor Charles J. Norwood was a unique character in many ways. An unceasing worker he possessed to a very notable degree the time honored essentials of personal and professional honesty and integrity. As a teacher and public speaker he exhibited the rare traits of inspiration and individual magnetism. Charming as a conversationalist, a lover of music and art, he enjoyed a wide and appreciative circle of admirers and friends.

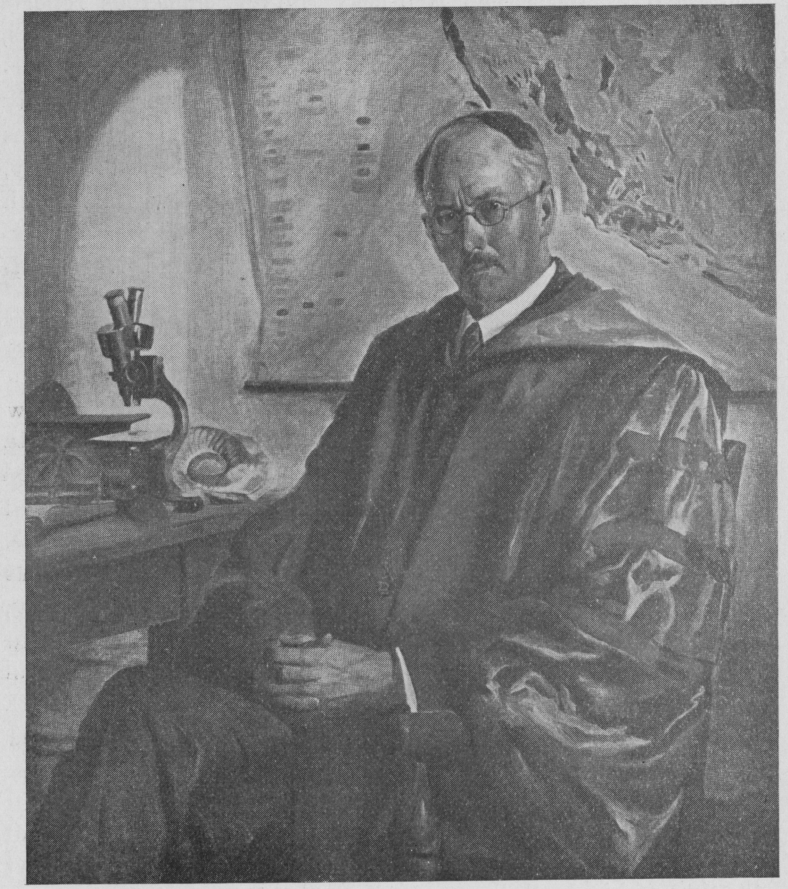
His published works in the geological field consist of five papers and reports prepared for the Missouri Survey, seven reports published by the second Kentucky Survey, numerous reports and papers published by the Kentucky Department of Mines, four reports of progress published by the third Kentucky Survey under his direction and some miscellaneous papers chiefly on coal. A complete list of his official geological publications appears in Vol. XV, Series VI, Kentucky Geological Survey, 1923. Professor Norwood is survived by his widow, Mrs. Sarah E. White Norwood, a daughter, Mrs. Kitchell Walker of Lexington, a son Joseph W. Norwood of Louisville and five grandchildren.

STUART WELLER

Dr. Stuart Weller was born in Maine, Broome Co., New York, December 26, 1870, the son of James and Henrietta (Marean) Weller. His death due to heart failure occurred suddenly August 5th, 1927 near Marion, Kentucky. He received his B. S. Degree at Cornell University in 1894, and his Ph. D. degree at Yale University in 1901. Beignning in 1890 he was successively assistant geologist on the Missouri, New Jersey, Illinois and Kentucky Geological Surveys, his period of work in Kentucky including the summer seasons of the years 1920 and 1926 inclusive. He was appointed assistant geologist on the U. S. Geological Survey in 1891, and again ten years later from 1901-1906. Subsequently he became a geologist of full rank in the Federal service. Early in the "nineties" he was in charge of the geological collections in the museum at Cornell University, and again later at the University of Chicago. At the time of his death he was Professor of Paleontologic Geology at the University of Chicago, having been on the teaching staff of this institution since 1895.

Dr. Weller's special field of paleontological and geological work was the Lower Carboniferous or Mississippian rocks of the Central Mississippi valley, an area involving parts of the states of Kentucky, Missouri and Illinois. His published works prepared for the Kentucky Geological Survey consist of three volumes, 1 paper and three quadrangular maps as follows:

(1) Geology of the Golconda Quadrangle, 1921, (2) Geology of the Cave-in-Rock Quadrangle, 1926, (3) Geology of the



DR. STUART WELLER

Princeton Quadrangle, 1923; (1) Oil and Gas Possibilities in Caldwell County, Ky., 1921; (1) Areal Geological map of the Golconda Quadrangle, (2) Areal Geological map of the Cave-in-Rock Quadrangle, (3) Areal Geological map of the Princeton Quadrangle, and (4) A Portion of the Smithland Quadrangle (unpublished).

In the execution of the geology of this difficult and highly faulted area of Mississippian rocks of Western Kentucky, Dr. Weller made his greatest contribution to geology in this Commonwealth. Aside from their purely scientific value, these competent researches in the field in Western Kentucky have done much to stimulate industrial development in those parts of Crittenden, Livingston, Lyon and Caldwell Counties involving the great fluorite district of the Eastern United States, Western Kentucky and Southern Illinois.

Aside from his work on the Kentucky Geological Survey, Dr. Weller was the author of many reports and papers on geologic and paleontologic subjects. His scientific work was marked by great care and untiring effort. In the laboratory and field he was exhaustive in his investigations. In opinion he was conservative, rarely failing to make his deductions the products of undoubted facts. As an educator he was the master instructor and inspiration of many including the writer of these lines. In his profession and field he occupied a place at once individual and distinguished.

Widely connected through scientific, educational and patriotic societies in the United States and abroad, Dr. Weller's personality will be missed by many, and the loss of his highly competent service in his particular field—the Lower Carboniferous—will be keenly felt not only by his many former students and close friends but by geologists everywhere. He is survived by his widow, Mrs. Harriet Marvin Weller and three sons: James Marvin, Chester Marean, and Allen Stuart of No. 5735 Blackstone Avenue, Chicago, Illinois.

AVAILABLE MAPS AND REPORTS

There are now ready and available for immediate distribution through the Kentucky Geological Survey to any interested individual, corporation or institution requesting same a large number of special reports and maps, prepared by this and previous Surveys. These publications cover the general geology and development of many of the mineral resources of Kentucky. The early reports of the 1st and 2nd Geological Surveys (Owen, Shaler and Procter) are now entirely exhausted. The publications of subsequent Surveys, including the present (Sixth)

Kentucky Geological Survey, which are now available are listed in chronological sequence by title and authors. The required postal charge and the number which are still available is indicated. The number of cloth bound reports now in stock is 23,300. The total number of paper bound pamphlets in stock relative to geology is 10,326. The total number of maps is 73,440. The total number of maps and reports now available for distribution is 113,438. A request for any of these publications addressed to the Director, when accompanied by the required amount of postage in stamps (checks or money orders may be used) will be promptly filled until the edition is exhausted. The list given is essentially a duplicate of the one used in the official correspondence of the Kentucky Geological Survey.

LIST OF AVAILABLE MAPS AND REPORTS

January 1, 1928.

Instructons for Ordering: Single copies of any and all maps and reports listed hereunder will be mailed to any interested individual, corporation, company, or institution requesting same, providing the exact fee as indicated is forwarded with the request. Packages will not be sent express collect. This survey will not bill any applicant for required charges. Avoid delay and confusion by accompanying your letter of request with money order or check in the proper amount.

GEOLOGIC REPORTS

SERIES VI.

(1920-1928)

"WILLARD R. JILLSON SURVEY"

	Required Charge	Copies in Stock
Vol. 1.—Glass Sands of Kentucky. C. H. Richardson. 1920	$1.00	56
Vol. 2.—Economic Papers on Kentucky Geology. W. R. Jillson. 1921	Edition Exhausted	
Vol. 3.—Oil Field Stratigraphy of Kentucky. W. R. Jillson. 1921	Edition Exhausted	
Vol. 4.—Geology of the Golconda Quadrangle. Stuart Wells. 1921	Edition Exhausted	
Vol. 5.—Geology and Coals of Webster County. L. C. Glenn. 1921	1.00	69
Vol. 6.—Sixth Geological Survey. W. R. Jillson and others. 1921	Edition Exhausted	
Vol. 7.—Mississippian Series in Eastern Kentucky. Chas. Butts. 1922	1.00	54
Vol. 8.—Clay Deposits of Kentucky. H. Ries. 1922.	Edition Exhausted	

	Required Charge	Copies in Stock
Vol. 9.—Geography of the Jackson Purchase. D. H. Davis. 1923	Edition Exhausted	
Vol. 10.—Geology of Princeton Quad. Stuart Weller. 1923	1.00	87
Vol. 11—Building Stones of Kentucky. C. H. Richardson. 1923	1.00	85
Vol. 12.—New Oil Pools of Kentucky. W. R. Jillson. 1926	1.00	1110

CONTORTED CRETACEOUS SHALES

This highly deformed argillaceous bed occurs in the foothills of the Carpathean Mountains a few miles northwest of Ploesti, Rumania.

Vol. 13.—Fluorspar Deposits of Kentucky. L. W. Currier. 1923	1.00	40
Vol. 14.—Surface Waters of Kentucky. W. R. King. 1923	1.00	428
Vol. 15.—Geological Research in Kentucky. W. R. Jillson. 1923	1.00	41
Vol. 16.—Wild Life in Kentucky. W. D. Funkhouser. 1925	Edition Exhausted	
Vol. 17.—Mineral Resources of Kentucky. W. R. Jillson. 1925 (In Press)	1.00	
Vol. 18.—Geography of the Mountains of Kentucky. D. H. Davis. 1924	1.00	120
Vol. 19.—Geography of the Kentucky Knobs. W. G. Burroughs. 1926	1.00	486
Vol. 20.—Coal Industry in Kentucky. W. R. Jillson. 1924	1.00	1088

	Required Charge	Copies in Stock
Vol. 21.—Oil Shales of Kentucky. Thiessen, White and Crouse. 1925	1.00	160
Vol. 22.—Road Materials of Kentucky. C. H. Richardson. 1924	1.00	39
Vol. 23.—Geography of the Blue Grass. D. H. Davis. 1927	1.00	
Vol. 24.—Geography of the Western Coal Field. W. G. Burroughs. 1925	1.00	76
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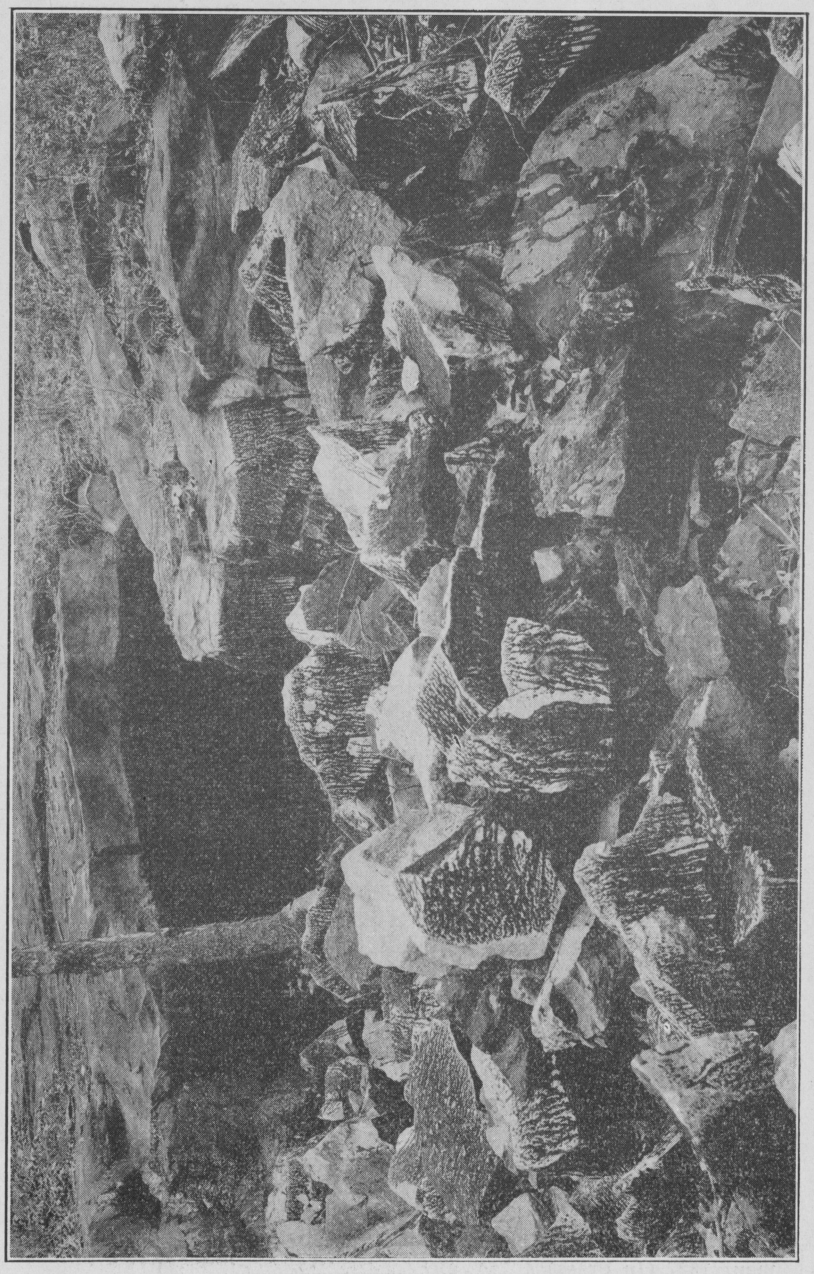

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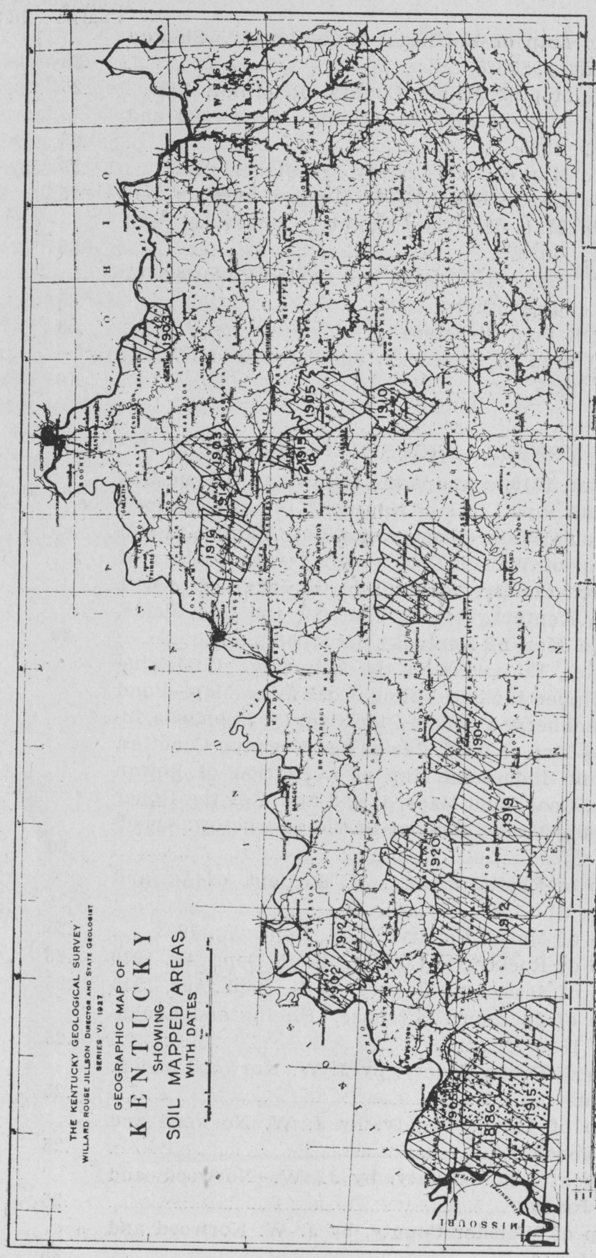

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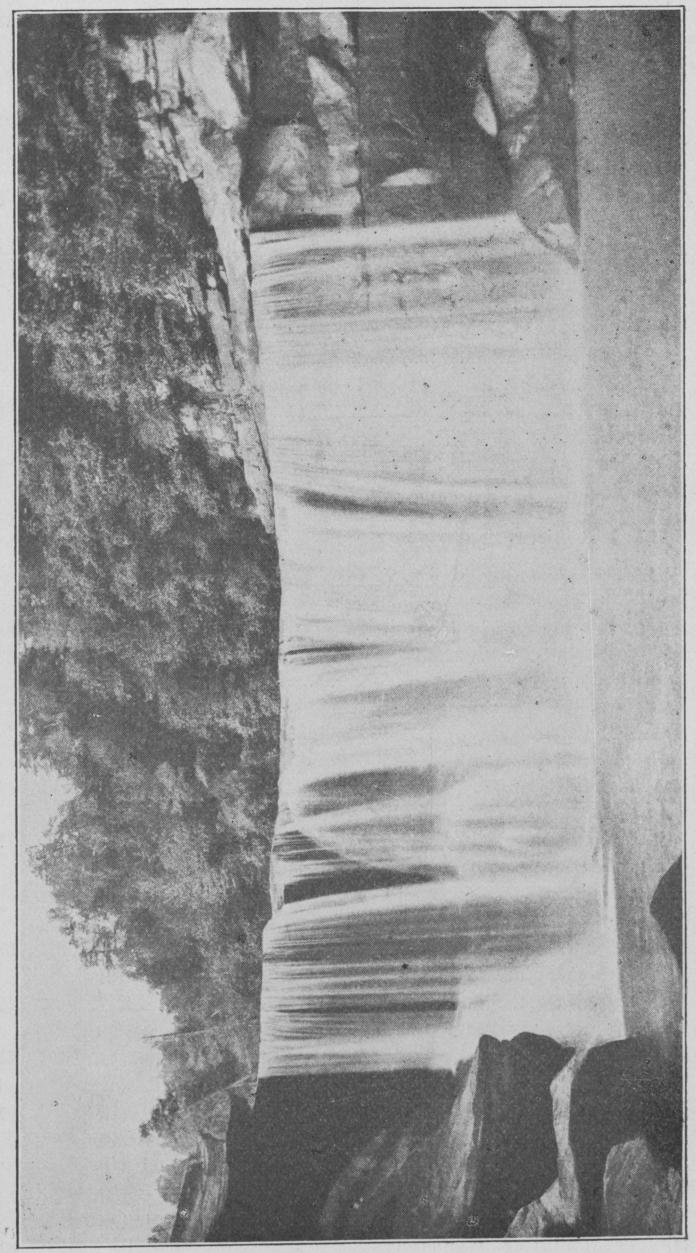

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71. Providence Quad., parts of Crittenden, Union, Webster, Caldwell and Hopkins Cos. 19
72. Regina Quadrangle, parts of Pike County, Ky.; Dickenson and Buchanan Cos., Va. 30
73. Richmond Quad., parts of Jessamine, Fayette, Madison, Estill, Jackson, Garrard 10
74. Salyersville Quad., parts of Menifee, Morgan, Wolfe, Magoffin and Breathitt Cos. 5
75. Scottsville Quadrangle, parts of Allen, Barren and Warren Counties, Kentucky 450
76. Sebree Quadrangle, parts of Henderson, Webster and Union Counties 10
77. Shawneetown Quad., Union, Crittenden Cos., Ky.; Hardin, Gallatin Cos., Ill. 15
78. Smithland Quad., parts of Livingston, Marshall and McCracken Counties 10
79. Sneedville Quad., part of Harlan Co..... 2
80. Spring Lick Quad., parts of Ohio, Butler and Grayson Cos. 400
81. Sutherland Quadrangle, parts of Daviess, McLean and Ohio Counties 10
82. Taylorsville Quad., parts of Spencer, Shelby, Jefferson and Bullitt Counties 5
83. Tell City Quad., parts of Hancock and Daviess..... 10
84. Tompkinsville Quad., part of Monroe Co..... 10
85. Troublesome Quadrangle, parts of Perry, Breathitt and Knott Counties 9

86.	Uniontown Quadrangle, parts of Union and Henderson Counties	19
87.	Whitesburg Quadrangle, parts of Letcher, Knott and Harlan Counties	8
88.	Whitesville Quadrangle, parts of Daviess, Hancock and Ohio Counties	7
89.	Williamsburg Quadrangle, parts of McCreary, Whitley, Pulaski, Laurel, Knox and Bell Counties, Kentucky, and Scott, Campbell, Claiborne Counties, Tennessee	10
90.	Williamson Quadrangle, parts of Pike and Martin Counties, Ky.; and part of Mingo Co., W. Va.	8
	Total topographical quadrangular maps	
	Grand Total all maps	
	Grand total all reports, papers, maps	

ADDENDUM

The importance of the free and active function of the Kentucky Geological Survey to the economic and industrial advancement of Kentucky has been recognized and referenced by Governor Flem D. Sampson on many occasions. He has pointed out the futility of expecting a highly technical and scientific bureau to function as a trail-blazer ahead of the rapid development of the mineral resources of the State when financed so slenderly as to require annually a closing down of its activities in the office and field for several months.

Furthermore he has exposed the fallacy of presuming that a State little more than half mapped, and very incompletely known geologically can hope to compete successfully in the broadest sense with adjacent Commonwealths where every foot of the terrain and all of the endowments of nature are located and described. Speaking in person before the General Assembly of Kentucky in the House of Representatives on January 11, 1928, Governor Sampson said in the course of his Biennial Message:*

HELP FOR THE GEOLOGICAL DEPARTMENT

"The work of the geological department is the genesis of our mineral development program. The economic importance of the completion of the topographical base map of Kentucky

* Biennial Message of Governor Flem D. Sampson before the General Assembly of Kentucky, assembled in Joint Session, Jan. 11, p. 17, Frankfort, Ky. 1928.

has become very apparent because of the great saving which can be effected through its use in Kentucky's gigantic highway construction program. This department has been providing, through maps and reports, a key to the extension of our mineral industry. This service has base mapped 56 per cent of the area of Kentucky. New mineral wealth valued now at about $160,000,000.00 per year and increasing about 8 per cent to 10 per cent annually, comes to Kentucky as a result of this scientific work. These base maps and geological reports are of very great importance to our present program of development, and the balance of Kentucky should be thoroughly mapped and the Geological Department authorized to make examination and report of the mineral resources in every section of the State. This work has been delayed because of lack of financial aid. In order that this important work may proceed with reasonable rapidity and that we may have this much needed information and assistance, I recommend that this department have more liberal support from the State."

MINERAL RESOURCES

"The following is a memorandum furnished by Dr. Jillson of the Geological Department, and addressed to Governor Sampson:

The present appropriations to Geological Survey are:

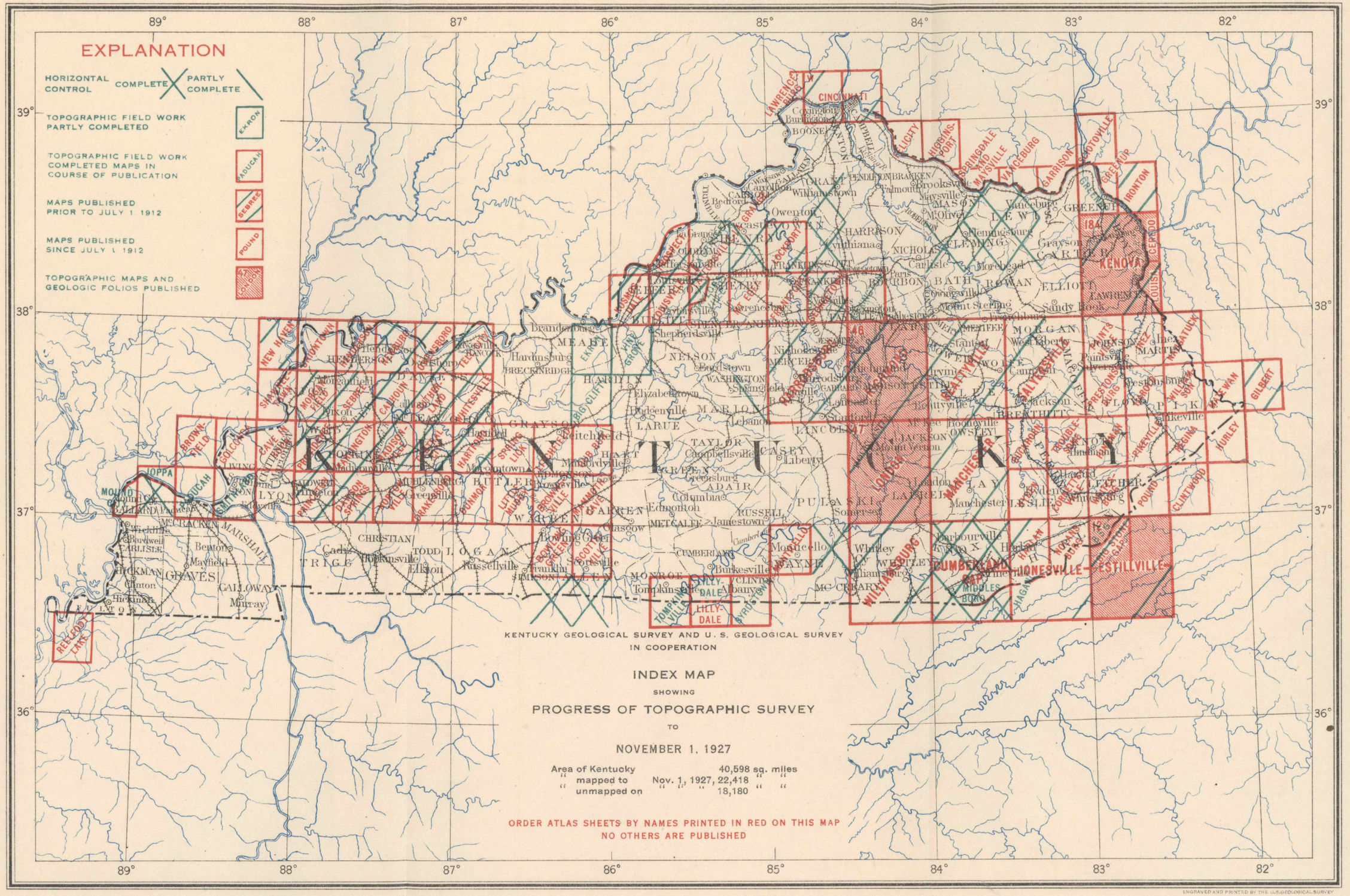
$40,000	Geol. Survey, all general purposes, salary and printing.
50,000	Topographic maps only.
$90,000	Total.

"It has frequently been said, and in truth, that the future of Kentucky—a rich Appalachian state—is inseparably bound up with an active development of its great wealth of mineral resources. Within the past decade the economic importance of the completion of the topographical base map of Kentucky has become very apparent because of the great savings which can be effected through its use in Kentucky's gigantic highway construction program. For seventy-five years the Kentucky Geological Survey, often interrupted in its important public function and always precariously financed, has been providing through maps and reports the key to the expansion of our mineral industry. This survey has base mapped 56% of the area of Kentucky. New mineral wealth valued now at about $160,000,000 a year and increasing about 8 or 10% per annum comes to Kentucky as a result of this scientific work.

"Investigation shows that the Geological Survey has now a large number of completed manuscript maps and reports on asphalt, coal, oil, gas, fluorspar, clays and other mineral resources of Kentucky completed, but is without funds for their publication. An emergency appropriation of $15,000 is suggested as the most direct means of immediate release to the public of this valuable information. This bill should also properly carry such clauses as will tend to place the Geological Survey on a partially self-supporting basis. Ohio and West Virginia, states strictly competitive with Kentucky, are fully base mapped. A plan has been devised whereby the topographical base map of Kentucky may be completed within the next four years. An annual budget appropriation of $100,000.00 for this specific purpose is urged conditioned upon a like appropriation for this work by the Federal Government. Furthermore, and in order to increase the value of the Geological Survey as an aid to the industrial expansion of Kentucky, it is recommended that the general biennial budget appropriation in this department be increased from the present sum of $40,000.00 to $75,000.00."

DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

KENTUCKY GEOLOGICAL SURVEY
WILLARD ROUSE JILLSON
DIRECTOR AND STATE GEOLOGIST



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