THE THIRTEENTH ANNUAL MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA.

BY EDMUND O. HOVEY.

The thirteenth annual meeting of the Geological Society of America was held in the assembly hall of the Albany (Boys) Academy on December 27, 28 and 29, 1900, under the presidency of Dr. G. M. Dawson, C.M.G., F.R.S., director of the Geological Survey of Canada. About fifty fellows of the society were in attendance, which was considered a large number, in view of the distance of the place of meeting from the large centers of population on the Atlantic seaboard. Thirty-eight papers were presented for reading, eleven of which were read by title only, on account of the absence of their authors. The comparatively small number of papers actually read gave ample opportunity for discussion, and this was a very valuable feature of the meeting. The address of welcome by the Hon. T. Guilford Smith, chairman of the State Museum Committee and member of the Board of Regents of the State University, was historical in character and dwelt especially upon the little known Geological Society of Pennsylvania, which had a very brief existence in 1835 and 1836, and was the first geological society formed in this country. In the address of welcome by Dr. F. J. H. Merrill attention was called to the fact that the sessions of the society were being held in the meeting room of the old Albany Institute, which was an active patron of science for many years and which originated the movement which resulted in the establishment of the geological and palæontological survey of the State of New York many years ago. Dr. J. M. Clarke, the other member of the local committee, in his welcoming speech spoke of the fact that the room in which the present meeting was held was the one in which Prof. Joseph Henry made his famous and historic demonstration of the electric telegraph. Forty-four years had passed since the last preceding general meeting of geologists had taken place in Albany.

Dr. Dawson's presidential address was entitled "On the Geological Record of the Rocky Mountain Region in Canada" and gave a succinct resumé of the results of thirty years study of that vast area by the Geological Survey of Canada, which began under Dr. A. R. C. Selwyn and James Richardson and has been continued by Dr. G. M. Dawson and Messrs. Amos Bowman, J. McEvoy, R. G. McConnell, J. B. Tyrrell, R. W. Brock and J. C. Gwillim and their assistants. The Cordilleran region in Canada is much narrower than that of the United States, being only about 400 miles in width, and the mountain ranges preserve a quite close parallelism with the coast of the Pacific Ocean, and the geological features accord with the physical. The result of this is that the geological horizons have great longitudinal extent, while their transverse section is comparatively narrow. The region falls into five natural sub-divisions: the Laramide geosyncline, comprising the Rocky Mountains proper, forming a belt sixty miles wide along the eastern border of the Cordillera; west of this a belt 140 miles wide, made up of a somewhat irregular and sometimes interrupted series of mountain systems to which the general name of the gold ranges has been applied, and embracing the Purcell, Selkirk, Columbia and Cariboo Mountains; still further west the interior plateau of British Columbia, which has a breadth of 100 miles and is well-defined for a length of about 500 miles, with an average elevation of about 3,500 feet; still further west the coast ranges of British Columbia, which form a belt 100 miles in width and extend along the border of the Pacific for more than 900 miles, beginning near the estuary of the Fraser River; finally, the long, ridge-like highlands of Vancouver Island and the Queen Charlotte Islands, which stand upon the real border of the continental plateau. Dr. Dawson then took up in order each of the great geological systems represented in the region and discussed its features and phenomena in detail, bringing his address to a close with the following words:

The most striking points evidenced by the geological record of the Rocky Mountain region of Canada may be summarized as follows:

There was an enormous thickness of strata accumulated, both to the east and to the west of the Archæan axis. In the Laramide geosyncline (that of the Rocky Mountains proper) the beds no doubt attained the full thickness of more than 46,000 feet. In the western and wider geosyncline it is not so certain that all the formations were ever actually superposed at any place or time, but their volume cannot have been less than those in the Laramide geosyncline, and their total measured thickness is much greater.

There is a great proportion of volcanic materials in the western geosyncline and the region is characterized by the recurrence of vulcanism throughout the geological time-scale, resulting in the production of massive volcanic formations in the Cambrian, Carboniferous, Triassic, Cretaceous and Miocene.

The recurrence of folding and disturbance parallel to the border of the Pacific Ocean basin and the concurrent great changes in elevation of the land relatively to the sea both continued down to quite recent geological times, the latter even into the Pleistocene.

There are tremendous energy of denudation, in part due to the events just referred to, but also dependent upon the position of the region on the eastern border of a great ocean, where in northern latitudes an excessive rainfall must have occurred at all periods on the westernmost mountain ranges. No comparable denuding has been probably exercised on the eastern side of the continent in similar latitudes since the definition of the Pacific and Atlantic Ocean basins.

During the year the society has lost one member by death, Franklin Platt, of Philadelphia, who was one of the six assistants chosen by J. P. Lesley to undertake the second geological survey of Pennsylvania. He chose bituminous coal as his field of work, but afterward left the pursuit of pure science and went into commercial life as the head of a coal company.

Eleven new members have been added to the society's lists and the present enrollment is 248. The new officers for the ensuing year are: president, Charles D. Walcott; and vice-presidents, N. H. Winchell and S. F. Emmons. The next meeting of the society will be held in connection with Section E of the American Association for the Advancement of Science in Denver next August. The annual dinner of the society was the usual informal, enjoyable affair, under the leadership of Prof. B. K. Emerson. An account of the Albany meeting would not be complete without an appreciative mention of the elaborate reception tendered to the society by Dr. F. J. H. Merrill, State Geologist of New York, which gave the members opportunity to meet many of the best known of Albany citizens. Abstracts of the papers read at the business sessions of the society will shortly appear in the SCIENTIFIC AMERICAN SUPPLEMENT.

PROPOSED IMPROVEMENTS AT THE SAULT STE. MARIE CANAL.

The first ship canal around the rapids of the Sault Ste. Marie was built by the State of Michigan, and completed in 1855 at a cost of nearly $100,000. It was but 350 feet in length and contained two locks, but in its time it served greatly to stimulate trade on the Upper Lakes. The rapid development of the Lake Superior country and the consequent increase of commerce soon taxed the capacity of the canal. In 1881 the old canal was superseded by one of modern proportions. The single lock was 515 feet in length, with a width of 60 feet at the gates and 80 feet in the chamber and a depth of 14 feet over the sills. The total cost was $2,150,000.

The opening of this second canal relieved the congestion only temporarily; for great as was the tonnage passing this point during the period of the old canal's existence, from 1855 to 1881, the growth of traffic during the next period was even more rapid. In 1870, after the old canal had been open 15 years, the total annual tonnage was 691,000 tons. In 1894, when a third canal was built, the tonnage had risen to 13,110,363 tons per annum. In the meanwhile the Canadian canal at this point had been opened to traffic. The third American canal, which is now to be enlarged, is composed of two locks; the larger, the Poe Lock, having a length of 800 feet and a width of 100 and a depth over sills of 20 feet 6 inches; and the Weitzel Lock, with a length of 600 feet. The improvements to be recommended at the next session of the Rivers and Harbors Committee of Congress provide for the enlargement of the Weitzel Lock to a length of 1,600 feet, a width of 100 feet, and a depth over the sills sufficient to accommodate the largest lake vessel either afloat or building at the time the work is begun. These plans, which will undoubtedly be carried out during the next few years, will make this canal connecting these two great lakes by far the most important in the world. Through this channel of traffic there passes in eight months of the year a tonnage greatly in excess of that which passes through the Suez Canal or enters the port of London, or of New York, during a year.

Two-score years ago there were less than 1,000 lockages annually through the canal. During the past season there were often that many per week. The lockages for the season aggregated nearly 20,000. Of the vessels carrying traffic through this canal, some 4,000 in number, all save about one-twenty-fifth were American vessels. The total value of the cargoes carried through this canal annually is nearly a quarter of a billion dollars. In favorable seasons freight is carried at a rate of less than one mill per ton for each mile transported—about one-third of the lowest railroad rate. The tonnage of the Sault Ste. Marie canals for the past year exceeds 25,000,000 tons.

The importance of the Sault Ste. Marie canals in interlake commerce is little appreciated. The canals have assisted in the great development of the lake carrying trade in cereals and copper and iron ore. In four years the traffic in iron ore has increased from less than 150,000 tons to more than 11,000,000 tons annually, and in the same time there has been built up a trade in coal on Lake Superior of more than 3,000,000 tons annually. Even the last lock constructed by our government at Sault Ste. Marie was not designed with a view to the present great demands. Hence the numerous blockades of vessels, which have proved exceedingly costly to ship-owners and merchants. The enlargement of the canal now proposed will obviate these annoyances and provide adequate facilities. But these improvements will be only a part of the great plan for the development of lake commerce. Already our government has spent about $7,500,000 in canal construction at this point, and an additional $3,000,000 has been expended in the maintenance of the canal. The improvements now planned will bring the grand total of expenditures of the United States government to nearly $20,000,000.

MOVING PICTURE LITIGATION.

The question of priority in moving picture patents has just come up for argument in the United States Circuit Court for the Southern District of New York, the suit being brought by Mr. Edison against the American Mutoscope Company. The patent, for which the suit was brought, was No. 589,168, granted August 31, 1897, to Mr. Edison, and its claims alleged to be infringed are numbers one, two, three and five. The first three claims deal with the picture taking machine, including the single lens camera, the single tape-like film and the rapid-feed movement for feeding the film and turning on and off the light. The fifth claim embodies the continuous translucent film with the pictures upon it. The brief and arguments state that by employing a single lens camera the pictures were all taken from the same point of view and by making the movable part of the apparatus a tape-like film, the necessary high speed for securing the required large number of pictures per second could be produced without duplication of the film, and this film could be given the considerable length necessary for the continuous taking of pictures over an extended period of time without increasing the weight of the moving parts unduly. The resulting picture strip possessed all the essential characteristics for successful use in an exhibiting apparatus, and permitted of the direct printing of positives upon a similar film. The strip thus produced had pictures taken from the same point of view and arranged in a continuous straight line sequence throughout the length of the film and equi-distant from each other, thus permitting of its use in simple and practical forms of exhibiting apparatus. The complainants stated that a single tape-like film that could be moved with sufficient rapidity to secure the rapid succession of photographs with a single lens was an epoch-making invention. The idea was conceived by Mr. Edison in 1889, but the development of the idea and the formation of the company required so much time that it was not until 1894 that he placed upon the market machines employing the picture film made on his camera. The films and machines were on the market for two years when the great success of the enterprise caused others to enter the field.

The defense contended that the apparatus was based on the "persistence of vision," which had been known for a century, and that the claims in the patents referred to had been anticipated by prior patents and in printed matter. The prior state of the art was reviewed at great length. It was contended that many moving picture cameras for using long tape-like films had been invented before Edison's alleged invention, and that the rapid progress in the art of recent years was the result of the invention of the Eastman celluloid film and was not particularly due to the apparatus devised by Edison. A decision will probably be rendered in a few weeks.

DEATH OF LORD ARMSTRONG.

Sir William George Armstrong, first Lord Armstrong, who died on December 27, 1900, was one of a little group of inventors and manufacturers who have made modern armament what it is. He was born in 1810, and he early took deep interest in science and mechanics. He invented the hydro-electric machine, a most powerful means of developing frictional electricity. For this he was elected a Fellow of the Royal Society. His next inventions were an electric crane, and the accumulator by which an artificial head of water is substituted for the natural head, gained only by altitude. He greatly extended the application of hydraulic power to a variety of purposes, and finally with some friends founded the Elswick Engine Works. In 1854 he first became known as an inventor of war material. In that year he put out the gun which bears his name, and presented the patents to the government, and he was knighted in recognition of his unselfish patriotism. His system was extended to guns of all sizes, the primary principle being the coiling of one wrought iron tube over another until a sufficient thickness has been reached. The Elswick company is one of the largest manufacturing concerns of its kind in the world, and is taking a leading part in the development of artillery and other implements of war. Sir William was given a peerage in 1887.