DEDICATION

OF

BUEHLER BUILDING

MISSOURI GEOLOGICAL SURVEY AND WATER RESOURCES

INFORMATION CIRCULAR NO. 1

1946

Department of Business and Administration

Division of the

MISSOURI GEOLOGICAL SURVEY AND WATER RESOURCES

EDWARD L. CLARK, *Director and State Geologist*

ROLLA, MISSOURI

MID-STATE PRINTING CO., JEFFERSON CITY, MO.

Buehler Building, home of the Missouri Geological Survey and Water Resources.

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LETTER OF TRANSMITTAL

October 7, 1946

Honorable Phil M. Donnelly
Governor of Missouri
Jefferson City, Missouri

Dear Governor Donnelly:

I have the honor and pleasure to transmit herewith Information Circular No. 1, Missouri Geological Survey and Water Resources. This report opens a new series of publications which will be designated as information circulars. The purpose of this new series will be to make available general information pertinent to the mineral and water resources of the State.

Information Circular No. 1 presents the addresses and opening remarks on the occasion of the dedication of the Buehler Building.

Respectfully submitted,

Edward L. Clark
State Geologist

PROGRAM

DEDICATION OF THE BUEHLER BUILDING

2:00 P. M. Friday, September 27, 1946

Rolla, Missouri

Master of Ceremonies: Howard I. Young, president of the American Zinc, Lead and Smelting Company and president of the American Mining Congress.

Introduction of State Officials.

The Relation of Industry to the State Geological Survey, by George C. Smith, president of the St. Louis Chamber of Commerce.

Today's Requirements for a State Geological Survey, by Morris M. Leighton, chief of the State Geological Survey Division, Department of Registration and Education, State of Illinois, Urbana, Illinois.

Dedication of the Buehler Building, by the Honorable Phil M. Donnelly, Governor of the State of Missouri.

Presentation of the Flag of Missouri.

Benediction.

OPENING REMARKS

by

Howard I. Young*

It is an honor to have the privilege of participating in the dedication of this edifice which has been made available for the use of the Missouri Geological Survey.

For many years our State has maintained a substantial production of minerals and metals. The value of these reached a peak of $81,000,000 in 1917. Missouri leads all of the states in the production of lead and has maintained this position for many years. In World War II the value of minerals in the peak year was approximately $75,000,000.

Missouri has been fortunate in having outstanding geologists and engineers directing the administration of the Geological Survey and the mapping and study of its mineral resources.

Dr. Henry A. Buehler spent 43 years in our State Geological Survey. For 36 of those years he was chief of the organization. Those of us who had the good fortune of knowing "Chief" Buehler and of working with him from time to time during the period of his administration in this office realized the fine qualities that he possessed as an engineer, geologist, and humanitarian. He was unselfish in his devotion to the development of the natural resources of the State of Missouri and in his desire to assist young men who had the good fortune to attend the Missouri School of Mines. Not only did he spend a great deal of time in the development of natural resources, but he also devoted much time for many years to the development of our fine highway system.

It is a fitting tribute, therefore, that in making available to our State this new edifice for the Missouri Geological Survey, it should bear the name of the one man who has done so much in the development of the mineral resources of our State.

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*President of the American Zinc, Lead and Smelting Company and president of the American Mining Congress.

THE RELATION OF INDUSTRY TO THE STATE GEOLOGICAL SURVEY

by

George C. Smith*

I am honored by your invitation to appear on this program dedicating the Buehler Building, for I am not a geologist nor a mining engineer. I'm not even a politician. But I was a friend of Chief Buehler—one of the thousands of friends he had. And I am a friend of the Geological Survey.

I am happy that Chief Buehler's services to the State are to be memorialized by naming this building for him. He served Missouri well for nearly half a century—as state geologist for 36 years, during which time he gained national recognition for his work, becoming president of the Association of American State Geologists and later president of the American Institute of Mining and Metallurgical Engineers. He was a true scientist, a humanitarian, a public servant of the highest order. He merited every honor we can bestow.

I came to know the Chief about 20 years ago when I moved to St. Louis to engage in industrial development work. I needed the services of the Geological Survey in my work and still do. Long before I met the Chief, I had come to realize that a knowledge of sources of mineral raw material was vital information in locating industries.

In fact, my first industrial survey taught me that. Over 30 years ago I was asked to conduct a survey to determine where in the United States automobile tires could be produced and distributed at lowest cost. Tires, as made before the recent war, were not produced solely from rubber and cotton cords. They contained a substantial amount of carbon black, litharge, sulphur, kaolin, and feldspar; and in those early days they were sold mounted on steel rims.

Our newest tires even contain more mineral materials; for, instead of natural rubber, we now use synthetic rubber produced principally from butadienes and styrenes, both products of the petroleum industry.

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*President, St. Louis Chamber of Commerce.

In making my first plant location study it was necessary also for me to determine comparitive building costs, and that included such items as cement, sand, gravel, face and common brick, floor tile, gypsum roof tile, lime, glass and paint, and building stone.

The making of tires requires a vast amount of water for steam and process uses. Composition and temperatures are important, as well as quantity. This one plant needed an amount of water approximately equivalent to the consumption of a city the size of Dayton, three times the size of Springfield or St. Joseph.

Enormous quantities of fuel were to be required.

Finally the selection of a specific 80 acre site, topographically correct for drainage and flood protection, with suitable bedrock and subsoil was determined partially by the use of topographical maps.

I needed and used the services of six state geologists from six different states to complete that one plant location study.

Shortly after it was finished, I undertook to find a location for a huge chemical plant for our War Department. That industry, to manufacture synthetic acetate, required as much water as the city of Philadelphia. It was to be a large user of coal and sulphur and needed a site of several hundred acres on a river of good water and free from flood troubles. Again geological data were of utmost importance.

It isn't any wonder then that when I moved to Missouri, I early sought out Chief Buehler and his organization; for I knew that, in the selection of a location for almost any kind of industry, some information of a geological character was required. It may be only information relating to fuel and water or site topography. It may be power resources or building materials. Or more importantly, it may be highly technical information about sources and quality of suitable mineral raw materials.

Missouri has had a long and interesting history of mineral development. Lead has been mined in Missouri since 1720 and has been produced in no less than 28 counties in the State. Mining was the first vocation in Missouri. Mine de La Motte was discovered by prospectors from Fort Chartres in 1719, and the mine became famous for its lead long before Laclede and Chouteau founded the trading post of St. Louis. Lead was the most useful of all metals in the west at that time, for every settler had a gun and needed lead for bullets—either for hunting, for fur collecting, or for guarding against the Indians.

Today Missouri produces two-thirds of the nation's annual supply of virgin lead; and many of its earliest mines are still in production, due in part to the research work of the state geologist who, through the study of subsurface geology by the use of modern scientific equipment, has been able to extend the economical mining areas of the original mines.

The hydrated basic carbonate of lead—white lead—is a valuable paint pigment. Its availability is responsible for the development of the large paint and pigment industry of Missouri. The lead oxides—litharge and red lead—are used in very large amounts in the making of automobile and other storage batteries. Red lead is also an important paint pigment and the standard protective coating for iron and steel. Lead is used in pottery glazes, in petroleum refining, especially to give gasoline its anti-knock qualities, and to increase its octane values. I have already said that litharge was used in making rubber. It is also used extensively in the making of insecticides and of certain colors.

Metallic lead is used in the form of sheets, pipe and plumbers' supplies in the construction industry—even in G. I. houses—in the making of chemical apparatus, in water mains, and alloyed with tin as solder. Alloyed with antimony, tin, and copper, it produces anti-friction bearings. It is used in electric cable coverings, ammunition, caulking compounds, foils, and linings for X-ray apparatus. It is the basic metal of the printing industry. In short, lead is practically indispensable in our present modern industrial and social structure as it has been in the development of civilization itself. In fact, without lead we could not produce or operate our automobiles as now constructed. We could not operate our railroads; there would be no communication system as we now know it, for there would be no lead to insulate the wires or type for the use of our vast printing industry.

We are fortunate that Missouri has the largest lead-producing district in the world.

I have spoken thus of lead because of our pre-eminent position in its production and because of its long contribution to our industrial structure. With almost equal interest we might talk about our iron ores, the early history of our charcoal furnaces, or Andrew Carnegie's start in the steel industry here, and more particularly about recent developments and new explorations which have revitalized its production in Missouri. Again the state geologist has played his part, for it was largely the result of magnetometric surveys made by his department that resulted in

the discovery of large bodies of ore and the reopening of Iron Mountain.

In these discoveries I find distinct pleasure, for I donated to the Survey its first magnetometer and a truck, paid for the crews to operate it for some three seasons. Some of the members of the present staff began their work on the Survey as a result of funds made available to it by the St. Louis Industrial Club of which I was managing director. We were interested in iron ores so we could revitalize our iron and steel industry at St. Louis. Chief Buehler was interested too, so much so, in fact, that with that instrument, he completed the first state-wide magnetometric survey ever made in this country.

Or we might talk of Missouri's coal mining industry, and of the potential uses of hydrocarbons in the whole new field of synthetic chemicals. Or we might describe the zinc industry which began in Missouri at Potosi in 1867, and of the zinc works at Carondelet founded in 1869. In some years Missouri produces about one-third of the nation's total production.

Or we might talk about barites—tiff to most of you—and the social problems connected with its production or its place in the pigment industry as a substitute for titanium, zinc, and white lead, or of its use for internal X-ray examinations; for Missouri ranks first in the production of barite. Barium sulphate is also used as a filler in rubber and in paper, too. Barium carbonate is used in case hardening of steel and as a source for many barium chemicals.

We should perhaps talk about our clays and how we have developed the largest fire brick plant in the world at Mexico, Missouri because we have such an excellent variety of fire clays. And of our diaspore and burley clays—the only known deposits developed commercially in North America. Or of the possible development of a great aluminium industry to be based on the high alumina content of our cheltenham and diaspore clays. Outside of our refractory fire bricks and shapes, refractory cements, building brick, clay tile and pipe, plants for the production of which are widely scattered over the State, we haven't yet done much with our clays industrially; for they can be used to produce a wide variety of ceramics, beauty creams, and other toilet preparations, drilling muds, facial muds, bath muds, and paving materials.

As much as I would like to, time doesn't permit me to talk further about our minerals and their industrial uses; of our pro-

duction of marbles—some of the most beautiful found anywhere in the world; of limestone, granite, and other building stone; of our glass sands and the great industries producing glass products; of chats so much in demand for railroad ballast; of copper; silver; tripoli; of gas and oil; and of the other minerals which annually bring our aggregate mineral production to a value of nearly one hundred million dollars, the production and conversion of which employ about one-half of all those employed industrially in the State.

This is an era of scientific research. Today our subsoil products are receiving scientific treatment. The organic chemist takes the hydrocarbons of our minerals and by various methods turns them into alcohol, solvents, plastics, tars, dyes, drugs, sugar, and foodstuffs. The inorganic chemist turns stones into metals and wool; sea water into soda ash, bromine, iodine, and even gold; sand into glass and the metal of silicon; gypsum into boards; potash, phosphates, and air into fertilizer; sulphur into pipe, insecticides, fungicides, and feed; and on and on indefinitely. The daily papers and the scientific journals, trying to keep abreast of these developments, read like romances.

Our new industries are the direct result of research to which our leading industries are devoting so much attention.

The Missouri Geological Survey is essentially a research organization. In dedicating this building today, it is only proper to suggest that it should become headquarters in Missouri not only for research into our subsoil structures, but carried forward into research into the myriad industrial uses to which our subsoil products can be put. The Survey has long needed better housing. The State needs, and needs vitally the services of the staff in developing more products and more uses for those products. That was the ideal and the aim and the hope of Chief Buehler. May we carry on in this new building for a better and a more prosperous Missouri. The Chief would want us to do that.

TODAY'S REQUIREMENTS FOR A STATE GEOLOGICAL SURVEY

by

MORRIS M. LEIGHTON*

It is a pleasure to come here today on the occasion of the dedication of your new building and to bring to you, on behalf of the Illinois State Geological Survey, heartfelt congratulations.

I am also glad for this opportunity to pay tribute with you to the memory of the late Dr. Henry A. Buehler. The honor which you are paying to his life and work by naming this structure the Buehler Building reflects the character of the people of Missouri and strikes a harmonious note among the thousands of his friends throughout the length and breadth of this land and across the seas.

As a fellow state geologist he was a colleague of mine for twenty-one years. Our two states lying side by side—Missouri on the one hand and Illinois on the other—have a great deal in common. Many of our geological problems are similar, our vested interests are measurably identical, and our people hold to the same ideals and objectives. The Father of Waters is not a barrier but a symbol of peaceful union. Dr. Buehler and I were close conferees; we were occasionally guests, one of the other; we developed ties which death cannot sever. And so it is with unusual personal feeling that I say it gives me great pleasure to be with you today in the dedication of this building which is to stand in memory of him and of his work.

I shall never forget the light that shown in the eyes of his protegé and chosen successor, Dr. Edward L. Clark, last spring when he related to me the beneficient action of the Missouri State Legislature and Governor Phil M. Donnelly in acquiring this building for the geological Survey. It must be indeed a great boon to him and to his loyal staff in their research enterprises for the State of Missouri. Dr. Clark's foresight and planning in this matter and his good judgment in winning the help of Representative B. H. Rucker and Senator E. W. Allison are marks of that same leadership which distinguished the late Dr. Buehler.

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*Chief of the State Geological Survey Division, Department of Registration and Education, State of Illinois, Urbana, Illinois.

In this day we like to see a man embrace his new work and responsibilities as Dr. Clark has. It reminds me of the farmer who, upon being asked when he went to work in the morning, replied, "Son, I don't go to work. I'm surrounded with it when I get up."

I have been requested to speak today on the subject, "Today's Requirements for a State Geological Survey." I infer from this that the citizens of Missouri place a high value upon their vast natural resources, that they recognize that everything starts from resources, and that, therefore, thoroughgoing knowledge of them is of prime importance. I wish to thank you for the compliment which you have paid me in inviting me to discuss this subject, but I must confess some misgivings of the relevancy and value of what I may say to your situation.

The Importance of State Resource Surveys

First I would like to emphasize the significance of our natural resources. Having inherited them we are inclined to take for granted and not give them a proper place in our thinking. Nations have risen and then fallen because the people did not look to their resources. Perhaps, however, they can be acquitted on the grounds that they were not sufficiently educated to investigate and utilize them, but this cannot be said of us.

Our civilization and our society depends upon our natural resources. The entire volume of the world's business always has flowed from the resources of the land, of the rocks beneath the land, of the water, and of the air. These resources constitute the starting point for all profitable employment—for labor, for skilful artisans, and for management—in the development, recovery, and extraction of their products; in their preparation and refining for use; in their conversion into consumers' goods; in their use in construction and fabrication; in their transportation and distribution; in providing for various forms of communication; in their marketing by wholesalers, jobbers, and retailers; in giving rise to financial institutions for barter and exchange; in providing means for the various trades and professions and for education, art, and religion; and in giving direction to the development of government. In other words, natural resources form the basis upon which and out of which our society is erected. They are the original source from which man's necessities and wants are supplied, whether these be in the form of

food, shelter, transportation, surgical services, or educational opportunities. Man creates nothing; he merely transforms the form, content, and nature of Nature's resources which he finds in his part of the world or can obtain from other areas.

The development of these valuable resources is dependent upon our knowledge of them. The more abundant they are and the more we know about them the greater our use of them and the higher our standards of living. Natural resource surveys, such as your Missouri Geological Survey, are therefore fundamental to the progress of your State. It is evident that you recognize this.

Our nation is young. The development which has taken place in the early part of its history and largely up until now has concerned those things most easily obtained and developed. Technology, however, has continued to advance; and now use for old materials and needs for new substances have constantly come to the fore. The draft upon some resources has depleted them to such a degree that it threatens our future. We must have natural resources surveys adequately equipped to cope with our modern conditions and problems and capable of extending continuously our fund of knowledge.

What Would Be A Model Natural Resource Survey?

There are reasons why a model natural resource survey for one state would not be a model for another. No two states have the same natural resources or the same opportunities for development or the same traditions and institutions or the same industrial and social needs. Therefore, it is not to be expected that the natural resource surveys of any two states can be alike in pattern, program, organization, or facilities.

But there are certain basic principles affecting the functions of most, if not all, state natural resource surveys which if heeded will go far in giving successful direction to their activities and accomplishments. I shall now refer particularly to that part of the natural resource field that is covered by geological surveys.

What Is It That a Model Geological Survey Should Have?

I offer certain suggestions in trying to answer this question, fully realizing that there may be different points of view, but I do so in the spirit of endeavoring to make a contribution to the solution of this very important question.

(1) The survey should have a proper motivating spirit of action.

Someone has said, "Tell me what your resources are and I shall tell you what your society is." The more I ponder this statement, the more I feel its force.

The resources of every region make an impress upon its people—the geographic location, the topography, the climate, the soil, the minerals, the water, and the human culture. I immediately reflect upon those regions which have much and those which have little. I picture their wealth, or their poverty; their attraction for men of ability on the one hand, or residual population who are content to live on small margins on the other hand; their progressive type of civilization or the lack of such development, either keeping the people primitive or sending the nation down the road to decay. It seems indeed true that the sum total of the resources of a region determine the state of society existing there. Of course it cannot be assumed that the mere existence of resources will insure their development. Our country was inhabited by the Indians for thousands of years without their having developed its resources, and there are some other countries today whose people are either bound by tradition or by a low level of intelligence and traits.

Instead, then, of saying, "Tell me what your resources are and I shall tell you what your society is," we might better express this thought, "Tell me what can be *done* with your resources and I shall tell you what your society can become." If there is need to suggest a motive for state geological surveys, this is one. The kind of a society that you and I can hope for for Missouri and Illinois and the rest of the nation will depend very much upon what can be *done* with their resources.

(2) A model survey must have a program of research aimed at both basic and applied knowledge. By basic knowledge I refer to knowledge that gives new light on the nature of materials and processes or means of transforming those materials into something useful. By applied knowledge I mean the engineering application of basic knowledge. Such a program of basic research and applied research must be shaped and reshaped against a background of continuously improved information concerning the economic possibilities of the geological resources of the state and the needs of the engineering profession.

A geological survey, however, is something more than an agency to solve geological problems. For example, it may be

necessary to sponsor topographic mapping to reveal the resources and conditions of topography, drainage, and human culture, and also to conduct research on problems of improved or new mineral products, improved recovery methods, or geophysical exploration. Citizens of the state think of a geological survey as the place where they can obtain all kinds of information regarding earth products and conditions. Their requests help to determine the duties and functions of a state geological survey as do also the kinds of data needed by mining engineers, civil engineers, metallurgists, chemists, ceramists, water supply and sanitary engineers, quarry operators, construction contractors, manufacturers, processors, purchasing agents, industrial commissioners of railroads, teachers, state and federal officials, and others. The research program must provide detailed data because general information no longer suffices. What a rich future the Missouri Geological Survey has before it, in its service to the State!

(3) A modern geological survey should have a staff advanced and experienced in the basic sciences of geology, physics, and chemistry, and in engineering and mineral economics. The interests of geological research crosses all of these fields of knowledge, and in dealing with Nature scientists can recognize no boundaries between them but rather their special virtues and applications. Such a group of scientists must be closely knit in organization under one administrative head, and the administrative head needs to employ the artistry of a good horseman who can drive horses either in parallel conbinations or in tandem. When the survey's program of research embraces work in the field of other existing and interested organizations, these organizations owe it to the public cause and to sound economy to hitch themselves together to work out those research and experimental projects.

(4) The survey should have a method of appointment for the director and staff, under due course of law, that will provide reasonable guarantee of permanent tenure as long as they are productive, cooperative, and carry out proper survey policies. Such specialists should receive compensations that encourage continuity of tenure. The service a state can receive from capable men of long experience extends far beyond the bulletins and maps that they produce or the field notes that they contribute to the technical files.

(5) The survey should have laboratories equipped with such special apparatus as modern science requires. A modern

geological survey is one that puts modern science to work on the resources of the state. There is nothing more practical in the end than a comprehensive knowledge of our resources, and this requires the right equipment as well as personnel.

(6) The survey should have an adequate clerical staff for the purpose of providing prompt replies to inquiries from citizens and all others who are interested in the industrial development of the state.

(7) An efficient filing system for all scientific data, maps, and specimens is of the greatest importance. Readiness to furnish accurate and specific information in the survey's possession is a delightful service to render to busy citizens who call for information or who are desirous of a prompt reply by wire or letter.

(8) The survey should have the means for prompt publication and distribution of the results of its investigations. Along with this it should also have the funds for an educational extension program among the schools of the state, furnishing them with study collections of minerals and rocks; occasional field conferences for high school science teachers to give them local color for their class work; and illustrated lectures to high school assemblies. By these means a better educated citizenry, conscious of the vast resources of the state, will be developed as the years roll by.

Prospects for the Future

No two decades are similar. Industrial and social change is inevitable. New scientific findings result in industrial expansion, and industrial expansion requires more facts regarding resources.

I am confident that geological surveys, both state and national, will increase in strength. They serve a great purpose in sound industrial development by their research, by their archives of growing valuable records, and by their dissemination of information.

In Missouri I am glad to note that your leaders in government and in the body politic are conscious of the State's dependence on its resources. This is well evidenced by the fact that they are setting aside this building and its research facilities and will extend still further this equipment as needed for more intensive work on the geological resources of the State.

It has been my observation over a period of nearly thirty years that the greatest benefits arising out of a geological survey's

activities are not those pertaining to startling discoveries but the everyday dissemination of facts that aid the citizens of the state in reaching better judgments concerning their business ventures than would otherwise be possible. One does not hear of these things, but they are of the greatest importance in the steady march of progress.

Young men and women in geology who are wondering about the opportunities in their chosen career need have no concern as to that matter. I suggest that their concern should be with reference to the breadth of their training in the basic sciences so that they will attain the greatest intellectual power of inquiry, analysis, and integration. I wish to repeat for their benefit that there is nothing more essential than our natural resources. What career can promise more fruitful service, what profession can invite greater devotion than that which makes scientific inquiry into the hidden resources of the state.

In concluding, I feel apologetic for presuming to say things which you are already mindful of, but if it has arisen out of my enthusiasm for what the Missouri Geological Survey has already done in the past and for what I believe it is destined to do in the future, I am sure that you will pardon my transgression and accept the good wishes of your neighboring state.

ADDRESS

by

GOVERNOR PHIL M. DONNELLY*

There are times in the history of a great state when it seems appropriate and opportune to pause in our busy activities to contemplate the past and to take stock of the present, as an inspiration and a guide to still greater days to come. We have reached such a time today.

As we view this splendid building, which we are about to dedicate to a most important work, of great value to our State, we think of the days gone by and of the progress and march of events that have led up to this occasion.

As we do this, we cannot help but feel that here at this hour the past meets the present in a spirit of achievement and victory; and it is as though this edifice stands as a monument to those who have labored so faithfully and so well for the welfare and advancement of Missouri and of our people.

This is a wholesome and a natural reaction to the acquisition of this building, for the purposes to which it will be dedicated today. A wartime structure, it was used by the Federal Government for a most worthy purpose, a USO club. The building was acquired by the State of Missouri and remodeled for its present and future use. It is now the new home of the Missouri Geological Survey and Water Resources. I am sure we can all hope and expect that from its new home the Geological Survey of our great State will go forward to new accomplishments as it builds upon the strong foundation of the glorious days of the past.

That past to which we proudly turn this afternoon has been a memorable one. The history of the Geological Survey in Missouri goes back to the early days of the State itself. Let us sketch briefly that history. In an address to the Tenth General Assembly of Missouri in 1838, Governor Lilburn W. Boggs recommended that an appropriation be made for a geological survey which would become a part of the program of the Internal Improvement Board. This appropriation was denied, but Governor Boggs succeeded in having the State Board of Improvement initiate a survey of the Meramec, Salt, North Grande, and Osage River basins.

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*Governor of the State of Missouri.

Governor Boggs' appeal for a geological survey aroused sufficient interest for a convention to be called in Springfield in 1846. This convention framed a memorial which was presented by Governor John C. Edwards to the General Assembly together with recommendations for the organization of a geological survey.

Two years later the Historical and Philisophical Society of Missouri urged in a memorial to Congress that inasmuch as two-thirds of the territory which is now Missouri was still under federal control, the national government should make a geological survey of the State. Governor Austin A. King in a message to the Sixteenth General Assembly in 1850 again urged its organization. While the efforts of Governors Boggs, Edwards, and King appeared to be fruitless, they had succeeded in the education of the people to an appreciation of the need of such work. Numerous papers were published advocating a geological survey. This agitation resulted in the passing of an Act on February 24, 1853, to provide for a geological and mineralogical survey of the State of Missouri.

It is interesting to note that in certain provisions of the Act the Governor was authorized and required "to appoint a state geologist who shall be a person of competant, scientific, and practical knowledge of the sciences of geology and mineralogy." The Act further provided that "the said state geologist and his principal assistants shall commence and carry on with as much expedition and dispatch as may be consistent with minuteness and accuracy a thorough geological and mineralogical survey of the state."

The state geologist and his principal assistants before entering upon the discharge of their duties were required to take an oath before some judge or justice of the peace to faithfully perform all of the services required and to abstain from all pecuniary speculations for themselves or others in the objects of their survey during its progress. In the long history of our State Geological Survey there is not an instance where it has been necessary to release a geologist because of the violation of this provision.

The first state geologist appointed was Professor G. C. Swallow, who associated himself with such outstanding men as Professor A. Litton, Dr. B. F. Shumard, F. B. Meek, G. C. Broadhead, and Dr. J. G. Norwood. These men were all to become outstanding and were to receive international recognition for their work.

The first Geological Survey, which was under the guidance of Professor Swallow, was discontinued in 1861 as a result of the conflict between the States.

In January 1868, Governor J. W. McClurg, in a message, devoted a great deal of time to a consideration of the State's resources and the need for publicizing them. The continued neglect of these interests had at last aroused the public attention; and on March 24, 1870, an Act was passed creating a second Geological Survey. This Act contained the provisions of the first Act but differed in some particulars, the most prominent of which was placing the geological and metallurgical bureau under the control of a board of managers. This Survey was continued until 1876 when it was moved to Rolla and discontinued.

Between the years of 1876 and 1889 nothing further was done by the State in the field of geological surveys. On May 18, 1889, an Act was passed providing for a Bureau of Geology and Mines to complete a survey of the State of Missouri. This has continued uninterrupted to the present day. This briefly is the story of the Geological Survey in the State of Missouri to the present time.

This building which we proudly dedicate today has been named the Buehler Building. It is so named in memory of one of our greatest geologists, Dr. Henry Andrew Buehler, whose life and career were so intimately associated with the advancement of his beloved State as he labored in the great field of geological research, planning, and investigation. It has been said of him that "every mineral industry in the State of Missouri felt the wisdom and influence of Buehler. His advice and counsel were in constant demand. Requests for information about mineral resources were given his personal attention. No task was too great if it involved the greater utilization of the mineral wealth of his State. The fruit of his life-long service and industry is testified by the fact that Missouri's mineral production in 1901 was less than $15,000,000 whereas in 1943 it approximated $75,000,000."

Dr. Buehler began his geological work with the State of Missouri in 1901. He was appointed state geologist in 1908, and continued in this capacity until the time of his death on March 14, 1944. Our present state geologist, Dr. Edward L. Clark, has said of him: "The wisdom of his counsel, the devotion to his profession, and the soundness of his philosophy of life were inspirational. He was a great teacher and minister although he refused to admit it. Buehler was richly endowed with qualities

that endeared him to all who knew him. His colorful and strong personality, straight thinking, utter frankness, genial friendliness, rough humor, code of ethics, originality, initiativeness, and untiring devotion to assigned duties made him a man whose character, honesty, and integrity were ever beyond reproach. His work is over, but his presence will continue to be felt."

Between the time of the appointment of Professor Swallow as the first state geologist and today, Missouri has been served by thirteen geologists. During that long period the work of the Geological Survey has progressed. There is not time on the program today to tell you in detail of its activities. Suffice to say that through its investigations, surveys, and study of our mineral deposits and resources; its geologic and topographic mappings; its work and reports of an engineering character; its geophysical studies; its vital services in the matter of our water resources; and its other highly specialized activities in the whole broad field in which it labors, it has contributed enormously to the growth and prosperity of Missouri and the well-being of our citizens.

In addition, the Geological Survey has made a distinct contribution to education and has maintained close connection with the educational process. Our statutes provide that the state geologist "shall be located at the State School of Mines at Rolla." They further provide that the headquarters of the survey be established there. The School of Mines and Metallurgy is maintained as a department of the University of Missouri. It has been in existence for seventy-five years and has made its own great contribution in the field of geological training, experimentation, and study. Thus the Geological Survey, through its association with this splendid school, further promotes the interests of our State by extending its beneficial influence through the halls of learning.

This, then, is the historical and material background from which our Geological Survey, housed in this structure, will go forward into new times. And so I dedicate this building, the Buehler Building, to those new days. And I call upon all our citizens to encourage the Missouri Geological Survey to ever greater goals and achievements. May your efforts and your accomplishments be carried on in the same spirit of progress which has activated your activities throughout the past. And may your work for the good of your State be always symbolized by the Flag of the State of Missouri which we will proudly raise above this

structure. Upon this flag, fashioned in our national colors, appears the coat of arms of the State of Missouri. Upon the coat of arms are two inscriptions which as a people we hold sacred in our hearts. "United we stand, divided we fall." "Salus Populi Suprema Lex Esto"—the welfare of the people shall be the supreme law. May we humbly dedicate this building and raise our State Flag above it in the spirit of these two great mottos and the truths which they convey to us, by which we as citizens live and labor for the good of all and the glory of our people, state, and nation.

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