While some mistakes have been made, it is believed that the topographic methods and the apparatus employed are now thoroughly effective; and that for this reason, and for the further reason that a corps of expert topographers has grown up, this branch of the work can also be carried forward more expeditiously and economically than ever before. At first most of the work was executed on a scale of four miles to the inch, another part on the scale of two miles to the inch, and only a small part on larger scales; but the improvement in methods, apparatus, and skill has been such that the surveys can be made on a scale of a mile to the inch at slightly greater cost than the original surveys on a quarter of that scale; and, accordingly, all the surveys of the bureau are now made on the two-mile scale and the one-mile scale, and the four-mile scale has been abandoned. It is proposed to continue the work on these scales, and to give such attention to minor topographic details as to yield a good topographic map of the entire country, which, while neither geodetic nor cadastral, will serve as a satisfactory basis for geologic surveys and for a wide variety of industrial purposes.

In geologic surveying, and thus in the preparation of the geologic map of the United States, the work is rapidly passing from the preliminary stage of research to the effective stage of applied science; and it is believed that the methods developed are so far satisfactory as to warrant a definite working plan for the future. This plan includes a system of rock classification and a system of map conventions based thereon by which widely applicable and useful distinctions may be made. It includes also a system of arranging the atlas-sheets constituting sections of the geologic map of the United States provided for by the statute, and the accompanying descriptive text in atlas folios designed for convenient distribution and use. Each atlas folio is inclosed in a cover bearing a suitable title and a key-map locating the atlas-sheet, and each contains a copy of the topographic sheet without geologic colors; a second copy colored by formations; a third copy colored by groups with structure sections introduced; a fourth copy colored by formations of economic value and showing also the locations of mines and industrial establishments depending on mineral resources; in the glaciated regions a fifth copy showing superficial formations and their resources; and sometimes additional sheets giving columnar sections and other illustrations of the region. The accompanying text includes an elementary explanation of the atlas, a general sketch of the geologic province, and a special description of the area covered by the sheet. Furthermore, the plan contemplates the extension of the geologic surveys from the regions of complex structure, in which the classifications were developed, into regions of simpler structure, in which more rapid progress may be anticipated. Moreover, since a corps of experts has now been trained in the methods and the classification developed in the bureau, and since these experts are now ready to extend operations into the rich mining regions and other important fields in which premature work would have been unwise, it is planned to strengthen this technical work and thus to enhance the economic value of the geologic map without detracting from its scientific character.

The purpose of our statesmen in instituting the Geological Survey was to enable those engaged in mining and related industries to exploit our mineral resources safely and economically. It has always been recognized that mineral resources depend on rock structure, and that the structure and relations of rocks cannot be made intelligible to practical men without classification; moreover, it was understood that the structure and relations of rocks cannot be described, and in some cases cannot even be ascertained, without maps. It was for these reasons that statutory provision was made for the construction of a geologic map of the United States in connection with the examination of the mineral resources and mining products; it was for the same reasons that the topographic survey was undertaken as a basis for the final geologic map. The work of the topographic branch of the bureau has passed the experimental stage and entered upon the effective stage, while the work of the geologic branch is now passing from the stage of elaborate and often recondite research to the effective stage; and it is designed to carry forward the work of both branches with energy and to proceed with the preparation of the geologic map on a basis at once thoroughly scientific and economically useful. In fact, during the past two or three years the transformation in geologic work has been in progress and is now practically accomplished. Thirteen atlas folios are now engraved, and the field-work for about 160 atlas folios is completed, while the field-work required for a still larger number is in progress. In addition to these completed surveys, a general reconnaissance has been extended over about four fifths of the entire area of the United States, and a reconnaissance map representing the results of this work is now in the hands of the engraver.

THE GEOLOGICAL SOCIETY OF AMERICA.

THE fifth annual and winter meeting of the Geological Society of America was held in Ottawa, Canada, beginning Wednesday, Dec. 28, 1892.

Through the kindness of Dr. J. G. Bourinot, C.M.G. of the Royal Society of Canada and clerk of the House of Commons the ample and commodious room of the Railway Committee of the House of Commons was placed at the disposal of the society. There were about forty Fellows present, sixteen of whom came from various portions of the United States. The meeting was under the presidency of Mr. G. K. Gilbert, Chief Geologist of the United States Geological Survey, Washington, whilst Prof. H. L. Fairchild of the University of Rochester was secretary.

If we are to judge by the attendance and interest manifested at the meeting, as well as by the grade of papers presented, there is no doubt that it was a decided success. A local committee composed of Fellows of the Royal Society, members of the Logan Club, which comprises the scientific staff of the Geological Survey of Canada, etc., had made all necessary arrangements for the comfort and lodging of the members during the meeting. Dr. Selwyn, as chairman of the committee, and Mr. Smith as secretary, spared no pains to give the visiting Fellows of the Society a good reception. Much praise is also due His Excellency the Governor General for the exceedingly kind and generous manner in which he devoted so much time and attention to the society besides furnishing the Fellows from a distance with an excellent opportunity of having a glimpse of social life at the Canadian capital by giving an "at home" at Rideau on Friday afternoon. To Dr. Ells, Mr. J. B. Tyrrell and others, much credit is due for their exertions in preparing matters.

Shortly after ten o'clock on Wednesday, the 28th, President Gilbert took the chair and called upon His Excellency the Governor General to give the address of welcome. His Excellency made a very neat address which was received enthusiastically. To this the president replied, and referred to the proverbial hospitality for which Canadians were noted. The report of the Council was then presented by the secretary and the result of the vote announced so far as conclusions were arrived at. The following leading officers were then declared elected: President, Sir J. William Dawson; secretary, Prof. H. L. Fairchild; treasurer, Dr. T. C. White. The Secretary's report, as well as that of the treasurer, showed the society to be in a flourishing condition. Then followed obituary notices of three deceased Fellows: T. Sterry Hunt, J. S. Newberry, and J. H. Chapin. Prof. Raphael Pumpelly's notice of Dr. Hunt was read by Mr. Van Hise; that of Prof. Newberry, prepared by Dr. Kemp, was read by Prof. H. L. Fairchild; and Prof. Hitchcock read W. M. Davis's memorial of J. H. Chapin.

The reading of papers or work proper of the society began Wednesday afternoon at 2 P.M. Below is a list of the papers, in the order in which they were taken up at the meetings. The whole time of the society was taken up reading and discussing papers until a late hour Friday, the 30th of December. Time and space do not allow us here to do justice to the interesting discussions on the papers presented. Both Glacial and Archæan geology received a goodly share of animated discussion, whilst a few papers on palæontology also stimulated further inquiry. Dr. Willard Hayes's paper on "The new geology" was a splendid contribution to the geomorphology of the district examined by that author and described by him.

List of Papers.

A. R. C. Selwyn, On the coals and petroleum of the Crow's Nest Pass, Rocky Mountains; H. P. Brumell, On the geology of natural gas and petroleum in Ontario; H. P. Brumell, Note on the occurrence of petroleum in Gaspé, Quebec; Elfric Drew Ingall, Some features of the phosphate-bearing rocks of Ottawa (read by title); Sir J. William Dawson, Note on sponges found in the Cambro-Silurian at Little Metis, Canada (read in the absence of the author by Mr. F. D. Adams); J. F. Whiteaves, Notes on the Devonian formation of Manitoba and the N. W. Territories; Henry M. Ami, Notes on Cambrian fossils from the Selkirks and Rocky Mountain Region of Canada; Henry M. Ami, On the Potsdam and Calciferous terranes of the Ottawa Palæozoic basin; R D. Salisbury, Distinct glacial epochs, and the criteria for their recognition; J. B. Tyrrell, Pleistocene phenomena in the region southeast and east of Lake Athabasca, Canada; A. P. Low, Notes on the glacial geology of the Northeast Territories; Robert Chalmers, The height of the Bay of Fundy coast in the glacial period relative to sea-level, as evidenced by marine fossils in the boulder clay at Saint John, New Brunswick; W. J. McGee, The Pleistocene history of Northeastern Iowa; Warren Upham, Eskers near Rochester, N. Y.; Warren Upham, Comparison of Pleistocene and present ice-sheets; G. Frederick Wright, The post-glacial outlet of the Great Lakes through Lake Nipissing and the Mattawa River; N. H. Darton, On certain features in the distribution of the Columbia formation on the Middle Atlantic slope; George M. Dawson, Note on the geology of Middleton Island, Alaska (read by R. W. Ells); Waldemar Lindgren, Two Neocene Rivers of California; Robert W. Ells, On the Laurentian of the Ottawa district; Robert Bell, The contact of the Laurentian and Huronion north of Lake Huron; W. H. C. Smith, The Archæan Rocks west of Lake Superior; Alfred E. Barlow, On the Archæan of Sudbury mining district; C. R. Van Hise, The volcanics of the Huronian south of Lake Superior; Charles Rollin Keyes, Some Maryland granites and their origin (read by Mr. U. S. Grant); Charles Rollin Keyes, Epidote as a primary component in granites (read by Mr. U. S. Grant); James McEvoy, Notes on the gold range in British Columbia; Israel C. Russell, A geological reconnoissance in the central part of the State of Washington; R. W. Ells, The importance of photography in illustrating geological structure; J. W. Powell, The work of the United States Geological Survey (read by W. J. McGee); J. S. Diller, Cretaceous and Tertiary rocks of the Pacific States; T. W. Stanton, On the faunas of the Shasta and Chico formations; C. Willard Hayes and M. R. Campbell, Geomorphology of the southern Appalachians; N. H. Darton, Overthrust faults in eastern New York (read by W. J. McGee).

The president's address, on the "Problems of the Continents," was an admirable paper which brings up and introduces a subject of paramount importance. It serves as a preliminary basis for work at the coming meeting of geologists at the International Congress to be held in Chicago this summer.

Mr. W. J. McGee's public lecture was given in the new auditorium of the Normal School, on the subject "A fossil earthquake;" seldom has an Ottawa audience listened to a clearer and more striking bit of inductive reasoning than this lecture. About 300 persons were present, and the lecture was illustrated by stereopticon views. Mr. H. N. Topley kindly assisted the lecturer in this matter.

After the reading of the last papers on the list and programme on Friday evening, three votes of thanks were unanimously passed by the society. The first to the President and Fellows of the Royal Society, for their invitation and attention during the session of the Geological Society. The second to the Governor General for his hospitality and the generous as well as gracious interest he had taken in the meetings. The third to the Logan Club of Ottawa for its exertions in making the meeting a success.

One interesting feature of these meetings was the presence of the Premier of Canada, the Hon. Sir John Thompson, K.C.M.G., and of the Hon. T. M. Daly, Minister of the Interior and Geological Survey Department, when Dr. McGee read the paper prepared by Major J. W. Powell, director of the United States Geological Survey on the work of that survey. At the conclusion of the paper Sir John Thompson, Mr. Daly, M P., and Dr. Selwyn took part in the discussion. The comparative work and usefulness of the Geological Surveys of Canada and the United States was an interesting as well as practical question.

Altogether the meetings were most successful and teeming with interest, and closed with hopes of having another similar one at no distant date.

SEVENTH ANNUAL MEETING OF THE IOWA ACADEMY OF SCIENCE.

The seventh annual meeting of the Iowa Academy of Science convened in the High School Building in Cedar Rapids. Several enthusiastic sessions were held during day and evening of the 27th and 28th. The following papers were read: —

Professor S. Calvin presented a paper "On the Relation of the Woodbury Sandstones and Shales and the Inoceramus Beds of White to the Subdivisions of the Cretaceous proposed by Meek and Hayden," in which he gave a thorough review of the subject and illustrations of various sections bearing upon it. Perhaps one of the most important points of the paper was in regard to the identity of strata differing lithologically at different points, but proven to be the same, and in the view of the author the difference due simply to difference in distance from the shore line of the water in which they were deposited.

In a paper on "The Structure and Probable Affinities of Cerionites dactyloides Owen," Professor Calvin discussed the former views regarding this problematic fossil and showed some very fine specimens and drawings illustrating his view that this is a gigantic Prototozoan or colony of protozoans, a view which, with the evidence presented, seems more reasonable than any hitherto offered.

Dr. C. R. Keyes read a paper "On Natural Gas and Oil in Iowa," in which he maintained that the failure to find these materials in paying quantities so far in this State is not to be taken as proof that they will not be found. He also presented by title two papers, one entitled "Some Mineralogical Notes," and the other "Surface Disintegration of Granitic Masses and Some American Eruptive Granites."

Professor J. L. Tilton, in a paper "From Ford to Winterset," gave a number of carefully determined sections of the various exposures between these towns, and illustrated by a large chart in which they were shown drawn to scale for the entire distance.

Professor C. O. Bates discussed the "Analysis of Water for Railway Engines," giving details of his work in this line and suggestions as to the methods to be used and the results desired in such work.

Professor F. M. Witter, in "Some Observations on Helix cooperi," gave an interesting account of his observations on this mollusk in Colorado and exhibited a number of specimens of different ages.

His paper on the "Absence of Ferns between Fort Collins and Meeker, Colorado," contained a statement of his efforts to secure these plants in that region and discussed the causes for paucity of such material.

Professor Witter also presented a paper entitled "Notice of Stone Implements from Mercer County, Illinois, and Louisa County, Iowa," and accompanied it with exhibition of two very interesting stone implements.

Mr. Gilman Drew discussed "The Frogs' Lease of Life," giving a graphic account of the ability of frogs to survive under adverse circumstances, and showing that it has a very strong vitality. Details of a number of experiments in subjecting frogs to temperatures at varying points below freezing were given, also observations on the vitality of frogs' eggs.

Mr. Drew also remarked upon the inheritance of acquired characters as illustrated in the Honey Bee.

Professor C. C. Nutting, the retiring president of the Academy, took as his subject for presidential address "What We Have Been Doing," and showed in a very exhaustive and pleasing article what the members of the Academy had been engaged in scientifically during the year past. His paper will be an interesting bibliography of the scientific papers published by Iowa men.