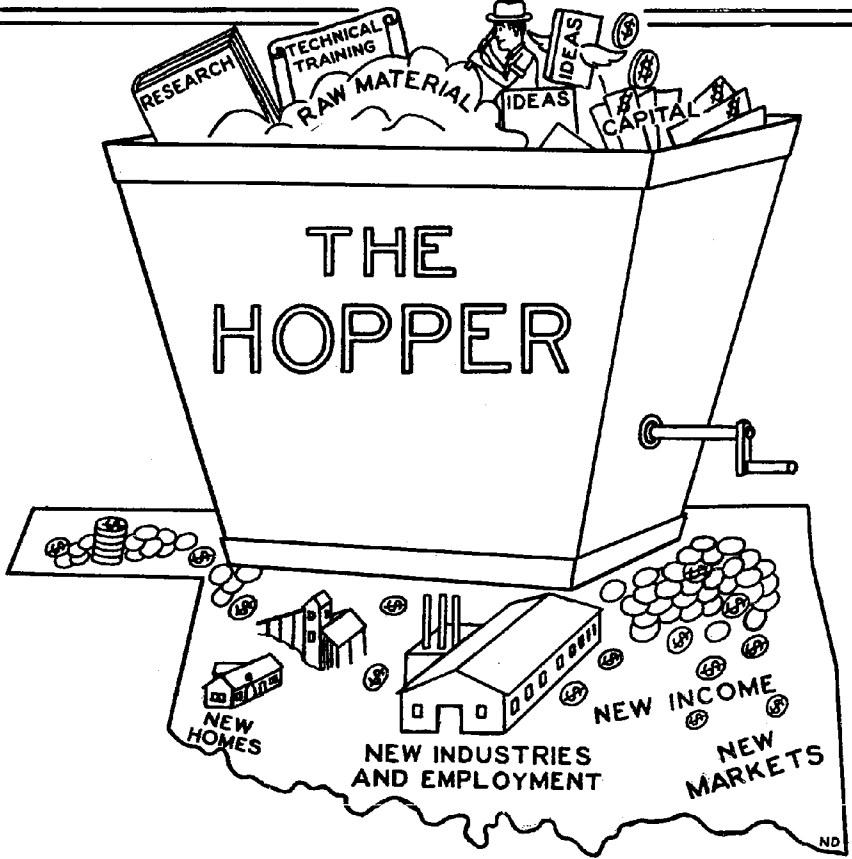


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OKLAHOMA'S NEW GEOLOGIC MAP 1/

BY

Hugh D. Miser 2/

Oklahoma's new geologic map, which is exhibited on this occasion in the form of a hand-colored manuscript copy, represents a compilation and integration of the mapping and other geologic results of many hundreds of Oklahoma geologists during the past 60 years. To these geologists we are deeply

1/ Summary of address presented before

Oklahoma Mineral and Gem Society, Norman,
Okla. Nov. 6, 1952
Fort Worth Geological Society, Fort Worth,
Texas, Nov. 17, 1952
Tulsa Geological Society, Tulsa, Okla., Dec.
1, 1952
Sigma Gamma Epsilon, Norman, Okla., Dec. 3, 1952.
Oklahoma Academy of Science, Stillwater,
Okla., Dec. 5, 1952
Oklahoma City Geological Society, Oklahoma
City, Okla. Jan. 8, 1953
Ardmore Geological Society, Ardmore, Okla.,
Jan. 15, 1953
North Texas Geological Society, Wichita Falls,
Texas, Feb. 5, 1953
Branner Geology Club, Fayetteville, Ark.,
Feb. 10, 1953
Shawnee Geological Society, Shawnee, Okla.,
Mar. 12, 1953

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Geological Survey and Acting Director of
the Oklahoma Geological Survey.

2/ Geologist, U. S. Geological Survey.

indebted and we owe high tribute. I always like to think of their fine qualities and their notable contribution to the progress of their science. Their toil, travel, and teamwork have been performed with zeal, industry and skill. They rose early in the morning; they went to the field at the break of day; they heard the bird chorus of the springtime; they added some of the artistry to Oklahoma's geologic map in the presence of the beautiful sunrise in the eastern sky. That's why Oklahoma's geologic map portrays a colorful sunrise! The grand-scale radial arrangement of the color bands of the sunrise on the map centers in the Arbuckle Mountains of southern Oklahoma, and the color bands extend from these mountains to and beyond the eastern, northern, and western boundaries of the State.

The preparation of the geologic map has been a cooperative endeavor that was proposed by the Oklahoma Geological Survey and the Tulsa, Oklahoma City, and Shawnee Geological Societies. The map project has been conducted cooperatively by the United States and Oklahoma Geological Surveys, and from the outset they have received cordial, generous collaboration from all official agencies, institutions, and persons who are concerned with Oklahoma geology. Those who have thus collaborated include the oil companies and independent geologists of Oklahoma, the School of Geology of the University of Oklahoma, the Department of Geology and Geography of the University of Tulsa, the Department of Agronomy of Oklahoma A. and M. College, the U. S. Soil Conservation Service, and the U. S. Bureau of Reclamation.

On my arrival in Norman, Oklahoma, in September 1947, to begin work on the map, Robert H. Dott, Director of the Oklahoma Geological Survey, placed me in charge of the project. At that time Mr. Dott, Malcolm C. Oakes, and I formulated, as far as possible, plans and procedures for the preparation and publication of the State Geologic map. Also we

recognized and suggested the need for a new base map of Oklahoma to serve as a base map for the geologic map. From 1947 through 1951, available maps were acquired from all possible sources, and much additional necessary field work was carried out by numerous geologists. By 1952 the acquisition of maps was essentially complete; then followed the assembly and integration of these maps to make the manuscript copy of the new State geologic map. When the spring of 1952 came, a few promised maps were still outstanding, and each of their authors received from me on April 1 a note containing in part the statement, "Just as showers in April bring flowers in May, so will the receipt of your maps in April bring to completion in May the beautiful sunrise portrayed by the geologic map of your State." Those letters, and also other solicitations, brought forth the remaining maps. The score for the contribution of maps arranged for and promised by companies and geologists is thus, I am happy to state, 100 percent. This is the measure of the generosity and cooperation displayed by all who helped to make the new map.

So many new geologic maps covering all parts of the State have been assembled that Oklahoma's new geologic map is really new. Some 80 percent of the State is covered by mapping that has been done after the publication of the first geologic map of the State in 1926; only 20 percent of the new map repeats parts of the 1926 edition.

The manuscript geologic map now awaits--among other things--glass-plate engraving, color-plate preparation, and printing at a scale of 1/500,000, or 8 miles to the inch. It will be published cooperatively by the U. S. Geological Survey and the Oklahoma Geological Survey, and copies will be sold by both surveys. Naturally I hope the map can be published by December, 1954, when I reach the age of 70--my retirement age from the U. S. Government service.

The geologic map will be printed on the recently published Oklahoma base map (scale 1/500,000) of the U. S. Geological Survey. This new base map was prepared in pursuance of a cooperative arrangement between the Oklahoma Planning and Resources Board and the U. S. Geological Survey. The Oklahoma Geological Survey is one of several State agencies to share the State's part of the cost of the base map.

Progress on the map project and its completion were made possible by the counsel and leadership of Mr. Dott, Director of the Oklahoma Geological Survey until July 1, 1952, and Dr. William E. Ham, Acting Director, after that date. They assigned State Survey geologists to do necessary field mapping in many areas; they employed draftsmen for work on the map; they provided office space, photographic service, clerical assistance, and many other types of services. Fortunately the available office space for the map project was increased in size from time to time commensurate with the growing need for working quarters and for filing and using the ever-increasing number of maps. My present accommodations, rooms 158 and 160 of Gould Hall on the University of Oklahoma campus, are spacious, comfortable, and convenient; the two-room suite was named by me "Possum Kingdom" from the two opossum-skin-like profiles in the grain of the wooden door of room 160.

Many oil companies and some independent geologists have done geologic mapping in the past 30 years in nearly all of the western half of the State and in much of the east-central and southeastern parts of the State. These companies and geologists were most cordial and helpful, and they contributed many hundreds of maps which, when combined, cover almost completely these parts of the State—a combined area equal to half of the State.

Dr. V. E. Monnett, Director of the School of

Geology of the University of Oklahoma, and Dr. A. N. Murray, Head of the Department of Geology and Geography of the University of Tulsa, assigned faculty supervisors and graduate students to study and map areas for the new State map and to obtain at the same time material for theses as partial requirements for M. S. and Ph. D. degrees.

The U. S. Soil Conservation Service furnished file copies of manuscript maps of more than half the counties in Oklahoma showing major soil areas. These were of great assistance in my mapping of alluvium, terrace deposits, and dune sand in western Oklahoma, and some of the maps were used with little or no modification for showing these deposits on the State map. The contribution of these maps was authorized by Harry Chambers, State Director, of the Soil Conservation Service, Oklahoma City. A helpful geologic interpretation of the major soil areas of the maps was provided by Louis E. Derr, State Soil Scientist, of that Service, at Stillwater. Others of that organization to contribute assistance including maps are Edward J. Anderson of Anadarko, Milton Gault of Vinita, and R. M. Marshall of Fort Worth, Tex.

Dr. Horace J. Harper, Professor of Soils, of the Agronomy Department, Oklahoma A. and M. College, and more recently Agricultural Director of the Samuel Roberts Noble Foundation, Ardmore, gave invaluable counsel and information on the character, origin, and distribution of the soils that have been derived from the surficial geologic deposits of Pliocene, Pleistocene, and Recent age.

M. G. Barclay, Area Planning Engineer of the U. S. Bureau of Reclamation, Oklahoma City, contributed more than 80 maps showing an inventory of lands along the Arkansas River and its tributaries. The boundaries of the alluvium shown on some of these maps were incorporated in the new State geologic map.

Field mapping by geologists of the U. S. Geological Survey in different parts of the State during the past five years has been made available. Nearly all this mapping was done in cooperation with the Oklahoma Geological Survey as a part of investigations of ground water under the supervision of Dr. Stuart L. Schoff.

The number of geologists who have thus done field, office, and laboratory studies in the past 5 years and who have contributed toward the preparation of the new State map is very large - 82 geologists who are listed below. An estimate of the aggregate time they devoted to these studies in the past 5 years is 50 man-years. This figure would be increased many fold if an estimate could be made of the total time spent in field mapping in the past 30 years by company and independent geologists and by geologists of the United States and Oklahoma Geological Surveys.

GEOLOGISTS WHO WORKED ON OKLAHOMA'S
NEW GEOLOGIC MAP, 1947-52.

University of Tulsa

Candidates for M. S. degrees under the supervision of Dr. A. N. Murray and Dr. H. E. Enlows:

Gore, Clayton E., Jr.
Montgomery, James H.
Smith, Riley
Wright, Leo M.

University of Oklahoma

Candidates for M. S. degrees under the supervision of Dr. Kaspar Arbenz, Dr. Carl C. Branson, Dr. E. A. Frederickson, Dr. George G. Huffman, and Dr. C. A. Merritt of the faculty and Malcolm C. Oakes, Geologist, Oklahoma Geological Survey:

Barker, James Charles	Lauderback, Ralph Lewis
Beckwith, Clyde G., Jr.	Lontos, Jimmy Tom
Bollman, James F.	Lohman, Clarence, Jr.
Brauer, Clemens P.	McBryde, Thomas J.
Branson, Robert B.	McKinley, Myron E.
Chandler, Philip Prescott	McKinley, Glenn E.
Chase, Gerald W.	May, Milton E.
Christian, Harry E.	Mills, Earl Lee
Claxton, Charles D.	Mondy, Holland Hugh
Chrisman, Louie P.	Polk, Thomas Robb
Crumpley, Bobby Kelly	Powell, Clarence C.
DeGraffenreid, Norman Bruce	Scull, Barton James
Doberovich, George	Schoonover, Floyd Eldon
Douglas, H. Marvin	Siemens, Allen G.
Dunham, Robert Jacob	Simpson, I. D., Jr.
Gibbs, Harry Daniel	Skolnick, Herbert
Gillert, Martin Peter	Smith, Edward T.
Heilborn, George	Snodgrass, Elvis D.
Hobbs, Mark H.	Stafford, Lester E.
Hull, Paul W.	Steele, Paul
Hurt, Thomas Wayne	Stewart, Lyle W.
Kozak, Frank Daniel	Thomas, L. E.
Kuhlman, Milton H.	Tillman, Jack L.

Candidates for Ph. D. degrees and their thesis subjects

University of Oklahoma

Ries, Edward Richard, Geology of Okfuskee County.

Tanner, William F., Geology of Seminole County.

Weaver, O. D. Jr., Geology of Hughes County.

Yale University

Ham, William E., Arbuckle and Tishomingo anticlines, Arbuckle Mountains.

University of Michigan

Myers, Arthur J., Pliocene and Pleistocene Geology of Harper, Ellis, and Roger Mills Counties.

Oklahoma Geological Survey - Geologists

Beach, J. O.	Huffman, George G.
Beckwith, Clyde G., Jr.	McKinley, Myron E.
Branson, Carl C.	Oakes, Malcolm C.
Chase, Gerald W.	Warren, John H.
Dott, Robert H.	Steele, Guy
Ham, William E.	

U. S. Geological Survey - Geologists

Barclay, Joseph E.	Fair, Charles
Burton, L. C.	Miser, Hugh D.
Bush, William	Schoff, Stuart L.
Davis, Leon V.	Trumbull, James V.
Dunham, Robert Jacob	

Paleontologists and others

Arbenz, Kaspar (Univ. of Okla.)
 Bridge, Josiah (U. S. G. S.)
 Cooper, G. Arthur (U. S. Nat. Mus.)
 Decker, Charles E. (Univ. of Okla.)
 Elias, M. K. (Univ. of Neb.)
 Hass, Wilbert H. (U. S. G. S.)
 Hibbard, Claude W. (Univ. of Mich.)
 Leonard, A. Byron (Univ. of Kan.)
 Miller, Arthur K. (State Univ. of Iowa)
 Rynicker, Charles (Gulf Oil Corp.)
 Stovall, J. Willis (Univ. of Okla.)
 Williams, Harold L. (Paleontological Lab.,
 Midland, Tex.)

The mapping program by the geologists just named resulted in the covering of many thousands of square miles. Much of this mapping was done in detail with a high standard of quality. The larger areas that have been mapped outside the areas listed with the names of candidates for Ph. D. degrees are briefly mentioned below:

1. All of northeastern Oklahoma lying north of

the Arkansas River, lying along and east of the Neosho River, and lying south of Wyandotte quadrangle. Mapping by two Univ. of Tulsa graduate students under supervision of Dr. Murray, by 23 Univ. of Okla. graduate students under direction of Dr. Huffman of Univ. of Okla. faculty and of Okla. Geol. Survey, by two Univ. of Okla. graduate students under Mr. Oakes of Okla. Geol. Survey. and by Dr. Branson of Univ. of Okla. faculty and of Okla. Geol. Survey.

2. A belt lying west of the Neosho River and east of the outcrop of the Fort Scott limestone and extending northward from the Arkansas River to the Oklahoma-Kansas line. Mapping by Dr. Branson and by many Univ. of Okla. graduate students under his direction.
3. Outcrop belt of Fort Scott limestone extending north-northeastward from Tulsa County to the Oklahoma-Kansas line. Mapping by John H. Warren of Okla. Geol. Survey.
4. Large areas of Pennsylvanian rocks in McIntosh, Okmulgee, Creek and Osage Counties. Mapping by Mr. Oakes.
5. All of Arbuckle Mountains in southern Oklahoma. Mapping by William E. Ham, Myron E. McKinley, and several other geologists.
6. Southern McCurtain County. Mapping by three Univ. of Okla. graduate students and Charles Fair of U. S. Geol. Survey.
7. Most of the outcrops of crystalline rocks in the Wichita Mountains. Mapping by many Univ. of Okla. graduate students under supervision of Dr. Merritt of Univ. of Okla. faculty, and by Gerald W. Chase of the Okla. Geol. Survey.

8. Much of the geology of Beaver County has been mapped by Stuart L. Schoff of the U. S. Geological Survey.
9. The surficial deposits of Pliocene, Pleistocene, and Recent age of Woods, Woodward, Harmon, Blaine, Dewey, Kay, Grant, and Alfalfa counties and of parts of Garfield, Major, Kingfisher, Canadian, and Custer counties were mapped by me. The Pleistocene and Recent deposits of Comanche, Greer, and Jackson counties and parts of Kiowa and Tillman counties were mapped by Gerald W. Chase and Clyde G. Beckwith, Jr. of the Okla. Geol. Survey.

Many soil survey maps of the U. S. Department of Agriculture and the Oklahoma Agricultural Experiment Station facilitated greatly reconnaissance field mapping of the alluvial, terrace, and other surficial deposits of western Oklahoma. The following county maps thus used are Kay, Grant, Alfalfa, Woods, Woodward, Major, Garfield, Canadian, Greer, Kiowa, and Tillman.

From the recital just given of the institutions, agencies, and geologists who have devoted time, energy, and funds to the new State map in the past five years it is clear that I have been only one of many makers of the new geologic map. I could thus appropriately be labeled, just as are all U. S. coins, with the Latin phrase, "e pluribus unum." It is also clear that the volume of contributed material is large. The number of maps used in the preparation of the new geologic map is 1,841. If these were placed end to end and fastened together they would make a sheet of paper 4,143 feet long.

Many draftsmen have been assigned to the project in Oklahoma from the fall of 1947 to the spring of 1953. They worked for long and short periods

and most of them served on a part-time basis in connection with other duties and college studies. Altogether there were 18 draftsmen, of whom 15 were employees of the Oklahoma Geological Survey and 3 were employees of the U. S. Geological Survey. They were engaged in the numerous processes of reduction coloring, and compilation of maps. This work accomplished in Oklahoma was a big chore totaling 5 man-years. It was faithfully and efficiently done. Robert L. Harris of the Okla. Geol. Survey started work on the project in 1947 while he was a student in aeronautical engineering at the University of Oklahoma. After several months exposure to Oklahoma geology and geologists he changed his studies to geologic engineering in which he received his degree in 1951. He worked on the project for a period of 3-1/2 years in which he gave 2 man-years of service. Others who rendered long periods of responsible service are Don J. Fishburn of the U.S. Geological Survey and Dwight H. Ford of the State Survey. Mr. Fishburn drafted the first manuscript copy of the State Geologic map on a draftex print (1/300,000) of the State's new base map. Mr. Ford assisted me with the tedious, big, and time-consuming chores connected with the preparation of the key map and explanation, the checking and fixing of different copies of the State map, and the hand-coloring of two prints of the State map. Most of the 18 draftsmen on the project were amateurs, and I thus was, in reality, the director of a school of cartography as a part of the map project.

My participation in the map project included the acquisition, compilation, and integration of maps mainly from original sources but partly from published sources. Also I cooperated with others in planning and supervising field investigations. I visited on occasions most of the field parties, and I assisted faculty representatives with the field supervision of some 36 graduate students. The opportunity to participate in these field studies and help the many graduate students was to me a

source of joy and pride. In these field studies the associations were pleasant; the training of the graduate students made of them mature field geologists; and this tremendous amount of combined endeavor spelled progress and completion of the State map.

My duties have not included the writing of papers and treatises on Oklahoma geology. Those responsibilities rest with the Oklahoma geologists who obtained first hand the field data and who have been encouraged by me to contribute their results to geologic literature. I am happy to state that there has been some measure of success in this policy and plan. I am, however, telling in this paper the story of who made the new geologic map, how it was made, and when it was made. My reason for writing the paper is to record the story of this cooperative endeavor. In its administration and prosecution, personal contacts and conferences were employed in arranging cooperation, acquiring maps, and planning and carrying out field programs. The files on these phases of the project in Norman, Okla., Washington, D. C., and elsewhere are nearly empty; they did not grow much.

In 1947 the full magnitude of the new map undertaking was not realized and the opinion then held was that a 2- to 3-year period would be adequate for the assembly of available material from many sources and for the necessary field mapping to fill in holes to assure good quality of mapping for all parts of the State. A longer period, 5-1/2 years, was found necessary. The undertaking thus became the biggest single project of which I have had charge in my professional career of some 45 years. Furthermore, the bringing to completion of my part of the job of making the manuscript map in the 5-1/2 year period required a strict devotion of my full time and energy to the map job. Numerous time-consuming things were declined and were not

done. A few of these are here mentioned: (1) Nearly all national scientific meetings were missed; (2) the offers of many positions and duties were declined; (3) most proposed field trips with other geologists in 1951 and 1952 were declined; (4) all mail, except first class, was held in my Washington office during those two years; (5) only one trip was made each year to the quartz crystal region of western Arkansas to pursue my 45-year hobby of collecting quartz crystals.

An interesting observation is that the acquisition of maps and the supervision of the field-mapping program required much travel--some on foot and much by automobile. Not a single worthwhile map was brought to my office in Norman without prior arrangements during one or more visits. My share of foot travel with field parties was many hundreds of miles. On the other hand, travel by automobile to places in Oklahoma and the surrounding states was far enough in miles to encircle the world seven times. Naturally, Arkansas, my home State and thus a standard of reference in many geologic matters, received visits from me on many occasions. Three of the "round the world" trips were made in a U. S. Government car; the other four were in my personal car.

I am highly honored to have had the opportunity to work with hundreds of other persons in the making of Oklahoma's second colored geologic map which is following by almost 30 years the state's first colored geologic map compiled by me and printed in 1926. My association with these hundreds of persons has provided me with genuine pleasure. Their toil, travel, and teamwork, which have been performed with zeal, industry, and skill, have made possible the preparation of the new geologic map, a herculean undertaking.

To each person I wish I could extend in person

or by letter my thanks and appreciation. There are, however, too many in Oklahoma and in other states for me to do so. Also my notebooks and files of maps do not bear the names of all the geologists, particularly oil company geologists, who did field mapping. Nor do my records contain the names of most oil company executives who granted authority to give maps to me. This paper, as well as my addresses on the geologic map before many local geological societies in Oklahoma in 1952 and 1953, provides in a measure an opportunity to convey my thanks, appreciation, and congratulations to the hundreds of Oklahoma map makers.

You have just heard another chapter in Hugh Miser's serial "Oklahoma's Geologic map." The first chapter was presented in Oklahoma in the winter of 1923-24. Other chapters have followed in the years after that first presentation. The future will witness additional chapters. Then, when I get to be an old man my listeners and days will be filled with tall tales of Oklahoma's wonderful geology, which, when portrayed in color on a map of the State, shows a beautiful sunrise and which thus symbolizes Oklahoma as the land of the sunrise. Also, if I should live to be as old as my great grandfather, George Miser, who reached 105 years, I shall be available for making the third edition of Oklahoma's geologic map, 25 to 30 years hence.

Norman, Okla., April 10, 1953.