SOUTH DAKOTA
STATE
GEOLOGICAL and NATURAL HISTORY SURVEY
Freeman Ward, State Geologist

BULLETIN 7

THE

Scope, Methods and Plans

OF THE

State Survey

BY

FREEMAN WARD

UNIVERSITY OF SOUTH DAKOTA
VERMILION
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REGENTS OF EDUCATION

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LETTER OF TRANSMITTAL

Dr. R. L. Slagle,
President of the University of South Dakota,
Sir,—

I have the honor herewith to submit for publication bulletin number seven, entitled "The Scope, Methods and Plans of the State Survey."

Respectfully

Freeman Ward,
State Geologist.

Vermilion, So. Dak.
February, 1916.

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SCOPE, METHODS, and PLANS of the STATE SURVEY

Freeman Ward, State Geologist

INTRODUCTION

Our country's progress depends largely on its natural resources. That is, certain materials of the earth and products of the soil are required by our modern civilization, are a necessary part of it. In fact our very existence is determined by these substances supplied by Nature.

A nation or state that has these material things within its own borders can thrive, grow and dominate industry and commerce. In so far as any substance has to be obtained from without its territory, in just so far is that community a dependent.

What, then, are these natural resources? Has South Dakota any or all of them within its borders? If only a part of them are in the state which ones are they? Have we enough for our own use? Have we an extra supply so that we can trade to some other state in exchange for what we lack? Do other states know what we have? How about the quality, the accessibility, the distribution of these resources of ours? If the State Survey fulfills its duty these questions can be answered definitely.

The present bulletin is prepared to make clear the nature of these resources and the relation existing between them, the State Survey and the State itself; and also to explain the various related activities along industrial and educational as well as along strictly scientific lines that have naturally resulted from the investigation and development of the resources themselves.

This is not the first time that this subject has been presented to the people. An act of the legislature in 1893 established the survey and so placed the matter before them at that time.

Since then the state geologists in their various reports have made explanation of survey policy and have outlined plans of work.

The present state geologist feels justified in presenting the case of the State Survey at this time for several reasons,— (a) A trip through the state during the past summer (1915) has revealed to him a wide spread ignorance in regard to the work of the Survey and even of its very existence. (b) The other explanatory matters offered in the past were included as parts of larger reports and so very likely were often overlooked by the general reader; it is hoped that the present bulletin issued for a definite purpose will reach the mark. (c) Some new subject matter and plans are added.

A complete knowledge of the scope of the work undertaken by the Survey should prevent misunderstanding on the part of the citizens of the state. It should be borne in mind that all operations of the Survey, however apparently obscure they may be at times, are really part of a definite plan which will ultimately work out good to the many.

No phase of the subject matter has been fully treated; complete and thorough discussion has been avoided. Should additional and more detailed information be desired it can be secured by addressing the State Geologist.

Criticism and inquiries of any sort are invited.

NATURAL RESOURCES

Natural resources have been defined as those resources provided by nature which may be used for the benefit of man. They may be divided into four groups— (1) Mineral Resources. (2) Water. (3) Soil. (4) Forests. In order that the complete scope of the subject may be realized a rather full outline list is given under each heading as follows,—

(1) **Mineral Resources.**—This resource has by far the greatest detail and variety of material; the sub-divisions are—

(a) Fuels—Coal; peat; oil and gas.

(b) Peat—Value other than fuel,—gas; coke; paper; packing material; fertilizer; tanning; litter; many other uses.

(c) Oil and Gas—Value other than fuel,—light; power; lubricant; derivative products.

(d) Stone—Used for building, structural and decorative purposes; flagstone; curbstone; paving blocks; crushed stone; fluxing and chemical use; grindstones; whetstones; etc.

(e) Lime—Used for building,—mortar, plaster, stucco.

Agriculture—soil amendment, insecticide, fungicide.

Miscellaneous—Sand; lime; brick; flux; sanitation; tanning; manufacture of—sugar, caustics, bleaching powder, soap, rubber, gas, paper, paints, glass, fertilizer, etc. Although there are a great many more uses for lime enough have been cited to show its wide usefulness.

Raw Material—Limestone, calcite, marble, shells.

(f) Cement—Raw materials,—limestone, marl, marble, natural cement rock, shale, clay, slag.

(g) Sand and Gravel—Used for building material, road metal, glass manufacture, sand-lime brick, molding, striking.

(h) Road Metal—Suitable for surfacing macadamized roads and for foundations for asphalt and concrete roadways. Raw material—rock, gravel, clay.

(i) Clays—Used for brick, many kinds; porcelain; pottery; various wares; drain tile; roofing tile; sewer pipe; crucibles; reforts, chemical apparatus; sinks; tubs; terra cotta; oil refining; food adulterant; paint and paper filler; cement; road material; etc.

(j) Mineral Paint—Mineral substances suitable for pigment.

(k) Fertilizers—Chiefly lime, phosphates, potassium compounds.

(l) Minerals—Under this heading are grouped a large number of minerals that have not so far been listed,—minerals containing gold, silver, copper, lead, zinc, iron, manganese, tin, aluminum, tungsten, and many other important and valuable elements too num-

erous to list; gem minerals; abrasives; asbestos; mica; gypsum; etc. A complete enumeration of commercially valuable minerals would include over 300 varieties. (See U. S. G. S. Bulletin 585.)

(2) **Water—**

(a) Surface—Rivers, lakes, swamps, etc.

(b) Underground—Wells, springs, mineral waters, etc. In this state artesian water is of special importance.

Not only for all domestic purposes and stock, but for boilers, power, irrigation, various manufacturing processes as well. Involves also problems of navigation, health, floods, drainage, ore deposition, reclamation, etc.

(3) **Soils—**

Requires no special description. The most important resource of all.

(4) **Forests—**

Special product of the soil requiring special attention because of the varied nature of its products, its permanent and increasing value under proper management, its control of water supply, floods, etc.

THE STATE SURVEY

The State Survey was established in 1893 by action of the legislature at its third session. A copy of this bill is given on page 21. As will be seen by a reading of the bill the legislature planned that the Survey should undertake an investigation of all the natural resources mentioned in the proceding pages; other duties besides were delegated to this organization.

As the work—soon to be outlined—becomes completed it will be of value to the state in several ways. In general it may be said that it will enable the state to get the greatest and fullest value from its natural resources. More particularly—by a development of the resources to their best—(a) Older industries will become more active with increased output. (b) New capital and industries will be

attracted to the state. (c) Resources will be conserved by improving methods of their exploitation and use. (d) The state with accumulated facts and information at hand can legislate intelligently in all cases where laws concerning resources and the use of land are required. (e) The state and its resources will become more widely known. (f) As a result, population will increase and property values rise. Other values resulting from the work of the Survey will be pointed out during the further development of the bulletin.

The two main divisions of activity are,—development work; service bureau. These will be taken up in order.

DEVELOPMENT WORK

Resources.—The first step in the problem of the State's resources is to determine just which of the numerous resources our state has and which it lacks. If there are present in the state all the common materials required for its normal settlement and growth, well and good; if less common, and consequently more valuable, materials are also possessed by the state, so much the better. These facts should be positively determined. It is also just as necessary to know which substances we do not have. Plans can then be made to secure these particular substances without loss of time. Furthermore, wildcating and unscrupulous promotion can be prevented and schemes for exploiting resources we do not possess can gain no footing.

Secondly, the distribution of each resource should be ascertained. Every community in the state should know just what resources are in its neighborhood and which part of the state must be turned to for material not immediately at hand.

Determinations should be made as to the quantity and quality of the resources. Material that is of small quantity and inferior quality is of little use to the state.

Furthermore, every resource should be examined as

to its accessibility. If some material is difficult to secure its quality will have to be enough better to make up for the extra expense involved in obtaining it. Conversely a deposit of ordinary quality may be worked at a profit if it is readily accessible.

There is still another aspect of development work to be considered. Today there are a great many substances which have a commercial value that they did not have ten or fifteen years ago or more. Minerals that formerly only reposed in cabinet collections, compounds that formerly were only laboratory curiosities, plants that formerly were weeds, are now a part of our commerce and trade and have a value unforseen in the past. In view of these facts it behooves the scientist to neglect no substance however insignificant, it may have a potential value. If a complete record is made of *all* materials then the state is prepared to reap a fuller benefit with the progress of science. Moreover, investigation should be undertaken to determine, if possible, a new use for every idle substance, or a better use for the substance now serving civilization in only a small way. This is science as such, this is the research idea which to so many persons seems not in the least "practical" but which in so many cases has necessarily preceded the practical.

Field Work—To secure all this information and to determine all the various points concerning the resources of the state, it is necessary to do field work in surveying. The whole state should be examined thoroughly, data of all kinds collected, specimens secured, records kept, and maps prepared.

In order that this part of the work may go forward with accuracy and the least loss of time there should be a suitable base map at hand. Such a map should show not only roads, streams, and cities, etc., but the relief or topography in detail, and should be prepared on a sufficiently large scale so that the desired detail may be represented thereon. Such maps are being made today especially well by the U. S. Geological Survey. All field work

in geology, soils or biology can be done most efficiently when a base map is prepared first; and the accuracy of the field work is largely controlled by the accuracy of the base map itself. It is true that a geologist or soil surveyor can go ahead without a base map and work by making his map as he goes, but he is thus spending fully one half, and often more, of his time in doing civil engineering rather than geology or soils.

The legislative act establishing the Survey has specificially stated that maps should be made by that organization.

Uses of Maps—In order that the full value of maps may be understood a list is hereby appended showing the uses to which maps may be put, as stated by the U. S. Geological Survey—

1. As preliminary maps for planning extensive irrigation and drainage projects, showing areas of catchment for water supply, sites for reservoirs, routes for canals, etc.

2. For laying out highways, electric roads, railroads, aqueducts, and sewage systems, thus saving the cost of preliminary surveys.

3. In improving rivers and smaller waterways.

4. In determining and classifying water resources, both surface and underground.

5. In making plans for the disposal of city sewage, garbage, etc.

6. In determining routes, mileage, location of road-building material, and topography in country traversed by public highways.

7. In selecting the best routes for automobiling tours and intercity runs.

8. As guide maps for prospectors and others in traveling through little-known regions.

9. As basis for the compilation of maps showing the extent and character of forest and grazing lands.

10. In classifying lands and in plotting the distribution and nature of soils.

11. In compiling maps in connection with the survey and sale of land.

12. In making investigations for the improvement of the plant and animal industry, and in a comprehensive study of physical and biological conditions in connection with the stocking of interior waters with food fishes and the locating of fish culture stations.

13. In locating and maping the boundaries of the life and crop zones, and in mapping the geographic distribution of plants and animals.

14. In plotting the distribution and spread of injurious insects and germs.

15. As base maps for the plotting of information relating to the geology and mineral resources of the country.

16. In maneuvers of the national guard, in the development of military problems, and in the selection of routes for road marches or strategical movements of the troops, particularly of artillery or cavalry.

17. In connection with questions relating to state, county, and town boundaries.

18. As a means of promoting an exact knowledge of the country and serving teachers and pupils in geographic studies.

19. As base maps for the graphic representation of all facts relating to population, industrial, and products or other statistical information.

20. In connection with legislation involving the granting of charters, rights, etc., when a physical knowledge of the country may be desirable or necessary.

Division of Field Work—The field work is divided into five portions as follows:

(1) Geological Surveying—With the view of investigating the Mineral Resources as already outlined; involves study of all phases of geology,—rocks, minerals, water, fossils, etc.

(2) Soil Surveying—Determination of the origin and distribution of all types of soils; serves as a basis for experimental and extension work on the part of the

State Agricultural College and Experiment Stations or similar organizations.

(3) Biological Surveying—Investigation of all plant and animal life, including such special problems as forests, fisheries, game birds, harmful insects, etc.

(4) Climatic Investigations—Mistakes have been made in the past and bona fide booms have failed because it was not generally known just what differences in climate there are in the state or what consequences follow upon these differences. Further detailed work to supplement that already being done by the Federal Weather Bureau will secure more exact knowledge concerning this important control of plant and animal life.

(5) Map Making—This should be one of the first things undertaken, for it is fundamental to so many other problems as already explained.

Many of these investigations can go forward simultaneously, and much of it can be done in co-operation with Federal departments which are investigating similar problems.

Office Work—Field work is logically followed by office work. Study of specimens, making of analyses of one sort or another, compiling of data, map making, etc., are supplementary activities that always follow the field work, and some, at least, of the problems encountered in the field can only be settled by investigation in the office or laboratory. In certain cases return trips to the field are required to settle doubtful or critical points that careful examination of data in the office and analysis of material has brought to light. It may be necessary to resort to "drilling, digging, or other excavation," as noted in the legislative bill, to complete the investigation and settle all queries that arise.

Reports—When the various data are all assembled, conclusions reached, records made and problems settled there comes the task of preparing reports and maps. In order that the people at large—for whom the work in all its entirety was undertaken—may know of these results and be able to profit by them, reports must presented for

their perusal and examination. These reports may be quite technical, or semi-popular treatments as the case requires; and will be of all sizes from small circulars to large monographs, with or without maps depending on the necessity for such. They may represent the final conclusions reached after extended study, or they may be only preliminary reports or reports of progress; still others may be periodic or statistical in character. In any case the data will be authoritative and will be put in a form most suitable to the particular phase of the work in question.

Time Required—The question may arise as to how much time would be required to do the field and office work and get the published results in the hands of the public. The time is apt to be long for several reasons, a few of which are indicated here.

Suppose the base map were all completed (which is true of but a small portion of the state), the time required for merely getting to all parts of the state is very considerable. For instance, there are about 75,000 square miles in South Dakota, and if conditions of travel were such that a man could pass steadily from one square mile to another in a straight line it would require a journey of 75,000 miles for this man merely to travel through every square mile of the state's territory. Suppose he travels at a rate of twenty miles an hour and for ten hours a day; his total time would be 375 days. At present the state geologist has university duties which keep him busy nine months out of the year. This leaves three months for field work—a total of about 75 working days out of each year. So then, for the state geologist to simply *see* every square mile of territory in the state at the prescribed rate of travel and with the particular amount of time at his disposal, would require five years.

One must realize of coures, that the surface conditions will not allow this steady rate of travel. Furthermore, field work can not be done at the rate indicated nor anywhere near it, much of the traveling and studying must be done on foot. Again, many of the square miles of the

state have a great deal of detail on them and require close scrutiny in almost every acre. Indeed, in one part of the state a party of eight spent six weeks on twenty-five square miles of territory and then did not get all the data there.

Enough has been mentioned to show that the time factor is a serious one.

To get results more quickly, those portions of the state that seem to be more favored with resources, or those places where the demand is greatest can be taken up first. And of course the working force can be increased to any degree depending on the funds available for such purpose. In fact if the Survey develops as it should there will be need for employing a large number of experts the year round.

SERVICE BUREAU

The information gained by the development work of surveying as just described, is of value only as it can be used by the individual directly, or indirectly through collective groups. The data gathered must be applied to our industrial, commercial and educational life in order that it may bring advancement and growth to the state.

The Service Bureau is that portion of the Survey organization which is the connecting link between the scientific investigation itself and the state as a body of people requiring certain material things. It is an information bureau regarding natural resources.

Authoritative, accurate and impartial conclusions and statistics as prepared through the activity of the Survey are valuable to the individual or community in any part of the state, and to special types or groups of people such as manufacturers, engineers, educators, scientists, investors, prospective residents, travelers, etc.

Naturally the accuracy and extent of the information at hand depends on the completeness of the work of development.

The various ways in which the information is disseminated and used are as follows:

(1) Distribution of Reports—The published reports on particular areas that have been surveyed, or particular subjects that have received special investigation are to be sent out to all interested.

(2) Answering Questions—Manufacturers, commercial clubs, scientists, and citizens in all walks of life can and do turn to the Survey for information on a variety of subjects connected with our natural resources and related problems. Many inquiries come in. These may be simply requests for a bulletin, map or other publication of the Survey, or lists of references on particular subjects. Other letters or inquiries call for information concerning some special resource in a given part of the state, or concerning the quality of soil and climate in a certain district, or the possibility of striking water, or the elevation at a particular point in the state, or lists of birds and flowers, or rock of a certain quality, etc. Such matters may not be in published form but the Survey, because of its large stock of information, is able to reply intelligently.

(3) Examination of Specimens—One is often desirous of having specimens examined and determinations made thereon. In such a case it may be sent to the Survey for that purpose. Tests and analyses will be applied as far as equipment will allow. Many such specimens—minerals, rocks, plants, and animals—have been received in the past and reported on. The field work is often of great aid in determining the nature of the substance, especially if it is geologic in character. In certain cases it may be necessary to make a trip to the field before a decision can be reached.

The value of some material in manufacture can not always be determined in the laboratory. Arrangements are then made by the Survey with factories or other industrial concerns to try out the material and give it a practical test.

(4) Outside Relations—The State is not an isolated portion of land; it is a related part of a larger unit—the Country. In so far as we have any resource that is

unique in character, quality or quantity it may be in demand even from distant parts of the country. In so far as we lack any resource we must get it from without. In recognition of these facts and as a matter of good business it is necessary to establish proper trade relations to meet the situation. Any manufacturer from without looking for raw products, any outside capital seeking investment, etc., would turn first to some central bureau, if there was one, for the facts in the case.

The State Survey is in a position to develope an information bureau that will serve the state by serving outside interests that approach the state with a definite industrial purpose. Such a bureau would be able to connect the state man with outside products or markets that he desires. The Survey thus becomes a clearing house of information, a commercial bureau.

In order that this may be possible a great deal needs to be done. Co-operation with commercial clubs, producing plants and similar organizations throughout the state with the purpose of assembling statistics and advertisement is very necessary.

To this end the Survey has started collecting material for an exhibit of *Products of South Dakota* to be placed in the State Museum which is a part of the Survey organization. Such an exhibit showing raw products, intermediate and finished products, properly labelled, would bear positive and striking testimony to our state's activity and productiveness. Producers are urged to send in exhibit material as soon as possible.

(5) Educational—In one sense a great deal of the Survey's work so far described is educational in that it aims to inform the people and better their conditions in many ways; much of the work, however, is only indirectly so. But in the following pages will be pointed out the more direct educational plans.

The Survey has an unexcelled opportunity to further the cause of education because of its large store of information, and its organization along a diversity of directions. And the extent of its usefulness in this matter

is measured by the degree of activity maintained in furthering the Development and Service plans as already outlined in the preceeding pages. If such plans are carried well toward completion the Educational part follows easily.

This educational work is accomplished in several ways—

(a) By distribution of reports, bulletins, circulars, maps, etc., and by answering questions.

(b) By giving lectures throughout the state. Members on the regular Survey staff or experts secured by them, will be prepared to present either general talks of a popular nature or special lectures on special subjects technical or otherwise, illustrated if possible. These will be offered to schools or other educational institutions, commercial clubs, societies, associations or organizations of any sort in the state who are interested in any phase of Survey work.

(c) Sets of Specimens—Plans are being made for the preparation of sets of minerals, rocks, plants, etc., of the state for free distribution especially to high schools and educational institutions of our commonwealth. Such sets properly labelled and arranged, and accompanied by explanatory bulletins should be a valuable force.

(d) Loaning of Lectures and Specimens—Typewritten lectures on a variety of subjects can be prepared and loaned to societies and clubs in lieu of a speaker in the flesh. It may be possible to send lantern slides, sets of specimens, or other illustrative material at the same time.

(e) Museum—The museum occupies a special place in the Survey organization and deserves more than a passing mention.

It is the repository of all collections made by the Survey whether the material is plant, animal, geological or archaeological. Type specimens are kept as a matter of record and when they are suitable for the purpose are put

in open or glass cases for exhibition purposes. Birds and animals through taxidermy are especially adapted for exhibition, as also are Indian relics, Molluscs, Fossils, and many Minerals and Rocks.

Since the Museum is a State institution it is the natural home for any collection of state things or collections gathered by citizens of the state. In the past such sets have either been given outright or loaned indefinitely. It is hoped that friends will realize that it is a certain duty on their part to have their collections of rare and unusual articles—curios, works of art, gems, relics, etc.,—as well as geological and biological specimens housed in this State Museum where the general public may have the advantage of seeing and studying them.

In the Museum will be placed all industrial exhibits which will visibly show the products, raw and manufactured, of our State.

The Survey in its Natural History work is beginning to collect live specimens also. These are being housed on the museum grounds with the aim of ultimately establishing a zoological park which will contain living specimens of all life forms in the state and as many from others parts of the world as is possible to secure.

With this variety of material placed on exhibit in rooms and grounds open to the public the museum not only offers entertainment to all who enter its doors but can give instruction as well, i. e. it is a direct objective method of education. Educators and instructors in the state can bring their classes to the museum to make studies of biology, industry, geology, commerce, etc. And if the demand warrants it the Survey will maintain trained guides who can take parties through the museum and explain the exhibits more fully than any system of labels possibly could.

CONCLUSION

Much has already been done by the Survey, but probably the larger part of the work outlined in the preceding pages is yet to be done. It is believed that the plans laid

out are practicable and if completed will bring rich returns to the state as a whole. Results can only be achieved where co-operation on the part of the citizens and funds on the part of the legislature are obtained. If results do not seem to be forthcoming quickly, before blaming the Survey investigate the conditions. Inquiry addressed to the State Geologist will bring a statement on the part of the Survey.

BILL ESTABLISHING A STATE GEOLOGICAL AND NATURAL HISTORY SURVEY

Adopted in March 1893 at the Third Session of the State Legislature

(Note—The bill below has been quoted verbatim, but the arrangement has been altered with the hope of making the contents more accessible. The marginal headings have been added for a similar reason.)

POLITICAL CODE

§ 215. The regents of education shall

Surveys to be made of Mineral, Vegetable, Animal Kingdoms;

cause to be made as soon as practicable surveys of the geology, natural history, and physical features of the state. Which surveys shall be carried on with a view of a complete account of the mineral, vegetable and animal kingdoms, as represented in the state, together with its physical features, including

Physical Features List—

Mineral Kingdom

ores,
the several geological strata,
soils, clays,
coals, peats,
artesian and other waters,
marls,
building and other stones and cements and
other useful minerals and materials,

Analyses Reports Further Tests

scientific analysis of said materials, and report upon their economic value and accessibility and further including tests by drilling, digging or other excavation for the discovery of water,
iron, silver, gold, copper,

coal, gas, salt
or other valuable mineral or other material that may from said surveys appear likely to exist in the state.

Said surveys shall further have in view a complete and scientific account of the

List— Vegetable and Animal Kingdom

vegetable and animal kingdoms of the state, including
all native and naturalized grasses,
herbs, plants, shrubs and trees,
insects, birds,
reptiles, fishes and
mammalia.

Geological Map

§ 216. They shall cause a geological map of the state to be made as soon as may be practicable, upon which the various geological formations shall be represented, and shall also

Elevations

cause to be ascertained by barometical and other observations, the elevations and depressions of different parts of the state;

Climate

cause to be ascertained by barometrical ical and other observations and statistics as may be required to account for the variety of climate and products of the various parts of the state; and

Maps

cause to be compiled, as soon as practicable an accurate geographical, physical and topographical map or maps of the state.

Specimens

§ 217. The said regents of education shall cause suitable specimens, properly prepared, secured and labelled, of all
soils,
rocks, ores,
coals, peats,
fossils,
cements,

building and other stones,
plants, woods,
skins and skeletons of animals, birds, insects and fishes,
and other mineral, vegetable, and animal substances and organisms discovered or examined in the course of said surveys, together with the

Reports and All Results

reports upon chemical or other scientific analysis made in connection with said surveys, and the
results of all meteorological, barometrical and other observations and statistics,

Preserved

to be preserved for public inspection, and whenever the same may seem to be practical,

Duplicate Sets

cause duplicates in reasonable numbers and quantities, of said specimens, reports and results, to be collected and preserved for the purpose of exchange with educational, scientific or other institutions, of which the Smithsonian Institute at Washington, in the District of Columbia, shall have the preference; and for the purpose of such donations to scientific institutions of this state, as shall by the said regents of education be deemed proper.

Expense Authorized by Regents

§ 218. No person appointed or employed to carry out the provisions of the three preceding sections shall incur any expense or make known the results of his investigations, except as authorized by the said regents of education.

Various Reports

All persons so appointed or employed shall immediately report to the said regents of education all discoveries of economic or scientific interest to the state in general and shall make, on or before the first of November next preceding each

regular session of the legislature, a complete report of the progress of said survey, accompanied by such maps, drawings, tables and other specifications and exhibits as may be proper and necessary to exemplify the same, and it shall be the duty of said regents of education on or before the 15th day of November, next preceding each regular session of the legislature, to submit the aforesaid report or reports to the Governor, who shall lay the same before the legislature, and the said regents of education, upon the completion of any separate portion or department of the said surveys, shall cause to be prepared a report which shall embody all useful and important information accumulated in the investigation of said portion or department, which report shall likewise be conveyed through the governor to the legislature.

Office of State Geologist Established

The Regents of Education at their meeting at Brookings, March 9, 1893, on the motion of Mr. F. G. Hale, took the following action:

Whereas, a recent act of the legislature makes it the duty of this board to provide for surveys of the geology, natural history and physical features of the state, and makes an appropriation;

Therefore, Be it resolved that the Professor of Geology and Mineralogy at the State University, be and is hereby elected State Geologist to carry out the purposes of said act, and that he be authorized to expend sums so appropriated for purposes contemplated by said act, the same to be drawn on vouchers approved by the Treasurer of this Board.

RECENT ACT OF THE REGENTS
April, 1916

On motion, the following resolution was adopted:

WHEREAS, Section 215 of the Political Code of the completed laws of South Dakota charges the Regents of Education with the duty of conducting a geological survey of the State of South Dakota; and

WHEREAS, By resolution of March 9, 1893, the Regents of Education made the Professor of Geology and Mineralogy at the University of South Dakota the State Geologist in charge of said survey; now, therefore, for the further and more explicit apportionment of the duties of the Board of Regents under the aforesaid Section 215, be it

RESOLVED, That so much of the research required of the Board by this Section as pertains to soils and their immediate relation to agriculture and agricultural problems, is hereby referred to the Department of Agronomy of the State College of Agriculture and Mechanic Arts, and in case the Bureau of Soils of the United States Department of Agriculture desires to carry on soil survey work in this state, then the Department of Agronomy will be and is hereby designated as the proper department for such co-operation.

RESOLVED, That any co-operative work in geological lines of research proposed by the United States Geological Survey should be referred to the State Geologist at the University of South Dakota.