

South Dakota
Geological and Natural History Survey

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CIRCULAR 7

The Needs
of the
State Geological and
Natural History Survey

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INTRODUCTORY

The purpose of the Survey ever since its organization many years ago has been to investigate the natural resources of the State. Manufacturing, building, construction, commerce, depend upon the raw materials that nature provides. If these industries and occupations are to be carried on economically and successfully, the facts concerning the raw materials must be known in great detail. The investigation of these natural resources, these raw materials, may be considered as taking an inventory of supplies so that the limitations of the business are known at the outset.

Much is known about our State's natural resources, but the greater part of the inventory taking is yet to be done.

The State is large and the investigation, if done thoroughly, cannot be done quickly. And the work has progressed slowly in the past because the Survey has had so few investigators on its staff. The present active staff of the Survey consists of one naturalist and one geologist, who can be in the field but a short time each season because the geologist has to teach nine months of the year. The work to be most effective must go forward at a faster rate. Delay in taking the inventory means delay in business enterprises. And the best way to accelerate the rate is to increase the number of workers and provide them with good base maps and adequate equipment and facilities for the most efficient investigation. In the following paragraphs the needs of the Survey are presented in some detail.

TECHNICAL EXPERTS

The Survey needs a number of scientific experts as permanent members of its staff and on a yearly salary.

Several geologists should be secured, also a biologist and a chemist. The investigation work in field and laboratory depends on these specialists. The greater the number of them employed the faster will the State's resources be examined. The salaries of these men will probably be high.

NON-TECHNICAL LABOR

The Survey activities demand a number of temporary workers to be employed by the Survey during the field season. This list includes cooks, camp men, assistants, etc. The number needed will be determined by the number of technical experts secured and the number of parties sent into the field.

CLERICAL AID

With the increase in the Survey staff there will be needed a clerk and stenographers.

EQUIPMENT

In order that the field parties may be most efficient in their work there must be an adequate supply of tents, camp stoves, cots, dishes, tools, etc.; also instruments necessary for surveying and prospecting, drawing paper, inks, pencils, notebooks, etc. The testing in the laboratory will require special equipment. Each party in the field should be provided with an automobile; if the work has to all be done on foot it is only 25 per cent efficient.

RUNNING EXPENSES

All employees while in the field should be allowed their expenses. This includes traveling expenses, board, lodging, the upkeep of the automobiles. The men will spend from two to six months in the field each year. There will be freight and express charges for shipping outfits and specimens.

The office and laboratory will require supplies.

TOPOGRAPHIC MAPS

A base map is absolutely essential for accurate and detailed field work of any kind. If there is no base map one has to be made. It is a great waste to have a geologist spend a large portion of his time making a base map. He should be provided with a base map before starting the field work. The better the base map the quicker and more accurate will the geological work be. The topographic maps are the best base maps made.

The topographic map has many other uses besides serving the geologist, as may be seen by examining the list prepared by the U. S. Geological Survey as follows:

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 automobile tours and intercity runs.
8. As guide maps for prospectors and others in traveling through little-known regions.
9. As a 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 mapping the boundaries of the life and crop zones, and in mapping the geographic distribution of plants and animal life.
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 as a means of serving teachers and pupils in geographic studies.
19. As base maps for the graphic representation of all facts relating to population, industries, 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.

Engineers recognize that the topographic maps will save much of the expense of preliminary surveys involving problems of drainage, highway construction, sewage disposal, water supplies, reclamation, etc., etc. Two quotations will show the opinions that engineers have in this

matter. In April, 1919, there was held in Chicago a conference of technical societies called by the Engineering Council; seventy-four organizations were represented. This conference passed a resolution urging the completion of the topographic mapping throughout the country, saying, among other things,

"It is apparent to this conference that by having such maps the saving in the cost of engineering works to be constructed during a very small portion of this time will more than pay for the making of these maps."

Again, Mr. M. O. Leighton, Chairman of the National Service Committee of the Engineering Council, in an appeal to the Secretary of the Interior says, among other things,

"Did we have a complete topographic map of the country for use in the execution of our National road program alone, the cash saving would exceed the cost of the map."

The Association of State Geologists has been unanimous in urging the necessity for topographic maps in geological and other work, as may be seen from the following quotations (selected from a compilation of opinions made by E. N. Lowe, State Geologist of Mississippi, who has kindly allowed us to use them):—

Dr. S. W. McCallie, State Geologist of Georgia: "I regard these maps as indispensable to high grade geological work. In other words, no State can hope to have a reliable geological report made on the State as a whole unless this work is preceded by topographic mapping.....Topographic maps are also of great value in laying out and constructing highways, as well as in the development of the water powers of the State."

Dr. Geo. F. Kay, State Geologist of Iowa: "I do not hesitate to state that topographic maps are very essential in connection with the development of any State. I feel sure that if we had topographic maps of the whole of our State we would be able to save hundreds of thousands of dollars within the next few years, during which time we will be carrying forward an extensive program of good roads, drainage, building of bridges, and many other phases of work related to the development of the State."

Dr. J. A. Bownocker, State Geologist of Ohio: "No matter what kind of scientific work one is doing, whether it is railroad, traction line, or canal planning, geological survey, natural history survey, soil survey, or, in fact, as just stated, any other kind of scientific work, the first thing asked for is an accurate map. We have been using the topographic maps in Ohio for about twenty years, and have found them invaluable. In fact, it is difficult to understand how we could get on without them, and at the same time do high grade work."

Dr. J. A. Udden, Director of the Bureau of Economic Geology at the University of Texas: "I can say for this State that the topographic maps pub-

lished by the United States Geological Survey, have been of great value in the oil development within the last two years. Naturally those who are interested in oil development prefer to go to parts of the State that are covered by good maps."

Dr. Thomas L. Watson, State Geologist of Virginia: "The data furnished by the maps resulting from topographic surveys are so varied as to make them useful in nearly every public and private activity having to do with the surface of the land, They are of practical value in planning engineering projects, improvement of highways, construction of electric and steam railways and in studying the sewage and water supplies of cities. They are of the highest economic importance as a means of showing the location, extent and accessibility, of lands, waters, forests, and mineral resources. Their main importance, however, is as a base upon which to study the geologic formations, and the relation of the coal, oil, gas-bearing formations, one to the other, their depth below the surface, and the probable extension of such resources into unexploited areas."

Dr. B. G. Morgan, State Geologist of Wyoming: "This work is of inestimable value to the State.....Topographic maps are of great assistance in geological work, especially in the study and investigations of oil fields and mineral deposits. Too much importance cannot be attached to the need of topographic surveys."

These vastly useful and important topographic maps are made in cooperation with the U. S. Geological Survey on a dollar for dollar basis. They will do the field work and publication, the State is to stand one-half of the expense, with the understanding that a minimum of \$5,0000.00 a year be contributed by the State. A plan has been drawn up by the Federal Survey whereby the topographic map for the whole United States is to be completed in thirteen years. South Dakota is only 25 per cent mapped. To complete the topographic map of South Dakota the Federal Survey estimates that the cost will be \$618,000.00, one-half of which (\$309,000.00) is South Dakota's share. An expenditure of \$15,000.00 a year would be a good beginning, more would be needed in the succeeding years.

TEACHING MATERIAL

There is a strong demand from the high schools of the state for type specimens of rocks, minerals, and plants for teaching purposes. The Survey is willing to collect and prepare sets of such specimens together with a map and descriptive bulletin.

MUSEUM

Much of the material collected by the Survey is of especial value to the public when it can be placed on exhibition. Our museum needs additional cases and accessories for the display of material now on hand. With the proposed growth of the Survey's activities many additional displaying facilities will be required.

PUBLICATION

All the information gathered as a result of the Survey's investigation in the field and laboratory will need to be published as bulletins, circulars, maps, etc., in order to be available to all interested in this development work. At present the Survey has material on hand waiting for sufficient funds for publication. It is quite obvious that, with the expansion of the Survey work, more will have to be published each year. There should be no delay in passing on information to the public.

There should also be a fund for the subscription to journals and periodicals, and the purchase of books relating to the various problems which the Survey is studying. Our present equipment needs additions: we must keep in touch with other workers in the same fields.

NOTE—The funds for the needs of the Survey, as presented above, must come from appropriation by the legislature. If you are interested in having an accurate inventory made of the natural resources of your community and the State at large then see that your legislators allow a generous appropriation at this coming session.

Inquiries addressed to the State Geologist will receive prompt attention.